NI 43-101
PRELIMINARY ECONOMIC ASSESSMENT TECHNICAL REPORT FOR THE VAN DYKE COPPER PROJECT

Miami, Gila County, Arizona

Centred at 3,695,560 N and 512,000 E (NAD 27)

Submitted to:
Copper Fox Metals Inc.
Suite 650, 340-12th Avenue SW
Calgary, Alberta V2R 1L5

26 February 2021

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DATE & SIGNATURE PAGES

Herewith, our report entitled 'Technical Report and Updated Resource Estimate for the Van Dyke Copper Project with an effective date of December 30, 2020.

"Signed and Sealed"

Sue C. Bird, M.Sc., P.Eng.
Moose Mountain Technical Services
Principal Engineer

Dated the _26_Feb 2021

"Signed and Sealed"

R. A. (Bob) Lane, P.Geo.
Moose Mountain Technical Services
Associate Geologist

Dated the _26_Feb 2021

"Signed and Sealed"

Tracey D. Meintjes, P.Eng.
Moose Mountain Technical Services
Principal Engineer

Dated the _26_Feb 2021

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Jim Norine, P.E.
Ausenco
Principal Engineer

Dated the _26_Feb 2021

CONSENT OF QUALIFIED PERSONS

I, **Sue C. Bird, P. Eng.**, consent to the public filing of the technical report titled **"Preliminary Economic Assessment for the Van Dyke Copper Project"** with the effective date of December 30, 2020 by Copper Fox Metals Inc. I certify that I have read the News Release dated January 13, 2021 filed by Copper Fox Metals Inc. and any other News Releases relating to the report that fairly and accurately represents the information in the Sections of the Technical Report for which I am responsible.

Dated this _26_ day of February 2021

"Signed and Sealed"

Sue C. Bird, M.Sc., P.Eng.
B.C. Registration No. 25007

I, **R. A. (Bob) Lane, P.Geo.**, consent to the public filing of the technical report titled **"Preliminary Economic Assessment for the Van Dyke Copper Project"** with the effective date of December 30, 2020 by Copper Fox Metals Inc. I certify that I have read the News Release dated January 13, 2021 filed by Copper Fox Metals Inc. and any other News Releases relating to the report that fairly and accurately represents the information in the Sections of the Technical Report for which I am responsible.

Dated this _26_ day of February 2021

"Signed and Sealed"

R. A. (Bob) Lane, P.Geo.
B.C. Registration No. 18993

I, **Tracey D. Meintjes, P.Eng** consent to the public filing of the technical report titled **"Preliminary Economic Assessment for the Van Dyke Copper Project"** with the effective date of December 30, 2020 by Copper Fox Metals Inc. I certify that I have read the News Release dated January 13, 2021 filed by Copper Fox Metals Inc. and any other News Releases relating to the report that fairly and accurately represents the information in the Sections of the Technical Report for which I am responsible.

Dated this _26_ day of February 2021

"Signed and Sealed"

Tracey D. Meintjes, P.Eng.
B.C. Registration No. 37018

I, **Jim Norine, P.E.** consent to the public filing of the technical report titled **"Preliminary Economic Assessment for the Van Dyke Copper Project"** with the effective date of December 30, 2020 by Copper Fox Metals Inc. I certify that I have read the News Release dated January 13, 2021 filed by Copper Fox Metals Inc. and any other News Releases relating to the report that fairly and accurately represents the information in the Sections of the Technical Report for which I am responsible.

Dated this 26 day of February 2021

"Signed and Sealed"

Jim Norine, P.E.
Registration 42008 (state of Arizona)

CERTIFICATE & DATE – Sue C. Bird

I, Sue C. Bird, M.Sc., P.Eng., do hereby certify that as a co-author of the report titled: **"Preliminary Economic Assessment for the Van Dyke Copper Project"** dated 26 February 2021.

1. I am a Principal of Moose Mountain Technical Services, residing at 1752 Armstrong Ave., Victoria, B.C.
2. I graduated with a Geologic Engineering degree (B.Sc.) from the Queen's University in 1989.
3. I graduated with a M.Sc. in Mining from Queen's University in 1993.
4. I am a member of the Association of Professional Engineers and Geoscientists of B.C. (No. 25007).
5. I have worked as an engineering geologist for a total of 18 years since my graduation from university.
6. My past experience with Cu deposits includes acting as qualified person (QP) for the resource estimate on a number of deposits including Rosemont, AZ, Ilovitza, as well as resource and reserve estimation for Taseko's Gibraltar Mine, BC.
7. I have read the definition of "qualified person" set out in National Instrument 43-101 and certify that by reason of education, experience, independence, and affiliation with a professional organization, I meet the requirements of an Independent Qualified Person as defined in National Instrument 43-101.
8. I am responsible for Sections 14, 15, 16, 18, 19, 20, 21, 22, 24 and portions of 1, 25 and 26 related to the resource and mine plan of this report titled **"Preliminary Economic Assessment for the Van Dyke Copper Project"** dated 26 February 2021.
9. I am independent of Copper Fox Ltd., as described in Section 1.5 of NI 43-101 and do not own any of their stocks or shares. I work as a geological and mining consultant to the mining industry.
10. To the best of my knowledge, information and belief at the effective date, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading. I have read NI 43-101 and Form 43-101F1, and the Technical Report has been prepared in compliance with that instrument and form.
11. I consent to the filing of the Technical Report with any stock exchange and other regulatory authority and any publication by them, including electronic publication in the public company files on their websites accessible by the public.

Dated this 26 day of February 2021

"Signed and Sealed"

Sue C. Bird, M.Sc., P.Eng.
B.C. Registration No. 25007

CERTIFICATE & DATE – R. A. (Bob) Lane

I, R. A. (Bob) Lane, P.Geo., do hereby certify that as a co-author of the report titled: **"Preliminary Economic Assessment for the Van Dyke Copper Project"** dated 26 February 2021.

1. I am an associate of Moose Mountain Technical Services, and the president of Plateau Minerals Corp., a mineral exploration consulting company with an office located at 3000-18th Street, Vernon, British Columbia.
2. I am a graduate of the University of British Columbia in 1990 with a M.Sc. in Geology.
3. I am a Professional Geoscientist (P.Geo.) registered with the Association of Professional Engineers and Geoscientists of British Columbia (Registration #18993) and have been a member in good standing since 1992.
4. I have practiced my profession continuously since 1990 and have more than 25 years of experience investigating a number of mineral deposit types, including copper porphyry and related deposits, primarily in British Columbia.
5. I have read the definition of "qualified person" set out in National Instrument 43-101 and certify that by reason of education, experience, independence, and affiliation with a professional organization, I meet the requirements of an Independent Qualified Person as defined in National Instrument 43-101.
6. I visited the Van Dyke Copper Project on May 24-25, 2019.
7. I am responsible for Sections 1 - 12 and Sections 23 and portions of 25 and 26 of the technical report entitled "**Preliminary Economic Assessment for the Van Dyke Copper Project**" dated 26 February 2021.
8. I am independent of the issuer applying all of the tests in Section 1.5 of National Instrument 43-101. I hold no direct or indirect interest in the Van Dyke Copper Project.
9. I am not aware of any material fact or material change with respect to the subject matter of the report that is not disclosed in the report which, by its omission, would make the report misleading.

12. To the best of my knowledge, information and belief at the effective date, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading. I have read NI 43-101 and Form 43-101F1, and the Technical Report has been prepared in compliance with that instrument and form.
13. I consent to the filing of the Technical Report with any stock exchange and other regulatory authority and any publication by them, including electronic publication in the public company files on their websites accessible by the public.

Dated this _26_ day of February 2021

"Signed and Sealed"

R. A. (Bob) Lane, P.Geo.
B.C. Registration No. 18993

CERTIFICATE & DATE – Tracey D. Meintjes

I, Tracey D. Meintjes, P.Eng., of Vancouver B.C. do hereby certify that:

1. I am a Metallurgical Engineer with Moose Mountain Technical Services with a business address at 1975 1st Avenue South, Cranbrook, BC, V1C 6Y3.
2. This certificate applies to the technical report entitled "**Preliminary Economic Assessment for the Van Dyke Copper Project**" dated 26 February 2021 (the "Technical Report").
3. I am a graduate of the Technikon Witwatersrand, (NHD Extraction Metallurgy – 1996)
4. I am a member in good standing of the Association of Professional Engineers and Geoscientists of British Columbia (#37018).
5. My relevant experience includes metallurgy and process engineering, and mine planning in North America, South America, South Africa, and Europe. My experience includes both operations and metallurgical process development including base metals, precious metals, industrial minerals, coal, uranium, and rare earth metals. My base metals project experience includes both operations and metallurgical process development. I have been working in my profession continuously since 1996.
6. I am a "Qualified Person" for the purposes of National Instrument 43-101 (the "Instrument").
7. I have not visited the Property.
8. I am responsible for Section 13 of the Technical Report.
9. I am independent of Copper Fox Metals Inc. as defined by Section 1.5 of the Instrument.
10. I have been involved with the Van Dyke Project during the preparation of previous Technical Reports.
11. I have read the Instrument and the Technical Report has been prepared in compliance with the Instrument.
12. As of the date of this certificate, to the best of my knowledge, information, and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated this 26 day of February 2021

"Signed and Sealed"

Tracey D. Meintjes, P.Eng.
B.C. Registration No. 37018

CERTIFICATE & DATE – Jim Norine

I, Jim Norine, P.E., of Tucson, Arizona do hereby certify that:

1. I am a Mechanical Engineer as well as Tucson Director, Minerals and Metals with Ausenco Engineering USA South with a business address at 4071 Port Chicago Hwy, Ste 120, Concord, California 94520.
2. This certificate applies to the technical report entitled "**Preliminary Economic Assessment for the Van Dyke Copper Project**" dated 26 February 2021 (the "Technical Report").
3. I am a graduate of the Northern Arizona University, (BS Mechanical Engineering – 2000)
4. I am a member in good standing of the Arizona Board of Technical Registration (#42008).
5. My relevant experience includes Mechanical Engineering and Project Management as they relate to the Delivery of Base and Precious Metals Processing plants in North America. I have practiced Mechanical Engineering and Project Management for over 20 years. I have worked for previous engineering consulting and construction management companies for over 18 1/2 years and 1 ½ years for Ausenco Engineering. I have been working in my profession continuously since 2000.
6. I am a "Qualified Person" for the purposes of National Instrument 43-101 (the "Instrument").
7. I have not visited the Property.
8. I am responsible for Sections 1, 17, 25, and 26 of the Technical Report.
9. I am independent of Copper Fox Metals Inc. as defined by Section 1.5 of the Instrument.
10. I have not been involved with the Van Dyke Project during the preparation of previous Technical Reports.
11. I have read the Instrument and the Technical Report has been prepared in compliance with the Instrument.
12. As of the date of this certificate, to the best of my knowledge, information, and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated this _26_ day of February 2021

"Signed and Sealed"

____

Jim Norine, P.E.
Arizona Registration No. 42008

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1 Summary

1.1 Project Overview

Copper Fox Metals Inc. (Copper Fox) retained Moose Mountain Technical Services (MMTS) to prepare a National Instrument 43-101 (NI 43-101) Preliminary Economic Assessment Technical Report for the Van Dyke Copper Project (the "Project"), Gila County, Arizona, U.S.A. The reasons for updating the previous PEA are:

1. changes in economic conditions, including a higher copper price,
2. a substantial increase in the soluble copper content of the deposit due to re-assaying and re-modelling of the deposit,
3. a more robust geological model,
4. revised soluble copper recovery estimates, and
5. Re-evaluation of the underground mine development and recovery well scheduling.

The updated resource estimate titled "NI 43-101 Technical Report and Updated Resource Estimate for the Van Dyke Copper Project" published on 4 May 2020, is used as the basis for Sections 4 through 14. The remaining chapters of this report build upon the work supporting the previous PEA published by MMTS on 18 December 2015, titled "NI 43-101 Preliminary Economic Assessment Technical Report for the Van Dyke Copper Project".

The Project has a long history of exploration, development and limited mining that dates to 1916. Copper Fox Metals Inc. (Copper Fox) and its wholly owned subsidiary Desert Fox Copper Inc. (Desert Fox) have been involved in exploration at the Van Dyke deposit intermittently since 2013.

It is the intent of his Technical Report to provide the reader with a review of a potential project economics of this mine plan and recommendations for future work. This report suggests a mine plan that utilizes underground access and in-situ copper recovery (ISCR) combined with traditional solvent extraction and electrowinning (SX-EW) to extract acid soluble copper (ASCu and CNSCu).

The key economic results of the PEA are summarized in Table 1-1 below and compared to the 2015 PEA. All currency is in US dollars. The results show a significant increase in mine life, copper production and economic indicators for the project.

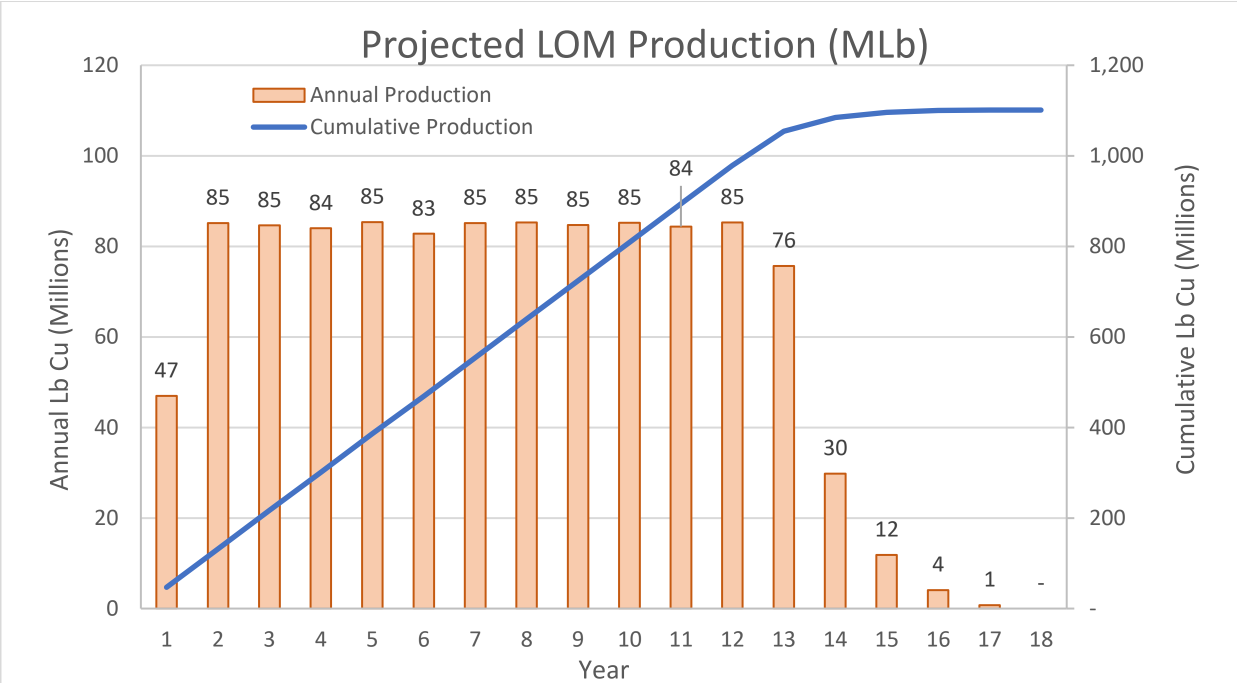
Table 1-1 Summary and Comparison of Economic Parameters

		Base Case	
Production and Cost Summary	**Units**	**2015 PEA**	**2020 PEA**
Life of Mine (LOM)	years	11	17
Copper Cathode Sold	Million lbs.	456.9	1,101.0
Copper Price	$US/lb	3.00	3.15
Gross Revenue	M$US	1,370.0	3,468.3
Royalties	M$US	31.5	82.5
Total Cash Costs	M$US	550.2	1,075.8
Total Cash Costs ($/lb recovered copper)	$US/lb copper	1.20	0.98
C1 Cash Costs ($/lb recovered copper) *	$US/lb copper	1.08	0.86
Sustaining Costs ($/lb recovered copper)	$US/lb copper	0.15	0.07
All In sustaining cost (AISC)**	$US/lb copper	1.36	1.14
Initial Capital Costs (includes contingency)	M$US	204.4	290.5
Taxes	M$US	110.9	321.0
Cashflow Parameters and Outputs			
Discount Rate	%	8.0%	7.5%
Pre-tax Net Free Cash Flow - EBITDA	M$US	453.1	1,757.3
Pre-tax NPV	M$US	213.1	798.6
Pre-tax IRR	%	0.4	48.4%
Pre-tax Payback	years	2.3	2.0
Post-tax Net Free Cash Flow	M$US	342.2	1,436.3
Post-tax NPV	M$US	149.5	644.7
Post-tax IRR	%	27.9%	43.4%
Post-tax Payback	years	2.9	2.1

EBIDTA is a financial term showing earnings before deduction of interest, taxes, depreciation, and amortization
* includes mining, processing, site services, G&A, transportation, and Royalty Costs
** includes Total Cash Cost, Sustaining Capital, Royalties, Severance Taxes
lbs=pounds, M$US=million United States dollars. Numbers are rounded

Note 1: AISC and C1 costs are non-GAAP financial measures which do not have standardized meanings prescribed by International Financial Reporting Standards (IFRS). These measures are meant to provide further information to investors and should not be considered in isolation or used as a substitute for other measures of performance prepared in accordance with IFRS.

Copper production over the life of the mine is 1.1 billion pounds of copper. The copper production in Years 2 through 12 is approximately 85Mlbs annually (106tpd) with ramp up and ramp down as illustrated in the plot of Figure 1-1.



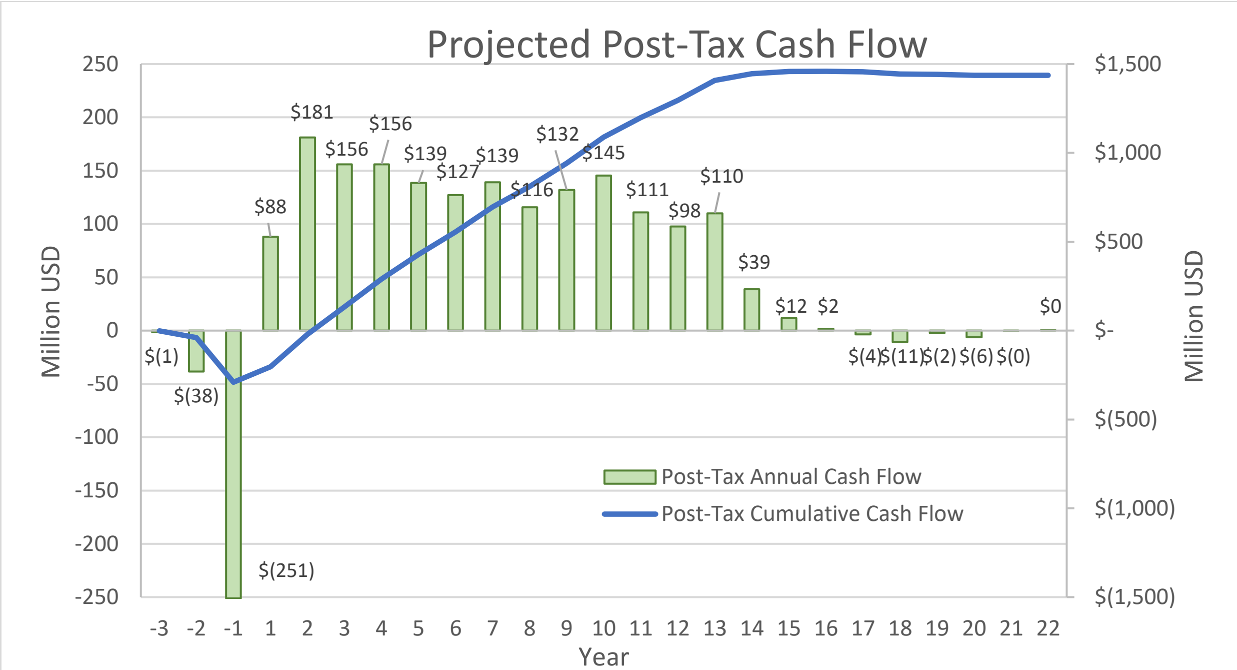
Source: MMTS

Figure 1-1 Annual and Cumulative Copper Production (Mlbs)

1.1.1 Cashflow Results

The economic analysis for the Base Case before taxes indicates an IRR of 48.4%, an NPV of US$798.6 million, and a payback period of 2.0 years. The economic analysis after taxes indicates an IRR of 43.4%, an NPV of US$644.7 million and a payback period of 2.1 years. The Base Case Net Free Cash Flow after recovery of all operating capital and sustaining costs before tax is estimated to be US$1.757 billion and US$1.436 billion after tax.

