Final General Conformity Determination 2014
For the Folsom Dam Modification Project, Joint Federal Project

Introduction

The following final general conformity assessment and determination is an update of emission projections for the Folsom Dam Modification Project, also known as the Joint Federal Project (JFP), due to construction and schedule changes that have occurred since a General Conformity Determination was prepared in May 2012. The Sacramento Metropolitan Air Quality Management District (SMAQMD) evaluated the project for compliance with the General Conformity requirements of SMAQMD Rule 104 – *General Conformity* in its May 15, 2012 *Conformity Determination Evaluation.* SMAQMD's evaluation relied on construction emission estimates prepared by the U.S. Army Corps of Engineers (USACE) in the report entitled, *Joint Federal Project (JFP) at Folsom Dam, Upstream and Downstream (for Cumulative Conformity Purposes), Air Quality Technical Report* (AQ Technical Report), which was dated October 2012. The 2014-2017 construction emission estimates contained in the AQ Technical Report are shown in Table 1.[1]

Table 1. Folsom JFP Approach Channel Project (Upstream+Downstream) Summary: Emissions After Mitigation (tons/year)

Activity Year	VOC	NOx	CO	PM_{10}	$PM_{2.5}$	SO_2
Alternative 2 (Approach Chanel Excavation With Cutoff Wall)						
2014	2	24	15	24	4	<1
2015	2	20	14	13	3	<1
2016	2	**28**	19	24	4	<1
2017	2	**25**	18	29	4	<1
General Conformity *De Minimis* Levels	25	25	100	100	100	100

Based on the above emission, SMAQMD concluded that:

> *"… [A]ll pollutant emissions except NOx would be below the General Conformity annual de minimis threshold during all construction years. Mitigated NOx emissions would be above the de minimis thresholds in 2016 and 2017 for Alternative 2…. Therefore, a conformity determination is required for NOx emissions."*

[1] The corresponding table in SMAQMD's Conformity Determination Evaluation also contained emission estimates for Alternative 3 (Approach Channel Excavation with Cofferdam). Because Alternative 2 was selected, no further discussion of Alternative 3 is warranted.

SMAQMD's evaluation concluded that:

> *A positive conformity determination can be made for the mitigated emissions from the Folsom Dam Modification project. This finding is based on:*
>
> - *Folsom Dam Modification project will be required to comply with all state and local regulations, thus it will meet all SIP control requirements. Folsom project will employ additional emission mitigation measures including electrification and use of cleaner construction equipment, trucks and marine vessels.*
>
> - *The 2011 Attainment and RFP Plan provides 4 tpd NOx in margin of safety for achieving NOx emission attainment target; the emissions increase from Folsom Dam Modification project (maximum emissions of 0.08 tpd NOx) is a nominal portion (2%) of the margin of safety provided; therefore, this margin of safety ensures the project will not cause the nonattainment area to exceed the 2011 Attainment and RFP emissions budget.*
>
> - *[C]ARB has committed to submit SIP revisions by December 2012 and will ensure that [C]ARB's technical revisions associated with state measures do not consume the excess emissions allocated to the Folsom Dam Project.*

Need for a Conformity Determination Update

Construction of the project is currently ahead of the schedule outlined in the *Folsom Dam Modification Project, Approach Channel, Final Supplemental Environmental Impact Statement/Environmental Impact Report, December 2012* (2012 Supplemental EIS/EIR*).* The extreme drought conditions experienced in California in 2014 have resulted in record low water levels in Folsom Lake. These conditions have allowed some work on the project to be done "in the dry", which has accelerated specific project action sand reduced emissions due to limited use of heavy marine engines. Some activities and emissions have been compressed and accelerated from the 2016/2017 timeframe to the 2014/2015 timeframe, resulting in higher air emissions during the 2014 construction season than was anticipated in the 2012 Supplemental EIS/EIR. However, these changes will result in an overall reduction in NOx emissions from the project.[2]

As required by the 2012 Supplemental EIS/EIR, the project is required to submit monthly emission reports to SMAQMD as a participant in SMAQMD's Construction Mitigation Fee

[2] Construction NOx emissions (during the 2014-2017 timeframe) were originally estimated in the 2012 Supplemental EIS/EIR to total 96.4 tons. As updated, construction NOx emissions during the same period are estimated to be 67.9 TPY tons resulting in approximately a 30% reduction.

Program.[3] Separate monthly reports are submitted by USACE (for certain contractors and sub-projects), and by Kiewit Corporation (for the majority of work performed on Phase IV of the project). A review of year-to-date construction mitigation fee reports for 2014, as well as construction activity projections for the remainder of 2014, indicates that the totals shown in Table 1 may be exceeded. Therefore, a new positive General Conformity determination is required prior to the conformity thresholds (shown in Table 1) being exceeded. The new determination will be based on the updated construction emission calculations presented herein.

