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## Research Project

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### Relationship Contracting in the Mineral Processing Industry

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**Bachelor of Engineering (Civil)**

**Supervisor: David Thorpe**

**Due Date: 30/10/08**

University of South Queensland  
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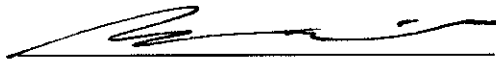
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# A Study of Relationship Contracting in the Mineral Process Industry

## ***Abstract***

*Relationship contracting is the method of executing a project through different processes to the traditional form of contracting. Its utilisation worldwide has seen both the private sector and government bodies complete many projects under this method of contracting with varying degrees of success. The mineral processing industry is no exception to this as it has also had fluctuating degrees of success with relationship contracting.*

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# 1 Introduction

Relationship contracting is a form of contracting that has been adopted worldwide for the execution of works in various different industries. Like the traditional form of contracting, each individual contract varies from one to the other depending on the requirements of both client and contractor.

Due to past failures and extensive litigation proceedings the traditional method of contracting is become redundant in the modern age of construction; therefore relationship contracting is now becoming a more regular occurrence for the development of infrastructure for the mineral processing industry.

This research project seeks to review and investigate the relationship contracting process in the private sector, with specific focus on the mineral processing industry; and devise and evaluate methods of implementing it into a company, within the private sector, with limited experience in this field. The points below outline the thorough process to be undertaken to achieve the desired results:

1. Research relationship contracting relating to the private sector in comparison to the traditional method of contracting.
2. Review and analyze specific examples of its implementation in the private sector.



3. Review methods and systems of analyzing the effectiveness of contracts and alliances with a view to developing conclusions on the success of such approaches.
4. Devise a method or procedure which can be used to determine whether, or how willing a client or contractor will be to undertake a relationship contract agreement.
5. Test the effectiveness of this procedure with practitioners against key desirable responses/indicators.
6. Suggest any possible future improvements that can be made to this procedure.
7. Prepare and submit the required project dissertation as per Project Reference Book.

If time permits:

8. Suggest ways of successfully applying this information into a company within the private sector with limited experience with relationship contracting.

## 2 Project Background

In the mineral processing industry the distinctions between traditional forms of contracts and relationship contracts are evident. A typical traditional contract is based upon a client discovering the need for some form of construction to take place. This is usually based on the client discovering a virgin or further deposit of minerals.

Whether it is maintenance or an upgrade of an existing facility or construction of a new facility, generally the same procedure applies. This procedure is based on an invitation for competitive tender on the required works, to several contractors who have performed similar works successfully in the past. After reviewing all the proposed bids, the work is awarded to the contractor with the most competitive or appealing bid. The contract is then generally undertaken on an EPCM (Engineering, Procurement, Construction, Management) or an EPC (Engineering, Procurement, Construction) basis.

### 2.1 Traditional Contracts

Basically an EPCM contract is a cost reimbursable contract which is based on the client reimbursing all expenses and awarding a set fee to the contractor on completion of the works. The fee and any incentives are sometimes based on KPIs (key performance indicators), which may involve items such as safety achievements, reaching schedule milestones, environmental considerations, etc. The profit margin is generally low, but so is the risk, as any over runs or delays are covered by the client.

An EPC contract, however, varies significantly and is based on the client and contractor agreeing to a set cost of the works to be undertaken during award. It is then the contractor's responsibility to perform all works, within a set timeframe, to the

client's specifications. All profits are based on any remaining funds after practical completion of the works. Any overruns or delays are covered by the contractor. With this form of contract the contractor distances himself from the client, so any costs or decisions to be made during the construction phase do not require client consideration and approval. The profit margin is generally higher than EPCM if managed effectively, but all risk associated with costs and delays are taken on by the contractor.

“The two most common types of construction contracts are “turn-key” or EPC (Engineering, Procurement and Construction): means the company is contracted to provide engineering, procurement and construction services by the owner. Think Design & Construct style contracts, where the project is largely Contractor managed and the cost risk and control are weighted towards the Contractor and away from the Owner. The EPC contractor has direct contracts with the construction contractors.

EPCM (Engineering, Procurement and Construction Management): means the company is contracted to provide engineering, procurement and construction management services. Other companies are contracted by the Owner directly to provide construction services and they are usually managed by the EPCM contractor on the Owner's behalf. Think Professional Services contracts, where the project is largely Owner managed and the cost risk and control is weighted towards the Owner.

Included is a simplified chart showing the differences in the type of contracts and how each would differ under the same situations: The list below is not a complete list of differences between EPC and EPCM contracts but it does address many of the major

contractual differences. The way each of these issues is handled can be modified during contract negotiations to suit the situation and overall goals of the project.

| <b>Task / Issue</b>            | <b>EPC (Engineering, Procurement and Construction)</b>   | <b>EPCM (Engineering, Procurement and Construction Management)</b>  |
|--------------------------------|--|---|
| Equipment Supply Contracts     | Negotiated & Signed solely between EPC contractor & Supplier   | Negotiated & signed between Owner and Supplier /with EPCM contractor's advise and assistance  |
| On-Site Construction Contracts | Negotiated & Signed solely between EPC contractor & Supplier   | Negotiated & signed between Owner and Contractor /with EPCM contractor's advise and assistance  |
| Supplier Selection             | Suppliers chosen solely by EPC contractor with no input from Owner   | Suppliers chosen by mutual agreement of Owner and EPCM contractor   |
| Scope of Supply                | EPC Contract only as good as the original project specifications presented during bidding process. Changes to specifications / scope of supply after awarding of contract can be expensive, due to EPC contractor's sole contract with Owner and Owner's inability to "Shop Around" for multiple quotations from independent contractors / suppliers | Owners can modify project specifications with little or no trouble. Owner, with the assistance of the EPCM contractor can negotiate independent contracts with suppliers / vendors at any time due to the fact that project is under multiple (independent) contracts and not one (1) all encompassing contract |
| Equipment Supply Warranties    | Warranties negotiated by Suppliers & EPC contractor and issued to EPC Contractor directly. Warranty to Owner from EPC contractor is negotiated separately between Owner and EPC Contractor and issued to Owner by EPC Contractor   | Warranties negotiated individually with each supplier by Owner with EPCM contractor's advice. Issued directly to Owner from the suppliers and contractors   |

|  |   |  |
|--|---|--|
| Process Warranties   | Warranties negotiated by Suppliers & EPC contractor and issued to EPC Contractor directly. Warranty to Owner from EPC contractor is negotiated separately between Owner and EPC Contractor and issued to Owner by EPC Contractor (Usually in the form of a performance Bond)                      | Warranties negotiated individually with each supplier by Owner with EPCM contractor's advice. Issued directly to Owner from the suppliers and contractors (Usually in the form of a Performance Bond)  |
| Construction Site Safety (General Liability Insurance, Workman's Compensation, Accident, etc.) | Site Safety solely the responsibility of the EPC contractor and sub contractors; in accordance with Contractual Agreements  | Site safety is monitored by EPCM contractor but site safety is the legal responsibility of Owner and Sub Contractors; in accordance with Contractual Agreements  |
| Permitting (Environmental, Construction, etc.)   | Permitting is the responsibility of the EPC contractor with the exception of permits that are required by law to be issued in the name of the Owner of the project  | Permits are issued to the Owner directly with EPCM contractor assisting in filing the necessary paperwork  |
| Project Budget Cost Overruns   | The cost risks for a project are borne by the EPC contractor. Any cost overruns, for equipment and/or services within the EPC contractor's scope of supply, are for their own account and can not be passed onto Owner unless "change conditions" occur or contractual agreements to the contrary | The cost risks for a project are borne by the Owner. Any cost overruns, for equipment and/or services are for the Owner account (with the exception of fixed price supply contracts) i.e. Final equipment pricing bids / on site cost higher than originally budgeted. |
| Project Budget Cost Savings  | The cost risks for a project are borne by the EPC contractor. Any cost savings, for equipment and/or services within the EPC contractor's scope of supply, are for their own account and are not passed onto Owner unless contractual agreements to the contrary                                  | The cost risks for a project are borne by the Owner. Any cost savings, for equipment and/or services are for the Owner account i.e. Equipment/Services bids are returned lower than budgeted.  |

|                                    |   |  |
|------------------------------------|---|--|
| <p>Project Day-to-Day Expenses</p> | <p>The day-to-day expenses for the project, within the EPC contractor’s scope of supply are borne by the EPC contractor.</p>  | <p>The day-to-day expenses for the project are borne by the Owner but are managed and administered by the EPCM contractor (up to pre-determined quantities, without Owner’s need for intervention). Usually a small fund is established by Owner for day-to-day expenses</p>   |
| <p>Project Financing</p>           | <p>Project Financing is usually accomplished by substantial down payment by Owner to EPC contractor and the remainder of the fees issued with Irrevocable Letter of Credit (with partial payments) from Owner to EPC Contractor. This requires Owner to have all financing in place at the onset of the Project so as to secure letter of credit (LC).</p>  | <p>Project Financing can be any combination of down payments, open accounts, and Irrevocable Letters of Credit from Owner to suppliers / contractors; whatever method is negotiated during contract negotiations. EPCM contractor will assist in all negotiations on Owner’s behalf. This allows Owner to have partial financing in place at the onset of the Project with the remainder available as needed, dependant on contractual requirements.</p> |
| <p>Legal Cost</p>                  | <p>Legal Costs are low for Owner. Owner negotiates only one detailed supply contract with EPC contractor. EPC contractor must negotiate individual contracts with suppliers / vendors. EPC contractor’s legal costs are high due to multiple contracts. In the event of legal action is taken, Owner must sue EPC contractor, who in turn must bring legal action against appropriate suppliers / contractors. (Usually a longer process than EPCM legal actions)</p> | <p>Legal Costs are higher for Owner. Owner negotiates multiple supply contracts directly with suppliers / contractor; with the assistance of EPCM contractor. In the event of legal action is taken, Owner must bring legal action against individual suppliers / contractors. (Usually a shorter process than EPC legal actions)</p>  |

|                       |  |   |
|-----------------------|--|---|
| <p>Administration</p> | <p>Owner’s administration costs are low with EPC contract. Only minimal staff (management, QC, legal, etc.) needed to administer/monitor project. May have negative effect on project “ownership” feeling within Owner’s organization (Hands off).</p> | <p>Owner’s administration costs are higher with EPCM contracts. Substantial staffing levels needed to assist/compliment EPCM contractor in administering/monitoring project. Promotes “ownership” feeling within Owner’s organization. Project staff often transferred to operational staff after project completion.</p> |
|-----------------------|--|---|

EPC and EPCM contracting are both very prevalent types of contracts within the construction industry. Dependent on the level of risk the Owner of a project is willing to accept, budget constraints, and the Owner’s organization core competencies, will determine which method is best for their project.

EPC contracting tends to be more expensive, to the Owner, due to the shift of project risk away from the Owner and to the EPC Contractor. On average, project’s cost 10% - 20% more using EPC style of contracting than a project using the EPCM style of contracting. This is due in large part to the project’s risk being more evenly distributed between the Owner and contracts / suppliers.

Construction contracting trends have been leaning towards the EPCM style of contracting and away from EPC contracting for several reasons but both methods have their place in business today.

**EPCM Advantages:**

- Lower Overall Cost
- Staff’s Sense of Ownership
- More Control over Process

- Better for less defined projects with anticipated changes to scope of supply
- Less Legal Litigation (Identify issues early and remedy situation before larger problems arise)
- Owner's Financing Flexibility

These are just a few of the advantages of EPCM style of construction contracting.

EPC contracting has its place in the construction industry as well. Under certain situations, it makes better sense to use this type of construction contracting than other methods.

**EPC Advantages:**

- One Stop Shopping "One point of Contact"
- "Hands off" approach to project
- Minimal Staffing Requirements
- Minimal Legal Risk
- Best for Well defined projects with Detailed Engineering Complete before EPC Contractor selected (Minimal Unknowns).

As stated before, these construction contract methods can be tailored to the individual projects / owner's needs. Some companies can go as far as breaking up each portion of the EPC / EPCM (Engineering, Procurement, Construction / Construction Management) to separate companies. One company can do the engineering; another can do the procurement, while still another can do the construction / project management).

Each company must decide for themselves, with the advice of legal and financial



counsels, as to which method of construction contracting is best for their particular project and situation.” [7]

## 2.2 Relationship Contracts

Relationship contracting is considered a form of EPCM contracting in regards to all works being reimbursable to the client. The main difference between a traditional EPCM contract and a relationship contract is that relationship contracting negates the continual tender process. The principal idea behind a relationship contract or alliance is for the client to work closely with a preferred contractor to develop procedures, policies and specifications, which meet their exact requirements. The initial capital expenditure and time associated with this is relatively extensive. However, if the relationship process is successful the client is reassured that any future work undertaken by the contractor will meet their exact requirements. The benefits of such a contract can be seen in the long term for both parties, with the contractor being provided with all works usually involving all construction, upgrades and maintenance work. The client also benefits long term by not facing continual capital expenditure associated with awarding various contracts for construction, upgrades and or maintenance for every new project. The profit margin for the contractor is generally low for each task or project, but the consistency of reimbursable work generally provides acceptable overall profit with low financial risk.

