EXPERIENCED BASED RECOMMENDATION ON RISK ALLOCATION FOR BOTH OWNERS AND CONTRACTORS

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Risk typically is defined as an element or factor arising during project execution which inhibits or negates the achievement of stated project cost, schedule or quality goals. Risk is both a potential condition and a specific element or event which may result in that condition. Project Risk Management is composed of a systematic process by which risk elements or conditions may be identified, evaluated and avoided, mitigated or eliminated, in order to preserve the achievement of project cost, schedule, and quality goals. Project Risk Management is the common term for a systematic program by which a party to a construction project identifies, evaluates, and acts to avoid, mitigate or eliminate risk elements or factors which threaten the successful achievement of project cost, schedule, scope, quality, and goals.

Every party to a construction project holds a particular and unique position relative to the risk elements for which it assumes responsibility during the execution of that project. Construction in the global market recognizes two types of risk management:

- Traditional insurance risk management, which is concerned with the management of the party's insurance program (i.e. builders risk insurance, hazard insurance and liability insurance).

- Execution risk management, which is concerned with the management of specific events or conditions which may inhibit or prevent the achievement of project cost, schedule and/or quality goals (i.e. design defects and construction delays).

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With regard to either type of risk, a fundamental principle that must guide risk allocation from the perspectives of the owner and the contractor is one of predictability. This concept may appear odd at first, but risk in engineering and construction requires a sense of predictability so that the parties know how to react and manage the risks that they face. Predictability is the foundation upon which many industries successfully contract for construction. Contractors generally expect the plans and specifications to be inclusive, when they are required to give a firm, fixed price. Owners, on the other hand, want to receive a constructed project that meets all of the defined scope for that same fixed price. But all of us know that engineered/constructed projects seldom meet what either expected at the beginning of the project. A perfect set of plans and specifications does not exist, and the one certainty is that all the planned conditions also will not be as expected. What both parties require, however, is a predictable pattern in "who" has the consequences "commercially" when risks arise, as they always do.

Since a contract is the primary means of providing such predictability, the contract must allocate the risks between the parties. This Risk Allocation is what many of the standard form contracts that are used globally provide – the predictability that all parties gain from a generally common understanding. It is not intended to eliminate disputes. Even if you do not agree with the allocation, it is generally understood by the parties they can manage the risk. When the Risk Allocation is "out of the norm," that is, an allocation of risk that is unusual, problems, inconsistencies, etc. occur. For instance, the use of typical Standard Conditions of Contract, such as, the FIDIC "Rainbow Series" of contracts, the World Bank's version of FIDIC, industry-specific forms of contract, etc. are based on legal principles of "mutual mistrust.[2]" Whether the contact is based in Civil Law or the Common Law, the almost universal basis of contracts in the global market is one of "mutual mistrust." What is meant by "mutual mistrust," for example, is that the owner believes that the contractor inherently will try and execute and deliver something less than that for which is obligated; that is, the contractor will provide less scope or quality and/or take longer. The contractor believes that owner will demand more than the contractor has agreed to execute and deliver for a fixed price; that is, the owner wants more scope or quality and/or delivery in less time. The owner and the contractor are expected to protect or defend the benefit of their "bargain." It is assumed that for either party there is not anyone with more interest and in a better position to do so than oneself. Thus, when one party believes it has been injured or damaged, the injured party has an obligation to the offending party to give reasonable notices of its failure or the presumed failure to "live up to the bargain." The users of such contracts become familiar with the processes and skill sets which enable parties to function under terms that are familiar. It forces parties, whether an owner or contractor, to behave in an expected manner. Where there are variances from that bargain reached, parties also must have defined process to resolve their different understandings.

