

# **March 2014 Quarterly Report**

Wednesday 30<sup>th</sup> April, 2014

# **Highlights**

- GMEL positions to establish a fully-integrated global rare earth supply business through alignment with NFC (China Non-Ferrous Metal Industry's Foreign Engineering and Construction Co. Ltd)
- NFC is a top-tier participant in the rare earth business, with ambitions to become a globally dominant player
- Aiming to align Kvanefjeld's cost-competitive production of critical rare earth concentrates with NFC's expertise and capacity in rare earth refining to create powerful new rare earth supply
- Memorandum of Understanding signed; agenda set to work toward Strategic Cooperation Agreement
- NFC alignment demonstrates the pursuit of a different business model to recent entrants in the rare earth space
- Important stakeholder meetings held in Greenland at the local community and senior political levels
  - > Aimed to discuss and finalise the development strategy with stakeholder input
  - Firm-up the timeline for the completion and processing of a mining license application
- Blue Ocean Equities update research on GMEL, following recent company developments





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## Introduction

Greenland Minerals and Energy Ltd ('GMEL' or 'the Company') is a mineral exploration and development company operating in southern Greenland. The Company is primarily focused on advancing the 100% owned Kvanefjeld multi-element project (critical rare earth elements, uranium, and zinc) through the feasibility and permitting phase and into mine development.

The Kvanefjeld project is centred on the northern Ilimaussaq Intrusive Complex in southern Greenland. The project includes several large scale multi-element resources including Kvanefjeld, Sørensen and Zone 3. Global mineral resources now stand at **956 Mt** (JORC-code compliant). The deposits are characterised by thick, persistent mineralisation hosted within sub-horizontal lenses that can exceed 200m in true thickness. Highest grades generally occur in the uppermost portions of deposits, with overall low waste-ore ratios. Less than 20% of the prospective area has been evaluated, with billions of tonnes of lujavrite (host-rock to defined resources) awaiting resource definition.

While the resources are extensive, a key advantage to the Kvanefjeld project is the unique rare earth and uranium-bearing minerals. These minerals can be effectively beneficiated into a low-mass, high value concentrate, then leached with conventional acidic solutions under atmospheric conditions to achieve particularly high extraction levels of both heavy rare earths and uranium. This contrasts to the highly refractory minerals that are common in many rare earth deposits.

The Kvanefjeld project area is located adjacent to deep-water fjords that allow for shipping access directly to the project area, year round. An international airport is located 35km away, and a nearby lake system has been positively evaluated for hydroelectric power.

GMEL finalised a comprehensive, multi-year pre-feasibility program in March 2012 that focussed on identifying and evaluating the best possible process flow sheet for the Kvanefjeld project, taking into account economic metrics, environmental considerations, technical and market risk. A feasibility-level Mine and Concentrator Study was released in early 2013, that outlined a staged development strategy with reduced capital costs. The study outcomes are extremely positive and reiterate the potential for Kvanefjeld to become a long-life, cost competitive operation. A large heavy REE output and significant uranium output differentiate Kvanefjeld from other potential emerging RE producers.

Rare earth elements (REEs) are now recognised as being critical to the global manufacturing base of many emerging consumer items and green technologies. Uranium forms an important part of the global base-load energy supply, with demand set to grow in coming years as developing nations expand their energy capacity.

## **March Quarter Activities**

The March Quarter, 2014, has been highlighted by an important corporate and technical development with the signing of a Memorandum of Understanding with China's NFC. This development comes on the back of an extensive period of discussions with a number of rare earth industry participants over the last two to three years. GMEL's rare earth strategy has been to align Kvanefjeld with a group that has extensive expertise in rare earth refining in order to create a complete rare earth supply chain. Kvanefjeld offers great appeal as a source of high purity rare earth concentrates, with a very competitive cost-structure delivered via revenues generated from uranium and zinc. Notably, the alignment with NFC highlights a different business model to that of other recent rare earth market entrants, and one that GMEL believes has a considerably more favourable risk profile.

In addition, GMEL has conducted important stakeholder meetings in Greenland. These meetings have been aimed to lock in on the primary development strategy with clear stakeholder support, such that the exploitation (mining) license application can be completed.

