Memorandum

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cc: Maggie Townsley, ICF Jones & Stokes; Marian Rule-Cope, Transystems

From: Tim Rimpo, Rimpo and Associates, Inc.

Subject: **Air Quality Analysis for the Sacramento Intermodal Transportation Facility**

This air quality technical memorandum describes the air quality impacts that would result from the Sacramento Intermodal Transportation Facility (SITF) improvements proposed for downtown Sacramento, California.

Project Description

The City of Sacramento proposes to expand and improve the existing Sacramento Valley Station (Station). The objective is to establish a state-of-the-art regional transportation center to meet future needs of rail and bus transit passengers and service operators in Sacramento through 2025.

A three-phased project is planned. Phase 1 involves realignment of the existing mainline tracks. Phase 2 consists of improvements to the existing Station. Phase 3 includes transforming the Station into a multimodel transportation center. This memorandum describes the air quality impacts of each phase.

Existing Air Quality Conditions

The project is located in Sacramento County, which is within the Sacramento Valley Air Basin. Sacramento County's air quality is classified as nonattainment for the federal ozone and particulate matter (PM10 and PM2.5) standards and is an attainment/maintenance area for the federal carbon monoxide (CO) standards. Sacramento County is also a nonattainment area for the ozone, PM10, and PM2.5 California ambient air quality standards.

Impact Analysis

Approach and Methodology

Criteria for determining the significance of air quality impacts were developed based on the California Environmental Quality Act (CEQA) Guidelines. According to Appendix G of the CEQA Guidelines, a project may cause a significant effect on the environment if it would:

- violate any air quality standard or contribute substantially to an existing or projected air quality violation, including normal operational and accidental releases;
- expose sensitive receptors to substantial pollutant concentrations;
- result in substantial air emissions or deterioration of air quality;
- create objectionable odors affecting a substantial number of people; or
- result in a cumulatively considerable net increase in any criteria pollutant for which the project region is a nonattainment area with regard to an applicable federal or state ambient air quality standard.

This memo describes several air quality evaluations that were conducted to determine whether the project would have a significant air quality impact on the environment.

The Sacramento Metropolitan Air Quality Management District (SMAQMD) has several air quality significance thresholds. This memo compares the project's construction and operational ozone precursor emissions to the SMAQMD's significance thresholds shown in Table 1 (Sacramento Metropolitan Air Quality Management District 2004).

Table 1. SMAQMD Significance Thresholds

Pollutant	Pounds per day
Construction oxides of nitrogen (NOx)	85
Operational NOx	65
Operational reactive organic gases (ROGs)	65

For construction-related exhaust emissions, the NOx threshold listed in Table 1 were used. For construction-related dust impacts, the SMAQMD recommendations for evaluating PM10 dust were used. The SMAQMD recommends that PM10 air quality dispersion modeling be conducted, depending on the amount of acreage disturbed per day (Sacramento Metropolitan Air Quality Management District 2004).

For the evaluation of operational emissions, the following approaches were used.

- For ROGs and NOx, operational emissions were estimated and compared to the SMAQMD's thresholds listed in Table 1.
- To evaluate CO hot-spot impacts, CO concentrations were estimated for the worst-case intersection that would be affected by the project. Caltrans' CO modeling protocol was used to conduct that evaluation (Garza et al. 1997).
- For particulate matter (PM10/PM2.5) hot-spot impacts, a qualitative evaluation was conducted using the U.S. Environmental Protection Agency (EPA's) and Federal Highway Administration's (FHWA's) guidance (U.S. Environmental Protection Agency and U.S. Department of Transportation 2006).

- FHWA guidance was used to evaluate the project's potential to generate a significant increase in toxic air contaminants (TACs), also called mobile source air toxics (MSATs) (U.S. Department of Transportation 2006).
- The project's increase in greenhouse gas (GHG) emissions was estimated using the same models used to estimate criteria pollutant emissions.
- Finally, the project was evaluated to determine if it meets regional and project-specific conformity.