For today's owners risk allocation is an identification of risks that potentially may affect a project. All projects start as an idea; that is, a concept that will fill a specific need, within a specific time, and at a specific location. Thus, the primary party involvements are those of the owner-operators, financing sources, and users. Since there are essentially no limits or boundaries on concepts – if it can be imagined, someone can turn the concept into a project. But, there are enormous risks involved in moving a project from

[2] Nielsen, K.R., Avoiding a Crisis in the Construction Industry: Guidelines for Internationalizing the Japanese Standard Conditions of Contract for Civil Works, Kochi University of Technology Press, Tokyo, Japan 2005.

concept through feasibility to financing. It is no longer enough to have a "good idea" upon which to seek funding or financing. In today's global economic structure the "good idea" must be backed by analysis and examination of the multitude of risks involved in executing and assuring a useful life. As projects become increasing complex and as competition for a share of the finite pool of global capital resources (public and private) to undertake projects increases, financing-funding sources must make well based decisions on which investments have the best chance of a significant return (economic or social). These decisions are tied to identifying potential risks and managing those risks.

However, not every concept should be or is transitioned into a project. Therefore, early in a project's life, the owner must test the project's assumed physical, technological and expense parameters versus the potential project's need, feasibility and return on investment. A project concept at least must pass three tests to be practical:[3]

1. Can the project be physically engineered and constructed?

2. Does the technology exist to engineer and construct the project to meet the purpose intended?

3. Does the expected benefit of the project justify the cost of engineering, constructing and operating the project?

If a concept fails any of the three tests, realistically it should not be built. Ancient to recent history is full of examples of projects which never should have been undertaken because the concepts failed to pass one or more of these three tests. Yet, there still are examples of projects being built in almost any location in the world which fail one or even all of the tests. Similarly, the tests must be applied to stakeholders, since the execution of those projects that fail one or more tests also have serious economic or social side affects, some intended and some unintended.

Nonetheless, an owner bears the sole responsibility for completing all of the risk management functions for the entire construction project until the bid and award phase at which point the contractor has to develop its own risk management plans when it responds with a tender that must account for the risks that it has been allocated. Every project risk management action taken during the project execution is based upon and flows directly from the decisions made by the owner and the winning contractor during this project formation stage. This means the owner is at the top of the project risk structure. If the owner does not practice sound risk management, then it is almost a given that risks will be unidentified, misevaluated, unallocated, misallocated, and mismanaged during the execution of the construction project. The risks that the owner allocates to other parties will determine whether or not a project is successful. In the

[3] Nielsen, K., "*Risk Management Techniques – Evolving Project Management Tools For All Seasons*", Track 1a, Infrastructure, Proceedings of the Third Civil Engineering Conference in the Asian Region (The 3rd CECAR), Seoul, Korea, 2004.

end, every risk element which is not actively managed and controlled has the potential to preclude the achievement of the owner's goals for the project.[4] Until the point at which an owner takes deliberate action to involve other parties in the execution of the project, all of the risk inherent in that project is the sole responsibility of the owner. Once the owner has decided to pay another party to assume specific elements of risk, it has a series of important decisions to make, such as which risks to allocate and which to keep; which project delivery method will provide the most suitable management of the inherent risk; which contractual provisions and payment methodologies are most compatible to the project delivery method and best suited for controlling the risk elements inherent in the project.

Given this context in regard to Risk Allocation, there are several observations and recommendations that I offer:

1. The project formation is when the actual process of risk allocation begins, and drafting of the contact reflects the decisions. The typical project consists of the following activities for an owner:

    - Concept – the owner identifies the need for the project and establishes the initial outer limit parameters of the project in terms of function, location, and preliminary funding and timing targets.

    - Feasibility – the owner establishes the fundamental design and construction attributes of the concept of the infrastructure project and prepares an order of magnitude cost estimate and schedule for completion of the project based on those fundamental design and construction attributes.

    - Financing – the owner secures financing or dedicates funding for the project based upon the order of magnitude cost and schedule estimate, the comparative need for the project (evaluation and ranking of all capital projects identified to attain a priority ranking), the total capital funds available, the feasibility of completing the project as planned and the cost to benefit ratio expected as a result of placing the completed structure of facility into its intended service.

