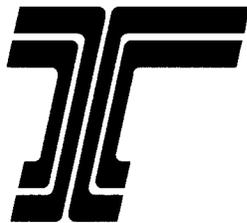
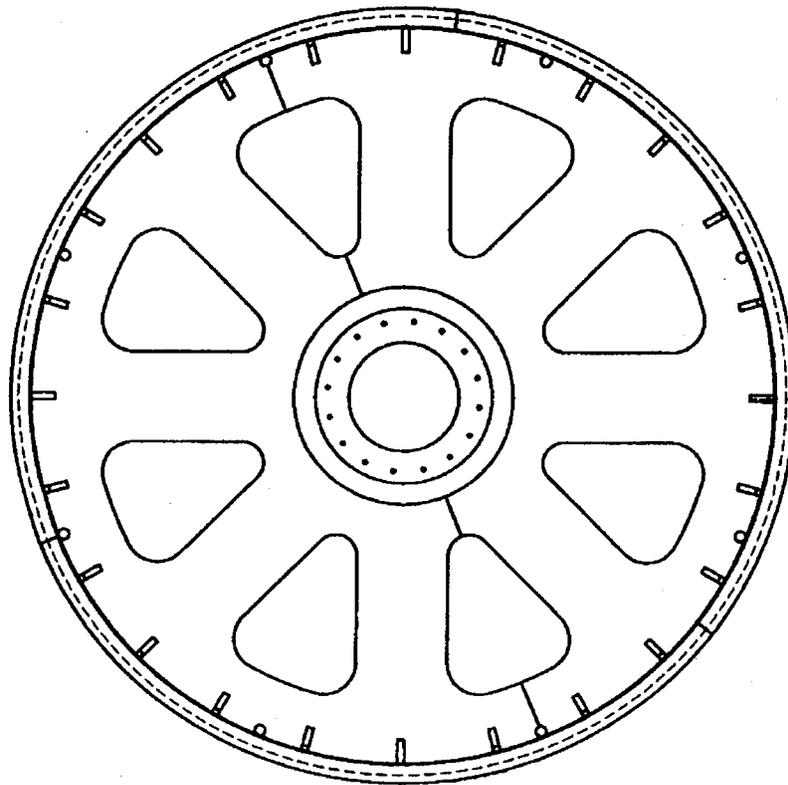


TECHNICAL QUALIFICATIONS PLUS PRICE CONTRACTING
LIFT SPAN TRUNNION REPLACEMENT
EXPERIMENTAL FEATURES REPORT



OREGON DEPARTMENT OF TRANSPORTATION

EXPERIMENTAL FEATURES REPORT
ON THE USE OF
TECHNICAL QUALIFICATIONS PLUS PRICE CONTRACTING
FOR
LIFT SPAN TRUNNION REPLACEMENT

Interstate 5 Columbia River Bridge #1377A
Pacific Highway (I-5) M.P. 308.38
Multnomah-Clark Counties
Contract Number 11940

By
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April 9, 1998

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1.0 EXECUTIVE SUMMARY

This project replaced two of the trunnion assemblies and the cables which connect and support the North counterweight and the North end of the lift span. The trunnions are fracture critical components, and the Northeast trunnion shaft had a small, but growing, fracture. Washington and Oregon State Departments of Transportation agreed on the scope of work and the need to move quickly to replace the fractured trunnion. Both trunnions and all related components were planned to be replaced to reduce the risk of mismatched components and to reduce the total amount of time the bridge would be out of service to both Interstate 5 traffic and Columbia River traffic.

Extreme risks associated with the complexity, unusual fabrication and erection requirements, disruption of service, public safety, and tight scheduling demanded a more certain method than low bid to successfully contract for this work. Special prequalification was seriously considered, but the contract would ultimately still go to the contractor who would cut his cost to the minimum. ODOT learned that an exemption to Oregon's contracting law could be obtained if the Bridge Section could develop a process that assured competition and objective award.

ODOT's Bridge Section and Contracts Unit worked with Oregon's Department of Administrative Services and Associated General Contractors, Oregon-Columbia Chapter, to develop a contracting process that would meet the needs of this project. The process developed, and approved for use, is Technical Qualifications Plus Price Contracting. It bases award on two factors, technical qualifications proposed and price proposed, with each weighted equally at 50%. This process conforms to a Department of Defense contracting method called Source Selection.

The contracting process required interested contractors to submit two sealed proposals, a Technical Qualifications Proposal and a Price Proposal. The Contract Request for Proposal provided the forms, instructions and scoring system that would be used to objectively evaluate the proposals. Four Technical Items identified the critical elements for selection on this project, with sub-elements assigned point values. The more sub-elements met, the higher the technical score would be. There was no elimination, as in special prequalification, for not having met an element or sub-element.

Five contractors, Christie Constructors, F.E. Ward, General, Guy F. Atkinson, and Kievit Pacific, submitted proposals. The technical proposals were scored by an Evaluation Committee composed of ODOT's Bridge Preservation Engineer, WSDOT's Bridge Preservation Engineer, The Structural Designer of Record, AGC's Representative and ODOT's Contract Unit Agreements Coordinator. The price proposals were opened in public, scored by their relationship to the average, and then final scores, the sum of technical and price scores, were announced. Christie Constructors had the highest final score.

The contract had an extremely aggressive schedule, requiring Christie to have all the components fabricated, approved and on-site by September 16, 1997, 105 days from award. Christie would then have 21 days to replace the components and make the bridge operational again. Finishing earlier than 21 days would result in a bonus of \$4,000 per hour. Finishing later than 21 days would result in assessed

damages of \$4,000 per hour. Christie, by developing a radically different approach to support the counterweight and exchanging the components, along with careful selection and training with mock-ups, finished the work in less than seven days, earning a bonus of \$1.4 million. Estimates of savings to local businesses were greater than this for each day the bridge was returned to service early.

The primary credit for this resounding success goes to Christie Constructors and their subcontractors. The credit for eliminating the expected traffic snarl goes to ODOT's Region 1 and WSDOT Southwest Region for working closely with the News Media, Mass Transit authorities, and the Cities of Portland and Vancouver. The thorough design documents from DGES, Inc. and the unique contract format were clearly the foundation that made this all possible.

2.0 TECHNICAL QUALIFICATIONS PLUS PRICE

Construction contracts are generally based on a designer specifying what is needed and a contractor determining how to provide it. A single factor is used to select the contractor, the lowest price bid. This assumes the public receives the greatest value from the contractor who uses the lowest cost materials, the least expensive construction technique, and provides the least management oversight and quality control that will meet the minimum standards specified.

For this project, the knowledge and experience needed to perform this work the right way on the first try were as valuable as the price for actually doing the work. As a result, ODOT looked for a method that could select the contractor based on the value provided through both of these factors.

The Federal Acquisition Regulation (FAR) used by federal agencies, including the Department of Defense, provides a number of contracting methods to permit obtaining higher value in contracts. One of these, found in FAR Part 15, Contracting by Negotiation, Subpart 15.6, Source Selection, bases contract award on a number of factors. One of these must be price. Quality must also be addressed, through one or more factors such as technical excellence, management capability, personnel qualifications, prior experience, past performance or schedule adherence.

Technical Qualifications Plus Price Contracting uses two factors. It looks like a cross between construction contracting and consulting engineering contracting. It shares some features with special prequalification, also. The following is a brief list of features:

- No contractors are excluded
- Contractors provide two separate sealed proposals at the same time:
 - Technical Qualifications Proposal
 - Price Proposal
- Technical Qualifications Proposals are scored by an Evaluation Committee, e.g.:
 - Oregon DOT Bridge Preservation Engineer
 - Washington DOT Bridge Engineer
 - Structural Designer of Record
 - AGC Member
 - ODOT Contracts Unit Member
- Bidding documents provide contractors with the detailed scoring system used
- Technical items scored are directly related to risk factors for project success
- Technical items are scored reviewing each characteristic and assigning a point if met
- Technical scores made public at same time price proposals opened
- Price score are calculated and added to technical score for final score
- Recommendation to Transportation Commission to award to highest final score

To both define objectively what we meant by technical qualifications and to ensure that the elements that contribute to quality in the final result were addressed, the following hierarchy was used:

Technical Qualifications Factor	0 to 100 points
Item T001 Completed three relevant projects	
Project 1 submitted	0 to 10 points
Project 2 submitted	0 to 10 points
Project 3 submitted	0 to 10 points
Where each of the three were scored:	
Type of work	0 to 4 points
Completion schedule	0 to 3 points
Within scope and budget	0 to 2 points
Customer/public recognition	0 to 1 point
Item T002 Machine shop qualifications	
Similar fabrication 1 submitted	0 to 4 points
Similar fabrication 2 submitted	0 to 4 points
Similar fabrication 3 submitted	0 to 4 points
Where each of 3 fabrications were scored:	
Similarity to trunnion	0 to 3 points
Time critical delivery	0 or 1 point
Quality assurance plan	0 to 4 points
Experience with mock-ups	0 to 3 points
ISO 9000 certification	0 or 3 points
AISC Cat 3 certification	0 or 3 points
Item T003 Crane and Rigging Service	
Crane maintenance program	0 to 3 points
Crane inspection program	0 to 3 points
Crane testing program	0 to 3 points
Crane certification program	0 to 3 points
Crane operations safety program	0 to 9 points
Rigging safety plan	0 to 4 points
Item T004 Project organization	
Clear chart with QA, safety, shift authority	0 to 6 points
Project superintendent experience	0 to 6 points
Project QA manager experience	0 to 4 points
Project safety manager experience	0 to 4 points

Price was evaluated in reference to the average of prices proposed, rather than the original estimate. Logically, prices below the average are desirable, to a point. As proposed prices drop significantly below the average, they begin to represent a significant risk that the proposer will not be able to deliver the level of quality expected. Proposed prices above the average are less desirable. As prices increase, they represent a risk that the public may be paying for greater service or quality than needed.

