PALADIN ENERGY LTD
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By Electronic Lodgement

Langer Heinrich Mine Restart Plan Confirms US$81M of Restart Expenditure and Life of Mine C1 Cost of US$27/lb U_3O_8

Paladin Energy Limited (ASX:PDN) ("Paladin" or "the Company") is pleased to announce the results of the Langer Heinrich Mine Restart Plan ("The Restart Plan"). The Restart Plan marks the completion of an extensive work package aimed at delivering a reliable mine restart to bring the globally significant Langer Heinrich Mine back into production under the right Uranium pricing environment.

HIGHLIGHTS

- The Restart Plan is now complete confirming restart capital, costs and operational performance;
- Langer Heinrich can be brought back into production for US$81M of pre-production cash expenditure, allocated as follows:
  - operational readiness (US$34M) required to mobilise the work force, undertake maintenance and provide the working capital requirements to commence production; and
  - discretionary capital (US$47M) specifically aimed at improving process plant availability and reliability to lift production capacity by more than 10%.
- Low restart capital intensity (US$14/lb) and competitive C1 Cost of Production (US$27/lb) confirms Langer Heinrich is well positioned alongside other Tier 1 operations to deliver product into a recovering Uranium market;
- The Restart Plan has confirmed a 17-year mine life for Langer Heinrich with peak production of 5.9Mlb U_3O_8 per annum for 7 years;
- The Life of Mine Plan outlines three distinct operational phases being Ramp-up (year 1), Mining (year 2-8) and Stockpile (year 9-17). The utilisation of stockpile material in the Ramp-up phase greatly reduces operational start up risk and provides a strong platform for the operation to move toward nameplate capacity within a 12-month period;
- Langer Heinrich remains fully permitted to resume mining and Uranium exports; and
- Paladin's cash position of US$35M provides financial flexibility and the Company will only consider a restart when it secures an appropriate term-price contract with sufficient tenor and value to deliver an appropriate return to all stakeholders.

Paladin CEO, Ian Purdy said "*The completion of the Langer Heinrich Mine Restart Plan is a significant step forward for the Company and completes the vast amount of study work undertaken over the past 18 months. The operational and economic parameters identified in the chosen restart plan show the strategic significance of the Langer Heinrich asset and highlight the potential economic returns that can be delivered under the right Uranium price environment. Paladin will continue to refine and progress work packages under The Restart Plan and I look forward to updating the market on our ongoing activities*".

EXECUTIVE SUMMARY

The release of the Langer Heinrich Restart Plan marks the conclusion of the Company's 18 month prefeasibility and optimisation study work programmes. The selected restart option provides a low risk, reliable restart plan balancing the ability to rapidly respond to strengthening Uranium prices and maximising asset value. Key Capital, Operational and Cost highlights of The Restart Plan are detailed below:

Please note that all operational performance, costs and capital metrics are on a 100% basis for the Langer Heinrich operation. Paladin owns 75% of Langer Heinrich.

Restart Costs (US$81M)

Operational Readiness	US$34M	Improving Plant Availability and Process Stability	US$47M
Maintenance	$13	Product Drying and Packaging	$14
Working Capital Replenishment	$14	Leach Surge Capacity and Water Storage	$7
Workforce and Mobilisation	$7	Process Control and Stability	$6
		Infrastructure Asset Integrity	$16
		Tailings Dam	$4

Key Operational Metrics

	Ramp-up Phase (Year 1)	Mining Phase (Year 2-8)	Stockpile Phase (Year 9-17)
Mining Rate (TMM Mt pa)	0	28.8	0
Mill Throughput (Mt pa)	3.3 (from stockpile)	5.1	5.3 (from stockpile)
Mill Availability (%)	71	95	95
Mill Feed Grade (ppm)	520	593	336
Process Recovery (%)	88.5	88.4	88.5
Production (Mlb pa U_30_8)	**3.3**	**5.9**	**3.5**
Mining & Stockpile Rehandling Cost ($M pa)[1, 3]	11	72	16
Processing & Maintenance Cost ($M pa)	57	81	67
G&A and Other ($M pa)	9	9	9
Capex ($M pa)[2]	1.5	14.5	13.1

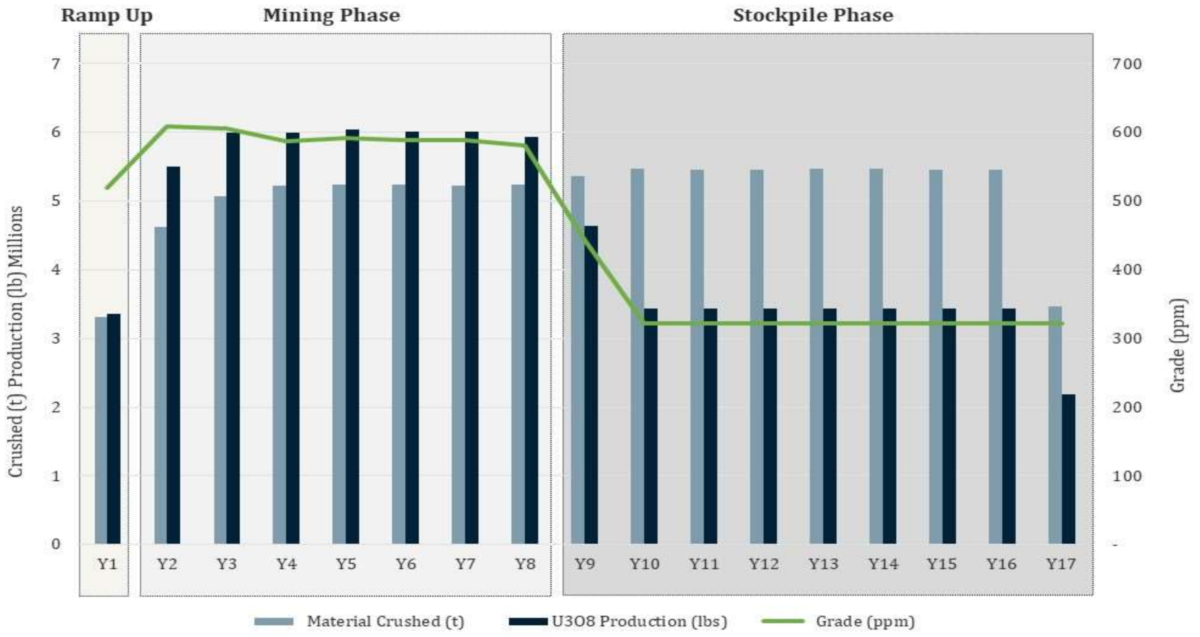
1. Excludes stockpile inventory adjustments. 2. Sustaining, minor improvements, progressive rehab and tailings mgt capex. 3. No in-situ mining occurs in Ramp-up and Stockpile phases. Stockpile re-handling only. 4. Figures quoted in table reflect yearly average over the operational phases.

Cost Profile

US$/lb U_3O_8	Ramp-up Phase (Year 1)	Mining Phase (Year 2-8)	Stockpile Phase (Year 9-17)	Life of Mine (All 3 phases)
Mining & Stockpile Rehandling [1]	3.3	12.2	4.6	**8.7**
Processing & Maintenance	16.9	13.7	19.3	**16.2**
G&A and Other	2.8	1.5	2.6	**2.0**
Production Cash Cost	**23.0**	**27.4**	**26.5**	**26.9**
Non-Cash Inventory Adjustments[4]	-	(7.9)	10.5	**-**
C1 Cost of Production	**23.0**	**19.5**	**37.0**	**26.9**
Freight & Logistics	0.95	0.95	0.95	**0.95**
Capex[3]	0.45	2.4	3.7	**2.9**
Government Royalties[2]	3%	3%	3%	**3%**

1. Excludes stockpile inventory adjustments. 2. Namibian Royalties of 3% US$ sales. Excludes 3rd party royalty of A$0.12/kg. 3. Sustaining, minor improvement, progressive rehab and tailings mgt capital. 4. Opening stockpiles have no book value (written off in 2017/2018).

Production Profile



Paladin is Well Positioned in an Improving Uranium Market

The Company remains poised to take advantage of the growing structural Uranium supply deficit in global markets. Spot prices have increased by 36 percent since the start of January 2020 to approximately US$34/lb U_3O_8. The Company notes continued primary production cuts and US utility contract coverage reaching critical lows. Securing term contracts remains key to the restart of Langer Heinrich.

The Langer Heinrich Mine remains competitively positioned versus other suspended mines, highlighted through modest restart capital and competitive operating costs, further underpinned by a proven product quality and a globally significant operation with lower incentive prices than greenfield projects.

Paladin remains in a healthy financial position. The Company has:

- Significant runway to execute its strategy with US$35M in cash at 31 May 2020;
- Greatly reduced cash burn with FY2021 cash spend forecast of less than US$10M;
- A disciplined and patient approach;
- Flexibility to respond to market conditions; and
- US$145M (as at 31 May 2020) of Senior Debt repayable January 2023.

Next Steps

Paladin will continue to build the foundations for a successful restart of the Langer Heinrich Mine. The Company will:

- Continue to engage with potential customers to secure term-price offtake agreements;
- Advance the critical-path elements of The Restart Plan, including;
    - Continue detailed mine planning to support the preparation of contract mining commercial documentation;
    - A detailed “as-is” condition survey of the processing plant, process flow modelling and preliminary engineering of the proposed modifications to support the preparation of Engineering, Procurement, Construction and Management (EPCM) commercial documentation;
    - Other ongoing detailed technical and commercial work aimed at further de-risking restart activities; and
    - Utilising the forward work program to publish a revised Ore Reserve.
- Continue to preserve the Langer Heinrich Mine through cost effective ongoing care & maintenance (C&M) activities; and
- Continue to minimise cash burn, with all work programmes to be funded within Paladin’s guidance of total expenditure for FY2021 of less than US$10M.