    - Strategy Formation – the owner finalizes the primary cost, schedule and quality goals for the project, selects the project delivery system, identifies the contractual and payment methods, drafts the contract document set, sets the basic design or performance specifications for the structure or facility, and

[4] Nielsen, K., "Structured Risk Identification and Allocation as a Component of Construction Program Management: A Process that Knows No Boundaries", Proceedings of ASCE Convention, Session - International Contracting Practices, Washington, DC, US, November 11, 1996.

establishes it's own project management and control processes, procedures and organization.

- Bid Award – the owner develops and issues a Request for Proposal (RFP), Invitation for Bid (IFP), or similar notice against which contractors will respond. During this phase the contractor will examine the RFP, develop a project execution plan, estimate the cost to complete the full scope of work delineated, prepare the project schedule for completion of the scope of work, and undertake all of the other activities required within the RFP.

2. Decisions by an owner to retain, allocate or insure a risk depend upon the evaluation of the consequences of an individual risk. The rule of thumb is that a risk should be assigned to the party in the best position to manage or control that risk. Therefore:

   - An owner should retain those risk elements which it is in the best position to manage or control. For example: owner may retain the right to initiate and approve changes to the design of construction project.

   - An owner should allocate those risk elements which another party to the project is in the best position to manage or control. For example: An owner may allocate the responsibility to meet all applicable codes and regulatory requirements to the contractor.

   - An owner should consider insuring against the impact of the risk element should it manifest during execution of the project, if a risk element is beyond any party's ability to manage or control. For example: an owner may secure insurance against the possibility of a typhoon destroying the structure or facility prior to the completion of construction.

   Understanding the nature of the risk, the likelihood of a risk element occurring and the possible impact to cost, schedule, scope and quality, if the risk element occurs, are all factors that the owner should consider during the project. Decision's as to how to manage and control those risk elements which have been identified and evaluated are the some of most important that an owner will make over the course of any construction project. As a result only the owner gets to choose which party to a construction project is allocated which risk element inherent within that project and allocation of risk elements is one of the most important management decisions that an owner will make during the entire project. In the most recent past the theory was that an owner should divest itself of as much risk as possible either through insurance or allocation of risk to other parties to the project. The theory was that the more risk allocated to others the less risk faced by the owner. Unfortunately, the concept of total risk divestiture under any project delivery system was based on the mistaken assumption that

once a risk element was allocated to others it (1) ceased to be a concern to the owner and (2) had no impact on the owner's cost, schedule, quality or quality goals. However, those assumptions have been proven false. The trend on construction projects is to allocate risk elements on the basis of identifying the party within the project structure which is best equipped and best positioned to manage that particular risk element.

For example, typical of risks which Exploration and Production (E&P) owners must account and should not allocate for in today's Oil & Gas projects include:

- Reserves Risk: The extent of reserves, and not only the anchor field, but also reserve risk associated with the prospects and discoveries in the area must be addressed.

- Credit Risk: Customer credit risk is a new risk issue stemming from the large inflow of small cap independents and the formation of many LLC's (Limited Liability Corporations) without any real assets.

- Engineering Risk: The E&P requirements continuously are pushing the deepwater envelop. A large risk consideration is that the meteorological-ocean data (current and waves) is empirical and is changing with new measurement information becoming available every year.

- Materials Risks: The huge costs of projects are driving the search for the cheapest material that meets specification which is to be fabricated in a location that has the least cost – often in different countries. In addition there is huge demand globally for the same materials for projects.

- Weather Risks: Loop currents and named storm risks are plaguing many off-shore projects, yet are increasingly uninsurable or not assignable.

- Customer Project Risks: Pipelines are a transportation system that relies on customer projects for its need and use. Political stability underpins many such projects and their market viability.

- People Risks: Changing social relationships and forced cultural changes of linear projects, like pipelines, are destabilizing local support and long term operability conditions.