The cashflow on an annualized basis is shown in Figure 1-2 for the post-tax case.



Source: MMTS

Figure 1-2 Projected Post-Tax Cash Flow

1.1.2 Sensitivity Analyses

Several sensitivity analyses have been run to determine the projects robustness. The effect of discount Rate, Copper Price, metallurgical recovery, capital cost and operating costs have all been evaluated.

The pre-tax and post-tax Net Present Value (NPV) for the Van Dyke ISCR project at various discount rates is summarized in the Table below with the 7.5% Base Case discount rate highlighted.

Table 1-2 Net Present Value – Sensitivity to Discount Rate

Discount Rate	NPV Pre-tax (M$US)	NPV Post-tax (M$US)
5.0%	$ 1,031.0	$ 835.6
7.5%	$ 798.6	$ 644.7
8.0%	$ 759.9	$ 612.4
10.0%	$ 623.4	$ 499.8
12.0%	$ 513.2	$ 408.8

The effect of an increase in copper price on the both the pre-tax and post-tax cashflow, NPV and IRR is summarized in the Table below.

Table 1-3 Project Economics Sensitivity to Copper Price

		Copper Price ($US)		
Production	**Unit**	**$US3.15**	**$US3.30**	**$US3.50**
Copper Cathode sold	Millions of lbs.	1,101.0	1,101.0	1,101.0
Gross Revenue	M$US	3,468.3	3,633.5	3,853.7
Royalties	M$US	82.5	86.4	91.7
Total Operating Costs	M$US	1,075.8	1,075.8	1,075.8
Initial capital	M$US	268.3	268.3	268.3
Sustaining capital	M$US	75.1	75.1	75.1
QT revenue split	M$US	209.3	226.4	249.3
Taxes	M$US	321.0	350.4	389.7
C1 Cost ($lb/recovered copper)	$US/lb.	0.98	0.98	0.98
AISC ($lb/recovered copper)	$US/lb.	1.14	1.15	1.15
Cashflow Parameters and Outputs	**Unit**	**$US3.15**	**$US3.30**	**$US3.50**
Discount Rate	%	7.5	7.5	7.5
Pre-tax Net Free Cash Flow-EBITDA*	M$US	1,757.3	1,901.4	2,093.5
Pre-tax NPV	M$US	798.6	870.9	966.7
Pre-tax IRR	M$US	48.4%	51.3%	55.1
Post-tax Net Free Cash Flow	M$US	1,436.3	1,551.0	1,703.8
Post-tax NPV	M$US	644.7	701.8	777.9
Post-tax IRR	M$US	43.4%	45.8%	49.1%

**EBIDTA is a financial term showing earnings before deduction of interest, taxes, depreciation, and amortization charges.*

A sensitivity analysis has been conducted on the base case pre-tax NPV and IRR of the project for the following variables: Cu Price, Cu Recovery, Capital cost and Operating costs. The plots below illustrate these sensitivities for the post-tax case. The project NPV is most sensitive to copper prices and copper recovery and less sensitive to operating and capital costs as illustrated in Figure 1-3. The IRR is sensitive to copper prices, recoveries and a decrease in capital costs as illustrated in Figure 1-4.

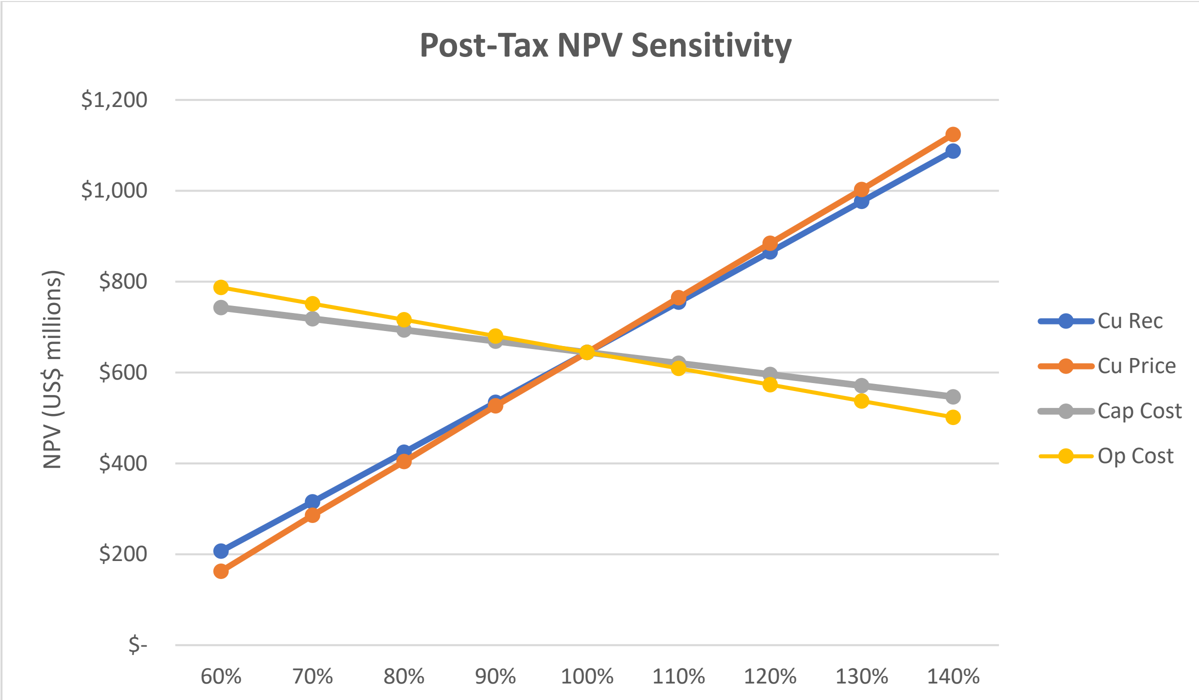


Figure 1-3 Post-Tax Project Sensitivities of NPV

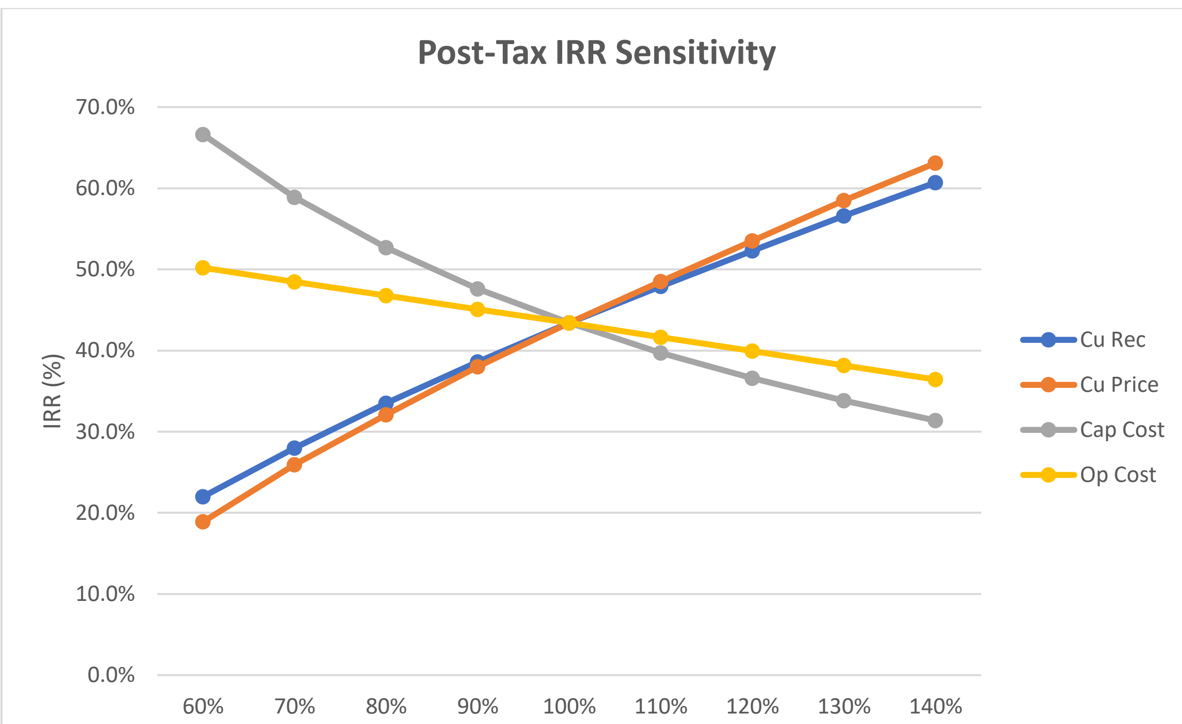


Figure 1-4 Post-Tax Project Sensitivities of IRR

1.2 Mineral Resource Estimate

The Resource Estimate of the Van Dyke deposit with an effective date of January 9, 2020 is listed inTable 1-4. Mineral resources are estimated within both a 0.025% Recovered Cu grade shell and within a "reasonable prospects for eventual economic extraction" shape, which includes internal dilution or all "must take" material within the confining shape.

The mineral resources are estimated using criteria consistent with the CIM Definition Standards (2014) and the "CIM Estimation of Mineral Resources and Reserves Best Practice Guidelines" (2019).

To account for 12.7Mlbs of Cu removed during historic mining operations, it has been assumed that all previous mining occurred in the Oxide Zone. The tonnage has been reduced by the amount required to reduce the total resource by the mined amount, with the average grades remaining constant.

Table 1-4 Resource Estimate for the Van Dyke Deposit, effective date January 9, 2020

							Cu Metal (Mlbs)	
Class	**KTonnes (000)**	**Rec Cu (%)**	**TCu (%)**	**ASCu (%)**	**CNCu (%)**	**Recovery (%)**	**Soluble Cu**	**Total Cu**
Indicated	97,637	0.24	0.33	0.23	0.04	90	517	717
Inferred	168,026	0.19	0.27	0.17	0.04	90	699	1,007

Notes:

1. *The "reasonable prospects for eventual economic extraction" shape has been created based on a copper price of US$2.80/lb, employment of in-situ leach extraction methods, processing costs of US$0.60/lb copper, and all in operating and sustaining costs of $US 1.25/tonne, a recovery of 90% for total soluble copper and an average Specific Gravity of 2.6t/m3.*
2. *Approximate drill-hole spacing is 80m for Indicated Mineral Resources*
3. *The average dip of the deposit within the Indicated and Inferred Mineral Resource outlines is 20 degrees. Vertical thickness of the mineralized envelope ranges from 40m to over 200m.*
4. *Numbers may not add due to rounding.*

The author is not aware of any environmental, permitting, legal, title, taxation, socio-economic, marketing, political, or other relevant factors that could materially affect the Mineral Resource estimate for the Van Dyke deposit that have not been accounted for in the reporting.

1.3 Project Location, Description and Ownership

The Van Dyke Copper Project is in the Globe-Miami mining district, Gila County, east-central Arizona, approximately 110 kilometers east of Phoenix. The land survey coordinates for the Project include Sections 29, 30, and 33 of Township 1 North, Range 15 East, Gila and Salt River Baseline and Meridian (GSRBM) and Sections 25, 31, and 36 of Township 1 North, Range 14 East, GSRBM. The Project is centered at 512000 E and 3695600 N (UTM; NAD27) within the administrative boundaries of, and well beneath, the town of Miami, Arizona.

The Project consists of 26 patented parcels of mineral estate lands and 35 unpatented lode mining claims. The mineral estate lands cover a total area of 531.5 hectares (ha) and are 100%-owned by Desert Fox Van Dyke Co. (a wholly owned subsidiary of Copper Fox Metals Inc.). The unpatented lode mining claims occur immediately south of, and in part overly the mineral estate lands. They cover 292.0ha of Federal Land administered by the Bureau of Land Management (BLM) and are also 100%-owned by Desert Fox Van Dyke Co.

1.4 History

In 1916, newly formed Van Dyke Copper Co. (VDCC) drilled its first hole (V-1) on the Van Dyke property, mineral estates that lay adjacent to those owned by Miami Copper Company and Inspiration Consolidated Copper Company. In the spring of 1919, VDCC began to excavate the vertical Van Dyke shaft located near the first drillhole (Rice, 1921; Peterson, 1962). By 1921, the shaft had reached a depth of 1,692 feet and had intersected mineralization like that cut by hole V-1 (Rice, 1921).

Further development was suspended because of low copper prices, but by 1928, copper prices had recovered and VDCC resumed its exploration and development activities. Underground drifts were developed on the main 1212, 1312 and 1412 Levels. The first ore shipments were made in 1929 and continued through to 1931, when copper prices declined to uneconomic levels (Peterson, 1962). The mine re-opened in 1943 as a National Defense project but closed again in June 1945. Metal production for the two periods of operation (1929-1931 and 1943-1945) totaled 11,851,700 pounds of copper (Peterson, 1962).

In the early 1970s, Occidental optioned its interest in the property at different times to AMAX and to Utah International. While the two companies conducted considerable amounts of drilling, both terminated their option agreements with Occidental. By 1975, a total of 50 holes had been drilled throughout the project area, including many within the town of Miami, covering an area measuring approximately 1300m east-west by approximately 1000m north-south. Mineralization encountered consisted primarily of the secondary copper minerals azurite, malachite and chrysocolla in tectonically fractured to brecciated Early Proterozoic Pinal Schist. Drilling determined that the Van Dyke deposit is covered by from 186 - 627m of unmineralized Tertiary Gila Conglomerate.

In 1976, Occidental initiated an in-situ leaching (ISL), or in-situ copper recovery (ISCR) pilot program in an area due west of the Van Dyke shaft. The pilot program was completed in 1977 and confirmed that ISCR was suitable for extracting copper from the deposit.

In 1986, Kocide Chemical Corporation (Kocide), negotiated a deal with VDCC to develop an ISCR and copper recovery operation in the area that Occidental had tested. Approximately 4 million pounds of copper cement was produced in 1988-89 and in 1989-90 it abandoned its plans and the Van Dyke property lay dormant until 2012.

In 2012, Bell Copper Corporation (Bell) entered into a purchase and sale agreement with Bennu Properties, LLC, Albert W. Fritz Jr. and Edith Spencer Fritz (Bennu-Fritz). In July 2012, Copper Fox signed a purchase agreement with Bell to acquire 100% of its interest in the Van Dyke property.

In 2014, Copper Fox completed six PQ diameter diamond drillholes with an aggregate length of 3,211.7m. The 2014 program also included 8 pressure leach tests, simulating in-situ conditions which allowed for an understanding of the copper recoveries/leach time/reagent consumption/deleterious elements in the

PLS. Modeling of the deposit showed that the deposit is open to the south and southwest, where additional drilling was recommended (Bird and Lane, 2015).

In 2015, Copper Fox completed a NI-43-101 Technical Report entitled "Preliminary Economic Assessment Technical Report for the Van Dyke Copper Project" dated November 18, 2015 prepared under the direction of Moose Mountain Technical Services, Mr. Jim Gray, P.Eng., et al as Qualified Persons. The PEA suggested that Van Dyke is a technically sound ISCR copper project, utilizing underground access and conventional SX-EW recovery methods with low cash costs, strong cash flow, a post-tax NPV of US $149.5 million and IRR of 27.9%. The PEA was based on $US 3.00/lb copper and included an Inferred Resource of 183 million tonnes containing 1.33 billion pounds of copper at an average total copper grade of 0.33%. Mine life was estimated to be 11 years with annual copper production of 60 million pounds in Years 1-6, declining thereafter.

1.5 Geology, Mineralization and Deposit Characteristics

The Van Dyke Copper Project is in the Basin and Range province of east-central Arizona, and centrally within the Globe quadrangle. East-central Arizona, including the Globe-Miami district, has undergone considerable structural deformation that began in the Paleoproterozoic and persisted through to the Tertiary. The Globe-Miami mining district is underlain by igneous, sedimentary, and metamorphic rocks of Precambrian, Paleozoic, Tertiary, and Quaternary age. The oldest exposed rocks in the district are Early Proterozoic (1.6-1.7 Ga) turbidites and felsic volcanic rocks of the Pinal Schist that were metamorphosed to greenschist facies. Subsequently, the Late Proterozoic Apache Group, a relatively thin (~1km) succession of regionally extensive marine sedimentary rocks was deposited across the region. Paleozoic rocks in the district include Cambrian Troy Quartzite, Devonian Martin Limestone, Mississippian Escabrosa Limestone, and Pennsylvanian to Permian Naco Formation. On the Van Dyke property, the post-Pinal Proterozoic strata and Paleozoic strata are absent; Pinal Schist is overlain directly by Tertiary Gila Conglomerate.

Laramide ages, intrusions, ranging from granodiorite to diorite, granite, and granodiorite to quartz monzonite, were emplaced during several phases of igneous activity. The most recent of these is the Schultz Granite, a composite pluton that was emplaced during the Paleocene (59 to 64 Ma). It underlies the southern part of the district; its younger porphyritic phases are genetically and spatially related to the area's porphyry copper and vein deposits.

The Van Dyke copper deposit is located within the Miami-Inspiration trend of deposits that includes five principal orebodies; from west to east they are Live Oak, Thornton, Miami Caved, Copper Cities and Miami East. The Van Dyke copper deposit lies to the east, and on the hangingwall side, of the Miami fault, a district-scale northerly-trending, east-dipping normal fault that developed during Tertiary extension. East side down displacement on the Miami fault is estimated to be approximately 200-220m, placing the Van Dyke deposit at deeper levels than the adjacent Miami Caved deposit. The entire Van Dyke copper deposit resides beneath a blanket of Gila Conglomerate and alluvium that ranges from 186 – 627m in thickness.

In 2019, Copper Fox re-analyzed 2,193 samples from 38 historical drillholes and updated the geological model for the Van Dyke deposit. The updated model indicates that the pre-Gila Conglomerate geology of the Van Dyke is more complex than previously depicted due to a series of interpreted WNW trending granite porphyry dikes of the Schultz intrusive. The 2019 modelling recognized a number of faults, but these faults are not interpreted to dismember the Van Dyke deposit as was interpreted by Occidental. As well the distribution of the secondary copper mineralization outlined in 2019 does not support Occidental's interpretation of two mineralized panels separated by a low grade to non-mineralized zone.

The Oxide zone consists primarily of malachite, azurite, chrysocolla, cuprite and native copper. The secondary copper mineralization occurs in fractures, quartz veins and in tectonically fractured to brecciated Pinal Schist. Beneath the Oxide zone there exists a weakly developed Supergene zone. It contains sparse malachite, azurite, chrysocolla and locally abundant chalcocite, and is transitional at depth into zones of low grade hypogene (chalcopyrite-molybdenite) mineralization, primarily in the central and western parts of the deposit.

1.6 Deposit Type

The principal type of mineral deposit found to-date on the Van Dyke property is that of an enriched secondary or supergene copper deposit that is genetically and spatially tied to the well-known and well-developed porphyry copper systems located adjacent to the Project and the hypogene mineralization beneath it. Malachite, azurite, chrysocolla and chalcocite comprise the majority of the copper-bearing minerals at Van Dyke. They formed from the weathering and oxidization of primary copper and iron sulphides creating copper-laden solutions that migrated laterally and downward primarily along interconnected zones of fracturing and brecciation.

1.7 2019 Sampling Program

A 2019 resampling program of drill core chips, rejects, and pulps from 38 historic drillholes located within the Van Dyke deposit added 2,193 new analyses for Total Copper (TCu), Acid Soluble Copper (ASCu) and Cyanide Soluble Copper (CNCu). This data, together with data collected from the company's 2014 drill program and other historic drillhole data, was used to remodel the deposit using a Total Soluble Copper (TSCu) cut-off grade of 0.025%. This data, coupled with the use of a robust Quality Assurance/Quality Control program, adequately verified the historical data base. Weighted average grades of the mineralized intervals are shown in Section 10.3.

