Draft Policy No. X: Principles to Govern Development of an "Offsets" Policy for Permitting Discharges to Groundwater

What is an "Offset"?

An alternative means of achieving partial or complete compliance with Waste Discharge Requirements (WDRs), for a given pollutant or pollutants, by managing other sources and loads (not directly associated with the regulated discharge) so that the combined net effect on receiving water quality from the discharge and the offset is functionally-equivalent to (and often better) than that which would have occurred by requiring the discharger to comply with their WDRs at the point-of-discharge. Offsets are voluntary. They must be proposed by the discharger[1] as an Alternative Compliance Program (ACP), must be approved by the Central Valley Water Board, and are enforceable through the WDR or other orders issued by the Board. Page 5 and following of this Policy document provides examples of potential applications of an Offsets Policy.

What is the purpose for establishing an Offsets policy?

1) Offsets provide a mechanism, other than approving an exception, for permitting non-compliant discharges in an area that lacks available assimilative capacity while continuing to make progress toward attainment of water quality standards in the basin or Management Zone.

2) Offsets provide a regulatory alternative, other than prohibiting the discharge, when it is infeasible, impracticable or unreasonable to comply with WDRs directly.

3) Offsets provide another potential method for permitting discharges with pollutant concentrations greater than the objective or higher than the current receiving water quality and can provide better overall improvement or result in less degradation in that receiving water basin, sub-basin or Management Zone.

4) Offsets provide a mechanism to re-target the resources required to achieve compliance in order to produce greater public benefits (better net water quality, lower cost, less risk, etc.).

5) Offsets provide a mechanism whereby diverse dischargers within the same Management Zone can pool available resources to implement ACPs, in phases, on a risk-priority basis. The option to pool resources creates a strong incentive to establish such Management Zones.

6) Offsets provide a mechanism to develop and fund large-scale, long-term regional water quality improvement projects such as described by the Strategic Salt Accumulation Land and Transportation Study (SSALTS)[2] or the Nitrate Implementation Measures Study (NIMS)[3] by recognizing participation in such efforts as partial credit toward compliance.

Commented [JBD1]: Ie if the Board doesn't want to allocate for this dischargers use….or if the discharge can't be effectively assimilated and causes a hot spot …ie due to lack of mixing (assimilating) of the discharge into enough of the generally available resource.. ie it takes 100 years, or, if it has to push along legacy loadings to get there (as would be the case for many (of not all) groundwater discharges (if using the volume weighted assimilative capacity as currently proposed in the SNMP)

[1] Throughout this document the term "discharger" can connote either an individual discharger or a coalition of dischargers regulated under a common set of categorical WDRs.

[2] *Strategic Salt Accumulation Land and Transportation Study (SSALTS), Final Phase 2 Report: Development of Potential Salt Management Strategies*. Report prepared by CDM Smith on behalf of CV-SALTS. October 1, 2014; *SSALTS, Final Phase 1 Report: Identification and Characterization of Existing Salt Accumulation Areas*. Report prepared by CDM Smith on behalf of CV-SALTS. December 13, 2013.

[3] *Nitrate Implementation Measures Study (NIMS) Final Report*. Report prepared by CDM Smith on behalf of CV-SALTS, March 31, 2016

7) Offsets create a market-based incentive to establish Mitigation Banks designed to develop and implement water quality improvement projects. This is particularly useful for pooling the resources of many relatively small dischargers into a critical mass of funding to support projects that would normally be beyond their individual means.

8) Offsets encourage creative solutions to complex problems by measuring success at the most critical endpoint: Net effect of water quality on end-users. This outcome-oriented approach is consistent with the primary purpose for imposing water quality standards-based permit requirements in the first place.

9) The current Central Valley Basin Plans do not authorize the Central Valley Water Board to consider offsets when evaluating compliance. If such authority is added to the Basin Plans the Board must take separate action, through the normal public notice and hearing process, to consider and approve any proposed offset.

Where do Offsets fit within the array of existing regulatory options?

1) When offsets are employed, compliance is assessed by considering the aggregate net effect of the discharge and the offset project(s) on receiving water quality. Consequently, if a discharge requires an offset in order to achieve compliance with one or more receiving water limitations, then implementation of the offset must be enforceable through the WDRs.