The alliance method of contracting is not a recent innovation in regards to contracting; however it is foreign to many clients and contractors. One of the main hurdles that an alliance or relationship contract faces is the ethos that the client and contractor must distance themselves contractually from one another. A continual and successful execution of these contracts in the future will require a cultural change of the

personnel from both the client and contractor from traditional contracting which often operates with less trust. A relationship contract built around trust, honesty and open communication will minimise or abolish the claims system that is used in EPCM and EPC contracts by sharing the commercial risk.

For a relationship contract to be a success, the client must have the trust and faith in the contractor to be able to perform the works within budget and schedule. In turn the contractor must demonstrate that all works are performed to the best of their ability and with the client's best interest in mind. As long as this understanding is maintained the client will be provided with all the works that meet their specifications and requirements and the contractor will have a continuous and planned flow of works as the preferred contractor.

KPIs can be used to determine the overall success or general progression of a relationship contract or alliance. There are various types of KPI used to determine or establish progress or achievements through out a project or scope of works. The implementation of these is essential in a regular audit scheme to determine the health of the relationship between the client and contractor. A poor result or indicator of any kind can have detrimental effects on the relationship and could eventually lead to the failure of the contract. It's important to perform audits on a regular basis using a set of stringent KPIs to monitor and report on areas which have excelled and others which may require attention.

HSE (Health, Safety and Environment) if not already considered mandatory would be considered to be a critical KPI used in such an audit. It would be essential for a

relationship to be maintained to ensure that continual satisfactory results are achieved for this indicator. A continual poor result for this KPI can result in a contractor acquiring a reputation for having a poor attitude towards HSE and may result in the client awarding work to other contractors. It may also have damaging effects on the client, particularly in today's society with so much attention and focus being on safety performance and environmental issues. A poor record for safety could result in a serious casualty or death which could lead to the project being closed for a certain period until certain standards are met or even closed indefinitely by a third party such as a mining authority or government. A poor environment indicator could also result in significant claims from third parties such as EPAs (Environmental Protection Agencies) to ensure any associated environmental effects are minimized or eliminated.

All of the above are possible outcomes from only one example of a KPI achieving negative results, which highlights the necessity for KPIs to monitor the progress and health of the project or scope of works. Effective implementation through an auditing scheme will pin-point areas which may need additional resources or capital expenditure to minimize or eradicate any future negative effects. This in turn would minimize the strain on the relationship that could otherwise lead to its possible dissolution.

### 3 Literature Review

#### 3.1 Overview

Antoine de Saint-Exupery (1900-1944) is quoted for saying that “One man may hit the mark, another blunder; but heed not these distinctions. Only from the alliance of the one, working with and through the other, are great things born.” [2] Antoine was a pilot, poet and author who lived in France and Africa during the Second World War, and he obviously wrote this quote to reflect the eventual success the Allies had against Germany. However, this quote could be used when concerning other forms of alliances or relationships taking place in the private sector of today.

Relationship contracting within the private sector of the mineral processing industry is not an original innovation; however, it has not been accepted as a common form of contracting. Over the last few years relationship contracting has been adopted in some form in various companies and organizations. Like traditional contracts, each relationship contract has different contributing factors which lead to success or failure. Therefore it is important to look at how key or core values, when effectively incorporated and implemented, result in the overall success of relationship contracting. There is also a need to undertake some research into key performance indicators and analysis methods of contracts. A detailed critical review can then be performed on some specific examples of relationship contracts or alliances undertaken in both the private and public sector to assess the degree of success, if any, the contract had in undertaking the required works.

### 3.2 Core Values and Concepts

There are many core values which need to be fostered and employed by both contractor and client for a successful relationship contract to exist. It is vital to cover and explore these core values into considerable depth as they are the backbone of a successful relationship contract. “The relationship must be founded on a set of strong, mutually held core values and guiding principles, which are then supported by a contractual agreement formalizing the most appropriate risk sharing arrangements and reiterating the core values and guiding principles of the parties. These core values are generally based around:

- Commitment – Total commitment to achievement of the project goals – actively promoted by the Chief Executives of all parties.
- Trust – To work together in a spirit of good faith, openness, cooperation and no blame
- Respect – The interest of the project take priority over the interests of any of the parties.
- Innovation – To couple breakthrough thinking with intelligent risk taking to achieve exceptionally good project outcomes.
- Fairness – To ensure that neither party is being unfairly disadvantaged
- Enthusiasm – To engender enthusiasm for professional duties and the project’s social activities.” [1]

It is vital to explore the nature and execution of relationship contracting covering all the major aspects from the basic concept, definition, and risk management; through to benefits, and fundamental aspects and approaches to be adopted for the concept to be successful. Of these major aspects particular emphasis is placed on the concept of open communication and honesty, as it states that “For Relationship

Contracting to be successful, all parties need a positive change in habits, behaviour and attitudes towards project outcomes and towards one another. This is achieved by formulation and agreement of project aligned goals, establishment of the Integrated Project Team and implementation of training techniques and skills development to sustain a team building environment and overall project performance. This includes:

- Comprehensive induction of all new members joining the team;
- External coaching and guidance to assist and reinforce the team approach; and,
- Workshop sessions to identify concerns and pinpoint key issues which need resolution, and setting stretch targets.

Open and honest communication between all individuals is driven by their belief that they are members of the team and that the entire team is focused on achieving the projects aligned goals.” [1]

Research has shown a continual recurrence of the implementation of particular core or key values to ensure the success of a relationship contract. “The extent to which the following parameters apply will dictate the success of an alliance relationship:

- Change. Both parties must be willing to commit to change. This requires individuals to change in the way they do business and organizations to change the way they execute projects.
- Alignment of goals. Open communication between parties must achieve common goals and agreement on the basic relationship principles

- Risk. Risk must be equally apportioned between the parties.
- Scope. Scope of work has to be clear, unambiguous and complete.
- Form of contract. The form of contract must reflect the relationship principles and encourage effective project management, trust and effective communication.
- Individuality. The master/servant relationship of conventional contracting does not apply. There should be no “man marking”
- Incentives. These must be structured so that both parties share in the gains and losses.
- Communication. All communicating must be positive and honest. Concerns are best dealt with by “work shopping”
- Facilitation. Independent facilitators are required to develop an environment of trust and open communication. Facilitators also help to develop team goals and maintain focus on the goals.
- Management commitment. The senior management of both parties needs to be totally committed to the concept and practice of alliancing” [3]

These are obviously important concepts and principles which must be incorporated into a relationship contract throughout the course of its execution. Particularly the issues faced with the existing ethos of distrust between the client and EPCM contractor.

Some sources also outline the potential for relationship contracting to become more common in the mineral processing industry due to the general dissatisfaction of the traditional form of contracting “Relationship contracting is said to have been born out

of dissatisfaction with the adversarial relationship between owner and contractor said to be ‘encouraged’ by traditional project delivery models.” [4]

This highlights clients’ ever increasing inclination to distance themselves from the traditional method of contracting due to continual unsatisfactory past experiences and results. In turn it also provides a positive insight into the future growth and further development of relationship contracts and alliances.

### 3.3 Comparison Between Traditional and Relationship Contracts

The comparison between the two forms of contracting is rather apparent. “Under the traditional approach, a proponent will typically seek to deliver a project that delivers a lowest cost outcome; maximum functionality and performance; maximum return on assets; flexibility (such as having an ability to change technology/scope definition); a minimum schedule duration; and ability to transfer risk. Under this model, proponents typically adopt tender processes and contracts that drive contractors to:

- Minimise bids to win
- Shift risk back to owner
- Seek out weaknesses in the contract, specification and scope
- Increase revenue
- Exploit scope growth, change and delays through variations to maximize profit growth opportunities.

Under an Alliance Contracting Model, collective responsibility is taken for some or all project risks. Some underlying principles include:

- No contractual walls



- People selection is made on a “best for project” basis
- Commercial model aligning goals of all parties
- Unanimous decision-making and no disputes
- A “whole project” focus, rather than ‘my bit’, i.e. no more “that’s their problem”
- Single governance structure, which essentially features a single entity made up of the relevant parts.

The Alliance would involve integrated teams, structured to provide a better result. The objective is to focus on performance rather than contract.” [11]

It is important to understand the significant difference between these two styles of contract so that further research into the topic can progress without misunderstanding the vital components and aspects.

### 3.4 Examples of Relationship Contracts

To gain a better understanding of the concepts and aspects of relationship contracting it is important to look at various examples already completed or currently being executed in the private sector.

#### 3.4.1 AHEA (Alcoa Hatch Engineering Alliance)

For many years now Alcoa has successfully executed and implemented many alliances worldwide with Hatch Engineering.

Alcoa being the world’s largest aluminum producer identified the need for the development of a relationship contract or alliance to undertake all the continual on-going works worldwide. A cost benefit analysis was performed and it was soon

discovered that the costs associated with continually tendering all required works was extravagant and so the option of a preferred contractor to be executed under an alliance was explored further.

Over 30 years ago Alcoa sent an ITT (invitation to tender) to all contractors deemed capable of performing the on going small capital works projects under a relationship contract. After several submissions it was found that Kaiser Engineering, which was later taken over by Hatch Engineering, were the most feasible option. Over the years several relationship contracts were developed between Hatch and Alcoa worldwide with the Hatch Alcoa Engineering Alliance (Atlantic Division) in the United States of America and there are two in Australia.

Many projects and upgrades for Alcoa have been executed through this alliance, which in turn has provided Alcoa with the opportunities to improve on the efficiency, cost effectiveness and environmental impacts of their aluminum plants. The Pinjarra Refinery is an example of these works. “Alcoa’s Pinjarra Refinery Efficiency Upgrade was approved by the Western Australian Government in February 2004 and will significantly reduce atmospheric emissions.

Specifically, these include the reduction of:

- volatile organic compounds in emissions by 10 percent;
- particulate emission overall from the refinery’s calciners by 25 per cent; and
- carbon monoxide emissions by an estimated 90 percent.

The \$550 million project will increase its efficiency and capacity to meet increasing worldwide demand for alumina.

Commissioned in 1972, the Pinjarra Refinery is located six kilometres east of the rural town of Pinjarra, about 90 kilometres south of Perth, and is one of the most successful and cost efficient alumina refineries in the world - currently producing about seven per cent of the world's alumina.

The Pinjarra Refinery Efficiency Upgrade is one of the largest approved projects in the global Alcoa alumina business and will deliver extra production while also reducing emissions.

The Efficiency Upgrade will reduce Greenhouse emissions per tonne of alumina. Refinery process improvements will mean a better use of natural resources and a reduction in the energy intensity (energy used per tonne of product) of alumina produced.

Through the project, the Pinjarra Refinery has upgraded its existing equipment with best-practice technology; installed new emissions control technology, and increased its alumina production capacity at Pinjarra by 17 per cent (an extra 660,000 tonnes per annum) to 4.2 million tonnes per annum.

Project Manager: Phil Campbell

Project Sponsor: Alcoa World Alumina Australia

Constructor: Alcoa World Alumina Australia

Construction Period: 22 months

Project Value: \$550 million

Project Status: Environmental approval was granted by the WA State Government in February 2004 and Pinjarra Efficiency Upgrade construction work started in June 2004.

Project completion: The construction phase of the project is due for completion by in early 2006.

Structural Engineers: Alcoa Hatch Engineering Alliance.” [10]

Similar works are also taking place around other parts of the world such as Canada, America and parts of Europe. “Alcoa Primary Metals selected Hatch as their EPCM alliance partner for their Northeast Region, consisting of three smelters in Québec (Lauralco, Baie Comeau, and ABI / Becancour), two in Massena, New York, and the Fjardaal smelter in Iceland. The alliance will be responsible for managing and executing all engineering, procurement, and construction management for the US\$100-million average annual capital expenditure program involving capital and maintenance projects.” [9]

The scope of works, like the Pinjarra refinery, require the improvement of facilities to meet environmental standards and increase productivity and efficiency. “Hatch is performing all EPCM work necessary to scope, design, and implement the program. The majority of these assignments will be brownfield projects to improve operating efficiency and capacity for compliance with safety and environmental requirements. The initial phase of each EPCM project requires Hatch to work with plant operating

personnel and reliability engineers to define problems, outline constraints, and identify projected results. Hatch will then prepare preliminary engineering, a cost estimate, schedule, and scoping documents to support the submission of a Request for Authorization (RFA). Once the RFA is approved, Hatch is responsible for managing and performing detailed design, procurement, and construction management to meet budget, schedule, safety, and quality goals. Often these assignments involve working with local engineers and contractors whose efforts must conform to Alcoa and Hatch Kaiser procedures and requirements.