The average was assigned 50 of a possible 100 points. For this project, the expected average was \$3.0 million. The expected spread was \$1.0 million. The lowest price for increasing value was set at \$0.5 million below and the highest point for reducing value was set at \$0.5 million above the average. This resulted in \$50,000 per 50 points added or subtracted from the average. The scoring was then set to be one point added to 50 for every \$10,000 below the calculated average up to a maximum of 100 points; or one point subtracted from 50 for every \$10,000 above the calculated average to a minimum score of 0.

The FAR requires that evaluation of the technical factors be done separately from price evaluation. The Technical Evaluation Committee was given only the sealed Technical Proposals to score. The sealed Price Proposals were kept separate. A public bid opening was held to open the price proposals. As each price score was announced, the technical score for the proposer was also announced. After all proposals had been opened and announced, the price scores and final scores were calculated and cross-checked at the bid opening. The recommendation was made to the Oregon Transportation Commission that award be made to the proposer with the highest final score, Christie Constructors.

ODOT planned to use a federal process (in the FAR) for two reasons; to enable federal participation if either state sought that, and to enable future use, regardless of funding source. WSDOT did decide to use Federal-Aid funds on this project, requiring a federal process. Since this was not a routine contracting procedure, FHWA approved its use as Special Experimental Project No. 14 (SEP-14).

3.0 REASONS FOR SELECTION

This project had clear and compelling reason to require the most qualified contractor. The consequences of relatively small errors in planning, fabrication, erection, and waterfront work would have catastrophic consequences for both the Interstate 5 and Columbia River transportation systems.

The purpose for the project was replacement of a five foot long, 20 inch diameter shaft, located 200 feet above traffic, which had an actively growing crack. The 80-year old and extremely brittle steel used for the shaft is very susceptible to fracture, and cracks very rapidly. Based on the average number of times the bridge is opened, once started, the crack would grow to two inches and immediately fail within 5 to 15 years. Shaft failure would result in destruction of the bridge.

Risk assessment for the project centered on several factors.

First, replacing the lift span machinery is a complex process. It requires a crane placed over the

water, a structural support system for the counterweight, custom fabricated assemblies weighing 42,000 pounds and machined to tolerances of thousandths of an inch, interruption and rerouting of Interstate 5 traffic and is only possible during August through October, when the Columbia River is at low water.

Second, this work disrupts commuters, area businesses and long distance shippers. Interrupting the flow of Northbound traffic, 54,000 vehicles per day, and shifting it to Interstate 205 would cause additional fuel costs of over \$100,000 per day. The costs of lost business per day were not predicted.

Third, this kind of work is very specialized. With few movable bridges and fewer major projects, most contractors have not done a project exactly like this, and would not have the experience to include in their bid all the tasks necessary to perform the work.

Fourth, public safety is a major concern. Crane work, high steel work, altering the flow of Interstate 5 traffic all produce tremendous risk for serious injury. Some can be dealt with directly, such as closing the bridge, but much depends on the contractor's ability to protect against possible problems.

Fifth, in order to meet the serious constraints placed because of these other risks, a highly coordinated schedule is necessary, and the ability to stay on it is critical.

This risk assessment made it clear that selecting the right contractor was critical. While the technical design was proceeding, ODOT began investigating methods to select the contractor.

The first possibility considered, and discarded, was low bid.

The second possibility considered, and discarded, was emergency contracting. This was not a true emergency. In addition, identifying who could best accomplish the work was not obvious. Some process was still required to decide which contractor should be selected.

The third possibility considered, special prequalification, followed by award to the lowest bid from the selected group of contractors would at least address some of the risk factors. It can require the potential bidders to have specific capabilities and can require State approval for key positions on the contractor's project team. In the end, however, the contractor is selected solely on the lowest award price.

This meant creating a new approach. ODOT Contracts Unit Manager, Joe Speight, advised in May, 1996, that the Department of Administrative Services (DAS) could grant ODOT an exemption to award a specific project on other than lowest price bid. This would still be a construction contract, awarded under Oregon Transportation Commission authority, but on an award basis other than low bid.

The new process would need to address the risk factors. Information required should clearly show that the proposer had relevant experience and capability to deal with the risk factors. The process needs to result in the selection of a contractor who proposes the best combination of qualifications and price, that is, the best overall value to the public for this specific project.

4.0 PROCESS TO ENABLE USE

The process used by ODOT is summarized in the steps below:

1. Confirm the project requirements justify other than low bid.

Unusual technical complexity
Minimum disruption to users required
Specialized construction expertise required
Public safety is at risk
Highly coordinated work scheduling is necessary
2. Request exemption from agency with authority for purchase regulations (DAS).

Demonstrate requirements (one or more of above)
Show cost is at least neutral, and value higher than low bid
Show will not restrict competition (i.e. only so many bidders able)
3. Consult with Contracting Community (AGC).

Need concurrence on justification exemption wording to be successful
Need to have their expertise to help score proposals
4. Consult with potential proposers.

One-on-one contact with each potential proposer, separately
Provide draft plans and specs to each
Provide scoring system (in specs) to each
Incorporate suggestions, answers to questions, into contract
Incorporate recommended improvements to scoring system
5. Assemble Technical Evaluation Committee or Board.

Include project owner(s), designer, contracting official, contractor rep
Board reviews technical requirements, scoring, recommends changes
6. Advertise project, highlighting unusual proposal and award technique.

Advise proposers of late changes/improvements
Receive technical and price proposals same date
Technical Board scores technical proposals (took 2 days for 5 proposals)

7. Open sealed price proposals and announce technical scores in public “bid letting.”

Score price proposals, total price and technical scores for final scores

Announce final scores

Provide analysis and debriefing of each proposal back to proposer

These steps could be followed by virtually any public agency that needed to consider factors beyond just bid price for a construction project.

5.0 RESULTING PERFORMANCE

In summary, the performance of the contractor, Christie Constructors, and all subcontractors and suppliers, far exceeded both ODOT’s and the public’s expectations. The question remains to determine how this contracting method contributed to help produce this remarkable success.

The objective of using Technical Qualifications Plus Price was to select the construction contractor most likely to successfully deliver this difficult and unusual project with minimum delays, problems and rework, while ensuring a competitive price.

Evaluation of how a contracting process produced a result requires retracing the steps from contract design through completion of the work.

The first step is determining whether or not a proposed new contract format is even possible. This has three necessary properties: it must be biddable; it must be contractable; and it must withstand or avoid bid protests. Obviously, this was biddable and contractable. What assurance was there, prior to advertisement, that it would be? ODOT used an existing federal contracting process, which was known to three of the interested contractors. Oregon’s Department of Administrative Services, with help from the Oregon Department of Justice, guided ODOT and AGC in jointly developing this process, so that the general contracting community understood and could deal with the final contract format.

As a direct result, of six contractors which either were identified by ODOT as potentially able to perform the work, or who had asked ODOT if they could be considered, five ultimately submitted responsive proposals and one determined that this work was beyond its capabilities. The technical proposals submitted varied in size, but every proposal addressed every technical item in the detail required. In order to be contractable, there must be an unequivocal method of determining to whom the contract should be awarded. The scoring system used had sufficient resolution and tie-breakers so that it would produce a winning proposal. The results in this case clearly ranked the five submittals.

The acid test is in bid protests. There were three opportunities for protesting this contract. The first basis could have been that insufficient time, or excessive revisions, made it impossible to provide a responsive bid. The second basis could have been that the scoring system did not treat all bidders fairly.

And the third basis could have been that the contractor selected for award did not meet all requirements. There were no bid protests. The contract was awarded one working day after contractor selection.

The next step is in post-award submittal performance. The contract laid the requirement that the organization, key personnel, suppliers and crane operations proposed must be used to accomplish the work. Time was of the essence, since there were only 3-1/2 months until the required start date of the equipment replacement. Christie Constructors was both fast and agreeable. Only one potentially significant issue came up. ODOT required that Christie's supplier, Votaw Precision Technology, an aerospace machine shop, obtain the required American Institute Of Steel Constructors Category 3 certification, as called for in the specifications. AISC promptly granted the certification, and work proceeded. Christie proposed three significant changes to the project in this period. They proposed setting the foot of their tower crane on the footing ledge of the bridge pier, using a radically different method of supporting the counterweight, and prefabricating the wire rope and equalizer assemblies to minimize crane lifts. This placed a load on the structural designer, Glen Scroggins, but it was not unexpected. ODOT's Project Manager for the construction, Claude Sakr, was involved very heavily during this period working with the traffic mitigation plan and in obtaining necessary permits and agreements. During this period, the contract provided that our design consultant, and our Fracture Control Engineer, Steve Lovejoy, would travel to Votaw to pre-approve shop drawings, and again to approve the assembly of components prior to shipping. The contract had successfully provided a mechanism for cooperative efforts and to ensure correct and timely fabrication of components.

The third step is execution of required work. As a result of preplanning and dry-runs, Christie was able to predict, a week in front of the permitted 21 day bridge closure period, that with the changes approved, they would complete the equipment replacement in just 7 days. By September 16, Christie had all components approved and staged, and a clear plan, with alternatives, ready to complete the work. This contract included a substantial incentive for finishing earlier than 21 days, \$4,000 per hour. An equal disincentive was applied for every hour beyond the 21 days. These were figured on an hourly basis, vice per day, because of the potential for claims if ODOT delayed the contractor for a few minutes and caused the completion time to increment a whole day. The magnitude was based on cost impacts for fuel that, for 50,000 cars traveling an additional 40 miles one way to use the Interstate 205 Bridge, would exceed \$100,000 per day. This did come up with the final inspection and test lifts of the span. Because the cables had been lifted in groups of eight, with a potential for cable to cable abrasion, the engineers insisted on a 100% visual inspection of the cables during the test lifts. This resulted in an intense discussion, with Christie completely satisfying all testing requirements and actually finishing in 6 days plus a few hours. As a result, Christie earned a bonus of \$1.4 million on top of the original award of \$2.9 million.

