Trinity Consultants

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VIA ELECTRONIC MAIL

December 16, 2005

Donald Funderlic, P.E.
Camp Dresser & McKee
777 Taylor Street, Suite 1050
Fort Worth, TX 76102

RE: General Conformity Analysis, Upper Trinity River Project, Revision 1

Dear Mr. Funderlic:

Camp Dresser & McKee (CDM) has retained Trinity Consultants (Trinity) to assist in the preparation of a draft Environmental Impact Statement (EIS) for the proposed Upper Trinity River Project. CDM has requested that Trinity prepare a response to U.S. Environmental Protection Agency (EPA) and Texas Commission on Environmental Quality (TCEQ) requests additional information in support of the draft EIS.[1,2] Specifically, a request was made as to whether emissions from the proposed project would trigger a General Conformity analysis and/or require revisions to the EIS. Trinity's original analysis generated a request by TCEQ to include some additional sources in the analysis and to revise the analysis based on the highest activity calendar year, rather than the highest activity 12-month period originally used.[3] This letter contains Trinity's ***revised*** estimate of air emissions from the proposed project, which shows that a General Conformity analysis is not required.

SUMMARY

Air Emissions from the proposed project would result primarily from engines in off-road construction equipment. However, at the request of TCEQ, we have calculated emissions from on-road sources that will be directly involved with the project. These include workers' private vehicles (i.e., driving to and from the job site), concrete and steel delivery trucks and other maintenance and delivery vehicles.

In accordance with EPA and TCEQ guidance, air emissions from the non-road equipment were calculated using emission factors from EPA's draft NONROAD 2004 emission model and compared to TCEQ's General Conformity *de minimis* thresholds. Emissions from on-road vehicles were calculated using emission factors provided by the North Texas Council of

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[1] August 12, 2005 letter from John Blevins, U.S. EPA to William Fickel, U.S. Army Corps of Engineers
[2] July 28, 2005 letter from Candice Garrett, TCEQ to Rebecca Griffith, U.S. Army Corps of Engineers
[3] November 21, 2005 telephone call between Ken Gathright, TCEQ and Doug Reeves, Trinity.

Governments (NTCOG), which were developed by NTCOG specifically for the DFW metroplex using the EPA MOBILE6 emission model.

Based upon conservative estimations on the type and operation of equipment projected to be used in the Upper Trinity River project, the calculated emissions for all pollutants are less than 100 tons per year. Therefore, further General Conformity analysis is not required for the project.

BACKGROUND

Section 176(c)(1) of the Clean Air Act (CAA) and 40 CFR 51 Subpart W contain requirements for what is termed "General Conformity". The General Conformity rule prohibits any Federal agency from supporting or approving any action or project that does not conform to an EPA-approved State Implementation Plan (SIP). In the Texas SIP, EPA has approved TCEQ's request for "*de minimis*" levels for determining what projects require a detailed conformity analysis; projects that have annual emissions less then the *de minimis* levels do not require additional analysis. For the D/FW nonattainment area, the *de minimis* levels established in the SIP are 100 ton/yr of NOx and VOC.[4] This was reiterated in a July 28, 2005 letter from TCEQ to the U.S. Army Corps of Engineers, stating that if project emissions were less than 100 ton/yr, a General Conformity analysis would not be required.

EMISSION CALCULATION

NON-ROAD SOURCES

Air emissions from non-road sources associated with proposed project were calculated using emission factor calculations used in EPA's draft NONROAD 2004 emission model.[5] The formula for calculating the emission factors for actual run hours is found in Equation 1 below:

$$EF_{adj} = EF_{SS} \times LF \times TAF \times DF \qquad \textit{Equation 1}$$

Where:
- EF_{adj} = Total adjusted emission factor
- EF_{SS} = Steady-state emission factor
- LF = Load factor
- TAF = Transient adjustment factor, and
- DF = Deterioration factor

Emissions for idling periods (i.e. hours when the equipment engines are running but the equipment is not performing work) were estimated using idling emission factors for Class 8

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4 30 TAC 101.30

5 U.S. EPA, Assessment and Standards Division, Office of Transportation and Air Quality, *Exhaust and Crankcase Emission Factors for Nonroad Engine Modeling, Compression-Ignition*, (EPA420-P-04-009, 2004)

heavy-duty diesel vehicles (HDDV) generated by the EMFAC2002 model.[6] These factors can be found in Table 1 below.