Project Cost: US\$100 million per annum

Client: Alcoa Primary Metals

Location: Northeast Region: Québec, Canada New York, USA and Iceland

Start: 2000

Completion: On-going” [9]

These projects highlight the ever increasing pressure for clients to produce a competitively priced end product with an ever decreasing impact to the surrounding environment. The Alcoa Hatch Engineering Alliance has provided the most economic solution and opportunity for Alcoa to do this.

### 3.4.2 Wandoo Alliance

The Wandoo Alliance was created to perform the design, construct, install and commission of the offshore facilities for Ampolex’s Wandoo oilfield. The alliance was a conglomerate of Ampolex, Ove Arup, Brown and Root, Keppel Corporation

and Leighton Contractors and was the first alliance to be formed in the Australia offshore oil and gas industry.

“The Wandoo deposit is located about 80kilometres north-west of Karratha on Eastern Australia North West Shelf. At full capacity the Wandoo facility will have a fluid capacity of 120,000 barrels of liquid per day with a maximum oil production capacity of 40,000 barrels of oil per day. The Alliance scope of work for the facilities comprises:

- Design, construction, installation and commissions of the central production platform – Wandoo B – consisting of a concrete gravity sub structure (CGS) with 400,000 barrels of oil storage and supporting a 7,000 tonne (dry weight) topside processing facility
- Modification of the existing Wandoo A monopod to allow remote operation and tie-in to Wandoo B
- Design and installation of five in-field flexible flowlines; and
- Refurbishment and relocation of the existing export tanker loading buoy

Ampolex approved a capital expenditure budget of just under \$500 million (Australian Dollars) to cover the above scope of work and any development drilling required for the project.” [13]

Ampolex before acquiring 100% of the participating interest in the Wandoo reserve, were predominantly a small exploration company with limited experience in production on a large scale. Not only was this an issue but the complexity of the reserve also provided various obstacles.

An assessment of the viability of the field as an asset depended upon establishing the productibility of the field, which necessitated an extended production test (EPT). This required the use of a small monopod production platform. The installation of the monopod was completed, by competent contractors with vast experience in their relevant fields, before schedule but over budget. Ampolex, due to their lack of experience, had to employ consultants and contractors to manage the ongoing process, which resulted in the indefensible and extremely expensive position of contractors managing contractors.

“The General Manager Production Mr. R.O. Wood recognized this and was concerned about the expensive indulgence of man marking and the need to eliminate this duplicative (often triplicative) cost inefficiency, and the real risk that a traditional development approach would not allow Ampolex to develop the full field.” [13] Consequently the Manager Production for Ampolex went on a fact finding mission to explore other options which would reduce the excessive man marking for the construction phase of the Wandoo field; eventually resulting in the development of the Wandoo Alliance.

Initially an ITT (invitation to tender) was submitted to technically and commercially pre qualified contractors to undertake the required works. One of the specific requirements of the contractors was to acknowledge an agreement that all commercial risk will be shared amongst all parties associated with the alliance. “To achieve this [The development of the Wandoo reserve] a contractual framework is created whereby the individual parties share the risk of the project, and are rewarded on the

overall project performance not just their portion of the works. This is the commercial/contractual incentive for all parties to work as one team. The known scope of work is carried out on an “open book basis, at direct cost, with a predetermined profit margin, and the client prepared to pay extraordinary profit for extraordinary performance” [13]

Obviously many contracting organizations were reluctant to adopt this amount of risk for a one off contract; however a joint venture of contractors with vast and diverse experience in the oil and gas industry were selected. Ampolex made the stringent decision to avoid the joint venture stage of this contract “The invited companies were asked to form their own prospective alliances in advance of discussions with Ampolex. This is a decision that Ampolex would not change. The client should not be a marriage broker” [13] Generally this was in place to ensure that the all parties involved would be fully aware of all commercial implications and possible difficulties, which may arise amongst one another. This would in turn enable all parties to undertake all work in a harmonious manor. “The key to alliancing is that the parties in the alliance work as one team through true company integration, having a common culture, focused on a common goal or outcome for the project and are rewarded for extraordinary performance.” [13] The other issue is that Ampolex was not aware of any past difficulties or issues amongst various organizations. It was vital that all parties were able to work with harmony and trust “As this alliance is based on trust, not just between the client and contractors but also between the contractors, any broken past relationship may hinder this trust”[13]



After an extensive selection process, involving a thorough interview and short listing process, the successful prospective alliance was announced in September 1994. It was comprised of Dawson Engineering/Brown & Root Joint Venture, Leightons Contractors Pty. Ltd., Keppel Corporation Limited and Ove Arup Pty. Limited.

The commercial agreement was then finalized amongst all parties involved in the Wandoo Alliance with the following objectives developed to ensure that final goal is achieved:

“To ensure that the Wandoo Development proceeds in a coordinated, efficient and cost effective manner so as to achieve the following objectives:

- Compliance with the Design Basis
- Adhere to the Operating Standards during the Operating Period; and
- Minimal Final Costs and the earliest Completion Date.

To this end the parties have pledged their commitment to conduct their activities in a manner consistent with the Alliance Principles, which shall ensure the success of the Wandoo development and subvert self interest for the greater interest of the Wandoo Development” [13]

A special consultant, JMW, was utilized at the beginning of the alliance to ensure that commitments of the client and contractors are all aligned. JMW are a company with significant experience in helping alliances in the North Sea and North Atlantic.

“Therefore the alliance process that was adopted is primarily focused on:

- Building alliance behaviors/culture, shared vision;

- Training the project team in “breakthrough” principles and actions;
- Developing with the Board and project team shared ownership of the breakthrough results to be achieved and the time frame (stretch targets);
  
- Coaching the project managers and project team members to commit to and deliver project milestones and move quickly through problems and difficulties to use problems to achieve “breakthroughs”;
  
- Monitoring results and providing goal focused interventions to keep the project on track;
  
- Assisting development and maintenance of the productive interactions between the board and project management team members, and team members from all companies;
  
- Developing an unique alliance culture for the project so that it s results and rewards are primary and individual companies; interests are secondary;
  
- Building with the team an environment of enthusiasm, spirit and accomplishment;
- and

The education/training/coaching process provided by JMW works towards developing a culture of collaboration, mutual respect, integrity, innovation and no blame.

Participants and individuals become result-focused, innovative and willing to challenge conventional paradigms.”[13]

A set of core values and key principles were then drafted up and it was expected that all personnel employed within the alliance would adhere to these with an extreme level of commitment. Although it was accepted that it was unlikely that they could ever be fully achieved all the time, it was however the responsibility of those involved to ensure that they were fostered to an “unreasonable” standard so that the alliance can reach its full potential. “Some of the principles are very fundamental; but, they cannot be taken for granted. They are things such as:

- TRUSTING other team members and parties without waiting to see if they seem trustworthy;
- COMMUNICATING HONESTLY and DIRECTLY;
- LISTENING GENEROUSLY to each other
- SUPPORTING OTHERS and having MUTUAL RESPECT for OTHERS;
- accepting that it is OK to say NO, but giving reasons; as opposed to saying YES, but not delivering;
- fostering and atmosphere of INTEGRITY, whereby people are expected to do what they say when they cannot see what to do;

- accepting and maintaining a level of STRETCH or discomfort in declared

TARGETS;

- being FOCUSED ON ACHIEVING RESULTS;

- working on a basis of NO BLAME if someone fails, especially if it's a failure to achieve a low probability stretch target;

- individuals taking OWNERSHIP of their actions and inactions; and

- working in an environment where PROBLEMS are not seen as a negative, but as avenues to POSSIBILITIES" [13]

The Wandoo Alliance is an example of a successfully implemented relationship contract as it was completed under budget and ahead of schedule. The success of this contract was due to these values and principles developed and fostered throughout the life of the contract.

The majority of aspects that characterize a relationship contract can be found in the Wandoo Alliance. The only exception to this is the concept of preferred contractor. Unlike the AHEA, where the concept of preferred contract is developed and fostered, the Wandoo Alliance was a one off contract and the contractors were not required for any further on going works or upgrades of the facilities outside of the predetermined scope of works.

### 3.4.3 Other Alliances

Government organizations and departments have typically been the major advocates of relationship contracts or alliances in Australia. There have been many successful infrastructure projects for water boards and road authorities all around Australia that have been completed under an alliance. Not only have they successfully been completed under budget and ahead of schedule but they have also received awards for meeting environment standards and requirements. “Three of this year’s four Queensland Case Earth Awards have gone to projects completed under alliance contracts, reflecting a growing trend in the construction industry. Wivenhoe Alliance, comprising Toowong’s Leighton Contractors, SEQWater Corporation, Coffey Geosciences, the NSW Department of Commerce and MWH Australia, won for its upgrade of South East Queensland’s primary water supply and flood mitigation dam. The \$70m project involved construction of a 165m wide additional spillway, a five-span traffic bridge, post-tensioning of the existing spillway and associated works. The upgrade was completed six months ahead of schedule and 10 per cent below budget. “[8]

Other examples of alliances which achieved environmental awards “The Burnett River dam was completed in November 2005 and named Paradise Dam. The \$200 million project was completed by an alliance including Burnett Water, Milton’s Macmahon Contractors, SMEC and Hydro Tasmania. The Eenie Creek Road Stage 2a project at Noosa earned an award for JF Hull Holdings. The project included the construction of a concrete bridge over the Weyba Creek and environmentally-sensitive wetlands. A launching truss system allowed 51t super T-bridge girders to be erected without environmentally damaging access roads.

Environmental Excellence: Category 2, \$5 million to \$15 million

*Winner:* Eenie Creek Road Stage 2a

*Contractor:* JF Hull Holdings

Environmental Excellence: Category 3, over \$15 million

*Winner:* Wivenhoe Dam Upgrade (Joint Winner)

*Contractor:* Wivenhoe Alliance

Environmental Excellence: Category 3, over \$15 million (Joint Winner)

*Winner:* Paradise Dam

*Contractor:* Burnett Dam Alliance (BDA)

Construction Excellence: Category 3, over \$15 million

*Winner:* Paradise Dam

*Contractor:* BDA ” [8]

Construction of these projects could easily lead to overruns in budget and schedule if performed under a traditional method of contracting; especially if significant claims and disputes lead to a litigation process. These kinds of overruns in the budget and schedule are not acceptable for government departments or authorities, as it is taxpayer’s dollars that are funding the entire process.

### 3.5 Financial Benefits

Generally most projects require the financing of the works by some form of financial institute as the capital is not always available to complete the project. The execution of works through an alliance agreement or relationship contract has not only benefits for clients and contracts, but the financial institutions can appreciate the benefits of a well developed and managed alliance as well. “Despite the increase uncertainties of time and cost, with suitable precautions and the inclusion of appropriate contingent equity and cost overrun facilities, alliance contracts can provide a bankable project delivery method even for a project financing” [6] It seems from this that financial institutions are just as willing to provide capital for the execution of a project through an alliance agreement as well as the more traditional contract styles. “...it could be said that alliance contracts are just facing reality. They are a natural response to non conforming tenders which seek head-contractor style profit margins while pushing back on risk transfer. The traditional EPC/turn key model, dogged by prolonged and costly disputes, is hardly perfect, and with the right financing structure, the right alliance partner and the right project, the alliance contract can be a viable basis for a project financing.” [6] Even though it mentions, that it requires the right project, the right alliance partner and the right financing structure for a successful project financing, it must be noted that these are the kind of factors that need to be considered in the development of a traditional form of contract regardless.

### 3.6 Key Performance Indicators

Within the private sector, key performance indicators are used to determine the ongoing or overall success of an EPCM project. These indicators can be used to assess

various areas of concern or interest ranging from environmental and safety through to economical construction factors; however it is essential to select KPIs of relevance and importance. “Many things are measurable. That does not make them key to the organizations success. In selecting KPIs it is critical to limit them to those factors that are essential to the organizations reaching its goals. It is also important to keep the number of Key Performance Indicators small just to keep everyone’s attention focused on achieving the same KPIs” [5]

The implementation of these KPIs into an incentive scheme to continually improve on the project relationship and reduce the risk for both the client and contractor on many different levels is vital to the success of a relationship contract. “Incentive schemes are usually applied to influence the behaviour of the alliance. For EPCM alliances these are typically based on KPIs for parameters deemed by the client to be important.” [3]

The importance of KPIs or KRAs (Key Result Areas) are evident when assessing painshare/gainshare principles as part of the commercial risk sharing aspect included in a relationship contract. “Generally, the Commercial Framework will consist of three parts or “limbs”, with Limb 1 generally related to payment of direct project costs, Limb 2 covering corporate overheads and profit, and Limb 3 for Pain/Gain share. Limb 3 can be based on performance against agreed criteria in Key Result Areas (KRAs) that are developed by the Alliance and applied to an allocated pool of funds. Limb 3 may also involve a share in the capital cost overrun or under-run. Limb 2 is adjusted upwards or downwards according to the outcomes of Limb 3.

