



Chain-of-custody in the diamond and gold jewellery supply chain – issues and options
Discussion Paper – 19 April 2010

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Input from Philip Olden on gold supply chain gratefully acknowledged. Images from iStockphoto.

Comment welcome: Please send to consultation@responsiblejewellery.com

1. Purpose

The purpose of this paper is to review issues and options relating to chain-of-custody in the diamond and gold jewellery supply chain. The paper is being developed to initiate and inform discussion among the RJC and its stakeholders.

2. Background

The RJC formally launched its certification system for responsible business practices in the gold and diamond jewellery supply chain in December 2009. Certification is based on independent, third party auditing against an internationally-applicable standard, the RJC Code of Practices.

In 2010, the RJC is investigating the feasibility of developing a standard and process for independent, third party certification of chain-of-custody systems in the jewellery supply chain.

The aim is to assist RJC Members and other stakeholders who may wish to seek voluntary certification of chain-of-custody systems as a complementary element to the RJC certification of responsible business practices.

3. Key terms and technologies

A number of terms are used when talking about transparency or standards as applied to supply chains, including:

- Chain-of-custody
- Ethical/responsible sourcing
- Traceability
- Provenance
- Product tracking
- Supply chain management
- Stewardship

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These all refer to efforts to manage the supply chain to encourage certain objectives, such as fair trade and/or sustainable development, agreed standards of production, identification of point of origin, management of product lifecycle, and/or customer-supplier due diligence.

The term used in this paper is 'chain-of-custody', which describes the ownership and control aspect of the supply chain. The issue of interest is how to assure systems for custody of material with certain characteristics, as it passes through the supply chain from production to the consumer.

Chain-of-custody – definitions

Chain-of-custody – the custodial sequence that occurs as ownership or control of the material supply is transferred from one custodian to another along the supply chain.

A 'chain-of-custody system' comprises a set of technologies, procedures and documents that are used to provide relevant information on the chain-of-custody through each step of the jewellery supply chain.

A chain-of-custody *claim* is a representation about the chain-of-custody of a product, made to purchasers of the product.

Chain-of-custody *certification* is an independent attestation that a chain-of-custody system meets a standard.

A chain-of-custody *standard* sets out minimum requirements for the design and operation of a chain-of-custody system, for the purposes of certification.

There is a range of technologies available, and in development, to support chain-of-custody systems. These usually enable physical product and/or custody to be tracked, and include radio-frequency identification (RFID), inscription, material fingerprinting, digital imaging of stones, and documentation systems, for example. However the individual technologies, while important, should be understood as enablers of the broader chain-of-custody system and not seen as the system itself.

4. Why Chain-of-custody?

Driver 1 – Civil society and consumers

Chain-of-custody or traceability systems are often put forward as a solution to a range of issues in the jewellery supply chain. A number of civil society campaigns point to chain-of-custody, in association with responsible business practices, as providing one or more of the following:

- Driver to improve mining practices;
- Driver to increase proportion of recycled materials;
- Increased visibility of material provenance;
- Consumer choice as to point of origin;
- Means to avoid 'conflict' resources, illegal or criminal practices and detrimental impacts such as human rights abuses.¹

¹ For a broad discussion of conflict resources including traceability issues, see: [Beyond Conflict: Reconfiguring Approaches to the Regional Trade in Minerals from the Eastern DRC](#).

Driver 2 – Business to business

Chain-of-custody may also be useful in a business to business context, as a means to protect reputation and to promote responsible business practices. For example, retailers may seek assurance about the origin and/or processing of products they purchase, without necessarily making chain-of-custody or other claims when selling those products. This may be as a result of their branding strategy, commitment to due diligence, and/or due to the inherent complexity of their supply chains.

Similarly, chain-of-custody systems are already applied by many businesses in the jewellery sector and in other industries for quality control, safety and security purposes, to ensure that product manufacturing standards are met, even though no claim about chain-of-custody is made to the consumer. Experience by this and other industries in managing the integrity of complex supply chains may provide useful benchmarks for the design of a chain-of-custody certification system.

5. Why the RJC?

The RJC is well positioned having established and agreed standards with an assurance system which covers responsible business practices across the entire jewellery supply chain from mine to retail. The RJC system, launched in 2009, certifies Members' business practices, but it does not certify product or its movement through the supply chain. If developed, RJC chain-of-custody certification could provide a common, mutually recognised, industry-wide platform that could be accessed to support on-product and/or business-to-business claims as to the sourcing and/or responsible production of diamonds and/or gold and/or jewellery.