TABLE 1. IDLING EMISSION FACTORS FOR NON-ROAD EQUIPMENT, g/HR

HC	CO	NOx	PM
3.48	26.3	80.7	1.0

Total emissions were calculated by estimating the number of run and idle hours for all equipment, and multiplying those hours by their respective emission factors.

Hours of operation (both idle and running) for each type of non-road equipment were estimated for the highest activity calendar year (2009) by CDM. A detailed list of equipment, their estimated hours of operation, and equipment specifications used can be found in Table 2 below. The "utilization factor" contained in the table is the fraction of the operating hours that the specific equipment spends performing work; the remaining time is assumed to be at idle. Note that idling emissions were not included in the previous version of our analysis.

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[6] Clarke, et. al., *Idle Emissions from Heavy Duty Diesel Vehicles*, September 19, 2005 presentation, West Virginia University, Center for Alternative Fuels, Engines and Emissions

TABLE 2. EQUIPMENT AND SPECIFICATIONS

Description of Equipment	Rated HP	No. of Units	Working Days/Unit	Working Hrs/Unit	Total Working Hours	Util. Factor[1]	Total No. of Run Hours	Total No. of Idle Hours
Crawler Crane (200 Ton)	260	3	52	417.6	1,252.8	0.9375	1,175	78
Crawler Crane (80 Ton)	200	5	104	835.2	4176	0.9375	3915	261
Mobile Crane (75 Ton)	275	1	104	835.2	835.2	0.9375	783	52
Telescopic Handlers (CAT TH560B)	100	3	261	2,088	6,264	0.9375	5873	392
Misc. Equipment (Pumps, Lifts, etc.)	50	6	261	2,088	12,528	0.75	9396	3,132
Excavator (CAT 345B II)	321	1	78	626	626	0.75	470	157
Dozer (CAT D6N XL)	145	4	36	288	1,152	0.75	864	288
Motor Graders (CAT 14H)	220	4	15	120	480	0.75	360	120
Articulated Truck (CAT 740)	415	2	52	418	835	1.0	835	0
Soil Compactor (CAT 825 G)	339	1	52	418	418	0.975	408	10
Vibratory Compactors (CAT CS-583E)	150	4	15	120	480	0.75	360	120
Concrete Paver (Gomaco GP-2600)	275	5	12	96	480	1.0	480	0
Skid Steer Loaders (CAT 268B)	80	8	88	704	5,632	0.75	4224	1,408
Misc. Equipment (Pumps, Lifts, etc.)	50	6	88	704	4,224	0.75	3168	1,056
Excavator (CAT 345B II)	321	4	91	728	2,912	1.0	2912	0
Excavator (CAT 345B II)	321	4	19	152	608	1.0	608	0
Dozer (CAT D10R)	850	4	16	128	512	1.0	512	0
Dozer (CAT D8R)	305	10	75	600	6,000	1.0	6000	0
Articulated Truck (CAT 740)	415	14	60	480	6,720	1.0	6720	0
Soil Compactor (CAT 825 G)	339	2	91	728	1,456	0.98	1420	36
Wheel Loader (CAT 980G)	319	2	3	27	54	1.0	54	0
Mobile Crane (75 Ton)	275	2	34	272	544	0.9375	510	34
Telescopic Handlers (CAT TH560B)	100	2	34	272	544	0.9375	510	34
Excavator (CAT 345B II)	321	1	8	64	64	1.0	64	0
Vibratory Compactor	50	1	8	64	64	1.0	64	0
Misc. Equipment (Pumps, Lifts, etc.)	50	4	34	272	1,088	0.75	816	272
Excavator (CAT 345B II)	321	1	240	1,920	1,920	1.0	1920	0
Excavator (CAT 345B II)	321	9	88	704	6,334	0.75	4751	1,584
Excavator (CAT 325C)	188	1	200	1,600	1,600	0.75	1200	400
Dozer (CAT D6N XL)	145	1	80	640	640	0.75	480	160
Mobile Crane (75 Ton)	275	1	200	1,600	1,600	0.9375	1500	100
Telescopic Handlers (CAT TH560B)	100	1	200	1,600	1,600	0.9375	1500	100
Misc. Equipment (Pumps, Generator, etc.)	50	4	253	2,024	8,096	0.75	6072	2,024

[1] The utilization factor presented is the factor given by CDM increased by 50%.