The principles of pain/gain share are reasonably simple:



- It must meaningfully provide incentives for the Alliance to achieve exceptional outcomes
- It must be linked to real risks and benefits
- The only way to increase profit margin is through gamebreaking performance;
- There is no win / lose scenario
- Each party has meaningful incentive
- The project sponsor is committed to maximizing participant returns = win win win
- There are links between separate elements, i.e. there is no incentive to play one party off against another.

In essence, Normal Performance = Normal Reward; Poor Performance = Poor

Reward; and Outstanding Performance = Outstanding Reward.

The following table demonstrates some project objective examples:

| <b>Key Result Area (KRA)</b> | <b>Minimum Conditions of Satisfaction</b>                         | <b>Game-Breaking Performance Objectives</b>   |
|------------------------------|---|---|
| Cost                         | Deliver project within budget                                     | Deliver project for 20% under budget  |
| Schedule                     | Deliver project on time   | Deliver project six months early  |
| Quality                      | Deliver project to agreed specifications (workmanship and design) | Deliver project to agreed benchmarks of outstanding workmanship and design project to agreed benchmarks of high levels of integration with existing and adjoining assets. |
| Community                    | Project is not delayed by community or stakeholder opposition     | Widespread community advocacy and support for the project.  |
| Operability                  | Operators and end users are satisfied with the asset              | Widespread support and high levels satisfaction with the delivered asset.   |

Typical KRAs include:

- Cost
- Schedule
- Quality – workmanship
- Community relations
- Environment
- Stakeholder advocacy
- End user satisfaction
- Team member satisfaction.

If performance does not meet the minimum conditions of satisfaction and certainly is not regarded as a “gamebreaking” performance, then project participants can only expect to recover their direct costs. This would likely be a loss scenario and is better known on Alliances as “painshare”. This is obviously not desirable, and an indicator that performance on the project by all participants has been poor.”[11]

It is important to ensure that these KRAs are clearly defined and quantified at the beginning of the project so there is no ambiguity between parties involved in the relationship contract. This will in turn mean that the incentive or gainshare/painshare scheme will be executed with equality.

The Sabodala Gold Project in Senegal, Africa is an example of a project implementing an incentive scheme based around KPIs. Generally EPCM contracts being reimbursable to the contractor means that profits, or fees as they are more commonly known, for the contractor is based around a predetermined set profit amount or rate.

Each project has differing methods of determining this fee. At times it is a fixed amount of capital regardless of the scope changes or variations processed during the project duration. Another method of calculating the fee is the contractor sometimes increases the overhead rates that are charged to the client for their services. So instead of charging the standard overhead rate to the client to cover the contractor's ongoing costs associated with leases, services and administration personnel, and project staff (indirect EPCM costs), the rate is increased by a certain agreed amount. This increase in the overhead rate is therefore the profit margin for the contractor.

For the Sabodala Gold Project the main method of fee payment is based on a percentage of the total project direct costs (all costs other than EPCM overhead costs). So if the client decides to implement any scope changes or variations it therefore means that the fee for the project will increase or decrease accordingly. Along with this set fee there is also an incentive scheme developed by the client and EPCM contractor. So if Ausenco Mineral Ltd. (EPCM provider) complete the project under budget and ahead of schedule a percentage of this saving to the client will be paid out to Ausenco Minerals Ltd. "The Principal will pay the EPCM Contractor an incentive fee in the event that the Actual Cost is less than the Target Cost Estimate ("Cost Incentive Fee"). The Principal will pay to the EPCM Contractor an incentive fee in the event that the Date of Practical Completion is earlier than the Date for Practical Completion ("Time Incentive Fee").

#### Cost Incentive Fee

The Principal will pay to the EPCM Contractor an amount equal to 30 % (thirty percent) of the amount the Actual Cost is less than the Target Cost Estimate.

The Principal and the EPCM Contractor will meet within one month after the achievement of Acceptance to agree the Actual Cost.

Where a Cost Incentive Fee is payable, the Principal will pay the EPCM Contractor within 14 days of a valid invoice being supplied to the Principal for the Cost Incentive Fee.

Should the Parties be unable to agree the amount of the Actual Cost, the amount will be determined in accordance with Clause 24 of the Contract.

It is acknowledged and agreed between the Parties that the Principal will have no right to damages and/or costs of whatever nature for the Actual Cost exceeding the Target Cost Estimate.

#### Time Incentive Fee

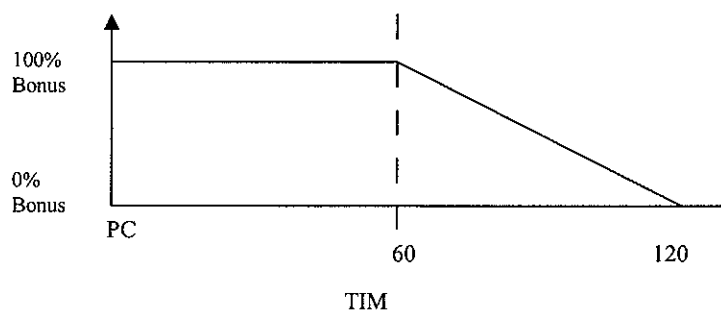
If the Date of Practical Completion is earlier than the Date for Practical Completion then, subject to the provisions of this Clause 13.3, the Principal will pay the EPCM Contractor a Daily Rate as calculated below, per day for each day from the Date of Practical Completion to the Date for Practical Completion.

The Daily Rate payable is, USD35,000 pro-rated against the spot gold price on the Date of Practical Completion referenced on the London Bullion Market ("Spot Price"), , as per the following calculation;

$$\text{Daily Rate} = (\text{Spot Price} / \text{USD600}) \times \text{USD35,000}$$

The Daily Rate payable will be further adjusted depending on the date of successful completion of the Performance Tests, as follows:

- If the Performance Tests are successfully completed within 60 days of the Date of Practical Completion, the Daily Rate will not be subject to any adjustment.. Within this initial 60 days, there can be as many attempts at completion of the Performance Test as can be managed. If the Performance Tests are not successfully completed in the initial 60 days after the Date of Practical Completion, but are successfully completed between 61 and 120 days after the Date of Practical Completion, then a linearly reducing percentage of the Daily Rate will be payable to the EPCM Contractor.
- No Time Incentive Fee is payable if the Performance Tests are not passed within a period of 120 days from the Date of Practical Completion.



Where a Time Incentive Fee is payable, the Principal will pay the EPCM Contractor within 14 days of a valid invoice being supplied to the Principal for the Time Incentive Fee.

Notwithstanding all of the above, the Principal and the EPCM Contractor can meet after the Date of Practical Completion and agree to otherwise determine an alternative incentive payment.” [12]

The incentive scheme for the Sabodala Gold Project is based around financial KPIs; however there have been other projects executed under other KPIs. The Cowal Gold Project for instance had an incentive scheme based around financial and safety KPIs. As for the Sabodala Gold Project, if the EPCM contractor completed the Cowal Gold Project under budget or early there was an incentive. There were also incentives for LTI (lost time injury) free periods. Generally these are based around increments of every 1,000,000 man hours worked.

### 3.7 Conclusions and Discussions

Some conclusive statements and assumptions can be derived from the research conducted in the above literature review.

Out of this research it can be seen that there is a common trend for the need of a set of core values and concepts. These are extremely important in ensuring the success of the alliance. Without a doubt the most important concept would be the issue regarding trust. In any form of alliance or relationship contract there needs to be high a degree of trust between the client and the contractor. Generally the client needs to trust the contractor/s will perform the required scope of works in their best interest. If this trust is fostered to an acceptable degree it can dramatically reduce costs and improve efficiency of the project by dramatically reducing multiple amounts of man marking.

In the article for the Wandoo Alliance there was a statement made “subvert self interest for the greater of the Wandoo Development” [13]. This statement is of

particular interest as it defies all familiar cultures and attitudes in the majority of contracting organizations. Alliancing provides the opportunity for movement from the traditional method of performing contracts to providing the opportunity for organizations to change their attitudes and cultures and take advantage of new opportunities and possibilities to achieve extraordinary results. However even though this is proven to work most large organizations still have “an implicit and largely unexamined bias against creating such a culture”. [13]

Research has shown that the Wandoo Alliance would probably be one of the best examples for studying relationship contracting in its most pure form as it covers the majority of aspects associated with relationship contracting. Along with this is the fact that the project was an extreme success with all parties, both client and contractors, profiting significantly by completing the works ahead of schedule and under budget. However this was only achieved through stringent researching, planning, strategizing and implementation. One point that needs to be made regarding the Wandoo Alliance is, unlike the AHEA, it was only a one off project and there was no need for a preferred contractor as there was no on going works for the Wandoo project.

Another point or topic of interest that can be derived from this research is the importance and effectiveness of key performance indicators as assessors of incentive schemes. If implemented and managed correctly these can provide the basis for the successful execution of a relationship contract.

## 4 Development of Methodology

No one contract is the same whether it is EPCM, EPC, schedule of rates or a relationship contract. Contracts depend upon clients requests and contractors requirements. Generally any contract has two fundamental or key requirements, that is the client trying to minimize capital expenditure and the contractor trying to maximize profit. The most beneficial form of contract for both parties is then based around these requirements. Generally this means that no one contract is the same regardless of its nature. Relationship contracts are no exception to this, as there are varying forms and extents of these contracts. It has been found through research and discussions with a variety of personnel with varying exposure to alliancing or relationship contracting that there are many methods and requirements that actually constitutes as a relationship contract; however these differ considerably depending upon personal opinion and experience.

### 4.1 Interviewee A

After discussions with Interview A (see Appendix C), General Manger - Alcoa Hatch Engineering Alliance, Western Australia, it was evident that the success of this relationship contract is based on various factors.

One of these factors involves the separating of the two contributing parties from their individual corporations. The purpose of this is to create a separate entity which is not influenced by either of the contributing parties and in turn has many benefits. One of these benefits is the inability of either contributing party (i.e. Alcoa and Hatch) to interfere in the operation of the alliance. This is effective in eliminating the entire litigation process and “blame game” if for some reason a project or projects are not



completed on time or on budget; as it is the alliance as a collaboration of the two parties that is to be made accountable.

Another benefit of this separation is that all decisions are made within the alliance where all members are treated with equality regardless of their original employer. Any attempt to intervene in the operating and managing of this alliance, especially by Alcoa (the client) is not possible as decisions are made within the alliance by all members regardless of original background.

Specific emphasis was made on the importance of regular team building functions and workshops. On a monthly basis the senior members of the alliance participate in team building retreats and workshops. This provides the opportunity for these members to set targets, goals and develop relationships which will ensure that the team will function as best as possible. Several times a year the whole alliance participate in similar workshops and functions, which provides the opportunity for further team cohesion and efficiency.

Mention was made of possible further improvements to be made in the future. One of the major issues highlighted was the fact that members of the alliance are still identified as either Hatch or Alcoa employees by the means of their clothing. It is believed that for the alliance to be more successful there needs to be an eradication of the individual uniforms, which in turn eliminates employer identification and individualism in the workplace.

AHEA has long been a successful relationship contract and has built its success on years of experience and trust with Hatch/Kaiser Engineering. The alliance is successful because of the trust, openness and effort that each organization have provided throughout the course of the contract. As long as these concepts and work ethics continue to exist so will the alliance.

#### 4.2 Interviewee B

Further investigation and interviewing of various personnel revealed another form of relationship contracting or alliancing. Interviewee B, Project Manager for an EPCM provider (see Appendix D), believes that an alliances or relationship contracts exists when an EPCM provider becomes the preferred contractor for the client. An example of this could possibly be the EPCM contract between Minara Resources and Ausenco Minerals Ltd. Even though it is not considered an actual relationship contract it has inadvertently moved into this direction due to various reasons.

Officially there is no relationship contract agreement between Ausenco Minerals Ltd (EPCM provider) and Minara Resources (client); however various aspects and concepts of a relationship contract are covered in this EPCM contract. Minara are an Australian based mineral processing company with their major operations based in Murrin Murrin, Western Australia. Ausenco, as the EPCM contractor for the works has the responsibility to undertake all upgrades requested by the client. These upgrades are conceptualized and based on Minara's economic needs or requirements and initially are reviewed in a feasibility stage and then if viable are awarded to Ausenco, so that the necessary works can be performed. The operations at Murrin Murrin are extremely diverse and complex with this plant processing many different minerals and resources simultaneously, so the many upgrades or improvements

awarded to Ausenco are generally small capital works projects to aid in plant operations and efficiency.

Minara obviously identified the necessity for a preferred EPCM provider, as the cost associated with tendering every small capitals works project would be astronomical. Not to mention that an EPCM provider would be reluctant to tender on singular small capital works projects particularly with the current market where valuable human and economic resources can be utilized on larger projects with higher turnovers. As a result Ausenco have ultimately become the preferred EPCM provider for all Murrin Murrin Operations.