THE RESTART PLAN DETAILS

Background

Paladin owns 75% of the Langer Heinrich Mine, located in Namibia. The remaining 25% is owned by CNNC Overseas Uranium Holdings Limited, a subsidiary of China National Nuclear Corporation (CNNC), a leading Chinese nuclear agency. The Langer Heinrich Mine commenced operations in 2007 and has produced and sold over 43Mlb of U_3O_8 to date. The mine was transitioned into care and maintenance in August 2018 due to the sustained low Uranium price.

Langer Heinrich Mine Restart Plan

The Restart Plan provides a low risk, reliable restart plan balancing the ability to rapidly respond to strengthening Uranium prices and maximising asset value, ensuring the delivery of objectives around:

- Definition of capital improvements required to increase plant runtime to 95%;
- Identification of growth options and work packages to de-bottleneck the plant by 25%;
- Improvement in management systems and process control to increase process stability;
- Verification of license, permits and certificates required for restart;
- Detailing and de-risking The Restart Plan and schedule to ensure benefits will be realised; and
- Modelling key operational Life of Mine metrics.

The Restart Plan has confirmed the economic significance of the Langer Heinrich Mine with key highlights:

1. *Capital restart costs divided by annual production volume.*

Figure 1 – Key Economic Parameters for Langer Heinrich Mine Restart Plan

Restart Costs

The Restart Plan confirms that Langer Heinrich can be brought back into production and deliver reliable operations with a pre-production cash expenditure of US$81M (100% basis). The expenditure is separated into two components:

Operational Readiness (US$34M)

Operational readiness expenditure relates specifically to working capital and other cash expenditure required to restart baseline operations at Langer Heinrich. The operational readiness expenditure will focus on:

- Performing maintenance on plant and infrastructure (US$13M);
- Replenishing reagents, purchasing spare parts and other working capital (US$14M); and
- Workforce recruitment, mobilisation and training. Mobilise key contractors, including mining contractor (US$7M).

Discretionary Capital Investment to Improve Plant Runtime (US$47M)

Discretionary capital investment is focused on improving plant reliability and runtime to 95% (historic levels c.85%) by targeted expenditure on key areas of the process plant including:

- Product drying and packaging facility upgrade reducing product volumes and transport weight (US$14M);
- Leach feed surge tank to decouple crushing from leach and increasing water storage mitigating production interruption when primary water supply is disrupted (US$7M);
- Process control upgrade and process equipment changes to increase stability and control (US$6M);
- Address known asset integrity issues – piping, structural and electrical (US$16M); and
- Tailings dam capacity increased to meet future production (US$4M).

Figure 2 – Aerial Photo of Discretionary Capital Investment Projects

Key Operational Metrics

The Restart Plan has detailed the Life of Mine operational parameters for the restart of production. The remaining 17-year production life of Langer Heinrich has been defined into three phases with different operational performance targets.

Ramp-up Phase (Year 1)

- 12 months from restart commitment to first production;
- Ramp-up to full production targeting 80% nameplate within six months and 100% nameplate within twelve months (McNulty Curve, Type One);
- Targeted reliability improvements deliver 95% runtime, which increases leach capacity (the historical bottleneck) by 12.5% above historical levels; and
- Processing medium grade stockpile at 520ppm grade.

Mining Phase (Years 2-8)

- 7 years targeting 5.9Mlb pa U_3O_8;
- Processing mineralisation between 350 to 900ppm grade (average 593ppm); and
- Further debottlenecking is completed in year 3 to increase leach capacity by an additional 12.5% (US$12M). This staged debottlenecking will be underpinned by two years of operating experience, allowing targeted investment in asset integrity (pumping, piping, electrical upgrades and process control) to improve process stability.

Stockpile Phase (Years 9-17)

- 9 years of processing stockpiles at 336ppm grade; and
- Target 3.5Mlb pa U_3O_8 production.

	Ramp-up Phase (Year 1)	Mining Phase (Year 2-8)	Stockpile Phase (Year 9-17)
Mining Rate (TMM Mt pa)	0	28.8	0
Mill Throughput (Mt pa)	3.3 (from stockpile)	5.1	5.3 (from stockpile)
Mill Availability (%)	71	95	95
Mill Feed Grade (ppm)	520	593	336
Process Recovery (%)	88.5	88.4	88.5
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Capex ($M pa)[2]	1.5	14.5	13.1

1. Excludes stockpile inventory adjustments. 2. Sustaining, minor improvements, progressive rehab and tailings mgt capex. 3. No in-situ mining occurs in Ramp-up and Stockpile phases. Stockpile re-handling only. 4. Figures quoted in table reflect yearly average over the operational phases.

Figure 3 – Langer Heinrich Mine Key Operational Restart Metrics

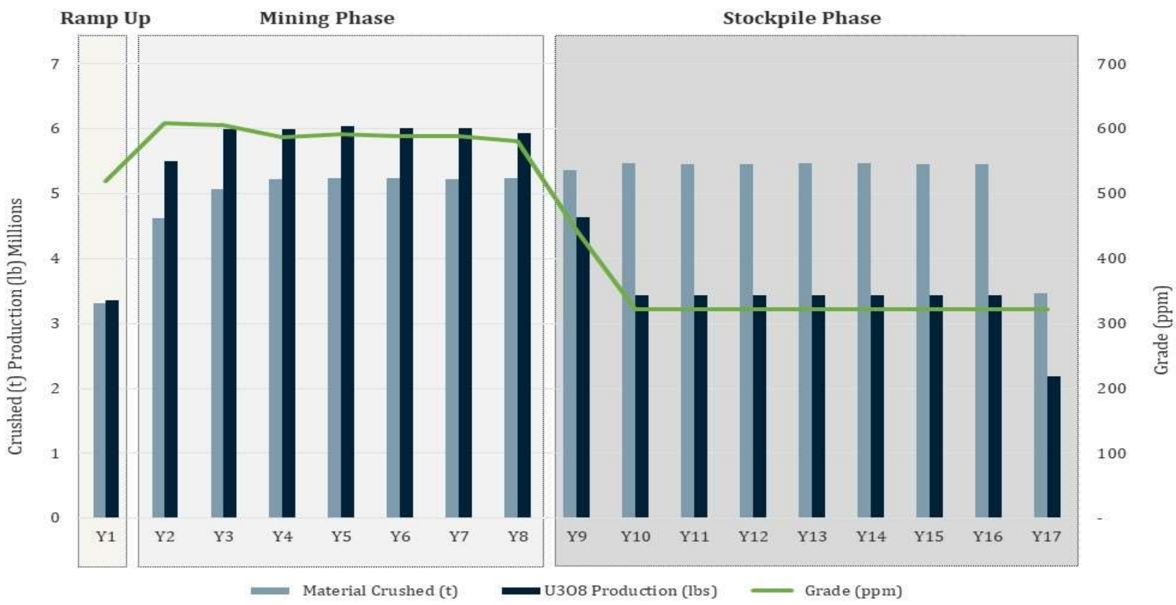

Figure 4 – Langer Heinrich Life of Mine Production Profile

The Mineral Resource estimate in the attached Appendix underpins the production target and has been prepared by a Competent Person in accordance with the requirements of the JORC Code. The production target is based on Mineral Resources of 86.1Mlb and comprises 86% Measured category (inclusive of 30.8Mt ROM stockpiles), 13% Indicated category, and 1% Inferred category Mineral Resource. There is a low level of geological confidence associated with the Inferred category Mineral Resource and no certainty that the production target associated with the Inferred category Mineral Resource will be realised. The Company notes that the Inferred Mineral Resource, representing 1% of Mineral Resources underpinning the production target, is not a material component of the study work.

Given The Restart Plan is a new plan which the previously announced Ore Reserves are not applicable to, moving forward the Company proposes to undertake the necessary work to ascertain the extent to which the Measured and Indicated category Mineral Resources can be defined as Ore Reserves pursuant to the JORC Code.

Cost Profile

The Restart Plan highlights a Life of Mine C1 Cost of Production of US$27/lb confirming Langer Heinrich remains well positioned versus other Tier 1 operations to deliver product into a recovering uranium market.

The Ramp-up Phase reflects the utilisation of existing stockpile material to feed the processing plant, significantly reducing mining costs whilst the operation transitions towards nameplate capacity. Peak mining activity and mining costs occur during the Mining Phase, with high material movement used to feed the processing plant and build-up of low grade stockpiles that will support nine years of stockpile processing during the Stockpile Phase.

Mining costs reflect 45% of total Production Cash Costs during the Mining Phase with Processing & Maintenance costs forming 50%. Mining costs reduce to 17% of total Production Cash Costs during the Stockpile Phase, with 73% of costs relating to Processing & Maintenance.

US$/lb U_3O_8	Ramp-up Phase (Year 1)	Mining Phase (Year 2-8)	Stockpile Phase (Year 9-17)	Life of Mine (All 3 phases)
Mining & Stockpile Rehandling [1]	3.3	12.2	4.6	**8.7**
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1. Excludes stockpile inventory adjustments. 2. Namibian Royalties of 3% US$ sales. Excludes 3rd party royalty of A$0.12/kg. 3. Sustaining, minor improvement, progressive rehab and tailings mgt capital. 4. Opening stockpiles have no book value (written off in 2017/2018)

Figure 5 – Langer Heinrich Mine Cost Profile

Reconciliation of The Restart Plan to The Prefeasibility Study (October 2019)

In October 2019 the Company released the findings of its Prefeasibility Study (refer ASX announcement '*PFS delivers for Langer Heinrich'* released on 14 October 2019).