The role of the RJC would be to develop a standard for chain-of-custody systems and systems for assurance, via independent third party verification by accredited auditors, that the standard was being met. Ideally the standard would be developed such that the base requirements are agreed internationally as applicable generically across the jewellery supply chain, but with flexibility for Members and stakeholders to apply additional requirements for individual supply chains or specific points of origin.

The RJC recognises that while chain-of-custody systems can be a valuable strategy in response to a range of drivers, they are not a panacea. Even a well-designed chain-of-custody system can be defeated if unscrupulous operators have the will and the technical means to do so. However for legitimate actors in the supply chain, chain-of-custody systems can provide an important point of differentiation and confidence in the business practices involved in production.

6. Challenges

Developing a chain-of-custody certification system would present a number of challenges, some of which are inter-connected.

Technical constraints. The physical characteristics of diamonds and gold, the extent of mixing of products from different sources, and the overall complexity of supply chains present many challenges for effective chain-of-custody systems. Stages of the supply chain such as gold refining, metals recycling and the trade of smaller diamonds may present unique technical and/or economic challenges.

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Cost. Systems and technologies are available to track diamond and gold products to a high level of precision, however the direct and indirect cost of application of an RJC chain-of-custody standard needs to be commercially realistic.

Scalability. Most chain-of-custody claims used in the diamond and gold jewellery supply chain operate at a relatively small scale, or “niche” level. This may be due to limited availability of qualifying product, higher costs, and potential negative impacts on non-qualifying products. However there may be many opportunities to increase flexibility and reduce costs through a chain-of-custody certification that can operate on a larger scale and be used by multiple parties for multiple product lines.

Meeting expectations – unintended consequences. Chain-of-custody systems may raise several potential pitfalls which should be considered in developing a certification system.

- Exclusion of certain sources or jurisdictions may lead to further deterioration of negative human rights or social conditions;
- Chain-of-custody claims may be used to facilitate misrepresentations about responsible practices;
- Chain-of-custody systems can be compromised, potentially causing greater reputational risks;
- Offering products with chain-of-custody claims may have unduly negative implications for generic products;
- Common expectations may be that any valid chain-of-custody claim must fall under the track-and-trace model (see below);
- The development of chain-of-custody certification may create pressures for widespread adoption beyond the capacities of some supply chains to adjust, or create perverse impacts.

Political. Some NGOs and owners of existing chain-of-custody systems could view a system developed by the RJC as being threatening or not fulfilling their own agendas. However other system and standard-owners may be interested in working with the RJC to develop an industry-wide platform. Various national and inter-governmental initiatives are also emerging in this area.

Legal. All activities must adhere to the RJC’s Anti-trust Statement and Policy. For this reason, the RJC cannot require chain-of-custody certification of its Members and any standard developed will be voluntary. Because of the anti-trust dimension of these issues for the RJC, care will be needed to ensure that all communications on these issues are clear.

Implications for the RJC Brand. The development of a chain-of-custody certification system could have important implications for the RJC’s brand, which is focussed on responsible business practices. A chain-of-custody system may potentially include facilities that are not within any RJC certification scope, or may not involve any claims about responsible business practices. New rules and relationships would need to be established between the RJC as an institution, the RJC System, and the chain-of-custody certification system.

Size of task. A chain-of-custody certification system could cover and/or interface with a wide variety of models which have varying levels and types of claims. The standards development and stakeholder engagement processes, and the ongoing administration of

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any resulting system, would require an institutional commitment of time and resources, with potential risks and rewards.

These and other potential challenges would need to be considered in the evaluation of the feasibility of an RJC chain-of-custody certification system.

7. Gold and Diamond Jewellery Supply chain

The jewellery supply chain can be thought of as a series of handling and processing stages that begin with raw materials and end with final jewellery products sold to the consumer.

The supply chain for the jewellery industry is complex and fragmented. Raw materials may come from many different types of sources in many different countries; they may be sold several times, mixed, and converted into new products before being sold to the end consumer.

Figure 1 below illustrates the basic stages of the supply chain and the main supporting organisations.

