

Impact of Mining: Yukon mining supply chain

FINAL REPORT

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1 Introduction

The terms of reference *Yukon Impact of Mining: Yukon Mining Supply Chain* lay out the broad objective of this study as: "... to better understand the economic impact of the mining industry within Yukon, as it relates to the local business community." The terms of reference also outline the following key research questions:

1. What are the key activities along the mining supply chain for which products and services are required?
2. To what extent do companies at all stages of the mining lifecycle use local firms to procure products and services? At what rate is this done? How much is spent?
3. To what extent are local firms positioned to provide service to the industry? Are there gaps?

Mining in the Yukon has a long history and the industry has long contributed economic benefits across the territory, but the nature, extent and value of the local supply chain — along with gaps in the supply chain that might be filled by local firms — are not thoroughly understood. This project is intended to increase that understanding.

1.1 Supply Chain Definition

The following definition is drawn largely from the document entitled: *Yukon Mining Sector Profile: Component 4, the Mining Supply Chain* (2013) authored by Malcolm Taggart and Luigi Zanasi for the Yukon Department of Economic Development.

A supply chain is simply the necessary flow of products and services to the end user. In the mining context this is often thought of as suppliers to an operating mine but the industry-wide supply chain is much more complex, ranging from contractors providing staking services through exploration companies to wholesale fuel distributors bringing in the fuel for actual operations. Along the way is a complex web of consultants, service providers, wholesalers and retailers.

In the resource industries there has been a general shift away from bringing and keeping activities in-house (vertical integration) within a company, and towards out-sourcing all manner of services and activities to separate, specialized firms. For large resource companies the advantages of owning and/or directly managing different aspects of their supply chain are: a greater degree of control, a reduction of risk that critical goods or services are not available when needed, and the potential to improve profitability. The motivations to outsource more and more of the supply chain — and even formerly core aspects of the business like the actual mining — are:

- The reduction in overhead costs;
- The advantages of having smaller, more specialized firms doing what they specialize in, and;
- The competition among suppliers reducing overall costs and therefore improving profitability.

While both sides of the supply chain — the suppliers and the buyers — see themselves as benefiting from the trend toward greater reliance on a deeper and more complex supply chain, who benefits most? Brian Dumsday¹ argues that, although all firms involved can benefit, those that benefit most are:

¹ BW Dumsday and Associates. November 2012. Alberta Supply Chain Overview.

- Suppliers of goods who can carry large inventories;
- Suppliers who themselves have relationships with large numbers of suppliers or sub-contractors;
- Suppliers of complex products; and,
- Buyers with large purchasing budgets.

In the Yukon context it is critical to keep in mind the relatively small size of the overall economy (in comparison with, e.g. Alberta or BC) and the relatively small size of the market to be served by the local mining supply chain.

1.2 Approach and Methodology

We anticipated that there would be a number of challenges to completing this project and fulfilling all of its requirements:

1. There is very little literature looking at the specifics of the mining supply chain in the Yukon but somewhat more for the supply chains in other Canadian jurisdictions and nationally.
2. The need to examine all stages of the mining lifecycle. An operating mine has a different supply chain than an exploration project or a reclamation project.
3. In the Yukon there are very low numbers of companies operating in parts of the mining cycle.
 - The total population of operating hard rock mines in the Yukon is one: the Minto Mine.
 - Yukon Zinc and North American Tungsten (operator of the Cantung mine in the NWT that was used as a proxy for a Yukon mine in the 2009 Yukon *Mineral Sector Supply Chain Gap Analysis* study) are both under court-ordered protection from their creditors and both owe Yukon vendors significant sums.
 - There are currently no mines being constructed in the Yukon.
4. Although placer mining is not mentioned in the terms of reference, placer mining continues to be a significant part of the Yukon mining industry and will have a supply chain that is different from that of the hard rock operations.
5. Mineral exploration and development hit a peak in the Yukon in 2011 and has fallen significantly since. There are very few companies that spent significant amounts in the Yukon in 2014.
6. Although there are a number of sites undergoing reclamation work at some level in the Yukon, this part of the mining cycle is dominated by the work being done at the Faro site.
7. The general difficulty in getting businesses to respond to surveys is greatly increased when they are being asked to divulge financial information. The 2009 Yukon *Mineral Sector Supply Chain Gap Analysis* study had a low response rate, for example.

Our approach to these challenges included the following:

- We conducted a desktop literature review to build on the two related Yukon studies: *Yukon Mining Sector Profile: Component 4, the Mining Supply Chain* (2013), and *Yukon Mineral Sector Supply Chain Gap Analysis* (2009), along with a broader review to find the most current and relevant research on mining supply chains in Canada.
- We assembled the most current (2009 through 2011) relevant input-output data from Statistics Canada for both the Yukon and for Canada as a whole, in order to approach the question of the existing Yukon mining supply chain from a broad statistical perspective and identify the commodities and services most purchased as inputs by the mining industry.

- The challenge of very low numbers of companies working in the Yukon at different stages of the mining lifecycle is inescapable; there is no magic bullet solution. We took a multi-faceted approach to this problem:
 - We targeted a total of 15 companies that we identified as being highly likely to have spent at least \$500,000 in the Yukon in 2014 for face-to-face or direct interviews and completed a survey with 11 of those 15.
 - We then conducted an email-based online survey targeting other Yukon mining companies and received 31 responses of which 17 did not have any claims in the Yukon leaving 14 that are mining companies by our definition of holding active claims. Of those 14 mining companies, 5 were placer operations (see below) leaving us with a total of 20 quartz mining companies who shared information with us either via the online survey or an interview.
 - We then combed through the financial statements and reports of publically traded companies that hold claims in the Yukon but were not part of either the interview list or contacted for the online survey. The Yukon spending amounts gathered from this effort were then used to help weight the responses from the interviews and online survey.
- We initially intended to attempt to conduct an email based/online survey of placer miners using the membership list of companies from the Klondike Placer Miners' Association (KPMA). Unfortunately, the KPMA has a policy of not sharing its membership list. We therefore are left with only five responses from placer miners who responded to the survey that was intended to capture quartz miners and explorationists. Although this is a very low number and we have no means of knowing how representative the responses are, we have included them for the sake of completeness.
- Most of the closure and reclamation work being done in the Yukon is on four sites abandoned by their corporate owners. This work is being largely funded by the federal government but managed by the Yukon government. To get a sense of the nature and amount of spending during the closure and reclamation phase we have collected available data on government contracts for the four Yukon reclamation sites: Faro, Mount Nansen, Clinton Creek and Ketza River.
- Finally, we have also approached the Yukon mining supply chain from the vendor side through a comparison between the work done by the Yukon Bureau of Statistics in its 2013 Business Survey on revenue and GDP attributable to mining with the results of the email based/online survey of Yukon businesses that we conducted. We received 42 responses to that survey.

2 Mining Supply Chain Literature Review

There are two known studies that have focussed specifically on the Yukon's mining supply chain: *Yukon Mining Sector Profile: Component 4, the Mining Supply Chain* (2013), and *Yukon Mineral Sector Supply Chain Gap Analysis* (2009).

2.1 Yukon Mineral Sector Supply Chain Gap Analysis (2009)

The first known effort to provide a systematic analysis of Yukon's mineral supply chain was commissioned by Yukon Economic Development in 2009.² *Yukon Mineral Sector Supply Chain Gap Analysis* was based on a primary research effort that involved surveying of four projects:

- The Minto mine (only operating Yukon mine at the time);
- The Cantung mine (as a proxy for a Yukon mine of similar size and type);
- The Wolverine project (then under construction); and,
- The Carmacks Copper project (then in the permitting process).

In addition, 18 companies conducting exploration drilling on their properties were surveyed but only four responded, a 22% response rate.

In general, the authors of the analysis warn that the very small sample size on the producer side, coupled with the low response rate on the exploration side, limits their observations to a high level analysis only, and that the results cannot be reasonably extended to other Yukon mine operations. With those caveats however, the analysis offers the following on the mining production side:

- Mining companies are beginning to make public and firm commitments on the use of local suppliers to support mining during both pre-production and production;
- Spending on administrative costs and technical services tends to occur outside Yukon;
- Spending on mining, milling and transport show mixed results with no particular pattern; and,
- Price and value appear to be the driving factors in establishing supplier relationships.

And on the mineral exploration side:

- The largest components of mineral exploration spending are: drilling, labour, transportation, camp operations, and assays & analysis;
- Mineral exploration is a largely local endeavour. Most supply chain items are purchased in Yukon from Yukon suppliers;
- As with operating mines, most administrative spending occurs outside Yukon; and,
- Most of the spending on technical services is outside of Yukon.

2.2 Yukon Mining Sector Profile: Component 4, the Mining Supply Chain (2013)

This 2013 paper was part of a broad, multi-component profile of the Yukon's mining sector authored by Malcolm Taggart and Luigi Zanasi for Yukon Economic Development.³ It consists of a literature review and an analysis of inputs into the Yukon's mining sector through the use of

² Vector Research. June 2009. *Yukon Mineral Sector Supply Chain Gap Analysis*.

³ Research Northwest. June 2013. *Yukon Mining Sector Profile: Component 4, the Mining Supply Chain*.

Statistics Canada's input-output (I-O) data. Note that the latest available I-O data in 2013 was for 2009.

We have drawn on the *Yukon Mining Sector Profile: Component 4, the Mining Supply Chain* in a number of ways for this report:

- The definition of a mining supply chain in Section 1.1;
- The summary of the 2009 report *Yukon Mineral Sector Supply Chain Gap Analysis* in Section 2.1 above; and,
- Use of the 2013 literature review as a building block for the literature review presented in Section 2.3 below.

In addition, in Section 3 we have built on the I-O based approach used in the 2013 report to analyse inputs into the Yukon's mining sector and how those inputs changed between 2009 and 2011 (the most current data available).

2.3 Other Mining Supply Chain Literature

Much of the readily available literature on mining supply chains comes from the industry itself, or more commonly, from firms and consultancies that themselves provide the sector with advice and management services for mining supply chains. Most of this can be distilled down to advice that mining companies need to:

- Focus on cost saving strategies at all points along their supply chain;
- Manage their supply chain's strategic risks;
- Build good relationships with their suppliers;
- Improve performance management of suppliers;
- Introduce effective measurement and tracking of savings; and,
- Focus on finding even more cost savings along their supply chain.

In Canada it seems that the government of Saskatchewan, through its Ministry of the Economy, is a leader in producing literature on the specifics and practicalities of mining supply chains.

2.3.1 Saskatchewan

Saskatchewan has a strong focus on productivity and supply chain development in its Ministry of the Economy. The province hosts an annual mining supply chain forum and tradeshow, with its seventh annual forum held in April 2015 and eighth annual scheduled for April of 2016.⁴

The mining supply chain forum and tradeshow is intended to increase awareness of current mining operations and projects in Saskatchewan and the related supply chain opportunities for manufacturing companies, while also providing practical information to existing and potential new suppliers on how to be a preferred supplier to the mining industry.

The provincial government has also developed three related guides for businesses and communities:

- *How to Successfully Access the Mining Supply Chain*⁵;
- *Potash Mining Supply Chain Requirement Guide*⁶ and,
- *Uranium Mining Supply Chain Guide*⁷.