The October 2019 PFS ('The PFS') outlined two options for restarting operations at the Langer Heinrich Mine, a restart at a 5.2Mlb average annual peak production rate ('The PFS 5.2Mlb Option') and a restart at an expanded 6.5Mlb average annual peak production rate ('The PFS 6.5Mlb Option'). These two options are tabled below, as per the October 2019 ASX Announcement, along with the current Restart Plan:

Option	Total Life of Asset		High and Medium Grade Mineral Resources		Low Grade Mineral Resources		Restart & Improvement Cost (US$ real)
	Timeframe* (years)	AISC (US$/lb)	Peak Production Rate (Mlb pa)	Timeframe (years)	Peak Production Rate (Mlb pa)	Timeframe (years)	
PFS: 5.2Mlb	20	33	5.2	8	2.7	12	80
PFS: 6.5Mlb	16	29	6.5	6	3.4	10	110
The Restart Plan	16	32	5.9	7	3.5	9	81

*Excluding Ramp-up year

Figure 6 – The Restart Plan Metrics Compared to The Prefeasibility Study

The Restart Plan is the result of further optimisation and review processes of The PFS and is the Company's chosen restart option. The Restart Plan allows for a low risk, reliable restart balancing the ability to rapidly respond to strengthening uranium prices, whilst maximising the value of the asset. The Restart Plan is based on a re-sequencing of mining and processing activities outlined in The PFS and takes elements from both The PFS 5.2Mlb Option and The PFS 6.5Mlb Option identified in The PFS. Material assumptions underpinning the production target and forecast financial information derived from the production target continue to apply from the October 2019 PFS and have not materially changed. The Company notes the following comparisons:

<u>*Production*</u>

- Total life of asset forecast production in The Restart Plan and the two PFS options is 76.1Mlb of Uranium; and
- The Restart Plan includes an optimised production profile with more consistent annual production volumes in the first 7 years to facilitate the execution of uranium term contracts.

Restart & Improvement Costs

- The restart and improvement costs in The Restart Plan and the two PFS options are based on the same cost estimates and assumptions with the following two exceptions:
  - US$17M of wet commissioning costs included in restart costs for both of The PFS Options have been reclassified as ramp-up costs in The Restart Plan; and
  - The US$30M of pre-restart improvement costs identified in The PFS 6.5Mlb Option is assumed to be delivered in two tranches in The Restart Plan - US$18M pre-restart and $US12M in year three of operations.

Mine Plan

- The Restart Plan includes an updated and re-sequenced mine plan, aimed at mitigating key risks during Ramp-up and delivering a plan more conducive to contracting mining operations. The new mine plan assumes:
  - Slower ramp-up in mining activities with medium grade stockpiled mineralisation processed for the first 15 months of processing plant operations;
  - A longer mining phase than The PFS 6.5Mlb Option mine plan (7 years vs approximately 4 years), and shorter than The PFS 5.2Mlb Option (10 years); and
  - Higher mining unit costs than The PFS 6.5Mlb Option due to higher total material movement and a longer mine plan (US$8.70/lb v US$6.10/lb), and similar costs to The PFS 5.2Mlb Option (US$8.70/lb v US$8.40/lb).

Processing Plant

- The PFS 6.5Mlb Option assumed a 25% increase in plant throughput on restart;
- The PFS 5.2Mlb Option assumed no improvement to the processing plant;
- The Restart Plan has been optimised to include a two-stage plant expansion, 12.5% throughput increase on restart and a further 12.5% increase during year three of operations; and
- The two-stage plant expansion under The Restart Plan has been chosen to minimise construction and restart risks and to conserve cash ahead of operations.

Costs

- The AISC of The Restart Plan (US$32/lb) is within the range of The PFS 6.5Mlb Option (US$29/lb) and The PFS 5.2Mlb Option (US$33/lb);
- The Restart Plan AISC is higher than The PFS 6.5Mlb Option AISC predominantly due to higher mining costs, resulting from the new mine plan (refer above); and
- The Restart Plan AISC is marginally lower than The PFS 5.2Mlb Option AISC predominantly due to shorter mine life, resulting from higher production levels.

Future Improvements Identified in The PFS

- The PFS identified potential future operating cost savings of US$4.50/lb:
  - These included reagent recovery and recycling, Vanadium production, ore sorting to improve Uranium selectivity from ore, and crushing and ore beneficiation expansion to enable more Uranium to be fed to leach;
  - These cost savings have not been included in The Restart Plan or The PFS; and
  - The Company continues to study and pursue these opportunities; and
- The PFS identified the potential to optimise care and maintenance costs at the Langer Heinrich Mine. The optimisation is now complete, and details of estimated future cost savings will be provided with the release of the Company's FY2021 Budget Expenditure guidance, expected to be released to the market in July 2020.

Uranium Offtake and Pricing

The Langer Heinrich Mine currently has a life of mine Uranium offtake with CNNC Overseas Uranium Holding Limited, a subsidiary of China National Nuclear Corporation (CNNC), a leading Chinese nuclear agency. The offtake is for up to 25% of future production at approximately the then prevailing Uranium spot price. The details of the offtake agreement are commercially sensitive and confidential. The restart of the Langer Heinrich Mine will only be considered on the Company securing additional term contracts with sufficient tenor and value to underpin an appropriate return to all stakeholders. The tenor, structure and pricing of the proposed term contracts is subject to bilateral negotiations with potential customers and are commercially sensitive and confidential.

Given the commercially sensitive and confidential nature of the Company's ongoing discussions with potential customers, the Company will not be providing guidance on the hurdle price required to support a decision to restart the Langer Heinrich Mine. The Company notes that the current spot pricing (~$34/lb) and term pricing (~US$39/lb), as reported by market commentator TradeTech, would not deliver the economic returns required for the Company to restart the Langer Heinrich Mine.

Access to Utilities and Permits Confirmed

The Restart Plan has confirmed that all permits required for restart are, or are reasonably expected to be, in place for production and that Langer Heinrich has contractual and legislative access to critical Government supplied services of water and power.

Mineral Resource Table

	Measured			Indicated			Inferred			Total			
Uranium Mineral Resources 250ppm U_3O_8 cutoff	**Mt**	**Grade ppm U_3O_8**	**Mlb U_3O_8 (100% basis)**	**Mt**	**Grade ppm U_3O_8**	**Mlb U_3O_8 (100% basis)**	**Mt**	**Grade ppm U_3O_8**	**Mlb U_3O_8 (100% basis)**	**Mt**	**Grade ppm U_3O_8**	**Mlb U_3O_8 (100% basis)**	**Paladin Ownership (%)**
Langer Heinrich													
In-situ	66.2	490	71.9	18.8	435	18	6.3	420	5.8	91.3	475	95.7	75
MG[1] ROM Stockpiles	4.7	520	5.4	-	-	-	-	-	-	4.7	520	5.4	75
LG[2] ROM Stockpiles	26.1	325	18.7	-	-	-	-	-	-	26.1	325	18.7	75
Total	97	445	95.9	18.8	435	18	6.3	420	5.8	**122.1**	**445**	**119.7**	**75**

	Measured			Indicated			Inferred			Total			
Vanadium Mineral Resources 250ppm U_3O_8 cutoff	**Mt**	**Grade ppm V_2O_5**	**Mlb V_2O_5 (100% basis)**	**Mt**	**Grade ppm V_2O_5**	**Mlb V_2O_5 (100% basis)**	**Mt**	**Grade ppm V_2O_5**	**Mlb V_2O_5 (100% basis)**	**Mt**	**Grade ppm V_2O_5**	**Mlb V_2O_5 (100% basis)**	**Paladin Ownership (%)**
Langer Heinrich													
In-situ	66.2	160	23.3	18.8	140	5.8	6.3	135	1.9	91.3	155	31	75
MG ROM Stockpiles	4.7	170	1.8	-	-	-	-	-	-	4.7	170	1.8	75
LG ROM Stockpiles	26.1	105	6	-	-	-	-	-	-	26.1	105	6	75
Total	97	145	31.1	18.8	140	5.8	6.3	135	1.9	**122.1**	**145**	**38.8**	**75**

Note: Values may not add due to rounding
[1] "MG" refers to medium grade
[2] "LG" refers to low grade

Figure 7 – Mineral Resource Table

Mineral Resource Update

Run of Mine (ROM) stockpiles have consistently been published as a component part of the total Langer Heinrich Mine Mineral Resource since 2011. The basis of this Mineral Resource update is applying the Measured category classification to these previously separately tabulated ROM stockpiles. The underlying in-situ Mineral Resource as announced on 14 October 2019 remains unchanged, as are the tonnes and grade stated for ROM stockpiles in the same announcement. These ROM stockpiles were created during mining from 2006 to 2016 as part of the long term processing strategy for Langer Heinrich Mine. ROM stockpiles have always been considered by the Company to be equivalent to Measured category material, however, these ROM stockpiles were not previously explicitly reported in such a way.

In order to appropriately address this difference, and for clarity, this Mineral Resource update applies the Measured category classification to the ROM stockpiles and does not convert material from one Mineral Resource category to another.

Summary information in relation to the in-situ Mineral Resources and ROM stockpile Mineral Resources is set out immediately below and at the end of this announcement in accordance with Sections 1 to 3 (inclusive) of Table 1 of the JORC Code.

Summary of the Underlying Data used to Estimate the Grades and Tonnages

The original exploration drilling was targeted at a nominal 50m x 50m grid but is dependent on final drill rig location. Spacing currently increases to approximately 100m at the far western end of the deposit. Pre-mining infill drilling which currently covers over 60% of the deposit has been conducted at a nominal 12.5m x 12.5m spacing. This information forms the basis current in-situ Mineral Resource estimate. The pre-mining infill drilling added over one million metres drilling to the original Mineral Resource dataset.

ROM stockpile material was sourced from areas subject to detailed blasthole drilling at a spacing approximately 3.5m x 3.56m. When mining ceased this amounted to more than 500,000 drill holes and more than 4,000,000 1m composites.

Uranium grade values determined from all drilling types (exploration, pre-mining infill and blasthole) are derived in the same manner using downhole radiometrics and are based on 1m composites of 5cm gamma data. Samples used for validation geochemical assays were split to a 1m interval.

The Vanadium values within the Mineral Resource estimate are based on the ratio of U_3O_8 to V_2O_5 within the mineral carnotite. The Langer Heinrich deposit mineralization is essentially monomineralic in that the vast majority of the mineralization consists of the uranium vanadate carnotite. Minor tyuyumunite has been identified and, although a different related mineral, it is noted the that the molar ratio of U:V is the same for both carnotite and tyuyumunite.