GMEL also participated in the Greenland Day forum and the Greenland Business Association/Arctic Cluster for Raw Materials forum at the Prospectors and Developers Association of Canada's annual meeting in Toronto in March (PDAC). The Company also participated in a Symposium investor roadshow in Sydney and Melbourne to update market followers on the Company outlook following recent key developments.

The Company's technical focus has been on finalising the process design package for Kvanefjeld, which can then form the basis of updated cost estimates for the Kvanefjeld feasibility study. This is important to upcoming work programs with NFC.

Importantly for GMEL, the path forward including key milestones and timelines, is now clearly mapped out.

## The NFC Alignment: Toward a Poweful Rare Earth Business

In March, Greenland Minerals and Energy Limited advised that it has made a significant step toward the establishment of an integrated global rare earth supply business with the signing of a non-binding Memorandum of Understanding (MoU) with China Non-Ferrous Metal Industry's Foreign Engineering and Construction Co. Ltd. (NFC). The MoU sets out a framework for both parties to cooperate in aligning the rare earth concentrates from GMEL's Kvanefjeld Project, with NFC's substantial rare earth separation experience and capacity, to create a powerful force in global rare earth supply.

Over recent years GMEL has looked to identify and engage groups that have the capability to work with the Company in establishing a vertically-integrated rare earth supply business, in parallel to advancing technical aspects of the Kvanefjeld Project. On the basis of numerous meetings and technical due-diligence conducted over the previous three years, a clear alignment of interests has emerged between GMEL and NFC.

GMEL's Kvanefjeld Project is now in definitive feasibility study stage, and is scheduled to enter the permitting phase in late-2014. Studies conducted to date indicate the potential to develop Kvanefjeld as a cost-competitive, long-life operation that will produce rare earth concentrates, uranium oxide, zinc concentrate and fluorspar. The unique ore-type allows for a simple and efficient processing route that is readily scalable with low-technical risk. These attributes make Kvanefjeld a standout amongst emerging mining operations with significant projected rare earth output.

NFC has a strong reputation in engineering, financing, constructing and operating mines, smelters, and refineries in many parts of the world. NFC's participation in the rare earth industry comes through its subsidiary Guangdong Zhujiang Rare Earths Company; which holds the distinguished status as the first group to carry out full separation of fifteen rare earth elements in China, and is recognised globally as a leader in rare earth separation technology.

NFC intends to increase its participation in the global rare earth business, and has a new 7000tpa capacity rare earth separation facility planned, with all approvals in place.

Upon completion, this will represent one of the world's newest, largest-capacity and most technologically advanced rare earth separation facilities. Of significance, the planned facility is designed to process concentrates of a similar composition to the 'critical rare earth' mix aimed

to be produced from Kvanefjeld, and the capacity closely matches the volume of Kvanefjeld's stage 1 projected output.

The complementary aspects of GMEL's Kvanefjeld Project and NFC's planned rare earth separation capability are clear, and represent a compelling opportunity.

Under the terms set out in the MoU, both parties intend to increase the technical cooperation to assist in the completion of feasibility studies on Kvanefjeld, and finalise a mining license application. The timing is important as the technical exchange is designed to ensure that Kvanefjeld and NFC's new separation facility are optimally aligned. Both parties are aiming to establish a strategic cooperation agreement, and map out the structure of a business partnership and associated commercial considerations. The creation of a full value chain will have GMEL well-positioned to commence marketing rare earths to end-users globally, and to secure offtake agreements.

GMEL's vision for the Kvanefjeld Project has included the establishment of an effective rare earth business, through combining the cost-competitive production of critical rare earth concentrates from Kvanefjeld with expertise and capacity in downstream rare earth separation. The Company looks forward to working with a group of NFC's capability and reputation to secure this vision and establish a strong rare earth business partnership.

With an avenue to establishing a strong rare earth business unit taking shape, GMEL will increase its focus on structuring the uranium business, and firming up an optimal uranium partner for the Kvanefjeld Project.