1.8 Analytical Methods

Copper Fox used Skyline Assayers and Laboratories (Skyline) in Tucson, Arizona, for the analysis of all historic drill core chip, drill core reject, and drill core pulp samples collected from the 2019 resampling program except for check samples which were analyzed by Activation Laboratories Ltd. (Actlabs) in Ancastor, Ontario, Canada. A comprehensive Quality Assurance/Quality Control (QA/QC) program was instituted to check for lab accuracy and precision. Samples were analyzed for total copper, acid soluble copper, and cyanide soluble copper.

1.9 Data Verification

Copper Fox's 2019 sampling program of historic drill core chip, reject and pulp samples was designed to provide a complete as possible modern data set to support the estimation of an updated resource estimate for the Van Dyke Copper Project.

Lane visited the site while the 2019 sampling and shipping program was actively underway and verifies that sampling procedures employed by Copper Fox personnel was consistent with modern best exploration management practices, including use of a comprehensive QA/QC program.

Overall, the new data produced from the re-analysis of selected historical drill core and drill core pulps correlated strongly with the original values for total copper. However, the new acid soluble copper values were consistently higher than the historical values. The variances in the latter may be the result of 40 years of oxidation that affected stored historic drill core and drill core pulps. Also, modern acid soluble copper or sequential copper analytical methods, such as the use of a ferric-bearing leachate, may be more aggressive, and therefore extract more copper, than the techniques used four decades ago. The re-analysis of a selection of historical drill core and drill core pulps verify that earlier operators followed proper procedures and used adequate care to obtain reproducible results. However, some historical reporting suggested that the copper contribution from chrysocolla was not fully represented in the analytical results.

MMTS is of the opinion that the 2019 Copper Fox sampling program:

1. generated analytical results that are suitable for use in resource estimation,
2. where both historic data and 2019 data exist, data from 2019 will be used for resource estimation,
3. through a rigorous QA/QC assessment of the data, verified that the remainder of the historical analytical results are suitable for use in resource estimation.

1.10 Mining Method

Trade-off studies (MMTS, 2015) indicate that it is more cost effective to install the in-situ wellfield from underground development rather than from surface. The proposed access to the mineralized zone contemplates an access ramp from surface to the mineralized zone using mechanized equipment to allow development within the targeted production zone and installation of service and ventilation facilities.

A total of 5,936m of underground development is planned over the LOM as described in Table 1-5.

Table 1-5 Van Dyke Underground Development Summary

Excavation Type	Qty	Length (m)	Dimensions	Shape	Total Length (m)
Main Access Ramp to Portal	1	1,456	4.6m W x 4.6m H	Arch (wall 3.1m)	1456
Vents/ Access from Ramp to Van Dyke shaft	2	15	3.6m W x 3.6 m H	Flat	30
North Decline	1	1,141	4.6m W x 4.6m H	Arch (wall 3.1m)	1,141
North Vent/Egress Decline	1	216	3.6m W x 3.6 m H	Flat	216
Vent/Egress Raise	1	401	3.0m dia	Bore	401
Galleries	10	74	6.1m W x 6.1m H	Arch (wall 4.6m)	740
Phase 1 Total Excavation					**3,984**
South Decline	1	1,173	4.6m W x 4.6m H	Arch (wall 3.1m)	1,173
South Vent/Egress way	1	23	2.0 m x 2.0 m	Flat	23
Galleries	14	54	6.1m W x 6.1m H	Arch (wall 4.6m)	756
Phase 2 Total Excavation					**1,952**
Combined Total Excavation					**5,936**

All underground development will be completed using conventional drill and blast tunneling techniques by mining contractors. Appropriate ground support will be completed as and if required. The first phase of underground development is contemplated to be completed during pre-production phase, and includes the main access ramp, ventilation and access to the historic Van Dyke shaft, the north decline for access above the deposit, the galleries connecting to the decline in which the wells are to be installed, and the ventilation and egress decline connecting to the ventilation and egress raise at the end of the decline. Ventilation during access ramp and underground development will be provided by a fan located at the historic Van Dyke shaft. Ventilation raises will serve as alternate egress route as required. The second phase of development is contemplated to include the south decline, the galleries for well installation associated with the second phase, and the ventilation and egress way connecting to the ventilation and egress raise.

The mine plan is estimated to produce roughly 190,000 LCM of waste rock that will be stored in a valley directly adjacent to the portal on land owned by Desert Fox. Funds have been allocated within the PEA to progressively reclaim the rock pile in accordance with permit requirements at the end of the mine life.

1.11 In-situ Copper Recovery (ISCR)

Copper Extraction and Acid Consumption:

Historical operations and prior metallurgical testwork confirm that Van Dyke is suitable to use ISCR for extraction of copper. An overall 76% Cu recovery (including Plant Efficiency of 95% and Pre-conditioning of the mineralized zone to ensure a high Sweep Efficiency) was used in the PEA. Leaching is carried out using a weak (5gram/liter) solution of sulphuric acid over a five-year period. Acid consumption is estimated to be approximately 1.5lb acid/lb copper produced based on the current testing and historical leach test results.

No deleterious elements in the pregnant leach solution (“PLS”) were identified during the 2014 pressure leach tests.

Underground Production Wells:
The copper recovery circuit has been designed to establish a closed system related to fluid injection and recovery. The well holes will be drilled in angled fan patterns from underground galleries and follow an approximate 5-spot pattern with four recovery wells surrounding a single injection well in a repeating pattern, with the average distance between injection and recovery wells designed to be 21m.

The study incorporates permeability enhancement to induce additional fracturing around each drillhole to achieve desired leach solution saturation via injection holes and well flow rates of PLS from recovery holes. The number of wells in the PEA is 1925 with ratio of recovery wells to injection wells slightly over 1:1.

Forecasted Copper Production:

The Base Case contemplates 85Mlbs/year (similar in scale to Taseko's Florence ISCR project) of Grade "A" copper cathode production that includes an initial ramp up year (yr. 1) at 60% of production capacity and a three-year (yrs. 14-17) ramp down period with reduced annual production at the end of mine life. Mine life is estimated to be 17 years.

The Pregnant Leach Solution ("PLS") recovered from the wellfield is pumped to the PLS retention pond on surface and then to the Solvent Extraction Electrowinning ("SX-EW") facilities for copper recovery. Reagents are added to the solution from the SX-EW plant to bring the solution to required operating concentrations and is then recycled back to the wellfield. No deleterious elements in the PLS were identified during the pressure leach tests conducted by Copper Fox.

1.12 Infrastructure

The Van Dyke project is located within the town limits of Miami, Arizona. Sewer, water, communications, and powerlines are currently present on the property. The planned administration, maintenance, and warehouse facilities are located along Chisholm Avenue and the SX-EW facilities and truck scale are sited at the end of Nash Avenue to take advantage of local topography, accommodate environmental considerations, and ensure efficient operations. The processing facilities include:

- Solvent extraction plant,
- Electrowinning tank house and tank farm for auxiliary vessels,
- Solution pond to handle: PLS, raffinate, process water, emergency pond,
- Water treatment plant,
- Ancillary facilities including warehouse and maintenance shop, and
- Administration offices.

1.13 Cost Estimates

1.13.1 Capital Costs:

Initial Capital Costs, presented in the Table below, are defined as all costs incurred until commencement of copper production, including pre-production operating costs. Capital Cost estimates are based on new construction costs and consists of direct and indirect cost factors. Factored estimates are used for Codes A, D, E, and all indirect costs. For Code B and Code C detailed estimates are used.

Table 1-6 Initial Capital Estimate Summary

Initial Capital Estimate Summary		
WBS* Code	**Description**	**Cost (US$ 000s)**
A	General Site	11,440
B	ISCR Well Field	6,035
C	Underground Mining	49,676
D	Processing	62,225
E	Buildings and Facilities	9,750
PP	Pre-Production Operating Costs**	22,287
Total Direct Costs		**161,413**
X	Indirect Costs	48,827
Y	Owner's Costs	23,913
Total Indirect Costs		**74,740**
Z	Contingency (30% of Direct and Indirect))	56,386
Total Initial Capital Cost		**290,539**

** Work Breakdown Structure (WBS)*
***Indirect Costs, Owner's Costs, and Contingency are not applied to Initial Operating Costs.*

A contingency is included based on the expected level of accuracy and engineering definition used in a PEA. The contingency covers undefined items of work within the scope of the project and is set at 30% of direct and indirect cost codes A, B, C, D, E, and X.

1.13.2 Indirect Costs:

Indirect Costs are calculated as a percentage of direct construction costs and capture charges that construction contractors might apply or include in their rates. Factors used for estimating indirect costs are shown in Table 1-7 below.

Table 1-7 Indirect Costs

Indirect Categories and Factors	
Construction Indirects - % of Direct Costs	15%
Spares - % of Processing Costs	5%
Initial Fills - % of Processing Costs	0%
Freight and Logistic - % of Direct Costs	5%
Commissioning and Pre-operational Start-up	Allowance
EPCM - % of Direct Costs	10%
Vendors	Allowance
Taxes and Duties	3%

1.13.3 Sustaining Capital Costs:

Sustaining Capital Costs are all capital expenditures incurred after commencement of copper production including additional or replacement equipment, additional underground development, and continuous well field expansion. LOM Sustaining Capital Costs are outlined in the Table below.

Table 1-8 Sustaining Capital Costs

Sustaining Capital Estimate Summary		
WBS Code	**Description**	**COST ($US 000s)**
A	General Site	0
B	ISCR Well Field	46,147
C	Underground Mining	23,903
D	Processing	5,420
E	Buildings and Facilities	0
Total Sustaining Capital		75,470
		US$ 0.07 /lb Cu

1.13.4 Operating Costs:

The estimated Total LOM Operating Costs and LOM Unit Costs required to produce a pound of copper are summarized in Table 1-9 below.

Table 1-9 Total Operating Costs

Operating Costs	LoM Cost (000's)	LoM Unit Cost (US$/lb Cu)
Drilling Cost	156,417	0.14
Frac Cost	88,009	0.08
Pump Costs	23,641	0.02
Drill Electricity	5,106	0.00
ISCR Well Field Acid Costs	82,579	0.08
Wellfield Monitoring (KP)	7,540	0.01
Pumping Electricity Costs	122,466	0.11
Maintenance Costs	130,348	0.12
Processing Costs	220,210	0.20
G&A, Offsite Costs	187,179	0.17
Water Treatment	33,150	0.03
Reclamation and Closure Costs	19,184	0.02
TOTAL OPEX	1,075,830	0.98

** All numbers are rounded following Best Practice Principles.*

1.13.5 All-In Sustaining Costs:

The all-in sustaining Cost includes all operating costs, royalties, severance taxes, and reclamation and closure costs and estimated to be US$1.14 per pound of copper produced as per the Table below.

Table 1-10 All in Sustaining Costs – LOM

Cost Category	Unit Cost ($US/lb)
Total Operating Costs	0.98
Royalties	0.07
Severance Tax	0.02
Sustaining Capital Costs	0.07
All in Sustaining Cost (AISC)	1.14

1.14 Closure and Reclamation

Closure and reclamation will be in accordance with the requirements set out in the State and Federal permits required to develop and operate the project and includes the following major activities:

- Rinse the underground wellfield to restore groundwater quality within the mined area to levels specified in the project permits,
- Decommission, sell, and remove all Buildings and other infrastructure, including the SX-EW plant
- Reshape the earth structures and disturbed areas to achieve long term stability and protection against erosion,
- Reshape the waste rock dump and construct vegetative cover,
- Treat the excess water, including wellfield rinse water, for two years following the cessation of commercial operations,
- Decommission the water management structures, and
- Decommission the water treatment plant.

The estimated Reclamation and Closure costs are summarized in the Table below.

Table 1-11 Estimated Reclamation and Closure Costs

Reclamation and Closure	Cost (US$ 000's)
Well Field Decommissioning	$4,434
Infrastructure Decommissioning	$4,043
SX-EW Decommissioning	$3,180
Water Treatment Plant Decommissioning	$4,054
Total Reclamation and Closure Costs	**$15,711**

1.15 Economic Analysis Summary

The economic analysis has been performed using a base case copper price of US$3.15/lb, like long term copper prices used for recently published NI 43-101 reports. Additional input parameters include a three-year pre-production period, a 17-year mine life and five post-production years for reclamation/closure and monitoring. The economic analysis includes allowances for capital, operating, sustaining, royalties, reclamation, and closure costs. The post-tax cashflow also considers city, county, state, and federal taxes. No price inflation or escalation factors have been accounted for.

Economic Analysis for the Van Dyke Copper project is based upon the following inputs:

- A LOM Copper price of $3.15/lb Cu as recommended by Desert Fox.
- No inflation or escalation applied to revenues or costs.

- A Capital Cost Estimates prepared by MMTS. Factored estimate including Indirect Costs, EPCM, Owner's Costs and Contingency.
- Capital Costs also include a 3% tax factor for the Arizona Privilege tax.
- Mine Production Schedule and Operating Costs prepared by MMTS, based on copper production rate, and factored $/lb Cu operating costs.
- Water treatment capital and operating cost estimate prepared by Knight-Piésold
- Results are based on 100% ownership (except in the Quiet Title Area) and an NSR royalty of 2.5%
- Revenue split based in the Quiet Title (QT) Area of 62.5% Desert Fox, 37.5% QT.
- Capital costs to be funded with 100% equity (no financing costs are included).
- Taxes have been calculated by R&A CPAs of Tucson Arizona.
- Property taxes are not included in this study.

The pre-tax and post-tax Net Present Value ("NPV") for the Van Dyke ISCR project at various discount rates is shown below. The 7.5% discount rate has been chosen as the Base Case for the project as this is in line with other Arizona based ISCR projects (Florence, 2017). The economic analysis includes recovery of capital, operating and sustaining costs, county, state and federal taxes and royalties. Input parameters include three-year pre-production period, long-term copper price of $US3.15/lb, 17-year mine life and five years for reclamation/closure and monitoring. Corporate income taxes are assumed to be 21.0% federal and 4.9% state.

The economic analysis for the Base Case before taxes indicates an IRR of 48.4%, an NPV of US$798.6 million, and a payback period of 2.0 years. The economic analysis post-taxes indicate an IRR of 43.4%, an NPV of US$644.7 million and a payback period of 2.1 years. The Base Case Net Free Cash Flow after recovery of all operating capital and sustaining costs before tax is estimated to be US$1.757 billion and US$1.436 billion after tax as summarized in Table 1-1.

1.16 Interpretations and Conclusions

The Van Dyke Copper Project hosts a copper deposit of significance within the prolific Miami-Inspiration trend of porphyry copper and related deposits. The Van Dyke Copper Project has been the subject of limited historic underground development, widespread surface exploration drilling and localized in-situ leaching. This PEA has indicated that, based on industry standards, the project is technically sound and has positive economics. Therefore, it is concluded that the project should proceed to include additional infill Drilling, Permitting, and a Pilot Test.

1.16.1 Geology and Mineralization

Re-assaying undertaken in 2019 as well as re-assessment of the metallurgy contributed to an updated Resource Estimate with an effective date of January 9, 2020. The updated resource has been used to update the Preliminary Economic Assessments as the subject of this report, with positive results.

1.16.2 Drilling and Analytical Data Collection

This Technical Report was prepared by MMTS who, in the preparation of the report, reviewed historical geological data and laboratory results to develop an understanding of the Project. In 2019, a comprehensive re-sampling program of drill core chips, rejects, and pulps from 36 historic drillholes added 2193 new analyses for Total Copper (TCu), Acid Soluble Copper (ASCu) and Cyanide Soluble Copper

(CNCu). This data, coupled with the use of a robust QA/QC program, adequately verified the historical data base.

The results of the work are believed to adequately characterize the deposit at an early stage in its assessment, but the geometry, length, width, depth, and continuity of the mineralized body may change with additional exploration.

1.16.3 Metallurgical Testwork

Metallurgical testwork has been minimal within the Cu grades within the Project Area. The metallurgical recoveries are determined to be adequate for this stage of study.

1.16.4 Mine Plan

The mine plan including underground development, waste rock storage and well layout design is reasonable with the projected schedule, capital and operating costs developed for the project based on similar projects and scaled factors. The mine plan and input parameters are considered adequate for cashflow analysis and financial used for the PEA.

1.16.5 Recovery Plant

The proposed SX-EW processing facilities is a well proven technology and common throughout the region. It is expected that there will be no significant challenges associated with either equipment supplies and maintenance or local personnel who are experienced with the recovery facilities.

Estimated flowrates will require flexibility in operation of the recovery plant to best match the grade and flowrates of the pregnant solution that is fed.

1.17 Project Risks

1.17.1 Operational Risk

The business of mineral exploration, development and production by their nature contain significant operational risks. The business depends upon, amongst other things, successful prospecting programs, and competent management. Profitability and asset values can be affected by unforeseen technical issues and operational circumstances.

1.17.2 Environmental Risks

Environmental permits have not yet been acquired for the Project. However, the Aquifer Protection Permit for the nearby Florence ISCR project has been obtained and have not been appealed with commercial production at Florence to commence.

The Van Dyke Copper Project, and the town of Miami, are encompassed to the west and north by large mining developments including pits, leach pads, dumps, and other mining infrastructure. The Project itself has been the subject of underground development and in-situ leaching in the northwest corner of the Project, and widespread surface exploration drilling. The infrastructure remaining from those activities, all of which occurred prior to 1990, includes access roads, equipment laydown areas, drill sites and steel drillhole collars, a copper cementation plant and ancillary facilities, and the Van Dyke Shaft. Most of the historic drill sites occur within the town of Miami and many are encumbered by town infrastructure.

1.17.3 Political and Economic Risk

Factors such as political and industrial disruption, currency fluctuations and interest rates could have an impact on future operations; these risks are beyond the control of the company.

1.18 Project Opportunities

1.18.1 Modelling Opportunities

The resource model has opportunities to be updated based on exploration and infill drilling to both increase the potential size of the deposit and upgrade the resource classification from Inferred to Indicated.

1.18.2 Metallurgical Opportunities

Additional testing, particularly over the range of soluble Cu grades applicable to the deposit could provide additional support for increased metallurgical recovery.

1.18.3 Mine Plan Opportunities

Underground support requirements have been designed assuming conservative geotechnical parameters. Geotechnical studies of the Pinal Schist at depth and the Gila Conglomerate could reduce support requirements and cost. Additional drilling studies and in-situ test results could help optimization the well layout plan to increase efficiency and reduce costs.

1.18.4 Process Plant Opportunities

The current estimated production schedule does introduce variability within the SX-EW system due to the flowrates and grades throughout the life of the mine. The opportunity exists to optimize the process plant based on a further refined production schedule in terms of flow and grade.

1.19 Recommendations

This PEA has shown the Van Dyke deposit to be a technically sound potential in-situ leach copper recovery (ISCR) operation with positive economic indicators. Therefore, it is recommended to advance the project to higher levels of study, to eventually support a production decision and financing. The initial steps toward completion of a Preliminary Feasibility Study ("PFS") is exploration drilling which would include hydrogeologic and geotechnical studies as well as metallurgical sampling. It is recommended for Desert Fox to concurrently obtain the Pilot Test permits, with a Pilot Test undertaken once the permits are received.

The components of the data collection necessary for a PFS and their estimated costs are summarized in the Table below.

Table 1-12 Budget Estimates for Future Studies

Study Component	Budget Estimate ($US 000)
Exploration Drilling	1,500
Geology, QAQC, Resource Model	100
Metallurgic Testing	400
Hydrogeologic Drilling	1,500
Water Management	230
Pilot Testing	9,000
Pilot Test Permitting	1,000
Geotechnical Testing	250
Infrastructure Studies and Costing	200
Process Design	100
Environmental & Socio-economic	400
Reporting	600
Total	**15,540**

1.19.1 Recommendation for Exploration Drilling

Future drill programs should utilize robust QA/QC procedures like those implemented in 2014 and used in 2019. The use of drillhole logs that allow for detailed geological descriptions is encouraged, as is the collection of geotechnical data and metallurgical samples.