During operations mined tonnes were accounted for by weightometer equipped trucks and grade confirmed with secondary discrimination using radiometric truck scanners. The information related to mined tonnes and secondary grade discrimination was collected as a matter of routine during mining operations and is stored in a mining production reporting (MPR) database. Data stored in the MPR database allows for tracking of material across the mine site and the ability to perform tonnes and grade reconciliation through the mill feed, ROM stockpiles, ore mark-outs at the pit source and the Mineral Resource estimate sequence.

Information in the MPR database was used reconcile the monthly tonnes and grade of each ROM stockpile build and final stockpile build tonnes and grade with mine surveys.

ROM stockpiles were used as the sole source of feed for production between December 2016 and May 2018. Reconciliation between the estimated tonnes and grade of recovered ROM stockpile material fed to the plant and the tonnes and grade as measured by the plant during this period showed no material variation.

Estimation Methodology

The uranium metal in-situ portion of the Mineral Resource was estimated using MIK techniques with a specific variance adjustment correction applied to allow for the level of selectivity expected during the mining process. Estimation search distances range from 50mE x 50mN x 3mRL to 100mE x 100mN x 5.2mRL in three passes. Searches were conducted on an octant basis with a minimum of 4 octants for Measured and Indicated material and two octants for Inferred material. In addition a minimum of 16 samples (and maximum of 48) were required for Measured and Indicated estimates, this was relaxed to a minimum of 8 samples for Inferred material. The full MIK model has been used to report the open pit portion of the mineral resource at a 250ppm U_3O_8 cut-off grade.

The uranium grade estimate used to define the tonnes and grade for ROM stockpiles, when in-situ, is derived from a conditionally simulated model (based on 100 simulations) using a 4m x 4m x 3m block size and the estimation was completed using a multiple pass process with a search distance starting at 8m x 8m x 3m. Searches were conducted on an octant basis with a minimum of 4 octants required for the first pass. Additional economic parameters are applied to the model in order to define economically mineable mineralisation blocks.

The vanadium grade estimate in the Mineral Resource estimates for both in-situ and ROM stockpiles were derived by the application of the U_3O_8 to V_2O_5 ratio described above.

Mineral Resource Classification and Criteria used for Classification

All relevant factors have been taken into account when determining the Mineral Resource classification (including as described above and as follows).

The in-situ Mineral Resource has been classified on the basis of drilling density throughout the deposit as well as the validity of the underlying data.

The information stored in the MPR database, together with routine surveys of ROM stockpile volume, final stockpile build reconciliation, the results of reconciliation of the reclaimed ROM stockpile material used for processing between December 2016 and May 2018 and a reconciliation of the classification of material mined from the current undepleted Mineral Resource Model is the basis of applying the Measured Mineral Resource category to ROM stockpiles.

The ROM stockpile inventory is comprised of mined material that, prior to being mined, was externally classified as Measured and Indicated category Mineral Resources. From 2008, the practice at the mine site was that prior to actual mining taking place, detailed infill drilling at a 12.5m x 12.5m spacing was routinely undertaken in order to provide for final definition of the pit limits and allow for short term mine planning. Prior to mining, blast hole drilling is completed at a routine spacing of 3.5m x 3.56. The blast hole data was subsequently used to create grade control models for individual blast areas using conditional simulation and, from these, derive mining mark-out shapes.

Mined material was transported by a weightometer equipped truck through a radiometric truck scanners which determines the final grade and destination ROM stockpile for each truck. Operations data describing the point of origin, measured trucked tonnes, final discriminated grade and destination ROM stockpile were recorded in the MPR database.

ROM stockpiles are currently broken into two different categories based on the grade range of the feed used to build the stockpile to allow efficient blending and grade profiling of plant feed. The grade range for material delivered to the low grade stockpile was 250ppm – 400ppm U_3O_8. The grade range for the material delivered to the medium grade stockpiles was 400ppm – 650ppm U_3O_8. Material with grades greater than 650ppm U_3O_8 was arranged ROM stockpiles but were consumed during previous operations.

Reconciliation between ROM stockpiles fed to the plant between December 2016 and May 2018 showed that, in terms of tonnes, grade and metal the stockpile movements reported 4.32% higher tonnes, 2.32% lower grade and 1.90% more metal than was received by the processing plant.

Reconciliation of the classification of the material mined from the current undepleted Mineral Resource model determined that 99.96% was classified as Measured category material and 0.04% was classified as Indicated category material at the time it was mined. The proportion of the Indicated category material that was subject to mining is considered immaterial.

Refer also to the 'Mineral Resource Statement Additional Technical Information' section below.

Geology and Geological Interpretation

The in-situ Mineral Resource (from which the ROM stockpiles were mined) is a calcrete-hosted secondary uranium deposit associated with valley-fill sediments in an extensive Tertiary palaeodrainage system. The geological setting of the deposit is well understood having been subject to extensive exploration over a significant period and mining over the 10 year period from 2006 to 2016.

Additional information has routinely been sourced from in-pit mapping of the mineralisation during mining.

Sampling and Sub-sampling Techniques and Sample Analysis Method

In-situ Mineral Resource

All exploration and pre-mining infill drill holes were downhole radiometrically logged at a vertical depth of 5cm with periodic geochemical assaying to confirm radiometrically derived grades. To determine radiometric grades a number of factors are applied to radiometric data to derive a deconvolved equivalent U_3O_8 grade, according to a well-defined and documented procedure (refer to the JORC Table 1 disclosures). Downhole radiometric logging completed by Paladin during in the period 2010 – 2016 was quality controlled by sleeve calibrations on radiometric probes were completed prior to the commencement of each logging shift. Routine calibrations of all downhole radiometric probes were completed at various sites around the world until a purpose-built calibration pit was constructed at LHM. Following construction, the calibration pit was validated against pits at Pelindaba (South Africa), Adelaide (Australia), Grand Junction (USA) and Saskatoon (Canada).

Geochemical assaying was undertaken on reverse circulation (RC) drilling chip samples, which were collected from mineralised holes, to validate downhole gamma results. The routine aim was for approximately 10% of all mineralised holes to be validated by assay. Samples were selected on a 'whole of hole' basis. RC samples are split on the drill rig and should any duplicates be taken they are split from the bulk residue sample by riffle splitter.

Sample preparation was undertaken by either Bureau Veritas in Swakopmund or Intertek Laboratories in Walvis Bay or Actlabs in Windhoek, using industry standard methods (crush–split-pulverize) and is considered appropriate to the style of mineralisation present in the deposit. When required, standard, blank and split duplicates were inserted into the sample stream with the aim being every 20 samples. The material sampled is relatively fine grained and the sample size taken is deemed to be appropriate. Analysis of duplicates has indicated some potential for a bias to be introduced during the splitting process and. Because of this, additional care is taken setting up the drill rig.

ROM Stockpile Mineral Resource

All blast holes were downhole radiometrically logged at a vertical depth of 5cm as described for downhole radiometric logging for exploration and pre-mining infill drilling. No specific geochemical sampling and subsequent assays were undertaken from blasthole drilling.

Vanadium Mineral Resource

During the 2019 drilling program a number of assays were acquired from samples distributed throughout the deposit in order to confirm whether the U:V molar ratio was reasonable throughout the deposit. A specific alkaline partial leach assay method was devised and was utilized by Actlabs in order to confirm that, as a minimum, the carnotite U:V ratio could be relied upon to provide a proxy for vanadium within the deposit. Of the 1,446 samples analysed only two (at a grade of 79 and 102 ppm U_3O_8) reported at less than the expected ratio. All of the other samples reported vanadium results that were higher than the expected ratio—it is believed that this additional vanadium was present in clays in particular and may or may not be reported to the actual processing leach solutions.

Analysis of historical plant uranium and vanadium values also supports the use of a carnotite vanadium value within the Mineral Resource estimate. It should be noted that the reported vanadium values will be a minimum value and it is expected that, during processing, an additional 5–10% vanadium would be expected to be present in leach liquors.

Figure 8 shows the recovery comparison between uranium determined by four acid digest and the uranium determined by defined partial leach methodology to illustrate the effectiveness of the partial leach. The results are broadly in line with those determined from the routine metallurgical testwork for the first hour of leach. It is expected that additional leach time (not practical within the routine commercial laboratory process) would potentially increase the partial leach recovery. Given that carnotite based vanadium would be expected to be leached at the same rate as carnotite based uranium there is no impact on the values used for confirmation of the U:V molar ratio.

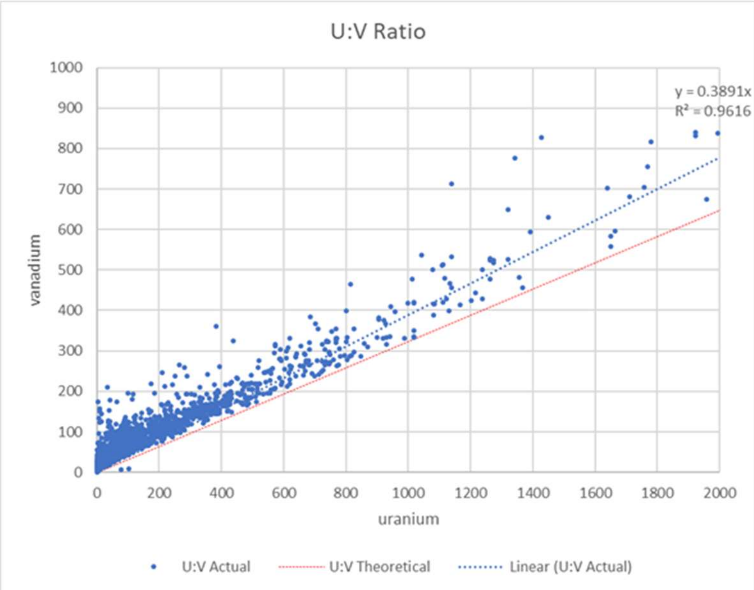

Figure 8 – Partial leach uranium and vanadium results

The basis of the determination of Vanadium values is the same for both the in-situ and ROM stockpile Mineral Resources.