Project Description

The USACE, in conjunction with federal and state partners, is constructing an auxiliary spillway (in five phases) at Folsom Dam located in Folsom, California, on the American River. The new auxiliary spillway will address the need to safely pass probable maximum flood event inflows, and lesser flood event inflows (occurring less frequently than a 100-year event). Structural modifications are proposed to address increasing the discharge capability and/or increasing storage during extreme flood events above the 200-year event level. Construction of phases 3 and 4 of the project is currently underway. These phases include a spillway, control structure, approach channel, chute and stilling basin, spur dike and a temporary cut-off wall. Construction activities include excavation, blasting, rock processing and concrete batching. Specifically, the following sources of direct and indirect emissions are expected:

- Engine exhaust from the onsite operation of off-road construction equipment
- Engine exhaust from the onsite operation of marine vessels
- Engine exhaust from the onsite and offsite operation of haul trucks
- Engine exhaust from onsite and offsite operation of worker vehicles
- Fugitive dust from haul trucks operating on paved and unpaved roadways.
- Fugitive dust from pickup trucks operating on paved and unpaved roadways.
- Fugitive dust from active stockpiles
- Fugitive dust from on-site excavation
- Fugitive dust from in-the-dry blasting
- Fugitive dust from onsite rock crushing, and
- Fugitive dust from onsite concrete batching

See the project description in the 2012 Supplemental EIS/EIR document for further details.

[3] SMAQMD's construction mitigation fee program entails the payment of an offsite mitigation fee for any NOx emissions which exceed SMAQMD's significance threshold of 85 lbs/day, establish pursuant to the California Environmental Quality Act.

Scope of Construction Emission Calculations

Analysis Years

Construction emissions were updated for calendar years 2014, 2015, 2016, and 2017 (the final construction year). Emissions for 2014 were based on actual activity through June (as available), and projected activity thereafter. Projected construction activity was used to calculate 2015 through 2017 emissions.

Included Activities

Construction emissions within the scope of the Folsom Dam Modification Project were calculated for the following activities (and for the years in which they occur). Emissions were calculated for Kiewit activities and for the activities of other contractors as overseen by the USACE, as summarized in Table 2 below.

Table 2. Folsom JFP Approach Channel Project
Summary of Activities Included in the Request for an Updated Conformity Determination

Construction Activity	Project Years	Contractor	Included in 2012 SEIS/EIR or Additional Activity?
Completion of Phase IV – Alternative 2 in AQ Technical Report	2004-2017	Kiewit	Included in 2012 SEIS/EIR
Lower Pipeline Staging Area	2014	Kiewit	Additional Activity
Erosion Control Project	2014	Kiewit	Additional Activity
Cheeseman Slope Removal	2016	Kiewit	Additional Activity
Phase IV Safety Bench	2016	Kiewit	Additional Activity
Phase V Miscellaneous Work	2016-2017	Kiewit	Additional Activity
Right Bank Stabilization Contract	2015	TBD	Additional Activity
Annual Reserve Troop Training	2017	U.S. Army	Additional Activity
Rossmoor Bar Mitigation	2015-2016	TBD	Additional Activity
Phase V Miscellaneous Work	2016-2017	TBD	Additional Activity
Phase III: Control Structure Work	2014-2015	Granite Construction	Included in 2012 SEIS/EIR

Included Pollutants

Construction emissions were calculated for ROG, NOx, CO, PM_{10}, $PM_{2.5}$ and SO_2.

Mitigation

The mitigation measures used in the emissions update calculations were identical, or more stringent (i.e. voluntary early implementation of the Tier 4 requirements) than those required by the *Folsom Dam Modification Project, Approach Channel, Final Supplemental Environmental Impact Statement/Environmental Impact Report (*2012 Supplemental EIS/EIR*)* or prior CEQA documents applicable to preceding project phases. The specific mitigation measures applicable to each source category are specified below.

One mitigation requirement in the 2012 Supplemental EIS/EIR is the use of Tier 3 or higher off-road equipment through calendar year 2014, and Tier 4 equipment thereafter.[4] However, it should be noted that equipment used for the Annual Reserve Troop Training project listed above, would not conform to this requirement. For national security reasons, the troop training must be conducted using equipment that is representative of the Army's fleet, which may or may not include higher tier engines. Emission impacts are expected to be small due to the short duration of the training exercises. The training exercises are also scheduled to occur at a time with minimal overlap with the higher emitting projects. It is further noted that certain ongoing projects were approved under prior NEPA/CEQA documents with less stringent mitigation than noted above. Because these projects overlap and create emissions concurrent with those estimated in the 2012 Supplemental EIS/EIR, they have been included in this update.