The recommended exploration program includes the following elements:

1. Diamond Drilling & Analysis: an 8-hole, 4500-metre program is recommended to test the possible extension of the deposit westwards towards the property boundary and to the southwest and to collect core for metallurgical test work.
2. Down-Hole Geophysics (acoustic televiewer)
3. Metallurgical test work: 6-8 pressure leach tests on whole core from select areas of the deposit
4. Hydrogeology: Installation of piezometers to measure water levels

The recommended program has an estimated cost of $1.86 million as summarized below. Cost for metallurgy, hydrology and geotechnical drilling and studies are detailed in their respective sub-sections below (Table 1-13).

Table 1-13 Summary of Exploration Drilling Expenditures

Item	Estimated Cost ($CDN)
Drilling	$1,500,000
Assaying	$30,000
Geological Labour	$125,000
Accommodation & Meals	$80,000
Field Supplies	$25,000
Transportation & Travel	$45,000
Community Relations	$20,000
Permitting & Legal	$15,000
Data Compilation & Reporting	$20,000
Total	**$1,860,000**

1.19.2 Recommended Pilot Test

It is recommended that a Pilot Test of a 5-spot ISCR injection and recovery well system be set up in an area of the deposit east of the historic underground workings and previous ISCR development. The estimated cost for this Pilot Test is $7.0M - $8.5M, with costs as summarized in Table 1-14.

Table 1-14 Summary of Pilot Test Costs

Item	Quantity	Cost
Pilot Test Wells	8	$ 3,500,000
Hydraulic Test Wells	3	$ 800,000
Monitoring Wells	5	$ 300,000
Hydrofracture Tests	8	$ 2,000,000
Tracer Tests 1	1	$ 500,000
Sub Total	na	$ 7,100,000
Contingency 20%		$ 1,416,000
Total		**$ 8,496,000**

There are two main permits needed to support the Pilot Test: Arizona Protection Permit (issued by the Arizona Department of Environmental Quality) and the Underground Injection Control Permit for Class III Wells (issued by the US Environmental Protection Agency). It is anticipated to take about a year to develop the applications and collect the necessary environmental data and it would take 6 months to one year to go through the review process. Permitting for the pilot program is estimated to cost $1M as summarized in Table 1-15.

Table 1-15 Summary of Pilot Permitting Costs

Item	Cost
Baseline Water Quality	$ 120,000
Aquifer	$ 310,000
Underground Injection control permit – Class III well	$ 370,000
Application Review Process	$ 200,000
Total Cost	$ 1,000,000

1.19.3 Metallurgical Testing and Costs

Additional testing of metallurgical samples collected during the proposed drill program is expected to cost $400,000 (as per Table 1-13).

1.19.4 Recommended Geotechnical Data Collection

Future work should include a trade-off study that compares the cost of underground development that crosses the Gila Conglomerate and Pinal Schist transition zone and includes operation in galleries directly above the deposit to savings in well field development resulting from shorter wells.

Additional geotechnical work and analysis recommended is estimated to cost $200,000 and includes:

- Geotechnical data collection during drilling to define RQD, RMR, to better define major fault locations and ATV to better define joint set orientations.

- Laboratory strength and index testing on samples recovered from the drill program, including: Unconfined Compressive Strength Point Load and potentially Atterberg Limits on the clay material.
- Review of the ground support requirements based on a review of existing mining experience in the area, as well as the updated information from drilling, from testing and from the Pilot Test.
- Better definition of the corrosion protection requirements for the ground support.
- Report and analysis.

1.19.5 Recommended Water Management Studies

Additional water management work is expected to cost $200,000 and includes the following goals:

- Characterize the hydrometeorology of the site.
- Characterize the expected effluent water quality for the sources of surplus water on the site.
- Confirm the period over which the resource blocks need to be rinsed in closure and what the
- flow rates are expected to be.
- Define the water quality targets for discharge.

1.19.6 Recommended Underground Design

The following recommendation are made to help improve the underground design:

- Several geotechnical holes should be drilled along the alignment of the access decline and the two ramps (north and south ramps) so that rock qualities can be determined, and more detailed ground support regimes can be forecast.
- Trade-off studies should be carried out to see if using a contractor for life of mine development, rehabilitation of mine workings, life of mine supervision of drilling crews is the most cost-effective approach to developing and operating the mine.

1.19.7 Recommended Process Design Studies

Additional optimization needs to be completed regarding the processing equipment operations to address future variability within the PLS flowrate and concentration throughout the life of the mine. It is estimated this study would cost between US$40,000-US$70,000.

Currently there is no geotechnical information at the proposed process plant site or surface infrastructure. In the next phase a small geotechnical program should be performed to determine both the surface and subsurface conditions at the proposed plant site, surface infrastructure and borrow sources. The program should consist of reviewing any geotechnical and geology information in the area, perform surface mapping and small geotechnical test pit, borehole and laboratory campaign in the process plant and infrastructure along with a small geochemical program to understand both geotechnical and geochemical conditions to develop these facilities. It is estimated this geotechnical program would cost $100,000 to complete.

This area has a long history of mining and should have a significant amount of meteorological data to develop hydrological and hydraulic characteristics around the process plant and surface infrastructure.

This can be utilized to develop the climate and hydrology condition around the surface facilities to develop surface water management for the site for the next phase.

1.20 Risks and Opportunities

General risks to the forward-looking information include:

- changes to costs of production from what is assumed
- unrecognized environmental risks
- unanticipated reclamation expenses
- unexpected variations in quantity of mineralized material, grade, or recovery rates
- geotechnical or hydrogeological considerations during mining being different from what was assumed
- failure of mining methods to operate as anticipated
- failure of plant, equipment, or processes to operate as anticipated
- changes to assumptions as to the availability of electrical power, and the power rates used in the operating cost estimates and financial analysis
- ability to maintain the social licence to operate
- accidents, labour disputes, and other risks of the mining industry
- changes to interest rates
- changes to tax rates

The mine plan is partly based on inferred mineral resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorized as mineral reserves, and there is no certainty that the PEA based on these mineral resources will be realized. Mineral resources that are not mineral reserves do not have demonstrated economic viability.

1.20.1 Geology & Resource Modelling Risks

Risks to the resource estimate include changes to the geologic model, and the following factors which could affect the resource estimate:

- continuity of mineralization
- historic underground openings location

1.20.2 Mining Risks

Risks to the PEA include changes to the following factors and assumptions:

- metal prices
- interpretations of mineralization geometry and continuity in mineralized zones
- geotechnical and hydrogeological assumptions
- ability of the mining operation to meet the annual production rate and anticipated grade control standards
- operating cost assumptions
- mine operation and ISCR recoveries

1.20.3 Environmental Risks

Better definition of hydrometric, hydrological, and geochemical conditions is needed before the project can continue with the environmental assessment process.

1.20.4 Block Modelling Opportunities

Infill drilling could upgrade the classification from inferred resources to provide additional measured and indicated resources. Continued structural and geologic modelling will increase both the extent and the confidence in the resource modelling.

1.20.5 Recovery Methods & Metallurgical Testing Opportunities

Additional testing of metallurgical samples provides an opportunity to improve recoveries.

1.20.6 Mining Opportunities

With detailed metallurgical testwork information, the mining sequence could be optimized to higher initial cashflow. There is potential for improved underground support and stability requirements when additional geotechnical data such as waste rock strength are available from drill testing.

2 Introduction

Desert Fox Van Dyke Co. (Desert Fox) retained Moose Mountain Technical Services (MMTS) to prepare a National Instrument 43-101 (NI 43-101) compliant Preliminary Economic Assessment Technical Report for the Van Dyke Copper Project, Gila County, Arizona, U.S.A.

The NI43-101 responsibilities of each engineering consulting firm are as follows:

- MMTS to manage the NI 43-101 as well as to provide the geology, QA/QC, resource, metallurgy, and mining sections.
- Ausenco provided the Process design.
- Piteau provided input to the well design and layout.
- Knight-Piésold provided geotechnical analyses, hydrology, and environmental permitting input.

2.1 Terms of Reference

The purpose of this Technical Report is to provide an NI 43-101 Preliminary Economic Assessment (PEA) for the Van Dyke Copper Project based on an updated Resource estimate, updated economic conditions and costs, and a review of preliminary hydrologic, metallurgic, and geotechnical studies. The PEA provides an in-situ leach mine plan and cash flow analysis for the project. The information presented herein forms the basis for ongoing advanced studies, which will include additional drilling, metallurgic, hydrologic, and economic analyses to optimize future development of the Van Dyke Copper Project.

This Technical Report was prepared using industry accepted Canadian Institute of Mining, Metallurgy and Petroleum (CIM) "Best Practices and Reporting Guidelines" for disclosing mineral exploration information; the Canadian Securities Administers revised regulations in NI 43-101 (Standards of Disclosure for Mineral Projects, June 24, 2011); Companion Policy 43-101CP and Form 43-101F1; and the updated CIM Definition Standards for Mineral Resources and Mineral Reserves (November 2019).

2.2 Qualified Persons

This report was prepared by the following qualified persons (QPs):

- Bob Lane, P.Geo, MMTS
- Sue Bird, P.Eng., Principal, MMTS
- Tracey Meintjes, P.Eng., MMTS
- Jim Norine, P.E., Ausenco

A summary of the sections for which each qualified person is responsible, and the date of their most recent site visit is provided in Table 2-1. All QPs are independent of Desert Fox.

Table 2-1 Table of Responsibilities

Qualified Person	Date Site Visit	Report Sections
Bob Lane, P.Geo, MMTS	November 26, 2013 May 24-25, 2019	1.3 through 1.9, 1.16.1, 1.16.2, 1.19.1, 2 through 12, 19, 23, 24, 25.2, 25.3, & 26.1
Sue Bird, P.Eng., Principal, MMTS	April 12, 2014	1.1, 1.2, 1.10 through 1.15, 1.16.4, 1.17, 1.18.1, 1.18.3, 1.19.2, 1.19.4, 1.19.6, 1.20.1 through 1.20.4, 1.20.6, 14, 15, 16, 18, 20, 21, 22, 25.1, 25.5, 25.7, 25.8.1, 25.8.3, 26.2, 26.4, 26.5, 26.6, & 27
Tracey Meintjes, P.Eng., MMTS	No site visit	1.16.3, 1.18.2, 1.19.3, 1.26, 13, 25.4, 25.8.2, & 26.3
Jim Norine, P.E., Ausenco	No site visit	1.10, 1.16.5, 1.18.4, 1.19.7, 1.20.5, 1.25, 17, 25.6, 25.8.4, & 26.7

2.3 Sources of Information

This report is based on historical information and data compiled by Desert Fox including unpublished paper and electronic copies of reports, technical memos and correspondence, geologic maps, drill logs and cross-sections, analytical results from re-sampling of stored historic drill core and drill core pulps in 2014 and 2019, analytical results from diamond drilling completed in 2014, and publicly available reports and documents. The minable resource and cash flow is based on both factored and detailed cost estimates, with the overall metal recovery based on metallurgic studies by SGS, environmental studies by Greenwood Environmental and Knight Piésold, and geotechnical and hydrogeologic studies by Knight Piésold, and ISCR with permeability enhancement by Piteau Associates.

All sources of data referenced in the text are listed alphabetically in Section 27 of this report.

2.4 Site Visits and Scope of Personal Inspections

Robert A. (Bob) Lane, P.Geo., visited the Project on four occasions commencing on November 26, 2013, up to and including May 24-25, 2019. Mr. Lane's 2014 visits to the site coincided with Desert Fox's 2014 Phase 1 drilling program and included an inspection of the core logging and core processing station, stops at two of the in-progress drillholes, examination of core from three of the completed 2014 drillholes, review of drill core handling procedures, drill core Chain-of-Custody procedures, and QA/QC methodologies. Mr. Lane also completed a tour of the site including stops at the historic Van Dyke Shaft, the former Kocide Chemical copper recovery plant, several pertinent outcrops, and a number of historic drillhole collar locations. Mr. Lane examined core from four holes drilled in the 1970s by Occidental Minerals Corporation, the drillholes completed by Desert Fox in 2014 and the cataloging of sample pulps that remained in storage from the Occidental period of drilling. The May 24-25, 2019, visit included an inspection of the company offices and core and sample storage facilities, review of core sampling procedures, sample Chain of Custody procedures and QA/QC methodologies.

Sue Bird, P.Eng., visited the Project on April 12, 2014 and examined the overall site geology, rock types, drillhole collars, shaft), core, and pulps through a tour by the site geologists.

2.5 Definitions and Units of Measurement

The units of measure and frequently used abbreviations used in this report are shown in Table 2-2 and Table 2-3 respectively. All currency quoted in this report refers to US dollars unless otherwise noted. All distances and linear measurements are provided in metres and kilometres unless otherwise noted.

Table 2-2 Glossary

Term	Definition
Acid Soluble	The portion of the mineralization which can be extracted from the rock using sulphuric acid
Assay	Analysis of a rock or soil sample metal content
Composite	Assay data weight-average over a larger, standardized length
Cut-off grade	The grade value of mineralization at which the deposit can be considered economic, or in the case of Inferred material to be considered probable for eventual extraction
Dip	The angle in degrees from horizontal that the surface is inclined perpendicular to strike
Domain	A segregation of the deposit into volumes which are interpreted to contain similar geologic characteristics
Fault	A structure within the earth displaying movement along the discontinuity
Grade	The concentration of metal within the assay, composite, or block expressed in %, ppm or ppb
Kriging	Interpolation of samples values that minimizes the estimation error
Lithology	Geologic term defining rock type
Lixiviant	The liquid used to extract the metal from the mineralization in leaching.
Mineral Resource	"a concentration or occurrence of solid material of economic interest in or on the Earth's crust in such form, grade or quality and quantity that there are reasonable prospects for eventual economic extraction" (CIM, 2014)
Mineral/Mining Lease	An area of land for which mineral rights are held by a certain party
Mining Assets	Material properties
Mixed	Mineralization including both oxide and sulfide mineralization, also labelled Supergene zone
Nearest neighbor	Interpolation of samples to include only the closest value by polygonal estimation
Raffinate	The leach solution minus the copper
Shoulder Grade	The grade cut-off of at the ends of an assay interval used for reporting wtd. mean grade
Sulfide	Mineralization including significant sulfur bearing minerals
Zone	A segregation of the deposit into oxide, mixed, or sulfide based on the grade and acid solubility of the mineralization

Table 2-3 List of Abbreviations and Acronyms used in this Report

Abbreviation	Description
%	percent
ºC	Degrees Celsius
ADEQ	Arizona Department of Environmental Quality
ADWR	Arizona Department of Water Resources
APP	Aquifer Protection Permit
AQL	Aquifer Quality Limit
ASLD	Arizona State Land Department
BLM	US Department of the Interior, Bureau of Land Management
Cu	Copper
TCu	Total Copper
CNCu	Cyanide Soluble copper (chalcocite)
ASCu	Acid Soluble copper (copper oxide)
TSCu	Total Soluble copper
GSRBM	Gila and Salt River Baseline and Meridian
lbs	pounds
masl	Metres above standard sea level
ppb	Parts per billion
ppm	Parts per million
RQD	Rock Quality Designation
sg	Specific gravity
t	Metric tonne
USEPA	United States Environmental Protection Agency
WQARF	Water Quality Revolving Fund

Historical exploration and mining data in Arizona were documented using the Imperial system, with units of length expressed in feet and inches, mass in short tons, and precious metal grades in ounces per short ton. More recent exploration and mining data in Arizona is also commonly quoted using Imperial units. However, in this report the metric system is used preferentially, with units of length expressed in kilometres, metres or centimetres, units of mass expressed in kilograms or metric tonnes, and base metal grades expressed in percent per tonne or in parts per million (ppm).

All UTM positions referenced in this report and on its accompanying figures are referenced to the North American Datum of 1927 (or NAD 27).

3 Reliance on Other Experts

In preparation of this report the authors have relied upon others for information pertaining to land status and historic exploration.

The QPs have not independently reviewed ownership of the project area and the underlying property agreements. The QPs have fully relied upon, and disclaim responsibility for, information derived from Copper Fox corporate staff and legal experts retained by Copper Fox for this.

Regarding metallurgical work, the authors have relied on SGS E&S Engineering Solutions Inc. (SGS) who completed a preliminary in-situ Copper Leaching Simulation Study on the Van Dyke Copper Project; a summary of the study is presented in Section 13: Mineral Processing and Metallurgical Testing.

Regarding environmental work, the authors have relied on Greenwood Environmental who completed a framework for expected permitting and environmental timelines, and Knight Piésold (KP) who reviewed this work and developed a water treatment and reclamation plan.

Regarding Hydrogeological work, the authors have relied on KP, Piteau Associates, and Ray Huff and Associates (RHA).

3.1 Land Status

The land status information summarized herein, including ownership, location and dimension of mineral estate and surface estate lands that comprise most of the Project, was the result of exhaustive research and compilation by independent land manager Mr. Daniel L. Mead of Cornerstone Lands/DLM/L.L.C., Tucson, Arizona. The legal descriptions for these mineral estate and surface estate lands were sourced from official Gila County documents located in Globe, Arizona. The information provided to the authors by Mr. Mead is relied upon.

Official legal descriptions of unpatented mineral claims that form the southern part of the Project area were collected from the federal Bureau of Land Management offices in Tucson, Arizona. This information is relied upon.

3.2 Historic Exploration

The geological and exploration data captured from earlier operators of the Van Dyke Copper Project and, to a lesser degree, from relevant publicly available reports, provide a sound technical foundation for the Project. The authors believe that the historical and technical information provided for the preparation of this report was accurate at the time it was written and is relied upon. The authors believe the current technical information provided by Copper Fox is accurate and is relied upon.

The interpretations and opinions expressed by these earlier workers, regarded to be competent, experienced explorationists, were based on a current understanding of the geological setting of the deposit and are reasonable. Their work is regarded to have been performed in accordance with high standards for the periods in which the work was completed and is relied upon. The current interpretations and opinions expressed are based on more comprehensive analytical data and understanding of evolution of the copper deposits in the Miami-Globe area and are reasonable.

4 Property Description and Location

4.1 Location

The Van Dyke Copper Project is situated within the Globe-Miami mining district, Gila County, east-central Arizona, approximately 110 kilometers (km) east of Phoenix (Figure 4-1). The core area of the Project is centered at 512000m E and 3695600m N (UTM; NAD27) and lies primarily within the town limits of Miami, Arizona. The Town of Miami lies about 10 km west of the City of Globe and 16 km west of the San Carlos Apache Indian Reservation. Miami, Globe, and several unincorporated communities nearby, including Inspiration, Claypool, and Central-Heights-Midland City, are commonly called Globe-Miami.