## **Stakeholder Meetings in Greenland**

GMEL conducted important stakeholder meetings in Greenland in January, with follow-up meetings held in April. These forums have been aimed to establish a primary development strategy that is endorsed by local community stakeholder groups, as well as government regulatory bodies. This represents part of the process of finalising the mining license application for Kvanefjeld, and to ensure that stakeholders are well-informed and have had the opportunity to put forward comment during the process. The meetings have highlighted a desire from a broad cross section of stakeholders to conduct both mineral beneficiation and initial hydrometallurgical refining in Greenland. This would see the production of critical rare earth concentrates, and uranium oxide in Greenland, along with the production of zinc concentrate and fluorspar. Under this scenario the separation of rare earths into high-purity marketable

products will take place offshore, and is a focal point of relationship with NFC. The alternative scenario that has been under consideration is to only establish the mineral beneficiation stage in Greenland and to export a high grade mineral concentrate to an off-shore hydrometallurgical refinery.

Meetings with senior government representatives have focussed on firming up the timeline for the permitting process for Kvanefjeld. Greenland's regulatory system is aiming to be fully prepared to receive a mining (exploitation license) application for Kvanefjeld in early 2015, and is aiming to be positioned to issue a mining license as of early 2016.

## **Corporate Activities**

GMEL was represented at the annual PDAC meeting in Toronto, which is an important forum for Greenland's broader resources industry. The Company participated in the Greenland Business Association event, which is held in conjunction with the Arctic Cluster for Raw Materials. This represents an important gathering of mining companies, service providers and support industries, along with representatives of government agencies. The event brings together many proponents of Greenland's emerging resources industry. GMEL also presented in the Greenland Day event, which showcases Greenland's major emerging resource projects.

The Company also participated in a Symposium investor roadshow in Sydney and Melbourne, to update market followers on the back of important political developments in Greenland and the alignment with a top-tier rare earth partner in NFC.

Increased efforts will now be focussed on the dialogue with potential uranium partners. With the rare earth business unit taking shape, much greater clarity is cast on Kvanefjeld's potential cost-competitive, long-life uranium production in the politically stable and supportive jurisdiction of Greenland. The Kvanefjeld uranium proposition is therefore of increasing appeal to uranium industry participants and power utilities alike.

Blue Ocean Equities, the boutique Australian financial services group, updated research on GMEL in early April following the signing of the MoU with NFC. This updates research by Blue Ocean that was initiated in late 2013, following the repeal of the zero-tolerance policy by the Greenland government. The updated research note provides further context to the potential partnership with NFC, and captures other recent developments.

## **Technical Focus and Developments**

### **Process Plant Design**

Process design work has continued for the Kvanefjeld Project with a focus on the establishment of a hydrometallurgical refinery in Greenland. A process design was completed which integrated the refinery with the concentrator across two different sites in Greenland. This allows sharing of infrastructure and utilities. The refinery will be located in close proximity to the concentrator with the mixed REO carbonate product to be pumped via a pipeline to a filtration plant located close to the port site location. The process engineering included the development of a comprehensive equipment list of over 2,000 individual items. Equipment types and materials of construction were carefully specified to suit the process conditions. Multiple budget quotes from suppliers and vendors have been received for each piece of equipment which will provide a robust basis for the Feasibility Study cost estimate.

### **Sample Production**

Additional samples of 'rare earth carbonate' have been produced for detailed evaluation by our potential rare earth partner NFC. The rare earth carbonate has been recovered from the mineral concentrate which was produced from pilot plant operations in November 2012 and contained 15% REO and 0.25% uranium. The rare earth carbonate product contains 58% REO, and will assay 97% REO as a mixed 'rare earth oxide' after calcining to remove carbonate and moisture.

GMEL is investigating the production of a mixed rare earth oxide instead of a rare earth carbonate as this is the preferred concentrate form for NFC. NFC's Zhujaing Rare Earth Co Ltd's separation plant currently typically receives a mixed rare earth oxide feedstock which assays 93% REO. The rare earth carbonate product was produced from process streams generated from the recently completed 100 hour continuous leach test. In total approximately 1.7 kg of rare earth carbonate will be produced. The evaluation from NFC is likely be performed by Zhujiang Rare Earth Co Ltd at their laboratories in Guangdong, Southern China. Here the optimum rare earth separation methodology will be employed to separate the mixed rare earth concentrate into 15 individual rare earth oxides.

