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PURCHASING GUIDELINES

FOR

MEDIUM AND HEAVY TRUCKS

prepared at a

Government-Industry Conference

convened in

Olympia, Washington

on

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by the

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"BUY QUIET" PROGRAM

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I. INTENDED USE OF GUIDELINES

These guidelines have been prepared to help state agencies, cities, and other governmental units purchase better medium and heavy trucks at competitive prices. Specifically, they suggest an approach for purchasing quieter, cleaner, more fuel efficient trucks with a lower total cost of ownership through the competitive bidding process.

Towards the end, this document contains suggested specification language, a suggested bid evaluation formula, and a suggested bidder's price/data sheet which can be incorporated into a government's invitation for bids. This language, formula, and price/data sheet were developed at a government-industry conference convened by NIGP in Olympia, Washington on May 21, 1982.

No effort to establish a complete specification for medium and heavy trucks has been made. Rather, the central focus is on a suggested bid evaluation formula which considers the "value of noise reduction," the "value of cleaner air," the "cost of energy," the projected "preventive maintenance cost," a not-to-exceed "guaranteed maintenance" price, and a "guaranteed buy back" price.

The other elements (the suggested specification language and the bidder's price/data sheet) are of equal importance, however, since they are essential complements to the bid evaluation formula.

II. SUGGESTED SPECIFICATION LANGUAGE

(to be incorporated into a government's current specifications)

BID EVALUATION FACTORS: As explained in Attachment A to this specification the contract that results from this procurement will be awarded to the responsive and responsible bidder whose "evaluated bid price," based on the indicated bid evaluation formula, is lowest. In addition to purchase price, this bid evaluation formula considers the "value of noise reduction," the "value of cleaner air " and the "cost of energy,"

Sections below require the bidder to provide information regarding "pass by" noise level, engine air pollution emission levels, fuel consumption rate,

This information will be used to calculate an evaluated bid price for each bidder.

"PASS BY" NOISE LEVEL: Bidder shall provide sound level in decibels (A Scale) measured in accordance with the U.S. Environmental Protection Agency Noise Test Procedure for Medium and Heavy Trucks, as contained in the Federal Register, Tuesday, April 13, 1976, Part III, Environmental Protection Agency, Noise Emission Standards for Transportation Equipment: Medium and Heavy Duty Trucks, pp. 15538-15558. Space for providing this information is set aside on the Bidder's Price/Data Sheet. Failure to provide this information will result in bid being considered non-responsive.

ENGINE AIR POLLUTION EMISSION LEVELS: Bidder shall provide engine air pollution emission levels for (a) hydrocarbons, (b) carbon monoxide, and (c) hydrocarbons and oxides of nitrogen, measured in accordance with 40 CFR, Part 86, Subpart D,

"Control of Air Pollution from New Motor Vehicle Engines, Certifications, and Tests." (Procedures for gasoline and diesel engines differ slightly). Space for providing this information is set aside on the Bidder's Price/Data Sheet. Failure to provide this information will result in bid being considered non-responsive.

FUEL CONSUMPTION RATE _____: Bidder shall provide engine fuel consumption rate in gallons of fuel per horsepower hour, measured in accordance with brake specific fuel consumption (BSFC) as determined under test conditions of SAE J816 of latest issue of the R.P.M. specified in the BID INVITATIONS. Space for providing this information is set aside on the Bidder's Price/Data Sheet. Failure to provide this information will result in the bid being considered non-responsive.

III. SUGGESTED BID EVALUATION FORMULA

(This suggested bid evaluation formula has been prepared by the National Institute of Governmental Purchasing, Inc. (NIGP) in cooperation with the Federal Supply Service, G.S.A., local and state government purchasing agencies, and industry representatives. It is designed for use as an attachment to a government's own specifications.)

"BUY QUIET/BUY CLEAN/BUY EFFICIENT" LIFE CYCLE COST BID EVALUATION FORMULA FOR MEDIUM AND HEAVY TRUCKS

(Attachment A)

Purpose

The purpose of this formula is to permit the (State, City, County, etc) to purchase a quieter, more energy efficient truck which pollutes the air less and has a lower total cost of ownership. In effect, it allows a government to offer a competitive bid on a unit which may be slightly more expensive to acquire initially, but which will make less noise, use less energy, burn more cleanly, and cost less to own during its useful life.