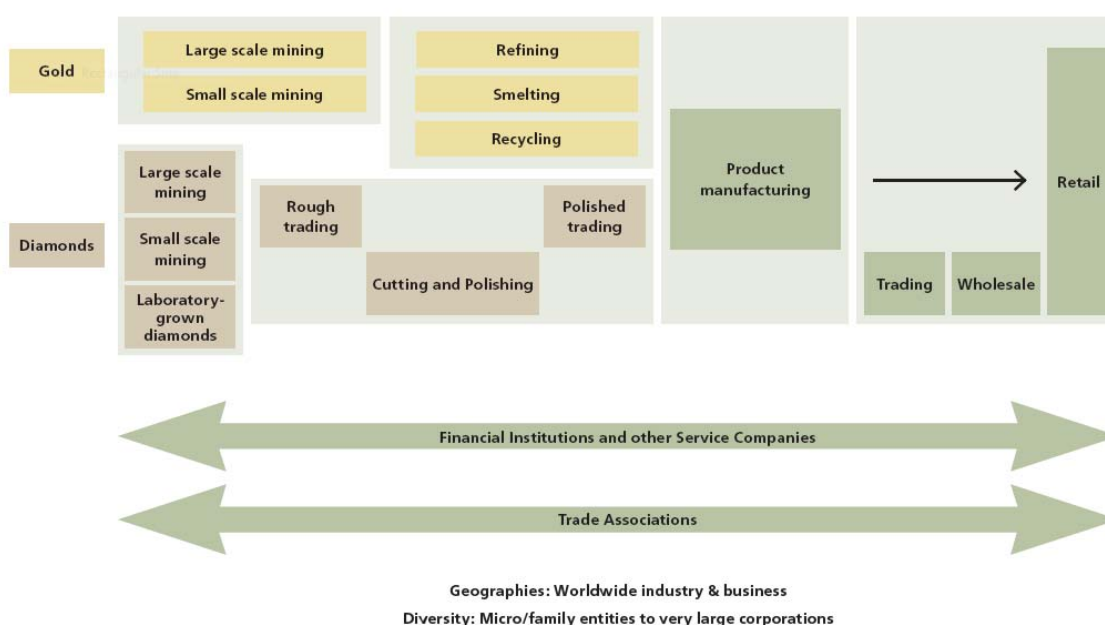


Figure 1 – Diamond and gold jewellery supply chain – overview

The gold market is much larger and more geographically diversified than diamonds. The gold jewellery market is five times larger than diamonds at first cost (before any trade margins) and has major volume markets in USA, Middle East, India and China. In addition, the role that gold has as a de facto currency mean that the supply chain is usually more complicated than diamonds.

At the micro level, supply chains for different jewellery products can vary considerably in scale, diversity, integration and potential drivers. Figures 2, 3 and 4 overleaf are hypothetical examples that highlight the range of operators who might form the supply chains for products in three price points. It should be noted that the gold supply chain may be much more complex in reality than is suggested in these examples.


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Figure 2,3 and 4 – Examples of different diamond and gold jewellery supply chains


The story of a diamond ring: 18 K gold, 10 side stones, 1+ ct centre stone. £ 6,800 (approx. US\$10,200)

Diamonds			Metals		
Centre stone, 1+ ct	10 side stones, mixed sources		Gold	Silver, Copper, Platinum	
Mining					
Botswana	Russia	Angola	South Africa	Peru, USA, South Africa	
Rough Trading			Processing		
Sold to DTC client, who sells to a manufacturer in Antwerp	Sold by Alrosa to a rough trader, then sold to a manufacturer	Sold by Ascorp to a manufacturer	Mine produces gold dore sent to refiner in Dubai to produce bullion	Mine concentrates sold to smelters and refineries in various locations	
Cutting and Polishing			Trading		
Israel, then consigned directly to retailer in USA	India, retained in-house	Armenia, sold to wholesaler in Antwerp	Bullion sold by bullion bank to gold dealer	Metals sold to metals dealers	
	Jewellery Manufacturing, Thailand				
	Side stones sourced by manufacturer in-house and from polished wholesaler		Manufacturer sources gold and metals from dealers, converts to 18K		
Manufacturer casts ring, sets side stones and prongs in accordance with standing order, ships to retailer.					
Retailer mounts centre stone on ring for sale to final customer. Payment made for centre stone. Final price of gold content determined by spot price at time of sale.					
High proportion of the value is attributable to the rough diamond used for the centre stone.					