Trinity has made several major assumptions about the type and operation of the equipment. In all cases, these assumptions were either the default values in the NONROAD2004 model or more conservative estimates (i.e., resulting in higher emissions) when compared to a detailed fleet profile.

First, Trinity assumed that all engines in the construction equipment were "Tier 0" engines, i.e., the engines were built after the 1988 model year (MY), but are not certified to EPA's Tier 1, 2, 3 or 4 emission standards. It is unlikely that there will be many engines used in the project that were built prior to the 1988MY, but there may be many engines that are certified to the Tier 1 or 2 standards. As such, this estimate is likely overestimating emissions by assuming that all equipment was manufactured after 1988 but before the implementation of the EPA Tier 1/2/3/4 certified engine requirements; the year that certified engines are required varies with the size of the equipment, but is the 2001 model year for most equipment.

Second, Trinity increased the utilization factors for all non-road equipment by a factor of 50% (except for those already projected to run 100% of operating hours). This serves to overestimate emissions by biasing the equipment from idling to running; idling emissions are significantly lower than running emissions. Also, Trinity assumed that the engines were at 50% of their useful life and included appropriate emissions degradation factors (i.e., factors that account for the fact that engine emissions increase during the life of the engine). Finally, Trinity used default TAFs and LFs contained in the NONROAD2004 model; these factors adjust the steady-state emission factors for the typical in-use conditions experienced by the equipment (e.g., short periods at high load followed by long periods at idle).

Trinity calculated the emission factors found in Table 3 below using Equation 1 in conjunction with default factors from EPA guidance.[7]

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[7] "Median Life, Annual Activity, and Load Factor Values for Nonroad Engine Emissions Modeling." U.S. Environmental Protection Agency, Report No. NR-005c, April 2004.

TABLE 3. NON-ROAD EQUIPMENT ADJUSTED EMISSION FACTORS, g/BHP

Description of Equipment	HC	CO	NOx	PM
Crawler Crane (200 Ton)	0.2993	1.2684	3.6466	0.1908
Crawler Crane (80 Ton)	0.2993	1.2684	3.6466	0.1908
Mobile Crane (75 Ton)	0.2993	1.2684	3.6466	0.1908
Telescopic Handlers (CAT TH560B)	0.6277	3.4418	3.9139	0.6067
Misc. Equipment (Pumps, Lifts, etc.)	1.1413	4.9310	3.9139	0.6722
Excavator (CAT 345B II)	0.4312	2.6627	4.7534	0.3378
Dozer (CAT D6N XL)	0.4312	2.6627	4.7534	0.3378
Motor Graders (CAT 14H)	0.4312	2.6627	4.7534	0.3378
Articulated Truck (CAT 740)	0.4312	2.6627	4.7534	0.3378
Soil Compactor (CAT 825 G)	0.4312	2.6627	4.7534	0.3378
Vibratory Compactors (CAT CS-583E)	0.2993	1.2684	3.6466	0.1908
Concrete Paver (Gomaco GP-2600)	0.4312	2.6627	4.7534	0.3378
Skid Steer Loaders (CAT 268B)	0.6277	3.4418	3.9139	0.6067
Misc. Equipment (Pumps, Lifts, etc.)	1.1413	4.9310	3.9139	0.6722
Excavator (CAT 345B II)	0.4312	2.6627	4.7534	0.3378
Excavator (CAT 345B II)	0.4312	2.6627	4.7534	0.3378
Dozer (CAT D10R)	0.4312	2.6627	4.7534	0.3378
Dozer (CAT D8R)	0.4312	2.6627	4.7534	0.3378
Articulated Truck (CAT 740)	0.4312	2.6627	4.7534	0.3378
Soil Compactor (CAT 825 G)	0.4312	2.6627	4.7534	0.3378
Wheel Loader (CAT 980G)	0.4312	2.6627	4.7534	0.3378
Mobile Crane (75 Ton)	0.2993	1.2684	3.6466	0.1908
Telescopic Handlers (CAT TH560B)	0.6277	3.4418	3.9139	0.6067
Excavator (CAT 345B II)	0.4312	2.6627	4.7534	0.3378
Vibratory Compactor	0.7922	2.3489	3.0026	0.3797
Misc. Equipment (Pumps, Lifts, etc.)	1.1413	4.9310	3.9139	0.6722
Excavator (CAT 345B II)	0.4312	2.6627	4.7534	0.3378
Excavator (CAT 345B II)	0.4312	2.6627	4.7534	0.3378
Excavator (CAT 325C)	0.4312	2.6627	4.7534	0.3378
Dozer (CAT D6N XL)	0.4312	2.6627	4.7534	0.3378
Mobile Crane (75 Ton)	0.2993	1.2684	3.6466	0.1908
Telescopic Handlers (CAT TH560B)	0.6277	3.4418	3.9139	0.6067
Misc. Equipment (Pumps, Generator, etc.)	1.1413	4.9310	3.9139	0.6722

