CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION
ORDER R5-2025-0018

AMENDING
ORDER R5-2020-0051-002
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT
CA0083861

AEROJET ROCKETDYNE, INC.
GROUNDWATER EXTRACTION AND TREATMENT SYSTEMS,
ARGET, GET E/F, GET HA, GET J, GET KA, GET LA, GET LB, GET AB
WHITE ROCK GET, SAILOR BAR PARK GET, GOLDEN STATE WATER WELLS
AND LOW THREAT DISCHARGES
SACRAMENTO COUNTY

FINDINGS

The California Regional Water Quality Control Board, Central Valley Region (Central Valley Water Board), finds that:

1. On 16 October 2020, the Central Valley Water Board adopted Waste Discharge Requirements Order R5-2020-0051 (NPDES CA0083861) for Aerojet Rocketdyne, Inc., Groundwater Extraction and Treatment Systems, ARGET, GET E/F, GET HA, GET J, GET KA, GET LA, GET LB, GET AB, White Rock GET, Sailor Bar Park GET, Golden State Water Wells and Low-Threat Discharges, Sacramento County. Order R5-2020-0051 was amended by Order R5-2021-0002 and replaced by Order R5-2020-0051-001 on 18 February 2021. Order R5-2020-0051 was further amended by Order R5-2024-0019 and replaced by Order R5-2020-0051-002 on 19 April 2024. For the purposes of this Order, Aerojet Rocketdyne, Inc. is referred to as "Discharger" and the various treatment systems are referred to as "Facilities". This Order amends Order R5-2020-0051-002 as summarized in Finding 2.

2. In a memorandum dated 14 September 2023, the Discharger requested increasing the Order R5-2020-0051-002 Groundwater Extraction and Treatment system EF (GET EF) Average Monthly Effluent Limitation (AMEL) and Maximum Daily Effluent Limitation (MDEL) for acetaldehyde from 5 micrograms per liter (µg/L) to 50 µg/L. The Discharger proposed this acetaldehyde limit based on a historical 50 µg/L Maximum Contaminant Level (MCL) set by the New York State Department of Health, as this was the only reference to an acetaldehyde MCL that the Discharger was able to identify as a comparable regulatory standard since there is no California or U.S. EPA numeric water quality objective for this constituent. Acetaldehyde is not a California Toxic Rule listed constituent and not a constituent of concern at the Aerojet Superfund Site. GET EF utilizes a fluidized bed bioreactor in which the Discharger adds ethanol, phosphoric acid, and urea to sustain a microbial population which destroys perchlorate in the influent water. Aerojet has detected acetaldehyde at concentrations greater than 5 µg/L in approximately 7 GET EF effluent samples based on 51 effluent samples from February 2020 to January 2024 resulting in violations and mandatory minimum penalties (MMPs). While the Discharger has not identified the root cause of the GET EF acetaldehyde generation, studies (see references 1 and 2 below) indicate that certain microorganisms can produce acetaldehyde in metabolizing ethanol.

   Order R5-2020-0051-002 included a numeric threshold, in absence of a numeric water quality objective, for acetaldehyde of 2.2 µg/L based on a U.S. EPA estimated

incremental $1x10^{-6}$ cancer risk level for drinking water and effluent limitations for acetaldehyde were established based on this value. The value of 2.2 µg/L was a numeric interpretation of the Central Valley Water Board's *Water Quality Control Plan for the Sacramento and San Joaquin River Basins*' (Basin Plan) narrative chemical constituent objective, which states that "[w]aters shall not contain chemical constituents in concentrations that adversely affect beneficial uses." (Basin Plan, § 3.1.3.) The existing permit's numeric interpretation of the chemical constituents objective is erroneous, as the acetaldehyde cancer risk value is an inhalation unit risk value of $2.2 x10^{-6}$ per µg/m^3 and not a drinking water concentration risk value. However, there are inhalation screening level concentrations of 2.6 µg/L based on a carcinogenic target risk and 19 µg/L based on a non-cancer child hazard index for tap water exposure for acetaldehyde in U.S. EPA's *Chemical Assessment Summary for Acetaldehyde* (1988, 1991), published in U.S. EPA's Regional Screening Levels (RSL) for Resident Tap Water (2024). The tap water RSL concentrations were calculated using the inhalation reference of $2.2x10^{-6}$ per µg/m^3. Additionally, a water odor threshold of 34 µg/L was established in 1983 in the article *Odor as an Aid to Chemical Safety: Odor Thresholds Compared with Threshold Limit Values and Volatilities for 214 Industrial Chemicals in Air and Water Dilution, Journal of Applied Toxicology* by John E. Amoore and Earl Hautala for acetaldehyde.