Construction Emissions

Construction emissions would be generated as exhaust from diesel combustion equipment and as fugitive dust from equipment operating over exposed earth. These emissions were quantified using the URBEMIS model, version 9.2.4. For each phase, phase start and end dates and construction equipment were entered into URBEMIS.

Construction Emissions—Ozone Precursors

Table 2 shows the maximum pounds per day of NOx that would be emitted during each construction phase. Emissions would exceed the SMAQMD's significance threshold of 85 pounds NOx per day. Consequently, the SMAQMD will require that NOx emissions from diesel construction equipment be reduced by 20% (compared to the fleet average). Because this 20% reduction measure is not sufficient to reduce the project's NOx emissions to less than the 85 pounds per day significance threshold, the project applicant will also be required to pay a fee to the SMAQMD (Sacramento Metropolitan Air Quality Management District 2008). That fee would be used to purchase emission reductions to offset the project's NOx impacts. Implementation of the mitigation measures, including the fee, would reduce the project's construction-related ozone precursor emission impacts to a less-than-significant level.

Construction Emissions—PM10

The SMAQMD also requires that PM10 emissions be modeled to determine whether those emissions would violate the state or federal PM10 standards (Sacramento Metropolitan Air Quality Management District 2004). However, neither modeling nor fugitive dust mitigation is required if the maximum disturbed area is 5 acres or less. The maximum area of disturbed acreage would equal 5 acres per day for Phase 1, and 4 acres per day for Phases 2 and 3 (Reiger pers. comm.). Consequently, PM10 modeling is not required. Construction-related PM10 emissions are less than significant and no mitigation is required.

Table 2. Construction Emissions

Construction Phase	Maximum NOx Emissions (pounds per day)
Phase 1: January–December 2010	169.3
Phase 2: January 2011 –December 2013	210.6
Phase 3: October 2013–December 2017	168.6

For each phase, emissions were estimated using URBEMIS2007, version 9.2.4, and the construction phase lengths, equipment lists, amount of imported and exported soil, and amount of daily disturbed acreage. Phase 3 assumes the "Move the Depot" alternative. Emissions associated with the "Don't Move the Depot" alternative would be slightly lower than Phase 3 but would still exceed the SMAQMD's significance thresholds.

Operational Emissions

Each operational phase of the project has the potential to generate criteria pollutants (ROGs and NOx), CO, PM10/PM2.5, TACs, and GHGs. Each of the project's operational phases are evaluated for its:

- criteria pollutant emissions,
- CO hotspots,
- PM10/PM2.5 hotspots,
- TACs,
- GHG emissions, and
- conformity (regional and project-specific).

Criteria Pollutant Emissions

Phase 1—Track Relocation

In Phase 1, the existing tracks would be relocated and realigned. Phase 1 would not increase, and would likely decrease, operational emissions. By separating the freight and passenger tracks, it would reduce the amount of freight train idling that currently results due to the "hold-out" rule. The hold-out rule requires that all freight trains stop outside of the passenger platform area if a passenger train is loading or unloading passengers. The project will allow Union Pacific Railroad's (UPRR's) trains to avoid idling as mandated by the hold-out rule, operate at higher speeds, increase their freight movement capacity, and provide relief to truck congestion along Interstates 5 and 80. The track relocation project will allow greater volumes of freight to move faster through the Station, while improving safety and reducing congestion and air emissions.

Removing the freight bottleneck would likely shift some amount of freight transport away from trucks traveling on Interstates 5 and 80 onto the UPRR mainline. Because rail transport has lower emissions per ton of freight moved as compared to truck transport, the switch from truck to train will lower emissions in the Sacramento area, reducing both criteria pollutant and GHG emissions. This is a less-than-significant impact.

Phase 2—Sacramento Valley Station Improvements

In Phase 2, several improvements would be made to the Sacramento Valley Station, including reconfiguring existing parking that will add 153 additional parking spaces and 330 additional auto trips per day. Table 3 summarizes the emissions associated with those trips. As Table 3 shows, emissions would be less than the SMAQMD's significance thresholds established for ROG and NOx. The SMAQMD has not established thresholds for CO, PM10, PM2.5 or carbon dioxide (CO_2). This is a less-than-significant impact.