Like all relationship contracts or alliances in the mineral processing industry the sharing of resources between client and EPCM contractor is a necessity to ensure the success of the alliance and this contract is not any different. The current competitive market and the specific drafting requirements of the Murrin Murrin operations has seen the client offer drafting assistance, not a task generally performed by the client, to ensure that the contract delays are minimized as much as possible. However like every other traditional EPC or EPCM contract there is still the distinctive hierarchy of client and contractor.

Form discussions with key personnel from Ausenco Minerals Ltd it was noted that the development of an official alliance or relationship contract was drafted and reviewed but no agreement could be made between Minara and Ausenco. So although a basic unofficial relationship contract exists the other concepts of relationship contracting

are non-existent and not fostered in this EPCM contract; even though Ausenco is the preferred EPCM contractor.

### 4.3 Interviewee C

After discussions with Interviewee C (see Appendix E), Feasibility Studies Manager for an EPCM provider, it was found that a relationship contract is mainly based around the painshare/gainshare relationship between the client and EPCM provider. Consequently all parties are rewarded for reaching some form of milestone, or level of performance or efficiency and vice versa. Generally these milestones or KPIs are based around completing a scope of work under budget or before the scheduled practical completion. Under a normal EPCM contract the client generally accepts all risk and costs associated with substandard KPI results i.e. delays in schedule or overruns in the budget, but this form of contract shares the risk between the two entities so that success and failure is shared equally.

Mention was also made of an essential concept that defines a relationship contract, which is the sharing of resources between the client and the EPCM provider for the benefit of the project. For a relationship contract to be successful it is essential that personnel from both entities are integrated and utilized in a virtual corporation separate in structure, management and manning from its participants. If managed effectively results in a system of equality which ensures that all successes and failures are jointly shared amongst all parties and no single entity or person is blamed or praised for the overall outcome of the project.

The use of client satisfaction surveys and questionnaires was also discussed. SKM are currently using a client survey satisfaction which is executed on an annual basis to

key the success of projects performed throughout that financial year. A yearly function is set up to present the results to shareholders and employees. The results are based upon a ranking system for each question and then a total is obtained and the overall success is determined. It is thought that the results obtained from this survey are not relevant or indicative of overall success of projects executed during that period. It was believed that it was more of a public relations tool to promote the organization's success to shareholders and future/current clients.

#### 4.4 Conclusions and Discussions

Some conclusive points and arguments can be derived from the above research. The decision to develop a questionnaire is based on the past work performed by other organizations and personal opinions of professionals in the EPCM contracting and mineral processing industries.

Many organizations have developed surveys and questionnaires for various reasons. However the majority of these like SKM's client satisfaction survey, waiver in their ability to adequately publish accurate and valid information; however it provided the basic concept for the development of a questionnaire for this project. For various reasons, but mainly due to time constraints and future development and execution, it has been decided to target the client and EPCM /EPC contractor market. Research has shown that it is generally client's hesitation that hinders the development of alliances or relationship contracts to execute capital works projects. So the focusing on this target market will hopefully provide a better insight into the constraints that this form of contracting suffers in the mineral processing industry.

Both small and large mineral processing organizations have developed relationship contracts (i.e. Wandoo Alliance and AHEA) these examples have shown that there is no discrimination as to the size of an organization and the success of a relationship contract. Consequently the target market should not be limited to the established and effluent organizations; however it would be necessary to include these to establish a proper comparison.

Generally the only constraint a contractor has with the execution of a relationship contract is the sharing of commercial risk with the client. Every other aspect of a relationship contract should appeal to a contractor; therefore a questionnaire should be developed with an emphasis on client satisfaction, client attitudes towards contractors and relationship contracts in general, and other points and issues such as KPIs and financial benefits.

It is also evident from the verbal and written correspondence with various members of EPCM and client organizations that the opinion of relationship contracting varies from one person to the next. It would therefore be important to generalize the questionnaire as much as possible so that an overall understanding of the willingness of a client is developed.

## 5 Project Methodology

The purpose of this research project is to explore relationship contracting in depth and to determine the issues clients and contractors have when considering a contract of this nature.

The development of a questionnaire will highlight concerns and issues faced by a client or EPCM contractor when considering a relationship contract. Research, discussions with key personnel and work colleagues (see Chapter Four), and limited experience has identified various issues with relationship contracting. The general understanding is that a lack of trust between the client and EPCM contractor is one of the major contributing factors which prevents the implementation of relationship contracts. As a result, this will be one of the major topics covered in the questionnaire. Key performance indicators and their implementation to determine the success of an alliance or relationship contract may also be worth while exploring.

It is then the intention to arrange meetings with various client representatives so that the questionnaires can be completed. Selection of respondents for this interview and questionnaire process will be mainly based on recommendations, referrals and introductions by work colleagues. Generally business development and the feasibility departments of EPCM contractors have considerable contact with clients in the early phases of contract and relationship development. Obviously this would be an opportune stage to contact a client representative when the actual nature of the contract has not been determined yet. Probably the more realistic, and opportunistic in its own respect, would be to interview client representatives or contractors during the

execution of; or towards the end of an existing contract. This would provide a different point of view from the respondent regarding the concept of relationship contracting, depending on their opinion regarding the overall success of the project.

The client's experience would also have to be taken into consideration when selecting the respondents. For many years the mineral process industry has been based on a strict work hierarchy of client, contractor and sub contractor in an EPC style of contracting. It has only been over the last couple of years that clients and contractors have accepted the concept of EPCM contracting let alone EPCM relationship contracts. As a result many client representatives and contractors, who have been in the industry for long periods of time, generally have an attitude of distrust for the client and contractor. It would be important to interview personnel from various backgrounds and experiences so that an adequate comparison and analysis can be performed.

Initially a questionnaire needs to be drafted, developed and finalized. To ensure relevance and effectiveness of this questionnaire it is the intention to develop it with key business development and alliance members of an EPCM contractor, thoroughly to identify and eradicate any discrepancies. This will involve performing several test runs and in turn attempting to cover all possible responses and outcomes. Any discrepancies or inadequacies with the procedure which can not be removed or altered need to be considered when analyzing the final result.

The data obtained from this interview and questionnaire process will be analyzed with key responses, indicators and attitudes; also derived during the development of the



questionnaire, so that a plausible outcome can be reached. To undertake this and in turn obtain a plausible and measurable result, a numerical ranking system for each response needs to be conceptualized and applied to the data. This will also be finalized during the development of the questionnaire. A ranking for each question will be provided with an average of all the results taken to achieve a final outcome and in turn any future relationship contracting opportunities.

A short interview may also be conducted where various responses and expressions will be minuted and then used at a later date as possible indicators to determine the attitudes and enthusiasm of clients concerning the concept of relationship contracting

A report can then be developed and presented to the interested parties describing the entire procedure and process. The compiled data and information will then be analyzed with some conclusion and opinion derived, based on the developed ranking system, of the willingness of the client to undertake relationship contract process.

The final questionnaire used for the purposes of collecting the relevant information can be seen in Appendix B. It must be noted here that a consent form has been included in this questionnaire. The purpose of this is to ensure all candidates that all information divulged will be kept confidential and that it is used for the strict purposes of this paper only.

## 6 Results and Discussions

### 6.1 Analysis of Results

The questionnaire developed has rendered differing responses from the various candidates. Many factors and aspects were taken into consideration when thoroughly analyzing the data. The conclusive summary of this analysis can be seen below.

#### 6.1.1 Candidate A

##### Background Information on Company

Compass Resources is a relatively small Australian exploration company with a wide range of interests in the mineral processing industry. These interests include copper, cobalt, nickel and uranium, which span across the world with feasibility studies, and exploration and mining operations in Australia, China, South America and South East Asia. The organizations objective is to “advance to be a major base metals and uranium producer with at least three producing mines operating within the next five years.” [17]

##### Reason for Selection

This company was chosen based on a identified need to select a broad range of client stereotypes. This client is in its early developmental stages with only really exploration and feasibility studies, some operations are currently being undertaken but only on a small scale. Selection of this candidate will hopefully provide an insight into the willingness of an Australian based client to undertake a relationship contract agreement in its early stages of development.

### Analysis of Questionnaire

The responses obtained from this candidate (see Appendix F) were of a mixed response and at times not of a very elaborate nature; however some points of interest can still be derived from the information provided in this response.

The candidate seems to think that the current studies that are being performed with the organization under an EPCM basis are progressing quite well. The candidate's preference to perform the works via EPCM contracts is based on the contractor not having to concentrate on costs and final budget, but actually completing the project properly without compromise to quality. The candidate also seems to think that an EPCM contract is more desirable as it provides more financial benefits by providing the client the opportunity to monitor spending and costs. It also enables the client to discover any future problems that may arise with the plant.

With regards to past experiences with relationship contracting, it seems that the candidate has had some undesirable results with this method of contracting. It was suggested that consultants or an independent third party of some form is employed to monitor rates for the various required works to ensure the contractor does not escalate or inflate them above the current market rates. It could be inferred from this that the candidate has been involved in a relationship contract where there has been some dispute or claim over rates for personnel.

The questions relating to trust, open communication and teamwork were answered briefly but with considerable amounts of promise. The fact that Compass are currently

providing the capital expenditure in the development of workshops to enable the further development of a positive ethos of trust, open communication shows that not only the respondent, but the entire organization is also showing signs of the possibility for a relationship contract to be formed. Other factors such the willingness to integrate personnel into the same project office also leads to the conclusion that a relationship contract could be developed with this client.

The KPIs mentioned in the last section of the questionnaire seem contrary to the expected economic and financial indicators. Candidate A mentions indicators for safety and relationships with sub contractors as well as the expected ones of performance, schedule and costs. It is interesting to note that the candidate thought, that a key performance indicator was relationship with sub contractors, as this further demonstrates the willingness of the client to undertake a relationship contract.

#### Conclusion on Willingness

In conclusion it could be stated that the client would be rather willing to undertake a relationship style contract. From the information provided in the questionnaire and analysis performed above it can be noticed that even with negative experience with this form of contracting the candidate is still willing to learn from the past mistakes and shows various signs that a relationship contract would a certain possibility.

However from the interpretation of the questionnaire results it could be concluded that for a relationship contract to be successfully executed with this client it would require several specific aspects. A contract with commercial risk shared on a painshare/gainshare basis with specific KPIs as the determinant of the level of

painshare or gainshare would need to be developed. There would also be a necessity for frequent workshops to be conducted between the client and contractor to improve and work upon a mutual ethos based on trust, open communication and team work.

### 6.1.2 Candidate B

#### Background Information on Company

Mineral Deposits Limited traces has a history of more than 60 years in the mineral sands industry in Australia, with mineral sand dredging operations on the eastern seaboard of Australia producing premium zircon and rutile products. Recently it has seen the organisation expand into other parts of the world with the development of “two principal assets into mining operations, the Sabodala Gold Project and the Grande Côte Mineral Sands Project, both in Senegal, West Africa.” [12] The MDL philosophy for the execution of works is to perform “exploration, drilling and development of projects with the long-term benefit of the company, its shareholders and the community in which we operate uppermost in our minds and deeds.” [12]

#### Reason for Selection

MDL is an Australian based organization with the majority of its operations based in country. The recent exploration into Africa has provided the opportunity to approach a local mineral processing company of a significant size to hopefully gain an understanding of this stereotypical mineral processing organizations opinion with regards to performing works under a relationship contract agreement.

### Analysis of Questionnaire

From the responses obtained (see Appendix G) and after discussions with this candidate it would be concluded that the concept of alliancing or relationship contracting is a foreign, but possible concept.

It seems that the candidate is content with the current projects being executed under EPCM contracts. The candidate believed that EPC contracts were not as desirable, as EPCM contracts allowed the client to be involved in the decision making process throughout the entire stage of the project. Even though there was a considerable cost associated with adopting all commercial risk, and employing consultants to monitor and assist in the progress of the project development.

Trust and open communication were a major aspect that this candidate believed was vital to the success of any contract regardless of its nature. MDL currently have two major projects in Senegal, Africa, which are conducted under an EPCM agreement and the candidate believes that there needs to be a significant amount of trust between the client and contractor to ensure that work can be conducted in a harmonious manner. If the client becomes too involved in the project it can create huge issues with commercial risk and liabilities. However if the client has minimal involvement (similar to an EPC contract) then the end product may be something that does not meet their standards.

This candidate also believes that involvement in the developmental stages of the project will reduce the costs with commissioning and the handover process as the

client is entirely aware of all the equipment and procedures used in the construction of the plant. This also provides the chance for the client to spend additional capital on equipment that will produce a product of a more superior or equal quality for less operating and maintenance costs.

Not surprisingly the candidate placed major emphasis on the key performance indicators associated with costs and performance. This provides some insight into the highest priorities for the client, which in turn highlights the various painshare/gainshare principles which would need to be incorporated into the commercial agreement in a relationship contract.