The next to the last step in evaluation of contract performance deals with contract wrap-up. One indicator is claims. This contract did have claims. Added traffic control work has a serious dispute in process. Several minor issues are also disputed. In general, ODOT's Project Manager and Christie's Project Manager worked together very cooperatively to close out the project. ODOT asked Christie to perform some additional minor work on the two structures while the main channel was still closed.

Christie agreed, and provided the same exceptional quality as on the original work. While somewhat subjective, ODOT would be extremely pleased to work with Christie again. A second indicator, also subjective, is the opinion of the general contracting community. After seeing how this went, a number of contractors have commented that Christie was the best choice for this work.

The last step in evaluating performance of this contracting process is determining how the contracting community would react to future use of technical qualifications plus price. The general contractors are open to our use of this process again, as an exception, where AGC agrees it makes sense.

6.0 CONTRACTORS' VIEW

Contractors who had worked for ODOT on unusual projects, when asked for their reaction to the suggestion that ODOT might contract for the trunnion replacement in a special way, responded that it might work well, and were pleased that ODOT was placing value on the extra quality that experienced contractors provide.

In working with AGC, ODOT learned that contractors were concerned that ODOT might be reacting to prior problems and making this project unnecessarily difficult to bid. There was also concern that other public agencies might follow ODOT's lead, but without the necessary preparation, and misuse qualifications based contracting. AGC provided ODOT with draft criteria for acceptable reasons to use other than low bid procedures. These were similar to what was being discussed for use with Construction Manager/General Contractor relationships. ODOT described the work required and the local AGC members concluded that it was indeed a specialized, high risk project that should be handled differently. AGC helped us develop the exemption justification for the project. We offered, and AGC accepted, to have a non-bidding contractor on the technical evaluation committee. In keeping with the mutual desire to make this work, AGC chapter President, David Douthwaite, offered several candidates for ODOT's selection of the individual best suited. This represents a high level of trust.

While still working on the design documents, ODOT invited general contractors to examine the bridge, obtain preliminary drawings, and indicate their interest in providing technical proposals. Four were extremely interested, and of these three had experience with this contract method. The fifth was interested, but this was not directly in their area of expertise. ODOT encouraged this contractor because of their excellent record for quality work. The sixth contractor recognized that this was beyond their capabilities, but was interested as a subcontractor for waterfront support. All were advised that this was a two to five million dollar project with a tough timetable and no room for rework. At this point, no incentives had been considered. All five were interested in being the contractor chosen to do this work because they were the most qualified. Answers to questions they had asked and incentives were added prior to final contract documents. Despite the flurry of changes which fixed the start date and altered traffic control, all five stayed with the project. Incentives did not attract any additional contractors, and disincentives did not frighten off any of the original five. This represented a high level of commitment.

In the most recent quarterly meeting between ODOT's Bridge Section and the AGC Oregon-Columbia River Chapter, the use of special pre-qualifications was an agenda item. The contractors generally approved of the idea of pre-qualifications, but kept turning the discussion to the scoring system used on the Trunnion Project. They like the incremental scoring system better than the usual pass-fail system. We asked them if they would like to see this process used again. They said yes, including an unsuccessful proposer on this project. We asked if they would support our use on large projects, over \$15 million for example. They countered, saying that they would rather see us use it on complicated projects. Their rationale was that dollar amount was not a good indicator of qualifications needed for success. On large paving projects, for instance, the total cost would be very high, but the work might be very simple, but on a much smaller project, like the Trunnion, the work could be very difficult and need an experienced contractor. We offered to look at the upcoming projects and come back with a proposal to discuss. They thought that was a reasonable approach. While this does not constitute formal endorsement, it is a clear indication that the general contractors are very willing to work with the State DOTs to develop better contracts. It is also clear that the general contractors require objective, incremental criteria for selection.

7.0 LESSONS LEARNED

Technical Qualifications Plus Price Contracting requires significant time and effort during contract development. The effort required was primarily in design management and Contracts Unit. The payback is in reduced effort during construction. On this project, ODOT did not have a construction inspector. However, the Project Manager, Structural Design Engineer and Fracture Control Engineer worked approximately 20 out of 24 hours each day during the closure period.

The scoring system used for machine shops did not work as intended. When the start date was fixed, rather than when the components were on site, all proposers ended up having to propose all known shops in order to have every possible chance of obtaining the components on time. The contract was not set to accept or reject suppliers, although it did provide for more than one shop. We could not select the highest scoring shop and tell each contractor who they must use. We were forced to average the score of all shops proposed. Ironically, because Votaw did not have AISC certification at the time proposed, they lowered Christie's score. If we had pre-approved a list of suppliers, we would not have known of Votaw, and we would have paid more and would have likely seen the work slip to the next year. This is a clear lesson, the general contractors are the experts in knowing both how best to do the work and where best to find suppliers.

The Project Manager needs to be a party to this process. ODOT did not have one identified prior to advertisement. Some of the revisions would have been caught much earlier. When assigned, the PM was dedicated to this project. This was not because of the format, but because of the public impact of this project. In retrospect, the reasons that cause use of this contract method should likely cause a dedicated project manager.

The Technical Evaluation Committee would function best if established when the decision is made to use this process. The timeline on this project did not permit doing anything early. If we had had the time, the Committee would have revised some of the scoring criteria.

We provided a detailed format for the technical proposal and the scoring system in the technical proposal. The contract specifications contained a short summary of the scoring and referred to the technical proposal for the scoring system. Contractors advised that putting the scoring system on the submittal form, so as each question is answered, the value of the answer could immediately be figured would have helped. Removing the short summary from the specifications would also have helped.

Serious incentives applied to a critical period was very successful. We would not have attempted such incentives, however, if we did not have a contract that could assure quality first.

Oregon and Washington DOTs went to unusual lengths to work with the media, local governments, businesses and mass transit to explain what was going to be done, and when. The news media provided intense coverage of the upcoming repairs, the horrible traffic snarls expected and options to avoid the problem. The public was not expected to change their habits, but we were totally surprised when they listened, and stayed home. Traffic was a non-problem, primarily because businesses rearranged vacation schedules, people took advantage of mass transit, and car-pooling increased significantly, judging from the number of vehicles using the new High Occupancy Vehicle lanes.

A project like the Trunion Project makes the most sense for the first use of technical qualifications plus price contracting. Conventional wisdom would propose experimenting on a closely controlled and non-controversial project. But without the urgency, the severe consequences, the unusual work, and the public impact to make failure so unthinkable, a radically different approach is not warranted. With a critical project, the first question asked is how are we going to make sure it does not fail. Technical Qualifications Plus Price Contracting is clearly a proven answer.

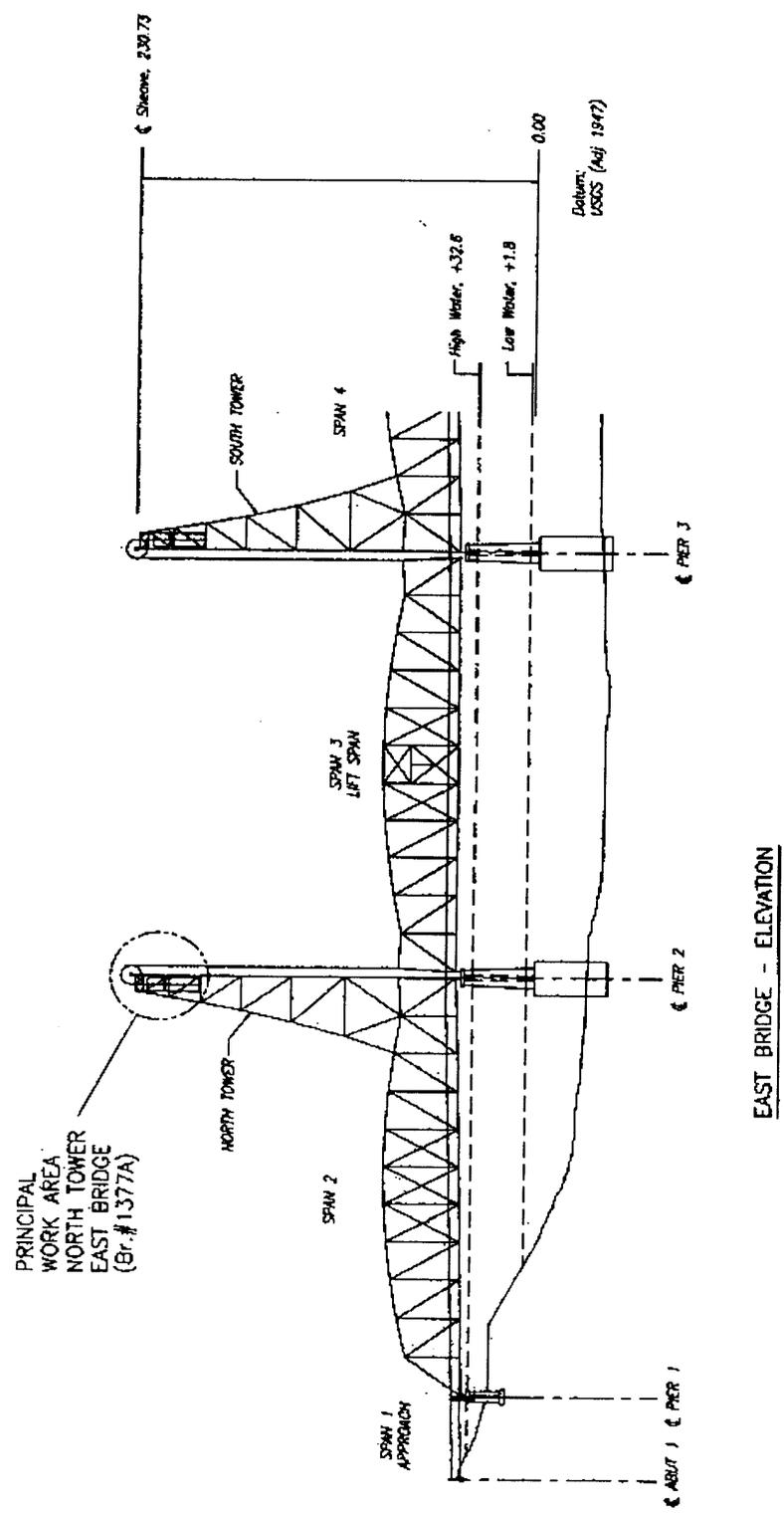
8.0 POTENTIAL FOR FUTURE USE

As noted above, Oregon DOT sees use of this process again. We would approach each potential use as an exception, and consult with the contracting community prior to use. We expect this would be very valuable in some of the interchange replacements and modifications that will be required in the Portland area. This would enable us to benefit from contractors' expertise in staged construction, traffic control, prefabrication and rapid sequencing of work. As ODOT and the contracting community become comfortable with this process, we might seek permanent authority to use it, with a requirement to prepare a Public Interest Finding, and obtain concurrence of AGC.