## **Feasibility Study Outlook**

The technical team is currently preparing to initiate other aspects of the Feasibility now that the process design is complete. These packages of work relate to mechanical and civil design of the process facilities and infrastructure. Detailed Scopes of Work (SOW) have been prepared and tendered for the following aspects of the project with locations selected and capacity determined:

- 1. Process Plant Mechanical, Civil and Electrical Design.
- 2. Port Studies
- 3. Tailings Dam design studies
- 4. Acid Plants Technology Supply Packages
- 5. Cost Estimation for Construction by Non Ferrous China (as an Engineering Procurement and Construction (EPC) contract)
- 6. Mine Scheduling and Cost Estimation
- 7. Logistics and Shipping

## **Tenure, Permitting and Project Location**

#### **Tenure**

Greenland Minerals and Energy Ltd (ABN 85 118 463 004) is a company listed on the Australian Securities Exchange. The Company is conducting exploration of license EL2010/2. The Company controls 100% of EL2010/2 through its Greenlandic subsidiary.

The tenement is classified as being for the exploration of minerals. The project hosts significant multielement mineralisation within the Ilimaussaq Intrusive Complex.

Historically the Kvanefjeld deposit, which comprises just a small portion of the Ilimaussaq Complex, was investigated by the Danish Authorities. The project has received significant past exploration and feasibility evaluation in the form of drilling, geophysics, geochemistry, an exploratory adit and numerous and varying metallurgical test work and technical papers.

#### **Permitting**

Greenland Minerals and Energy Limited is permitted to conduct all exploration activities and feasibility studies for the Kvanefjeld REE-uranium project. The company's exploration license is inclusive of all economic components including uranium and REEs. The Company holds the right to apply to exploit the Kvanefjeld project. The approval of an exploitation license is largely dependent on establishing an economically robust, and environmentally and socially acceptable development scenario.

### Location

The exploration lease covers an area of  $80 \text{km}^2$  in Nakkaalaaq North on the southwest coast of Greenland. The project is located around  $46^\circ~00'\text{W}$  and 60~55'N.

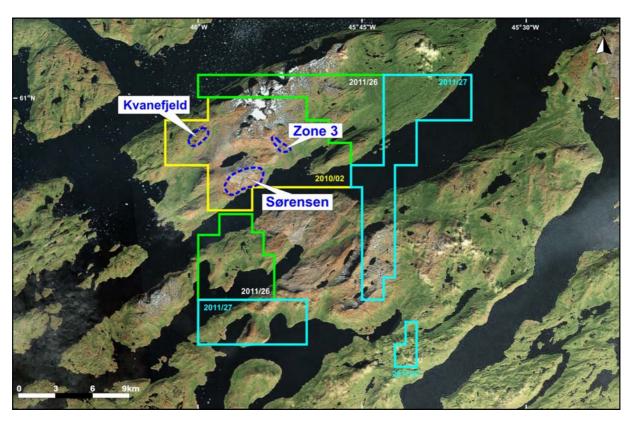
The town of Narsaq is located approximately 8 kilometres to the south west of the license area. Narsaq is connected to Narsarsuaq International Airport by commercial helicopter flights operated by Air Greenland. Local transport between settlements is either by boat or by helicopter.

The Company has office facilities in Narsaq where storage, maintenance, core processing, and exploration activities are managed. This office supports the operational camp located on the Kvanefjeld Plateau above the town where the operational staff are housed.

Access to the Kvanefjeld plateau (at approximately 500m asl) is generally gained by helicopter assistance from the operations base located on the edge of the town of Narsaq. It is possible to access the base of the plateau by vehicle and then up to the plateau by a track.

## **Other Exploration License Holdings**

As announced on 18 May 2011 GMEL had applied for, and was granted license holdings to consolidate its ground position in the Kvanefjeld area. The new license areas occur immediately adjacent to the Ilimaussaq Complex and may be prospective for specialty metal mineralization hosted near the margins of the complex (see Figure 1). GMEL aims to conduct evaluations to assess the potential for mineralization, in conjunction with sterilising key areas that are under assessment for plant and infrastructure locations. The Company is considering a number of possible locations for key infrastructure items, which include areas adjacent to the Kvanefjeld resource, as well as the broad area on the northeastern side of the Ilimaussaq Complex. Stakeholder input and environmental considerations are critically important to the site selection process.