As shown in Table 4 below, even with onsite mitigation, NOx emissions are expected to exceed the General Conformity de minimis threshold in 2014, by 6.3 tons. The project is already subject to SMAQMD's Construction Mitigation Fee program. Under the program, projects that exceed the SMAQMD's short-term construction significance threshold of 85 pounds per day of NOx must apply enhanced exhaust control practices (i.e., onsite mitigation). If the threshold continues to be exceeded, an offsite mitigation fee is payable at a rate equivalent to $17,720 per ton of emissions. The project's participation in this program in 2014 to date has produced approximately10.6 tons of reductions, which do not require additional mitigation according to the SMAQMD.[5] To mitigate the remainder of projected 2014 emissions, the USACE has leased 21 tons of emission reduction credits (ERCs) from the SMAQMD Priority Reserve Bank.

[4] The Phase III portion of the project, being performed by Granite Construction, is not subject to this requirement. Phase IV and all future projects, except as noted above and variances made by the Corps, will be required to utilize Tier 4 engines.

[5] August 18, 2014 email from Karen Huss of SMAQMD to Nancy Sandburg and Katie Huff of USACE.

Overall Calculation Methodology

The overall calculation methodology was the same as that used for the 2012 AQ Technical Report, except as noted below. This methodology was summarized in the AQ Technical Report and implemented in the Excel file: *Folsom Dam Modifications Calculations AQ Comparison Summary 5-3-12.xlsx* ("EIS/EIR Excel file"). Relevant sections of this file form the basis for the emission calculations. The updated worksheets have been renamed for clarity, and unused worksheets (e.g., for Project options not selected) have been deleted. An electronic version of the emission calculations is available from the Corps to allow for a detailed review of the calculations. Additionally, emissions of greenhouse gases (GHGs) have been updated to include methane (CH_4) and nitrous oxide (N_2O). The methodology was summarized in the AQ Technical Report and implemented in the Excel file: Folsom Dam Modifications Calculations AQ Comparison Summary 5-3-12.xlsx ("EIS/EIR Excel file"). Relevant sections of this file form the basis for the emission calculations. The updated worksheets have been renamed for clarity, and unused worksheets have been selected.

Source Specific Calculations

Emissions from the following sources were calculated as indicated.

Off-Road Construction Equipment

Emissions from off-road construction equipment (including off-road vehicles, portable engines and marine engines) were calculated from equipment lists provide by Kiewit and the USACE. The equipment lists contained the equipment type, horsepower rating, model year, and actual (or projected) hours of operation. These data were input into a tool similar to SMAQMD's Construction Mitigation Calculator, which has been developed to perform the emission calculations. The tool derives emission factors for ROG, NOx, PM_{10}, and $PM_{2.5}$ based on user inputs. For off-road vehicles and portable engines, the tool calculates emissions based on data contained in the California Air Resources Board's (CARB's) OFFROAD2011 model.

SMAQMD's calculator was modified to allow direct input and calculations for a large list of equipment on the 'Output' tab. The off-road data embedded in the SMAQMD calculator was updated and modified based on the current version of CARB's OFFROAD model in the following ways:

- The annual accrual rates contained in SMAQMD's model (See "Off-Road EFs 1" tab, Column "V") were substituted with update data from OFFROAD2011 (See "ActivityCmHrs" table, "Cumulative Hours Final" column). In general, this increased deterioration and emission factors.

- For portable engines (which are not included in OFFROAD), annual accrual rates were added at an assumed rate of 2,000 hours per year, capped at 12,000 hours.

- For portable engines, the following load factors were added from the California Emissions Estimator Model (CalEEMod): Air Compressors = 0.48, Generator Sets = 0.74, Pumps = 0.74, and Welders = 0.45.

- For all equipment types, a carbon monoxide (CO) emission factor was calculated based on the OFFROAD data contained in the calculator (See the "Off-Road EFs" tab, Columns "K" and "L").

- For all equipment types, a sulphur dioxide (SO_2) emission factor was calculated based on the fuel sulphur content of CARB diesel (15 ppmw), a generalized brake-specific fuel consumption of 7,000 hp-hr,[6] and diesel-fuel physical properties of 137,000 Btu/gal and 7.05 lbs/gal.[7]

The equipment lists provided by Kiewit and the USACE were derived in accordance with the 2012 supplemental EIS/EIR mitigation requirement to use Tier 3 or higher off-road equipment through calendar year 2014, and Tier 4 equipment thereafter. To calculate unmitigated emissions, a theoretical off-road fleet was developed using the "large fleet targets" contained in Table 3 of CARB's Regulation for In-Use Off-Road Diesel-Fueled Fleets.[4] For each vehicle, the engine model year was set to the lowest model year (as shown in Appendix A of the Regulation) that would meet the targets in Table 3. In general, this required Tier 2 or Tier 3 off-road engines (depending on engine power category).