3. One method is to insure for most or some risk, such as, builders risk insurance, hazard insurance and liability insurance, and thus cover the risk that is allocated to a party. There is, however, a large problem. Available insurance globally for projects has a limit. Insurance is available for most projects which have a value of US$ 800 million to US$ 1 billion, but only then if the contractors for the

construction have really strong balance sheets. The total value of insurance available globally for construction is US$450 billion annually, but the U.S. market by itself is US$ 1.1 trillion. So that makes the contractors balance sheets quite important from an owner's perspective. Current theories on Risk Allocation, however, tend to push risk down to the lowest level through successive levels of contracting. Thus we have a crisis today that guarantees more claims because:

- It pushes risk to the lowest level in the contracting chain where the firms where there exists the least financial depth.

- The lowest levels have to accept the risk because they do not have the clout to ward off the allocation.

- The ability of the firms who are left with the risk can do very little to alter the risk should it emerge on the project.

The result is that accountability is not in line with the risk. Correct risk allocation also recognize an ability to control or at least to minimize the consequences of the risk. Thus, one key concept I will offer is to evaluate whether a contractor can remain in business and thus pay, if the owner succeeds with a dispute? This issue is very real. The convergence of demand globally for infrastructure, mining and energy has meant opportunity for owners (private companies and government owned) and contractors alike, but also leads to significant global competition. The following statistics, based on the latest figures reported by Engineering News-Record (ENR), suggest some interesting facts:

ENR's Top Contractors in 2005 - Infrastructure and Energy Projects								
	Global Market				**U.S. Market**			
Contractors	**No.**	**%**	**2005 Revenue US$ Bil.**	**%**	**No.**	**%**	**2005 Revenue US$ Bil.**	**%**
U.S. Based Contractors	108	48	153	27	52	23	35	18
International Contractors	117	52	410	73	173	77	154	82
Total Contractors	225	100	563	100	225	100	180	100

These statistics say a lot. Internationally based contractors do substantially more work globally than the U.S., and they earn revenue on average that is 2.5 larger (US$ 3.5 Billion and 1.4 Billion). These statistics, however, do not tell the whole story. International contractors may have several mega-projects and their assets and liabilities may not be adequate to cover the risks that have been allocated.

4. A contractor has no project risk management role in a construction project until the point at which the owner issues the RFP requesting bids or tenders. Then the contractor must engage in its own project risk management.[5] The first step that a prudent contractor should take will be exactly that taken by the owner, that is, prepare a profile of the risk elements which have been allocated by the owner to it. From the contractor's perspective the risk will include the discrete items delineated within the project scope of work (i.e. deliverables). The contractor works under two significant disadvantages, however:

   - It has a very limited time within which to prepare bid or tender which significantly restricts the depth to which it can conduct any analysis of the risks allocated to it within the project; and

   - Its initial cost to prepare the bid or tender is, in itself, a significant risk to the contractor, as the contractor must invest money which it may never recover in an attempt to win a competitively bid project award.

   Once having identified all of the risk elements allocated to it, however, a contractor must conduct its own evaluation of the risks in much the same manner and using much the same tools as the owner used during the project formation stage. Although a contractor may pass through a particular performance risk to a subcontractor, if the risk element manifests and the project suffers an impact the owner will not seek recovery from that subcontractor. The owner will look no further than the contractor for recovery. From a practical standpoint, the contractor remains responsible to manage and control all of the risks which have been allocated to it by the owner.

   The contractor does have choices it may make concerning risk:

   - If the total risk load is too high or there are a few significant risks which the contractor is unable to undertake, it can choose not to bid the project.

   - If a risk is likely to emerge during the execution of the project, the contractor can add money in the form of direct cost or contingency intended to cover the impact of the risk to the project. For example: it is not unusual for a contractor facing liquidated damages to assume a limited number of days of delay and add the cost of the expected liquidated damages for those delay days to their total bid or tender. The contractor can impose back-to-back (the terms of the subcontract mirror those of the contractors) the liability on subcontractors and vendors which, while it will not protect the contractor from the owner, it will enable the contractor to recover at least a portion of the impact cost

[5] Nielsen, K., "Execution Risk Management in Design-Build Infrastructure Projects", Proceedings of ASCE's Construction Institute Conference, Tysons Corner, VA, US, May 12-13, 2004.

generated by the risk element, but this process leads to accountability is not in line with the risk.