#### Conclusion on Willingness

It would be safe to assume that the willingness of this client to undertake a relationship contract agreement could be rather high considering the responses obtained on key questions, such as issues associated with trust, key performance indicators and financial benefits. Due to the lack of understanding of relationship contracting it would definitely be a worthwhile exercise to approach a collective of representatives in this organization. The aim would be to develop a presentation to provide a better understanding and knowledge of the basic principles and concepts associated with this form of contracting. Maybe then implementing the questionnaire to these members would be a worthwhile exercise to key the enthusiasm of a wider selection of candidates. All this would have to be conducted before it becomes worthwhile preparing a full proposal for the execution of some further works under a relationship contract.

### 6.1.3 Candidate C

#### Background Information on Company

PT Bumi Resources is an Indonesian mining conglomerate which is considered Asia's fastest growing coal company. The organization went public in 1990 on various Indonesian stock exchanges. Originally a hotel and tourism organization, in 1998 it the decision was made to diversify its interest into the oil, gas and coal industry and since then has proceed to develop and grow in this field. Over the years from 1998 to the present day Bumi purchased majority shareholder stakes in various coal, oil and gas companies around Indonesia and South East Asia. The vision for the organization is "To be a world-class, global operator within the energy and mining sectors" [14].

#### Reason for Selection

One of the main decisions to select this company was based on the fact that it is a rapidly developing large organization with international origins. The fact that it is a foreign organization also provided the opportunity to obtain data and information, with regards to the willingness of relationship contracting, from a company in the international arena. Also the fact that the organization has significant interests in the coal industry provides a diverse representation of the various kinds of organizations in the mineral processing industry.

#### Analysis of Questionnaire

No response was obtained from participant.



### Conclusion on Willingness

Various conclusions can be derived regarding the willingness of this client to undertake a relationship contract. It could be concluded that the absence of a response might portray the client's lack of interest into the willingness to undertake such an agreement. However there was never the opportunity to meet the candidate face to face, due to their work location being overseas, so it was simply a matter of emailing the questionnaire. This impersonal approach has proven to create non respondent participants.

A lack of response may also be an indication that the client representative is simply too busy or possibly forgot to complete the questionnaire, as their already heavy work load may dictate certain priorities. It could therefore be concluded, that if this client was to be pursued further than a response to the questionnaire would really need to be obtained; as a non response obviously fails to represent an organizations unwillingness to undertake a relationship contract agreement.

#### 6.1.4 Candidate D

##### Background Information on Company

Dundee Precious Metals (DPM), since 2003, has been operating as a mining company in vast parts of the world. It is a Canadian based, mining company engaged in the acquisition, exploration, development and mining of precious metal properties. Along with these operations it also has significant exploration activities and feasibility studies that it is currently being executing. DPM's objectives are to "identify, acquire,

finance, develop and operate low cost, long life mining properties; and is also committed to create shareholder value through its disciplined but opportunistic business model.” [15]

#### Reason for Selection

The lack of response from Candidate C, which was to provide a response for a large international organization, provided the opportunity to approach this candidate to complete the questionnaire. Dundee Precious Metals, as stated above, is a Canadian based organization which has operations and exploration projects all around the world. The size of the organization would be comparatively similar to Bumi Resources so obtaining a response from this candidate would hopefully provide the information required.

#### Analysis of Questionnaire

No response was obtained from participant.

#### Conclusion on Willingness

Due to the lack of response similar conclusions derived for Candidate C could be related to this case as well.

### 6.1.5 Candidate E

#### Background Information on Company

Anvil Mining is the leading copper producer in the Democratic Republic of Congo (DRC). The organization only operates in the Congo with various projects through the

Copperbelt region. Since 2002 Anvil has been processing copper out of mines in the DRC and with the development of projects, such as the expansion of the Kinsevere Copper Project, currently being undertaken will mean that their presence will remain for some years to come. The company has “a strong commitment to sustainability and corporate social responsibility is helping to set the foundation for continued development of Anvil's operations.” [16]

### Reason for Selection

Both candidate C and D failed to provide a response so candidate E was chosen as a late selection in the attempt to obtain a response to the questionnaire for a large international mineral processing organization. It was considered important to gain a response from an organization that met this criterion so that a proper analysis of the results can be undertaken.

### Analysis of Questionnaire

On reviewing of the response obtained (see Appendix H) from this candidate it can be seen that various issues with regards to relationship contracting have been raised.

The candidate provided negative responses with regards to the success of the current project performed through an EPCM contract. The main issue was “difficulties in obtaining experienced engineer and overall planning/project management staff” (see Appendix H) which consequently results in delays and budget over-runs for the project. There generally seems to be significant skepticism with performing a contract through the traditional EPCM structure; especially with the concept of owning the

commercial risk for the project. Issues such as “client has less control over costs, standards and schedule; client holds all the ultimate risk, despite the claim by EPCM contractors that it will be shared; very difficult to brief the contractor and get him to change his operating methods to suit client’s systems.” (see Appendix H) Some of these comments seem to contradict the stereotypical feeling with EPCM contracts; especially the comment regarding loss of control over costs, standards and schedule as generally an EPCM contract is conducted so that the client can control these factors.

It is interesting to reflect on comments made by Candidate A and B in comparison to this and see how two different clients have conflicting opinions about the conducting of EPCM contracts. The candidate is under the opinion that under an EPCM contract the contractor loses all motivation and drive to complete the job under budget and ahead of schedule, compared to an EPC where the price and schedule is fixed. Where as Candidate A and B don’t seem to mind the blow out in budget as long as the contractor demonstrates that the job is being performed in their best interests.

It is no surprise, considering the skepticism shown for EPCM contracting, that the several questions associated closely with relationship contracting were answered with a negative response. The most interesting point to mention would be that the candidate feels that an ethos of trust, open communication and teamwork between the contractor and client are “mutually opposed objectives” (see Appendix H). Other aspects that provided concern for the future development of a relationship contract with this client was the negative responses with regards to the success of teambuilding workshops used to help develop and foster a better relationship between the two parties. It seems that the candidate believe that these workshops eventually end up

simply costing too much without enough or any benefits. The candidate also believed that the integration of personnel from both parties into the one project office is also a futile and pointless exercise as the benefits were only minor, but seems to think that attitudes could have changed over the last 10 years.

However it is interesting to note that there was some positive signs taken from this questionnaire response with regards to relationship contracting. It seems that the client has had some experience or exposure to relationship contracts that have been conducted in the commercial building industry. It seems that the relationship contracts executed for the construction and maintenance of commercial buildings on a fixed sum basis has had tremendous success. This relationship contract is similar to an EPC contract but is based on a preferred contractor basis. This is effective in providing a final product that is guaranteed to be low on maintenance and operational costs; as it is the contractor's responsibility to maintain the building for a certain period of time. This is based on a fixed fee, inflation geared budget, so any overruns in the maintenance budget are the responsibility of the contractor. Therefore it is in the best interest for the contractor to not only complete the job under budget and ahead of schedule, but to delivery a superior final product as well. This in turn provides both financial benefits for the client and contractor. Even though this research project only covers relationship contracts between the client and contractor, in the mineral processing industry, the above findings still provides some future possibilities for further research and applications.

KPIs provided the same insight as with Candidate B with the majority of these being based around costs and schedule; however due to the negative responses from this

candidate with regards to relationship contracting the integration of these into some form of painshare/gainshare commercial risk arrangement would be futile.

### Conclusion on Willingness

On mentioning relationship contracting to this candidate, in our initial meeting, I was met with a response of grave skepticism for the whole concept when relating to the mineral processing industry. As it can be seen from the brief resume provided in the questionnaire, the candidate has had some exposure with Alcoa; and mention was made of how the candidate provided serious opposition to the development of the AHEA (Alcoa Hatch Engineering Alliance). Obviously further pursuing a relationship contract agreement with this client would seem pointless if this candidate represents the opinion of the entire organization.

## 6.2 Issues

During the course of undertaking this research project many issues arose. It has been the intention throughout the course of this research project to avoid or eliminate as many issues or problem areas as much as possible; however inevitably there was always aspects that were not thought of or covered in the research and development.

One of the major issues faced with the use of a questionnaire targeted at singular candidates is the fact, that only one opinion is gathered, as this may or may not represent the opinion of the mineral processing organization in question. On top of this there is no way of determining the candidate's connection with the organization, as a consultant or contractor employed for a temporary project specific role may not have the organization's best interests at heart when completing the questionnaire.

Another issue that has been faced throughout the course of implementation of this questionnaire is the non-existent responses from various candidates. It was found that there was a trend with candidates being emailed the questionnaire and not returning responses. Time would be a major contributing factor to blame for the lack of responses to the questionnaire. The candidates who failed to provide a response have extremely stressful, time demanding occupations in remote locations around the world; therefore the completion of a questionnaire for a university student's research project is probably not a major concern or priority for these candidates.

The lack of development of a ranking system for this questionnaire was an issue faced when analyzing the data and hence determining a quantitative value which reflects the willingness of the candidates to undertake a relationship contract. To create some form of ranking system would mean that the entire structure and procedure for the questionnaire would have to be revised. This would in turn create results that were not relevant, as discussed in Section 4.4.

Another issue faced is the interaction between client and contractor. Throughout the entire period of data gathering (i.e. implementation of questionnaire) it was clearly stated and advertised that the questionnaire was for a final year research project for university. However all the candidates chosen for the questionnaire were possible or existing clients for the EPCM contractor that I'm currently employed with, so any interaction had to be dealt with the utmost of professionalism; especially when following up on responses for the questionnaire. After one or two follow up phone

calls or emails it was advised, that if no response was obtained, that no further pursuit of that candidate was to be made.

For the further development of this research and its application into the private sector these issues will need to be addressed and overcome.

### 6.3 Improvements

It is evident from the issues raised above that there are plenty of opportunities for improving on the questionnaire process used in this research project.

The development of a ranking system will provide more quantitative, yet less qualitative, answers which does not enable the data to be analyzed definitively and with conviction as any specific issues or comments can not be taken into consideration. Only a final number or value is used to assess the willingness of a client to undertake a relationship contract. It would however mean that the response rate would probably increase largely due to the amount of input required from the respondent to be reduced dramatically. The downfall of this is that the amount of respondents would have to increase exponentially to acquire an adequate amount of test results and this would create various issues due to the already limited target market.

Another improvement that may be worthwhile would be to include a section regarding commercial risk into the questionnaire. It was originally thought that this was only an issue faced with contractors; however further research after the final drafting of the questionnaire found that it is also an issue that clients have relationship contracting.

Relationship contracting generally requires a commercial risk sharing agreement to be



developed between both parties; however generally the painshare/gainshare arrangement only equates to a certain percentage. Therefore the client absorbs the remainder of the costs associated with any overruns in schedule or budget.

If ethical, possibly a question in the introductory section regarding the association of the client representative to the organization (i.e. are they a contractor or full time employee?) would be useful in interpreting results. It is thought this association really determines the loyalty and dedication to the organization, and in turn the relevance or importance of the results obtained. If the client representative is a contractor, for a project specific role, and after practical completion of the project has no intention of continuing employment with the client then the results obtained would probably be tainted. This would be due to the respondent not having much care or knowledge for the organization's future goals or ambitions.

It was discovered during the course of implementing the questionnaire that the rate of return for the questionnaire was relatively high; however every candidate that the questionnaire had to be emailed to failed to return a response. An arranged meeting and face to face discussion regarding the questionnaire and the research project generally creates a more enthusiastic response from the respondents instead of phone calls and emails. It could only be concluded that this would be due to the face to face meeting being of a more personal nature; however filtering candidates to level would enhance the issue of shortening an already limited target market.

At times it was difficult to interpret the candidates' responses due to the lack of elaboration or eligibility. It may be useful for future applications and implementation

of this questionnaire to express a certain word limit on each question so that an adequate answer may be obtained and effectively analyzed. The issue with eligibility may also be overcome by expressing a need for the answer to be word processed before being submitted.

One questionnaire response per organization would lead to the conclusion of bias or a possible conflict of opinions between the organization and candidate. Therefore it would be recommended that this questionnaire be implemented on a larger scale in future. This would eventually eliminate any possible bias and a collective opinion obtained would be used to gain a better understanding of the willingness of a client to undertake a relationship contract agreement.

#### 6.4 Future Applications

The future applications for the further development and application of the concept developed in this research project are rather broad and extensive.

Currently my employment is with a prominent and progressing EPCM contractor, who has future endeavors of developing relationship contracts with prospective future clients. This was actually one of the major contributing factors which lead to the selection of this topic.

One of these endeavors has lead to the project manger for a major copper project that is currently being developed in the DRC (Democratic Republic of Congo). It was initially proposed that the contract would be of an EPC nature due to the possibility of obtaining significant profits. However it was only realized after some research during the final estimating and feasibility stages that the DRC is actually consider the hardest

country in the world to conduct business in. This in turn lead to significant amounts of commercial risk included into the contract sum, which provided a figure that was found to be unacceptable by the client.

The project manager then discussed the option of possibly setting up some form of commercial risk sharing agreement with the client in the attempt to reduce the project costs. It was my responsibility to provide the project manager with information and advice regarding this matter. The project is yet to be awarded, and the style of contract has not been agreed upon, but the prospect of developing my research further has provided some relevance to this research project and an insight into future possibilities and opportunities.

