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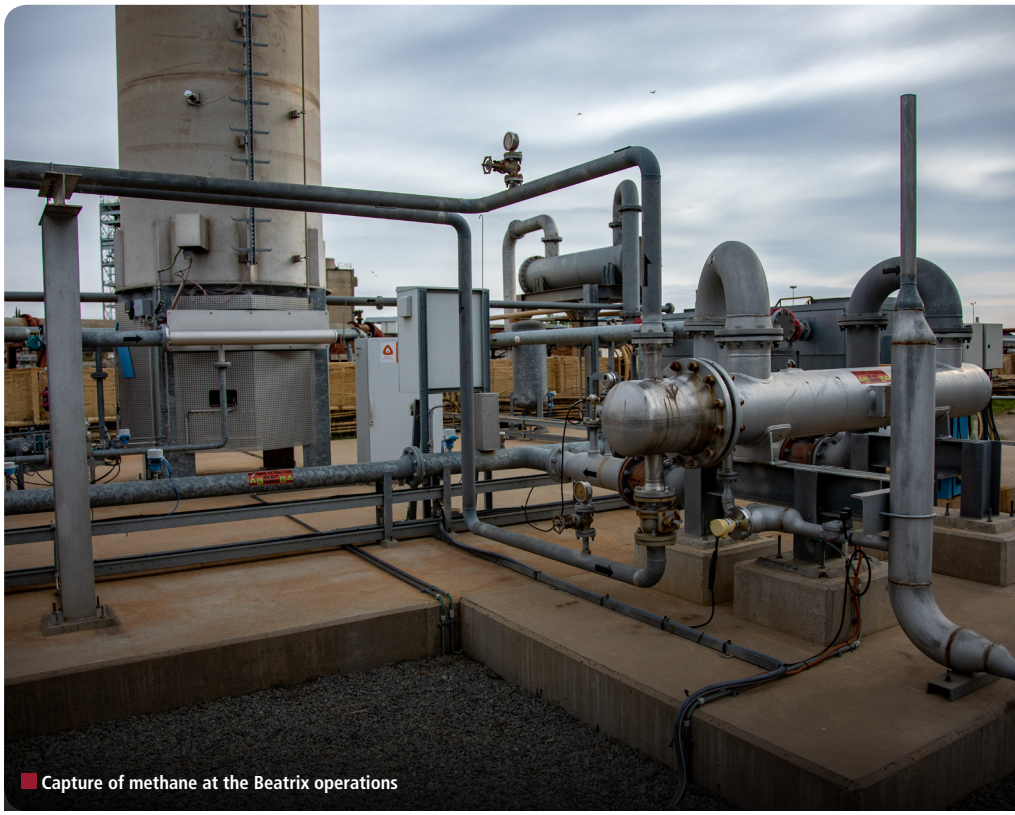
SA GOLD OPERATIONS

GENERATING CLEAN ENERGY: BEATRIX METHANE CAPTURE AND DESTRUCTION PROJECT

FACT SHEET 2019

Sibanye-Stillwater's Beatrix operation, a deep-level gold mine in the Free State province of South Africa, intersects methane from underground sources during mining operations. The methane is liberated into the general mine atmosphere.



Capture of methane at the Beatrix operations

Methane encountered in underground mining needs to be removed or diluted on account of its highly explosive nature. The removal and venting of the underground methane to surface therefore enables safe mining operations.

In 2003, Sibanye-Stillwater's Beatrix operations set about exploring opportunities to reduce the impacts of methane by removing it from the underground workplace as much as possible, in the interest of employee safety. In 2006, an agreement was entered into with carbon and climate change advisory firm, Promethium Carbon, for the compilation of a project design document and assistance with the registration and regulatory approval by the designated National Authority for the project to capture and destruct methane. The system was designed and built to extract and flare (on surface) 400 litres per second of methane gas (from identified sealed-off working areas) from the Beatrix South section. The flare destroys the methane through burning the gas. One tonne of methane has an equivalent greenhouse gas effect of 23 tonnes of carbon dioxide.

Through flaring, the methane is transformed into carbon dioxide and thereby reduces the greenhouse gas effect. The Beatrix methane project entails the destruction of methane extracted from the underground working environment and also flaring methane from five surface exploration boreholes off the mine property.