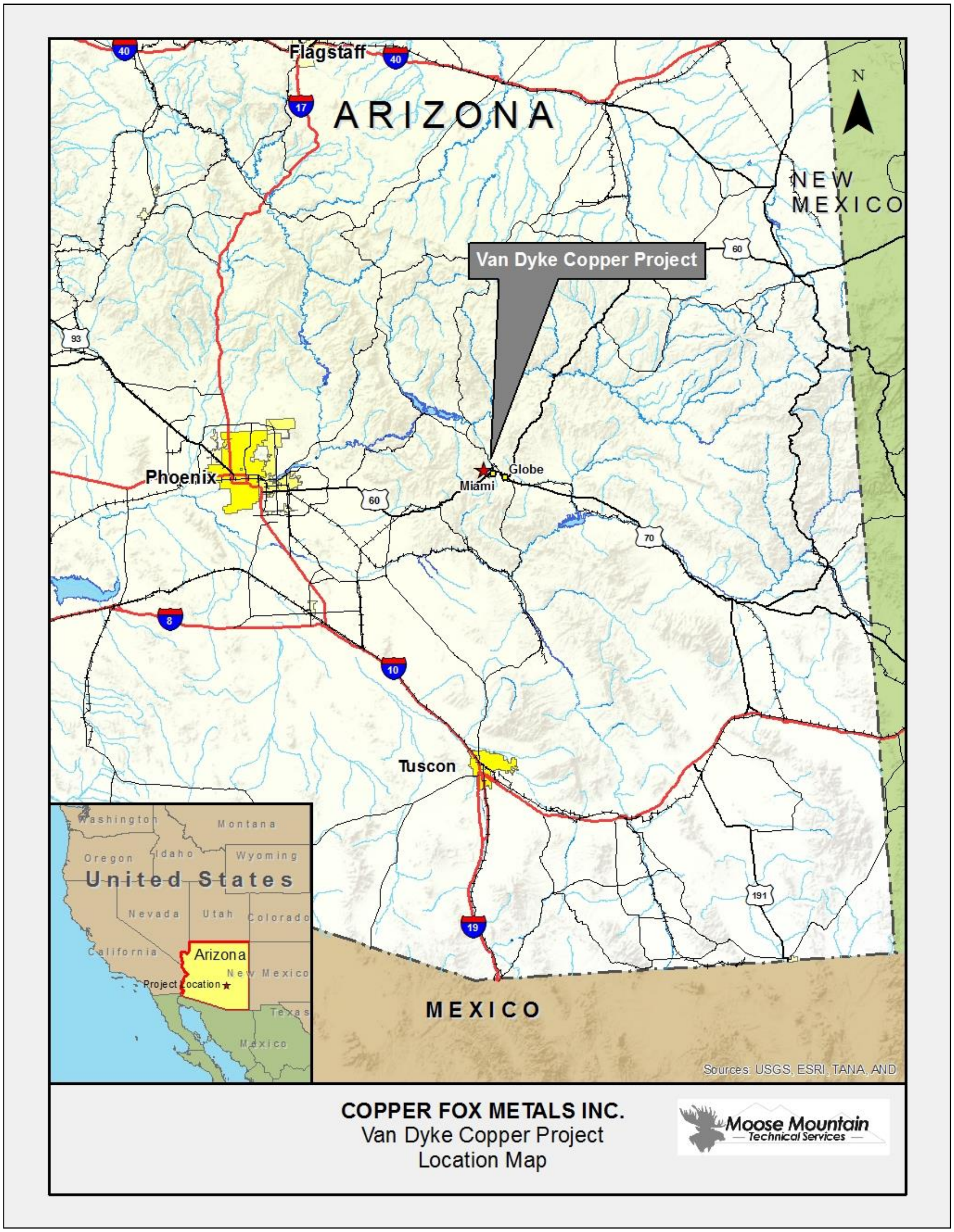
The land survey coordinates for the Project include Sections 29, 30 and 33 of Township 1 North, Range 15 East, Gila and Salt River Baseline and Meridian (GSRBM) and Sections 25, 31, and 36 of Township 1 North, Range 14 East, GSRBM.

The Globe-Miami mining district is a major copper mining area located in the northern foothills of the Pinal Mountains and the Globe Hills, within the Arizona-New Mexico Basin and Range Province, and the broad Walker-Texas Lineament Zone. The mining district is almost entirely within the Inspiration and Globe quadrangles and comprises the Miami-Inspiration sub-district in its western side and the Globe Hills sub-district on its eastern side. The mining district includes several porphyry copper deposits that have been mined since the discovery of rich veins of chrysocolla in the Globe Hills in 1874. The history of the Globe-Miami mining district, with a focus on the Van Dyke Copper Project is provided in Section 6 of this report. A discussion of mineral deposit types found in the Globe-Miami mining district is provided in Section 8 of this report.

The productive mineral deposits of the Globe-Miami district, including the Van Dyke copper deposit, and the nearby Superior district, lie within a 10km wide, generally northeast to easterly trending corridor (Peterson, 1962). This corridor marks a zone of Proterozoic structural weakness that parallels the contact between Pinal Schist and the Proterozoic granites to the north-west. The corridor is also parallel to the main foliation within the Pinal Schist, and it is also the locus of Mesozoic and Tertiary silicic intrusions, which are interpreted to be genetically associated with mineralization in the district (Hammer and Peterson, 1968). The main porphyry deposits are therefore centered on the main intrusive mass, while the vein deposits occur distally, but still within the mineralized corridor.

There are currently two producing mines in the Globe-Miami district: the Pinto Valley copper mine of Capstone Mining Corp. and Carlota (Cactus) copper mine of KGHM. The district also hosts the Miami Mine of BHP Billiton, presently on-care and maintenance, and the historic Copper Cities and Old Dominion copper deposits.

The Van Dyke Project shares a common claim boundary with the Miami-East and Miami-Inspiration mine sites. The Van Dyke copper deposit does not out crop, but resides beneath a thick blanket of Gila Conglomerate, which is capped locally by a thin veneer of alluvium. It is situated in the down dropped hanging wall block of the Miami fault, opposite the east end of the Miami-Inspiration orebody. The Van Dyke deposit is approximately 1,500 m long, 900 m wide, and ranges in thickness from 40 to over 230 m. The deposit is interpreted to be the extension of the porphyry copper mineralization mined in the open pits that border the northern edge of the property. The mineralization increases in thickness toward the center of the deposit.



Source: MMTS, 2021

Figure 4-1 Location of the Van Dyke Copper Project

4.2 Tenure and Ownership

Tenure

The Van Dyke Copper Project consists of several varieties of patented lands, many of which occur within or near the city limits of the town of Miami (Figure 4-2). Additional patented lands owned by the company are contiguous with and lie south and east of the core area of the Project. A total of 26 patented parcels covers an aggregate area of 531.5 hectares (Table 4-1).

The company also owns 35 unpatented lode mining claims (MIA 1-35) that are contiguous with and located immediately south of the core area of the Project. The unpatented claims are located on Federal Land administered by the Bureau of Land Management (BLM). The unpatented claims cover 292.0 hectares (Table 4-2).

Desert Fox also owns the surface rights over the western part of the patented mining claim area (Figure 4-3).

Ownership

The ownership history of the patented lands covering the Van Dyke Copper Project is described in Section 6 of this report. The patents became available after taxes had not been maintained for many years. Bennu Properties, LLC, Albert W. Fritz Jr. and Edith Spencer Fritz (Bennu-Fritz) applied to Gila County and acquired clear title to surface and subsurface mineral rights (patents) that cover the Van Dyke property in April 2012, through a tax lien foreclosure process.

Bell Copper Corporation conducted initial negotiations and finalized terms for acquisition of the Van Dyke Copper Project with Bennu-Fritz through a "Letter of Intent". However, before the deal could be completed Bell effectively sold its position to acquire 100% of the Van Dyke patented lands to Copper Fox. Ultimately, Bennu-Fritz sold the Van Dyke property directly to Copper Fox Van Dyke Company (a wholly owned subsidiary of Copper Fox) by way of a Special Warranty Deed signed by the two entities on April 5, 2013. Bennu-Fritz retains a 2.5% Net Smelter Return ("NSR") production royalty from the Van Dyke deposit. Copper Fox, in its' sole and absolute discretion, has the right to purchase up to 2% of the 2.5% NSR for a period of two years by the payment of US$1.5 million for each 1% NSR purchased.

Annual Costs to Maintain Ownership

There are no annual taxes for the Project's mining patents (Mineral Estate). However, annual taxes are required for patented lands that include surface rights (real property) in addition to sub-surface (mineral) rights, and the taxes are for the surface rights only. The annual aggregate tax required to maintain the surface lands is $898.28, and payment has been made to Gila County, Arizona.

The 35 unpatented federal lode mining claims owned by Copper Fox require an annual maintenance fee of $165 per claim be paid to the United States Bureau of Land Management, and a fee of $10 per claim be provided to Gila County. A payment of $5,775 was made in respect of these claims in August 2020 for the filing year September 1, 2020 to August 31, 2021.

Table 4-1 List of Patented Lands, Van Dyke Copper Project

Patent Number	Legal Description	Type of Patent	Area (acres)	Area (Ha)
Township 1N, R 14E				
Patent-46574	T1N, R14E, Sec 36: Long shot, Solace #1 & Solace #2 claims	ME Patent	32.6	13.2
Patent-431029	T1N, R14E, Sec 25 & 36: Gray Copper claim	ME Patent	20.6	8.3
Patent-434949	T1N, R14E, Sec 36: Chief, Vesper, Cracker Jack, White Captive, Orphan, Snail, Red Cloud & Iron claims	ME Patent	63.0	25.5
Patent-546592	T1N, R14E, Sec 36: Dora fractional claim	ME Patent	0.4	0.2
Patent-590391	T1N, R14E, Sec 36: Sho Me No. 2, Copper Center, Sulphide No.1 claims	ME Patent	56.5	22.9
Patent-590392	T1N, R14E, Sec 36: Onward, Onward #2 & Onward #3 claims	ME Patent	38.0	15.4
Patent-612204	T1N, R14E, Sec 36: Blue Bell, Blue Bell #2, Blue Bell #3 & Sulphide claims	ME Patent	35.6	14.4
Patent-629135	T1N, R14E, Sec 36: Sulphide #2 claim	ME Patent	14.6	5.9
Township 1N, R 15E				
Patent-22128	T1N, R15E, Sec 30 Lot 4 Sec 30 & T1N, R14E Sec 25 Lot 12	HES Patent	40.0	16.2
Patent-91944	T1N, R15E, Sec 30: Sho Me claim	ME Patent	21.6	8.7
Patent-56345	T1N, R15E, Sec 30 Lot 5	HES Patent	38.3	15.5
Patent-159952	T1N, R15E, Sec 30 SE 1/4 of NE 1/4	HES Patent	40.0	16.2
Patent-219203	T1N, R15E, Sec 30: Myrtle Lode claim (MS 2583)	ME Patent	9.0	3.6
Patent-160508	T1N, R15E, Sec 30 W 1/2 of NE 1/4	HES Patent	21.2	8.6
Patent-160509	T1N, R15E, Sec 30 E1/2 of NW 1/4	HES Patent	18.4	7.4
Patent-163255	T1N, R15E, Sec 30 Lots 2, 3, & 8	HES Patent	0.4	0.1
Patent-181896	T1N, R15E, Sec 30 NE 1/4 of NE1/4	FLSDA	11.0	4.5
Patent-248767	T1N, R15E, Sec 30 SE 1/4	CE Patent	160.0	64.7
Patent-253612	T1N, R15E, Sec 30 SE 1/4 Of SW 1/4	CE Patent	40.0	16.2
Patent-302130	T1N, R15E, Sec 30 Lot 1	HES Patent	1.4	0.6
Patent-541188	T1N, R15E, Sec 29 SW 1/4	HES Patent	79.0	32.0
Patent-1106529	T1N, R15E, Sec 29 SE 1/4	CE Patent	160.0	64.7
Patent-1041095	T1N, R15E, Sec 33 SW 1/4	FLSDA	132.0	53.4
Patent-1041093	T1N, R15E, Sec 33 S1/2 SE1/4 & S1/2 SW 1/4	FLSDA	40.0	16.2
Patent-1041094	T1N, R15E, Sec 33 SW1/4 NE1/4 & N1/2 SE 1/4	FLSDA	80.0	32.4
Patent-1041093	T1N, R15E, Sec 33 SE 1/4	FLSDA	160.0	64.7
			1313.4	**531.5**

Brief definitions of the government patents listed above:

ME (Mineral Estate) Patent: The Federal Government transfers its ownership for both the mineral and surface estate of an unpatented mining claim or claims to the patentee.

CE (Cash Entry) Patent: The sale of public land to the highest bidder.

FLSDA: The sell, exchange, or interchange of USFS land (both surface and mineral estate) by a quitclaim deed to a citizen or company by authority of the Secretary of the Department of Agriculture.

HES (Homestead Entry Survey) Patent: The sale of Federal Government land to the highest bidder to those that had pre-emption claim.

Table 4-2 List of Unpatented Lode Mining Claims, Van Dyke Copper Project

Claim Name	AMC #	County	Book	Fee Number	Area (acres)	Area (hectares)
MIA-1	405285	Gila	2010	12604	20.661	8.361
MIA-2	405286	Gila	2010	12605	20.661	8.361
MIA-3	405287	Gila	2010	12606	20.661	8.361
MIA-4	405288	Gila	2010	12607	20.661	8.361
MIA-5	405289	Gila	2010	12608	20.661	8.361
MIA-6	405290	Gila	2010	12609	20.661	8.361
MIA-7	405291	Gila	2010	12610	20.661	8.361
MIA-8	405292	Gila	2010	12611	20.661	8.361
MIA-9	405293	Gila	2010	12612	20.661	8.361
MIA-10	405294	Gila	2010	12613	20.661	8.361
MIA-11	405295	Gila	2010	12647	20.661	8.361
MIA-12	405296	Gila	2010	12648	20.661	8.361
MIA-13	405297	Gila	2010	12614	20.661	8.361
MIA-14	405298	Gila	2010	12615	20.661	8.361
MIA-15	405299	Gila	2010	12616	20.661	8.361
MIA-16	405300	Gila	2010	12649	20.661	8.361
MIA-17	405301	Gila	2010	12650	20.661	8.361
MIA-18	405302	Gila	2010	12617	20.661	8.361
MIA-19	405303	Gila	2010	12651	20.661	8.361
MIA-20	405304	Gila	2010	12652	20.661	8.361
MIA-21	405305	Gila	2010	12653	20.661	8.361
MIA-22	405306	Gila	2010	12654	20.661	8.361
MIA-23	405307	Gila	2010	12655	20.661	8.361
MIA-24	405308	Gila	2010	12656	20.661	8.361
MIA-25	405309	Gila	2010	12657	20.661	8.361
MIA-26	405310	Gila	2010	12658	20.661	8.361
MIA-27	405311	Gila	2010	12659	20.661	8.361
MIA-28	405312	Gila	2010	12660	20.661	8.361
MIA-29	405313	Gila	2010	12661	20.661	8.361
MIA-30	405314	Gila	2010	12662	20.661	8.361
MIA-31	405315	Gila	2010	12663	20.661	8.361
MIA-32	405316	Gila	2010	12664	20.661	8.361
MIA-33	405317	Gila	2010	12665	20.661	8.361
MIA-34	405318	Gila	2010	12666	20.661	8.361
MIA-35	405319	Gila	2010	12618	20.661	8.361

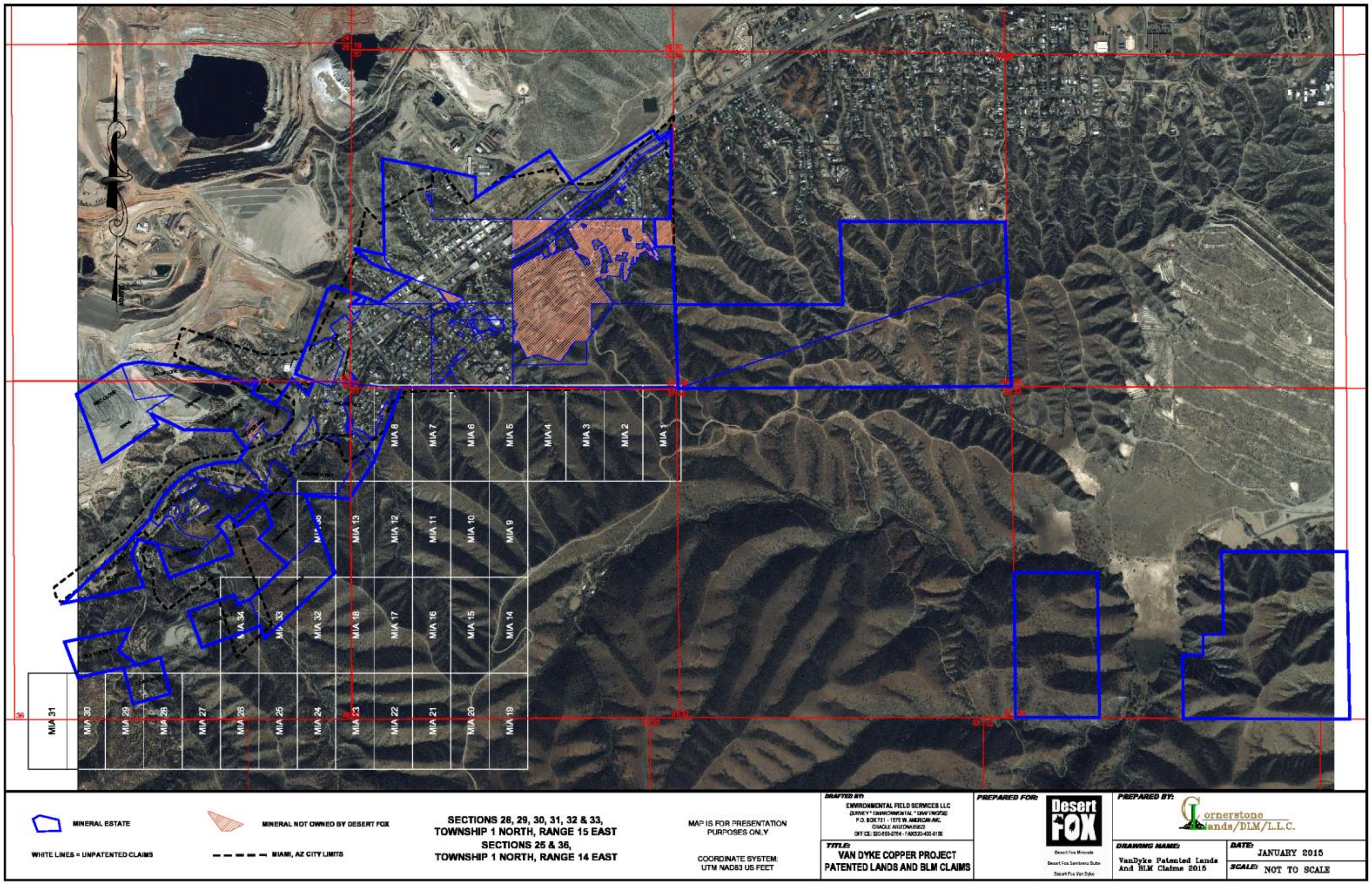


Figure 4-2 Distribution of Patented Lands and Unpatented Lode Mining Claims that Comprise the Van Dyke Copper Project

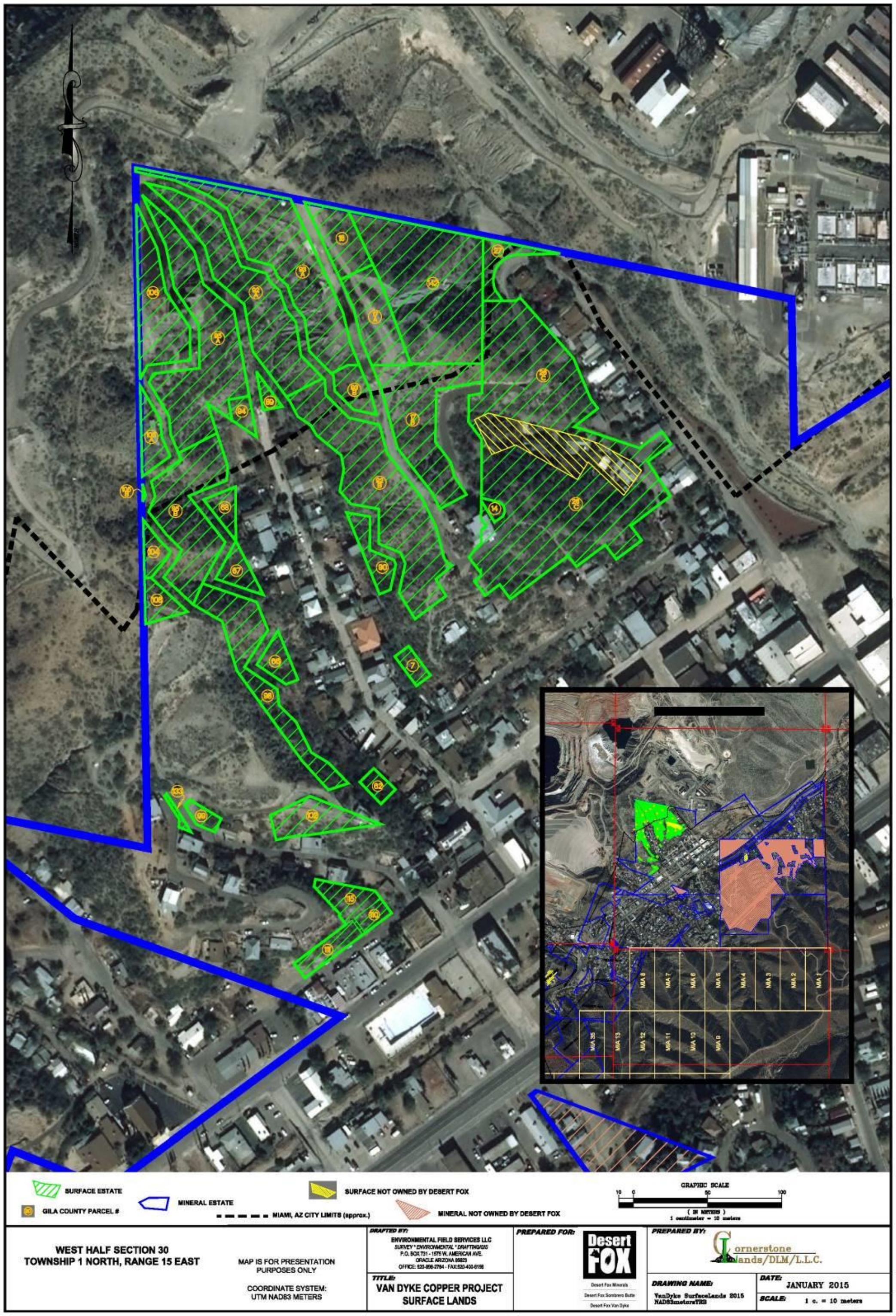


Figure 4-3 Distribution of Surface Rights owned by Copper Fox Van Dyke Company that Coincide with the Van Dyke Copper Project

4.3 Socio-Economic and Environmental Studies

The town of Miami is located on the northeastern slope of the Pinal Mountains, and is surrounded (except to the east) by the Tonto National Forest. The town is split by highway U.S. Route 60 and is served by the Arizona Eastern Railway.