These values were considered screening levels in the assessment of the effluent's potential to adversely affect beneficial uses; however, none were determined to be an appropriate numeric interpretation of the Basin Plan's narrative water quality objectives applicable to acetaldehyde. A critical downstream analysis was conducted using upstream monitoring data from four samples collected from March 2024 through July 2024, and the critical downstream concentration of acetaldehyde did not exceed the lowest screening level of 2.6 µg/L. However, since acetaldehyde is found in the effluent of GET EF, best professional judgment was used to establish a performance-based effluent limitation to maintain a level of treatment that ensures the discharge does not adversely affect the beneficial uses of the receiving water. Accordingly, modifications to Order R5-2020-0015-002 are made to reevaluate the effluent limitations for acetaldehyde.

References:

1. Tagaino, R., Washio, J., Abiko, Y. *et al.* Metabolic property of acetaldehyde production from ethanol and glucose by oral *Streptococcus* and *Neisseria*. *Sci Rep,* 9, 10446 (2019). https://www.nature.com/articles/s41598-019-46790-9
2. Kurkivuori, J. *et al.* Acetaldehyde production from ethanol by oral streptococci. *Oral Oncology,* 43(2), 181-186 (2007). https://www.sciencedirect.com/science/article/abs/pii/S1368837506000510

3. Issuance of this Order is exempt from the provisions of the California Environmental Quality Act (Pub. Res. Code, § 21000 et seq.) (CEQA) pursuant to Water Code section 13389, since the adoption or modification of a NPDES permit for an existing source is statutorily exempt and this Order only serves to implement a NPDES permit. (*Pacific Water Conditioning Ass'n, Inc. v. Discharger Council of Discharger of*

Riverside (1977) 73 Cal.App.3d 546, 555-556.). Issuance of this Order is also exempt from the provisions of CEQA in accordance with California Code of Regulations, title 14, section 15321, subdivision (a)(2).

4. The Central Valley Water Board has notified the Discharger and interested agencies and persons of its intent to amend Waste Discharge Requirements for this discharge and has provided them with an opportunity to submit their written views and recommendations.

BOARD ACTION
IT IS HEREBY ORDERED THAT:

Effective 25 April 2025, Waste Discharge Requirements Order R5-2020-0051-002 (NPDES CA0083861) is amended as shown in items 1 through 15 below.

1. Change the Order number from R5-2020-0051-002 to R5-2020-0051-003 throughout the Order.

2. **Cover Page.** Modify the last paragraph to the text shown below:

   I, Patrick Pulupa, Executive Officer, do hereby certify that this Order with all attachments is a full, true, and correct copy of the Order adopted by the California Regional Water Quality Control Board, Central Valley Region, on 16 October 2020, and amended by Order R5-2021-0002 on 18 February 2021, by Order R5-2024-0019 on 19 April 2024, and by Order R5-2025-0018 on 25 April 2025.

3. **Waste Discharge Requirements, Section II. FINDINGS.** Remove the “Modifications in this Permit Revision” sub-heading and add the following text to the end of Section II.A.

   Modifications in this Permit Revision

   On 14 September 2023, the Discharger requested modifications to this permit to increase the GET EF average monthly effluent limitation (AMEL) and maximum daily effluent limitation (MDEL) for acetaldehyde from 5 µg/L to 50 µg/L, citing a 2000 State of New York Maximum Contaminant Level (MCL) as a comparable regulatory standard since there is no California or U.S. EPA numeric water quality objective for this constituent. The Discharger has detected acetaldehyde in the effluent above 5 µg/L seven times based on 51 samples from February 2020 to January 2024 resulting in violations and mandatory minimum penalties (MMPs). GET EF utilizes a fluidized bed bioreactor in which the Discharger adds ethanol, phosphoric acid, and urea to sustain a microbial population which destroys perchlorate in the influent water. While the Discharger has not identified the root cause of the GET EF acetaldehyde generation, studies indicate that microorganisms can produce acetaldehyde in metabolizing ethanol.