Based on these emission factors, emissions were calculated based on the equipment specifications in Table 2. Total emissions from non-road sources are found below in Table 4.

TABLE 4. NON-ROAD VEHICLE EMISSIONS, TON/YR

Equipment	HC	CO	NOx	PM
Crawler Crane (200 Ton)	202	858	2,469	129
Crawler Crane (80 Ton)	519	2,205	6,341	330
Mobile Crane (75 Ton)	142	605	1,740	91
Telescopic Handlers (CAT TH560B)	816	4,479	5,137	786
Misc. Equipment (Pumps, Lifts, etc.)	1,206	5,289	4,611	703
Excavator (CAT 345B II)	144	894	1,607	113
Dozer (CAT D6N XL)	121	752	1,364	94
Motor Graders (CAT 14H)	76	472	851	59
Articulated Truck (CAT 740)	330	2,037	3,636	258
Soil Compactor (CAT 825 G)	131	812	1,450	103
Vibratory Compactors (CAT CS-583E)	37	158	455	23
Concrete Paver (Gomaco GP-2600)	125	775	1,383	98
Skid Steer Loaders (CAT 268B)	478	2,646	3,166	455
Misc. Equipment (Pumps, Lifts, etc.)	407	1,783	1,555	237
Excavator (CAT 345B II)	889	5,487	9,795	696
Excavator (CAT 345B II)	186	1,146	2,045	145
Dozer (CAT D10R)	414	2,555	4,561	324
Dozer (CAT D8R)	1,739	10,743	19,177	1,363
Articulated Truck (CAT 740)	2,651	16,371	29,224	2,077
Soil Compactor (CAT 825 G)	458	2,827	5,050	358
Wheel Loader (CAT 980G)	16	101	181	13
Mobile Crane (75 Ton)	93	394	1,134	59
Telescopic Handlers (CAT TH560B)	71	389	446	68
Excavator (CAT 345B II)	20	121	215	15
Vibratory Compactor	6	17	21	3
Misc. Equipment (Pumps, Lifts, etc.)	105	459	400	61
Excavator (CAT 345B II)	586	3,618	6,459	459
Excavator (CAT 345B II)	1,462	9,046	16,267	1,139
Excavator (CAT 325C)	218	1,348	2,435	169
Dozer (CAT D6N XL)	67	418	758	52
Mobile Crane (75 Ton)	273	1,159	3,334	174
Telescopic Handlers (CAT TH560B)	208	1,144	1,312	201
Misc. Equipment (Pumps, Generator, etc.)	779	3,418	2,980	454
TOTAL (lb/yr)	14,974	84,523	141,558	11,310
TOTAL (ton/yr)	**7.49**	**42.26**	**70.78**	**5.65**

A comparison of Table 4 with the previous analysis shows that estimated emissions for the 2009 calendar year are higher than the previous estimate. This is due to the incorporation if idling emissions into the emission inventory.

ON-ROAD SOURCES

Emissions from on-road vehicles associated with the project were estimated using emission factors provided by NCTCOG.[8] These factors have been developed by NCTCOG specifically for performing conformity analyses in the DFW nonattainment area by using EPA's MOBILE6 on-road vehicle emission model. The factors have units of grams per vehicle mile traveled (g/VMT) and are given for each combination of vehicle class and county.[9] For purposes of simplicity, emissions from vehicle traffic were calculated with the factors for Tarrant County, although there is little variation in the emission factors between counties. Table 5, below presents the NCTCOG emission factors.

TABLE 5. ON-ROAD VEHICLE EMISSION FACTORS, g/VMT

Vehicle	MOBILE6 Vehicle Class	HC	CO	NOx	PM[A]
Gasoline Passenger Vehicle (LDGV)	LDGV	0.66	8.37	0.53	N/A
Heavy Duty Diesel Truck, Class 8	HDDV8	0.37	2.06	11.30	N/A
Heavy Duty Diesel Truck, Class 6	HDDV6	0.22	1.07	4.62	N/A
Heavy Duty Diesel Truck, Class 3	HDDV3	0.16	0.83	3.43	N/A

A PM Emission factors were not provided by NCTCOG.