Drilling Techniques

The vast majority of drilling used in the in-situ Mineral Resource estimate comprises RC drilling. Historical drilling included a combination of percussion, RC and diamond core techniques and this drilling now only forms a minor portion of the Mineral Resource dataset. All drilling since 2000 has been RC and over this period the same equipment was used to complete exploration and pre-mining infill drilling.

Blasthole drilling was completed using open hole percussion techniques and, as downhole radiometric logging was used to derive grade values, sample quality derived from this drilling is not considered to be an issue.

Cut-off Grades

Cut-off parameters are based on the likelihood of open pit mining of the in-situ Mineral Resource. Pit optimisation calculations were undertaken at a number of commodity prices to determine both the likely size and scale of the deposit. A uranium price of US$40/lb indicates a marginal cut-off grade of 250ppm U_3O_8 using budgeted mining and processing costs from the PFS. Values for V_2O_5 are reported using the uranium cut-off grade as vanadium is only sourced as a by-product of mining carnotite, the only uranium mineral present.

The cut-off grade for the ROM stockpiles has already been defined (as described above) by the effective cut-off grade applied when the stockpiles were originally mined and the inclusion of these stockpiles within the Mineral Resource does not rely on selective reclamation of the stockpiles.

Reasonable Prospects for Eventual Economic Extraction – Analysis of Mining and Metallurgical Methods and Marameters and other Modifying Mactors Considered to Date

It is assumed that the in-situ Mineral Resource is likely to be extracted by open pit mining techniques. As the Mineral Resource estimation technique is MIK no additional dilution or recovery adjustments have been made over those contained in the original estimation. Refinement of the MIK variance adjustment have been undertaken over and above the calculated values based on mining experience since 2007. The additional variance adjustment reduced the averages grades by approximately 1% relative to the previous Mineral Resource estimate.

No mining dilution or ore loss is applied to ROM stockpile recovery as dimensions are well known. The ROM stockpile floors are surveyed prior to build and no blasting is required prior to recovery.

In terms of metallurgical factors and assumptions, existing metallurgical testwork and previous processing of ROM stockpiles indicates that the in-situ and ROM stockpile Mineral Resources are amenable to conventional alkaline leach extraction at reasonable cost.

Testwork to determine the amenability of the process flowsheet to the production of a vanadium product was undertaken prior to the transition of the site to care and maintenance and is a continuing part of the PFS. Work completed to date indicates that a saleable vanadium product can be reasonably produced within the current flowsheet with only moderate modification to the processing plant within the product recovery area.

As such, the inclusion of vanadium within the resource is deemed reasonable and meets the criteria of ‘Reasonable prospects for eventual economic extraction’. As vanadium will represent purely by-product production no additional value has been placed upon it other than marginal revenue recovery in order to determine reasonable prospects for eventual economic extraction.

Further information regarding the modifying factors applied in relation to the in-situ and ROM stockpile Mineral Resources is set out in the body of this announcement above and in the JORC Table 1 disclosures below. Refer also to the ‘Mineral Resource Statement Additional Technical Information’ section below.

There are no other mining, processing, metallurgical, infrastructure, economic, marketing, legal, environmental, social, and governmental factors material to the in-situ and ROM stockpile Mineral Resources

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This release has been authorised for release by the Board of Directors of Paladin Energy Ltd.

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About Paladin

Paladin Energy Limited (ASX: PDN) is an Australian listed uranium company focussed on maximising the value of its 75% stake in the Langer Heinrich Uranium mine in Namibia.

Langer Heinrich is a globally significant, long-life operation, having already produced over 43Mlb U_3O_8 to date. Operations at Langer Heinrich were suspended in 2018 due to low uranium prices.

Beyond Langer Heinrich, the Company also owns a large global portfolio of uranium exploration and development assets. Nuclear power remains a cost-effective, low carbon option for electricity generation.

APPENDIX

Forward-looking Statement

This announcement includes certain forward-looking statements, such as statements that provide expectations regarding future production, reserve or resource potential, exploration drilling, exploration activities and other events or developments that the Company expects to occur. Although the Company believes that such expectations are based on reasonable assumptions, such statements are not guarantees of future performance and actual results or developments may differ materially from the expectations expressed in the forward-looking statements. The Company does not assume any obligation to update or revise its forward-looking statements, whether as a result of new information, future events or otherwise. No representation is made or will be made that any forward-looking statements will be achieved or will prove to be correct.

Mineral Resource Statement Additional Technical Information

Mineral Resource Table

	Measured			Indicated			Inferred			Total			
Uranium Mineral Resources 250ppm U_3O_8 cutoff	**Mt**	**Grade ppm U_3O_8**	**Mlb U_3O_8 (100% basis)**	**Mt**	**Grade ppm U_3O_8**	**Mlb U_3O_8 (100% basis)**	**Mt**	**Grade ppm U_3O_8**	**Mlb U_3O_8 (100% basis)**	**Mt**	**Grade ppm U_3O_8**	**Mlb U_3O_8 (100% basis)**	**Paladin Ownership (%)**
Langer Heinrich													
In-situ	66.2	490	71.9	18.8	435	18	6.3	420	5.8	91.3	475	95.7	75
MG[1] ROM Stockpiles	4.7	520	5.4	-	-	-	-	-	-	4.7	520	5.4	75
LG[2] ROM Stockpiles	26.1	325	18.7	-	-	-	-	-	-	26.1	325	18.7	75
Total	97	445	95.9	18.8	435	18	6.3	420	5.8	**122.1**	**445**	**119.7**	**75**

	Measured			Indicated			Inferred			Total			
Vanadium Mineral Resources 250ppm U_3O_8 cutoff	**Mt**	**Grade ppm V_2O_5**	**Mlb V_2O_5 (100% basis)**	**Mt**	**Grade ppm V_2O_5**	**Mlb V_2O_5 (100% basis)**	**Mt**	**Grade ppm V_2O_5**	**Mlb V_2O_5 (100% basis)**	**Mt**	**Grade ppm V_2O_5**	**Mlb V_2O_5 (100% basis)**	**Paladin Ownership (%)**
Langer Heinrich													
In-situ	66.2	160	23.3	18.8	140	5.8	6.3	135	1.9	91.3	155	31	75
MG ROM Stockpiles	4.7	170	1.8	-	-	-	-	-	-	4.7	170	1.8	75
LG ROM Stockpiles	26.1	105	6	-	-	-	-	-	-	26.1	105	6	75
Total	97	145	31.1	18.8	140	5.8	6.3	135	1.9	**122.1**	**145**	**38.8**	**75**

Note: Values may not add due to rounding
[1] "MG" refers to medium grade
[2] "LG" refers to low grade

<u>Competent Persons Statement</u>

The information in this announcement that relates to Exploration Results and Mineral Resource estimates for the Langer Heinrich deposit were prepared by David Princep of Gill Lane Consulting who is an independent consultant. Mr. Princep has visited the Project on numerous occasions since 2003, with the most recent being in July 2016. Mr. Princep, a Competent Person, is a Fellow of the Australasian Institute of Mining and Metallurgy and a Chartered Professional Geologist. Mr. Princep has sufficient experience that is relevant to the style of mineralisation and type of deposit under consideration and to the activity being undertaken to qualify as a Competent Person as defined in the 2012 edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (JORC 2012). Mr. Princep approves of and consents to the inclusion of the information in this announcement in the form and context in which it appears.

<u>Underlying Data</u>

For the mineralisation figure below, the colour scheme is as follows; blue = 250 – 400ppm U_3O_8, green = 400 – 650ppm U_3O_8, red = 650 - 900ppm U_3O_8 and magenta >900ppm U_3O_8 and is shown at a 250ppm U_3O_8 cut-off grade.

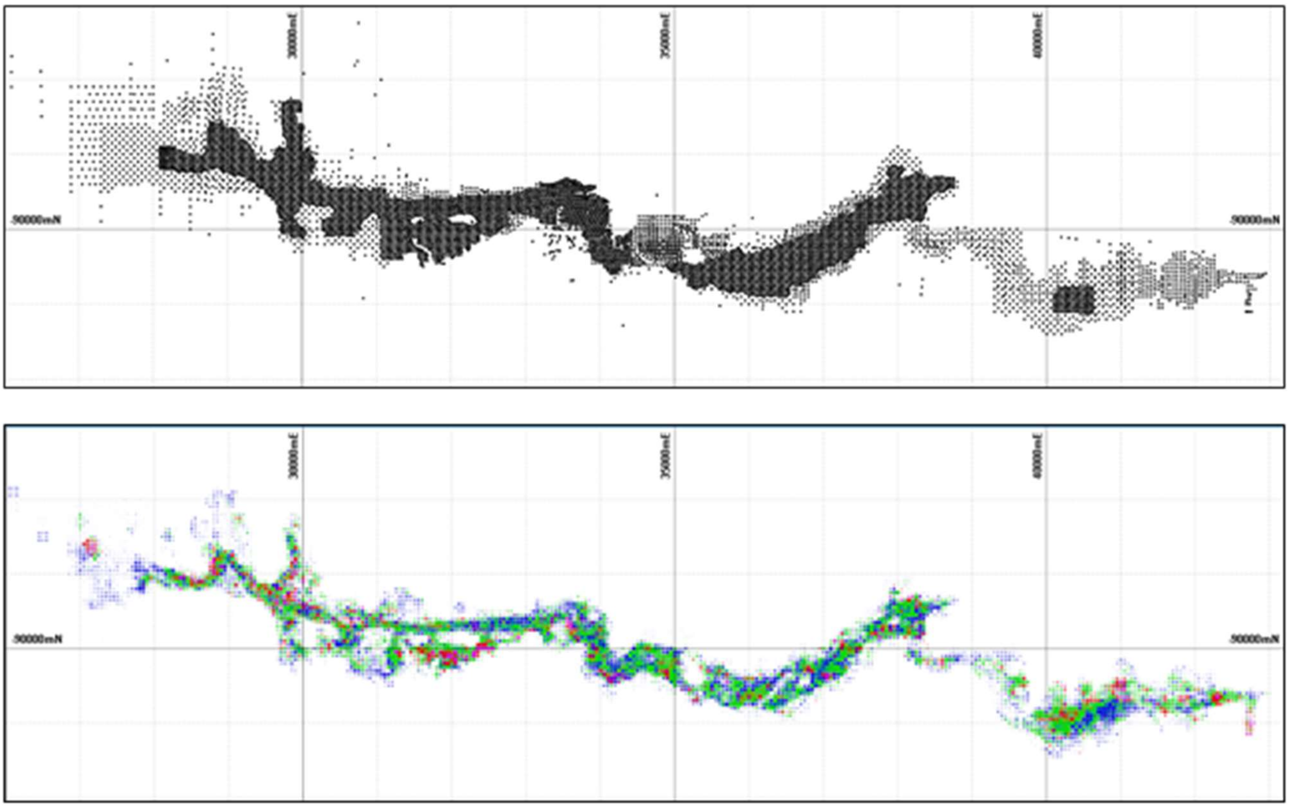

Figure 1: Langer Heinrich Sample Locations and Uranium Mineralisation

JORC Code, 2012 Edition – Langer Heinrich Deposit 2020

Section 1 Sampling Techniques and Data

(Criteria in this section apply to all succeeding sections.)