   Acetaldehyde is not a California Toxic Rule listed constituent and not a constituent of concern at the Aerojet Superfund Site. Order R5-2020-0051-002 included a numeric

threshold, in absence of a numeric water quality objective, for acetaldehyde of 2.2 µg/L based on a U.S. EPA estimated incremental $1x10^{-6}$ cancer risk level for drinking water and effluent limitations for acetaldehyde were established based on this value. The value of 2.2 µg/L was a numeric interpretation of the Central Valley Water Board's *Water Quality Control Plan for the Sacramento and San Joaquin River Basins*' (Basin Plan) narrative chemical constituent objective, which states that "[w]aters shall not contain chemical constituents in concentrations that adversely affect beneficial uses." (Basin Plan, § 3.1.3.) The existing permit's numeric interpretation of the chemical constituents objective is erroneous as the acetaldehyde cancer risk value is an inhalation unit risk value of $2.2 x10^{-6}$ per $µg/m^3$ and not a drinking water concentration risk value. However, there are inhalation screening level concentrations of 2.6 µg/L based on a carcinogenic target risk and 19 µg/L based on a non-cancer child hazard index for tap water exposure for acetaldehyde in U.S. EPA's *Chemical Assessment Summary for Acetaldehyde* (1988, 1991), published in U.S. EPA's Regional Screening Levels for Resident Tap Water (2024). The tap water RSL concentrations were calculated using the inhalation reference of $2.2x10^{-6}$ per $µg/m^3$. Additionally, a water odor threshold of 34 µg/L was established in 1983 in the article *Odor as an Aid to Chemical Safety: Odor Thresholds Compared with Threshold Limit Values and Volatilities for 214 Industrial Chemicals in Air and Water Dilution, Journal of Applied Toxicology* by John E. Amoore and Earl Hautala for acetaldehyde.

These values were considered screening levels in the assessment of the effluent's potential to adversely affect beneficial uses; however, none were determined to be an appropriate water quality objective for acetaldehyde. A critical downstream analysis was conducted using upstream monitoring data from four samples collected from March 2024 through July 2024, and the critical downstream concentration did not exceed the lowest screening level of 2.6 µg/L. However, since acetaldehyde is otherwise found in the effluent of GET EF, best professional judgment was used to establish a performance-based effluent limitation to maintain a level of treatment that ensures the discharge does not adversely affect the beneficial uses of the receiving water.

4. **Waste Discharge Requirements, Section II. FINDINGS.** Remove the final sentence of Section II.N., as shown below.

   N. Anti-Backsliding Requirements. Sections 303(d)(4) and 402(o)(2) of the CWA and federal regulations at 40 CFR 122.44(l) prohibit backsliding in NPDES permits. These anti-backsliding provisions require effluent limitations in a reissued permit to be as stringent as those in the previous permit, with some exceptions.

5. **Waste Discharge Requirements, Section IV. EFFLUENT LIMITATIONS AND DISCHARGE SPECIFICATIONS.** Modify Table 5. Effluent Limitations to remove the acetaldehyde AMELs, remove the acetaldehyde MDELs, and add acetaldehyde Annual Average effluent limitations, as shown below.

Table 5. Effluent Limitations

Parameters	Units	Average Monthly	Maximum Daily	Annual Average
Flow – Discharge 002	Mgd	11.52	11.52	--
Trichloroethylene [1]	(µg/L)	1.5/3.0	1.5/3.0	--
Trichloroethylene [1]	lbs/day	0.15/0.29	0.15/0.29	--
Tetrachloroethylene	µg/L	0.5	0.7	--
Tetrachloroethylene	lbs/day	0.036	0.05	--
cis-1,2-Dichloroethylene	µg/L	0.5	0.7	--
cis-1,2-Dichloroethylene	lbs/day	0.036	0.05	--
1,1-Dichloroethylene	µg/L	0.5	0.7	--
1,1-Dichloroethylene	lbs/day	0.036	0.05	--
Chloroform	µg/L	0.5	0.7	--
Chloroform	lbs/day	0.036	0.05	--
1,1-Dichloroethane	µg/L	0.5	0.7	--
1,1-Dichloroethane	lbs/day	0.036	0.05	--
1,2-Dichloroethane	µg/L	0.38	0.5	--
1,2-Dichloroethane	lbs/day	0.037	0.048	--
1,4-Dioxane	µg/L	3	6	--
1,4-Dioxane	lbs/day	0.125	0.25	--
N-nitrosodimethylamine	µg/L	0.002	0.010	--
N-nitrosodimethylamine	lbs/day	0.00027	0.00096	--
Perchlorate	µg/L	6	10	--
Perchlorate	lbs/day	0.6	0.95	--
Acetaldehyde	µg/L	--	--	7.3
Acetaldehyde	lbs/day	--	--	0.70
Formaldehyde	µg/L	50	50	--
Formaldehyde	lbs/day	5.1	5.1	--
Acrylamide	µg/L	0.05	0.05	--
Acrylamide	lbs/day	0.005	0.005	--

6. **Attachment E – Monitoring and Reporting Program, Section X. REPORTING REQUIREMENTS.** Revise Section X.B.7.a text as shown below.

   a. **Calendar Annual Average Limitations.** For constituents with effluent limitations specified as “calendar annual average” (electrical conductivity and acetaldehyde) the Discharger shall report the calendar annual average in the December SMR. The annual average shall be calculated as the average of the samples gathered for the calendar year.