⁴ <http://economy.gov.sk.ca/MiningSupplyChainForum>

⁵ March Consulting Associates Ltd. for Saskatchewan Ministry of the Economy. 2012. *How to Successfully Access the Mining Supply Chain*. Available at: <http://economy.gov.sk.ca/AccessTheSupplyChain>

⁶ Hatch for Saskatchewan Ministry of the Economy. 2012. *Potash Mining Supply Chain Requirement Guide*. Available at: <http://economy.gov.sk.ca/PotashGuide>

The *How to Successfully Access the Mining Supply Chain* guide was largely based on an online survey of key players in the mining and mining service sectors, including large consulting firms, of the Saskatchewan economy, with follow-up interviews also conducted. The guide appears to be aimed at firms that have little background in the industry. Its overall advice to new entrants is very broad and somewhat rote:

“To be successful in the Mining Industry, as a new manufacturer, you need to:

- Do your homework
 - Fully understand your customers’ business (See Section – Mining Overview)
 - Know who your customers are, and what they are doing (See Section – Your Customer)
 - Learn the process they use for Procurement (See Section – Supply Chain)
 - Discover where opportunities exist (See Section – Services and Equipment)
- Invest in the opportunity
 - Develop your company image (See section – Marketing your company)
 - Develop your core competencies (See Section – Assessing needs)
- Think long term
 - Be realistic and focus on sustainability (See Section – Strategies)
- Make your mark
 - Follow the steps to becoming a new supplier (See Section - Becoming a New Supplier)
 - Strive for Excellence (See section – How to maintain your position)
 - Search for Continuous Improvement opportunities (See Section – Quality Management)”⁸

There is also somewhat more specific advice from the survey. For example:

“Mining Companies control the type of contracts they wish to use and are now expanding into using more flexible incentive type contracts. Consultants have less flexibility as they are governed by the Mining Companies, and they are shown as more conservative in their contract choices.”⁹

Perhaps even more useful is the inclusion of relatively detailed tables containing, for example, representative lists of equipment required for new mining projects, including an estimated value for each piece of equipment.

The *Potash Mining Supply Chain Requirement Guide*, prepared by Hatch, appears to be a more specific and useful guide for firms that are looking to become part of the supply chain for new potash mines in Saskatchewan and for government in its efforts to support industry growth. The guide presents the order-of-magnitude costs associated with the main expenditures over the lifecycle of a typical greenfield potash facility. The life cycle has five stages:

- Exploration and Resource Evaluation.
- Regulatory Licences, Permits and Approvals.
- Engineering and Construction.
- Operations and Maintenance.
- Closure, Reclamation and Monitoring.¹⁰

⁷ AMEC Americas Ltd. for Saskatchewan Ministry of the Economy. 2014. Uranium Mining Supply Chain Guide. Available at: <http://economy.gov.sk.ca/UraniumGuide>

⁸ Saskatchewan Ministry of the Economy. “How to Successfully Access the Mining Supply Chain.” P.8

⁹ Ibid. p.68

¹⁰ *Potash Mining Supply Chain Requirement Guide*. P.1

The steps required to go through each of the five stages is presented and a cost estimate for each step is included. Some of the cost estimates (getting the required permits and approvals for example) are based on the experience of recent projects in the province. Other cost estimates that are less dependent on project specifics are of a more generic nature. The stages are broken down in varying levels of detail with goods and services in the lifecycle supply chain grouped into categories. Some specialty suppliers are referenced separately.

The 2014 *Uranium Mining Supply Chain Guide* appears to be modelled closely on the earlier potash guide. The introduction states:

“This guide provides information on the quantity, value and scheduling of supplies and services purchased by typical Saskatchewan uranium mining project owners and/or operators to discover, develop, operate, maintain, decommission and close out projects. The intended readers and users of this guide are current supply and service providers to the industry, potential supply and service providers, and the Government of Saskatchewan to help guide its programs and support for the industry. This guide attempts to give a balanced understanding of supplies and services purchased during both the capital-intensive engineering design and construction stage, and the operations, maintenance and decommissioning stage. Spending in the earlier stage is relatively rapid, but total value of purchases is greater through the latter stage.”¹¹

Some selected average rates that the *Uranium Mining Supply Chain Guide* presents for different services required are shown in the following tables. Each table estimates rates at a different stage of the mining life cycle.

Table 1: Average Rates for Services Required in the Target Identification Stage of Uranium Mining in Saskatchewan

Service	Average rate
Ground geophysics	\$150 per km
Ground geochemistry	\$100 per km
Professional consulting	\$225 per hour
Technical consulting	\$150 per hour
Analytical services	\$110 per sample
Logistical services	\$100 per hour

Table 2: Average Rates for Services Required in the Resource Evaluation Stage of Uranium Mining in Saskatchewan

Service	Average rate
Drilling services	\$200 per m
Borehole geophysics	\$50 per m
Analytical services	\$15,000 per hole
Logistical services	\$60,000 per year

¹¹ *Uranium Mining Supply Chain Guide*. P. 2

Table 3: Average Rates for Services Required in a Model Open Pit Operations and Maintenance Uranium Mine in Saskatchewan

Description	Quantity	Unit	Unit cost
Diamond drilling	20,000	metres	\$220.00
Maintenance parts - mobile equipment	4,100,000	\$/year	-
Explosives	714,125	kilos	\$2.50
Diesel fuel	6,000,000	litres	\$1.20

The closure and reclamation period for a model uranium mine in Saskatchewan is estimated at approximately 50 years and costs are estimated to be approximately \$200 million over this period.

3 Input-Output Data

Input-output data provides information on the purchases of different industries, including mining. Statistics Canada publishes input-output data at two levels of aggregation: summary and detailed. The detailed data is only available for Canada as a whole but separates out the different sectors of the "Mining, quarrying, and oil and gas extraction industry". Territorial data is only available for the entire "Mining, quarrying, and oil and gas extraction industry."

3.1 Summary Level Purchasing Data for the Yukon

Yukon input-output data is only available at the "summary level", which means that only total data for the overall *Mining, quarrying, and oil and gas extraction* industry is published. According to input-output data, the total gross input of the mining, quarrying, and oil and gas extraction industry averaged \$348.8 million annually for 2009 through 2011. Note that this is gross input and includes value-added and indirect taxes net of subsidies of \$264.1 million. Total purchases by the industry averaged \$77.3 million annually for 2009 through 2011.

Table 4 presents a ranking of purchases of the top 15 goods and services by the mining, quarrying, and oil and gas extraction industry in the Yukon for 2009 through 2011, along with an estimate of the dollar value of those purchases. These 15 categories of goods and services make up approximately 80% of all purchases by the industry.

Table 4: Percentage and Value of the Top 15 Goods and Services Purchased by the Mining, Quarrying, and Oil and Gas Extraction Industry, Yukon, 2009 through 2011 Average

	Percent	Value
Fictive services	17.46%	\$13.5 m
Professional services (except software and research and development)	15.56%	\$12.0 m
Refined petroleum products (except petrochemicals)	15.22%	\$11.8 m
Fictive materials	13.10%	\$10.1 m
Other finance and insurance	11.03%	\$8.5 m
Real estate, rental and leasing and rights to non-financial intangible assets	4.53%	\$3.5 m
Wholesale margins and commissions	3.58%	\$2.8 m
Depository credit intermediation	3.15%	\$2.4 m
Industrial machinery	2.97%	\$2.3 m
Computer and electronic products	2.80%	\$2.2 m
Primary metallic products	2.76%	\$2.1 m
Transportation margins	1.81%	\$1.4 m
Mineral fuels	1.42%	\$1.1 m
Transportation and related services	0.78%	\$0.6 m
Administrative and support, head office, waste management and remediation services	0.78%	\$0.6 m

Source: Calculated from: Statistics Canada. CANSIM Table 381-0022 - Input-output tables, inputs and outputs, detailed level, basic prices, annual (dollars) and CANSIM Table 381-0028 - Provincial input-output tables, inputs and outputs, summary level, basic prices, annual (dollars). (Accessed: 2015-11-05)

Fictive services are the number-one ranked purchase by the industry in the Yukon. The standard dictionary definition of fictive is: “created by imagination”. But these services are not really imaginary; they cannot be ascribed to a specific industry although they are a category in firms’ income tax returns. Fictive services include: advertising, promotion, meals, entertainment, travel, meetings and conventions. In the Yukon mining context meals would include the purchase of food for camps and travel would include the costs of flying in employees for their shifts in camp.

Professional services are ranked number two and this is not surprising given the amount of exploration work done from 2009 through 2011. The services of geoscientists and a wide variety of professional consultants would make up the bulk of these purchases. It is also no surprise that refined petroleum products are an important purchase by the industry; gas and diesel are used at every stage of the mining process.

Fictive materials, like fictive services, are not imaginary. All operating supplies and office supplies fall into this category and in the mining context important supplies include explosives and all chemicals — collectors, frothers and modifiers — and other materials needed for mill operations.

4 Industry Surveys

As noted in Section 1.2 the challenge of very low numbers of companies working in the Yukon at different stages of the mining lifecycle is inescapable; there is no magic bullet solution. We took a multi-faceted approach to this problem.

We targeted a total of 15 companies that we identified as being highly likely to have spent at least \$500,000 in the Yukon in 2014 for face-to-face or telephone contact and completed interviews with 11 of those 15.

We then conducted an email-based online survey targeting other Yukon mining companies and received 31 responses of which 17 respondents did not have any claims in the Yukon, leaving 14 that are mining companies by our definition of holding active claims. Of those 14 mining companies, 5 were placer operations (see Section 4.3 below) leaving us with a total of 20 quartz mining companies who shared information with us either via the online survey or an interview.

We then combed through the financial statements and reports of publically traded companies that hold claims in the Yukon but were not part of either the interview list or contacted for the online survey. The Yukon spending amounts gathered from this effort were then used to help weight the responses from the interviews and online survey.

4.1 Sampling

Our sample was based on the Yukon Chamber of Mines' membership and a number of other firms the team was aware were engaged in mining exploration in the Yukon for which we had contact information. As well, we decided to survey supplier firms on the off chance they might be engaged in mining activities. We divided the sample into two groups. The first group of 15, which consisted of what we believed were "major players", were contacted individually by telephone and were asked to either complete the questionnaire or assisted in completing it. The "major players" were believed by team members to have spent at least \$500,000 in 2014. The second group was contacted via email and were sent reminders by the survey team and the YCM.

Our total sample size was 82 as follows:

Table 5 Sample Size, Yukon Mining Company Survey

	Sample Size
Firms contacted by telephone	15
Mining/exploration firms contacted via email	24
Supplier firms	43
Total Sample size	82

Note that neither North American Tungsten nor JDS Mining (Silvertip Mine) are part of the sample as their deposits are outside the Yukon and do not form part of the Yukon's GDP. As well, we have excluded Yukon Zinc's Wolverine mine as we indicated in our proposal.

4.1.1 Response Rates

Our overall response rate was 51.2% or 42 of the 82 firms. However, the even higher response rate of the major players lends some confidence to the dollar amounts from the survey.

Table 6 Number of Responses by Claim Type, Yukon Mining Company Survey

	Number of Responses
No claims	17
Placer	5
Quartz	20
Total	42

The email-based online survey resulted in 31 responses of which 17 did not have any claims in the Yukon leaving 14 that are mining companies by our definition of holding active claims.

Of those 14 mining companies, 5 were placer operations. Four of these five had exclusively placer claims while the other had both quartz and placer claims but spent more on its placer claims.

We completed interviews and obtained data from 11 of the 15 major players. There were thus a total of 20 quartz mining companies who shared information with us either via the survey or an interview.