Table 3. Phase 2 Operational Emissions (pounds per day)

	ROG	NOx	CO	PM10	PM2.5	CO_2
Phase 2	1.7	2.0	22.9	4.2	0.8	2,626.5
SMAQMD threshold	65	65	—	—	—	—
Exceed threshold	No	No	NA	NA	NA	NA

Emissions estimated using trip generation rates from project traffic report (Dowling and Associates 2008) and URBEMIS model version 9.2.4 for year 2014.

NA = not applicable, SMAQMD has not established a mass emissions threshold for this pollutant.

Phase 3—Intermodal Improvements

The SITF project was evaluated as part of the Railyards Specific Plan (RSP) environmental impact report (EIR). That analysis used the same terminal square footages as the project. The traffic analysis for the SITF portion of the RSP EIR assumed no incremental increase in vehicle trips for the SITF site (City of Sacramento 2007). Consequently, Phase 3 would not increase vehicle trips or vehicle emissions.

Phase 3 would increase area source emissions associated with natural gas combustion used for space and water heating and gasoline combustion used for landscape maintenance equipment. Table 4 shows the area source emissions associated with Phase 3. Emissions of ROGs and NOx would be less than the SMAQMD's significance thresholds. Also, CO, PM10, and PM2.5 emissions would be negligible. This is a less-than-significant impact.

Table 4. Phase 3 Area Source Emissions (pounds per day)

Source	ROG	NOx	CO	PM10	PM2.5	CO_2
Natural gas	0.06	0.84	0.71	0.00	0.00	1,009.88
Landscape	0.12	0.02	1.55	0.01	0.01	2.81
Architectural coatings	0.75	—	—	—	—	—
Total (unmitigated)	0.93	0.86	2.26	0.01	0.01	1,012.69

Carbon Monoxide Hot Spots

Phase 1—Track Relocation

Phase 1 would not generate additional vehicle trips. Consequently, it would not increase traffic congestion at intersections near the project. There would no CO impacts associated with Phase 1.

Phase 2—Sacramento Valley Station Improvements

Project concentrations from local traffic were evaluated by modeling roadside CO concentrations. Three intersections affected by the project would operate at a level of service (LOS) D, E, or F. Of these, the 3rd and J Street intersection would have the worst LOS (E) and the highest traffic volumes (Dowling and Associates 2008). Consequently, CO modeling was conducted for the intersection of 3rd and J Streets under existing and future conditions.

Table 5 shows the CO modeling results. The results show that, even assuming worst-case modeling conditions, the project would not cause or contribute to violations of the ambient standards. Consequently, Phase 2's CO impacts are less than significant.

Phase 3—Intermodal Improvements

As described in the traffic appendix of the RSP EIR, Phase 3 of the SITF project would not increase vehicle trips (City of Sacramento 2007). Consequently, Phase 3 would not increase vehicle congestion or CO concentrations in the vicinity of the SITF.

The SITF represents one small portion of the overall RSP. Buildout of the specific plan would increase vehicle trip generation and CO concentrations. However, the RSP EIR shows that the increase in CO resulting from full build-out would not result in violations of the CO standards (City of Sacramento 2007). Therefore, the CO impacts associated with buildout of the specific plan, which includes Phase 3, would be less than significant.

Table 5. Estimated CO Concentrations (parts per million)

3rd Street/J Street Intersection	Existing	Existing	Future	Future
Averaging period	1-hour	8-hour	1-hour	8-hour
Concentration	3.1	2.2	1.6	1.1
Background	8.0	5.6	8.0	5.6
Total	11.1	7.8	9.6	6.7
Ambient standard	20	9	20	9
Exceed standard	No	No	No	No

One-hour concentrations estimated using CALINE4 model, traffic volumes (Dowling and Associates 2008), and on-road CO emission factors developed with the EMFAC2007 model. Eight-hour concentrations represent modeling 1-hour concentrations converted to 8-hour average a persistence factor of 0.7. Background concentrations were based on the highest monitored 1-hour and 8-hour concentrations during the last 4 years.