Method

This formula will be used to calculate an "evaluated" bid price for each bidder's offer; and evaluated bid prices, rather than "actual" bid prices, will be compared in the determination of the lowest and best bidder. (As stated in the purchase description,) each bidder must provide information regarding pass-by noise level, engine air pollution emission levels, engine fuel consumption rate, preventive maintenance cost, guaranteed maintenance price, and the guaranteed buy back price offered.

This information and the purchase price offered will be inserted into the formula provided below to calculate the evaluated bid price for each bidder. Failure to provide this information will result in a bidder's bid being considered non-responsive.

Formula and Criteria

The formula for determining "Evaluated Bid Price" (EBP) is:

EBP = P - VNR - VCA + CE

Where:

EBP = Evaluated Bid Price

P = Actual Bid Price

VNR = Value of (Additional) Noise Reduction (this "value" compensates the bidder, for evaluation purposes only, by giving him dollar credit for each decibel that the model he offers is quieter than the noisiest model offered "responsively." A formula for calculating VNR is provided below.)

VCA = Value of Cleaner Air (This value compensates the bidder, for evaluation purposes only, by giving him dollar credit for engine emission levels that are below the levels mandated in national air pollution emission standards for medium and heavy trucks. A formual for calculating VCA is provided below.)

CE = Cost of Energy (e.g., gasoline, diesel, or propane fuel) required to operate the vehicle during its projected life. (A formula for calculating CE is provided below.)

Step One: Calculate the Value of Noise Reduction (VNR)

The formula for calculating VNR is:

$$VNR = Y\ (P_{AV})\ (N_N - N)$$

Where:

Y = the percentage of P_{AV} (defined below) by which the purchasing agency will "compensate" (or "reward") the bidder, for bid evaluation purposes only, for each decibel that the model he offers is quieter than the noisiest model offered responsively, ($N_N - N$). For purposes of this procurement, Y=___%, expressed as _____.

P_{AV} = the mean average of the Actual Bid Prices (Ps) for all models offered responsively. (NOTE: In cases where a bidder offers one or more "alternates," only the model with the lowest noise level and meeting the requirements of the Invitation for Bids shall be considered for bid evaluation and contract award.)

N_N = the "pass by" noise level in decibels (A Scale) of the noisiest model offered responsively.

N = the "pass by" noise level in decibels (A Scale) of the model for which VNR (and EBP) is being calculated.

Step Two: Calculate the Value of Cleaner Air (VCA).

The formula for calculating VCA is:

$$VCA = Z(P_{AV})\ (APR - APR_D)\ \left[\left(\frac{R_N}{R_{APR}}\right)\right]^{*}$$

Where:

Z = the percentage of P_{AV} by which the purchasing agency will "compensate" the bidder, for bid evaluation purposes only, for each percentage point that his APR (defined below) is greater than the APR_D (also defined below). (*NOTE: If the purchasing agency chooses to use the same weighting for Y, in Step One, and Z; and, it desires to reward proportionately equal reductions in noise level and air pollution levels equally, it should include the "scaling" factor $\frac{R_N}{R_{APR}}$ in its calculation formula for VCA. R_N is the range of noise levels for all models offered responsively and is calculated by subtracting the N of the quietest model from the N of the loudest model, N_N. R_{APR} is the range of Average Percentage Reductions for all models offered responsively and is obtained by subtracting the APR of the "dirtiest" model from the APR of the cleanest model).

P_{AV} = the mean Average of the Actual Bid Prices for all models offered responsively. (NOTE: This has been calculated previously, in Step One).

APR = the Average Percentage Reduction in engine emission levels from the maximum levels mandated in national air pollution standards for medium and heavy duty trucks, for the model for which VCA (and EBP) is being calculated. APR is the mean average of the Percentage Reductions for (a) hydrocarbons, (b) carbon monoxides, and (c) hydrocarbons and oxides of nitrogen.

APR_D = the APR of the responsively offered model with the lowest Average Percentage Reduction (i.e., the "dirtiest" model).

Step Three: Calculate the Cost of Energy (CE):

The formula for calculating CE is:

$$CE = CEG \left(\frac{PLM}{MPG}\right)$$

Where:

CEG = the cost of energy (i.e., diesel, gasoline, or propane) per gallon. For purposes of this procurement, CEG = _____.

PLM = the projected life cycle, in miles, of the truck. For purposes of this procurement, PLM = _____.