4.1.2 Sample Weighting

We weighted the sample based on an estimate of total spending by mining and exploration companies operating in the Yukon. We estimate that the total spending by survey respondents amounted to \$213,288,198 in 2014. Note that this amount is total spending overall relating to the respondents' Yukon operations.

We estimated total spending by companies operating in the Yukon at \$229,006,000. We obtained this amount by adding the following to the \$213,288,198 survey total:

- \$7,121,181 from the published financial statements of the “major players” who did not respond
- \$7,596,766 from published financial statements smaller companies who are not YCM members
- \$1,000,000 estimated spending by non-responding small players who received funding from the Yukon Mineral Exploration Program (YMEP; 2014 budget for hard rock was \$1.096 million)

We created three strata depending on the total amount spent. The first stratum was for companies spending more than \$25 million, the second for companies spending between \$500,000 and \$25 million and the third was for companies spending less than \$500,000. The weights assigned to each stratum were, respectively: 1, 1.13345 and 4.18765.

Note that the sample in the first two strata represents 94% of the two larger strata universe and 81% of the total spending. Overall, the sample accounts for 93% of hard rock mining production and exploration spending in the Yukon. Therefore, while not a random sample, the spending results from the survey are quite reliable, even in the event that the responses are biased towards companies that spent more in the Yukon.

4.2 Survey Instruments

The survey instruments are presented in the appendix. Slightly different instruments were used for the individual and email surveys, but the information obtained is essentially the same and all 42 responses were combined in one data base.

The survey instruments can be separated into four parts. The first part included questions about what kind of operation the firm had (quartz or placer mining, supplier). Firms that did not own or lease active claims were dropped from the survey. The second part asked how much was spent in different categories and what estimated percentage of that went to Yukon businesses. There were four major categories of spending (plus a catchall “Other spending”) and each category had a number of items. The spending categories in the survey were:

1. Exploration
 - Drilling Services
 - Geophysical Services
 - Other Direct Exploration spending
 - Groceries and Accommodations for field work
 - Geochemical Services
 - Assaying and Analytical
 - Geological Services
 - Environment Services
 - Engineering Services
2. Equipment
 - Rental of camp gear (sat phone dishes, gen sets)
 - Purchase of camp gear (sat phone dishes, gen sets)
 - Vehicle and equipment maintenance/repairs and fuel
 - Rental or lease of vehicles
 - Heavy equipment servicing
 - Air Services (helicopter)
 - Air Services (fixed wing)
 - Heavy equipment services or purchase
3. Travel and marketing
 - Accommodations, meals and entertainment
 - Airfare
 - Marketing (including advertising, and social media)
 - Charitable work (incl. event sponsorships, and donations)
 - Trade Show booths/Conferences (excluding travel expenses)
4. Office and administration
 - Accounting/bookkeeping
 - Legal services
 - Office space expenses such as rent, utilities, etc.
 - Consultants (not employees)
 - Expediting/shipping
 - Office equipment (computers, printers, furniture, etc.)
 - General office/business expenses
 - Office supplies
 - Office Admin Other
5. All other expenses

The third part of the survey asked about the availability and quality of goods and services provided (or not) by Yukon businesses. The questions related to the four major groupings of expenditures outlined above. Respondents were asked to rate Yukon suppliers on the four categories for their competitive pricing, prompt and timely service, selection and availability and overall quality.

The fourth part asked a number of “demographic” questions describing their operations and membership in different organizations.

4.3 Placer Mining

We intended to conduct an email based online survey of placer miners using the membership list of companies from the Klondike Placer Miners’ Association. Unfortunately, the KPMA does not share their membership list.

We therefore are left with only five responses from placer miners who responded to the survey that was intended to capture quartz miners. This small sample can in no way be representative of the industry.

4.4 Vendor Survey

We have also approached the Yukon mining supply chain from the vendor side through a comparison between the work done by the Yukon Bureau of Statistics in its 2013 Business Survey on revenue and GDP attributable to mining with the results of an email based/online survey of Yukon businesses that we conducted. That comparison can be found in Section 5.4.

We developed a separate sample of 369 businesses likely to have done business with the mining industry. These businesses were surveyed via email. We obtained a total of 42 responses. Of those only 33 gave us their total sales and 39 provided the percentage of their sales to the mining industry.

The survey instrument was simple and short. It asked for the respondent’s industry group, its gross sales and the percentage of sales to the mining industry and any comments. The industry group matched the broad industry groups in the Yukon Bureau of Statistic’s 2013 Business Survey report on revenue and GDP attributable to mining:

- Accommodation and food services; e.g. hotels, restaurants, caterers, food service contractors
- Construction; e.g. building construction, road building and earth moving
- Manufacturing; e.g. metal fabrication, machine shops
- Professional, scientific and technical services; e.g. geoscience, engineering, legal, accounting and other consultants
- Retail trade; includes non-store retailers
- Support activities for mining; e.g. drilling, prospecting, staking, excluding geoscience and other professionals that fa
- Transportation and warehousing; e.g. air transport, trucking
- Wholesale trade; e.g. fuels, general merchandise
- All other industries

Response rates by industry were as follows in Table 7:

Table 7 Vendor Survey Response Rates by Industry Group

Industry	All Responses	Responses with total sales
Professional, scientific and technical services	11	10
Support activities for mining	7	5
Transportation and warehousing	6	3
Construction	5	5
Accommodation and food services	3	3
Manufacturing	3	0
Retail trade	3	3
Wholesale trade	3	3
All other industries	1	1
Total	42	33

5 Analysis

5.1 Quartz Exploration and Mining

In the subsections below we break out spending by firms engaged in Yukon quartz mining and exploration into categories and provide estimates for amounts and percentage Yukon spending by category.

5.1.1 Spending

Our sample represents about 93% of the \$229 million estimated spending for activities relating to Yukon claims by operating mine and hard rock exploration. Weighting the sample to represent the total yields the following amounts for total spending and purchases from Yukon businesses.

Table 8 Total and Yukon Spending, Mining Company Survey, Weighted Data, by Major Spending Categories, 2014

	Total Spending	Yukon Businesses	% Yukon
Exploration spending	\$112,890,000	\$41,692,000	36.9%
Equipment spending	\$51,966,000	\$29,294,000	56.4%
Travel & marketing spending	\$6,108,000	\$2,627,000	43.0%
Administration and office spending	\$23,118,000	\$2,398,000	10.4%
Other spending	\$33,716,000	\$23,601,000	70.0%
Total	\$229,006,000	\$99,613,000	43.5%

Based on survey responses, about 44% of the \$229 million spending in 2014 by quartz mining and exploration firms was purchased from Yukon businesses. While the majority of equipment spending was directed to Yukon firms, only 10.4 % was spent in the Yukon for Administration and office spending.

Even if we assume, completely unrealistically, that our sample is totally biased, i.e. all of the non-respondents purchased nothing from Yukon businesses, the total spending going to Yukon businesses would amount to \$92,346,000 or 40.3% of total spending.

5.1.1.1 Exploration spending

Table 9 Total and Yukon Exploration Spending, Mining Company Survey, Weighted Data, by Major Spending Categories, 2014

	Total	Yukon Businesses	% Yukon
Drilling Services	48,753,000	12,286,000	25.2%
Geophysical Services	914,000	330,000	36.1%
Other Direct Exploration	37,727,000	20,928,000	55.5%
Groceries and Accommodations for field work	6,843,000	3,395,000	49.6%
Geochemical Services	1,920,000	753,000	39.2%
Assaying and Analytical	3,725,000	1,817,000	48.8%
Geological Services	5,067,000	1,059,000	20.9%
Environment Services	6,857,000	1,096,000	16.0%
Engineering Services	1,084,000	28,000	2.6%
Total Exploration Spending	\$112,890,000	\$41,692,000	36.9%

As shown, the survey found total exploration spending of \$112.9 million of which approximately 37% was spent with Yukon businesses. Assaying services and groceries and accommodations for field work each approach 50% Yukon spending but engineering services for exploration are almost all purchased from outside the Yukon.

5.1.1.2 Equipment Spending

Table 10 Total and Yukon Equipment Spending, Mining Company Survey, Weighted Data, by Major Spending Categories, 2014

	Total	Yukon Businesses	% Yukon
Rental of camp gear (sat phone, dishes, gen sets)	1,106,000	949,000	85.8%
Purchase of camp gear (sat phone, dishes, gen sets)	3,824,000	1,626,000	42.5%
Vehicle and equipment maintenance/repairs & fuel	20,745,000	15,291,000	73.7%
Rental or lease of vehicles	2,488,000	484,000	19.4%
Heavy equipment services	11,662,000	1,313,000	11.3%
Air Services (helicopter)	6,519,000	4,010,000	61.5%
Air Services (fixed wing)	5,622,000	5,622,000	100.0%
Total Equipment Spending	\$51,966,000	\$29,294,000	56.4%

Yukon quartz mining and exploration companies reported spending a total of \$52.0 million on equipment in 2014 of which 56% was with Yukon businesses as shown. Fixed wing aircraft services, rental of camp gear and vehicle and equipment maintenance plus fuel all show the significant involvement of Yukon firms. Heavy equipment services on the other hand have a very low Yukon share of spending.

5.1.1.3 Travel and Marketing Spending

Table 11 Total and Yukon Travel and Marketing Spending, Mining Company Survey, Weighted Data, by Major Spending Categories, 2014

	Total	Yukon Businesses	% Yukon
Accommodation, meals and entertainment	1,272,000	293,000	23.0%
Airfares	2,409,000	1,102,000	45.7%
Marketing (including advertising & social media)	1,380,000	678,000	49.1%
Charitable work (event sponsorships & donations)	543,000	424,000	78.1%
Trade Shows /Conferences (excluding travel)	708,000	130,000	18.4%
Total Travel and Marketing Spending	\$6,108,000	\$2,627,000	43.0%

A total of \$6.1 million was spent on travel and marketing by Yukon quartz mining and exploration firms in 2014. Of that, 43% went to Yukon businesses as shown. Not surprisingly, a high percentage of the reported spending on charitable work went to Yukon organizations and a low percentage went to trade shows and conferences.

5.1.1.4 Office and Administration spending

Table 12 Total and Yukon Office and Administration Spending, Mining Company Survey, Weighted Data, by Major Spending Categories, 2014

	Total	Yukon Businesses	% Yukon
Accounting/bookkeeping	2,384,000	380,000	15.9%
Legal services	1,630,000	107,000	6.6%
Office space costs (e.g. rent, utilities, etc.)	2,339,000	285,000	12.2%
Consultants (not employees)	3,109,000	232,000	7.5%
Expediting/shipping	8,297,000	783,000	9.4%
Office equipment & furniture	593,000	21,000	3.5%
General office/business expenses	3,364,000	516,000	15.3%
Office supplies	263,000	51,000	19.2%
Office Admin Other	1,139,000	23,000	2.0%
Total Office & Administration Spending	\$23,118,000	\$2,398,000	10.4%

The survey found that office and administration spending by Yukon quartz miners and exploration companies was \$23.1 million in 2014 and almost 90% of that was spent outside the Yukon. This is not surprising given that most mining companies are based elsewhere.

5.1.2 Ratings

Respondents were asked to rate the services or products offered in the Yukon for the four expenditure groupings along four “dimensions” on a scale of one to five:

- Competitive pricing
- Prompt and timely service
- Selection and availability
- Quality

We computed average ratings for each of these, as well as for each of the four major expenditure groups and each of the four dimensions. Note that only between 9 and 13 respondents, depending on the “dimension” and expenditure group, answered the questions out of the 25 survey respondents.