- A contractor can propose alternatives to the owner which may reduce or remove a risk from the contractor in return for a lower price or shorter time to completion of the project. This alternative, however, is not generally available in the global market unless the owner is a private organization and it is willing to accept the contractor's suggestions.

Risks which an owner has allocated to the contractor are a fact of life in the construction industry. In the end the contractor must price, schedule, control and manage risk if it is to be successful. Like the owner, the critical first step is for the contractor to identify the risk which has been allocated, evaluate that risk as accurately as possible, and then establish its alternatives for managing and controlling that risk.

5. An Engineer-Procure-Construct (EPC) approach to executing many projects is an appropriate delivery method. The use of Lump Sum EPC approaches (or a Lump Sum Turnkey approach) is certainly the norm in many industries, like the Oil & Gas, Mining, Industrial Process, and Infrastructure. Many projects have the need for fast execution so that the owner(s) can commence operation of the project and obtain the benefits as soon as possible. The lump sum EPC contract approach can enable the owner to set its performance and quality criteria, such as, a preferred and technology, purchase long lead equipment for its chosen technologies, and to have a single entity to which it looked to provide the completed Project with minimal oversight, interference and changes. The Contractor's responsibility then is to perform engineering, procurement and construction necessary to meet the contract criteria employing its professional judgments.

   Unfortunately, in many instances the criteria are not possible or appropriate. Such is case where the technology is pushed, such as is the case when an increase in production capacity is several orders of magnitude larger, production involves depths where there is little experience, etc. The owner also may have ultimate knowledge with respect to the technology, or conversely the owner may purchase the technology from a third party, but is accustomed to having its staff intimately involved in all aspects of project execution. Or, contractors may not have the lead time because of constraints in the supply of the equipment or constraints in supply of skilled labor. Therefore, owners and contractors must be cognizant of all the conditions. Owners should not demand the contractor take the risk where it does not have a chance of success. Contractors should not promise something that it is not capable of delivering.

6. Following is a list of typical areas that give rise to risk for the contractor or may be allocated to a contractor. This checklist is intended to assist in the identification of risks to be addressed. It is not a comprehensive list, but can be used for the identification, assessment, and management of project specific risks must be carried out by the contractor and is specific to a multinational contractor client of Nielsen-Wurster:

1.0 NATURE OF THE RELATIONSHIP BETWEEN THE PARTIES

- Prior experience with owner (the contractor and any joint venture partner).
- Background checks of a new owner.
- Prior experience with major partners and proposed relationship on this contract.
- Background check on new partners.
- Credit checks findings (owner and partners).

2.0 OWNER/EMPLOYERS'S CRITERIA FOR AND DEFINITION OF SCOPE OF PROJECT.

- Verify project financing is in place.
- Project phasing and schedule.

3.0 LIST OF EPC DUTIES AND RESPONSIBILITIES.

- Design
- Construction
- Optional services including any operations or maintenance responsibilities.
- The contractor's responsibilities in association with others (this will include information on the contractor's share of any joint venture and a description of how risks are allocated within the joint venture). A Memorandum of Understanding (MOU) should be developed at this stage and submitted at least in draft form.

4.0 LIST OF OWNER'S DUTIES AND RESPONSIBILITIES.

5.0 RESPONSIBILITY FOR OBTAINING VARIOUS PERMITS.

- Environmental
- Right of way acquisition.
- Utilities.
- Construction site access.

6.0 SUBCONTRACTING AND PURCHASE OF EQUIPMENT/MATERIALS.

- Small or disadvantaged business requirements/penalties.
- Set aside or offset requirements.
- Owner furnished equipment/materials.
- Consequences of Owner's rejection of subcontract or a subcontractor.

7.0 SCHEDULING AND MILESTONE DATES.

- Clear definition of interim and completion milestones.
- Consequences of early/late completion (liquidated damages and/or early completion bonus).
- Identify agreed to or anticipated caps.