**Figure 1**. GMEL's license holdings over and adjacent to the Ilimaussaq complex in south Greenland. All licences are held outright by GMEL.

<b>Exploration Licence</b>	Location	Ownership
EL 2010/02	Southern Greenland	100% held by Greenland Minerals and
		Energy (Trading) A/S
EL 2011/26	Southern Greenland	100% held by Greenland Minerals and
		Energy Limited
EL 2011/27	Southern Greenland	100% held by Greenland Minerals and
		Energy Limited
EL 2013/05	Western Greenland	100% held by Greenland Minerals and
		Energy Limited

Capital Structure – As at 31 <sup>st</sup> March, 2014	
Total Ordinary shares	575,497,356
Quoted options exercisable at \$0.60	25,769,191
Unquoted options exercisable at \$0.75	4,999,520
Performance rights (refer to announcement 21/10/11 for terms)	12,000,000
Employee rights (refer to announcement 4/10/2013 for terms)	9,985,500

Please visit the company's website at <a href="www.ggg.gl">www.ggg.gl</a> where recent news articles, commentary, and company reports can be viewed.

Yours faithfully,

Roderick McIllree

Managing Director

Greenland Minerals and Energy Ltd.

Statement of Identified Mineral Resources, Kvanefjeld Multi-Element Project (Independently Prepared by SRK Consulting)

				ssification, Tonnage and Grade							Contained Metal					
Cut-off	Classification	M tonnes	TREO <sup>2</sup>	U <sub>3</sub> O <sub>8</sub>	LREO	HREO	REO	$Y_2O_3$	Zn	TREO	HREO	$Y_2O_3$	U <sub>3</sub> O <sub>8</sub>	Zn		
$(U_3O_8 ppm)^1$		Mt	ppm	ppm	ppm	ppm	ppm	ppm	ppm	Mt	Mt	Mt	M lbs	Mt		
Kvanefjeld - March 2	2011															
150	Indicated	437	10929	274	9626	402	10029	900	2212	4.77	0.18	0.39	263	0.97		
150	Inferred	182	9763	216	8630	356	8986	776	2134	1.78	0.06	0.14	86	0.39		
150	<b>Grand Total</b>	619	10585	257	9333	389	9721	864	2189	6.55	0.24	0.53	350	1.36		
200	Indicated	291	11849	325	10452	419	10871	978	2343	3.45	0.12	0.28	208	0.68		
200	Inferred	79	11086	275	9932	343	10275	811	2478	0.88	0.03	0.06	48	0.20		
200	<b>Grand Total</b>	370	11686	314	10341	403	10743	942	2372	4.32	0.15	0.35	256	0.88		
250	Indicated	231	12429	352	10950	443	11389	1041	2363	2.84	0.10	0.24	178	0.55		
250	Inferred	41	12204	324	10929	366	11319	886	2598	0.46	0.02	0.03	29	0.13		
250	<b>Grand Total</b>	272	12395	347	10947	431	11378	1017	2398	3.33	0.12	0.27	208	0.65		
300	Indicated	177	13013	374	11437	469	11906	1107	2414	2.30	0.08	0.20	146	0.43		
300	Inferred	24	13120	362	11763	396	12158	962	2671	0.31	0.01	0.02	19	0.06		
300	<b>Grand Total</b>	200	13025	373	11475	460	11935	1090	2444	2.61	0.09	0.22	164	0.49		
350	Indicated	111	13735	404	12040	503	12543	1192	2487	1.52	0.06	0.13	98	0.2		
350	Inferred	12	13729	403	12239	436	12675	1054	2826	0.16	0.01	0.01	10	0.0		
350	<b>Grand Total</b>	122	13735	404	12059	497	12556	1179	2519	1.68	0.06	0.14	108	0.3		
Sørensen - March 20	012															
150	Inferred	242	11022	304	9729	398	10127	895	2602	2.67	0.10	0.22	162	0.6		
200	Inferred	186	11554	344	10223	399	10622	932	2802	2.15	0.07	0.17	141	0.5		
250	Inferred	148	11847	375	10480	407	10887	961	2932	1.75	0.06	0.14	123	0.4		
300	Inferred	119	12068	400	10671	414	11084	983	3023	1.44	0.05	0.12	105	0.30		
350	Inferred	92	12393	422	10967	422	11389	1004	3080	1.14	0.04	0.09	85	0.2		
Zone 3 - May 2012																
150	Inferred	95	11609	300	10242	396	10638	971	2768	1.11	0.04	0.09	63	0.2		
200	Inferred	89	11665	310	10276	400	10676	989	2806	1.03	0.04	0.09	60	0.2		
250	Inferred	71	11907	330	10471	410	10882	1026	2902	0.84	0.03	0.07	51	0.		
300	Inferred	47	12407	358	10887	433	11319	1087	3008	0.58	0.02	0.05	37	0.1		
350	Inferred	24	13048	392	11392	471	11864	1184	3043	0.31	0.01	0.03	21	0.0		
Project Total			- 2													
Cut-off	Classification	M tonnes	TREO <sup>2</sup>	U <sub>3</sub> O <sub>8</sub>	LREO	HREO	REO	$Y_2O_3$	Zn	TREO	HREO	Y <sub>2</sub> O <sub>3</sub>	U <sub>3</sub> O <sub>8</sub>	Zn		
(U₃O <sub>8</sub> ppm) <sup>1</sup>		Mt	ppm	ppm	ppm	ppm	ppm	ppm	ppm	Mt	Mt	Mt	M lbs	Mt		
150	Indicated	437	10929	274	9626	402	10029	900	2212	4.77	0.18	0.39	263	0.97		
150	Inferred	520	10687	272	9437	383	9820	867	2468	5.55	0.20	0.45	312	1.28		
150	Grand Total	956	10798	273	9524	392	9915	882	2351	10.33	0.37	0.84	575	2.25		