The overall total rating for all expenditure groups and dimensions was right in the middle at 3.0. The dimension where Yukon suppliers fared worst was, not surprisingly, Competitive pricing,

followed by Selection and availability. These two ratings probably reflect the small size of the Yukon's market.

The quality of Yukon services and products has the highest overall score at 3.5, with no respondent rating the quality of any major expenditure group as "Poor" and the quality related to Travel and marketing expenditures being rated as quite high at 4.2.

Table 13 Ratings of Expenditure Groups along Four Dimensions, Number of Responses and Average Rating

Rating	1 – Poor	2	3	4	5 – Excellent	N/R	Total	Avg. rating
Exploration/Extraction								
Competitive pricing rating	2	2	5	5	2	9	25	2.9
Prompt and timely service rating	0	3	3	6	4	9	25	3.3
Selection and availability rating	1	4	6	3	1	10	25	2.3
Quality rating	0	2	5	6	2	10	25	3.3
Total Exploration/Extraction rating	3	11	19	20	9	38	100	2.8
Equipment								
Competitive pricing rating	3	3	4	5	1	9	25	2.4
Prompt and timely service rating	1	5	3	5	2	9	25	2.3
Selection and availability rating	2	1	8	3	1	10	25	2.9
Quality rating	0	2	6	5	2	10	25	3.2
Total Equipment rating	6	11	21	18	6	38	100	2.6
Travel and Marketing								
Competitive pricing rating	1	1	5	3	3	12	25	3.4
Prompt and timely service rating	0	0	5	6	2	12	25	3.9
Selection and availability rating	0	1	6	3	3	12	25	3.5
Quality rating	0	0	3	7	3	12	25	4.2
Total Travel & Marketing rating	1	2	19	19	11	48	100	3.6
Office & Administration								
Competitive pricing rating	1	1	5	5	0	13	25	3.1
Prompt and timely service rating	0	1	6	4	1	13	25	3.3
Selection and availability rating	0	1	5	6	0	13	25	3.3
Quality rating	0	0	6	5	1	13	25	3.8
Total Office & Administration rating	1	3	22	20	2	52	100	3.3
Overall								
Competitive pricing rating	7	7	19	18	6	43	100	2.8
Prompt and timely service rating	1	9	17	21	9	43	100	3.1
Selection and availability rating	3	7	25	15	5	45	100	2.9
Quality rating	0	4	20	23	8	45	100	3.5
Total Overall rating	11	27	81	77	28	176	400	3.0

5.2 Placer Mining

The five placer mines in the sample spent \$431,847 of which \$400,170 went to Yukon businesses. The largest expenditure was for drilling, at \$308,439, all of it going to Yukon businesses. However, these figures cannot be considered to be representative of the industry. An absolute minimum sample size of about 20 would be required, assuming a $\pm 15\%$ 90% confidence interval.

5.3 Closure and Reclamation Phase

In the Yukon the closure and reclamation phase of the mining cycle is dominated by the work being done at the Faro mine site. This work is being funded by the federal government but managed by the Yukon government. The Yukon government is also responsible for managing the work being done on the Clinton Creek and Mount Nansen properties. These three properties are defined by government as abandoned. In April of 2015 the Ketz River property was abandoned by Veris Gold, adding it to the list.

There are also other Yukon mine sites that are in the closure and reclamation phase of mining — part or all of the Keno Hill, Brewery Creek and Minto sites — but these are not considered as abandoned by their corporate owners and remain corporate responsibilities.

The Yukon government's contract registry provides data on contracts that have been awarded to do work at each of the abandoned mine sites. We have searched the contract registry for contracts associated with each site from 2009/10 through 2015/16 (7 fiscal years). The contracts have been sorted into the North American Industry Classification System (NAICS) industry groupings used by the Yukon Bureau of Statistics in its 2013 business survey analysis of revenue and GDP attributable to mining. Note that the Waste management and remediation services classification is not used in the 2013 business survey analysis but we use it here to capture the contracts labelled as care and maintenance.

We have then also determined to the best of our ability which contracts went to Yukon companies versus which went to companies outside the Yukon. Note that this does not necessarily mean that all of the revenues from a particular contract will flow outside the Yukon. Outside businesses may in turn hire local firms as subcontractors but this will not show up on the contract registry. It is also important to note that if a firm had or has an ongoing presence in the Yukon (i.e. an office in Whitehorse) it is considered a Yukon business for this analysis. This has large effects on the Professional, scientific and technical services: Yukon classification. For example, CH2M Hill is considered a Yukon company by this definition through its office in Whitehorse and its contracts to plan the closure of the Faro mine lead to very large numbers presented in Table 16.

Table 14: Clinton Creek Contracts Awarded by NAICS Industry Classification, 2009/10 through 2015/16

	Transportation and warehousing	Construction	Professional, scientific and technical services	Total
Value				
Yukon	\$29,830	\$1,122,349	\$417,422	
Outside	\$0	\$516,606	\$321,989	
Total	\$29,830	\$1,638,955	\$739,411	\$2,408,196
Percent of industry spending				
Yukon	100.0%	68.5%	56.5%	
Outside	0.0%	31.5%	43.5%	
Total	100.0%	100.0%	100.0%	
Percent of total spending				
Yukon	1.2%	46.6%	17.3%	
Outside	0.0%	21.5%	13.4%	
Total	1.2%	68.1%	30.7%	100.0%

Source: Yukon Contract Registry: www.hpw.gov.yk.ca/registry. Accessed 2015/11/12

Table 15: Mount Nansen Contracts Awarded by NAICS Industry Classification, 2009/10 through 2015/16

	Construction	Professional, scientific and technical services	Waste management and remediation services	Total
Value				
Yukon	\$201,624	\$1,791,145	\$0	
Outside	\$75,000	\$1,099,234	\$782,600	
Total	\$276,624	\$2,890,379	\$782,600	\$3,949,603
Percent of industry spending				
Yukon	72.9%	62.0%	0.0%	
Outside	27.1%	38.0%	100.0%	
Total	100.0%	100.0%	100.0%	
Percent of total spending				
Yukon	5.1%	45.4%	0.0%	
Outside	1.9%	27.8%	19.8%	
Total	7.0%	73.2%	19.8%	100.0%

Source: Yukon Contract Registry: www.hpw.gov.yk.ca/registry. Accessed 2015/11/12

Table 16: Faro Mine Contracts Awarded by NAICS Industry Classification, 2009/10 through 2015/16

	Transportation and warehousing	Construction	Professional, scientific and technical services	Waste management and remediation services	Total
Value					
Yukon	\$43,762	\$1,065,238	\$83,474,950	\$0	
Outside	\$0	\$16,230	\$3,696,883	\$54,623,713	
Total	\$43,762	\$1,081,468	\$87,171,833	\$54,623,713	\$142,920,776
Per cent of industry spending					
Yukon	100.0%	98.5%	95.8%	0.0%	
Outside	0.0%	1.5%	4.2%	100.0%	
Total	100.0%	100.0%	100.0%	100.0%	
Per cent of total spending					
Yukon	0.03%	0.75%	58.41%	0.00%	
Outside	0.00%	0.01%	2.59%	38.22%	
Total	0.03%	0.76%	60.99%	38.22%	100.0%

Source: Yukon Contract Registry: www.hpw.gov.yk.ca/registry. Accessed 2015/11/12

Table 17: Ketz River Mine Contracts Awarded by NAICS Industry Classification, 2014/15 through 2015/16

	Professional, scientific and technical services	Total
Value		
Yukon	\$2,790,000	
Outside	\$31,375	
Total	\$2,821,375	\$2,821,375
Per cent of industry and total spending		
Yukon	98.9%	
Outside	1.1%	
Total	100.0%	

Source: Yukon Contract Registry: www.hpw.gov.yk.ca/registry. Accessed 2015/11/12

Note that although the Ketz River Mine was formally abandoned in the spring of 2015, the Yukon government awarded contracts for geotechnical assessment and site infrastructure improvement in the fall of 2014.

Since 2009 the Yukon government has awarded \$152 million in contracts to advance the closure and reclamation of the four abandoned sites. Of that total, approximately \$91 million or 60% has been awarded to companies that have at least a minimal ongoing presence in the Yukon.

Of that \$152 million since 2009, approximately \$55.4 million or 36% has been for care and maintenance contracts, \$93.6 million or 62% for professional and technical services and only \$3.0 million or 2% for construction contracts distinct from the care and maintenance work.

Looking ahead, it appears highly likely that there will be a shift away from the heavy spending on professional and technical services and towards construction as the final closure plan for Faro in particular is implemented.

5.4 Vendors to the Mining Industry

As previously noted we have also approached the Yukon mining supply chain from the vendor side through a comparison between the work done by the Yukon Bureau of Statistics in its 2013 Business Survey on revenue and GDP attributable to mining with the results of an email based/online survey of Yukon businesses that we conducted.

5.4.1 2013 Business Survey

As part of its 2013 Business Survey Report¹² the Yukon Bureau of Statistics (YBS) attempted to estimate business revenue and GDP attributable to mining (along with tourism and construction). Yukon businesses, grouped by NAICS classification, were asked to estimate how much of their gross revenues were from the mining industry in the Yukon in 2012. YBS then took these responses and calculated the share of Yukon's GDP that could be attributed to mining through each classification of vendor to the industry.

Table 18 below shows the results of the 2013 Business Survey for 2012 with the following notes:

- Wholesale Trade and Retail Trade figures are derived from Statistics Canada's estimates.
- "All Other Industries" includes Agriculture, Forestry, Fishing and Hunting; Utilities; Information & Cultural Industries; Finance and Insurance; Real Estate, Rental and Leasing (w/o owner occupied housing); Management of Companies and Enterprises; Admin and Support, Waste Management and Remediation Services; Educational Services; Health Care and Social Assistance; Arts, Entertainment and Recreation; and Other Services.

¹² Yukon Bureau of Statistics. Yukon Business Survey 2013. Available at: http://www.eco.gov.yk.ca/stats/pdf/2013_Business_Survey_Report_RR.pdf

Table 18: Gross Revenues and GDP Attributed to Mining, Yukon, 2012

	Gross revenues attributed to mining (millions)	GDP attributed to mining (millions)
Mining, quarrying, and oil and gas extraction	\$481.9	\$362.8
Wholesale trade	\$73.1	\$19.7
Retail trade	\$51.4	\$9.4
Transportation and warehousing	\$51.1	\$26.2
Construction	\$28.9	\$12.3
Professional, scientific and technical services	\$25.0	\$16.7
Manufacturing	\$19.4	\$9.4
Accommodation and food services	\$11.3	\$5.8
All other industries	\$24.0	\$32.7
TOTAL	\$766.1	\$495.0

Source: Yukon Bureau of Statistics. Yukon Business Survey 2013.

The Yukon Bureau of Statistics offers the following summary of its results:

- Mining, Quarrying, and Oil and Gas Extraction businesses reported \$497.1 million in revenues, accounting for nearly 20% of all Yukon's business gross revenue in 2012.
- Attribution of gross revenue to mining by all Yukon businesses including Mining and oil and gas extraction businesses totalled \$766.1 million in 2012.
- The industry with the highest revenue attributed to mining, besides the Mining, Quarrying, and Oil and Gas Extraction industry itself (\$481.9 million), was Wholesale Trade. The total gross revenue of Wholesale Trade in 2012 totalled \$151.4 million, of which \$73.1 million, or 48.3%, was attributed to mining.
- Based on mining-related revenues reported by all Yukon businesses, the total GDP attributable to mining was \$495.0 million in 2012. The industry with the largest contribution to mining GDP, besides the Mining, Quarrying, and Oil and Gas Extraction industry itself (\$362.8 million), was Transportation and Warehousing at \$26.2 million.
- Mining GDP accounted for 18.8% of Statistics Canada's estimates of Yukon's total GDP in 2012 (expenditure-based, current dollar GDP).