Criteria	JORC Code Explanation	Commentary
Sampling techniques	Nature and quality of sampling (eg cut channels, random chips, or specific specialised industry standard measurement tools appropriate to the minerals under investigation, such as downhole gamma sondes, or handheld XRF instruments, etc). These examples should not be taken as limiting the broad meaning of sampling. Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used. Aspects of the determination of mineralisation that are Material to the Public Report. In cases where 'industry standard' work has been done this would be relatively simple (eg 'reverse circulation drilling was used to obtain 1m samples from which 3kg was pulverised to produce a 30g charge for fire assay'). In other cases more explanation may be required, such as where there is coarse gold that has inherent sampling problems. Unusual commodities or mineralisation types (eg submarine nodules) may warrant disclosure of detailed information.	The vast majority of drilling used in the mineral resource estimate comprises Reverse Circulation (RC) drilling and downhole radiometric logging. A number of additional factors were used to deconvolve an equivalent U_3O_8 grade, according to a well-defined and documented procedure. For Paladin drilling in the period 2010 – 2016 sleeve calibrations on radiometric probes were completed prior to logging each drill hole. RC chip samples were collected for all mineralised holes to validate downhole gamma results if required. The routine aim is for approximately 10% of all mineralised holes to be validated by assay. Samples were selected on a 'whole of hole' basis. Sampling protocols before Paladin acquired interest: Aimed at 1m samples for all drilling, some drill holes were composited within the historical dataset to longer intervals. Sampling protocols after Paladin acquired interest: Drilling was sampled at the drill rig using a cyclone and rotary or riffle splitter and placed into calico bags, all un-split samples were retained on site for a limited period of time. Samples were also sieved into chip trays to ensure a permanent record was maintained. Sample preparation, crush (where required) – split - pulverize, of the 1m sampled intervals at the laboratory in either by either Bureau Veritas in Swakopmund or Intertek Laboratories in Walvis Bay or Actlabs in Windhoek. Samples were analysed by either XRF or ICP.
Drilling techniques	Drill type (eg core, reverse circulation, open-hole hammer, rotary air blast, auger, Bangka, sonic, etc) and details (eg core diameter, triple or standard tube, depth of diamond tails, face-sampling bit or other type, whether core is oriented and if so, by what method, etc).	All holes were RC. As no core was drilled orientation was not recorded. Prior to Paladin acquiring interest: Historical drilling included a combination of percussion, RC and diamond core, this drilling now only forms a minor portion of the mineral resource dataset. All drilling since 2000 has been RC.
Drill sample recovery	Method of recording and assessing core and chip sample recoveries and results assessed. Measures taken to maximise sample recovery and ensure representative nature of the samples. Whether a relationship exists between sample recovery and grade and whether sample bias may have occurred due to preferential loss/gain of fine/coarse material.	RC sample recoveries have been periodically assessed, especially when samples have been taken to validate downhole radiometric logging. Checks have been undertaken during the life of the project to confirm that fine grained mineralisation is not lost during the drilling process. There is no relationship between RC recovery and grade. The use of downhole radiometrics to derive an assay grade mitigates against any issues with drilling recoveries.

Criteria	JORC Code Explanation	Commentary
Logging	Whether core and chip samples have been geologically and geotechnically logged to a level of detail to support appropriate Mineral Resource estimation, mining studies and metallurgical studies. Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc) photography. The total length and percentage of the relevant intersections logged.	All RC chips are logged by geologists. RC drill chips are stored in chip trays on site. The deposit is currently considered to have minimal metallurgical variability however the geological logging is conducted in detail and is considered appropriate for all future studies. Drilling is continued until approximately 2-5m of basement material has been penetrated ensuring that the entire thickness of the potential mineralisation have been sampled and logged.
Sub-sampling techniques and sample preparation	If core, whether cut or sawn and whether quarter, half or all core taken. If non-core, whether riffled, tube sampled, rotary split, etc and whether sampled wet or dry. For all sample types, the nature, quality and appropriateness of the sample preparation technique. Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples. Measures taken to ensure that the sampling is representative of the in-situ material collected, including for instance results for field duplicate/second-half sampling. Whether sample sizes are appropriate to the grain size of the material being sampled.	RC samples are split on the drill rig, should any duplicates be taken they are split from the bulk residue sample by riffle splitter. Sample preparation was undertaken by either Bureau Veritas in Swakopmund or Intertek Laboratories in Walvis Bay or Actlabs in Windhoek, using industry standard methods (crush–split-pulverize) and is considered appropriate to the style of mineralisation present in the deposit. When required, standard, blank and split duplicates were inserted into the sample stream with the aim being every 20 samples. The material sampled is relatively fine grained and the sample size taken is deemed to be appropriate. Analysis of duplicates has indicated some potential for a bias to be introduced during the splitting process and, because of this, additional care is taken setting up the drill rig. In order to confirm that the U:V ratio in carnotite was uniform throughout the deposit additional samples were sourced from historical (since 2006) drilling where small representative samples were retained (~250g). These samples were inserted into the routine multi element analysis stream and were specifically assayed for vanadium by partial leach.
Quality of assay data and laboratory tests	The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total. For geophysical tools, spectrometers, handheld XRF instruments, etc, the parameters used in determining the analysis including instrument make and model, reading times, calibrations factors applied and their derivation, etc. Nature of quality control procedures adopted (eg standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (ie lack of bias) and precision have been established.	Where required, U_3O_8 was analysed predominantly by pressed powder XRF methods or, in 2019, four acid digest with ICP-MS finish. A scoping study was done prior to the re-commencement of drilling, to determine most appropriate assay method: matrix-matched standard material was analysed by various methods and the method returning the most appropriate results (XRF) was identified. In 2019, due to the requirement to obtain a more comprehensive multi element analysis for geometallurgical studies four acid digest ICP-MS was used for the analysis of 2019 drill samples. Downhole radiometric probes are calibrated at a primary calibration facility each year to confirm both the dead-time and K-factor's to be applied to calculate the equivalent U_3O_8 value. All probes are subject to routine sensitivity checks to identify instrument drift and confirm the reliability of readings. Where radiometric logging is conducted inside drill rods, appropriate casing factors are defined from both in-rod and open hole logs. It is Company policy to use open hole logs wherever possible. The downhole probes in use at Langer Heinrich Mine were Auslog

Criteria	JORC Code Explanation	Commentary
		slimline A33 total count scintilometers. Due to the volume of logging undertaken up to 25 probes may be in use at any one time. Standard, blank and split duplicate are submitted into the sample stream with the target being one set for every 20 samples. Analysis of the drilling programmes undertaken between 2010 and 2016 indicates that the standards and blanks performed very well however duplicate analysis showed some spread in results and investigation suggested this was due to potential excess pressures used during the RC drilling process. A partial leach analysis method was defined for laboratory use. The method matches as reasonably as possible the leach processes encountered during routine processing of mineralised material. This partial leach digest was used to confirm that the amount of vanadium reporting to solution was, at a minimum, equivalent to that expected from the molar equivalence between uranium and vanadium in carnotite. Evidence from >1,500 assays indicates that this ratio is maintained at a minimum and that there is the potential for minor additional vanadium to report to leach liquors. The radiometric truck scanners were routinely calibrated using specific stockpiles of known grade Langer Heinrich Mine mined material. Sensitivity checks of the radiometric truck scanners were undertaken on a regular basis.
Verification of sampling and assaying	The verification of significant intersections by either independent or alternative company personnel. The use of twinned holes. Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols. Discuss any adjustment to assay data.	As both assaying and downhole logging are performed, along with scintillometry of sample bags following geological logging, the identification of mineralized intersections has been confirmed by a number of methodologies and personnel. Other than during the historical, original exploration work, limited twinning of holes has been undertaken however analysis of close spaced pre-mining grade control drilling and mining blast hole drilling (both using the same radiometric logging techniques and equipment) indicates that there is minimal grade variation when sample data is aggregated into mining block sizes. Original work undertaken by Gencor using diamond drilling of the corners around the centre of 2m x 1m test pits indicates that there is significant short scale local grade variability, however when all the sample data from the 5 drill holes was averaged for each vertical metre the results were equivalent to the test pit samples metre. As the RC drill holes are radiometrically logged it is expected that the local variability relative to diamond (in particular) and RC drill sampling will be considerably reduced. Data has been routinely entered into an Access logging database during data capture at the mine. When all data has been collected for a hole, it is transferred to the Paladin main office where the database administrator imports it into the server based Geobank drilling database. Data is verified by geologists after it has been collected, prior to import into Geobank, and