The census of 2013-2017 determined that there were 2,238 people, 1,032 housing units and 773 families in Miami. The racial makeup of the town was 86.1% Caucasian, 1.5% American Indian and Alaska Native, 3.0% Black or African American, 0.7% Asian and 14.2% from other races. Fifty-six percent (56%) of the population were Hispanic or Latino.

According to the 2019 Census reported for the town of Miami, 75% of the 1,032 housing units were occupied. The median income per household was US$28,984. For the population 25 years and over (1,366), educational attainment was 31% high school graduate, 26% with some college education (no post-secondary degree), 6% with a bachelor's degree and 3% with a post-graduate degree.

In 1989, the Arizona Department of Environmental Quality (ADEQ) declared metal-bearing water in the Pinal Creek area a cleanup site under the state's Water Quality Revolving Fund (WQARF). A group of mining companies, consisting of BHP Copper (formerly Magma), Cyprus Miami Copper Corporation, and Inspiration Consolidated Copper Company, formed the Pinal Creek Group to conduct the cleanup activities under the direction and supervision of ADEQ. The Van Dyke mine is located within the Pinal Creek watershed, adjacent to the Pinal Creek Group mines.

The Florence Copper mine project of Taseko Mines Limited, located approximately 65 km southwest of the Globe-Miami area, has successfully completed its pilot-scale testing to demonstrate that the proposed in-situ copper recovery process can be carried out in an environmentally safe manner that protects groundwater resources. In June 2019, Taseko Mines (news release dated June 20, 2019) reported that after six months of operating the test facility, the leach solution reached commercial grade levels and submitted the Aquifer Protection Permit ("APP") amendment application to the Arizona Department of Environmental Quality ("ADEQ") to proceed to commercial production.

4.4 Permits and Authorizations

On March 6, 2014; the Arizona Department of Water Resources (ADWR), an agency that oversees all drilling in the State of Arizona, granted Copper Fox permit 55-916587. The permit allowed for the drilling of up to 25 holes for mineral exploration purposes within Section 30, Township 1 North, Range 15 East, until March 6, 2015.

In 2014 Copper Fox completed a six-hole verification diamond drilling program on both patented mineral tenure and surface tenure owned by the company.

Access for the drilling of two holes in the northern part of the property, VD14-02 (a twin of drillhole OXY-6) and VD14-03 (a twin of drillhole OXY-8), both located on patented claims owned by the company, was granted by surface tenure holder BHP.

The town/city of Miami granted access to three sites within city limits including the site for drillhole VD14-06, which was drilled in a parking lot adjacent to the town's mayor and council office building. Agreements and social license for drilling of holes VD14-04 and VD14-05 located on private property within city limits, was also gained from residents who might have been impacted by the temporary activities.

The permit for the drilling of up to 25 holes for mineral exploration purposes within Section 30, Township 1 North, Range 15 East, granted by ADWR, expired March 6, 2015.

Environmental Permitting Requirements for Advanced Exploration and Development

An Aquifer Protection Permit (APP) is required from ADEQ for the potential discharge of pollutant to an aquifer. The applicant must show that the Best Available Demonstrated Control Technology will be used by the facility and that Aquifer Water Quality Standards (AWQS) will not be exceeded because of discharge from the facility.

Underground Injection Control (UIC) permits for ISCR injection wells are issued by USEPA, as well as aquifer exemptions, if injecting in an Underground Source of Drinking Water (USDW). Under the Arizona Pollutant Discharge Elimination System (AZPDES) Permit Program, all facilities that discharge pollutants from any point source into waters of the United States (navigable waters) are required to obtain an AZPDES permit. Water rights, wells construction and groundwater withdrawal for mineral extraction (ISCR recovery) and metallurgical processing are permitted by the Arizona Department of Water Resources (ADWR).

Other permits may be required from ADEQ (air quality, storm water) and USEPA (hazardous waste, historical preservation). The Arizona State Mine Inspector will authorize the Mined Land Reclamation Plan and the town of Miami and the Gila County will issue utilities and right-of-way permits.

Other permit requirements could be triggered by non-compliance with respect to the following acts:

- National Environmental Policy Act
- National Historic Preservation Act
- Endangered Species Act
- Resource Conservation and Recovery Act (solid and hazardous waste)
- Emergency Response and Community Right-to-Know Act
- Clean Water Act

This information regarding permitting has been reviewed by Knight Piésold in 2020 and is determined to be unchanged (Knight Piésold and Co., 2020).

5 Accessibility, Climate, Local Resources, Infrastructure and Physiography

5.1 Access

The Van Dyke Copper Project is in the Globe-Miami mining district at the town of Miami, Gila County, Arizona. The project is approximately 110km east of Phoenix and is accessed via U.S. Route 60 (Figure 5-1) which runs easterly through Bloody Tanks Wash and connects the town of Miami with the city of Globe approximately 10km further to the east. The town of Miami is built up on both sides of the highway and areas of previous drilling occur throughout the town. Many of these drill sites are still accessible by a dense network of community paved and gravel roads. However, some historic drill sites are hidden beneath more recent town infrastructure such as asphalt parking lots or building construction.

Roads servicing the mining operations of BHP Copper and Freeport McMoRan, immediately north and west of Miami and of the Project are gated and require authorizations for use. Some of these roads access historic Van Dyke drill sites that now reside on surface rights owned by the mining companies. Access agreements were struck to secure legal access to these areas whose mineral rights are unequivocally owned by Desert Fox.

5.2 Climate

The National Oceanic and Atmospheric Administration's Climate Atlas of the United States and the Western Regional Climate Center records provide data from 1914 - 2005 from a station in Miami, Arizona.

The regional climate is semi-arid. The average amount of annual precipitation for the area is 58.4 cm. Most of the rainfall occurs during the winter and summer months. Precipitation during the winter months (December - March) usually occurs as long, steady storms. Snow may fall at higher elevations, but typically does not accumulate. Rain events during the summer months (July - early September) are typically short and violent in response to local thunderstorms. May and June are the driest months of the year and the period can reach drought conditions.

The average annual maximum temperature for the period of record at this station is 25°C. The warmest month is July with an average maximum temperature of 36°C. The coolest month is January, with an average minimum temperature of 1°C.

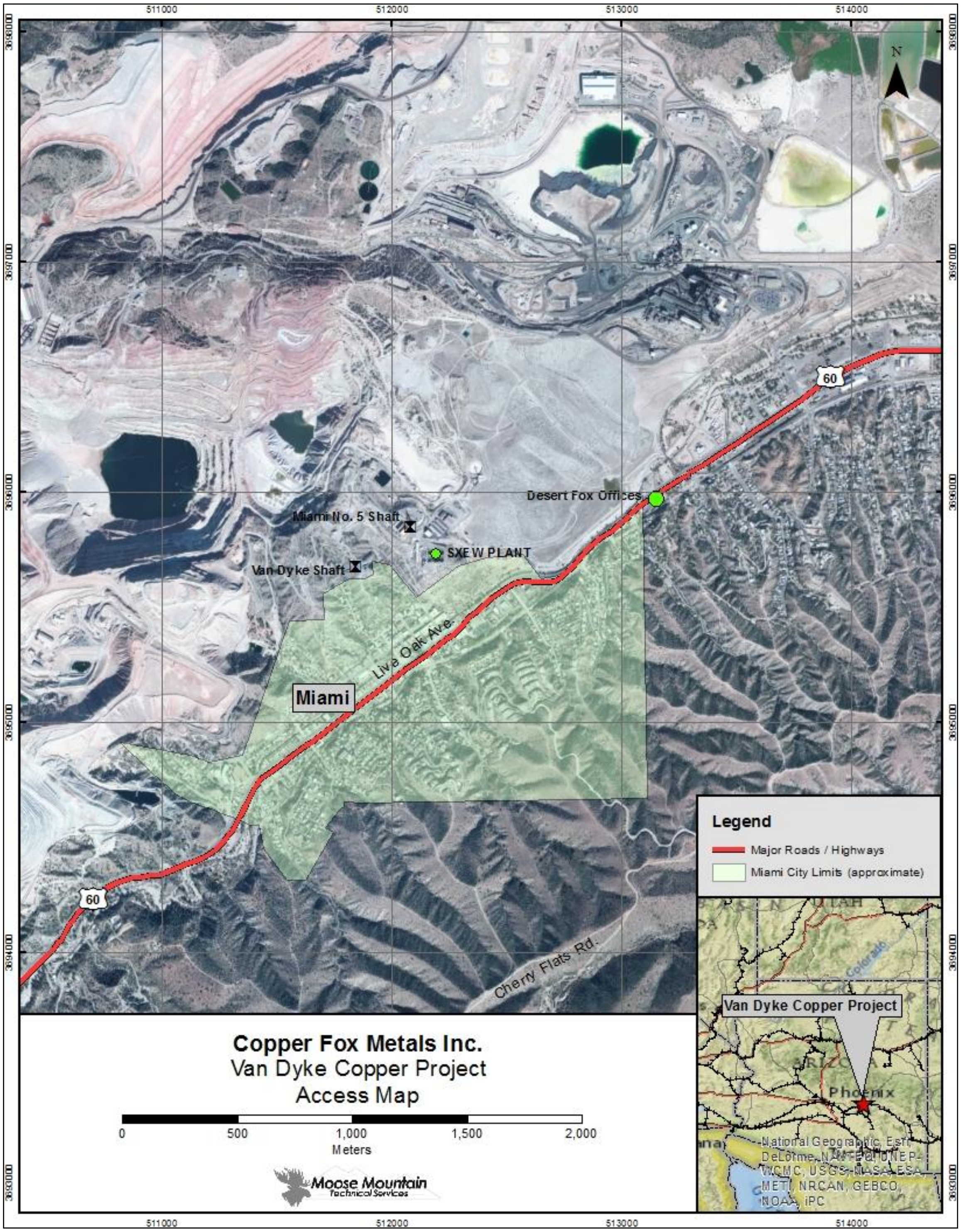


Figure 5-1 Van Dyke Copper Project – Access and Location

5.3 Local Resources

Existing facilities at the Project include a permanent office and core storage building and a series of steel "sea cans" that are used to store drill core and equipment, and a yard which serves as a suitable core layout and working area (Plate 5-1). The yard is not fenced, but core and supplies are never left out or unattended during daylight hours. All materials are put away and locked inside the office or sea cans during non-working hours. The office facility is in the town of Miami at the following address: 344 E. Highway 60, Lower Miami, AZ 85539-1353.

5.4 Infrastructure

There is a long-standing tradition of copper mining in the area, and the industry still provides the largest number of jobs for residents. Therefore, the local services already in place are sufficient to supply the Project's needs. The current level of community services is thought to be adequate for the requirements of the Project. Medical facilities are available at Miami's Cobre Valley Community Hospital. Fire, police, public works, transportation, and recreational facilities are in place and fully functioning. The two communities have an adequate supply of permanent housing and temporary housing to more than accommodate the projects exploration workforce.

Source: MMTS, 2021

Plate 5-1 Copper Fox's office, core logging and equipment storage facilities, Miami, Arizona

5.5 Physiography and Vegetation

The project is in the Basin and Range physiographic province of in east-central Arizona. The topography of the project area consists of a narrow, east-west alluvial corridor, where downtown Miami is situated and through which Highway 60 runs. The alluvial corridor, Bloody Tanks Wash, is flanked to the north and to the south by hills that rise to elevations of about 4,000 feet masl. Bloody Tanks Wash slopes gently eastward and during rain events channels water toward Miami Wash and the headwaters of Pinal Creek. The town of Miami is at an elevation of approximately 3,400 feet asl; prominent dumps, heap leach pads, tailings facilities and other mining infrastructure from other operations occupy large areas immediately north and northwest of the town and project area (Plate 5-2).

There are no natural surface water features in the area. Several large tailings ponds are located north of the Bloody Tanks Wash.

Source: MMTS, 2021

Plate 5-2 Looking northwest over the town of Miami with the Van Dyke shaft (center) and Miami No. 5 shaft (right) shown in the background

The hilly topography is dissected by steep-walled gulley's that direct seasonal storm waters toward Bloody Tanks Wash which runs easterly through town. The Van Dyke deposit is located primarily beneath the town of Miami.

6 History

6.1 Early Developments in the Globe-Miami District

The Globe-Miami mining district of south-central Arizona is one of the oldest and most productive in the United States. The first prospecting expeditions visited the Globe-Miami area in the 1860s during a time when the area was still being settled. The early prospecting activity led to the discovery of numerous small silver+/-gold vein occurrences, some of which later became producing mines. By 1883, at the peak of silver mining, there were 12 mills processing ore in the vicinity of Globe (Ransome, 1903). Through the 1880s the price of silver decreased, and the mines gradually became uneconomic; by 1887 almost all the silver mining activity had ceased. During the same period, the price of copper rose sufficiently to create interest in high-grade copper occurrences, some of which had previously been worked for silver.

The important Globe claim was staked in 1874 to cover impressive chrysocolla-bearing veins that later became part of the Old Globe mine (later renamed the Old Dominion mine). It did not garner significant attention until 1881 when mining infrastructure was moved from a small high-grade copper operation 10 km west of Globe to the Old Dominion site. Mining at the Old Dominion underground copper operation reached full production in 1884 and continued until 1931.

Toward the end of the century, reserves of higher-grade copper ore decreased while the demand for the metal increased, and the economics of extracting copper from lower grade deposits improved. Efficient bulk mining techniques and new recovery processes were developed to extract copper from porphyry deposits and contributed heavily to the future development of several large surface and underground mines in the Miami area.

During 1905 and 1906, prior to the establishment of the town of Miami, the predecessors of the Miami Copper Company (Miami Copper) began to procure options on many of the claims that eventually formed the bulk of the Miami mining operation (Miami Unit). In 1907, development of the Redrock shaft encountered abundant, rich copper oxide mineralization that compelled the company to develop the site. By 1911, Miami Copper had completed construction of a mill, power plant, and other infrastructure and produce copper concentrate from the Miami deposit (Ransome, 1919). From 1911 to 1959 block caving was used as the primary mining method. In 1943, in-situ leaching in an area of subsidence was initiated, and post-1959 this method of mining was used exclusively. Ownership and operatorship of the site changed hands numerous times throughout its development (Miami Copper was taken over by Magma Copper Company which became part of Newmont Mining, Inc. in 1969; Magma Copper was spun-off by Newmont in 1987) ultimately being purchased in 1996 by BHP Copper, Inc., which then merged with Billiton in 2001 to become BHP Billiton. In addition to mining, reclamation and reprocessing of old tailings to extract additional copper began in the 1989 and was completed in 2001 when mining operations were suspended. The site produced more than 2.7 billion pounds of copper during its 90 years of operation and is presently undergoing remediation and reclamation.

The early success of Miami Copper enhanced the prospectivity of the Miami area. Inspiration Mining Co. (IMC) acquired ground in the area and by 1911 had drilled more than 80 holes, sunk several shafts, and developed 27,000 ft of underground workings. In 1912, IMC merged with another local explorer, Live Oak Development Co., to form the Inspiration Consolidated Copper Company (Inspiration Consolidated) and, after a construction phase, began producing in 1915. Ultimately, multiple deposits were discovered and later developed by Miami Copper and Inspiration Consolidated over an irregular west-east corridor more than 4 km in length; the area is known as Miami-Inspiration. Mining of rich secondary copper mineralization took place from a complex of deposits distributed along the corridor including the Thornton, Live Oak, Red Hill, Blue Bird, Joe Bush and Oxhide pits and from underground block-caving of the Miami and Miami East ore bodies (Skillings, 1978; Creasey, 1980). Ownership and operatorship of the Inspiration Consolidated site also changed as several mergers and acquisitions took place. Inspiration Consolidated was purchased by Cyprus Minerals Company in 1988, which evolved into Cyprus Amax Minerals Company. Cyprus Amax was purchased by Phelps-Dodge in 1999 and which in turn was purchased in 2007 by present owner/operator Freeport McMoRan Copper & Gold Inc. (Freeport).

The Carlota (Cactus) property, located west of Miami-Inspiration, also began as a small underground copper-silver producer, being operated intermittently from 1929 to 1964. Copper carbonates and silicates occur in shattered diabase in the footwall of the Kelly fault zone. The property was re-evaluated in the early 1970s and late 1980s, and after changing ownership multiple times, was purchased in 2005 by Quadra Mining Ltd. Quadra developed a large open pit and heap leach/SX-EW operation that was commissioned in 2008. KGHM International purchased the mine in 2011.

The first bulk mining of porphyry-style copper mineralization in the Globe-Miami district began in 1943 when the Castle Dome deposit, located 3 km northeast of Carlota and approximately 8 km west of the town of Miami, transitioned from a high-grade low-tonnage operation. Mineralization at Castle Dome consisted of a chalcocite-enriched supergene blanket and was mined until 1953. In 1954, the Copper Cities disseminated copper deposit approximately 5 km north of Miami was exploited, followed later by the small Diamond H pit, located about 2 km southwest of Copper Cities (Peterson, 1954). The large Miami and Inspiration deposits transitioned to bulk mining techniques at about the same time. Stripping of the Pinto Valley deposit, which constituted the hypogene mineralization immediately northeast of the original Castle Dome supergene orebody, began in 1972. In 2013, Capstone Mining Corp. purchased the Pinto Valley copper mining operation from BHP Copper.

In 1969, Miami Copper discovered the Miami East deposit, a tabular ore body located 3 km east of the Miami-Inspiration workings and at a depth of approximately 1 km. Production began in 1974 utilizing a combination of conventional mining and in-situ leaching techniques until reserves were exhausted. The mine site, known as the Miami Unit, has been on care-and-maintenance since 2002, but BHP has been conducting residual leaching of stockpiles with copper recovered from solution by the SX/EW process. The site's smelter processes concentrate primarily from Bagdad, Sierrita, Morenci and Chino.

Presently, mining in the Globe-Miami district is taking place at Freeport's Miami mine and Capstone's Pinto Valley mine. Freeport's operations include heap leaching of copper ore and recovery by solution extraction/electrowinning (SX/EW). The site also has a smelter and rod mill.