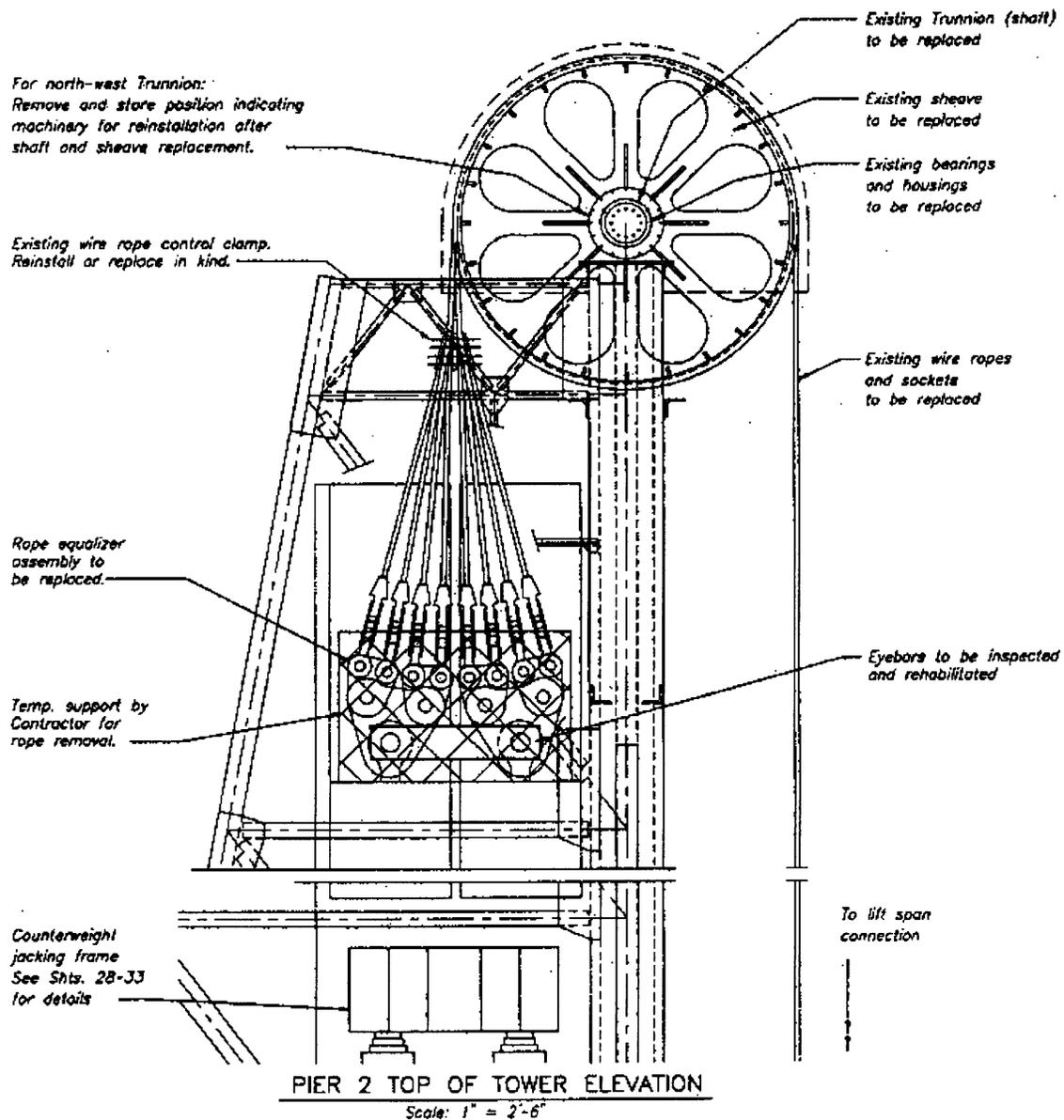
Oregon DOT would be pleased to help other State DOTs experiment with this process. It has the potential, by focusing on qualifications to perform the work, of avoiding the pitfalls of a mismatch between real requirements and the skills of the lowest bidder.

9.0 APPENDICES

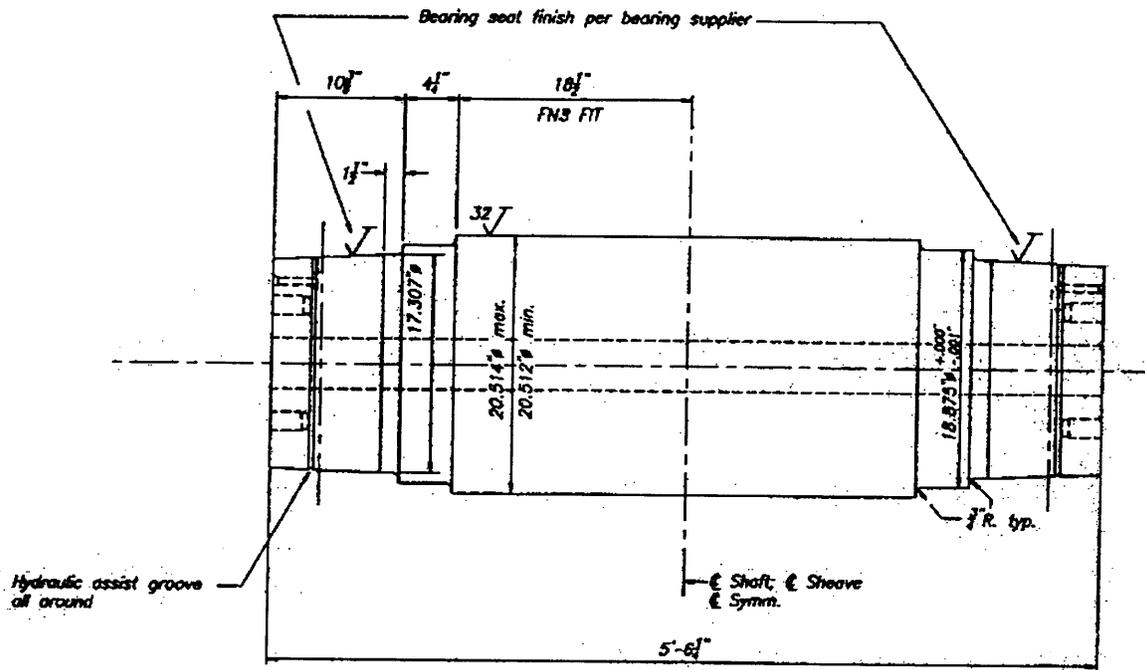
APPENDIX A TRUNNION DETAILS



Trunnion Replacement Work Site Detail



Trunnion Replacement Component Details



ALLOY STEEL FORGING
AASHTO M102 CLASS G (ASTM A668 CLASS G)

Trunnion Shaft Detail

APPENDIX B TECHNICAL SPECIFICATION EXCERPTS

DESCRIPTION OF WORK

Trunion Replacement
Columbia River (I-5) Bridge, NB Section
Pacific Highway
Multnomah County, OR and Clark County, WA

TIME AND PLACE OF RECEIVING PROPOSALS

Proposals for the work described above will follow a unique process:

Proposals will consist of two sealed submittals:

Technical Proposal
Price Proposal

Proposals shall be submitted no later than close of business, May 23, 1997.

The Technical Proposals will be opened and scored by ODOT/WSDOT/AGC Technical Evaluation Committee.

The Technical Scores will be announced and the Price Proposals opened and read in Room 123 of the State Transportation Building in Salem, Oregon, at 9:00 a.m. on the 29th day of May, 1997. The Price Proposals will be scored and a combined technical/price Final Score will be calculated. All scores will be published by May 30, 1997. Award will be made to the bidder with the proposal having the highest Final Score.

COMPLETION TIME LIMIT

Complete all work to be done under the contract not later than November 3, 1997. The contract specifies a maximum 21-day period to close the bridge to automotive traffic and making the drawspan inoperable for vessels during replacement of the drawspan North tower equipment and cables. Early completion incentives are specified for this period, as are liquidated damages for returning the bridge to full service later than 21 days.

CLASS OF PROJECT

This is a Federal-Aid project.