2) Where an allocation of assimilative capacity is sought, implementing an offset project may be the best practicable treatment or control that is most consistent with maximum benefit to the people of the state. This is particularly true where the net effect on receiving water quality and/or end users is better than would otherwise occur by requiring strict compliance with water quality standards at the point of discharge. In such cases, implementing the proposed offset project would become a condition for allocating assimilative capacity to the discharge.

3) Where there is no assimilative capacity available, or the Central Valley Water Board is unwilling to allocate the available assimilative capacity,[4] offsets can be used to minimize the net negative affect on receiving water quality as a condition for authorizing an exception to a non-compliant discharge. In such cases, the offset program may be used to help demonstrate that the discharger is making "reasonable progress" at mitigating excess pollutant loads where feasible and practicable. Implementation of the offset project would become a condition for granting the exception and be enforceable through the WDRs.

4) Offsets have been most commonly and successfully applied where a formal load allocation has been established for a given pollutant in a given receiving water. The presence of an accepted procedure for calculating and assigning pollutant loads also facilitates the process needed to validate and account for credits generated by the offset program.

5) Although offset projects may be proposed for any type of discharge, they are a particularly useful tool to implement more cost-effective water quality control strategies where the Central Valley Water Board has elected to "prescribe general waste discharge requirements for a category of

Commented [JBD2]: For a bank to work this "currency" must be clearly and unambiguously defined in a way that is directly tied to managing water quality to certain water quality limits (concentrations)…ie protection of beneficial uses…..for instance, salt mass alone is not sufficient.

Commented [JBD3]: Speaks directly to my prior comment

Commented [JBD4]: As per my first comment

Commented [JBD5]: A salt mass loading can only work if the water amounts are fixed relative to the salt mass load. Otherwise a more general method such as "excess salt" must be utilized **(See January 21, 2010 presentation to CV-SALTS)**

[4] California Water Code §13263(b)

discharges"[5]. Historically, the large number of non-point source discharges spread over a wide area makes it very time-consuming and expensive to assemble all of the documentation required by the state's Nonpoint Source Policy.[6] Offsets may offer the opportunity to focus and simplify the process so that some of the monitoring and reporting resources can be redirected to accelerate or expand water quality improvement projects.

Under what conditions should an Offset be considered?

1) When it is not feasible, practicable or reasonable for the discharge to comply directly with applicable WDRs. WDRs normally require "direct" demonstration of compliance either at the point-of-discharge or at the confluence with the receiving water. Evaluating compliance at the confluence with receiving water allows the Central Valley Water Board to consider pollutant reductions that may occur as a result of system mixing or by the process of percolating through the ground to the aquifer.[7]

2) When it is not feasible, practicable or reasonable to prohibit a discharge that is unable to comply with applicable WDRs. This situation may also necessitate that the Central Valley Water Board approve a conditional exception where the offset is one of the conditions.

3) When there is no assimilative capacity available in the receiving water or as a condition for allocating any available assimilative capacity in order to authorize a discharge. This situation may also require the Central Valley Water Board to approve a conditional exception.

4) When the net effect of authorizing the discharge, including the proposed offset project, would result in better water quality in the groundwater basin or sub-basin than is likely to occur if the discharge was required to comply with the applicable WDRs at the point-of-discharge.

5) When the net effect of authorizing the discharge, including the proposed offset project, would result in better water quality in the receiving water than would be expected to occur if the non-compliant discharge was prohibited altogether.

6) When the proposed offset project will provide substantially greater and more immediate public health protection (e.g., real risk reduction) than is expected to result if the discharger was required to comply with the applicable WDRs at the point-of-discharge or the non-compliant discharge was prohibited completely.

7) When the proposed offset project is an integral part of and facilitates a larger strategic plan designed to ultimately achieve attainment of water quality standards through a phased program of implementation that has been reviewed and approved by the Central Valley Water Board.