It is critical to note that the Yukon Business Survey asked firms about their 2012 revenues. Although 2011 is now seen to be the peak year in the last upswing of mining in the Yukon, 2012 still had higher levels of mineral production, employment and exploration spending than 2014.

5.4.2 Vendor Survey

The vendor survey did not yield useful numbers because of the low response rate. Only 42 of the 369 businesses contacted responded. The number who provided total sales numbers was even lower at 33 as was presented on Table 7 on page 15 above.

Nevertheless the data on sales are presented here in Table 19. Interestingly, even though only three firms in Accommodation and food services responded, the total sales to the mining industry, at more than \$16.4 million was higher than the \$11.3 reported by the YBS in the 2012 Yukon

Business survey when the mining industry was more active. This underlines the potential unreliability of the data.

Table 19 Vendor Survey Respondents Total Sales and Sales to Mining Industry, n=33

Industry	Total Sales	Sales to Mining Industry	% of sales to mining industry
Accommodation and food services	\$65,450,000	\$16,372,500	25%
Support activities for mining	\$30,387,135	\$5,097,135	17%
Professional, scientific and technical services	\$8,048,000	\$1,544,500	19%
Wholesale trade	\$4,928,220	\$1,184,233	24%
Transportation and warehousing	\$2,950,000	\$1,182,500	40%
Construction	\$9,300,000	\$910,000	10%
Retail trade	\$1,400,000	\$185,000	13%
All other industries	\$100,000	\$2,000	2%
Manufacturing (n=0)	n/a	n/a	
Grand Total	\$122,563,355	\$26,477,868	22%

These figures could be extrapolated to the entire population of 369 businesses. Assuming there was no response bias confidence intervals could be computed. However, given the large variance, especially in the sales to the mining industry, the lower bound of the confidence intervals at 90% and 95% probability were below zero, so we used approximately one standard deviation or about 67% probability for our confidence bounds.

Table 20 Confidence Intervals for Vendor Survey Total and Mining Industry Sales Estimates, n=33, d.f.=32

Statistic	Total Sales	Sales to Mining Industry
Average	\$3,714,041	\$802,360
Sum	\$122,563,355	\$26,477,868
Standard Deviation	\$11,930,137	\$2,864,589
Standard Error of Average Sales	\$2,076,770	\$498,661
Skewness	4.741	5.251
Population Estimate	\$1,370,481,151	\$296,070,706
67% confidence intervals for average	±\$2,076,769	±\$498,661
Lower bound of confidence interval of average	\$1,637,272	\$303,699
Upper bound of confidence interval of average	\$5,790,810	\$1,301,020
Lower bound of confidence interval of population total sales	\$604,153,404	\$112,064,960
Upper bound of confidence interval of population total sales	\$2,136,808,899	\$480,076,452

So the ranges are very broad, which is not surprising given the small sample size. Total sales could range from \$600 million to \$2.1 billion and sales to the mining industry from \$112 million to \$480 million.

6 Conclusions

As noted in the introduction, the terms of reference also outline the following key research questions:

1. What are the key activities along the mining supply chain for which products and services are required?
2. To what extent do companies at all stages of the mining lifecycle use local firms to procure products and services? At what rate is this done? How much is spent?
3. To what extent are local firms positioned to provide services to the industry? Are there gaps?

We address each of these questions in Sections 6.1, 6.2, and 6.3 below.

6.1 Key Activities: Mining Supply Chain

There are a number of ways of determining and listing the key activities along the mining supply chain for which products and services are required. For example, the *Uranium Mining Supply Chain Requirement Guide* discussed in Section 2.3.1 has many pages of tables listing in considerable detail products and services required by theoretical “model” uranium mines (both open pit and underground) from exploration through final closure.

But instead of relying on a model operation we are choosing to present key products and services as reported by the Yukon industry itself in our survey and through the data provided by the input-output model (see Section 3). Table 21 summarizes the goods and services purchased by the Yukon mining industry — both in the Yukon and Outside — in 2014 as determined by our survey.

Table 21: Goods and Services Purchased by the Yukon Mining Industry, Ranked by Total Spending, 2014

Goods and/or services purchased	Total spending
Drilling Services	\$48,753,000
Other Direct Exploration spending	\$37,727,000
Vehicle and equipment maintenance/repairs & fuel	\$20,745,000
Heavy equipment services	\$11,662,000
Expediting/shipping	\$8,297,000
Environment Services	\$6,857,000
Groceries and Accommodations for field work	\$6,843,000
Air Services (helicopter)	\$6,519,000
Air Services (fixed wing)	\$5,622,000
Geological Services	\$5,067,000
Purchase of camp gear (sat phone, dishes, gen sets)	\$3,824,000
Assaying and Analytical	\$3,725,000

Goods and/or services purchased	Total spending
General office/business expenses	\$3,364,000
Consultants (not employees)	\$3,109,000
Rental or lease of vehicles	\$2,488,000
Airfares	\$2,409,000
Accounting/bookkeeping	\$2,384,000
Office space expenses (e.g. rent, utilities, etc.)	\$2,339,000
Geochemical Services	\$1,920,000
Legal services	\$1,630,000
Marketing (including advertising & social media)	\$1,380,000
Accommodation, meals and entertainment	\$1,272,000
Office Admin Other	\$1,139,000
Rental of camp gear (sat phone, dishes, gen sets)	\$1,106,000
Engineering Services	\$1,084,000
Geophysical Services	\$914,000
Trade Shows /Conferences (excluding travel)	\$708,000
Office equipment & furniture	\$593,000
Charitable work (event sponsorships & donations)	\$543,000
Office supplies	\$263,000

Table 22 summarizes the top 15 goods and services purchased by the Yukon mining, quarrying, and oil and gas extraction industry and their average value for the years 2009 through 2011 as reported in Statistics Canada's input-output data.

Table 22: Value of the Top 15 Goods and Services Purchased by the Mining, Quarrying, and Oil and Gas Extraction Industry, Yukon, 2009 through 2011 Average

Goods and/or services	Value
Fictive services ¹	\$13.5 m
Professional services (except software and research and development)	\$12.0 m
Refined petroleum products (except petrochemicals)	\$11.8 m
Fictive materials ²	\$10.1 m
Other finance and insurance	\$8.5 m
Real estate, rental and leasing and rights to non-financial intangible assets	\$3.5 m
Wholesale margins and commissions	\$2.8 m
Depository credit intermediation	\$2.4 m
Industrial machinery	\$2.3 m

Goods and/or services	Value
Computer and electronic products	\$2.2 m
Primary metallic products	\$2.1 m
Transportation margins	\$1.4 m
Mineral fuels	\$1.1 m
Transportation and related services	\$0.6 m
Administrative and support, head office, waste management and remediation services	\$0.6 m

Source: Calculated from: Statistics Canada. CANSIM Table 381-0022 - Input-output tables, inputs and outputs, detailed level, basic prices, annual (dollars) and CANSIM Table 381-0028 - Provincial input-output tables, inputs and outputs, summary level, basic prices, annual (dollars). (Accessed: 2015-11-05)

Notes: ¹ Fictive services include: advertising, promotion, meals, entertainment, travel, meetings and conventions. In the Yukon mining context meals would include the purchase of food for camps and travel would include the costs of flying in employees for their shifts in camp.

² All operating supplies and office supplies fall into this category and in the mining context important supplies include explosives and all chemicals — collectors, frothers and modifiers — and other materials needed for mill operations.

6.2 Local Firms: Mining Supply Chain

Table 23 shows how much is purchased from Yukon vs. Outside businesses ranked by the percentage bought from Yukon businesses. Most of Air services, camp gear rental, vehicle and equipment rental is provided by Yukon firms while about half of direct exploration, groceries and accommodation, assaying and airfares are provided from the Yukon. About one third of geochemical and geophysical services, and camp gear purchasing are from Yukon firms.

However, the survey shows that less than one quarter of professional and technical services (geological, environmental, legal, accounting, engineering and other consultants), other than geochemical and geophysical services, are obtained from the Yukon. This is perhaps the most noteworthy result of this survey.

The survey responses showed that 9.4% of total shipping and expediting were obtained from Yukon businesses. However, exclusive of shipping concentrate out of the Yukon, the percentage of expediting and shipping services purchased from Yukon businesses amounted to more than 81%.

Table 23 Value of Services Provided by Yukon and Outside Businesses Ranked by Percentage Purchased from Yukon Businesses

	Yukon businesses	Outside businesses	% Yukon
Air Services (fixed wing)	5,622,000	-	100.0%
Rental of camp gear (sat phone, dishes, gen sets)	949,000	157,000	85.8%
Charitable work (event sponsorships & donations)	424,000	119,000	78.1%
Vehicle and equipment maintenance/repairs & fuel	15,291,000	5,454,000	73.7%
Air Services (helicopter)	4,010,000	2,509,000	61.5%
Other Direct Exploration	20,928,000	16,799,000	55.5%
Groceries and Accommodations for field work	3,395,000	3,448,000	49.6%
Marketing (including advertising & social media)	678,000	702,000	49.1%
Assaying and Analytical	1,817,000	1,908,000	48.8%
Airfares	1,102,000	1,307,000	45.7%
Purchase of camp gear (sat phone, dishes, gen sets)	1,626,000	2,198,000	42.5%
Geochemical Services	753,000	1,167,000	39.2%
Geophysical Services	330,000	584,000	36.1%
Drilling Services	12,286,000	36,467,000	25.2%
Accommodation, meals and entertainment	293,000	979,000	23.0%
Geological Services	1,059,000	4,008,000	20.9%
Rental or lease of vehicles	484,000	2,004,000	19.4%
Office supplies	51,000	212,000	19.2%
Trade Shows /Conferences (excluding travel)	130,000	578,000	18.4%
Environment Services	1,096,000	5,761,000	16.0%
Accounting/bookkeeping	380,000	2,004,000	15.9%
General office/business expenses	516,000	2,848,000	15.3%
Office space expenses (e.g. rent, utilities, etc.)	285,000	2,054,000	12.2%
Heavy equipment services	1,313,000	10,349,000	11.3%
Expediting/shipping	783,000	7,514,000	9.4%
Consultants (not employees)	232,000	2,877,000	7.5%
Legal services	107,000	1,523,000	6.6%
Office equipment & furniture	21,000	572,000	3.5%
Engineering Services	28,000	1,056,000	2.6%
Office Admin Other	23,000	1,116,000	2.0%

6.3 Gap Analysis: Mining Supply Chain

Section 6.2 presents how much of the supply chain is provided by Yukon firms. It is not known whether some of the low percentages are due to lack of availability in the Yukon or a preference to use outside firms. As one respondent stated: “When a reliable contractor based outside Yukon has been retained, we tend to continue to retain them rather than hire locally.”

The major players were also asked whether there were any goods they would have preferred to purchase in the Yukon but were not available. The eight respondents answered with the following items (number of times respondents mentioned in brackets):

- Drilling services [3];
- Bobcat drill and steel [2];
- Freight;
- Geophysical services, geophysical rentals;
- Mill Equipment and parts;
- Reagents;
- Pump (Industrial) parts and liners;
- Helicopter services;
- Self-contained/ self-rescue devices;
- Geological supplies.