PROJECT INFORMATION

Information pertaining to this project may be obtained in the field from the following:
Bret Richards, Project Manager, 9002 S.E. McLoughlin Blvd., Milwaukie, 97222; telephone 503-731-834

SECTION 00120 - BIDDING REQUIREMENTS AND PROCEDURES

Comply with Section 00120 of the Standard Specifications, supplemented and/or modified as follows:

120.05 Request for Bidding Documents - Add the following:

The plans, which are applicable to the work to be performed under the contract, bear title and date as follows:

"Trunion Replacement
Columbia River (I-5) Bridge, NB Sec.
Columbia Highway
Multnomah County, OR & Clark County, WA
May 1997"

120.10 Proposal Booklet – In the first paragraph, change the item "DRE Directory" to read "DBE Directory".

In the second paragraph, add the following after the term "Noncollusion Certificate":

- Certificate of noninvolvement in any debarment and suspension
- Certificate regarding lobbying activities

Add the following to the end of the list in the second paragraph:

- Technical Qualification Schedule of Items
- Technical Qualification Score Sheet

00120.40(a) General - Delete the second paragraph and replace with the following:

Two separate proposal packages will be submitted for this project. The first proposal, the Price Proposal, shall be assembled by properly completing all documents in the proposal section, as designated in 00120.10, with the exception of those identified as Technical Qualification Schedule, between the front and back covers of the proposal book. A proposal bond is not required if another type of proposal guaranty is given (see 00120.40(e)).

The second proposal, the Technical Proposal, shall be assembled by properly completing the document identified as Technical Qualifications Schedule of Items, attaching qualification documents requested.

00120.40(e) Proposal Guaranty - Delete the third paragraph and substitute the following:

Acceptable surety companies are limited to those authorized to do business in the State of Oregon.

00120.45 Submittal of Proposals - Delete the contents of this section and replace with the following:

Submit the Price Proposal and the Technical Proposal in separate sealed envelopes to the Commission at the address given in the proposal booklet. The words "Price Proposal" or "Technical Proposal," as appropriate, and the name of the project shall be printed on the outside of each sealed envelope.

Proposals submitted after the time set for receiving proposals, or Price Proposals or Technical Qualifications Proposals submitted without the other, will not be opened or considered. Only the information provided up until

the time set for receiving proposals will be passed to the Technical Qualifications Evaluation Committee. The Committee will use no other information to score the Technical Proposals. To ensure receipt and consideration, the two proposals should be delivered by the bidder in person or by messenger. The Commission assumes no responsibility for the receipt and consideration of proposals that are mailed.

Submit both sealed proposals to Program Services, Transportation Building, Salem, OR 97310 by Close of Business (COB) on the date specified in the proposal booklet. No proposals will be accepted after Program Services has closed on that date.

00120.65 Revision or Withdrawal of Proposals – Permission will not be given to change any price proposal after it has been delivered to the Program Services Office except to change unit prices and total prices entered on the bid schedule. These changes must be requested in writing or by electronic facsimile (FAX) transmission from an individual authorized to sign the proposal. Changes requested in writing or by FAX transmission will not be accepted unless they are prepared in accordance with the instructions found on page 18 of the Bidders Price Proposal, and the bidders proposal number is properly included. These changes must be received in the Program Services Office before the time set for opening proposals.

A bidder may withdraw a proposal after it has been delivered to the Program Services Office if the withdrawal request is received in writing or FAX transmission from an individual authorized to sign the proposal by the Program Services Office before the time set for opening proposals and includes the bidder's proposal number.

00120.65 Opening and Comparing of Proposals - Delete the contents of this section and replace with the following:

The proposals on this project will not be publicly opened on the date and time specified for receipt of proposals. Instead, the Price Proposals will remain sealed in the possession of the Program Services Unit until the date and time established for this action.

The Technical Qualifications Proposals will be opened by the Technical Qualifications Evaluation Committee, consisting of three technical experts from the Oregon and Washington Bridge Engineering Sections, the Design Consultant, a contracts expert from the Program Services Section and a representative appointed by the Associated General Contractors, Oregon-Columbia Chapter. Each Technical Qualifications Proposal shall be scored using the Technical Qualifications Criteria in Section 00175(a) and the Technical Qualifications Score Sheet contained in the Proposal Booklet. This scoring will be completed and signed by the committee members prior to the date and time set for opening of Price Proposals.

The Price Proposals shall be opened and read publicly at the date and time indicated in the Notice to Contractors and the proposal booklet. The Technical Score will be read publicly at this time. Proposers and interested parties are invited to attend. Once all Price Proposals have been opened and read, the Price Proposals will be scored using the Price Criteria in Section 00175(b). The Price Score will be added to the Technical Qualifications Score to obtain a Final Score and announced. All scores for all Proposers will be published by the next business day. Award will be made, under Department of Administrative Services Exemption Order #332, signed November 8, 1996, to the Proposer with the highest score, with 50% of the final score contributed by the Technical Score and 50% contributed by the Price Score, subject to the concurrence of the Oregon Transportation Commission.

Price Proposals will be scored on the basis of the total amount of the Price Proposal. The total amount will be the sum computed from quantities listed in the bid schedule and unit prices entered by the proposer. In case of conflict between unit price and corresponding extended amount, unit price shall govern.

Award of contracts, return of proposal guarantees, and execution of contract agreement are covered in Section 00130.

00120.75 Criteria for Scoring Proposals - The following criteria will be used to score the proposals to determine which proposal is most advantageous to the public, as provided by DAS Exemption #332:

00120.75(a) Technical Qualification Criteria - A total of 100 points is the maximum score for technical qualifications. This Technical Score is the sum of the following, which are detailed in the Technical Qualifications Schedule of Items and the Technical Qualifications Score Sheet in the Proposal Booklet:

- Waterfront/Movable Bridge Construction Experience: up to 30
- Fabrication of Complex Machinery Experience: up to 25
- Crane Maintenance, Inspection and Operations: up to 25
- Construction Management Team: up to 20

00120.75(b) Price Proposal Criteria - A total of 100 points is the maximum score for value of price proposed. The price proposed is the total amount for all items as described in Section 00120.65, above. The Price Score is the sum of the following:

- The average of price proposals received will equal: 50
- Each proposal less than the average price will receive an additional 1 point for each \$10,000 it is less than the average, to a maximum of 50 points.
- Each proposal above the average price will have 1 point subtracted for each \$10,000 it is greater than the average, to a maximum of 50 points.
- The maximum score will be for one (or more) proposal(s) \$500,000, or more, below the average of all proposals, which would be 100 points. The minimum score would be for one (or more) proposal(s) \$500,000, or more, above the average of all proposals, which would be 0 points.

00120.75(c) Combining Price plus Technical Qualifications - To select the proposal most advantageous to the State - Each Proposer's Technical Score, 0 to 100 points, will be added to his or her Price Score, also 0 to 100 points. This Final Score, 0 to 200 points, is the basis for award. In the event the highest Final Score is the same for two or more Proposers, the Proposer with the highest Technical Score of these will be deemed to have the highest Final Score for the purpose of awarding the contract. In the event that two or more Proposers have the highest Final Score and also the same Technical and Price Scores, the Proposer with the lowest actual Price Proposal of these shall be deemed to have the highest Final Score for contract award.

APPENDIX C TECHNICAL SUBMITTAL PACKAGE

TECHNICAL QUALIFICATIONS SCHEDULE OF ITEMS

Item T001 Describe three projects containing similar work that you have successfully completed. Include on this sheet or by attachment:

Project ____ of 3

Project Name:

Project Owner:

Owner Contact Name and Phone Number:

Awarded Price:

Price at Completion:

Awarded Completion Date:

Actual Completion Date:

Project Superintendent:

Waterfront work (bridge, pier, wharf, dam, vessel locks, ...) involved:

Machinery replacement/installation involved:

Heavy/high lift crane work involved:

Extraordinary quality assurance requirements:

Extraordinary scheduling/coordination requirements:

TECHNICAL QUALIFICATIONS SCHEDULE OF ITEMS

Item T002 Identify and provide qualifications of Machine Shop(s) you will use to fabricate the machinery and structural components for this project. Include on this sheet or by attachment:

Shop No. ____ of ____ Planned to fabricate: _____

Machine Shop Name:

List Certifications Shop has obtained (ISO, AISC, ASME, ...)

Provide a copy of Shop Quality Assurance/Quality Control Plan

Describe three similar fabrication projects Shop has performed. Include:

Project 1 of 3 Project Name:

Project Owner:

Kind of work (movable bridge components, dam sluice gate mechanisms, vessel lock mechanisms, shipyard crane components, large pressure vessels, bridge or high rise structural steel, ...) involved:

Extraordinary scheduling/coordination requirements:

Project 2 of 3 Project Name:

Project Owner:

Kind of work (movable bridge components, dam sluice gate mechanisms, vessel lock mechanisms, shipyard crane components, large pressure vessels, bridge or high rise structural steel, ...) involved:

Extraordinary scheduling/coordination requirements:

Project 3 of 3 Project Name:

Project Owner:

Kind of work (movable bridge components, dam sluice gate mechanisms, vessel lock mechanisms, shipyard crane components, large pressure vessels, bridge or high rise structural steel, ...) involved:

Extraordinary scheduling/coordination requirements:

TECHNICAL QUALIFICATIONS SCHEDULE OF ITEMS

Item T003 Identify and provide qualifications of Crane Service and Rigging Service you will use to lift machinery components to and from the bridge tower. Include on this sheet or by attachment:

Crane Service Name (or Proposer's Company):

Crane Manufacturer and Model:

Provide copy of Crane Service's Inspection and Certification Plan:

Provide copy of Crane Service's Accident History for past three years:

Provide resume of principal crane operator for project:

Rigging Service Name (or Proposer's Company):

Provide a copy of Rigging Service Accident History for past three years:

Provide resume of principal rigger for project:

TECHNICAL QUALIFICATIONS SCHEDULE OF ITEMS

Item T004 Describe the project organization you will use to handle the schedule constraints, specialized construction and difficult site conditions. Include on this sheet or by attachment:

Project Organization Chart:

Identify positions with authority to halt or correct non-conforming work:

Provide resume of Project Superintendent:

Provide resume of Quality Assurance Manager:

Provide resume of Project Safety Manager:

Provide resume or description of position(s) you see as critical to your success on this project, not yet listed:

TECHNICAL QUALIFICATIONS SCORE SHEET

Item T001	Maximum Points:	30
3 projects are movable bridge construction/ machinery rehab: Where each of 3 projects has 0 to 4 points possible: If a project in-water, but not movable bridge, subtract one point; If a project in-water, but no machinery involved, subtract one point; If a project not in-water, subtract two points; If a project not in-water and only minor equipment, subtract three points.	12	
3 projects finished earlier than required: Where each of 3 projects has 0 to 3 points possible: If a project finished on time, not early, subtract one point; If a project negotiated new completion date, subtract two points.	9	
3 projects finished at or within 10% of contract award price: Where each of 3 projects has 0 to 2 points possible: If a project over 10%, but significant added work, subtract one point.	6	
3 projects received customer commendation or news article: Where each of 3 projects has 0 to 1 point possible:	3	

Item T002	Maximum Points:	25
Machine shop has 3 projects making movable bridge trunnions on a tight schedule, i.e. less than 6 months: Where each of 3 projects has 0 to 4 points possible: If movable bridge, time critical, but not trunnion, subtract one point; If movable bridge, not time critical, not trunnion, subtract two points; If machinery for other industry and time critical, subtract two points; If machinery for other industry, not time critical, subtract 3 points.	12	
Machine shop has formal, published QA Plan: If internal document, process instruction, subtract one point If document developed for this project only, subtract two points If document copied from other contract or guide, subtract three points	4	
Machine shop has fabricated mock-ups for QA checks: If computer models or "fixtures", subtract one point	3	
Machine shop has ISO 9000 QA certification:	3	
Machine shop has AISC Category 3 structural steel certification:	3	

TECHNICAL QUALIFICATIONS SCORE SHEET

Item T003

Maximum Points:

25

Crane Service (or Proposer) has formal, published crane program which clearly covers the following four elements: maintenance, inspection, testing, certification: 12
Where each element has 0 to 3 points possible:
If an element is in a formal, published document it is worth 3 points.
If an element is covered in internal memos or guides, subtract one point;
If an element has been written or copied specifically for this project, subtract two points.

Crane Service (or Proposer) has formal crane operations safety program which clearly covers the following three elements: operator training, equipment qualifications, accident records: 9
Where each element has 0 to 3 points possible:
If an element is in a formal, published document it is worth 3 points.
If an element is covered in internal memos or guides, subtract one point;
If an element has been written specifically for this project, subtract two points.

Crane Service or Rigging Service (or Proposer) has a rigging safety plan which includes the following two elements: training, equipment inspection: 4
Where each element has 0 to 2 points possible:
If an element is covered formally, it is worth two points.
If it is covered through internal memos, guides, lists, subtract one point.

TECHNICAL QUALIFICATIONS SCORE SHEET

Item T004	Maximum Points:	20
<p>Formal, complete and clear project organization chart</p> <p>If chart does not address subcontractors or suppliers, subtract one point each</p> <p>If chart does not cover multiple work shifts, subtract one point</p> <p>If chart does not clearly show QA and Safety authority, subtract one point each</p>	6	
<p>Project superintendent directed two or more projects in Item T001, and has extensive experience, i.e. greater than 6 years, with Proposer's company on high value, high risk projects:</p> <p>If superintendent on two or more projects, but with company less than 6 years, subtract one point;</p> <p>If superintendent on only one project, but has extensive experience with company, subtract two points;</p> <p>If extensive experience with company, but not on movable bridge construction or machinery rehabilitation, subtract three points;</p> <p>If extensive construction experience, but not with Proposer's company or movable bridge projects, subtract four points;</p> <p>If less than 6 years experience in construction management, subtract five points.</p>	6	
<p>Project QA Manager has clear authority and experience in installing movable bridge machinery and/or similar heavy precision equipment:</p> <p>If QA manager/official on one or more projects cited, but with company less than 6 years in QA capacity, subtract one point;</p> <p>If not QA manager/official on a project cited, but at least 6 years with company in QA capacity, subtract two points;</p> <p>If with company less than 6 years in QA capacity, subtract three points.</p>	4	
<p>Project Safety Manager has clear authority and experience with in-water, heavy crane lift operations and heavy construction:</p> <p>If Safety manager/official on one or more projects cited, but with company less than 6 years in Safety capacity, subtract one point;</p> <p>If not Safety manager/official on a project cited, but at least 6 years with company in Safety capacity, subtract two points;</p> <p>If with company less than 6 years in Safety capacity, subtract three points.</p>	4	

APPENDIX D TECHNICAL SCORING SUMMARIES

Technical Proposal Item	Contractor				
	Atkinson	Christie	FE Ward	General	Kiewit
T001 Projects that demonstrate Qualifications					
Subtotal for T001	24.0	25.0	20.0	23.4	16.0
T002 Machine Shop Qualifications					
Subtotal for T002	15.6	16.2	8.8	20.6	16.2
T003 Crane Service					
Subtotal for T003	12.6	18.0	16.4	16.8	18.6
T004 Project Organization Proposed					
Subtotal for T004	19.6	19.2	6.6	13.6	14.8
Total Technical Score					
Sum for Each Contractor	71.8	78.4	51.8	74.4	65.6
Score for Each Contractor (Rounded Up)	72	79	52	75	66

APPENDIX E FINAL SCORING SUMMARIES

Contractor	Technical Score	Proposed Price + Modification = Total Price	Average Price - Total Price = Offset	50 Points +/- Offset = Price Score	Final Score
Atkinson					
		3,671,150	4,032,727	50	
		0	3,671,150	+36	
Total for Atkinson	72	3,671,150	361,577	86	158
Christie					
		3,399,800	4,032,727	50	
		-530,000	2,869,800	+50	
Total for Christie	79	2,869,800	1,162,927	100	179
FE Ward					
		6,593,300	4,032,727	50	
		-210,000	6,383,300	-50	
Total for FE Ward	52	6,383,300	-2,350,573	0	52
General					
		5,000,005	4,032,727	50	
		-1,128,000	3,872,005	+16	
Total for General	75	3,872,005	160,722	66	141
Kiewit					
		3,457,380	4,032,727	50	
		-90,000	3,367,380	50	
Total for Kiewit	66	3,367,380	665,347	100	166

APPENDIX F COMPARISON OF EVALUATORS' SCORING FOR CHRISTIE

Technical Proposal Item	Evaluator					Average
	1	2	3	4	5	
T001 Projects that demonstrate Qualifications						
Movable Bridge/In-Water construct/machinery rehab	10	12	12	12	10	11.2
Projects finished early	7	6	5	2	5	5.0
Projects finished within 10% of award	6	6	6	6	6	6.0
Customer commendation/award	3	3	3	3	2	2.8
Subtotal for T001	26	27	26	23	23	25.0
T002 Machine Shop Qualifications						
Movable Bridge trunnions/related projects	9.2	7.6	9	9.6	8.4	8.8
Formal, published QA Plan	3.2	3.4	3.8	3.4	3.6	3.5
Shop has used mock-ups for QA	2.4	2.4	2.4	1.8	2.4	2.3
ISO 9000 certification	0	0	0	0	0	0.0
AISC Cat 3 certification	0.6	1.2	1.2	1.8	1.2	1.2
Subtotal for T002	16	15	17	17	16	16.2
T003 Crane Service						
Crane Program: Maint, Inspect, Test, Certification	7	7	12	6	12	8.8
Crane Safety: Training, Quals, Accident Records	7	9	5	4	7	6.4
Rigging Safety: Training, Equip Certification	6	2	1	3	2	2.8
Subtotal for T003	20	18	18	13	21	18.0
T004 Project Organization Proposed						
Clear Organization Chart	6	6	6	6	5	5.8
Project Superintendent Qualifications	6	6	6	6	6	6.0
Project QA Manager Qualifications	4	3	4	4	2	3.4
Project Safety Manager	4	4	4	4	4	4.0
Subtotal for T004	20	19	20	20	17	19.2
Total Technical Score						
Sum of Subtotals	82	79	81	73	77	78.4
Technical Score (Sum of Average Subtotals Rounded Up)						79

APPENDIX G EXEMPTION ORDER APPROVING USE

Oregon

DEPARTMENT OF
ADMINISTRATIVE
SERVICES

TRANSPORTATION,
PURCHASING &
PRINT SERVICES
DIVISION

November 18, 1996

COPY

Grace Crunican, Director
Oregon Department of Transportation
135 Transportation Building
Salem OR 97310

RE: **Exemption Request** to allow Department of Transportation, to release a solicitation for the Interstate 5 Bridge weighted 50% on bid price and 50% on technical qualifications.

Enclosed is a copy of the legal order approving the above-referenced Exemption request. **Please note the conditions of the Order stated on pages 6 and 7.**

Please do not hesitate to contact me at 378-4167 (FAX 373-1626) if you have any questions or need assistance.

Good luck with your project.

Best regards,


Barbara A. Jensen
Executive Assistant
to the Administrator

NOTED:
F. J. NELSON



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1225 Ferry St. SE
Salem, OR 97310-1531
(503) 378-4642
FAX (503) 373-1626

ORDER ALLOWING USE OF AN
ALTERNATIVE PROCUREMENT METHOD

Before the Director, Department of Administrative Services
of the State of Oregon

In the Matter of the Exemption Request of the)	FINDINGS OF FACT,
Department of Administrative Services, on)	CONCLUSIONS OF LAW, ORDER
behalf of the Department of Transportation)	AND NOTICE OF OPPORTUNITY
Technical Service Branch, Bridge Section)	FOR JUDICIAL REVIEW

ORS 279.015 (1) requires, with certain exemptions, that all public contracts be based on competitive bidding and under ORS 279.029, awarded to the lowest responsive, responsible bidder. ORS 279.015(2) permits the Director of the Department of Administrative Services (DAS), as the State's public contract review authority, to grant under certain conditions, specific exemptions from the requirement for competitive bidding resulting in contract award to the lowest responsible bidder. The conditions for granting such specific exemptions include insubstantial harm to competition, non-favoritism and substantial cost savings to the State. The authority to grant specific exemptions was implemented in OAR 125-300-050.