8) Other "factors" the Central Valley Water Board will consider when deciding whether to approve a proposed offset program/project include, but are not limited to: Relative location of the discharge and offset project and potential impacts on downgradient waters, reliability of the recharge, whether recharge-based offsets constitute genuine "new" groundwater recharge, impacts on the

[5] California Water Code §13263(i); examples: WDRs issued to the dairy industry or various agricultural coalitions.
[6] Policy for Implementation and Enforcement of the Nonpoint Source Pollution Control Program. State Water Board Resolution No. 2004-0030, May 20, 2004.
[7] State Water Board Water Quality Order 81-5; In the Matter of the Petition of the City of Lompoc for Review of Order No. 80-03 (NPDES Permit No. CA 0048127), California Regional Water Quality Control Board, Central Coast Region (see pg. 6).

vadose zone over time, mixing assumptions, brine disposal, and whether the offset is proposed as a temporary or permanent alternate compliance strategy.

What implementation requirements should apply to Offsets?

1) Offsets should be consistent with the local plan to manage ~~salt~~ salinity and nitrate concentration. And, in general, it is desirable to encourage offsets in the same groundwater basin or sub-basin where the discharge occurs. However, the Offsets Policy is also intended to incentivize implementation of some large-scale projects such as a regional regulated brine line or a Mitigation Bank established to provide safe drinking water.

2) When there is no assimilative capacity available in the receiving water, the offset must result in a net improvement in water quality (e.g., the offset ratio must be > 1:1) compared to baseline regulatory requirements. Offset ratios < 1:1 may be authorized only in accordance with the state's antidegradation policy unless an exception is granted or Time Schedule Order (TSO) allows a less stringent interim ratio to apply.

3) Offsets must be for substantially the same pollutant. Cross-pollutant trading (e.g., total dissolved solids (TDS) for nitrate, nitrate for arsenic, etc.) should not be construed as true "offsets." However, such "trading" may be permissible when there is assimilative capacity available for the pollutant being discharged and the discharger proposes to significantly reduce a different pollutant in the receiving water in a manner that provides "maximum benefit to the people of the state."

4) The proposed package (discharge + offset project) cannot result in unmitigated localized impairments (e.g., "hotspots") to sensitive areas (especially drinking water supply wells). This situation can best be addressed by implementing offsets within Management Zones that provide other mechanisms to assure water users remain protected. Downgradient well owners must be notified and encouraged to participate in the offset approval process. Additional mitigation may be required.

5) Offsets must be approved by the Central Valley Water Board. The Board may elect to pre-approve specific offset projects (a 1-step process) or authorize the general use of offsets within a given order and then approve individual offset projects in subsequent Board actions (e.g., a 2-step procedure). All terms and conditions governing implementation of the proposed Offsets Policy must be enforceable through a WDR, Waiver or other enforcement order. Failure to comply with the terms and conditions of an offset approved by the Central Valley Water Board could constitute a violation of the underlying permit or enforcement order.

6) Offsets apply to a specific discharge for a defined period. Offsets can be renewed but must be periodically reviewed and reauthorized by the Central Valley Water Board. The length of that period will be specified by the Central Valley Water Board when the offset is approved.

7) The terms and conditions governing an approved Offset should specify the remedial actions that must be undertaken by the discharger, and the metric(s) used to trigger such obligations, in the event that the offset project fails for some reason.

8) The offset project must include a monitoring and reporting program sufficient to verify that the pollution reduction credits are actually being generated as projected and that these credits are adequate to meet offset the discharge loads in the ratio approved by the Central Valley Water

Board. Pollutant removal, reduction, neutralization, transformation and dilution may all be acceptable means of generating offset credits (subject to appropriate verification).

Commented [JBD6]: Yes!!!….should be listed as a beneficial use in the basin resource and not just as applied to the root zones.

Hypothetical Examples to Illustrate the Offset Concept[8]

Offset Example #1: *Equivalent Discharge Concentration*

Company X is seeking to discharge 10,000 gallons/day with an average TDS concentration of 1,200 mg/L to a groundwater basin with a TDS objective of 900 mg/L and a current average quality of 2,000 mg/L. Because there is no assimilative capacity available, the Central Valley Water Board intends to issue a WDR that restricts TDS concentrations in the discharge to no more than 900 mg/L. To meet this requirement, Company X would need to reduce the TDS in its discharge by 11.4 kg/day without changing the volume of its discharge.