PM10/PM2.5 Hotspots

The EPA and the FHWA (which is part of the U.S. Department of Transportation) have developed joint guidance that lists the following five project types as projects of air quality concern (POAC). Projects classified as POACs merit more in-depth review; projects considered POACs are:

- new or expanded highway projects that have a significant number of or a significant increase in diesel vehicles;
- projects affecting intersections that are at Level-of-Service D, E, or F with a significant number of diesel vehicles or those that will change to Level-of-Service D, E, or F because of increased traffic volumes from a significant number of diesel vehicles related to the project;
- new bus and rail terminals and transfer points that have a significant number of diesel vehicles congregating at a single location;
- expanded bus and rail terminals and transfer points that significantly increase the number of diesel vehicles congregating at a single location; and
- projects in or affecting locations, areas, or categories of sites that are identified in the PM2.5 or PM10 applicable implementation plan or implementation plan submission, as appropriate, as sites of violation or possible violation.

Each phase of the project was reviewed against these five criteria to determine PM10/PM2.5 significance.

Phase 1—Track Relocation

Phase 1 would not increase vehicle trips, affect nearby intersections, and would not result in an increase in PM10/PM2.5 emissions. Because Phase 1 would reduce diesel locomotive idling, it would have a beneficial air quality effect by reducing PM10/PM2.5 emissions. Phase 1 would have less-than-significant PM10/PM2.5 hot spot impacts.

Phase 2—Sacramento Valley Station Improvements

Phase 2 does not represent a new or expanded highway project, so the first of the five criteria does not apply. Only two intersections operating a LOS D, E, or F would be affected by the project, and only during Phase 2. Neither Phase 1 nor 2 would generate additional trips. Because Phase 2 would only generate light duty vehicles trips, the second criteria would not apply. The project is not a new terminal, so the third criterion does not apply. The fourth criterion is most applicable to the project because the project consists of an expanded bus and rail terminal. However, neither Phase 1 nor 3 would generate any additional vehicle trips, and although Phase 2 will generate additional trips, those trips would only consist of additional light duty vehicles. Consequently, the fourth criterion does not apply. The fifth criterion does not apply because the SITF site does not represent a location identified as having possible violations of the PM10/PM2.5 standards.

Consequently, the project would not be considered a POAC as defined in the EPA/FHWA guidance (U.S. Environmental Protection Agency and U.S. Department of Transportation 2006), and the project would not result in significant PM10/PM2.5 hot spot impacts.

Phase 3—Intermodal Improvements

As described above, Phase 3 would not increase vehicle trips or PM10/PM2.5 hotspots associated with vehicles. The only increase in PM10/PM2.5 emissions during Phase 3 would result from area sources. However, PM10/PM2.5 emissions from area sources are negligible (see Table 4). Consequently, Phase 3 would not result in a significant PM10/PM2.5 emissions increase. This impact is less than significant.

Toxic Air Contaminants

Phase 1—Track Relocation

Phase 1 would not increase vehicle trips as compared to no-project conditions. Consequently, Phase 1 would not generate an increase in TAC emissions. Under FHWA's MSAT criteria, Phase 1 has a low potential to cause significant MSAT effects (U.S. Department of Transportation 2006). This is because the project is designed to encourage transit use and would reduce traffic congestion. The project would not contribute to a significant increase in TACs and this impact is less than significant.

Phase 2—Sacramento Valley Station Improvements

Phase 2 would result in a minor amount of additional trips as compared to no-project conditions. However, as with Phase 1, Phase 2 would have a low potential to cause significant MSAT effects. The additional parking capacity would generate an increase of 330 trips per day, which would consist of light-duty vehicles (Dowling and Associates 2008). The project would not contribute to a significant increase in TACs and this impact is less than significant.