This is a request from the Department of Administrative Services on behalf of the DEPARTMENT OF TRANSPORTATION, Technical Services Branch, Bridge Section for a specific exemption, allowing the Bridge Section to release, through the Oregon Transportation Commission, solicitation for a construction project, which will be weighted 50% on bid price submitted and 50% on firms technical qualifications submitted. Granting this special process would allow for recognizing the cost savings to the State and its transportation system users from both a low initial bid price and from a technical proposal that demonstrates the proposer's ability to foresee and plan for problems peculiar to this unique type of work which would result in delays, additional work and potential claims.

FINDINGS OF FACT

- The Exemption Request.** This is a request for an Exemption allowing the use of an alternative method of competitive procurement to obtain highly specialized manufacturing and construction services to replace the counterweight cable sheaves, shafts, bearings and cable assemblies on the North tower of the historic, circa 1916, Northbound Interstate 5 crossing of the Columbia River (Bridge # 1377A).
- Background.** The Federal Highway Administration requires each state Department of Transportation to inspect all bridges every two years to identify and correct safety deficiencies before serious injury could result. It also requires each state DOT to more thoroughly inspect fracture critical components of steel structures, that is, those

NOTED:
F. J. NELSON

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BRIDGE DIVISION

components whose fracture would clearly result in catastrophic failure of the bridge. The counterweight sheave trunnion shafts are such components. The shafts, of hardened carbon steel, in accordance with the best engineering practices of 1916, are extremely brittle and subject to fracture from operating stresses, which was not known in 1916.

3. Careful inspection of the trunnion shafts of the Oregon Department of Transportation's five vertical lift bridges found such a fracture initiated in the Northeast trunnion shaft of the Northbound I-5 structure (Bridge # 1377A). Analysis by ODOT's Fracture Control Engineer, and confirmed by FHWA, showed the fracture would grow to completely sever the shaft sometime between 1999 and 2009, with the 700 ton counterweight falling uncontrolled through the bridge deck.
4. ODOT contracted for a feasibility and concept study to develop a repair procedure. This study also examined the costs and benefits of replacing just the shaft, the shaft and sheave, and the shaft, sheave and cables. The study concluded that it would both cost less and require less time to replace all of the components, since careful removal, disassembly, inspection, possible machining or remanufacture of reused components would not be required. Washington DOT and ODOT jointly concluded that the other counterweight shaft, the Northwest trunnion, could develop a similar fracture at any time. Therefore, it would be prudent to replace both assemblies while the counterweight support and heavy lift crane were in place. The same process is envisioned for the South tower, if and when a fracture initiates on one of its two shafts.
5. Movable bridges present a significant problem to ODOT. While they are part of the highway system and contain structural components similar to other bridges, they are also very different, containing complex, and massive, custom fabricated machinery and power systems to move the highway out of the way of waterborne shipping. Major projects to work on the machinery are very rare; in the 80 years that this bridge has been in service, only two projects, one in 1959 and one in 1987, have been performed. In addition to being infrequent, machinery rehabilitation or upgrade projects require special skills from the contractor, including precision machining of very large components, heavy waterfront construction, both heavy lift and high lift crane capabilities, and both precise scheduling of work tasks and precise prefitting of materials to stay within Coast Guard permitted periods of obstruction of the navigation channel, as well as to maintain traffic flow on the Interstate Highway.
6. PROJECT BACKGROUND: The uniqueness of this project makes it prudent to examine the construction contracting process to determine any necessary improvements to reasonably assure success. The critical factors which determine success for this project include:

- a. Unusual Technical Complexity

State highway projects involve surveying, earthwork, reinforced concrete and asphaltic pavement, road signs and illumination. The designs use standard drawings and specifications for most of the details, and the tolerances are usually on the order of one half of an inch. Virtually all of the materials supplied are from preapproved sources or are industry standards. This project calls for unique fabrication of two shafts, using an alloy steel forging, machined to tolerances of 0.001 inch, 5 ft 6.25 in long with a diameter of 20.472 in, with stepped and

tapered ends to fit roller bearing assemblies; two cast or welded sheaves, 12 ft 2.0 in diameter and 3 ft 0 in long, precisely machined to fit the shafts, plus cast and machined bearing housings, plus vender supplied precision roller bearings and mechanical locking rings. The contractor must ensure the components fit together correctly, within very tight tolerances, prior to starting work to remove the existing equipment. Failure to fit will require manufacturing one or more replacement components, with a potential serious lead-time for forging new material.

State highway projects often involve crane work, usually truck or crawler mounted cranes lifting materials up onto the bridge deck or falsework. This project requires lifting of unusually heavy components, 38,000 pounds for the shaft and sheave assembly, to a precise location up on top of the tower, 230 ft above the operator and out of his sight, without scuffing or nicking the machined surfaces. The crane must be mounted on a platform erected on temporary piles in the Columbia River, adjacent to the North tower. The existing components must be lifted off of the bridge and set down on a barge to be hauled to a machine shop for forensic examination. The new components must be brought by barge to the crane and then lifted and positioned until secured to the bridge. In addition to the two shaft and sheave assemblies, a total of 32 cable assemblies, 186 ft of 2 in wire rope, will be removed with the crane and replacements installed with the crane. The contractor must also use this crane to erect temporary structural additions to the tower and set a jacking frame in place, supported by this new structural assembly, to jack up and hold the 700 ton counterweight to permit replacement of the cables and machinery. Waterfront crane work of this magnitude is extremely rare in highway projects.

This project does include work familiar to bridge contractors, which would be unknown to a machine shop or shipyard familiar with other aspects of the job. The counterweight support involves extensive structural steel fabrication and erection. While planned for temporary use only, it must precisely fit with the existing structural steel members to support the counter weight. It will be disassembled upon completion and stored by ODOT for use on the South tower, when the need to replace that equipment develops. Repairs are also being made to the concrete counterweight, to prevent concrete chunks from spalling off and falling onto the highway from the stress of being supported from below, instead of from above by means of the cable assemblies.

b. Minimum Disruption to Users (Interstate 5 and Columbia River Traffic)

The State is reducing the disruption to both highway traffic and river traffic by requiring the contractor to show that he has all of the components called out in the design fabricated, fitted and on site, prior to start of the replacement work. The contractor, in his choice of methods, work sequencing, personnel, equipment and supervision, however, has a far greater impact on exactly when traffic would be interrupted, how long it would be interrupted, how certain these times are, and to what extent his work would affect traffic. With 54,000 vehicles crossing the bridge per day, the State cannot afford to wait additional days while the contractor tries a second, and third time, to take care of an unexpected problem or equipment malfunction. The planning and scheduling of work, to fit within traffic periods, shipping periods, the Salmon window, bad weather limitations, and machinery delivery dates is very tight.

c. Specialized Construction Expertise

This project requires the contractor to have significant expertise in heavy waterfront construction to handle the staging, transport, positioning and securing of large structural

members and machinery from the water, and physically within a shipping channel. It requires specialized expertise in fabricating, and providing detailed quality control of, large, precision machined mechanical components and cable assemblies, unique to vertical lift movable bridges. It requires specialized expertise in heavy lift crane work, erecting a 300 ton class crane with a 200 ft or greater tower and a 100 ft or greater jib capable of lifting a 38,000 pound load to the top of the tower and on the far side, out of sight of the operator. It requires the crane to be stably mounted on a platform in the river, extending into the shipping channel. It requires high ironwork to erect and remove the counterweight support system, and precision four point jacking of the 700 ton counterweight to prevent tipping or fracture, and catastrophic failure of the project. It requires careful coordination and control of a number of specialty crews to interlace the work correctly and keep on schedule.

d. Public Safety

While vehicles can be kept off the bridge, and shipping halted, during heavy lifts to prevent the risk of dropping the load on a vehicle or watercraft, it is not practical to close the bridge, or the shipping channel for the entire duration of the project. Work can be safely performed up in the tower, such as rigging and unrigging, unbolting and rebolting, providing correctly fabricated and installed overhead protection platforms and netting are used. The crane itself must be carefully installed, and secured, on its platform to ensure its stability, including in heavy weather, so that it cannot tip over and fall on the bridge, or on watercraft. Traffic control, and continuous notification to motorists of what is transpiring is required to avoid vehicle accidents during construction in this already constrictive roadway.

e. Highly Coordinated Work Scheduling

The motoring public and the maritime shipping industry will be seriously inconvenienced by this work. They will make reasonable effort to reschedule their trips around the period the work will interrupt use of the bridge. They will reasonably expect the bridge back in service when the State and the contractor say it will be. They will be severely affected when they discover the work was not kept to schedule. This forces the State to require a contractor with a proven track record in making and adhering to tight schedules. This becomes very difficult for the contractor on this project because of the specialty nature of the crews performing the work. The air may be still enough to permit a scheduled crane lift, but the water is too choppy for the barge to deliver the components. Or the water may be smooth enough, but the crane operator believes the air is not calm enough for the lift, or the fabricator had to check one last item on the bearings, and needed the assembly back in the shop. While each difficulty might be foreseeable, and able to be accounted for in a specialty crew's schedule, its impact on other crews might not be realized. Inexperience with this level of detail in planning and scheduling will result in unnecessary delays, and associated costs, and push the contractor to increase speed of performance, with an unacceptable reduction in quality of performance.

Each of these success factors has a cost associated with it, and a value to the State, either in reduced post award costs or in reduced costs to the public. The low bid process does not recognize these factors, or their consequences, in awarding a contract. The presence of one or more of these factors, or of extreme urgency or substantial cost savings, in a project, would be a reasonable basis to select a contracting process other than low bid. Rather than using a completely different, and unfamiliar process, on this critical project, ODOT examined two

The first potential modification, special prequalification, would not require an exception. Special prequalification requires prospective contractors to submit specific qualifications required by the agency. These are scored by the agency, and contractors determined qualified to perform the work are notified and requested to submit sealed bids. Award is based on low bid, and the relative abilities of the contractors to more quickly, reliably, safely, correctly or effectively provide equipment which will operate trouble free for another 80 years are not considered. These are at least as valuable to the State as the contractor's efficiency in producing the work at lowest cost.