MPG = the projected miles per gallon rating of the truck offered, measured in accordance with the procedure called for in the specification.

Step Four:

: Award the contract to the responsive and responsible bidder whose evaluated bid price is lowest.

IV. SUGGESTED BIDDER'S PRICE/DATA SHEET

This suggested bidder's price/data sheet has been prepared for use with the suggested NIGP specification language and bid evaluation formual for medium and heavy duty trucks.

1. Bidder: _____
2. Model Offered: _____
3. Purchase Price: _____
4. Engine Air Pollution Emission Levels: _____
   a. hydrocarbons _____
   b. carbon monoxide _____
   c. hydrocarbons and oxides of nitrogen _____
5. "Pass By" Noise Level: _____
6. Fuel Consumption Rate (in MPG): _____

Report Form
for Vendors

	AIR QUALITY			NOISE	ENERGY
	Hydrocarbon (g/bhp - hr)	Carbon Monoxide (g/bhp - hr)	Hydrocarbon Oxides of Nitro. (g/bhp - hr)	Noise Level (dBA)	
	(a)	(b)	(c)	(d)	(e)
1. Maximum Level Allowed by standard	1.5	25	10	_____ (if applicable)	_____ (if applicable)
2. Bid Vehicle	_____	_____	_____		
3. Reduction from standard (1) - (2)	_____	_____	_____		
4. % Reduction (3) ÷ (1)	_____	_____	_____		
5. Average Percentage Reduction (APR)					
Add 4(a) + 4(b) + 4(c). Divide sum by 3					

EXAMPLE

Report Form
for Vendors

	AIR QUALITY			NOISE	ENERGY
	Hydrocarbon (g/bhp - hr)	Carbon Monoxide (g/bhp - hr)	Hydrocarbon Oxides of Nitro. (g/bhp - hr)	Noise Level (dBA)	
	(a)	(b)	(c)	(d)	(e)
1. Maximum Level Allowed by standard	1.5	25	10	(If applicable)	(If applicable)
2. Bid Vehicle	1.0	20	6		
3. Reduction from standard (1) - (2)	0.5	5	4		
4. % Reduction (3) ÷ (1)	0.33	0.20	0.40		
5. Average Reduction Percentage (APR) Add 4(a) + 4(b) + 4(c). Divide sum by 3	P	.33 + .20 + .40 = .93 .93 ÷ 3 = .31 .31			

FROM TABLE A
31% CONVERTS TO
AQF OF 5.74

Medium and heavy-duty trucks are assembled from thousands of individual parts and components, and truck purchasers can ask for these parts and components either in terms of design characteristics (e.g., specific name and type), or in terms of performance characteristics. Generally, specifications stated in terms of performance offer the best opportunities for obtaining a better truck since they do not "lock in" the manufacturer on noise level, fuel consumption rate, and other important attributes. For example, trucks assembled to performance criteria have resulted in a 50% cut in noise levels.

Engine

This is usually the most significant noise source on a truck under 35 mph. Currently available engines do vary in their noise levels, also lower rpm engines are generally quieter than higher rpm engines, and usually offer better fuel economy as well.

Exhaust Systems

Exhaust system noise is also a significant contributor to the overall noise of a truck. Again specifying design of these systems can result in a much louder truck than necessary. Exhaust system components (mufflers, stack silencers) are currently available that can reduce such noise to low levels. Experience has shown that dual exhaust systems are particularly effective in many instances while single exhaust systems tend to continue to pose noise problems.

Transmissions:

A variety of noise levels are associated with different transmissions of comparable quality. One approach is to allow several gear teeth to come in contact during power transmission. This design reduces stress on individual gear teeth and significantly reduces noise.

Fans

Many trucks now come with thermostatically controlled radiator fans. The fan does not operate constantly, but only when required for cooling purposes. The noise of the fan is thus eliminated when it is not operating. This also has a favorable effect on fuel consumption since the fan does not constantly draw engine power. If a thermostatically controlled fan is not standard equipment, it is probably worthwhile to have it installed, since its initial cost will most likely to be more than offset by fuel savings.

Tires

Tires are the most significant noise source on a truck above 35 mph. The choice of tires is generally between radials and "bias ply". Radials generally are quieter and result in fuel savings. Either type is of a "rib" or a "cross ban" design. The rib type is generally quieter and is preferred over "cross bar" except on wheels providing the traction.