The Beatrix methane project was registered under the Verified Carbon Standard (VCS), formerly Voluntary Carbon Standard, from 1 March 2011 to 30 June 2011. The VCS is a standard for certifying carbon emission reductions. This VCS registration was an interim measure until the registration under the Clean Development Mechanism (CDM) of the United Nations Framework Convention on Climate Change (UNFCCC) could be implemented. During the initial registration period, the project was able to earn 9,643 verified carbon units (VCUs). A VCU represents one tonne of carbon dioxide equivalent (CO_2e) emissions reduced. The VCUs were held in a Markit Registry account and transferred to the VCU buyer's account on 7 November 2013. Sibanye-Stillwater received payment for the 9,643 VCUs on 13 November 2013. The Markit Registry allows its account holders to manage all their global carbon, water and biodiversity credits in a central financial markets-based registry system. It manages environmental portfolios and supports existing and emerging environmental programmes and markets.

Project registration under the CDM came into effect from 1 July 2011. In 2013, the project was extended to include generators that would use the extracted methane as a fuel source to produce electricity.

Electricity generation from extracted mine methane not only destroys the methane, it also serves to reduce our carbon emissions from purchased electricity as the methane-generated electricity is consumed by the mine and proportionally displaces electricity purchased from Eskom, which primarily uses coal-fired power stations.

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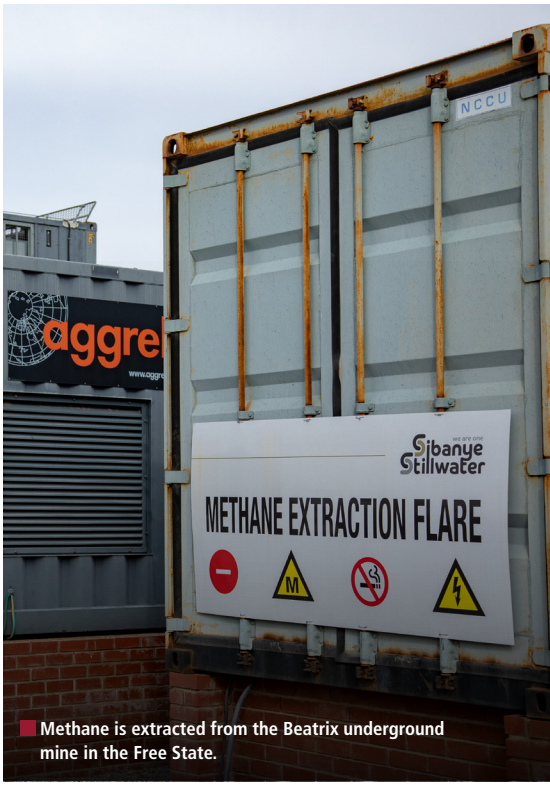
As a CDM project, Beatrix has accrued carbon credits for electricity generation from mine methane and flaring, generating approximately 1MW of electricity.

The first crediting period of the CDM project extended from 1 July 2011 to 30 June 2018. The carbon credits accrued during the first period have been split into three batches for verification purposes. The first two batches of carbon credits have been verified. Epic Sustainability (Epic) have made significant progress in the finalisation of the third batch verification process.

Epic is a designated operating entity accredited by the UNFCCC CDM to validate project proposals or verify implemented projects in terms of achievement of planned greenhouse gas emission reductions.

Batch (period)	Carbon credits	Status
First batch: (1 July to 31 March 2012)	35,290	Verification complete
Second batch: (1 April 2012 to 30 April 2013)	53,956	Verification complete
Third batch: (1 May 2013 to 30 June 2018)	200,000	Verification underway



Methane is extracted from the Beatrix underground mine in the Free State.

The carbon crediting period was not renewed for reasons which include the uncertainty of the carbon market and therefore no batch was registered beyond 30 June 2018. The first seven-year crediting period ended on 30 June 2018.

Although the crediting period was not renewed, the project continues to destruct methane through electricity generation and flaring.

The volume of methane gas destroyed since 1 July 2011 to 31 December 2018 is approximately 13 million cubic metres. During this period, a total of 214,383t CO_2e emissions was averted. This is equivalent to a reduction of 725,000 tonnes of coal being combusted.

Flaring of methane at the boreholes was discontinued in December 2018 following significant fluctuations and the decrease in methane volumes. During 2019, the removal of methane from the Beatrix South sealed-off section continued. This methane was routed to electricity generators and a backup flare. Approximately 3,747 MWh of electricity was generated. The backup flare combusted any methane that was not consumed by the electricity generators.

The volume of methane gas destroyed since 31 December 2018 to 31 December 2019 was approximately 1.9 million cubic metres through the generation of electricity and flaring. During this period, a total of 33,970t CO_2e emissions was averted. This is equivalent to a reduction of 78,470 tonnes of coal being combusted.