8.0 CHANGE ORDERS AND CLAIMS PROCEDURES AND ENTITLEMENT.

- Force Majeure clause.
- Time limits for owner decisions and approvals including any owner requested reviews.
- Conditions for allowed change orders.
- Claim procedures, arbitration.
- Dispute resolution board.
- Law governing.
- Appropriate unforeseen/changed conditions clause.

9.0 CONSTRUCTION AND PERFORMANCE WARRANTIES.

- Limitations based on owner-supplied information, equipment, resources (as applicable).
- Time limitations.
- Limitation to performance test (if applicable).
- Warranty reserve included in price - it is not the contractor's policy to provide a warranty.

10.0 COMPENSATION

- Amount/formula for payment.
- Mobilization payment.
- Granted by contract.
- Amount if stipulated.
- Arrangement within the project management team.
- Progress payment procedures.
- Substantial/final completion procedures and consequences.

11.0 CLAUSES TO ENFORCE PAYMENT.

- Limitation and extent of right to audit to cost-plus/reimbursable items.
- Interest and attorney's fee.
- Escrow of disputed sums.

12.0 LIMITATION OF LIABILITY.

- Limitation to fixed sum, percent of contract sum or formula.
- Limitation of liability to corporate entity.
- No, or limited liability for consequential damages - this item requires early discussion.
- Exclusivity of remedies clause.
- Limitation of damages to required insurance limits and waiver of subrogation.
- Reimbursement for owner/employer required design modifications.
- Limitation of Liquidated Damages.
- Damage attribution for owner/employer's delays.

13.0 ENVIRONMENTAL

- Responsibility for hazardous waste.
- Pre-existing (known).
- Pre-existing (unknown or found during construction).

- Compliance with other environmental regulations (list major governing regulations and party responsible).

14.0 INDEMNITY PROVISION AND LIMITING OBLIGATION TO INSURABLE RISKS.

15.0 INSURANCE PROVISIONS.

- Professional liability insurance.
- Design/builder's insurance.
- Builder's risk insurance.
- Other insurance including any insurance associated with operation.
- Waiver of subrogation.

16.0 BONDS/LETTERS OF CREDIT.

- Bid bond (amount, release date, provisions for call).
- Completion bonds (amount, release date, provisions for call).
- Performance bonds (amount, release date, provisions for call).
- Payment bonds (amounts, release date, provision for call).
- Letters of credit (amounts and purpose).

17.0 COSTS/COST SHARING.

- RFQ total costs and the contractor portion (include copy of any cost sharing agreements).
- RFP total costs and contractor portion (include copy of any cost-sharing agreements).
- Negotiation of total costs and contractor portion (include copy of any cost-sharing agreements).
- Mobilization costs.
- Design cost.
- Construction cost.
- Warranty cost - it is not the contractor's policy to provide a warranty.

- Contingencies (describe).
- Other costs not included above including cost of delays.
- Degree of participation of parties in cost proposal preparation.
- Cost proposal type
- Not-to-exceed price with shared savings
- Guaranteed maximum price including when finalized
- Fixed price (lump sum).

18.0 OPERATIONS AND/OR MAINTENANCE OF CONSTRUCTED FACILITIES.

- Maintenance required of design/builder (explain).
- Operations required of design/builder (explain).

19.0 OWNER/EMPLOYER RETAINAGE:

- Basis
- Amount (percent of payments or other)
- Duration
- When released
- Conditions of release
- Securities allowed as cash substitute
- Type of securities
- Ownership of securities interest

20.0 CLEAR LIST OF INFORMATION:

- Any items for which owner is responsible and on which the contractor may rely.
- Of areas where the contractor can provide substitutions and Value Engineering submittals.

21.0 STANDARD OF CARE FOR PROFESSIONAL SERVICES.

- Professional services performed in accordance with standard of care.

- Responsibility for changes in codes or interpretations.

22.0 OWNERSHIP OF PLANS.

- Limitations on use.
- Hard copy, not electronic medium, as official copy.
- Warranty/indemnity against copyright/patent infringement.