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## 8 Appendix

## **Appendix A – Course Specification**



**University of Southern Queensland**  
**FACULTY OF ENGINEERING AND SURVEYING**

**ENG 4111/4112 Research Project**  
**PROJECT SPECIFICATION**

FOR: Mark Bruce Whiteford

TOPIC: THE ANALYSIS OF RELATIONSHIP CONTRACTING IN THE PRIVATE SECTOR

SUPERVISOR: Dr David Thorpe

SPONSORSHIP: USQ

PROJECT AIM: This project seeks to review and investigate the relationship contracting process in the private sector, with specific focus on the mineral processing industry; and devise and evaluate methods of implementing it into a company, within the private sector, with limited experience in this field.

PROGRAMME: Issue A, 27<sup>th</sup> March 2008

1. Research relationship contracting relating to the private sector in comparison to the traditional method of contracting.
2. Review and analyze specific examples of its implementation in the private sector.
3. Review methods and systems of analyzing the effectiveness of contracts and alliances with a view to developing conclusions on the success of such approaches.
4. Devise a method or procedure which can be used to determine whether, or how willing a client or contractor will be to undertake a relationship contract agreement.
5. Test the effectiveness of this procedure with practitioners against key desirable responses/indicators.
6. Suggest any possible future improvements that can be made to this procedure.
7. Prepare and submit the required project dissertation as per Project Reference Book.

As time permits:

8. Suggest ways of successfully applying this information into a company within the private sector with limited experience at relationship contracting.

AGREED: \_\_\_\_\_ (Student) \_\_\_\_\_ (Supervisor)

28/03/08

\_\_\_/\_\_\_/\_\_\_

Examiner/Co-Examiner: \_\_\_\_\_

**Appendix B – Questionnaire**

**08- 111 Relationship Contracting in the Mineral Processing Industry**

**Participant Details:**

Name:

Organization:

Position:

Experience/Background:

**Consent Form**

I understand that my participation is completely voluntary, that I can decline to participate or withdraw at any time. I understand that the results of this questionnaire will be published in a research dissertation; however I will not be individually identified. I also understand that this consent form will be detached from the rest of the questionnaire. I declare that I am at least 18 years of age, and I hereby give my consent to participate in this study.

Name:.....

Signature:.....

Date:...../...../.....

**Introduction and Background**

1. Are you currently undertaking a project? Or perhaps recently completed a project or feasibility study? What is/was the nature of the contract, an EPC or EPCM? Please provide some basic details of the project if possible (i.e estimated/actual cost, duration, location, resource etc).

2. What is your opinion regarding the overall success of the project/recent project you have just undertaken or currently undertaking?

3. Do you think EPCM contracts are more successful in achieving the required results? Why do you believe this? Please provide a few bullet points.

4. If yes to question 3, what benefits do you consider EPCM contracts have over EPC contracts? If no, why?

5. Have you been associated with an alliance or relationship contract? If so would you consider it to have been successful? If not what would you have done differently to ensure its success? What improvements do you think could have been made?

**Trust and Open Communication**

6. Research has shown that one of the fundamental requirements for a relationship contract to be successful is an ethos based on trust, open communication and teamwork. Do you think that your organization would be able to adopt such an ethos with an engineering service provider? If not what would you consider to be the reason for this?

7. Do you believe that your organization would be willing to provide the capital expenditure into developing a trust, open communication and teamwork ethos by undertaking workshops and training sessions with an EPCM contractor?



8. Do you believe that it would be in the best interest of the relationship to fully integrate your personnel into the same project office as an EPCM contractor? If not why?

**Financial Benefits**

9. Do you believe that relationship contracts have financial benefits? If so what do you believe they are?

10. Do you think the initial capital expenditure is beneficial in developing systems and procedures with a preferred EPCM provider or is it more beneficial to go to tender for all scopes of work to be performed?

11. It's believed that a successful relationship will ensure lower maintenance and operational costs based on more efficient plants. Do you think that this is the case? If so why? If not, please explain your reasoning.

**Key Performance Indicators**

12. Some analysis and research into KPI's (Key Performance Indicators) has been performed and it has been found that these are essential in following degrees of success and progress throughout a project period. What do you believe would be important KPIs to achieve this? For example safety, performance etc.

13. Why do you believe these KPIs to be important?

**Appendix C – Minutes of Meeting with Interviewee A**

# **Minutes of Meeting**

Date: 24/05/08

Time: 10:00am – 10:36am

Attendees:

Interviewee A (General Manger - Alcoa Hatch Engineering Alliance, Western Australia)

Mark Whiteford

## **Agenda**

### **Past Experience**

Has had 6 years experience with Alcoa (the client). 3 years of these years were in Pittsburgh (USA) in the head office and the other 3 years were in Western Australia as general manager of the AHEA (Alcoa Hatch Engineering Alliance)

### **AHEA (Western Australian Division)**

Hatch Alcoa alliance has been operating since early 1970's.

The alliance developed in Western Australia is for only small capital works projects. Other major projects are still put out to tender. No maintenance involved.

The alliance was developed due to Alcoa not having the experience to construct plants. Costs too high to hire consultants on a full time basis to do this. Therefore an alliance was developed with a preferred contractor.

The initial alliance was with Kaiser Engineering and was developed through a tender phase. Hatch Engineering then bought out Kaiser and maintained the alliance with Alcoa.

### **Issues**

Manning turnover is the same as any other EPCM or EPC contract. The selection process for work colleagues is much more stringent.

To reduce conflicts and issues and maintain team work and trust all members of the alliance attend frequent team building workshops. The management team, on top of this, also attend team building retreats to develop further skills and relationships.

Regular meetings and review sessions are also in place were members can express any concerns or vent any issues that may have arisen since the last session. This

provides management with the opportunity to improvement the efficiency and cohesion of the team.

### **Future Improvements**

In future it was mentioned that a separate entity will be developed as currently there is still the distinction between Alcoa and Hatch members of the alliance. Interviewee wishes to develop a logo or symbol for the Western Australia Operations which identifies all members as one entity so that equality is felt by all members regardless of back ground.

**Appendix D – Minutes of Meeting with Interviewee B**



# **Minutes of Meeting**

Date: 20/04/08

Time: 13:16am – 14:04am

Attendees:

Interviewee B (Project Manager for an EPCM Provider)

Mark Whiteford

## **Agenda**

### **Murrin Murrin Operations**

Ausenco has become the preferred EPCM provider for Minara to perform all the ingoing works for its Murrin Murrin operations.

Minara and Ausenco share resources to help complete the works on time (i.e. sharing of draftsman)

Minara has obviously identified and or realised the necessity for a preferred contractor to perform all the works due to the significant amount of small capital works projects.

An alliance agreement was drafted and presented to Minara based on a preferred contractor basis; however no agreement between the two parties could be reached.

Interviewee seems to think that an alliance entails the executing of ongoing works through a preferred contractor as in the AHEA.

**Appendix E – Minutes of Meeting with Interviewee C**

# **Minutes of Meeting**

Date: 10/04/08

Time: 14:21am – 15:08am

Attendees:

Interviewee C (Feasibility Studies Manager for an EPCM Provider)

Mark Whiteford

## **Agenda**

### **SKM Client Survey**

Mentioned that SKM conducted an annual client satisfaction survey.

SKM client survey was executed by a third party. This third party was generally consultancy firm specifically dedicated to the development and execution of telephone surveys.

The survey was a quantitative set of questions based on a ranking from 1 to 5 (1 being the worst and 5 being the best), that were utilised against current and past clients of SKM's.

Mainly developed for public relation purposes. Information provided from this survey seems to lack depth and relevance.

### **Examples and Opinions of Alliances**

Opinion is that the main and most important component which defines an alliance is the execution of the works through a painshare/gainshare (i.e. sharing of commercial risk)

Provided a report on the Wandoo Alliance. Examined and discussed various aspects of this type of alliance.

Seems to think that the AHEA and other similar alliances were more of "gentlemen agreements" and not alliances.

**Appendix F – Candidate A Questionnaire Response**

**08- 111 Relationship Contracting in the Mineral Processing Industry**

**Participant Details:**

Name: Andrew Tan.

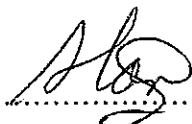
Organization: Compass Resources.

Position: Project Manager.

Experience/Background: Over 15 years exp. in construction, Business Development & project management. International experience in Thailand, Malaysia, Singapore, Papua New Guinea Australia and Diego Garcia. Mechanical Engineer.

**Consent Form**

I understand that my participation is completely voluntary, that I can decline to participate or withdraw at any time. I understand that the results of this questionnaire will be published in a research dissertation; however I will not be individually identified. I also understand that this consent form will be detached from the rest of the questionnaire. I declare that I am at least 18 years of age, and I hereby give my consent to participate in this study.

Name: Andrew Tan Signature: 

Date: 18/8/08

**Introduction and Background**

1. Are you currently undertaking a project? Or perhaps recently completed a project or feasibility study? What is/was the nature of the contract, an EPC or EPCM? Please provide some basic details of the project if possible (i.e estimated/actual cost, duration, location, resource etc).

Currently undertaking a few studies, all on an EPCM (reimbursable) basis.

|                     |           |
|---------------------|-----------|
| Water Study         | 6 months  |
| TSR study           | 4 months  |
| Environmental Study | 24 months |

2. What is your opinion regarding the overall success of the project/recent project you have just undertaken or currently undertaking?

So far, things seem to be tracking quite well.

3. Do you think EPCM contracts are more successful in achieving the required results? Why do you believe this? Please provide a few bullet points.

Yes, due to there being less 'pressure' to meet estimates and more discretion in getting the job done right.

4. If yes to question 3, what benefits do you consider EPCM contracts have over EPC contracts? If no, why?

- less pressure.
- Better relationships with consultant.
- Better outcome on results.
- Less surprises, everything is open book.
- problems discovered earlier, work together to fix.



5. Have you been associated with an alliance or relationship contract? If so would you consider it to have been successful? If not what would you have done differently to ensure its success? What improvements do you think could have been made?

- Yes, not too successful.
- I would ensure there were independent reviewers of rates to ensure rates were kept current with market conditions.
-

Trust and Open Communication

6. Research has shown that one of the fundamental requirements for a relationship contract to be successful is an ethos based on trust, open communication and teamwork. Do you think that your organization would be able to adopt such an ethos with an engineering service provider? If not what would you consider to be the reason for this?

Most definitely, yes.

7. Do you believe that your organization would be willing to provide the capital expenditure into developing a trust, open communication and teamwork ethos by undertaking workshops and training sessions with an EPCM contractor?

Yes, most definitely. We currently do that.

8. Do you believe that it would be in the best interest of the relationship to fully integrate your personnel into the same project office as an EPCM contractor? If not why?

Yes, open communication & acting as one team is essential to a successful outcome.

**Financial Benefits**

9. Do you believe that relationship contracts have financial benefits? If so what do you believe they are?

Paid bonuses for work over & above expectations  
& for meeting milestones.

10. Do you think the initial capital expenditure is beneficial in developing systems and procedures with a preferred EPCM provider or is it more beneficial to go to tender for all scopes of work to be performed?

Preferred EPCM provider.

11. It's believed that a successful relationship will ensure lower maintenance and operational costs based on more efficient plants. Do you think that this is the case?

If so why? If not, please explain your reasoning.

Yes, however it is also important to choose the correct EPCM contractor who can deliver the efficient plants.

Key Performance Indicators

12. Some analysis and research into KPI's (Key Performance Indicators) has been performed and it has been found that these are essential in following degrees of success and progress throughout a project period. What do you believe would be important KPIs to achieve this? For example safety, performance etc.

- Safety
  - Performance
  - schedule
  - relationships with sub-consultants
  - ~~Actual~~ Earned against actual.
- NA

13. Why do you believe these KPIs to be important?

They are an important measure to determine how well the consultant is progressing. It is factual and cannot be argued against, so is used as a yardstick to determine effectiveness.

## **Appendix G – Candidate B Questionnaire Response**

**08- 111 Relationship Contracting in the Mineral Processing Industry**

**Participant Details:**

Name:

PAUL COOLES

Organization:

STADORA GOLD OPERATIONS

Position:

PROCESSING MANAGER / CLIENT REPRESENTATIVE

Experience/Background:

- Mineral Processing Operations including mostly metallurgical roles in Western Australia, PNG + Africa.. (10 years)
- Placer Dome
- Barrick
- Minmet



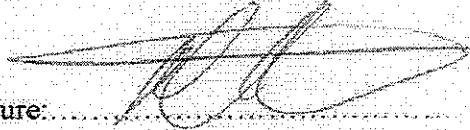
Consent Form

I understand that my participation is completely voluntary, that I can decline to participate or withdraw at any time. I understand that the results of this questionnaire will be published in a research dissertation; however I will not be individually identified. I also understand that this consent form will be detached from the rest of the questionnaire. I declare that I am at least 18 years of age, and I hereby give my consent to participate in this study.