7. **Attachment F – Fact Sheet, Section IV. RATIONALE FOR EFFLUENT LIMITATIONS AND DISCHARGE SPECIFICATIONS.** Revise the second paragraph of the Section IV.B.2.b. text as shown below.

   GET EF utilizes a more complex biological treatment system to remove perchlorate due to the elevated concentrations. The biological system has shown to generally

meet the 4 µg/L effluent limitation for the other GET facilities. However, there are instances with the biological system operating in manner to also assure the efficient operation of downgradient UV/peroxide and air stripping systems and their ability to meet the effluent limitations for the constituents they are designed to treat (VOCs and perchlorate), when insufficient treatment results in concentrations exceeding 4 µg/L perchlorate. As an example, alcohol is used as a food source for the bacteria reducing the perchlorate. Excess alcohol from the biological treatment system can be turned into formaldehyde and acetaldehyde in the UV/peroxide treatment unit at concentrations exceeding the maximum daily and monthly average effluent limitations for formaldehyde. Insufficient alcohol does not let the bacteria sufficiently reduce the perchlorate. Thus, there is a balancing act on the alcohol feed rate to meet two conflicting requirements. Therefore, the monthly average effluent limitation for perchlorate at GET EF is set at the Water Quality Based Effluent Limit (see IV.C.3.c.iii) of 6 µg/L. The monthly average was developed using the last 10 years of data from the GET EF effluent where the detected maximum effluent concentration was 11 µg/L. Under the construction and operation requirements the Discharger must still design and operate the system to attempt to achieve an effluent level of 4 µg/L or less.

8. **Attachment F – Fact Sheet, Section IV. RATIONALE FOR EFFLUENT LIMITATIONS AND DISCHARGE SPECIFICATIONS.** Add the following text to the end of Section IV.C.3.a and renumber the subsequent subsections.

This section only provides the rationale for the reasonable potential analyses for the following constituent that was found to have no reasonable potential after assessment of the data:

i. Acetaldehyde

(a) **WQO.** There is no applicable numeric WQO for acetaldehyde. However, a water odor threshold of 34 µg/L was established in 1983 in the article *Odor as an Aid to Chemical Safety: Odor Thresholds Compared with Threshold Limit Values and Volatilities for 214 Industrial Chemicals in Air and Water Dilution, Journal of Applied Toxicology* by John E. Amoore and Earl Hautala for acetaldehyde. Additionally, U.S. EPA has prepared Regional Screening Levels (RSLs) for tap water for acetaldehyde, with the primary risk being from inhalation of tap water through showering and cooking. There are RSLs for cancer at a 10^{-6} risk level of 2.6 µg/L and a noncancer hazard index of 19 µg/L. The tap water RSL concentrations were calculated using the inhalation reference of $2.2x10^{-6}$ per µg/m^3. These values were considered screening levels in the assessment of the effluent's potential to adversely affect beneficial uses; however, none were determined to be an appropriate numeric interpretation of the Basin Plan's narrative water quality objectives applicable to acetaldehyde.

(b) **RPA Results.** For priority pollutants, the SIP dictates the procedures for conducting the RPA. Acetaldehyde is not a priority pollutant. Therefore, the Central Valley Water Board is not restricted to one particular RPA method. Due to the site-specific conditions of the discharge, the Central Valley Water

Board used best professional judgment in determining the appropriate method for conducting the RPA for this non-priority pollutant constituent.

U.S. EPA's September 2010 NPDES Permit Writer's Manual recommends using a mass-balance approach to determine the expected critical downstream receiving water concentration using a steady-state approach. The downstream receiving water concentration is then compared to the applicable water quality threshold to determine if the discharge has reasonable potential to cause or contribute to an in-stream excursion. This approach allows assimilative capacity and dilution to be factored into the RPA. This U.S. EPA recommended approach has been used to assess the reasonable potential for acetaldehyde in the Facility's effluent to adversely affect the receiving water beneficial uses. The critical downstream receiving water concentration is calculated using the equation below:

$$Cr = (QsCs + QcCd) / (Qs + Qd)$$

Where: Qs = Critical stream flow

Qd = Critical effluent flow from discharge flow data (maximum permitted discharge)