The second modification, award based 50% on competitive technical qualifications and 50% on competitive bid price, extends the concept of special prequalification. It includes the scoring of the contractors' relative abilities to address the unique factors for success of this project along with their bid price in making award. Recognizing all of the success factors in making award of this unusual and technically complex project will result in the greatest value to the State. This second approach is the one recommended for this project.

6. **Project Plan:** Proposed Schedule for Procurement and Implementation

Task	Not Later Than
Obtain DAS, AG, OTC approval	November 6, 1996
Complete Evaluation Criteria	November 22, 1996
Complete Technical Drawings, Specifications	December 20, 1996
Complete Alternate Construction Solicitation	December 30, 1996
Advertise in Commerce Business Daily, etc.	December 30, 1996
Pre-bid Conference	January 8, 1997
Clarification questions to bidders, if necessary	January 15, 1997
Alternate Construction Bids due	January 24, 1997
Announce apparent winner	January 31, 1997
Award contract	February 7, 1997
Sign contract	February 14, 1997
Contract completion	December, 1997

7. **Competition.** This proposed alternate process is open to all construction contractors who register with the Department of Transportation to bid on Oregon DOT contracts. It requires interested contractors to examine their equipment, personnel and methods to determine that they have the qualifications to ensure successful execution of the project and to describe in the required technical proposal how they propose to meet ODOT's need for prompt, safe, effective fabrication and replacement of the lift system components. It invites industry participation in the definition and scoring of technical qualifications. It shifts the range of competitive bidders from smaller, lower overhead construction contractors and fabricators towards larger, more technically capable contractors and fabricators with dedicated planning and quality assurance staffs. The combination of technical qualifications with price, rather than separate consideration performed under special prequalification, ensures no contractor is eliminated from consideration. This combination also precludes the State from inadvertently setting qualifications so high that no firms qualify to submit bids.

8. **Savings.** Technically complex and infrequent movable bridge machinery projects do not closely follow the State's experience with costs of familiar road and bridge projects. Limited statistics do point to an increase in contract cost from bid to final of about 5%. They also point to increased costs for administration of 5 % or more. Contractors who are most capable of handling specialized work, such as this, include in their bid a clearer picture of the final cost and the necessary planning and quality assurance to avoid causing extra work for their customer. This added bid price offsets the savings they provide the State in reduced change orders and inspection. By awarding to a contractor who can realistically meet schedule, quality and safety expectations, the State and the contractor jointly save motorists using the Interstate 5 drawbridge significant inconvenience and costs for time and fuel approaching \$150,000 per day for bridge closures.

The costs to the State appear to be neutral in this alternate construction bidding process. Savings to users of the Interstate Bridge could be well in excess of the contract amount.

CONCLUSIONS OF LAW

This request complies with the criteria outlined in ORS 279.015(2).

1. **It is unlikely the Exemption will encourage favoritism or substantially diminish competition.**

This project will be formally procured by the Department of Transportation, Technical Services Branch, Bridge Section. All vendors who are qualified to provide the required services will have an equal opportunity to compete. The formal public notice requirements will be exceeded in an attempt to increase the number of proposers. The agency will evaluate bids based on objective standards. The project, while not subject to ORS 279.005 and 279.007, will clearly meet the intent of those statutes.

2. **The Exemption will result in cost neutral savings to the State, but will result in significant benefit and cost savings to transportation system users, and therefore indirect savings to the State.**

ORDER

An exemption is hereby granted to the **Department of Transportation, Technical Services Branch, Bridge Section** to enter into a contract for bridge work by using an alternative method of procurement. This order is subject to the following conditions:

1. To the extent possible and allowable under this Exemption, this procurement will follow the provisions of ORS Chapter 279 and 291; OAR Chapter 137 Division 30; OAR Chapter 125,

Divisions 300 through 360 -- including public notices and where appropriate, OAR Chapter 461 Division 11.

2. In concert with the Attorney General, objective standards for evaluating proposals shall be established and standards in making a contract award will be followed.
3. ODOT will work with DAS Purchasing to adapt standard contract language for the contract and shall incorporate into the contract such additional or substitute additional terms DAS, the Attorney General's Office and federal programs agree are necessary for the protection of the State and Federal Government.
4. ODOT shall provide DAS full access to the records of the project at any time. DAS shall use that access to determine if the terms of this order have been followed.

This Exemption shall remain in effect from the date of issuance through June 30, 1998.

The Findings of Fact submitted by the agency in support of this request are hereby approved.

Nov. 8, 1996

~~Hearing~~ Date

Jon Yunker
Jon Yunker, Director

Notice: Judicial review of this Order may be obtained by filing a petition for review with the Circuit Court of the State of Oregon for Marion County within 670 days from the date of this order. Judicial review is pursuant to the provision of ORS 1834.484.

DEPARTMENT OF JUSTICE, Approved for Legal Sufficiency

November 5, 1996

~~Hearing~~ Date

Dale K. Workman

Assistant Attorney General



U.S. Department
of Transportation
Federal Highway
Administration

Memorandum

Subject: **INFORMATION: Oregon's Price/Qualifications-
Based Bidding, Concept Approval under
Special Experimental Project No. 14 (SEP-14)**

Date: APR 28 1997

From: Director, Office of Engineering

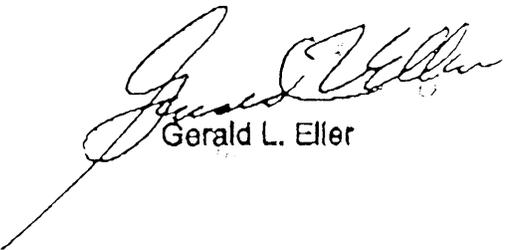
Reply to
Attn. of: HNG-22

To: Mr. Leon J. Witman, Jr.
Regional Administrator (HEO-10.4)
Portland, Oregon

We have reviewed the Oregon Department of Transportation's (ODOT) concept approval request for an alternative bidding method for the I-5 project over the Columbia River. The ODOT is proposing to use a form of price/qualifications-based bidding to replace the counterweight trunnion assemblies on the north tower of the northbound structure.

You may consider the ODOT's request for the use of this bidding method approved as part of the SEP-14 program. This contract will be awarded on the basis of the highest composite score considering both price information and technical criteria. The composite score will be determined with a 50 percent weight for cost and 50 percent weight for technical qualifications. The technical evaluation factors include: 1) waterfront/moveable bridge construction experience, 2) fabrication of complex machinery experience, 3) crane maintenance, inspection and operation, and 4) construction management team.

We look forward to ODOT's evaluation of this alternative bidding method. Thank you for the opportunity to review and comment on this SEP-14 request. Should you have any questions, please contact Wady Williams at (202) 366-0606 or Jerry Yakowenko at (202) 366-1562.


Gerald L. Eller

April 21, 1997

TO: Hank Honeywell
Division Administrator
Federal Highway Administration

Attention: Bruce Johnson

FROM: Terry Shike, P.E.
State Bridge Engineer

SUBJECT: **Lift Span Trunnion Replacement
Interstate 5 Columbia River Bridge 1377A
Pacific Highway (I-5) M.P. 308.38
Multnomah-Clark Counties
Key Number 07193**

This project replaces two of the trunnion assemblies, and the cables that connect and support the North counterweight and the North end of the lift span. The trunnions are fracture critical components, and the Northeast trunnion shaft has a small but growing fracture. Washington and Oregon State Departments of Transportation have agreed on the scope of work, and the need to move quickly to replace the fractured trunnion. Trunnions and all related components will be replaced to reduce the risk of mismatched components, and to reduce the total amount of time the bridge would be out of service to both Interstate 5 traffic and Columbia River traffic.

The consequences of accidents, delays, or improper fabrication are staggering. The size and weight of the components requires specialized high lift and heavy lift crane operations from the river. The size and required precision of the machined components requires an unusually qualified and experienced fabricator. The temporary support of the 700 ton counterweight requires special experience and technique. The hour-by-hour scheduling, quality checks and preplanning require an exceptionally talented construction management organization with proven techniques to deliver this.

NOTED
T. J. SHINE

The Oregon Department of Transportation has requested, and received, an exception to the requirement that Commission Services construction contracts be awarded solely by low bid for this project. The authority received, under Department of Administrative Services Exception Order #332, signed November 8, 1996, allows award based equally on technical qualifications proposed and price proposed. This process, often referred to as "A + B" follows the Source Selection Process described and authorized in the Federal Acquisition Regulation (FAR) Part 15, Contracting by Negotiation, Subpart 15.6, Source Selection. The Technical Qualifications Proposal will be evaluated and scored by a Technical Evaluation Board, appointed by Oregon Department of Transportation Contracts Unit Manager. The Board will consist of three members from the Bridge Engineering Section, or its Consultant, one member from the Contracts Unit, and one member from the construction industry (as designated by the Association of General Contractors). The methods for scoring the technical qualifications and the price are published in the project specifications. The State is obligated to award to the responsive proposer who has the highest numerical score which is the sum of the technical and price scores.

The State of Oregon is using State funds to pay its 50% share of the cost of this project. The State of Washington will use Federal Aid funds to pay for its 50% share. As a result, this letter requests concurrence of the Federal Highway Administration to the use of this contracting format, for this unusually critical and complex project, and agreement to participate with Federal Aid funds as requested by one or both States. Full Plan, Specification and Estimate submittals will be provided to FHWA prior to solicitation.

The State plans to make the solicitation available to contractors on May 2, 1997, with proposals required by May 23, 1997. The Technical Proposals will be evaluated and the scores announced in a public reading on May 29, 1997. The Price Proposals will be opened and read at the same time. The final scores will be calculated and made public the same day.

FJN:hlp