This is a very limited list. Of the items mentioned in the list above, Table 23 shows that about 25% of drilling services and 62% of rotary wing aircraft services were provided by Yukon businesses. So there might be room for expansion in the mining market for firms providing those two services.

No firm mentioned a gap in any of the professional and technical services, very little of which were purchased in the Yukon, except for the two which had the highest level of purchases from Yukon businesses: Geochemical Services and Geophysical Services.

Appendix A: Input-Output Data

Table 24 contains the full input-output data from Statistics Canada used to create the summary data presented in Section 3.

Table 24: Percentage and Rank of Commodities Purchased by the Mining, Quarrying, and Oil and Gas Extraction Industry, Yukon, and Selected Metal Mining Industries, Canada, 2009 through 2011 Average

	Percent		Rank	
	Yukon	Canada	Yukon	Canada
Grains and other crop products	0.00%	0.05%	27	28
Live animals	0.00%	0.00%	27	32
Other farm products	0.00%	0.00%	27	32
Forestry products and services	0.00%	0.00%	27	32
Fish and seafood, live, fresh, chilled or frozen	0.00%	0.00%	27	32
Support services related to farming and forestry	0.00%	0.00%	27	32
Mineral fuels	1.42%	0.79%	13	20
Metal ores and concentrates	0.00%	0.00%	27	32
Non-metallic minerals	0.04%	1.17%	26	18
Mineral support services	0.47%	3.55%	18	11
Mineral and oil and gas exploration	0.00%	0.00%	27	32
Utilities	0.26%	5.29%	20	6
Residential construction	0.00%	0.00%	27	32
Non-residential buildings	0.00%	0.00%	27	32
Engineering construction	0.00%	0.00%	27	32
Repair construction services	0.00%	1.35%	27	17
Food and non-alcoholic beverages	0.00%	0.00%	27	32
Alcoholic beverages and tobacco products	0.00%	0.00%	27	32
Textile products, clothing, and products of leather and similar materials	0.00%	0.00%	27	32
Wood products	0.00%	0.02%	27	29
Wood pulp, paper and paper products and paper stock	0.00%	0.00%	27	32
Printed products and services	0.00%	0.00%	27	32
Refined petroleum products (except petrochemicals)	15.22%	8.44%	3	4
Chemical products	0.65%	2.01%	17	15
Plastic and rubber products	0.00%	0.33%	27	26
Non-metallic mineral products	0.69%	0.76%	16	21
Primary metallic products	2.76%	4.20%	11	8
Fabricated metallic products	0.09%	0.41%	23	24
Industrial machinery	2.97%	1.91%	9	16
Computer and electronic products	2.80%	4.97%	10	7
Electrical equipment, appliances and components	0.09%	0.02%	23	29
Transportation equipment	0.00%	0.00%	27	32

	Percent		Rank	
	Yukon	Canada	Yukon	Canada
Motor vehicle parts	0.00%	0.62%	27	22
Furniture and related products	0.00%	0.00%	27	32
Other manufactured products and custom work	0.00%	0.49%	27	23
Wholesale margins and commissions	3.58%	3.65%	7	10
Retail margins, sales of used goods and commissions	0.00%	0.00%	27	32
Transportation and related services	0.78%	2.03%	14	14
Information and cultural services	0.13%	0.00%	21	32
Published and recorded media products	0.00%	0.00%	27	32
Telecommunications	0.13%	0.40%	21	25
Depository credit intermediation	3.15%	0.18%	8	27
Other finance and insurance	11.03%	8.66%	5	3
Real estate, rental and leasing and rights to non-financial intangible assets	4.53%	4.16%	6	9
Imputed rental of owner-occupied dwellings	0.00%	0.00%	27	32
Professional services (except software and research and development)	15.56%	20.86%	2	1
Software	0.00%	0.00%	27	32
Research and development	0.00%	0.00%	27	32
Administrative and support, head office, waste management and remediation services	0.78%	9.73%	14	2
Education services	0.00%	0.00%	27	32
Health and social assistance services	0.00%	0.02%	27	29
Arts, entertainment and recreation services	0.00%	0.00%	27	32
Accommodation and food services	0.00%	0.00%	27	32
Other services	0.43%	3.04%	19	13
Sales of other services by Non-Profit Institutions Serving Households	0.00%	0.00%	27	32
Sales of other government services	0.09%	0.00%	23	32
Fictive materials	13.10%	3.34%	4	12
Fictive services	17.46%	6.49%	1	5
Transportation margins	1.81%	1.08%	12	19
Services provided by Non-Profit Institutions Serving Households	0.00%	0.00%	27	32
Education services provided by government sector	0.00%	0.00%	27	32
Health services provided by government sector	0.00%	0.00%	27	32
Other federal government services	0.00%	0.00%	27	32
Other provincial and territorial government services	0.00%	0.00%	27	32
Other municipal government services	0.00%	0.00%	27	32
Other aboriginal government services	0.00%	0.00%	27	32

Source: Calculated from: Statistics Canada. CANSIM Table 381-0022 - Input-output tables, inputs and outputs, detailed level, basic prices, annual (dollars) and CANSIM Table 381-0028 - Provincial input-output tables, inputs and outputs, summary level, basic prices, annual (dollars). (Accessed: 2015-11-05)

Appendix B – Survey instruments

Mining company email/web survey

Yukon Mining company survey – Yukon spending

Thank for taking our survey. You can enter to win a \$300 Staples gift card at the end of the survey.

Click start to continue

1. Which of the following best describes your business:
 - Has title to or an option agreement on at least one Yukon quartz claim that is currently in good standing as of August 1st, 2015. (GO TO QUARTZ SURVEY)
 - Has a lease or claim holder title, or is an operator of, at least one Yukon placer claim in good standing as of August 1st, 2015. (GO TO PLACER SURVEY)
 - Both of those apply to this business (GO TO Q1B)
 - Neither of those apply to this business (THANK AND TERMINATE)
- 1b. (IF BOTH IS SELECTED) Which one of those types of businesses is the largest one?
 - “Quartz” claim mining/ exploration (GO TO QUARTZ SURVEY)
 - Placer mining/ exploration (GO TO PLACER SURVEY)
2. In your last complete fiscal year, has this business purchased any goods, or hired any professional services to advance your claims? (This includes any products or services, but does NOT include your owners own time or any payroll for employees)
 - Yes
 - No → (GO TO DEMOGRAPHIC QUESTIONS)

The following sections list spending in 4 categories: Exploration/Extraction, Equipment, Travel and Supplies, Office Administration and Miscellaneous. Any items not covered in these lists can be added in at the end of the Miscellaneous section.

3. Now think of those expenses related to **Exploration or Extraction**. For each category please enter the total amount spent in your last complete fiscal year, and the percentage of that which was spent at Yukon businesses. (please enter 0 if none. Enter your best estimate to the nearest whole number, no ranges)

Exploration/Extraction Services	Total \$\$\$ spent in this category (last fiscal year)	% of this category paid to Yukon businesses
Drilling Services		
Geophysical Services		
Direct exploration expenses		
Groceries and Accommodations for field work		
Geochemical Services (Quartz only)		
Assaying and analytical Services (Quartz only)		

4. Now think of those expenses related to **Equipment**. For each category please enter the total amount spent in your last complete fiscal year, and the percentage of that which was spent at Yukon businesses. (please enter 0 if none. Enter your best estimate to the nearest whole number, no ranges)

Equipment	Total \$\$\$ spent in this category (last fiscal year)	% of this category paid to Yukon businesses
Rental of camp gear (sat phone dishes, gen sets)		
Purchase of camp gear (sat phone dishes, gen sets)		
Vehicle and equipment maintenance/repairs and fuel		
Rental or lease of vehicles		
Heavy equipment services (Q)		
Heavy equipment services or purchase (P)		
Air Services (helicopter) (Q)		
Air Services (fixed wing) (Q)		

5. Now think of those expenses related to **Travel and Marketing**. For each category please enter the total amount spent in your last complete fiscal year, and the percentage of that which was spent at Yukon businesses. (please enter 0 if none. Enter your best estimate to the nearest whole number, no ranges)

Travel and Supplies	Total \$\$\$ spent in this category (last fiscal year)	% of this category paid to Yukon businesses
Accommodations, meals and entertainment		
Airfares		
Marketing – including advertising, and social media		
Charitable work– including event sponsorships, and donations.		
Trade Show booths/Conferences (excluding travel expenses)		

6. Now think of those expenses related to **Office Administration**. For each category please enter the total amount spent in your last complete fiscal year, and the percentage of that which was spent at Yukon businesses. (please enter 0 if none. Enter your best estimate to the nearest whole number, no ranges)

Office Administration	Total \$\$\$ spent in this category (last fiscal year)	% of this category paid to Yukon businesses
Accounting/bookkeeping		
Legal services		
Office space expenses such as rent, utilities, etc.		
Consultants (not employees) such as website development, proposal writers, etc.		
Expediting/shipping		
Office equipment (computers, printers, furniture, etc)		
General office/business expenses		
Office supplies		

7. Please list any Other Categories where you spent over \$100 that is not included in the previous categories

Other	Total \$\$\$ spent in this category (last fiscal year)	% of this category paid to Yukon businesses

8. Were there any goods or services that you would have preferred to buy in the Yukon, but were not available to purchase or not available at a competitive price?

- Yes → which ones? (Text box)
 - If those were available, what percentage of your non-Yukon spending listed above could have been spent in the Yukon?
 - What could be done to make those goods or services something you would purchase in the Yukon? (Text box)
- No

9. Please rate YUKON suppliers in each of the following areas on their delivery of products and services, using a scale from 1 to 5 where 1 = Poor and 5 = Excellent

	Exploration/Extraction Services	Equipment	Travel and Marketing	Office Administration Supplies and Services
Competitive pricing				
Prompt and timely service				
Selection and availability				
Quality				

DEMOGRAPHIC QUESTIONS

10. Which category best describes your mining operation?

- It is my primary source of income
- It is a supplemental income

11. Which of the following associations are you currently a member of?

- YCM
- Yukon Prospector’s Association (YPA)
- KPMA
- Other → list _____

Would you like to enter the contest for a \$300 Staples gift card?

- Yes → name, email, phone
- No

Major player individual survey

Survey of Impact of Mining: Yukon's Mining Supply Chain

This is a survey of Yukon-based producing mining companies, junior mining companies engaged in exploration and development of mineral deposits and prospects, and service providers to Yukon's mining and exploration industries. The broad objective of this study is: "...to better understand the economic impact of the mining industry within Yukon, as it relates to the local business community."

The purpose of the survey is to determine the total amount of money spent by Yukon-based companies on various aspects of exploration, development and mining operations, and the portion of these expenditures spent within Yukon. In summary, this is a survey of the dollar amount spent on Yukon's mining supply chain.

The study has been commissioned by the Department of Economic Development, Government of Yukon, **and is supported by the Yukon Chamber of Mines**. The project team consists of:

- Luigi Zanasi, M.A. of Luigi Zanasi Economist: Project Manager
- Malcolm Taggart, M.A. of Research Northwest
- Donna and Mike Larsen of DataPath Systems
- Carl Schulze of All-Terrane Mineral Exploration Services

The survey focuses on two major segments of Yukon's mineral industry: 1. Major participants, and; 2. Smaller exploration companies and service providers. This portion of the survey, conducted by Carl Schulze, focuses on mining companies in production, companies conducting advanced exploration and/or development of a deposit, and major consulting/mineral contracting firms that are based in or have significant activities within Yukon. The survey will consist of in-person or direct telephone interviews, supplemented with written submissions if preferred.