Company X proposes to construct and operate stormwater recharge basins in the area overlying the same groundwater basin. The new basins are expected to increase the total amount of precipitation that percolates to groundwater by 6 acre-foot/year (approximately 2 million gallons). The captured runoff has an estimated average TDS of 100 mg/L. The combined effect of the wastewater discharge and stormwater capture is 5.6 million gallons/year of recharge with a total volume-weighted average TDS concentration of 807 mg/L. The estimated offset ratio = 1.32:1 (Note: Long-term averaging required to implement this approach, and dissolution of additional salts must be considered).

Offset Example #2: *Equivalent Mass Reduction*

Company X is seeking to discharge 10,000 gallons/day with an average TDS concentration of 1,200 mg/L to a groundwater basin with a TDS objective of 900 mg/L and a current average quality of 2,000 mg/L. Because there is no assimilative capacity available, the Central Valley Water Board intends to issue a WDR that restricts TDS concentrations in the discharge to no more than 900 mg/L. To meet this requirement, Company X would need to reduce the TDS in its discharge by 11.4 kg/day without changing the volume of its discharge.

Company X proposes to construct and operate a desalter in the worst area of the same groundwater basin where the average TDS concentration is 4,000 mg/L. They will pump and treat 1,000 gallons/day for the benefit of a nearby community. The reverse osmosis treatment system will reduce the average TDS concentration in the product water to 200 mg/L (effectively removing 3,800 mg/L or about 14.4 kg/day). The estimated offset ratio = 1.25:1.

Commented [JBD7]: Again this only works if the water amounts are fixed…if the product water results in additional consumptive uses, or additional dissolution of solids, then additional salt mass needs to be removed. Also this approach essentially writes off the local groundwater as a generally available resource…ie if someone wants to use it then they have to treat it (ala Australia) ….That may be OK is all agree it's the best for the people of CA.

Offset Example #3: *Alternate Load Reduction - Eliminate Septic System*

A municipal discharger operates a wastewater treatment facility using a series of unlined ponds that overlie a groundwater basin with no assimilative capacity for nitrate-nitrogen. The average nitrate concentration in the discharge is 14 mg/L. As the city grows, the discharger plans to replace the present treatment with an activated sludge system that will reduce the average nitrate concentration to < 10 mg/L. However, this upgrade is not scheduled to begin until 2024. In lieu of accelerating the

[8] These examples are not being proposed as archetypes. They are offered solely to stimulate discussion regarding potential application of the Offsets Policy and identify the key issues and concerns related to using offsets.

construction plans to meet the current WDRs, the discharger proposes to expand the existing collection system to provide sewer services in an adjacent, upgradient community and to install additional aeration at the ponds to reduce the average Total Inorganic Nitrogen (TIN) concentration from 14 mg/L down to 13 mg/L. Mass balance calculations show that intercepting and treating sewage currently going to septic systems in that community and upgrading aerators will reduce the combined TIN load by 2% more than building the activated sludge system early. Expanding the collection system is estimated to cost less than one-third what it will cost to build the new wastewater treatment plant and will expand the utility's rate base by 10%. It will also result in the current pond system reaching capacity one year sooner than would occur under normal growth conditions. Therefore, the discharger also intends to begin the plant upgrade one year earlier than previously planned (i.e., 2023 instead of 2024). This project might also be implemented thru a traditional compliance schedule or TSO.

Offset Example #4: Planning & Design Work for Large Regional Projects

A coalition of agricultural dischargers, operating under a common set of categorical WDRs, are discharging salts to the underlying groundwater basin where the average TDS concentration is 1,100 mg/L and no assimilative capacity exists. The agricultural operators are using the best available water supply (TDS = 175 mg/L) to irrigate their fields; but, with a 15% leaching fraction, the recharge quality averages approximately 1,050 mg/L. This is slightly better than the receiving water quality but slightly worse than the "Upper" end of the acceptable TDS range specified for the Secondary Maximum Contaminant Levels.[9] However, TDS concentrations in the drinking water wells throughout the area are generally less than 700 mg/L. In lieu of increasing the leaching fraction, the dischargers are proposing to fund the first phase of the proposed long-term salt mitigation strategy identified in SSALTs, i.e., construction of a regulated brine line. This effort would focus primarily on preliminary engineering analysis (e.g., siting priorities), initial CEQA review, and regulatory permitting. The dischargers also propose to support the outreach efforts needed to secure the federal and state grant funding needed to pay for the capital construction anticipated in some subsequent phase of the program. This "offset" might also be approved as a condition for authorizing an exception to WDRs.