Criteria	JORC Code Explanation	Commentary
		regularly by geologists during geological modelling as well as and prior to resource estimates. The server-based database has restricted access and is internally audited. Uranium is converted to U_3O_8 in the database where required on export by x1.1798.
Location of data points	Accuracy and quality of surveys used to locate drill holes (collar and down-hole surveys), trenches, mine workings and other locations used in Mineral Resource estimation. Specification of the grid system used. Quality and adequacy of topographic control.	As all holes are drilled vertically, are relatively short (with the majority being in the 30-50m range) and the mineralisation is horizontal, only very limited downhole deviation surveys have been carried out. All recent (post 2007) collars were surveyed by DGPS by the minesite surveyor. Historical collars have been re-surveyed when located using DGPS with most locations being accurate. Where discrepancies have occurred these have been traced to original data entry issues or miss locations of holes in previous surveys.
Data spacing and distribution	Data spacing for reporting of Exploration Results. Whether the data spacing and distribution is sufficient to establish the degree of geological and grade continuity appropriate for the Mineral Resource and Ore Reserve estimation procedure(s) and classifications applied. Whether sample compositing has been applied.	The original exploration drilling was targeted at a nominal 50m x 50m grid but is dependent on final drill rig location. Spacing currently increases to approximately 100m at the far western end of the deposit. Pre-mining grade control which currently covers over 60% of the deposit has been conducted at a nominal 12.5m x 12.5m spacing. ROM stockpile material was derived from detailed drilling at a spacing of approximately 3.5m x 3.56m For downhole radiometrics the information used for mineral resources are based on 1m composites of 5cm gamma data. For geochemical assays, samples were split to a 1m interval. All geochemical data has been composited to 1m.
Orientation of data in relation to geological structure	Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type. If the relationship between the drilling orientation and the orientation of key mineralised structures is considered to have introduced a sampling bias, this should be assessed and reported if material.	The majority of mineralisation boundaries are gradational (and the sampling process either includes material either side of the mineralisation or, in the case of radiometrics, the entire drill hole) so not relevant to this style of mineralisation. Orientation of mineralisation is well known and drilling is, in most cases, near perpendicular to the mineralisation.
Sample security	The measures taken to ensure sample security.	Geochemical samples are dispatched with security tags on each container and each receiver signs off to confirm those samples have not been tampered with.
Audits or reviews	The results of any audits or reviews of sampling techniques and data.	A review of the mineral resource estimate was conducted as part of the LHM re-start concept study. No audits of the mineral resource have been completed since mining commenced.

Section 2 Reporting of Exploration Results

(Criteria listed in the preceding section also apply to this section.)

Criteria	JORC Code Explanation	Commentary
Mineral tenement and land tenure status	Type, reference name/number, location and ownership including agreements or material issues with third parties such as joint ventures, partnerships, overriding royalties, native title interests, historical sites, wilderness or national park and environmental settings. The security of the tenure held at the time of reporting along with any known impediments to obtaining a licence to operate in the area.	The vast majority of the drilling used in this mineral resource estimate was carried out on tenement ML140 which was granted 26th July 2005 and has an expiry date of 25th July 2030 with a minor proportion on ML172 which was granted 24th June 2015 and has an expiry date of 23rd June 2040. ML140 has an area of 4,375Ha and ML172 has an area of 2,999Ha. The tenements are 100% owned by Langer Heinrich Uranium Pty Ltd which, in turn, is 75% owned by Paladin Energy Limited. All tenements are in good standing and there are no current impediments to operating in the area.
Exploration done by other parties	Acknowledgment and appraisal of exploration by other parties.	The area has been explored on and off from the mid/late 1970's through to the present with the majority of historical drilling taking place in the 1980's by Gencor, 2000-2002 by Acclaim and most recently from 2003 by Paladin. All work undertaken by the proceeding companies was performed to a very high standard.
Geology	Deposit type, geological setting and style of mineralisation.	Langer Heinrich is a calcrete-hosted secondary uranium deposit associated with valley-fill sediments in an extensive Tertiary palaeodrainage system.
Drill hole Information	A summary of all information material to the understanding of the exploration results including a tabulation of the following information for all Material drill holes: - easting and northing of the drill hole collar; - elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar; - dip and azimuth of the hole; - downhole length and interception depth; - hole length. If the exclusion of this information is justified on the basis that the information is not Material and this exclusion does not detract from the understanding of the report, the Competent Person should clearly explain why this is the case.	Information on previous drilling can be found in the 2005, 2007 and 2010 NI43-101 Technical reports submitted by Paladin. The extent of the drilling can be seen in the plan figures included in the body of the report. To date 39,207 drill holes have been completed on various spacings – 100m x 100m down to 12.5m x 12.5m throughout the deposit. In the majority of cases, at least for the post Gencor work, the drill holes have been to the full depth of the palaeochannel plus a small allowance. ROM stockpile material was derived from detailed drilling at a spacing approximately 3.5m x 3.56m. When mining ceased this amounted to more than 500,000 drill holes and more than 4,000,000 1m composites. All drilling has been vertical as the mineralisation is effectively horizontal. Intercept depths vary between 0m and approximately 70m depending upon location within the strike length of the deposit – in general intercepts are shallow to the east and at depth to the west due to topographic surface erosion.
Data aggregation methods	In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (eg cutting of high grades) and cut-off grades are usually Material and should be stated. Where aggregate intercepts incorporate short lengths of high grade results and longer lengths of low grade results, the procedure used for such aggregation should be stated and some typical examples of such aggregations should be shown in detail. The assumptions used for any reporting of metal equivalent values should be clearly stated.	Not applicable as no exploration results are reported.

Criteria	JORC Code Explanation	Commentary
Relationship between mineralisation widths and intercept lengths	These relationships are particularly important in the reporting of Exploration Results. If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported. If it is not known and only the downhole lengths are reported, there should be a clear statement to this effect (eg 'downhole length, true width not known').	Due to the use of vertical drilling and the horizontal, layered nature of the deposit all drill intercepts can be considered to represent the true width of the mineralisation.
Diagrams	Appropriate maps and sections (with scales) and tabulations of intercepts should be included for any significant discovery being reported These should include, but not be limited to a plan view of drill hole collar locations and appropriate sectional views.	See Figure 1 in the Appendix above.
Balanced reporting	Where comprehensive reporting of all Exploration Results is not practicable, representative reporting of both low and high grades and/or widths should be practiced to avoid misleading reporting of Exploration Results.	Not applicable as no exploration results are reported.
Other substantive exploration data	Other exploration data, if meaningful and material, should be reported including (but not limited to): geological observations; geophysical survey results; geochemical survey results; bulk samples – size and method of treatment; metallurgical test results; bulk density, groundwater, geotechnical and rock characteristics; potential deleterious or contaminating substances.	Not applicable as no exploration results are being reported.
Further work	The nature and scale of planned further work (eg tests for lateral extensions or depth extensions or large-scale step-out drilling). Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.	It is expected that, as mining is undertaken, the programme of 12.5m x 12.5m pre-mining grade control drilling will continue until the entirety of the deposit has been drilled out. Currently the only area of the deposit not closed off is that to the west of ML140 within ML172. It is expected that, as the mineralisation within ML140 is mined out, additional wide spaced exploration drilling will be undertaken in ML172.

Section 3 Estimation and Reporting of Mineral Resources

(Criteria listed in the preceding section also apply to this section.)

Criteria	JORC Code Explanation	Commentary
Database integrity	Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes. Data validation procedures used.	All data has been extensively validated back to the original paper and electronic logs and any issues have been resolved. The geological database contains extensive validation tools for automatic flagging of a significant number of potential validation issues. Data validation procedures are visual (based on comparison of printed logs and sections) and electronic (on database upload of electronic information – assay results, gamma and downhole survey logs etc.)
Site visits	Comment on any site visits undertaken by the Competent Person and the outcome of those visits. If no site visits have been undertaken indicate why this is the case.	The project has been repeatedly visited by the Competent Person since 2003 with the most recent being for a period of 14 days during July 2016.
Geological interpretation	Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit. Nature of the data used and of any assumptions made. The effect, if any, of alternative interpretations on Mineral Resource estimation. The use of geology in guiding and controlling Mineral Resource estimation. The factors affecting continuity both of grade and geology.	The geological setting of the deposit is well understood having been subject to extensive exploration over a significant period and mining over the 10 year period from 2006 to 2016. Additional information has routinely been sourced from in-pit mapping of the mineralisation during mining. The mineral resource was defined by a combination of the modelled geological sequence and mineral resource grade shells. The local geology appears to be relatively simple in the main and it is not expected that any alternative interpretation would substantially alter either the gross geological model or the contained metal within the mineral resource estimate.
Dimensions	The extent and variability of the Mineral Resource expressed as length (along strike or otherwise), plan width, and depth below surface to the upper and lower limits of the Mineral Resource.	The current Mineral Resource is modelled to be approximately 16km in strike, 0m to 100m in depth and varies in width from 300m to 900m depending on the position of the paleochannel walls.
Estimation and modelling techniques	The nature and appropriateness of the estimation technique(s) applied and key assumptions, including treatment of extreme grade values, domaining, interpolation parameters and maximum distance of extrapolation from data points. If a computer assisted estimation method was chosen include a description of computer software and parameters used. The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data. The assumptions made regarding recovery of by-products. Estimation of deleterious elements or other non-grade variables of economic significance (eg sulphur for acid mine drainage characterisation). In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.	The Mineral Resource was estimated using Multi Indicator Kriging (MIK) techniques with a specific variance adjustment correction applied to allow for the level of selectivity expected during the mining process. Estimation search distances range from 50mE x 50mN x 3mRL to 100mE x 100mN x 5.2mRL in three passes. Searches were conducted on an octant basis with a minimum of 4 octants for Measured and Indicated material and two octants for Inferred material. In addition a minimum of 16 samples (and maximum of 48) were required for Measured and Indicated estimates, this was relaxed to a minimum of 8 samples for Inferred material. The full MIK model has been used to report the open pit portion of the mineral resource at a 250ppm U_3O_8 cut-off grade. The Mineral Resource reported here has been compared to the previous mineral resource estimate and compared favourably in terms of total contained tonnes and metal. The uranium grade estimate used to define the tonnes and grade for ROM stockpiles, when in-situ, is derived from a conditionally simulated