Phase 3—Intermodal Improvements

Phase 3 would not increase vehicle trips as compared to no-project conditions. Consequently, Phase 3 would not generate an increase in TAC emissions and would have a low potential to cause significant MSAT effects. The project would not contribute to a significant increase in TACs. Phase 3 TAC impacts are less than significant.

The RSP EIR included a health risk assessment for buildout of the entire specific plan. That cumulative analysis, which included the SITF project, found that the project would not cause a significant health risk. This further confirms that the SITF project's cumulative TAC impacts are less than significant.

Greenhouse Gas Emissions

Phase 1—Track Relocation

Phase 1 would not result in an operational increase in CO_2 emissions. CO_2 emissions would likely decrease because having passenger and freight trains operating on different tracks would reduce locomotive idling. This impact is less than significant.

Phase 2—Sacramento Valley Station Improvements

Phase 2 would generate an increase in GHG emissions of 2,614 pounds per day, which is equivalent to 433 metric tons CO_2 per year. These emissions are associated with the increase in vehicle trips generated by Phase 2's increase in parking spaces. Actual GHG emissions would likely be lower because cause more trips to be taken by transit vehicles at the expense of motor vehicle trips. This impact is less than significant.

Phase 3—Intermodal Improvements

Phase 3 would increase CO_2 emissions by approximately 1,013 pounds per day, which is equivalent to 167 metric tons of CO_2 per year. These emissions would result from area source fuel combustion associated with natural gas used for space and water heating of the SITF Terminal and from gasoline used to power landscape maintenance equipment. This impact is less than significant.

Conformity—Regional (Phases 1, 2, and 3)

A regional and project-specific conformity determination is required to ensure that the project meets federal requirements. Because the Sacramento area is nonattainment for the federal ozone and PM10 standards, and a maintenance area for CO, a regional conformity analysis is needed to ensure that the project's emissions meet the regional budget tests for these pollutants.

The project is included in the Sacramento Area Metropolitan Council of Governments (SACOG) Metropolitan Transportation Improvement Program (MTIP) 2009/12, issued in June 2008 (Sacramento Area Metropolitan Council of Governments 2008). This MTIP and its associated conformity determination are expected to be finalized by the end of 2008. However, if the MTIP's conformity determination is approved for the proposed MTIP, the project would not meet regional conformity requirements.

This is because the three SITF phases are inconsistent with the dates and descriptions listed in the 2009/12 MTIP. Phase 1 of the SITF is listed in the MTIP (SACOG ID # 24414) as being completed in 2012, when the expected date for completion is 2010 (Reiger pers. comm.). The expected completion date for Phase 2 (SACOG ID # 24378) is shown as 2011 in the MTIP, when the estimated completion date is 2013 (Reiger pers. comm.). Also, the Phase 2 project identified as SACOG ID# 24378 in the MTIP is inconsistent with Phase 2 project description. Finally, the expected completion date for Phase 3 is listed in the MTIP (SACOG ID # SAC2035) as being completed in 2013, when the actual date is 2017 (Reiger pers. comm.).

The timing of each SITF phase would need to be corrected in the MTIP before it becomes final and, once corrected, the conformity analysis would need to be revised and approved by FHWA.

This is a significant impact that would need to be mitigated by revising the 2009/12 MTIP before it becomes final. The 2009/12 conformity analysis must also be revised to ensure consistency with the revised MTIP.

Conformity—Project Specific (Phases 1, 2, and 3)

The project would not cause or contribute to violations of the California or national ambient air quality standards. The CO modeling results found that the project would not result in violations of either federal or state CO standards. Also, the project would not be considered a POAC and would not cause or contribute to violations of either the federal or state PM10/PM2.5 standards.

References

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Personal Communications

Reiger, Allene. Transystems. July 16, 2008—e-mail to Vicki Axiaq of ICF Jones & Stokes regarding construction phasing and construction equipment.