The major categories are: Exploration and/or Extraction, Equipment Acquisition, Travel and Marketing, Office Administration, and Other Applicable Categories. The survey excludes questions related to personnel. **All individual responses will be kept confidential, with no particular company referenced.**

We thank you in advance for agreeing to participate in this survey. The results of this survey will provide a more accurate picture of the contributions of Yukon mining and exploration activities on Yukon's economy.

Question 1: What is the main focus of your business:

- Producing hard rock mine**
- Producing placer mine**
- Advanced hard rock exploration or development**
- Advanced placer exploration**
- Consulting or contractual exploration firm**
- Other**

2: Exploration or Extraction. For each category please enter the total amount spent in your last complete fiscal year, and the percentage of that which was spent at Yukon businesses. (Please enter "0" if none. Enter your best estimate to the nearest whole number, rather than ranges)

Exploration/Extraction Services	Total amount spent in this category (last fiscal year)	Percentage paid to Yukon businesses
Drilling Services		
Geophysical Services		
Geochemical Services		
Professional Geological Services		
Assaying and Analytical Services		
Groceries, Accommodations for Field work		
Other direct exploration expenses		

3. Equipment. For each category please enter the total amount spent in your last complete fiscal year, and the percentage of that which was spent at Yukon businesses.

Equipment	Total amount spent in this category (last fiscal year)	Percentage paid to Yukon businesses
Rental or lease of vehicles		
Heavy equipment services		
Heavy equipment purchase		
Air Services (helicopter)		
Air Services (fixed wing)		
Rental of camp gear (satellite communications, generators, etc.)		
Purchase of camp gear (satellite communications, generators, etc.)		
Vehicle and equipment maintenance/repairs and fuel		

4. Travel and Marketing. For each category please enter the total amount spent in your last complete fiscal year, and the percentage of that which was spent at Yukon businesses.

Travel and Supplies	Total amount spent in this category (last fiscal year)	Percentage paid to Yukon businesses
Accommodations, meals and entertainment		
Airfare		
Marketing – including advertising and social media		
Charitable work– including event sponsorships and donations.		
Trade Show booths/Conferences (excluding travel expenses)		

5. Office Administration. For each category please enter the total amount spent in your last complete fiscal year, and the percentage of that which was spent at Yukon businesses.

Office Administration	Total amount spent in this category (last fiscal year)	Percentage paid to Yukon businesses
Accounting/bookkeeping		
Legal services		
Office space expenses such as rent, utilities, etc.		
Consultants (not employees) such as website development, proposal writers, etc.		
Expediting/shipping		
Office equipment (computers, printers, furniture, etc.)		
General office/business expenses		
Office supplies		

6. Other Expenditures. Please list any Other Categories where you spent more than \$100.

Other	Total amount spent in this category (last fiscal year)	Percentage paid to Yukon businesses

7. Were there any goods or services that you would have preferred to buy in the Yukon, but were not available for purchase or not available at a competitive price?

Yes If so, please list these below;

Category	Percentage of non-Yukon spending that could have been spent in the Yukon

No

8. Please rate YUKON suppliers in each of the following areas on their delivery of products and services, using a scale from 1 to 5 where 1 = Poor and 5 = Excellent

Category	Exploration/ Extraction Services	Equipment	Travel and Marketing	Office Administration Supplies and Services
Competitive pricing				
Prompt and timely service				
Selection and availability				
Quality				

9. Please list any other aspects of Yukon’s supply chain that may be deficient or non-existent, and if available would encourage you to purchase goods or procure services locally.

Category	Suggested improvements

Thank you kindly for taking the time to participate in this survey. Your responses will be compiled by our team, and reported to the Department of Economic Development.

Would you like to enter the contest for a \$300 Staples gift card?

Yes If so, please complete the following:

Name: _____

Tel: _____

Email: _____

No

Vendor Survey Instrument

1. The majority of your Yukon business is in which industry group?
 - Wholesale trade; e.g. fuels, general merchandise
 - Retail trade; includes non-store retailers
 - Transportation and warehousing; e.g. air transport, trucking
 - Construction; e.g. building construction, road building and earth moving
 - Professional, scientific and technical services; e.g. geoscience, engineering, legal, accounting and other consultants
 - Manufacturing; e.g. metal fabrication, machine shops
 - Accommodation and food services; e.g. hotels, restaurants, caterers, food service contractors
 - Support activities for mining; e.g. drilling, prospecting, staking, excluding geoscience and other professionals that fall under Professional, scientific and technical services
 - All other industries
2. What were your total (gross) YUKON sales in 2014 or your last fiscal year?
3. What percentage of your total (gross) YUKON sales in that time period do you estimate came from the mining industry?
4. Do you have any comments on how business could improve sales to the mining industry?

Thank you very much for your time today. We appreciate your help!

Appendix C – Mining Industry Survey Responses

Which of the following best describes your business:	Freq.	Percent	Cum.
Quartz	16	38.1	38.1
Placer	4	9.52	47.62
Both Quartz & Placer	5	11.9	59.52
No claims	17	40.48	100
Total	42	100	

Which one of those types of businesses has the largest volume of spending?	Freq.	Percent	Cum.
Quartz	4	9.52	9.52
Placer	1	2.38	11.9
.	37	88.1	100
Total	42	100	

In your last complete fiscal year, has this business purchased any goods, or hired any professional services to advance your claims?	Freq.	Percent	Cum.
Yes	22	52.38	52.38
No	3	7.14	59.52
.	17	40.48	100
Total	42	100	

EXPLORATION SPENDING

Drilling Services	sum	N	
\$ Spent	\$43,162,740	25	
% to Yukon businesses	Freq.	Percent	Cum.
0%	1	2.38	2.38
1-49%	7	16.67	19.05
50-99%	1	2.38	21.43
100%	4	9.52	30.95
n/a	29	69.05	100
Total	42	100	

Geophysical Services	sum	N	
\$ Spent	\$783,850	25	
% to Yukon businesses	Freq.	Percent	Cum.
0%	2	4.76	4.76
1-49%	2	4.76	9.52
50-99%	2	4.76	14.29
100%	3	7.14	21.43
n/a	33	78.57	100
Total	42	100	

Direct Exploration (Other)	sum	N	
\$ Spent	\$35,742,206	25	
% to Yukon businesses	Freq.	Percent	Cum.
0%	2	4.76	4.76
1-49%	2	4.76	9.52
50-99%	5	11.9	21.43
100%	8	19.05	40.48
n/a	25	59.52	100
Total	42	100	

Groceries and Accommodations for field work -	sum	N	
\$ Spent	\$6,486,258	25	
% to Yukon businesses	Freq.	Percent	Cum.
0%	1	2.38	2.38
1-49%	1	2.38	4.76
50-99%	2	4.76	9.52
100%	13	30.95	40.48
n/a	25	59.52	100
Total	42	100	

Geochemical Services (Quartz only) -	sum	N	
\$ Spent	\$1,701,451	20	
% to Yukon businesses	Freq.	Percent	Cum.
0%	\$1	2.38	2.38
1-49%	\$1	2.38	4.76
50-99%	\$1	2.38	7.14
100%	\$2	4.76	11.9
n/a	\$37	88.1	100
Total	\$42	100	

Assaying and Analytical (Quartz only) -	sum	N	
\$ Spent	\$3,284,964	20	
% to Yukon businesses	Freq.	Percent	Cum.
0%	2	4.76	4.76
1-49%	3	7.14	11.9
50-99%	3	7.14	19.05
100%	6	14.29	33.33
n/a	28	66.67	100
Total	42	100	

Geological Services -	sum	N	
\$ Spent	\$4,529,326	25	
% to Yukon businesses	Freq.	Percent	Cum.
0%	3	7.14	7.14
1-49%	3	7.14	14.29
100%	2	4.76	19.05
n/a	34	80.95	100
Total	42	100	

Environment Services -	sum	N	
\$ Spent	\$6,050,000	25	
% to Yukon businesses	Freq.	Percent	Cum.
1-49%	2	4.76	4.76
50-99%	1	2.38	7.14
100%	1	2.38	9.52
n/a	38	90.48	100
Total	42	100	

Engineering Services -	sum	N	
\$ Spent	\$956,000	25	
% to Yukon businesses	Freq.	Percent	Cum.
0%	1	2.38	2.38
1-49%	1	2.38	4.76
n/a	40	95.24	100
Total	42	100	

Exploration Total	sum	N	
\$ Spent	\$102,696,794	25	

EQUIPMENT SPENDING

Rental of camp gear (sat phone dishes, gen sets) -	sum	N	
\$ Spent	\$978,340	25	
% to Yukon businesses	Freq.	Percent	Cum.
0%	2	4.76	4.76
50-99%	1	2.38	7.14
100%	11	26.19	33.33
n/a	28	66.67	100
Total	42	100	

Purchase of camp gear (sat phone dishes, gen sets) -	sum	N	
\$ Spent	\$3,694,462	25	
% to Yukon businesses	Freq.	Percent	Cum.
1-49%	1	2.38	2.38
50-99%	3	7.14	9.52
100%	4	9.52	19.05
n/a	34	80.95	100
Total	42	100	

Vehicle and equipment maintenance /repairs and fuel -	sum	N	
\$ Spent	\$20,006,721	25	
% to Yukon businesses	Freq.	Percent	Cum.
0%	1	2.38	2.38
1-49%	1	2.38	4.76
50-99%	3	7.14	11.9
100%	11	26.19	38.1
n/a	26	61.9	100
Total	42	100	

Rental or lease of vehicles -	sum	N	
\$ Spent	\$2,401,886	25	
% to Yukon businesses	Freq.	Percent	Cum.
0.4	1	2.38	2.38
0%	1	2.38	4.76
50-99%	2	4.76	9.52
100%	7	16.67	26.19
n/a	31	73.81	100
Total	42	100	

Heavy equipment services (Quartz Only) -	sum	N	
\$ Spent	\$11,343,697	21	
% to Yukon businesses	Freq.	Percent	Cum.
0%	1	2.38	2.38
1-49%	1	2.38	4.76
50-99%	1	2.38	7.14
100%	8	19.05	26.19
n/a	31	73.81	100
Total	42	100	

Air Services (helicopter) (Quartz Only) -	sum	N	
\$ Spent	\$5,757,396	20	
% to Yukon businesses	Freq.	Percent	Cum.
1-49%	1	2.38	2.38
100%	9	21.43	23.81
n/a	32	76.19	100
Total	42	100	

Air Services (fixed wing) (Quartz Only) -	sum	N	
\$ Spent	\$5,005,015	20	
% to Yukon businesses	Freq.	Percent	Cum.
100%	8	19.05	19.05
n/a	34	80.95	100
Total	42	100	

Heavy equipment services or purchase (Placer Only) -	sum	N	
\$ Spent	\$12,000	5	
% to Yukon businesses	Freq.	Percent	Cum.
0%	1	2.38	2.38
n/a	41	97.62	100
Total	42	100	

Equipment Total	sum	N
\$ Spent	\$49,199,517	25

TRAVEL MARKETING ACCOMMODATION SPENDING

Accommodations, meals and entertainment -	sum	N	
\$ Spent	\$1,159,788	24	
% to Yukon businesses	Freq.	Percent	Cum.
0%	4	9.52	9.52
1-49%	5	11.9	21.43
50-99%	3	7.14	28.57
100%	4	9.52	38.1
n/a	26	61.9	100
Total	42	100	