23.0 APPROPRIATE CREDIT AND PUBLICITY AND USE OF PROJECT FOR PROMOTIONAL PURPOSES.

24.0 DISPUTE RESOLUTION.

- Step negotiations.
- Mediation.
- Arbitration.

25.0 TERMINATION PROVISIONS.

- By owner during selection phase.
- By the contractor for cause.
- By owner for cause.
- Premium for premature termination for owner's convenience.
- Consequences of temporary suspension.

26.0 LEGAL BOILERPLATE.

- Governing law.
- Integration clause.
- No waiver/Severability clause.

27.0 PROJECT CASH FLOW ANALYSIS.

- Amounts and timing.
- Linkage of payments to milestones.

28.0 DESIGN

- Percent complete by owner at RFP stage.
- Owner‘srole/participation during D/B process.
- Joint venture partner (contractor) role/participation.
- Constructibility procedures by joint venture partners.

29.0 CONSTRUCTION

- Owner’s role/participation during construction.
- QC roles and responsibilities.
- QA roles and responsibilities.
- Material testing roles and responsibilities.
- Sources of labor, responsibility and associated labor risks.

30.0 PROJECT COST FUNDING

- Source of funds.
- Funding schedule if not fully funded.

31.0 OTHER ITEMS

- Value engineering provisions/clauses/articles in RFP, if any.
- JV operating committee/board of control structure.
- Organization chart showing key staff.
- Attach copy of RFP.
- Attach copy of owner’s organization chart.
- Attach copy of joint venture, or other similar agreement.
- Attach copy of owner’s contract for D/B.
- List of other potential concerns.

7. Today’s tendency is execute the largest infrastructure projects in some form of PPP (or PFI). One of the issues that make PPP projects to risky for the insurance industry is the definitions of “service quality” that must transcend the technology evolution for the particular service over the length of the concession. Nielsen-

Wurster was involved earlier this year with a PPP contract to provide new rail cars for the state of New South Wales, Australia. The contract was with a consortium of rail car providers and included the operation of the systems on which the railcars were required. Although the contractor JV was not part of the concession, it represented the major component in that the contractor JV was required for a period of 25 years to meet the service requirements. The contractor JV sought insurance for several elements that it would provide under an EPC contract over the 25 year period. Ultimately, the contractor JV was able to get insurance for the 15 year delivery period of the new technology cars, but operation of the cars was specifically excluded because of a very poorly defined "satisfaction" measure of the riding public. The definition was not sufficiently quantifiable to measure and thus to insure the contractor JV. Thus, to "sell" a PPP project, the risk that is allocated must be shown to have been properly assessed, the risk must be shown to be properly allocated, the risk must be shown to capable of management according to a plan that is regularly updated, and there is a method by which the contract performance could be reasonably measured. The risk is be defined in such a way that the criteria can be reasonably measured.

8. "Alliance-type contract methodology" has gained a significant attention since it was first used in the Oil & Gas industry. The idea behind an alliance contract is one where the stakeholders "share" risk and not "allocate" risk. The Australian's have attempted to extend its usage to infrastructure projects, there have been 36 projects to date (we have been involved in many). There have indeed been several real successes. There have been several real disasters. The recent trend has been for the owners (whether Government organizations or the private concessionaires owners) is to "reserve more and more" powers, thus defeating the concepts that were promoted for Alliance Contracts. Also, many of the subcontractors complain that the benefits that accrue the alliance partners don't accrue to them, and they assert that they still have most of the risk. In essence it is a new name for project specific teams that have required multiple construction companies to form a joint venture because of their size and multi-year length. In addition, risk allocation must address personnel issues. Under the current conditions of demand globally, one risk that must be considered especially in Brazil, is the fact that the parties take some of the most experienced senior individuals out of their respective firm for the duration of the project (primary parties and subcontractors) just when their talents are most required. A reasonable "use" of these assigned personnel must be addressed and properly allocated.

There are many other lessons that have been accumulated from experience, but these suggestions arise from experience in the last five years all around the world.