Commented [JBD8]: This also triggers concerns about writing off the local resource to general use (as above comment).....and makes the general resource and water management less resilient for drought (see comments on drought policy and conservation)

Offset Example #5: Alternate Water Supply

An industrial discharger disposes of its wastewater by a land application system that irrigates silage crops grown in a 500 acre parcel. This parcel overlies a groundwater basin where the average nitrate concentration is 30 mg/L (no assimilative capacity). There is an economically-disadvantaged community immediately adjacent to and upgradient from the discharger's property. The community draws its drinking water from the same basin and the groundwater is contaminated by both nitrate and naturally-occurring arsenic. In lieu of reducing nitrate in the discharge, the discharger proposes to construct and operate a well-head treatment system that will reduce nitrate and arsenic levels in the upgradient community's drinking water so that it easily complies with state and federal drinking water standards.

Commented [JBD9]: OK but with my prior comments concerns about writing off the groundwater resource for general (untreated) use.

Offset Example #6: Nitrate Mitigation Bank

A Non-Governmental Organization (NGO) seeks and receives significant grant funding from the HP Foundation to develop an independent, non-profit corporation with a charter to construct and operate small drinking water supply systems for economically-disadvantaged communities. However, the initial grant funding is sufficient to address only a small fraction of the total problem. The HP Foundation

[9] California Water Code 22 §64449, Table 64449-B.

encourages the non-profit corporation to leverage the available resources by establishing a Nitrate Mitigation Bank. The NGO does so and the Central Valley Water Board formally recognizes the mitigation bank as an acceptable offset program (subject to continuing verification of nitrate credits by state authorities and independent auditors).

Commented [JBD10]: Must account for water variability if just nitrate mass serves as credits

a. A coalition of dairy operators, governed by a common set of categorical WDRs, is discharging nitrate to groundwater at a number of widely separated locations. Some of these dairies are proximate to economically-disadvantaged communities with wells impaired by excess nitrate and some are not. Rather than attempting to discern the relative priority and develop appropriate offset projects for each dairy facility, the dischargers propose to make regular payments to the Nitrate Mitigation Bank.

b. A separate crop coalition, governed by its own common set of categorical WDRs, is also dispersed over a wide area with varying proximity to economically-disadvantaged communities with nitrate-impaired wells. The coalition proposes to establish and collect an annual fertilizer use fee from its own members and to remit the proceeds to the Nitrate Mitigation Bank as an Alternate Compliance Program. The dischargers request that the Central Valley Water Board deem remission of said fees as an acceptable offset under their WDR.

In both cases, the mitigation bank would be responsible for assessing needs and coordinating with the community water systems to select a cost-effective solution. Contributions from the dischargers would be used to meet "matching requirements," operation and maintenance costs, or other expenses not normally covered by state and federal grants.

Offset Example #7: Alternate Load Reduction - Fallow Cropland

A small municipality relies on a pond system to treat its wastewater. Recharge water from the ponds presently has an average nitrate concentration of 15 mg/L. Small, low cost operational improvements are expected to reduce their nitrate concentration to about 13 mg/L. Meeting a WDR of 10 mg/L would require the city to construct and operate a modern activated sludge process that would cost several tens of millions of dollars. To offset the remaining nitrate the city proposes to purchase, annex, and retire 1,000 acres of active farmland on its border. The land will be re-zoned for multi-use purposes and will have ordinances and/or covenants severely restricting the use of nitrogen-based fertilizers in this area. Mass balance analysis confirms that the load reduction which results by fallowing the farmland is functionally-equivalent to that which would be achieved by building a new wastewater treatment plant. However, the offset approach would cost 30% less and, eventually, the acquisition expense would be recovered when the land was re-sold for development. The ordinances and covenants would remain in place in perpetuity. Some sort of formal excess load allocation process may be needed to implement this type of offset project.

Commented [JBD11]: As per my other comments regarding mass limits and water amounts, when the effect on beneficial uses is all concentration based