Airfare -	sum	N	
\$ Spent	\$2,238,670	25	
% to Yukon businesses	Freq.	Percent	Cum.
0%	1	2.38	2.38
1-49%	5	11.9	14.29
50-99%	6	14.29	28.57
100%	2	4.76	33.33
n/a	28	66.67	100
Total	42	100	

Marketing (including advertising , and social media) -	sum	N	
\$ Spent	\$823,838	25	
% to Yukon businesses	Freq.	Percent	Cum.
0%	2	4.76	4.76
1-49%	5	11.9	16.67
50-99%	4	9.52	26.19
n/a	31	73.81	100
Total	42	100	

Charitable work (incl. event sponsorship s, and donations) -	sum	N	
\$ Spent	\$474,068	25	
% to Yukon busines	Freq.	Percent	Cum.
1-49%	1	2.38	2.38
50-99%	3	7.14	9.52
100%	9	21.43	30.95
n/a	29	69.05	100
Total	42	100	

Trade Show booths/Conf erences (excluding travel expenses) -	sum	N	
\$ Spent	\$612,947	25	
% to Yukon busines	Freq.	Percent	Cum.
0%	3	7.14	7.14
1-49%	7	16.67	23.81
50-99%	3	7.14	30.95
100%	1	2.38	33.33
n/a	28	66.67	100
Total	42	100	

Travel marketing total	sum	N
\$ Spent	\$5,129,311	24

OFFICE ADMINISTRATION SPENDING

Accounting/ bookkeeping -	sum	N	
\$ Spent	\$1,980,052	25	
% to Yukon businesses	Freq.	Percent	Cum.
0%	9	21.43	21.43
1-49%	2	4.76	26.19
100%	4	9.52	35.71
n/a	27	64.29	100
Total	42	100	

Legal services -	sum	N	
\$ Spent	\$1,455,630	25	
% to Yukon businesses	Freq.	Percent	Cum.
0%	6	14.29	14.29
1-49%	4	9.52	23.81
50-99%	1	2.38	26.19
n/a	31	73.81	100
Total	42	100	

Office space expenses such as rent, utilities, etc. -	sum	N	
\$ Spent	\$2,056,891	25	
% to Yukon businesses	Freq.	Percent	Cum.
0%	5	11.9	11.9
1-49%	5	11.9	23.81
100%	3	7.14	30.95
n/a	29	69.05	100
Total	42	100	

Consultants (not employees) -	sum	N	
\$ Spent	\$2,871,655	25	
% to Yukon businesses	Freq.	Percent	Cum.
0%	4	9.52	9.52
1-49%	4	9.52	19.05
100%	2	4.76	23.81
n/a	32	76.19	100
Total	42	100	

Expediting/ shipping -	sum	N	
\$ Spent	\$8,038,050	25	
% to Yukon businesses	Freq.	Percent	Cum.
0%	2	4.76	4.76
1-49%	3	7.14	11.9
50-99%	3	7.14	19.05
100%	7	16.67	35.71
n/a	27	64.29	100
Total	42	100	

Office equipment (computers, printers, furniture, etc.) -	sum	N	
\$ Spent	\$566,210	25	
% to Yukon businesses	Freq.	Percent	Cum.
0%	6	14.29	14.29
1-49%	2	4.76	19.05
100%	2	4.76	23.81
n/a	32	76.19	100
Total	42	100	

General office/business expenses -	sum	N	
\$ Spent	\$3,015,564	25	
% to Yukon businesses	Freq.	Percent	Cum.
0%	5	11.9	11.9
1-49%	4	9.52	21.43
50-99%	1	2.38	23.81
100%	5	11.9	35.71
n/a	27	64.29	100
Total	42	100	

Office supplies -	sum	N	
\$ Spent	\$231,752	25	
% to Yukon businesses	Freq.	Percent	Cum.
0%	6	14.29	14.29
1-49%	4	9.52	23.81
100%	4	9.52	33.33
n/a	28	66.67	100
Total	42	100	

Office Admin Other -	sum	N	
\$ Spent	\$1,121,864	25	
% to Yukon businesses	Freq.	Percent	Cum.
0%	1	2.38	2.38
100%	1	2.38	4.76
n/a	40	95.24	100
Total	42	100	

Office and Admin Total	sum	N
\$ Spent	\$21,337,669	25

All Other Expenses -	sum	N	
\$ Spent	\$33,716,385	25	
% to Yukon businesses	Freq.	Percent	Cum.
50-99%	1	2.38	2.38
n/a	41	97.62	100
Total	42	100	

Grand Total Spending	sum	N
\$ Spent	\$212,079,676	25

Any goods or services that would have preferred to buy in the Yukon?	Freq.	Percent	Cum.
Yes	8	19.05	19.05
No	14	33.33	52.38
.	20	47.62	100
Total	42	100	

Goods & Services Not Available

Drilling, freight and geophysical services

Mill Equipment and parts, Reagents, Pump (Industrial) parts and liners

Helicopter services, drilling services

Safety "Self contained/ self rescue devices - Can't get them

geological supplies, geophysical rentals

Drilling services

bobcat drill and steel

bobcat drill and steel

If available, what % of your non-Yukon spending listed above?	Freq.	Percent	Cum.
0%	18	42.86	42.86
88.3%	1	2.38	45.24
100%	5	11.9	57.14
.	18	42.86	100
Total	42	100	

What could be done to make those goods or services something you would purchase in the Yukon

Mill Equipment: 75%, Reagents, 100%, Pump (industrial) parts and liners: 90%. Not listed what could be done.

NA

Safety "Self contained/ self rescue devices: Can't get them. Safety training for underground from outside: have to bring ..

not sure as these are specialized areas so doubt a business could do this in Yukon

When a reliable contractor based outside Yukon has been retained, we tend to continue to retain them rather than hire local..

more readily available and better price.

cheaper

Exploration /Extraction Services - Competitive pricing Rating	Freq.	Percent	Cum.
1-Poor	2	4.76	4.76
2-Fair	2	4.76	9.52
3-OK	5	11.9	21.43
4-Good	5	11.9	33.33
5-Excellent	2	4.76	38.1
.	26	61.9	100
Total	42	100	

Equipment - Competitive pricing Rating	Freq.	Percent	Cum.
1-Poor	3	7.14	7.14
2-Fair	3	7.14	14.29
3-OK	4	9.52	23.81
4-Good	5	11.9	35.71
5-Excellent	1	2.38	38.1
.	26	61.9	100
Total	42	100	

Travel and Marketing - Competitive pricing Rating	Freq.	Percent	Cum.
1-Poor	1	2.38	2.38
2-Fair	1	2.38	4.76
3-OK	5	11.9	16.67
4-Good	3	7.14	23.81
5-Excellent	3	7.14	30.95
.	29	69.05	100
Total	42	100	

Office Administration Supplies and Services - Competitive pricing Rating	Freq.	Percent	Cum.
1-Poor	1	2.38	2.38
2-Fair	1	2.38	4.76
3-OK	5	11.9	16.67
4-Good	5	11.9	28.57
.	30	71.43	100
Total	42	100	

Exploration /Extraction Services - Prompt and timely service Rating	Freq.	Percent	Cum.
2-Fair	3	7.14	7.14
3-OK	3	7.14	14.29
4-Good	6	14.29	28.57
5-Excellent	4	9.52	38.1
.	26	61.9	100
Total	42	100	

Equipment - Prompt and timely service Rating	Freq.	Percent	Cum.
1-Poor	1	2.38	2.38
2-Fair	5	11.9	14.29
3-OK	3	7.14	21.43
4-Good	5	11.9	33.33
5-Excellent	2	4.76	38.1
.	26	61.9	100
Total	42	100	

Travel and Marketing - Prompt and timely service Rating	Freq.	Percent	Cum.
3-OK	5	11.9	11.9
4-Good	6	14.29	26.19
5-Excellent	2	4.76	30.95
.	29	69.05	100
Total	42	100	

Office Administration Supplies and Services - Prompt and timely service Rating	Freq.	Percent	Cum.
2-Fair	1	2.38	2.38
3-OK	6	14.29	16.67
4-Good	4	9.52	26.19
5-Excellent	1	2.38	28.57
.	30	71.43	100
Total	42	100	

Exploration /Extraction Services - Selection and availability Rating	Freq.	Percent	Cum.
1-Poor	1	2.38	2.38
2-Fair	4	9.52	11.9
3-OK	6	14.29	26.19
4-Good	3	7.14	33.33
5-Excellent	1	2.38	35.71
.	27	64.29	100
Total	42	100	

Equipment - Selection and availability Rating	Freq.	Percent	Cum.
1-Poor	2	4.76	4.76
2-Fair	1	2.38	7.14
3-OK	8	19.05	26.19
4-Good	3	7.14	33.33
5-Excellent	1	2.38	35.71
.	27	64.29	100
Total	42	100	

Travel and Marketing - Selection and availability Rating	Freq.	Percent	Cum.
2-Fair	1	2.38	2.38
3-OK	6	14.29	16.67
4-Good	3	7.14	23.81
5-Excellent	3	7.14	30.95
.	29	69.05	100
Total	42	100	

Office Administration Supplies and Services - Selection and availability Rating	Freq.	Percent	Cum.
2-Fair	1	2.38	2.38
3-OK	5	11.9	14.29
4-Good	6	14.29	28.57
.	30	71.43	100
Total	42	100	

Exploration /Extraction Services - Quality Rating	Freq.	Percent	Cum.
2-Fair	2	4.76	4.76
3-OK	5	11.9	16.67
4-Good	6	14.29	30.95
5-Excellent	2	4.76	35.71
.	27	64.29	100
Total	42	100	

Equipment - Quality Rating	Freq.	Percent	Cum.
2-Fair	2	4.76	4.76
3-OK	6	14.29	19.05
4-Good	5	11.9	30.95
5-Excellent	2	4.76	35.71
.	27	64.29	100
Total	42	100	

Travel and Marketing - Quality Rating	Freq.	Percent	Cum.
3-OK	3	7.14	7.14
4-Good	7	16.67	23.81
5-Excellent	3	7.14	30.95
.	29	69.05	100
Total	42	100	

Office Administration Supplies and Services - Quality Rating	Freq.	Percent	Cum.
3-OK	6	14.29	14.29
4-Good	5	11.9	26.19
5-Excellent	1	2.38	28.57
.	30	71.43	100
Total	42	100	

Which category best describes your mining operation?	Freq.	Percent	Cum.
primary source of income	15	35.71	35.71
supplemental income	7	16.67	52.38
.	20	47.62	100
Total	42	100	

Yukon Chamber of Mines (YCM)	Freq.	Percent	Cum.
Yes	19	45.24	45.24
.	23	54.76	100
Total	42	100	

Yukon Prospectors Association (YPA)	Freq.	Percent	Cum.
Yes	7	16.67	16.67
.	35	83.33	100
Total	42	100	

Klondike Placer Miners Association (KPMA)	Freq.	Percent	Cum.
Yes	1	2.38	2.38
.	41	97.62	100
Total	42	100	

Other Organizations?	Freq.	Percent	Cum.
Yes	4	9.52	9.52
.	38	90.48	100
Total	42	100	

Specify Other Organization

NB. Major service provider
 Yukon Mining Alliance
 Yukon Chamber of Commerce
 AMEBC
 AMEBC, PDAC
 Atlin Placer Miners Assoc.