The story of a necklace: 10 K white gold, diamonds. US\$249

Diamonds			Metals		
57 diamonds, mixed sources, average .004 ct.			Gold	Silver	
Mining					
Australia	Namibia	South Africa	China, variety of mines	Canada	Recycled from industrial scrap
Rough Trading			Processing		
Sold to Rio Tinto client / manufacturer	Sold to a DTC client, then sold to polished manufacturer	Sold to a DTC client / manufacturer	Refined in China	Lead mine, locally smelted and refined	Refined in Dubai
Cutting and Polishing			Trading		
India	India	China	Silver bullion sold to a metals dealer in Hong Kong Gold bullion traded through Shanghai Gold Exchange		
Jewellery Manufacturing, China					
Polished manufacturer sources diamonds in-house and from other manufacturers, and consigns to the jewellery manufacturer, a related company			Jewellery manufacturer sources gold and silver, converts to 10K gold, using credit advanced by the retailer.		
Jewellery manufacturer casts pendant, sets stones, manufactures chain and ships to retailer. Retailer stocks the chains as a separate inventory item for use in other finished products.					
Relatively high proportion of value is attributable to cutting and polishing and jewellery manufacturing.					

The story of a set of 22K bracelets, 23,000 Indian Rs. (approx. US\$500)

Gold				
Mining, production of dore bars			Scrap	
South Africa	Canada	Indonesia	Dubai	India
Refining				
South Africa	Switzerland	Dubai	Dubai	India
Production of Dubai Good Delivery Bars				
Trading				
Bars Traded at Dubai Commodities Exchange, exported to India				
Gold imported and purchased by Indian bank				
Manufacturing				
Local workshops / retailers in India source gold from bank using bank credit and/or gold loans, fabricate and sell finished jewellery to consumers				
Retail sales based on spot price of gold. Very high proportion of the value is in the gold content.				
Product and type of sale is representative of the largest part of the global retail gold jewellery market.				

A key point in these examples is that the products of multiple supply chains, such as precious metals and gemstones, combine, transform and converge into a single (but highly diversified) product – a jewellery item for consumer sale. This creates a quite different chain-of-custody prospect than that of a single-provenance product (however processed) such as fish, paper or coffee.

8. Chain-of-custody systems – the four models

There is a wide range of chain-of-custody systems in operation across various industries and product types. These systems can be categorised into four main models: track-and-trace, bulk-commodity, mass-balance, and book-and-claim.

- **Track-and-trace:** traces product from source (producer, region or country), physically segregating and tracking it through supply chains. *Example: Marine Stewardship Council (MSC) fish.*
- **Bulk-commodity:** physically segregates certified from non-certified product to prevent mixing, but does not trace back to product origin. *Example: GMO and non-GMO soybean.*
- **Mass-balance:** each company keeps track of the amount of certified product it buys and sells. So while there is no physical segregation, there is administrative segregation. *Example: Forest Stewardship Council (FSC) credit system for mixed sources of paper.*
- **Book-and-claim:** The trade in physical products is completely decoupled from the trade in certificates. Usually a central 'Issuing Body' is responsible for issuing and redeeming traded certificates. *Example: renewable electricity.*

[Summarised from: [Sustainable Biomass Scheme](#)]

All four are designed to drive improved production practices, though each model has different management approaches, impacts on markets and supply chain relationships, and (consequently) levels of stakeholder credibility. Key issues include transparency and clarity in the different product certification claims to avoid confusion or deception.

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9. Examples in jewellery and other sectors

To illustrate the diversity of approaches in different sectors, Table 1 provides an overview of a range of examples of chain-of-custody systems and claims, based on publicly available information. Comments are welcome to improve the accuracy of this table.