Name:

*Paul Crook*

Signature:



Date:

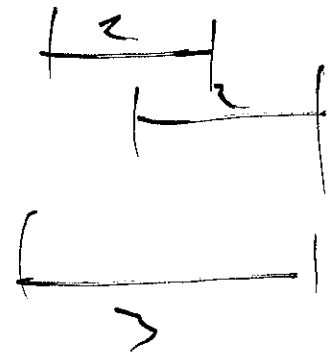
*10 / 9 / 2008*

Introduction and Background

1. Are you currently undertaking a project? Or perhaps recently completed a project or feasibility study? What is/was the nature of the contract, an EPC or EPCM? Please provide some basic details of the project if possible (i.e estimated/actual cost, duration, location, resource etc).

Design 24 months  
Construction - 24 months  
TOTAL PROJECT COST - \$210M  
Design

- 2 WIP PA
- Gold - 100,000 oz's / year
- Senegal / west Africa



2. What is your opinion regarding the overall success of the project/recent project you have just undertaken or currently undertaking?

- Duration → @ 6 months } given  
 - Cost → @ 15-20% } cost + steel, contracts Av.  
 } volatility during period  
 O.K.  
 <  
 <

3. Do you think EPCM contracts are more successful in achieving the required results? Why do you believe this? Please provide a few bullet points.

- Then what other form???

-> Depends on skills of client...

-> Definitely lower risk but as  
in all cases, scope + clear understanding  
up front is crucial

4. If yes to question 3, what benefits do you consider EPCM contracts have over EPC contracts? If no, why?

-> Knowledge of the plan.....

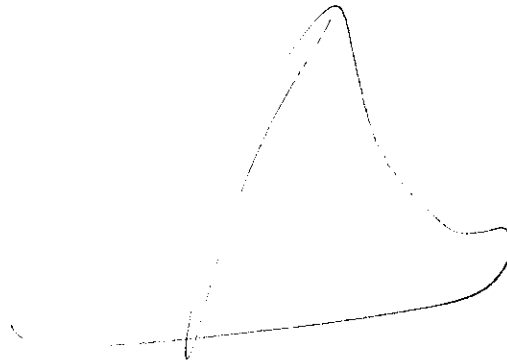
-> Continuity of project terms +  
direction.....

-> All in hand =>

->

5. Have you been associated with an alliance or relationship contract? If so would you consider it to have been successful? If not what would you have done differently to ensure its success? What improvements do you think could have been made?

*deDre*



Trust and Open Communication

6. Research has shown that one of the fundamental requirements for a relationship contract to be successful is an ethos based on trust, open communication and teamwork. Do you think that your organization would be able to adopt such an ethos with an engineering service provider? If not what would you consider to be the reason for this?

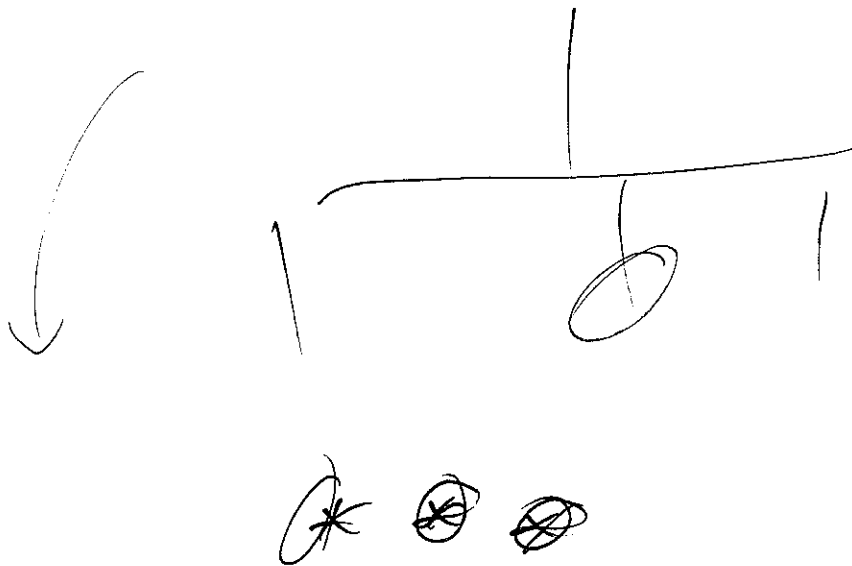
Yes. ~~Day 1~~ in the next  
crucial though ✓

7. Do you believe that your organization would be willing to provide the capital expenditure into developing a trust, open communication and teamwork ethos by undertaking workshops and training sessions with an EPCM contractor? ✓

Possibly .....  
\* would have to have a  
collaborative scoping theme  
- who's getting taught what & by  
whom??  
→ I see it more a case of getting  
people on board, not necessarily  
schools per se.  
Agreement & understanding of process →

8. Do you believe that it would be in the best interest of the relationship to fully integrate your personnel into the same project office as an EPCM contractor? If not why?

- yes I do. ✓
- Key is clarity of scope for those people + common objectives.....
- Caution that the Client does not hijack design or scope outside of agreed scope.....



Financial Benefits

9. Do you believe that relationship contracts have financial benefits? If so what do you believe they are? <sup>2</sup>

-If there is trust in the scope + intent, the possibility exists to have a more relaxed + streamlined design/review process. Where the involved client assumes a level of design responsibility + the risk. In this instance some of the normal risk built into the budget to cater to his risk can be reduced or removed.

10. Do you think the initial capital expenditure is beneficial in developing systems and procedures with a preferred EPCM provider or is it more beneficial to go to tender for all scopes of work to be performed?

Develop the systems + procedures up front.

11. It's believed that a successful relationship will ensure lower maintenance and operational costs based on more efficient plants. Do you think that this is the case?

If so why? If not, please explain your reasoning.

~~Yes.~~

not necessarily ensure it, help absolutely ...  
low maint + op costs result from  
having the experience (operational) part of  
the design. This "experience"  
comes from the client ...



Key Performance Indicators

12. Some analysis and research into KPI's (Key Performance Indicators) has been performed and it has been found that these are essential in following degrees of success and progress throughout a project period. What do you believe would be important KPIs to achieve this? For example safety, performance etc.

- ① • Schedule Conformance
- ② • Cost
- Hours / drawing @ design
- ③ • ~~Scope~~ / Scope Conformance / staying on track.

13. Why do you believe these KPIs to be important?

→ These projects take a long time.  
 You need to motivate  
 people focus + remind them  
 of where the plan is.

**Appendix H – Candidate C Questionnaire Response**

**08- 111 Relationship Contracting in the Mineral Processing Industry**

**Participant Details:**

Name: John F Ryan

Organization: Anvil Mining Limited

Position: Project Manager – Kinsevere Copper Project Stage 2

**Experience/Background:**

Project Manager of Anvil's 60,000 TPA Solvent Extraction and Electrowinning Plant (SX-EW) in the Democratic Republic of the Congo (DRC).

Manager of the outsourced contracting section of Western Power's Project Management Department. This was responsible for design and construction contracts for capital works associated with sub-stations, switching stations, transmission lines and distribution works.

Project Manager with Transfield Services on the furnace overhauls for Olympic Dam for both their flash and Electric Arc furnaces.

Project Manager Development Projects WA for Duke Energy. Projects included the Newman - Yandi transmission line, Port Hedland to Telfer transmission line, and feasibility studies into both gas and power options in WA. Team Leader on the purchase bid for Alcoa powerhouses in WA.

Chief Electrical Engineer and Project Manager for BHP Iron Ore (BHPIO) for power, automation and electrical safety projects at BHPIO WA minesites.

0050025899 – Mark Whiteford

ENG4111/4112 – Research Project

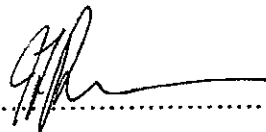
Project Manager and Construction Manager for Alcoa covering brown fields expansions and maintenance works at Kwinana, Pinjarra, and Wagerup I and II. Was Project Manager and Construction Manager for greenfields projects at Hedges Gold (Boddington), Wagerup I and Sao Luis (Brazil).

Electrical Engineer on hydro electric project in Yonki (PNG) covering construction and commissioning of head works, generators, substation and transmission lines

**Consent Form**

I understand that my participation is completely voluntary, that I can decline to participate or withdraw at any time. I understand that the results of this questionnaire will be published in a research dissertation; however I will not be individually identified. I also understand that this consent form will be detached from the rest of the questionnaire. I declare that I am at least 18 years of age, and I hereby give my consent to participate in this study.

Name: JOHN F RYAN.....

Signature: .....

Date: 28 / 10 / 2008.....

**Introduction and Background**

1. Are you currently undertaking a project? Or perhaps recently completed a project or feasibility study? What is/was the nature of the contract, an EPC or EPCM? Please provide some basic details of the project if possible (i.e estimated/actual cost, duration, location, resource etc).

Yes. It was initially an EPCM but was changed to an EP Project, in the Congo. It is 60,000 tonnes per year Copper SX-EW plant with an overall estimate of about US\$300 M. Project was scheduled to have construction substantially complete by December 2008 and be operational by April 2009. This is now forecast to be some US\$400 M and operational by second half of 2009.

2. What is your opinion regarding the overall success of the project/recent project you have just undertaken or currently undertaking?

Not good. Difficulties in obtaining experienced engineers and overall planning/project management staff.

3. Do you think EPCM contracts are more successful in achieving the required results? Why do you believe this? Please provide a few bullet points.

No. In industries where the client holds the process knowledge, the disadvantages are:-

- Client has less control over costs, standards, and schedule
- Client holds all the ultimate risk, despite the claim by EPCM contractors that it will be shared
- Very difficult to brief the contractor and get him to change his operating methods to suit client's systems.

4. If yes to question 3, what benefits do you consider EPCM contracts have over EPC contracts? If no, why?

Contractor has profit as his motivator and objective, whilst the Client has performance, quality of design and equipment as his objective.

If the Contractor is on a Cost Plus contract, then he loses the drive to complete the project quickly. The Client has to drive the project to completion.

5. Have you been associated with an alliance or relationship contract? If so would you consider it to have been successful? If not what would you have done differently to ensure its success? What improvements do you think could have been made?

I have used Alliance and Relationship contracts.

Alliance contract was hard work to get contractors to perform to a price (budget) and any quality issues were ultimately to the client's costs either directly or through late delivery.

In Relationship contracts, the contractors were chosen on their past ability. Contracts were tendered (some sole source) to lump sum with a schedule of rates for variations. This proved to be very successful, but still requires a client team to manage the project works.



**Trust and Open Communication**

6. Research has shown that one of the fundamental requirements for a relationship contract to be successful is an ethos based on trust, open communication and teamwork. Do you think that your organization would be able to adopt such an ethos with an engineering service provider? If not what would you consider to be the reason for this?

No. Mutually opposed objectives. The Client wants a cheap, quick solution with a functional plant. Engineering Service Provider has a desire to be innovative, technically challenged and build something of note for future business.

7. Do you believe that your organization would be willing to provide the capital expenditure into developing a trust, open communication and teamwork ethos by undertaking workshops and training sessions with an EPCM contractor?

Two organizations I have worked with did this and in one case, 10 years down the track, they find it is costing a lot more in time and funds to deliver. Budgets and deadlines suffer.

The other company is still coming to grips with the changes and the increased costs, formality in communication and delayed delivery.

8. Do you believe that it would be in the best interest of the relationship to fully integrate your personnel into the same project office as an EPCM contractor? If not why?

The first company did this and has found only minor benefits. Whether this is because of the model used or changes in the industrial engineering scene over the 10 years is debatable.

**Financial Benefits**

9. Do you believe that relationship contracts have financial benefits? If so what do you believe they are?

Yes. If you can build a relationship where Terms and Conditions and standards are developed jointly and then the contract is a lump sum, fixed term, then it saves significant time in tendering and assessment of tenders.

10. Do you think the initial capital expenditure is beneficial in developing systems and procedures with a preferred EPCM provider or is it more beneficial to go to tender for all scopes of work to be performed?

See above – go for tenders on an agreed set of standards and Terms and Conditions.

11. It's believed that a successful relationship will ensure lower maintenance and operational costs based on more efficient plants. Do you think that this is the case?

If so why? If not, please explain your reasoning.

Not in industry.

In commercial buildings and educational institutions it has been found that if you contract both the construction and the long term facilities management to one company or Joint Venture, then it has been worthwhile.

In industry, too many variables arise during the production cycle to give the Joint Venture company any certainty of long term outcomes. The client takes this risk.

**Key Performance Indicators**

12. Some analysis and research into KPI's (Key Performance Indicators) has been performed and it has been found that these are essential in following degrees of success and progress throughout a project period. What do you believe would be important KPIs to achieve this? For example safety, performance etc.

Agree KPI's are essential. Actual KPI's would range from budget, schedule (detailed deliverables), actual costs, incentives for cost saving, safety (if there is any site component).

13. Why do you believe these KPIs to be important?

There is no other way to measure performance and determine progress.