Cs = Critical upstream pollutant concentration

Cd = Critical effluent pollutant concentration

Cr = Critical downstream receiving water pollutant concentration

For the purposes of conducting the RPA, the critical stream flow (Qs) has been set to the harmonic mean flow of 1089 MGD in the American River using 15 minute interval data collected from the California Data Exchange Center – American River at Fair Oaks (AFO) monitoring station from January 2020 to January 2024 and the critical effluent flow (Qd) has been set to the permitted flow of 0.84 MGD. The critical effluent pollutant concentration, Cd, has been established as the projected annual average effluent concentration. Calculating a maximum annual average concentration considers variability in the data, per 40 C.F.R. § 122.44(d)(1)(ii). The projected annual average effluent concentration was determined based on effluent data collected from February 2020 to January 2024 and projected using statistics recommended in the TSD for statistically projecting effluent concentrations (i.e., Table 3-1 of the TSD using the 99 percent probability basis and 99 percent confidence level).

The projected annual average effluent concentration (Cd) is 12 µg/L based on an average effluent acetaldehyde concentration of 3.8 µg/L. The annual average upstream receiving water concentration (Cs) for acetaldehyde was 1.7 µg/L based on four samples collected from March 2024 through July 2024. Using the equation above, the calculated critical downstream receiving water acetaldehyde concentration (Cr) is 1.8 µg/L, which is comparable to ambient upstream conditions and does not exceed the lowest screening level

of 2.6 µg/L. Therefore, based on this data, the discharge does not have reasonable potential to adversely affect receiving water beneficial uses. However, acetaldehyde is found in the treatment train as a by-product of perchlorate treatment. Therefore, taking into consideration anti-backsliding considerations discussed in Section IV.3.D below, best professional judgment was used to establish a performance-based effluent limitation to maintain a level of treatment that ensures the discharge does not adversely affect the receiving water beneficial uses.

(c) **WQBELs.** This Order contains a performance-based annual average effluent limitation of 7.3 µg/L for acetaldehyde. The performance-based limitation is based on Facility performance using the maximum annual average effluent concentration between January 2020 and December 2023 of 5.8 µg/L with an additional 25 percent allowance that considers possible temporary increases that may occur due to spikes in acetaldehyde creation by microorganisms or other unknown sources in the treatment train.

(d) **Plant Performance and Attainability.** Analysis of the effluent data shows that the maximum annual average of 5.8 µg/L is less than the applicable WQBEL. The Central Valley Water Board concludes, therefore, that immediate compliance with the effluent limitation is feasible.

9. **Attachment F – Fact Sheet, Section IV. RATIONALE FOR EFFLUENT LIMITATIONS AND DISCHARGE SPECIFICATIONS.** Modify Table F-8. Summary of Reasonable Potential Analyses to remove acetaldehyde, as shown below.

Table F-8 Summary of Reasonable Potential Analyses

Parameter	Units	MEC	99th Percentile MEC	WQO/WQC	Source	RP:
Perchlorate	µg/L	11	11	6	California Primary MCL	Yes
NDMA	µg/L	0.100	0.100	0.003	CTR HH	Yes
Copper	µg/L	6.3	6.3	7.7/11	CTR CCC/CMC	No
Mercury	µg/L	0.001	0.001	0.05	CTR HH	No
Nickel	µg/L	13	13/390	43	CTR CCC/CMC	No
Zinc	µg/L	42	42	99	CTR CCC/CMC	No
Barium	µg/L	90	124	1000	California Primary MCL	No
Iron	µg/L	55	75	300	California Secondary MCL	No

Parameter	Units	MEC	99th Percentile MEC	WQO/WQC	Source	RP:
Manganese	µg/L	<5	23	50	California Secondary MCL	No
Chloride	mg/L	13	39	106	Water Quality for Agriculture	No
Nitrate	mg/L	0.8	4	10	California Primary MCL	No
Sulfate	mg/L	12	60	250	California Secondary MCL	No
Electrical Conductivity	µmhos/cm	210	230	700	Water Quality for Agriculture	No
Total Dissolved Solids	mg/L	220	260	450	Water Quality for Agriculture	No

10. **Attachment F – Fact Sheet, Section IV. RATIONALE FOR EFFLUENT LIMITATIONS AND DISCHARGE SPECIFICATIONS.** Revise the Section IV.C.3.a.i. text as shown below.

    b. **Constituents with Reasonable Potential.** The Central Valley Water Board finds that the discharge has a reasonable potential to cause or contribute to an in-stream excursion above a water quality standard for perchlorate and NDMA. WQBELs for these constituents are included in this Order. A summary of the RPA is provided in Attachment G, and a detailed discussion of the RPA for each constituent is provided below.