Marine Engines

Kiewit's activities include the usage of outboard marine engines and barges. Because marine engines are not included in SMAQMD's Construction Mitigation Calculator, they must be independently calculated. CARB has developed a separate inventory model for calculating marine engine emissions—The *California Barge and Dredge Emissions Inventory Database*. Data contained in this model were incorporated into the SMAQMD calculator to derive project emissions. The model uses the following generalized equation for calculating emissions.

$$E = EF_0 \times F \times (1 + D\frac{A}{UL}) \times HP \times LF \times HR$$

Where:

[6] From AP-42, Table 3.3-1, footnote "a."
[7] From AP-42, Appendix A, page A-5 data for "Diesel" and page A-7 data for "Distillate Oil"

E = is the amount of emissions of a pollutant emitted during one period;
EF_0 = is the model year, horsepower and engine use (propulsion or auxiliary) specific zero hour emission factor (when engine is new);
F = is the fuel correction factor which accounts for emission reduction benefits from burning cleaner fuel;
D = is the horsepower and pollutant specific engine deterioration factor, which is the percentage increase of emission factors at the end of the useful life of the engine;
A = is the age of the engine when the emissions are estimated;
UL = is the vessel type and engine use specific engine useful life;
HP = is rated horsepower of the engine;
LF = is the vessel type and engine use specific engine load factor;
HR = is the number of annual operating hours of the engine.

Due to the relatively small number of marine engines, the above equations were manually input onto the appropriate equipment lines on the modified "Output" tab of the SMAQMD calculator (renamed "Off-Road EFs 1). These emissions were independently calculated based on engine model year and type, based on the mitigation requirement to use Tier 2 or Tier 3 certified marine engines.

Haul Trucks

Emissions from haul trucks were calculated based on the model year, number of trips, and the round trip distance of each truck trip. Haul truck emission factors were derived from CARB's EMFAC2011 emissions model, using the heavy-heavy-duty diesel technology group applicable to construction trucks. Emission factors in units of grams per mile (g/mi) were determined based on the fleet operating in the Sacramento Valley Air Basin in each calendar year. The emission factors are weighted to include all operating speeds, which include both on-site and off-site operation. The model years were selected in accordance with the 2012 Supplemental EIS/EIR mitigation requirements to use 2010 model year (or newer) trucks in calendar year 2014 and beyond. This represents the highest level of control available for heavy-duty diesel trucks.

On-Site Trucks

Emissions from the onsite usage of pickup and mechanical trucks were calculated based on emission factors derived from EMFAC2011. Emission factors were derived based on the basin-wide fleet average model year of light-duty trucks operating in each calendar year. The number of each trucks operating was provided by Kiewit and USACE. There are no specific mitigation measures applicable to the on-site usage of light-duty trucks.

Worker Vehicles

Emissions from worker vehicles were calculated based on emission factors derived from EMFAC2011, and fleet composition as contained in the California Emissions Estimation Model (CalEEMod). CalEEMod also contains a default worker commute distance which was incorporated into the analysis. Emissions were calculated from the estimated number of worker vehicles. There are no specific mitigation measures applicable to worker vehicles.

Fugitive Dust

Fugitive dust emissions originate from a variety of sources, including blasting, excavation, rock crushing, stockpiling, wind erosion of disturbed areas, vehicle travel on unpaved roadways, vehicle travel on paved roadways, and concrete batching. As shown in Table 1, projected PM_{10} emissions were well below the de minimis threshold. Changes in activity related to fugitive dust have been recalculated based on updated activity data. Updated emissions have been included in the analysis, and are shown in Table 4. The overall effect of the activity updates indicates higher fugitive dust emissions in earlier project years, tapering off to very low emissions in the 2017 calendar year.

Updated Emissions

Construction emissions from the project for the 2014-2017 calendar years have been updated as described above. The updated mitigated emissions summary is shown in Table 4. Based on the updated mitigated emissions that are shown within this assessment, a positive General Conformity determination is made for the mitigated emissions for the Folsom Dam Modification Project.

Table 3. Folsom JFP Approach Channel Project Mitigated Emission Summary (tons/year)

Activity Year	VOC	NOx	CO	PM_{10}	$PM_{2.5}$	SO_2
2014	3.8	31.3	21.5	49.6	6.9	0.1
2015	1.9	13.2	14.2	31.7	5	0.1
2016	2.1	17.7	15.3	19	2.9	0.1
2017	0.6	5.9	2.7	0.3	0.2	0.1
General Conformity *De Minimis* Levels	25	25	100	100	100	100