6.2 History of the Van Dyke Copper Project

In the early 1900s, as the demand for a local workforce increased, the need to provide miners with convenient housing, shopping and places of amusement led to the founding of the town of Miami. Miami was founded in 1907 when the Miami Land and Improvement Company (MLIC) acquired a tract of land on the upper end of Miami Flats (present-day downtown Miami). In 1908, Mr. Cleve W. Van Dyke purchased the tract from the MLIC, purchased adjacent land, formed the Miami Townsite Company and began to sell surface building lots. The first train arrived in October 1909, and a federal census taken in 1910 determined that Miami had 1,390 residents.

Mr. Van Dyke shrewdly retained the mineral rights beneath the town, and in 1916 transferred these mineral rights to newly formed Van Dyke Copper Co. (VDCC). VDCC provided a vehicle for him to explore and potentially develop the ground that lay adjacent to mineral estates owned by Miami Copper Company (Miami Copper) and Inspiration Consolidated Copper Company (Inspiration Consolidated).

Later in 1916, VDCC drilled the initial hole into the Van Dyke deposit (Rice, 1921). The vertical rotary drillhole, V-1, was located on a ridge approximately 1000 feet southwest of the No. 5 Shaft of Miami Copper Company. It was drilled through post-mineral sedimentary rock (Gila Conglomerate) of uncertain thickness in the hope of intersecting a blind copper deposit. At a depth of 1169 feet the drill encountered a fault zone with abundant copper carbonate and copper silicate minerals that averaged 6.58% Cu (File note dated August 15, 1917). The hole was lost shortly thereafter in the footwall of the structure at a depth of 1219 feet. VDCC drilled a second vertical rotary hole 2,600 feet east-southeast of hole V-1. Hole V-2 reportedly intersected 41 feet of copper carbonate and copper silicate-bearing breccia averaging about 4% Cu (Peterson, 1962). VDCC also collared a third hole 6,700 feet farther to the southeast, but it was abandoned in Gila Conglomerate at a depth of 1,400 feet.

Exploration drilling was suspended early in 1918 because of the United States' participation in World War One but resumed in 1919 following an agreed upon armistice that ended the war and led to the signing of the Versailles Treaty. In the spring of that year, VDCC began to sink a vertical shaft located 200 feet south of drillhole V-1 (Rice, 1921; Peterson, 1962). By 1921 the shaft, which was designed for development and exploration purposes only, had been sunk to a total depth of 1,692 feet and had intersected mineralization like that cut by drillhole V-1 (Rice, 1921). Sinking of the shaft provided a significant cross-section of the geology and mineralization it encountered (Table 6-1 and Figure 6-1), including a fault zone that was interpreted to be the Miami fault, a southeast-dipping (60) normal fault that abruptly truncated the eastern extension of the Miami East deposit approximately 400m west of the Van Dyke shaft. This information enabled geologists to estimate with greater certainty the direction and amount of displacement on the Miami fault. Unfortunately, a sharp decline in the price of copper during the year led to the suspension of further underground development activities.

By 1928 copper prices had recovered. VDCC dewatered the shaft and resumed its exploration and development of the Van Dyke deposit. Underground drifts were developed on the 1212 Foot, 1312 Foot and 1412 Foot levels and the first shipments of ore were made in 1929. Ore shipments continued through to 1931 when copper prices again fell to levels that would not sustain profitable mining operations (Peterson, 1962).

In 1943 the Van Dyke mine was reopened as a National Defense project. It was found that most of the stopes and some of the drifts had caved (Kreis, 1974), but ore was available in parts of the mine. Despite exceptional average ore grades of approximately 5% Cu, the operation was not profitable because of the limited capacity of the small single hoist used to bring ore to surface from the 1212 Level. The mine was closed in June 1945. Metal production for the two periods of operation (1929-1931 and 1943-1945) totaled 11,851,700 pounds of copper (Peterson, 1962).

The property was idle in 1946, but in 1947, AMICO Mining Corp. (a company formed and held equally by Anaconda Copper Co., Miami Copper Co. and Inspiration Consolidated Copper Co.) leased the Van Dyke property and drilled four holes to test for the southern extension of the deposit. The holes failed to intersect encouraging mineralization; and AMICO was dissolved in 1949 (Peterson, 1962).

The Van Dyke property remained inactive from 1948 to 1963. In 1964, Freeport Sulfur Company leased the Van Dyke property and drilled two holes that failed to intersect mineralization (Clary et al., 1981). The property was again dormant until 1968.

In April 1968, Occidental Minerals Corporation (Occidental) acquired the Van Dyke property through a lease and Option to Purchase agreement with VDCC. In the early 1970s Occidental optioned its interest to several other companies including AMAX and Utah International (Utah). The two companies conducted considerable amounts of drilling but neither completed its earn-in. AMAX terminated its option with Occidental late in 1973 and Utah terminated its option with Occidental in late 1975 or early 1976. By 1975, a total of 50 holes had been drilled throughout the project area, including many within the Town of Miami. The drilling covered a polygonal area with maximum dimensions of approximately 1300 m in an east-west direction by approximately 1000 m in a north-south direction.

Drilling completed to the end of 1975, determined that the Van Dyke deposit is covered by from 186 m (in the northwest part of the deposit) to more than 627 m of unmineralized Tertiary Gila Conglomerate. Below the Gila Conglomerate, a layer of hematitic clay (up to 45m thick) occurs along the unconformity between the Gila Conglomerate and the Pinal Schist. Below the red hematitic clay layer, the Pinal Schist displays the characteristics of a “leach cap” formed by oxidization and leaching of a low-grade, low pyrite content porphyry copper deposit. The copper mineralization hosted in the Pinal Schist and porphyritic phases of the Schultz granite consists primarily of secondary copper minerals azurite, malachite and chrysocolla; underlain by a Supergene (“chalcocite”) zone. The zones of secondary copper mineralization transition into Hypogene sulphide (chalcopyrite-molybdenite +/- bornite) mineralization at depth.

Table 6-1 Description of Geology encountered in the Van Dyke Shaft (after Rice, 1921)

From (ft)	To (ft)	Description
0	760	Gila Conglomerate
760	1183	Pinal Schist with traces of chalcotrichite (top of Oxide Zone)
1183	1218	Pinal Schist with copper silicates and carbonates
1218	1430	Pinal Schist with traces of chrysocolla, malachite, azurite, cuprite & native copper (bottom of Oxide Zone)
1430	1595	Pinal Schist with stringers and disseminations of chalcocite (Supergene Zone)
1595	1610	Pinal Schist with pyrite and chalcopyrite (top of Hypogene Mineralization)
1610	1662	Granite Dyke (Davis Canyon Fault: 1635-1662’)
1662	1692	Pinal Schist

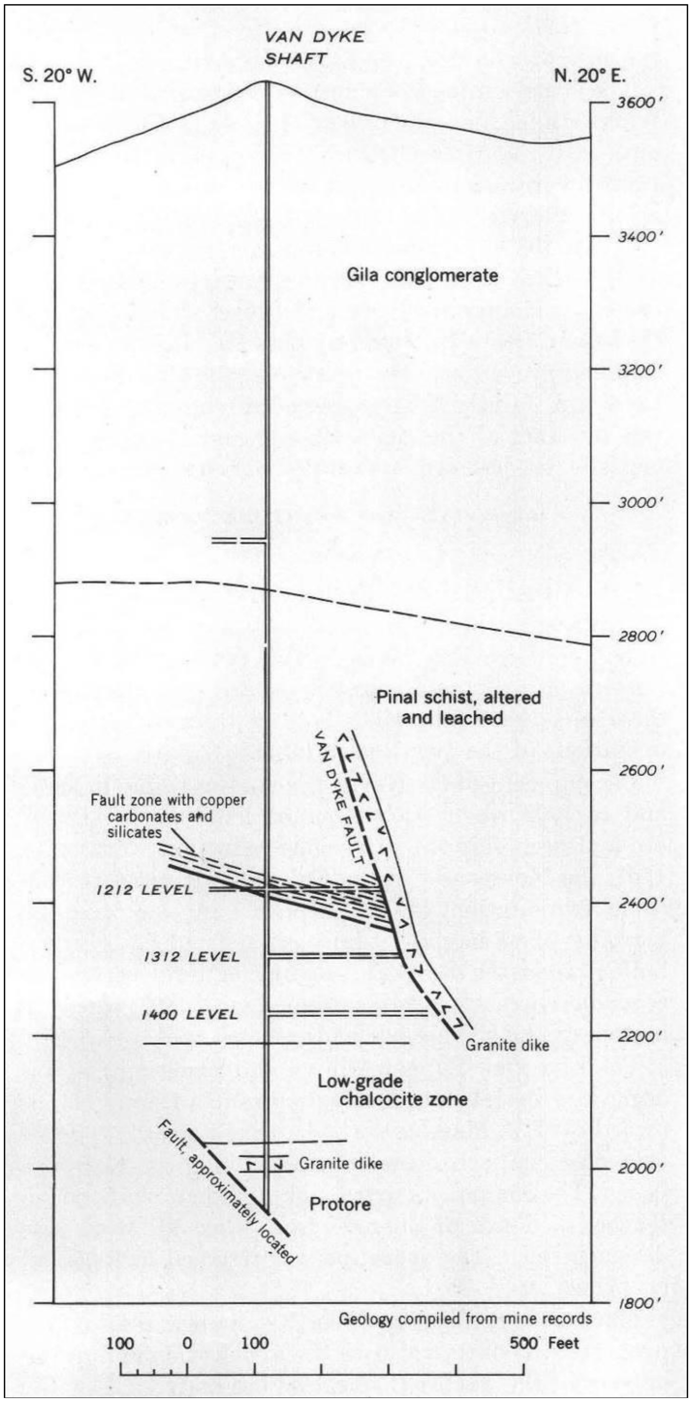


Figure 6-1 Geological Cross-section along 020° of the Van Dyke Shaft (reproduced from Peterson, 1962)

Modelling by Occidental of the Van Dyke deposit using information from the early underground workings and details from drilling completed between 1968-1975 determined that the Van Dyke deposit resides in the downthrown hangingwall block of the Miami fault, east of the truncated, elongate Miami-Inspiration system of deposits. In the Van Dyke shaft area and in nearby drillholes, copper mineralization was shown to be higher grade and vertically continuous and became the focus for later assessments (Table 6-2 and Figure 6-2).

In the 1970's, a total of 34 drillholes intersected sufficient widths and grade of copper mineralization to be used to calculate resource estimates for the Van Dyke deposit. Four different estimates were completed, all from 1973 to 1976, decades before implementation of National Instrument 43-101 (NI 43-101); the estimates are therefore historical and are not relied upon by the authors of this report or by Desert Fox. The historical estimates range from 103,000,000 tons averaging 0.53% Cu to 140,858,000 tons averaging 0.40% Cu. These estimates are outlined in Table 6-3 below. Resource estimates were also completed for a limited area in and adjacent to the Van Dyke underground workings and led to further test work (outlined below) in the immediate area of the mine (Kreis, 1974; Caviness, 1987).

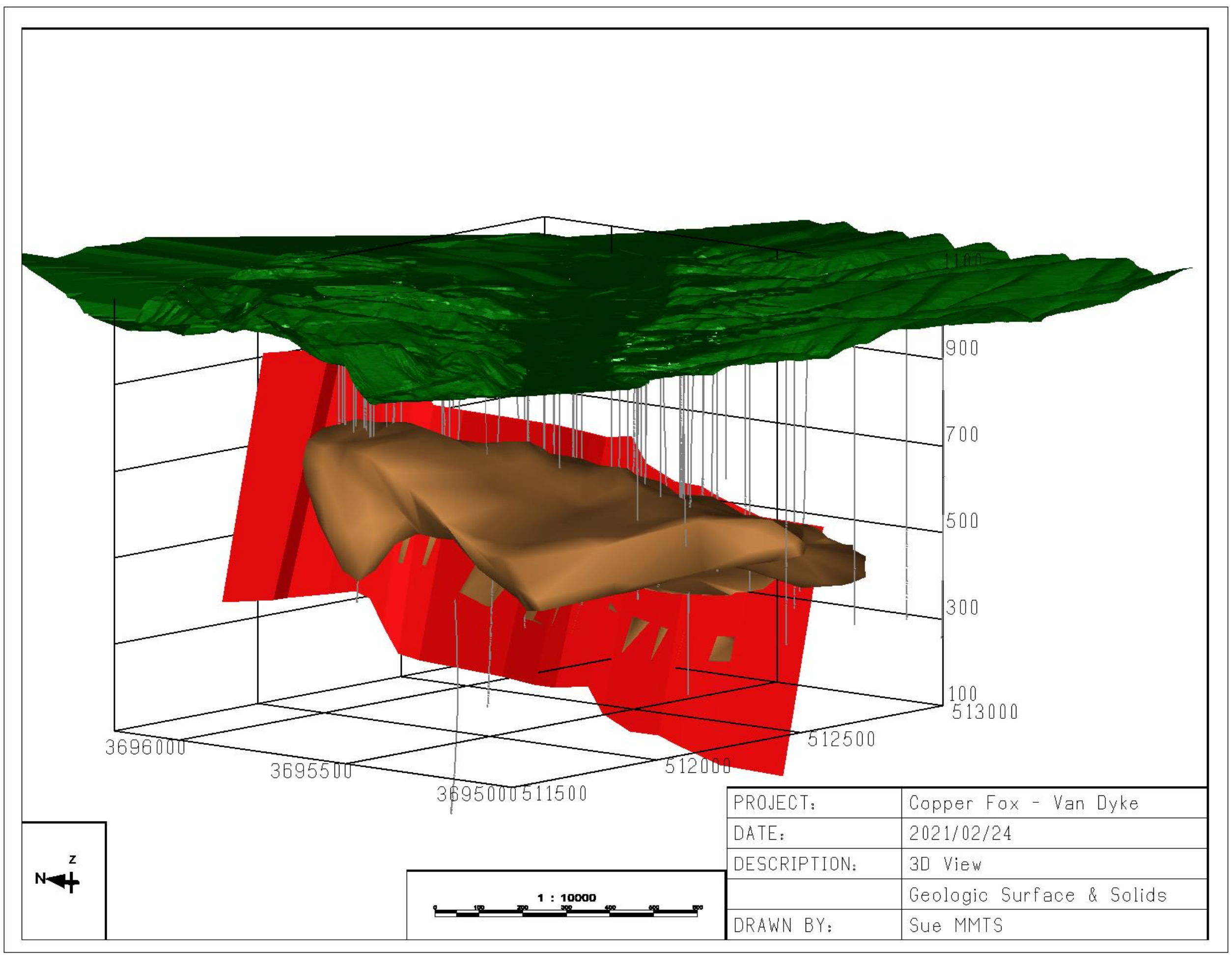


Figure 6-2 Geological Model: 3d view of the Van Dyke Fault (red) and Mineralized Solid (brown) – Looking Northeast

Table 6-2 List of Selected Historical Drillhole Intersections, Van Dyke Copper Deposit (Acid Soluble Copper (ASCu) Intervals (Shoulder Cut-Off of 0.05% ASCu)

DDH ID	Zone (relative)	From (m)	To (m)	Interval (m)	ASCu (%)
OXY-6	upper	376.12	402.34	26.21	0.661
	mid	415.44	435.86	20.42	0.676
	lower	506.27	582.17	75.90	0.831
	total	376.12	582.17	206.05	0.481
OXY-7	upper	396.24	418.19	21.95	0.696
	lower	427.94	541.93	114.00	0.417
	total	396.24	541.93	145.69	0.429
OXY-8	upper	322.48	339.24	16.76	0.196
	lower	374.29	439.22	64.92	0.504
	total	322.48	439.22	116.74	0.322
OXY-10	upper	339.85	379.17	39.32	0.654
	mid	426.72	460.55	33.83	0.283
	lower	473.96	489.51	15.54	0.207
	total m+l	426.72	489.51	62.79	0.211
OXY-18	upper	408.74	442.57	33.83	0.719
	mid	477.32	521.21	43.89	0.162
	lower	576.07	584.91	8.84	0.310
	total U+M	408.74	521.21	112.47	0.291
OXY-20	upper	428.85	452.93	24.08	0.313
	mid	479.15	500.79	21.64	0.159
	lower	508.10	528.52	20.42	0.376
	u+m+l	428.85	528.52	99.67	0.217
VD-5	upper	417.27	432.51	15.24	0.871
	mid	438.61	450.80	12.19	0.293
	lower	530.66	579.42	48.77	0.371
	total	417.27	579.42	162.15	0.230
VD-6	upper	364.54	429.16	64.62	0.412
	mid	450.49	459.64	9.15	0.134
	lower	480.97	500.48	19.51	0.302
	total	364.54	500.48	135.94	0.273

Table 6-3 Comparison of Historical Resource Estimates, Van Dyke Copper Deposit

Company or Estimator	Year	Tonnage	Total Cu (%)	Oxide Cu (%)	Method	Cut-off Grade
Occidental	1973	115,700,000	0.51	0.34	polygonal	0.20 % Cu
AMAX	1973	117,000,000	0.49	0.31	polygonal	0.20 % Cu
Utah	1975	140,585,000	0.40	0.24	sections	0.15% Cu
C.R. Caviness	1976	119,202,494	0.52	0.32	sections	0.20 % Cu

In 1976, Occidental initiated an in-situ leaching pilot program in an area due west of the Van Dyke shaft on patented claims and surface estate lands owned by VDCC. The work consisted of drilling from surface one vertical injection well and one vertical recovery well, each 1,000 feet in length, spaced 75 feet apart. Water was then pumped down the injection well to hydraulically fracture rock containing acid soluble copper mineralization. A weak sulphuric acid solution was then pumped down the injection well and allowed to percolate through the fractured rock until being drawn up the recovery well. The pilot program as completed in 1977 and confirmed that in-situ leaching was an efficient and effective method of extracting copper from the deposit. In 1978, Occidental initiated a second phase of in-situ testing by drilling five injection and recovery wells and eight monitoring wells. The testing continued until May 1980 and proved the feasibility of a surface in-situ leaching operation at Van Dyke (Huff et al, 1981). However, a surface operation at Van Dyke was not supported by the Town of Miami under which the deposit resides. Town ordinances and ongoing litigation discouraged Occidental sufficiently and later in 1980 the company relinquished its option on the Van Dyke property.

In 1986, Kocide Chemical Corporation (Kocide), a wholly owned subsidiary of Griffin Corporation, negotiated a deal with the owners of the VDCC to develop an in-situ leaching and copper recovery operation in the area that Occidental had tested in the 1970s. Kocide applied for and received the necessary permits to drill a series of injection and recovery wells and to construct a copper cementation plant. Production was expected to total approximately 600,000 pounds of copper per month during the initial phases of operation and then increase to approximately 1.5 million pounds of copper per month within two years. Advancement of the Project was delayed through 1987, and production did not commence until December 1988 (Beard, 1990). Initially, Kocide injected a dilute sulfuric acid solution into the underground workings and recovered the pregnant solution from a production well. Cement copper was precipitated in ‘Kennecott Cones’ using shredded and de-tinned cans and the product was shipped to the company’s Casa Grande plant for further refining to produce copper sulphate. A recorded 4 million pounds of copper cement was produced in 1988-89 and 1989-90. Kocide suspended its operations in 1990 due to iron build up in the recycled leach solution.

Later in 1990, Arimetco International Inc. acquired the Van Dyke property, and the following year rehabilitated the Van Dyke shaft. In 1992, Arimetco was developing plans to leach the entire deposit using the Van Dyke shaft as an extraction well, but this work did not proceed past the planning stages. Following Arimetco’s departure, the Van Dyke property lay dormant until 2012.

6.3 Recent Developments - Van Dyke Copper Project

In April 2012, Bennu Properties, LLC, Albert W. Fritz Jr. and Edith Spencer Fritz (Bennu-Fritz) concluded its acquisition of clear title to certain surface and subsurface mineral rights that comprise an estimated 90 - 95% of the known extent of the Van Dyke property through a tax lien foreclosure process. At about the same time, Bell Copper Corporation (Bell), through a wholly owned subsidiary, entered into a purchase and sale agreement with Bennu-Fritz to acquire the Van Dyke property. Bell also acquired 35 unpatented federal mineral lode claims (the MIA 1-35 claims) that cover approximately 600 acres of ground contiguous with the southern edge of the Van Dyke property.