11. **Attachment F – Fact Sheet, Section IV. RATIONALE FOR EFFLUENT LIMITATIONS AND DISCHARGE SPECIFICATIONS.** Remove Section IV.C.3.a.iii. and renumber the subsequent subsections.

12. **Attachment F – Fact Sheet, Section IV. RATIONALE FOR EFFLUENT LIMITATIONS AND DISCHARGE SPECIFICATIONS.** Modify Table F-9. Summary of Water Quality-Based Effluent Limitations to remove acetaldehyde, as shown below.

Table F-9. Summary of Water Quality-Based Effluent Limitations

Parameter	Units	Average Monthly Effluent Limitations	Maximum Daily Effluent Limitations	Instantaneous min/max
Perchlorate – Discharge 002	µg/L	6	--	--
NDMA – Discharge 002	µg/L	0.003	0010	--
1,2-DCA	µg/L	0.38	0.5	--
pH	standard units	--	--	6.5/8.5
Chlorine Residual	mg/L	0.01	0.02	--
Acute Toxicity	% survival	--	--	--
Chronic Toxicity	TUc	Narrative	--	--

13. **Attachment F – Fact Sheet, Section IV. RATIONALE FOR EFFLUENT LIMITATIONS AND DISCHARGE SPECIFICATIONS.** Revise the Section IV.D.3. text as shown below.

3. Satisfaction of Anti-Backsliding Requirements

The CWA specifies that a revised permit may not include effluent limitations that are less stringent than the previous permit unless a less stringent limitation is justified based on exceptions to the anti-backsliding provisions contained in CWA sections 402(o) or 303(d)(4), or, where applicable, 40 C.F.R. part 122.44(l).

The effluent limitations in this Order are at least as stringent as the effluent limitations in the previous Order, with the exception of effluent limitations for acetaldehyde. The effluent limitations for this pollutant are less stringent than those in Order R5-2020-0051-002. This relaxation of effluent limitations is consistent with the anti-backsliding requirements of the CWA and federal regulations.

a. **CWA section 402(o)(1) and 303(d)(4).** CWA section 402(o)(1) prohibits the establishment of less stringent water quality-based effluent limits "except in compliance with section 303(d)(4)." CWA section 303(d)(4) has two parts: paragraph (A) which applies to nonattainment waters and paragraph (B) which applies to attainment waters.

i. For waters where standards are not attained, CWA section 303(d)(4)(A) specifies that any effluent limit based on a TMDL or other WLA may be revised only if the cumulative effect of all such revised effluent limits based on such TMDLs or WLAs will assure the attainment of such water quality standards.

ii. For attainment waters, CWA section 303(d)(4)(B) specifies that a limitation based on a water quality standard may be relaxed where the action is consistent with the antidegradation policy.

Buffalo Creek, which is tributary to the American River, is considered an attainment water for acetaldehyde because the receiving water is not listed as impaired on the 303(d) list for this constituent. The exceptions in section 303(d)(4) address both waters in attainment with water quality standards and those not in attainment, i.e. waters on the section 303(d) impaired waters list. As discussed in section IV.D.4, below, a less stringent effluent limit complies with federal and state antidegradation requirements. Thus, a less stringent effluent limitation for acetaldehyde from the one in Order R5-2020-0051-002 meets the exception in CWA section 303(d)(4)(B).

b. **CWA section 402(o)(2).** CWA section 402(o)(2) provides several exceptions to the anti-backsliding regulations. CWA 402(o)(2)(E) allows a renewed, reissued, or modified permit to contain a less stringent effluent limitation for a pollutant if the permittee has installed the treatment facilities required to meet the effluent limitations in the previous permit and has properly operated and maintained the facilities but has nevertheless been unable to achieve the previous effluent limitations, in which case the limitations in the reviewed, reissued, or modified permit may reflect the level of pollutant control actually achieved (but shall not be less stringent than required by effluent guidelines in effect at the time of permit renewal, reissuance, or modification).

As described below, the Discharger has maintained the treatment facilities required to meet effluent limitations for acetaldehyde, but has nevertheless been unable to achieve the effluent limitations for acetaldehyde contained in previous Order R5-2020-0051-002. The updated information that supports the relaxation of effluent limitations for this constituent includes the following:

i. **Acetaldehyde.** Order R5-2020-0051-002 includes effluent limitations for acetaldehyde for GET EF. Since the adoption of Order R5-2020-0051-002 in February 2020, acetaldehyde has not been detected in the influent to GET EF, but has been detected in the effluent. Acetaldehyde is not a California Toxic Rule listed constituent and not a constituent of concern at the Facility. The Discharger operates a fluidized bed reactor (FBR) at GET EF, which is the best available technology to remove high concentrations perchlorate. The FBR requires daily maintenance and correct dosing of chemicals (ethanol, phosphoric acid, and urea) to provide enough food and nutrients to the bacteria in the FBR to ensure that perchlorate is completely destroyed.