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	Any assumptions behind modelling of selective mining units. Any assumptions about correlation between variables. Description of how the geological interpretation was used to control the resource estimates. Discussion of basis for using or not using grade cutting or capping. The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.	model (based on 100 simulations) using a 4m x 4m x 3m block size and the estimation was completed using a multiple pass process with a search distance starting at 8m x 8m x 3m. Searches were conducted on an octant basis with a minimum of 4 octants required for the first pass. Additional economic parameters are applied to the model in order to define economically mineable ore blocks. Once the material has been mined it is scanned using a radiometric discriminator in order to finally assign the material to a particular ROM stockpile. Grade wireframes were used to define distinct geology and mineralisation domains and these were used to control the MIK estimation. The only potential by-product is V2O5, a constituent part of carnotite, the only uranium mineral currently contained within the deposit. V2O5 has been estimated within the mineral resource based on the stoichiometric ratio between Uranium and Vanadium within carnotite. It is acknowledged that there may be additional vanadium within the mineralisation processed however it is currently assumed that the majority of this material would be refractory relative to the existing flowsheet. Testwork undertaken to date suggests that there are no deleterious elements or other non-grade variables of economic significance. The primary block sizes are 50m (E) x 50m (N) x 3m (RL) and are orientated in the direction of the strike of the mineralisation and are considered appropriate to both the average width of the mineralisation and the current drilling density. The selective mining unit (SMU) size of 4m x 4m x 3m was determined on the basis of the likely size of equipment used to mine the deposit and likely bench height for mining open pit. As the Mineral Resource estimation technique was MIK no grade capping or cutting was undertaken. Swath plots of the Mineral Resource and underlying sample data (in North, East and RL directions) was used to assess the validity of the Mineral Resource estimate. In all cases it is believed that the Mineral Resource estimate is reasonable. Basic reconciliation between the resource, mined and mill feed grades indicated a good to very good correlation between all grade sources.
Moisture	Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.	Tonnages are estimated dry.
Cut-off parameters	The basis of the adopted cut-off grade(s) or quality parameters applied.	Cut-off parameters are based on the likelihood of open pit mining of the Mineral Resource. Pit optimisation calculations were undertaken at a number of commodity prices to determine both the likely size and scale of the deposit. A uranium price of US$40/lb indicates a marginal cut-off grade of 250ppm U_3O_8 using budgeted

Criteria	JORC Code Explanation	Commentary
		mining and processing costs from The PFS. Values for V_2O_5 are reported using the uranium cut-off grade as vanadium is only sourced as a by-product of mining carnotite, the only uranium mineral present. The cut-off grade for the ROM stockpiles has already been defined by the effective cut-off grade applied when the stockpiles were originally mined and the inclusion of these stockpiles within the Mineral Resource does not rely on selective reclamation of the stockpiles
Mining factors or assumptions	Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but the assumptions made regarding mining methods and parameters when estimating Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the mining assumptions made.	It is assumed that the mineralisation is likely to be extracted by open pit mining techniques. As the mineral resource estimation technique is MIK no additional dilution or recovery adjustments have been made over those contained in the original estimation. Refinement of the MIK variance adjustment have been undertaken over and above the calculated values based on mining experience since 2007. The additional variance adjustment reduced the averages grades by approximately 1% relative to the previous Mineral Resource estimate. No mining dilution or ore loss is applied to ROM stockpile recovery as dimensions are well known. The ROM stockpile floors are surveyed prior to build and no blasting is required.
Metallurgical factors or assumptions	The basis for assumptions or predictions regarding metallurgical amenability. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential metallurgical methods, but the assumptions regarding metallurgical treatment processes and parameters made when reporting Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the metallurgical assumptions made.	Existing metallurgical testwork indicates that the mineralisation is amenable to conventional alkaline leach extraction at reasonable cost. Testwork to determine the amenability of the process flowsheet to the production of a vanadium product was undertaken prior to the transition of the site to care and maintenance and is a continuing part of the PFS. Work completed to date indicates that a saleable vanadium product can be reasonably produced within the current flowsheet with only moderate modification to the processing plant within the product recovery area. As such, the inclusion of vanadium within the resource is deemed reasonable and meets the criteria of 'Reasonable prospects for eventual economic extraction'. As vanadium will represent purely by-product production no additional value has been placed upon it other than marginal revenue recovery in order to determine reasonable prospects for eventual economic extraction.
Environmental factors or assumptions	Assumptions made regarding possible waste and process residue disposal options. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider the potential environmental impacts of the mining and processing operation. While at this stage the determination of potential environmental impacts, particularly for a greenfields project, may not always be well advanced, the status of early consideration of these potential environmental impacts should be reported. Where these aspects have not been considered this should be reported with an explanation of the environmental assumptions made.	Environmental baseline work was undertaken prior to the commencement of mining operations and this has been continued by Paladin. A full environmental impact assessment on the project has been completed and the operation continues to meet all existing environmental requirements. There are no other known legal, political or other risks that could materially affect the potential development of the mineral resources.

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Bulk density	Whether assumed or determined. If assumed, the basis for the assumptions. If determined, the method used, whether wet or dry, the frequency of the measurements, the nature, size and representativeness of the samples. The bulk density for bulk material must have been measured by methods that adequately account for void spaces (vugs, porosity, etc), moisture and differences between rock and alteration zones within the deposit. Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.	The bulk density value used in the Mineral Resource estimate was determined from analysis of diamond drill core, mining and processing samples using standardised techniques. A large number of bulk density determinations were used and these are distributed throughout the mineralisation. The main method employed was weighing in air and water following drying and sealing of the sample. This method is considered to appropriately deal with void, moisture and rock type differences. The value applied to the mineral resource estimate is based on the predominant mineralised rock type.
Classification	The basis for the classification of the Mineral Resources into varying confidence categories. Whether appropriate account has been taken of all relevant factors (ie relative confidence in tonnage/grade estimations, reliability of input data, confidence in continuity of geology and metal values, quality, quantity and distribution of the data). Whether the result appropriately reflects the Competent Person's view of the deposit.	The Mineral Resource has been classified on the basis of drilling density throughout the deposit as well as the validity of the underlying data. All relevant factors have been taken into account when determining the Mineral Resource classification. Run of Mine (ROM) stockpiles have consistently been published as a component part of the total Langer Heinrich Mine Mineral Resource since 2011. The basis of this Mineral Resource update is applying the Measured category classification to these previously separately tabulated ROM stockpiles. The underlying in-situ Mineral Resource as announced on 14 October 2019 remains unchanged, as are the tonnes and grade stated for ROM stockpiles in the same announcement. These ROM stockpiles were created during mining from 2006 to 2016 as part of the long term processing strategy for Langer Heinrich Mine. ROM stockpiles have always been considered by the Company to be equivalent to Measured category material, however, these ROM stockpiles were not previously explicitly reported in such a way. In order to appropriately address this difference, and for clarity, this Mineral Resource update applies the Measured category classification to the ROM stockpiles and does not convert material from one Mineral Resource category to another. The current classification of the deposit reflects the opinion of the Competent Person. The information stored in the MPR database, together with routine surveys of ROM stockpile volume, final stockpile build reconciliation, the results of reconciliation of the reclaimed ROM stockpile material used for processing between December 2016 and May 2018 and a reconciliation of the classification of material mined from the current undepleted Mineral Resource Model is the basis of applying the Measured Mineral Resource category to ROM stockpiles. The ROM stockpile inventory is comprised of mined material that, prior to being mined, was externally classified as Measured and Indicated category Mineral Resources. From 2008, the practice at the mine site was that prior to actual mining taking place, detailed infill drilling at a

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		12.5m x 12.5m spacing was routinely undertaken in order to provide for final definition of the pit limits and allow for short term mine planning. Prior to mining, blast hole drilling is completed at a routine spacing of 3.5m x 3.56. The blast hole data was subsequently used to create grade control models for individual blast areas using conditional simulation and, from these, derive mining mark-out shapes. Mined material was transported by a weightometer equipped truck through a radiometric truck scanners which determines the final grade and destination ROM stockpile for each truck. Operations data describing the point of origin, measured trucked tonnes, final discriminated grade and destination ROM stockpile were recorded in the MPR database. ROM stockpiles are currently broken into two different categories based on the grade range of the feed used to build the stockpile to allow efficient blending and grade profiling of plant feed. The grade range for material delivered to the low grade stockpile was 250ppm to 400ppm U_3O_8. The grade range for the material delivered to the medium grade stockpiles was 400ppm – 650ppm U_3O_8. Material with grades greater than 650ppm U_3O_8 was arranged ROM stockpiles but were consumed during previous operations. Reconciliation between ROM stockpiles fed to the plant between December 2016 and May 2018 showed that, in terms of tonnes, grade and metal the stockpile movements reported 4.32% higher tonnes, 2.32% lower grade and 1.90% more metal than was received by the processing plant. Reconciliation of the classification of the material mined from the current undepleted Mineral Resource model determined that 99.96% was classified as Measured category material and 0.04% was classified as Indicated category material at the time it was mined. The proportion of the Indicated category material that was subject to mining is considered immaterial. The Mineral Resources appropriately reflect the Competent Person's view of the deposit. The current classification of the deposit reflects the opinion of the Competent Person.
Audits or reviews	The results of any audits or reviews of Mineral Resource estimates.	The Mineral Resource estimate has been reviewed by Company specialists and the current values reflect this review. The Mineral Resource estimate was also reviewed as part of the PFS Independent Peer Review and no material issues were found
Discussion of relative accuracy/ confidence	Where appropriate a statement of the relative accuracy and confidence level in the Mineral Resource estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the resource within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the	Based on the current understanding of the deposit it is believed that the Mineral Resource estimate reasonably reflects the accuracy and confidence levels within the deposit. Due to the nature and style of the mineralisation it is expected that additional, detailed, infill drilling will locally modify grades and thicknesses however the global tonnages and grades are expected to remain consistent.

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	factors that could affect the relative accuracy and confidence of the estimate. The statement should specify whether it relates to global or local estimates, and, if local, state the relevant tonnages, which should be relevant to technical and economic evaluation. Documentation should include assumptions made and the procedures used. These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	