Estimates of VMT for each type of vehicle associated with the project were provided by CDM. While CDM did estimate the type of vehicle, data such as the gross vehicle weight rating (GVWR) were not provided. Trinity assumed that all trucks delivering concrete, steel and girders and low-boy style equipment delivery trucks were evenly split between Class 8a and 8b diesel trucks. Fueling and other delivery trucks were assumed to be Class 6 diesel vehicles, while vehicle maintenance trucks were assumed to be Class 3 (heavy pick-up) diesel vehicles.[10] The vehicle data are summarized in Table 6, below.

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8 December 14, 2005 email from Venugopal, Madhusudhan. Transportation Planner, NCTCOG to Rupangi Munshi, Trinity.

9 Emission factors for PM were not provided. However, TCEQ has not officially requested quantification of emissions of PM (see July 28, 2005 letter from TCEQ to U.S. Army Corps of Engineers).

10 For additional data on vehicle classes, see *User's Guide to MOBILE6.1 and MOBILE6.2*, EPA420-R-03-010, Section 1.2.3.

TABLE 6. ON-ROAD VEHICLE DATA

Vehicle Type	MOBILE6 Vehicle Class	Annual VMT
Workers' Personal Vehicles	LDGV	857,640
Concrete Delivery Trucks	HDDV8	13,840
Tractor-Trailer Low-Boy	HDDV8	10,200
Tractor-Trailer Dump Truck	HDDV8	204,700
Steel Delivery Trucks	HDDV8	6,160
Girder Delivery Trucks	HDDV8	12,000
Fueling Trucks	HDDV8	40,880
Delivery Vehicles	HDDV6	13,920
Maintenance Vehicles	HDDV3	20,311

Emissions from each vehicle class were then calculated using the emission factors provided by NCTCOG. The results are listed in Table 7, below.

TABLE 7. ON-ROAD VEHICLE EMISSIONS, TON/YR

Equipment	HC	CO	NOx	PM[A]
Workers' Personal Vehicles	0.61	7.91	0.50	N/A
Concrete Delivery Trucks	0.01	0.03	0.17	N/A
Tractor-Trailer Low-Boy	0.00	0.02	0.13	N/A
Tractor-Trailer Dump Truck	0.08	0.43	2.55	N/A
Steel Delivery Trucks	0.00	0.01	0.08	N/A
Girder Delivery Trucks	0.00	0.03	0.15	N/A
Fueling Trucks	0.02	0.09	0.51	N/A
Delivery Vehicles	0.00	0.02	0.07	N/A
Maintenance Vehicles	0.00	0.02	0.08	N/A
Total	**0.73**	**8.60**	**4.24**	**N/A**

A PM Emission factors were not provided by NTCOG.

CONCLUSION

Emissions from Non-Road and On-Road sources associated with the Fort Worth Central City project were calculated using emission factors from the NONROAD and MOBILE6 EPA emission models and activity estimates provided by CDM. Emissions from these sources are summarized in Table 8, below.

TABLE 8. SUMMARY OF MOBILE SOURCE EMISSIONS

Category	**HC**	**CO**	**NOx**	**PM[A]**
Non-Road Equipment	7.49	42.26	70.78	5.65
On-Road Vehicles	0.73	8.60	4.24	N/A
Total	**8.22**	**50.86**	**75.02**	**N/A**

A PM Emission factors for on-road vehicles were not provided by NTCOG.

As the table shows, emissions of all pollutants (i.e., NO_X, CO, PM and VOC) are less than 100 ton/yr; the highest emitted pollutant was NO_X at 75 ton/yr. Therefore, emissions from the proposed project are less than the General Conformity *de minimis* levels established by TCEQ, and no further analysis is required.

Please do not hesitate to contact Mr. Robert Liles, Principal Consultant or myself at (972) 661-8100 if you have any questions about our analysis or any other matter.

Regards,

TRINITY CONSULTANTS

B. Douglas Reeves
Managing Consultant

Cc: Mr. Robert Liles, Trinity Consultants
Mr. Michael T. Hammer, Trinity Consultants
Ms. Rupangi Munshi, Trinity Consultants