Order R5-2020-0051-002 suggested that excess alcohol in the effluent can cause formation of acetaldehyde; however, acetaldehyde has been detected in the GET EF effluent even when the Discharger carefully manages ethanol addition to not contain excess alcohol. Acetaldehyde detections in the effluent are inconsistent and the Discharger also noted difficulty with producing acetaldehyde in the effluent when troubleshooting acetaldehyde detections. Studies indicate that microorganisms can produce acetaldehyde in metabolizing ethanol, but the Discharger has been unable to prove these findings. While the Discharger has not identified the root cause of the GET

EF acetaldehyde generation, the Discharger made diligent efforts to reduce acetaldehyde in the effluent by properly operating and maintaining the treatment facilities but has nevertheless been unable to meet effluent limitations for acetaldehyde. Best professional judgment was used to establish a performance-based effluent limitation to maintain a level of treatment that ensures the discharge does not adversely affect the beneficial uses of the receiving water and that is based on Facility performance using the maximum annual average effluent concentration between January 2020 and December 2023 and considering possible temporary increases that may occur due to spikes in acetaldehyde creation by microorganisms or other unknown sources in the treatment train. Thus, relaxation of the effluent limitations for acetaldehyde from Order R5-2020-0051-002 is in accordance with CWA section 402(o)(2)(E).

14. **Attachment F – Fact Sheet, Section IV. RATIONALE FOR EFFLUENT LIMITATIONS AND DISCHARGE SPECIFICATIONS.** Revise Section IV.D.4., Antidegradation Policies text, as shown below.

This Order does not authorize lowering water quality as compared to the level of discharge authorized in the previous order, which is the baseline by which to measure whether degradation will occur. This Order does not allow for an increase in flow or mass of pollutants to the receiving water. The Order requires compliance with applicable federal technology-based standards and with WQBELs where the discharge could have the reasonable potential to cause or contribute to an exceedance of water quality standards. Accordingly, the permitted discharge is consistent with the antidegradation provisions of 40 C.F.R. part 131.12 and the State Anti-Degradation Policy.

This Order relaxes effluent limitations for acetaldehyde based on the implementation of a performance-based effluent limit. Order R5-2020-0051-002 included a numeric interpretation of the Basin Plan's narrative chemical constituent objective for acetaldehyde of 2.2 µg/L based on U.S. EPA estimated incremental $1x10^{-6}$ cancer risk level for drinking waters and effluent limitations for acetaldehyde were established based on this value. This interpretation is erroneous as the cancer risk value is an inhalation unit risk value for acetaldehyde. However, there are inhalation screening level concentrations of 2.6 µg/L based on a carcinogenic target risk and 19 µg/L based on a non-cancer child hazard index for tap water exposure for acetaldehyde in U.S. EPA's *Chemical Assessment Summary for Acetaldehyde* (1988, 1991), published in U.S. EPA's Regional Screening Levels (RSL) for Resident Tap Water (2024). The tap water RSL concentrations were calculated using the inhalation reference of $2.2x10^{-6}$ per $\mu g/m^3$. Additionally, a water odor threshold of 34 µg/L was established in 1983 in the article *Odor as an Aid to Chemical Safety: Odor Thresholds Compared with Threshold Limit Values and Volatilities for 214 Industrial Chemicals in Air and Water Dilution, Journal of Applied Toxicology* by John E. Amoore and Earl Hautala for acetaldehyde. These values were considered screening levels in the assessment of the effluent's potential to adversely affect beneficial uses; however, none were

determined to be an appropriate water quality objective for acetaldehyde. A critical downstream analysis was conducted using upstream monitoring data from four samples collected from March 2024 through July 2024, and the critical downstream concentration did not exceed the lowest screening level of 2.6 µg/L. However, since acetaldehyde is found in the effluent of GET EF, best professional judgment was used to establish a performance-based effluent limitation to maintain a level of treatment that ensures the discharge does not adversely affect the beneficial uses of the receiving water.

Previous Order R5-2020-0051-002 contained average monthly and maximum daily effluent limitations for acetaldehyde. An annual average effluent limitation for acetaldehyde has been established in this Order based on its long-term effects. The relaxation of WQBELs for this parameter will not result in an increase in pollutant concentration or loading, a decrease in the level of treatment or control, or a reduction of water quality. Therefore, the Central Valley Water Board finds that the relaxation of the effluent limitations does not result in an increase in pollutants or any additional degradation of the receiving water. Thus, the relaxation of effluent limitations is consistent with the antidegradation provisions of 40 C.F.R. part 131.12 and the State Anti-Degradation Policy.