Table 1 – Examples of chain-of-custody models in diamonds, gold, jewellery and other supply chains

	Chain-of-custody model	Approach	Certifying / claiming that ...	Comments
Diamonds				
Kimberley Process / World Diamond Council System of Warranties	Bulk commodity (Entry through KPCS signatory governments)	Packages of stones certified by exporting governments to be conflict-free. System of warranties continues conflict-free warranty through supply chain.	Diamonds are conflict-free.	Stones are not traced to origin in the System of Warranties.
Forevermark (De Beers)	Bulk commodity (Proprietary brand)	Individual inscription on stones and identification number used to identify stones through supply chain to consumer.	De Beers' Best Practice Principles apply throughout the pipeline. Product quality.	While the Forevermark chain-of-custody system uses track-and-trace internally, it does not identify producers or origins in its claim to consumers
Canada Mark (BHP Billiton)	Track-and-trace (Proprietary brand)	Individual inscription on stones and serial number used to identify stones from Canadian origin through supply chain to consumer.	Canadian origin.	Portion of Ekati mine production tracked stone by stone. Not intended to be the final brand. Other Canadian mines are eligible.
Canadian Diamond Code of Conduct	Track-and-trace (Entry to Code signatories)	Establishes a minimum standard required to validate a Canadian Diamond claim based on a paper trail and a chain of warranties.	Canadian origin.	Voluntary Code developed for compliance with the Canadian Competition Act. Covers issues that may be relevant to RJC.
Gold				
Alliance for Responsible Mining – Fairmined / Fairtrade Gold from Artisanal and Small-Scale Mining (ASM) (also silver and platinum)	Mass balance - minimum standard.	All operators in supply chain from mine to consumer must be certified Fairtrade operators to use Fairtrade label. Documentary traceability must be ensured by any operator at any point of the supply chain. Purchasers pay price premium on the London Gold Price to the artisanal mining organisation.	Fairtrade / Fairmined production of ASM Gold as per Standard Zero. Additional standards apply to "Ecological Gold", (eg gold extraction without chemicals and tracing to known source small-scale mining area).	Post-mining supply chain will need to pay for traceability costs. Where full compliance to physical traceability requirements imposes disproportional costs, refiners and manufacturers may be exempt from this requirement. First Fairtrade/Fairmined gold anticipated by end 2010.
	Bulk commodity – Physical segregation promoted.			
	Track-and-trace "Ecological Gold". (Open standard for ASM miners)			
Oro Verde – gold and platinum	Track-and-trace (Proprietary brand for artisanal mining region)	Local refining in Medellin with physical segregation; some clients do subsequent refining of raw gold. Certificate which attests to the origin and method of extraction of the metal. Website with certificate number entry.	Fair trade and ecological criteria. Alluvial gold mining techniques.	Small-scale production - approx 24kg gold and 6kg platinum per annum. Likely to become certified under ARM/FLO system.
Retailer direct sourcing of gold	Track-and-trace (Business relationship)	Retailer buys some or all of its gold needs from selected mines, with physical segregation during refining stage achieved through vertical integration.	Known source. Some claims about practices at source.	Examples: Cartier sources some of its gold from Eurocantera, which mines in Honduras and has a group refinery in Europe. Tiffany & Co purchases all of its gold from Bingham Canyon,

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				USA which has its own on-site refinery.
Jewellery supply chains				
Leber Jeweler Inc. – Earthwise Jewelry	Track-and-trace (Proprietary retail brand)	Gold purchased from US-based micro-refiner as fine casting grains. Canadian diamonds purchased with certificate of origin and laser-inscription (except for smallest stones). Jewelry can be custom-designed. Jewelry is sold to customers with Earthwise Jewelry Certificate detailing provenance.	Recycled post-consumer gold. Canadian origin diamonds.	Example of small retail jeweller direct purchasing recycled gold and known-provenance gemstones. Recycled gold can be traced from refiner stage (refiner = producer).
Open Source Minerals / Jeweltree Foundation / Wishes Jewels	Track-and-trace (Proprietary business-to-business brand and retail brand)	Precious metals and gemstones are sourced to origin, and practices are verified where possible. Assessment framework developed for cutting and polishing factories. Open Source Minerals is the trading company; Jeweltree Foundation facilitates the certification of source and practices in co-operation with IPIS . Online certificate access .	Traceable goods: Fair trade gold and platinum from Oro Verde. Known source of diamonds, including melee. Polishing factories audited against labour standards and applicable law.	Example of small trading / distribution company established to source known-provenance jewellery components and/or jewellery made from those components; also established certifying body and online retail brand.
Walmart - Love, Earth	Track-and-trace (Proprietary retail brand)	Each piece of jewellery carries a tag with a code which is unique to a manufactured batch, and each item within the batch is identical. Consumers can enter the batch code into a website to trace the production. Miners and manufacturers record batch-level traceability details online through a platform managed by Historic Futures.	Known source and supply chain of individual pieces, batch manufactured. Mines and manufacturers meet Walmart's standards and criteria for responsible sourcing.	Example of large diversified retailer's supply chain approach for one product line. Partnership between Walmart, Rio Tinto, Newmont Mining, Aurafin (gold jewellery manufacturing), Inter Gold (gold and diamond jewellery manufacturing arm of Rosy Blue), Conservation International (NGO), and Historic Futures (tracing).
Other sectors				
Forest Stewardship Council (FSC) – Chain of custody certification	Mass balance – minimum standard Bulk commodity Track-and-trace (Open standard for forest products supply chain)	FSC chain of custody tracks FSC certified material through all stages of the production process - from the forest to the consumer. Only FSC Chain of Custody certified operators can label products with FSC trademarks (FSC Pure, FSC Mixed and FSC Recycled). There are detailed systems for managing percentage-based claims in different product types.	Source includes material from a forest that conforms with FSC Forest Management Standard (or FSC Controlled Wood / FSC Reclaimed Material for mixed sources); <u>and</u> all steps in the supply chain conform with FSC chain of custody standard .	Different certification models are available – site-based; group certification for small enterprises; multi-site for large enterprises; project based (eg for building projects). These aim to reduce barriers to access and costs. FSC Controlled Wood and Reclaimed Material standards provide an option to use material from non-certified forests or reclaimed material.
Marine Stewardship Council (MSC) – Chain of custody certification	Bulk commodity	To sell seafood with an MSC ecolabel, all companies in the supply chain from	Source is an MSC certified fishery that conforms with MSC	MSC certification of fisheries is conceptually equivalent to RJC