<sup>&</sup>lt;sup>1</sup>There is greater coverage of assays for uranium than other elements owing to historic spectral assays. U<sub>3</sub>O<sub>8</sub> has therefore been used to define the cut-off grades to maximise the confidence in the resource calculations.

 $<sup>^2</sup>$ Total Rare Earth Oxide (TREO) refers to the rare earth elements in the lanthanide series plus yttrium.

Note: Figures quoted may not sum due to rounding.

#### ABOUT GREENLAND MINERALS AND ENERGY LTD.

Greenland Minerals and Energy Ltd (ASX – GGG) is an exploration and development company focused on developing high-quality mineral projects in Greenland. The Company's flagship project is the Kvanefjeld multi-element deposit (Rare Earth Elements, Uranium, Zinc), that is rapidly emerging as a premier specialty metals project. A comprehensive pre-feasibility study has demonstrated the potential for a large-scale, cost-competitive, multi-element mining operation. For further information on Greenland Minerals and Energy visit <a href="http://www.ggg.gl">http://www.ggg.gl</a> or contact:

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Greenland Minerals and Energy Ltd will continue to advance the Kvanefjeld project in a manner that is in accord with both Greenlandic Government and local community expectations, and looks forward to being part of continued stakeholder discussions on the social and economic benefits associated with the development of the Kvanefjeld Project.

The information in this report that relates to exploration targets, exploration results, geological interpretations, appropriateness of cut-off grades, and reasonable expectation of potential viability of quoted rare earth element, uranium, and zinc resources is based on information compiled by Mr Jeremy Whybrow. Mr Whybrow is a director of the Company and a Member of the Australasian Institute of Mining and Metallurgy (AusIMM). Mr Whybrow has sufficient experience relevant to the style of mineralisation and type of deposit under consideration and to the activity which he is undertaking to qualify as a Competent Person as defined by the 2004 edition of the "Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves". Mr Whybrow consents to the reporting of this information in the form and context in which it appears.

The geological model and geostatistical estimation for the Kvanefjeld, Sorensen and Zone 3 deposits were prepared by Robin Simpson of SRK Consulting. Mr Simpson is a Member of the Australian Institute of Geoscientists (AIG), and has sufficient experience relevant to the style of mineralisation and type of deposit under consideration and to the activity which he is undertaking to qualify as a Competent Person as defined by the 2004 edition of the "Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves". Mr Simpson consents to the reporting of information relating to the geological model and geostatistical estimation in the form and context in which it appears.

This information was prepared and first disclosed under the JORC Code 2004. It has not been updated since to comply with the JORC Code 2012 on the basis that the information has not materially changed since it was last reported.