The certified carbon credits from the Beatrix methane project is destined for sale and transfer to a company, Mercuria Energy Trading, in accordance with a purchase agreement that is in place. Considering the recent legislative changes in South Africa, namely the Carbon Tax Act that came into effect on 1 June 2019, and the supporting carbon offset regulations that were promulgated on 29 November 2019, the possibility of utilising some of the carbon credits from the Beatrix methane project to offset a portion of the carbon tax will be explored with the authorities and Mercuria Energy Trading. The Carbon Tax Act makes provision to offset 10% of the carbon tax liability through the exchange of valid carbon credits.

METHANE is a colourless, odourless, potent greenhouse gas, which contributes to global warming and climate change at a rate 23 times higher than carbon dioxide. It cannot be detected without special electronic equipment.

Unlocked during mining operations and transported by air from sources deep underground, it is extremely dangerous as it is highly explosive and can displace oxygen so that people exposed to it are prone to suffocation.

A methane management system has been developed at Beatrix to control this risk. The mine standard requires a minimum of two flammable gas detection instruments at each stope panel and there must be at least one instrument at each development end when work is underway.

At the Beatrix mining units 1 and 2, there is a telemetry system with strategically placed flammable gas and velocity sensors, critical fans and carbon monoxide sensors. Environmental conditions are monitored in the central control room at mining unit 1, located at Beatrix 3 shaft, on a 24-hour basis. Clear call-out procedures are followed in the event of an emergency.

Where elevated concentrations of flammable gas are constantly present in the general atmosphere, a location is declared hazardous, based on the results of risk assessments. Hazardous locations require special operating conditions, such as explosion-protected apparatus, telemetry monitoring, strict adherence to mine standards and awareness training for all employees. A Hazardous Locations meeting is held monthly, involving all related disciplines, such as mining, engineering and environmental engineering to ensure that the risk of a flammable gas ignition is being managed.

To ensure proper supervision at all working places, the mine has developed a workplace management system: documents with special instructions, hazard identification, risk assessments, Department of Mineral Resources and Energy recommendations, a flammable gas register and hand-over notes are stored in the mine overseers' offices. The system is also used during the induction of new employees or when people are moved from one mining section to another.

In addition to flammable gas induction training, the mine has regular safety awareness sessions, such as safety news flashes which highlight any related incidents and lessons learnt and special awareness drives, including the methane awareness month in May each year and the monthly Methane Emergency Preparedness Safety and Health (MESH) days where specific methane safety-related topics are discussed. These are general awareness days that involve all mine employees.

BEATRIX METHANE CAPTURE AND DESTRUCTION PROJECT:

TIMELINE

28 JULY 2006
R54 million Beatrix methane capture and destruction project officially starts in agreement with Promethium Carbon (carbon and climate change advisor) for administration and approvals

2011
Beatrix eligible to register under Clean Development Mechanism of the Kyoto Protocol to UNFCCC to earn certified emission reductions (CER) or carbon credits

21 MAY 2011
Flare commissioned with capacity to extract initial 400 litres per second of methane gas from identified sealed-off working areas at Beatrix South section

2013
- Issuance process begins to earn 35,290 CERs (from 1 July 2011 to 31 March 2012)
- Processing of second batch of Beatrix CERs began for period from 1 April 2012 to 30 April 2013

5 SEPTEMBER 2013
9,643 VCUs issued and held in Markit Registry account (R323,084)

7 NOVEMBER 2013
VCUs transferred to buyer's account

17 OCTOBER 2014
Verification of first batch of carbon credits under CDM completed and 35,290 CER credits issued

31 DECEMBER 2014
- 195 litres per second of methane gas extracted from underground and flared
- Volume of methane destroyed since commissioning the project (including main flare and borehole flares): 10.9 million cubic metres until 31 December 2014

JULY 2011-END DECEMBER 2014
Total of 175,336 tonnes carbon dioxide equivalent (CO_2e) destroyed

20 FEBRUARY 2015
Verification process of second batch of carbon credits for period from 1 April 2012 to 30 April 2013 began

2018
- First crediting period of CDM project that started on 1 July 2011 ends on 30 June 2018
- Epic appointed as designated operating entity for verification of third batch of carbon credits (for period from 1 May 2013 to 30 June 2018) while Carbon Check continues with verification of second batch of carbon credits
- Secondary sealing completed and results in fugitive mine methane emission reduction of 198,522t CO_2e

2019
- 25 July 2019 - Verification of second batch of carbon credits completed and 53,956 CER credits issued
- 59.2 litres per second of methane gas were extracted from underground
- Since commissioning the project, 14.9 million cubic metres of methane have been destroyed (including main flare and borehole flames)
- A total of 396,915 tCO_2e emissions was averted from 2011 to 2019. This is equivalent to a reduction of 916,873 tonnes of coal being combusted

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OUR VISION: Superior value creation for all our stakeholders through the responsible mining of our mineral resources