15. **Attachment F – Fact Sheet, Section IV. RATIONALE FOR EFFLUENT LIMITATIONS AND DISCHARGE SPECIFICATIONS.** Modify Table F-11. Summary of Final Effluent Limitations to update the acetaldehyde effluent limitation, as shown below.

Table F-11. Summary of Final Effluent Limitations

Parameter	Units	Effluent Limitations Avg Monthly/Daily Max	Basis1
Flow – Discharge 001	mgd	AMEL 5.04 MDEL 5.04	DC
Flow – Discharge 002	mgd	AMEL 11.52 MDEL 11.52	DC
Flow – Discharge 004	mgd	AMEL 3.9 MDEL 3.9	DC
Flow – Discharge 005	mgd	AMEL 6.75 MDEL 6.75	DC
Flow – Discharge 007	mgd	AMEL 5.11 MDEL 5.11	DC
Flow – Discharge 008	mgd	AMEL 2.88 MDEL 2.88	DC
Flow – Discharge 009	mgd	AMEL 1.44 MDEL 1.44	DC
Flow – Discharge 010	mgd	AMEL 0.58 MDEL 0.58	DC
Flow – Discharge 014	mgd	AMEL 2.59 MDEL 2.59	DC

Parameter	Units	Effluent Limitations Avg Monthly/Daily Max	Basis1
Flow – Discharge 016	mgd	AMEL 5.76 MDEL 5.76	DC
Flow – Discharge 017	mgd	AMEL 2.88 MDEL 2.88	DC
Flow – Discharge 019	mgd	AMEL 0.0009 MDEL 0.0009	DC
Flow – Discharge 020	mgd	AMEL 1.3 MDEL 1.3	DC
Volatile Organic Contaminants	µg/L	AMEL 0.5 MDEL 0.7	ML
Trichloroethylene–Discharge 002	µg/L	AMEL 1.5 MDEL 1.5	BP
cis-1,2-dichlorethylene -Discharge 002	µg/L	AMEL 1.5 MDEL 1.5	BP
Chloroform – Discharges 005 and 020	µg/L	AMEL 3.0 MDEL 5.0	BP
Chloroform – Discharge 004	µg/L	AMEL 2 MDEL 5	BP
1,4-Dioxane -	µg/L	AMEL 4 MDEL 6	ML, BP
1,2-Dichloroethane	µg/L	AMEL 0.38 MDEL 0.5	BP
N-nitrosodimethylamine – Discharges 001, 002	µg/L	AMEL 0.002 MDEL 0.010	ML
N-nitrosodimethylamine Discharges 005, 007, 008, 009	µg/L	AMEL 0.007 MDEL 0.007	PF, BP
N-nitrosodimethylamine Discharges 016,017	µg/L	AMEL 0.003 MDEL 0.007	PF, BP
Perchlorate	µg/L	AMEL 4 MDEL 6	ML
Perchlorate – Discharge 002	µg/L	AMEL 6 MDEL 10	PF, BP
Acetaldehyde	µg/L	Annual Average 7.3	PF
Formaldehyde	µg/L	AMEL 50 MDEL 50	BP
Acrylamide	µg/L	AMEL 0.05 MDEL 0.05	BP
Chlorine Residual	mg/L	AMEL 0.01 MDEL 0.02	NAWQC
pH	Standard units	Instantaneous Max 8.5 Instantaneous Min 6.5	BP
Acute Toxicity	% survival	See footnote 2	BP
Chronic Toxicity	TUc	No toxicity – 1	BP

Any person aggrieved by this action of the Central Valley Water Board may petition the State Water Board to review the action in accordance with CWC section 13320 and California Code of Regulations, title 23, sections 2050 and following. The State Water Board must receive the petition by 5:00 p.m., 30 days after the date that this Order becomes final, except that if the thirtieth day following the date that this Order becomes final falls on a Saturday, Sunday, or state holiday (including mandatory furlough days), the petition must be received by the State Water Board by 5:00 p.m. on the next business day.
Links to the laws and regulations applicable to filing petitions
(http://www.waterboards.ca.gov/public_notices/petitions/water_quality) may be found on the Internet or will be provided upon request.

I, PATRICK PULUPA, 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, Central Valley Region, on 25 April 2025.


Date: 2025.05.20 14:58:23 -07'00'

PATRICK PULUPA, Executive Officer