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	Track-and-trace - where whole fish or seafood is sold to consumers with information on fishery or region. (Open standard for seafood supply chain)	certified fishery to consumer ('boat to plate') must have MSC Chain of Custody certification. Certified fish must be physically segregated from non-certified fish. Every C of C certified company is given a unique code to use when purchasing from an approved supplier.	environmental standard for sustainable fishing ; and all steps in the supply chain conform with MSC chain of custody standard for seafood traceability .	certification of Member business practices. In the case of MSC, the certification of business practices is only for producers (the fisheries). Unlike FSC, mixing certified with non-MSC certified fish is not allowed under MSC ecolabel.
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The above table illustrates that there is a wide variety of chain-of-custody systems and models in use. An RJC chain-of-custody certification system will need to consider this variety and how different models might be addressed.

10. Chain-of-custody certification – some parameters for RJC

In general terms, a chain-of-custody certification system should meet at least the following criteria:

- Robust. A certification standard should be capable of addressing a wide variety of types of systems and technologies, and types of claims.
- Compliant with anti-trust laws - no restraint on competition.
- Reasonable cost of implementation.
- Auditable.
- Clear and transparent standards, verification system and chain-of-custody claim.

More specifically, development of an RJC chain-of-custody certification would need to consider various parameters that would frame its scope. Each **row** in Table 2 provides potential options for some of the main parameters of chain-of-custody claims. Each of these options could be included or excluded from RJC chain-of-custody certification – some are not mutually exclusive.

Table 2 – Chain-of-Custody Certification Scope - Options Matrix

Element	Potential Options			
Origin	Individual mine(s)	Region or country	Mine Ownership	Recycled
Model	Track and trace	Bulk commodity	Mass balance	Other
Certification of responsible practices	Certification (RJC or other) for all stages	Certification (RJC or other) for some stages	Certification (RJC or other) at origin only	Company using chain-of-custody claim with consumers must be RJC Member
Minimum coverage of the supply chain	All steps, mine to retail (Business to Consumer)	All prior steps (Business to Business)	One up / one down	Origin only
Proportion of final product	100% of a component	Percentage of a component	Entire jewellery item	Certain components of a jewellery item
Claimant eligibility	Open to any entity eligible to join RJC	RJC Members only	Other criteria	
Allowable claims	Allowable claims defined by RJC	Claims open to user definition, but verified by system	Other	

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There are pros and cons for excluding or including each option and these will be discussed in detail in future work by the RJC. Designing several chain-of-custody certification levels could be considered, to take account of different drivers.

11. Feedback welcome

The RJC invites comment and feedback on this discussion paper to:

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The comment period for this paper is from Monday April 19 to Friday June 18. Feedback will be taken into account in considering the activities and potential timelines of the next stage of investigations.

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