In July 2012, Copper Fox Metals Inc. (Copper Fox) signed a purchase agreement with Bell to acquire 100% of Bell's interest in the Van Dyke property. Under the terms of the purchase agreement Copper Fox, through a wholly owned subsidiary Desert Fox Van Dyke Co, acquire 100% of the Van Dyke property, including the MIA claims, as well as the Sombrero Butte property, by paying to Bell CDN$500,000, by paying to Bennu-Fritz US$1.5 million and by assuming the continuing obligations with respect to the Van Dyke property, subject to certain amended terms and conditions. Bennu-Fritz retain a 2.5% Net Smelter Return ("NSR") production royalty from the Van Dyke deposit. Copper Fox, in its' sole and absolute discretion, has the right to purchase up to 2% of the 2.5% NSR for a period of two years by the payment of US$1.5 million for each 1% NSR purchased.

In 2013, Copper Fox completed a program to recover approximately 6,000 boxes of core, 3,500 of the original pulp samples and most of the geotechnical, hydrogeological, and engineering studies as well as operating information and copper production statistics generated by the In-situ Leach tests completed by Occidental Minerals Corporation and Kocide Chemicals on the Van Dyke deposit.

In 2014, Copper Fox completed a six-hole (3,211.7m) verification diamond drilling (PQ core diameter) program, In-situ Pressure Leach testing (8 samples) of oxide copper mineralization, environmental baseline studies, hydrology studies, fluid mechanics, geochemical characterization of the lithologies surrounding the deposit, scoping level engineering studies, and a mineral resource estimate.

The resource estimate was prepared by Moose Mountain Technical Services (‘MMTS’) and the NI 43-101 technical report disclosing the resource estimate was filed on SEDAR on February 2, 2015. Ms. Sue Bird – P. Eng., and R. (Bob) Lane P. Geo as the Qualified Persons. The Inferred Resource (Base Case at 0.05% total copper cut-off) totalled 261.7 million tonnes grading 0.25% total copper containing 1.44 billion pounds copper. The modelling completed during the resource estimation, suggests that the copper mineralization is open to the west and southwest.

In 2015, Copper Fox completed a NI-43-101 Technical Report entitled “Preliminary Economic Assessment Technical Report for the Van Dyke Copper Project” dated November 18, 2015 prepared under the direction of Moose Mountain Technical Services, Mr. Jim Gray, P.Eng., et al as Qualified Persons. The PEA suggested that Van Dyke is a technically sound ISCR copper project, utilizing underground access and conventional SX-EW recovery methods with low cash costs, strong cash flow, a post-tax NPV of US $149.5 million and IRR of 27.9%. The PEA was based on $US 3.00/lb copper and included an Inferred Resource of 183 million tonnes containing 1.33 billion pounds of copper at an average total copper grade of 0.33%. Mine life was estimated to be 11 years with annual copper production of 60 million pounds in Years 1-6, declining thereafter. The acid soluble copper recovery used in the PEA was 68%. Direct operating costs were estimated to average $US 0.60 per pound over the life of mine. The PEA forecasted a Gross Revenue of $1.37 billion over the mine life with cumulative net free cash flow of $453.1 million (before tax) and $342.2 million (post-tax). The Initial capital cost (on a new basis, including pre-production costs and $US 42.4 million in contingencies) totaling $204.4 million, were expected to be recovered within 2.9 years on a post-tax basis. The project economics were most sensitive to copper recovery and copper price.

The PEA recommended that a pre-feasibility study (estimated cost of $US 16.6 million) consisting of 10,000m of diamond drilling to upgrade and to expand the resource as well as a five-hole ISCR pilot test program to investigate, among other things, soluble copper recoveries, hydraulic connectivity, hydrology, and other geotechnical parameters related to in-situ leaching be completed.

The results of the PEA were preliminary in nature as they include an Inferred Mineral Resource which is considered too speculative geologically to have the economic considerations that would enable them to be categorized as mineral reserves. There is no certainty that the PEA forecasts will be realized or that any of the resources will ever be upgraded to reserves. Mineral resources that are not mineral reserves do not have demonstrated economic viability.

In 2016, Copper Fox retained NV5 to estimate the cost of the compilation of the historical hydrogeological, water quality and information from three previous ISCR test programs completed by Occidental Minerals and Kocide Chemicals. NV5 estimated the cost to complete this work to be approximately $US 425,000.

In 2017, Copper Fox commenced the process to obtain a Class III; Underground Injection Control (“UIC”) and Aquifer Protection (“AP”) permits which if acquired, are good for the life of the Project. NV5 compiled the information from the three historical ISCR and production tests and information for geotechnical and hydrogeological wells completed around the Van Dyke project. Modeling of the Pollution Management Area, the Discharge Impact Area, the Cone of Depression and Points of Compliance as well as the abandonment plans for the proposed test site was completed to the draft stage when Copper Fox suspended the work on the permit applications due to its inability to obtain surface access to the proposed ISCR pilot scale test site.

No work was done on the Van Dyke Project in 2018.

In 2019 Copper Fox undertook a program to re-analyze all available historical sample pulps and where necessary/possible re-sample available drill core intervals for Total Copper (TCu), Acid Soluble Copper (ASCu) and Cyanide-Soluble Copper (CNCu) concentrations. A total of 2,193 drill core chips, rejects, and pulps from 38 historical diamond drillholes were submitted to Skyline Laboratories in Tucson Arizona for TCu, ASCu and CNCu analyses. Updating of the geological model for the Van Dyke deposit was also completed in 2019. Details of this work are set out in Sections 9 and 14 of this Report.

7 Geological Setting and Mineralization

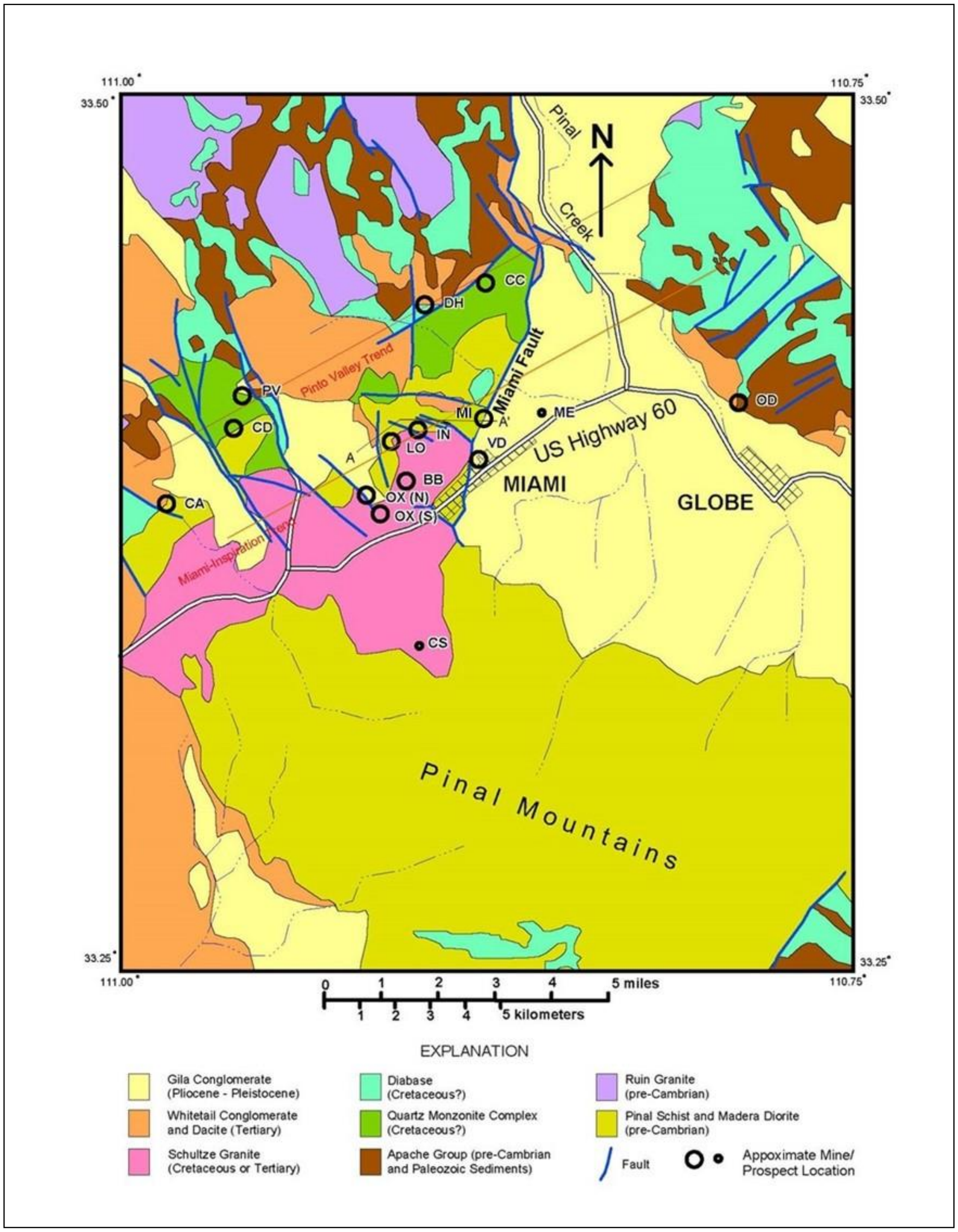
7.1 Geological Setting

The Van Dyke Copper Project is in the Basin and Range province of east-central Arizona, and centrally within the Globe quadrangle. The general geology of the Globe quadrangle was studied by F. L. Ransome in 1901 and 1902. The results of his work were published by the United States Geological Survey as Professional Paper 12 (Ransome, 1903) and as folio 111 of the Geologic Atlas (Ransome, 1904). In 1911, following the realization of the significance of low-grade disseminated copper deposits, Ransome returned to the district to conduct additional work, the results of which were included in Professional Paper 115 (Ransome, 1919). In the middle of the 20th Century, N.P. Peterson and others conducted fieldwork and produced several important reports, including United States Geological Survey Professional Paper 342, describing the geology and ore deposits of the district (Peterson, 1962), a publication that provides the geological framework for the area.

Southeast Arizona, including the Globe-Miami district, has undergone considerable structural deformation that began in the Paleoproterozoic and persisted through to the Tertiary. During the Late Cretaceous and Early Tertiary, the area endured basement-cored uplifts bounded by reverse faults, volcanism, intense compressive deformation, and plutonism that are all related to the development of the Laramide orogeny and magmatic-hydrothermal arc (Coney, 1978). A period of extensive erosion, including the unroofing of porphyry copper systems followed, and was in turn followed in the Late Tertiary by Basin and Range rifting (Maher et al., 2008).

The Globe-Miami mining district is underlain by igneous, sedimentary, and metamorphic rocks of Precambrian, Paleozoic, Tertiary, and Quaternary age. Figure 7-1 shows a simplified geological map of the western half of the district. Table 7-1 lists the stratigraphy of the Miami-Inspiration area. Figure 7-2 shows a diagrammatic sketch that illustrates the age and spatial relationships of the major rock units.

The oldest exposed rocks in the district are Early Proterozoic (1.6-1.7 Ga) turbidites and felsic volcanic rocks of the Pinal Schist that were metamorphosed to greenschist facies. These rocks were intruded by granodioritic to dioritic rocks at ~1.6 Ga, including the Madera Diorite. Post-metamorphic, regionally extensive granitic plutons (~1.4 Ga) were emplaced into this sequence and developed andalusite-bearing contact aureoles. Subsequently, the Late Proterozoic Apache Group, a relatively thin (~1 km) succession of regionally extensive marine sedimentary rocks dominated by siliciclastic and minor carbonate rocks, was deposited across the region. It consists of, from oldest to youngest: the Pioneer Formation, including the basal Scanlan Conglomerate; the Dripping Spring Quartzite, including the Barnes Conglomerate; the Mescal Limestone; and, minor basalt closely associated with the Mescal.



Note: Deposit Abbreviations: BB=Bluebird; CA=Cactus/Carlota; CC=Copper Cities; CD=Castle Dome; CS=Copper Springs; DH=Diamond H; IN=Inspiration (Thornton); LO=Live Oak; ME=Miami East; MI=Miami Caved; OD=Old Dominion; OX(N)=Oxhide North; OX(S)=Oxhide South; PV=Pinto Valley; VD=Van Dyke

Figure 7-1 Simplified Geological Map of the Western Half of the Globe-Miami Mining District (modified by L. J. Bernard after Peterson, 1962; Creasey, 1980; Sillitoe, 2010)

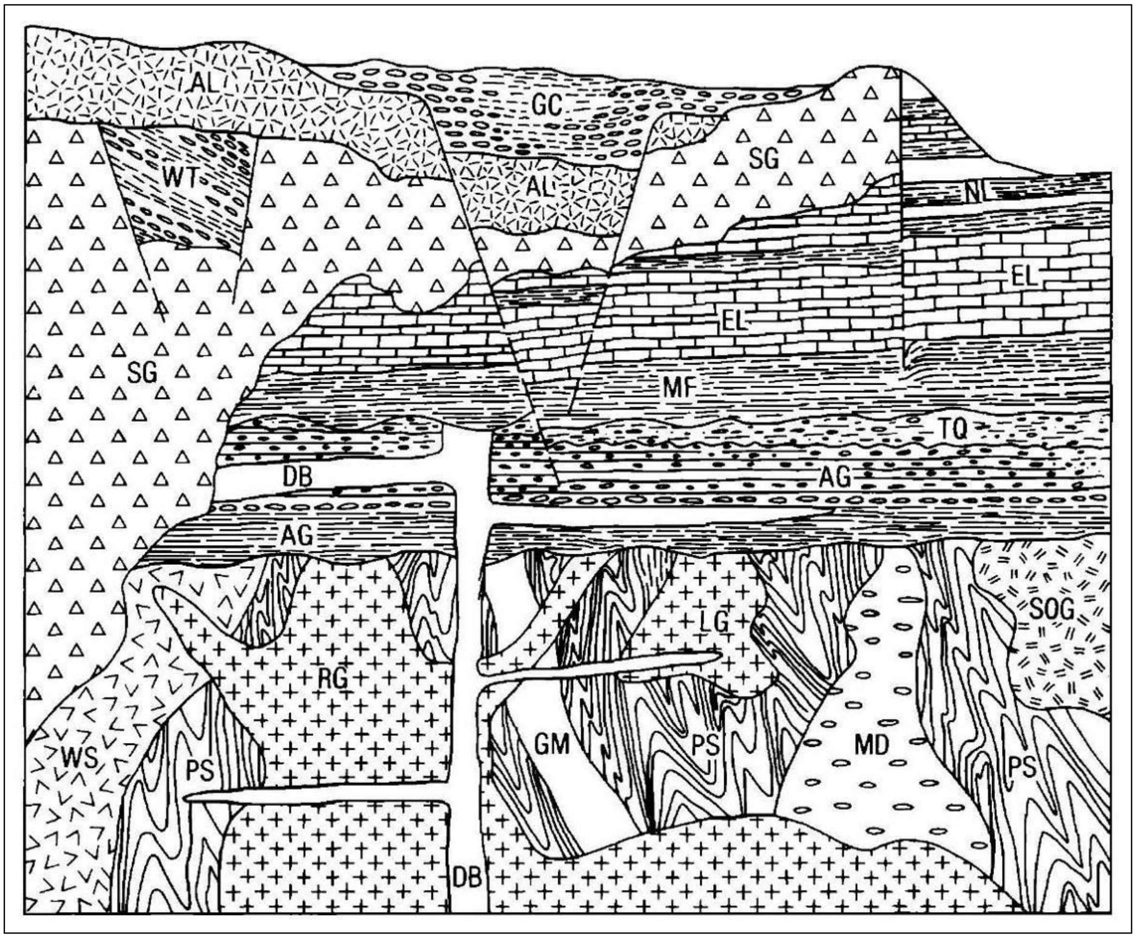
Paleozoic rocks in the district are the Cambrian Troy Quartzite, Devonian Martin Limestone, Mississippian Escabrosa Limestone, and Pennsylvanian to Permian Naco Formation.

During the latter stages or following deposition of the Apache Group, basaltic magmas were emplaced at about 1.1 Ga as sub-horizontal sheets (sills and sill-like bodies) of diabase with local, steeply dipping feeder dikes. These intrusions were emplaced predominantly at shallow depths, within the upper 2km of the crust, but locally breached the surface in the form of basalt flows. The masses of diabase locally are important hosts to mineralization and provide key markers used in reconstructing Laramide reverse and mid-Tertiary normal faults (Maher et al., 2008).

Table 7-1 Stratigraphy of the Miami-Inspiration Area (after Ransome, 1903 and 1919; Peterson, 1962; Creasey, 1980)

Rock or Formation	Age	Description
Alluvium	Upper Tertiary and Quaternary	Unconsolidated, poorly sorted poly-lithologic detritus
Gila Conglomerate	Upper Tertiary and Quaternary	poorly sorted, matrix-supported bouldery cobble conglomerate
Apache Leap Tuff	Miocene	dacitic ash flow tuff
Whitetail Conglomerate	Oligocene	well-bedded, hematite-rich matrix supported conglomerate
Naco Formation	Pennsylvanian - Permian	thin bedded calcareous sediment, marl and fossiliferous limestone
Escabrosa Limestone	Lower Mississippian	cliff forming limestone and dolostone
Martin Limestone	Upper Devonian	dolostone, minor shale and sandstone
Troy Quartzite	Cambrian	well-bedded, well-sorted quartzite with basal quartzite conglomerate
Apache Group		
Mescal Limestone	Precambrian (~1.2 Ga)	stromatolitic limestone, dolomitic limestone and chert
Dripping Spring Quartzite	Precambrian	upper quartzite beds and lower arenaceous shale
Pioneer Formation	Upper Precambrian	arkosic sandstone to arenaceous shale
Pinal Schist	Early Proterozoic (1.6-1.7 Ga)	regionally extensive meta-turbidites and minor felsic volcanic rocks metamorphosed to greenschist facies; locally andalusite-bearing

Several other Laramide age igneous intrusions, ranging from granodiorite to quartz monzonite, were emplaced during late Mesozoic and early Tertiary time. The most recent of these is the Schultz Granite, which underlies the southern part of the district, and was intruded into the Precambrian and Paleozoic country rock during the Paleocene. The Schultz Granite is a composite pluton consisting of at least three intrusive phases. The earliest phase is a granodiorite, the intermediate or main phase is a porphyritic quartz monzonite, and the youngest phase is a series of porphyritic intrusions that were not all emplaced at the same time (Creasy, 1980). Near the northern-most exposures at the Inspiration deposit, Schultz Granite has various textures and compositions that have been called granodiorite, quartz monzonite, and porphyritic quartz monzonite (Olmstead and Johnson, 1966). Creasey (1980) refers to this as the porphyry phase (ie. granite porphyry) of the Schultz Granite. A separate body of granite porphyry has been mapped at the Pinto Valley, Copper Cities, Diamond H, and Miami East deposits, and is seen near the vein-controlled mineralization at Old Dominion.



Abbreviations: AG, Apache Group; AL, Apache Leap Tuff; DB, diabase EL, Escabrosa Limestone; GC, Gila Conglomerate; GM, granite of Manitou Hill; LG, Lost Gulch Monsonite; MD, Madera Diorite; MF, Martin Formation; NL, Naco Limestone; PS, Pinal Schist; RG, Ruin Granite; SG, Schultze Granite; SOG, Solitude Granite; TQ, Troy Quartzite; WS, Willow Spring Granodiorite; WT, Whitetail Conglomerate.

Figure 7-2 Diagrammatic Sketch Illustrating Geologic Relationships of Rock Units in the Globe-Miami Mining District (Creasey, 1980)

Tertiary sedimentary and volcanic rocks cover the mineralized units. The Whitetail Conglomerate was formed because of regional uplift approximately 32 Ma. Rocks of the Whitetail Conglomerate contain weathered clasts of older rocks in a red iron oxide-rich, very fine-grained matrix, and locally detrital to exotic copper mineralization. A Miocene ash-flow tuff, known as the Apache Leap Tuff, covered the area following the Whitetail Conglomerate (21 Ma). Further Basin and Range faulting and subsequent erosion produced the Tertiary to Quaternary Gila Conglomerate from the erosion of all older rocks.

The Gila Conglomerate fills a deep structural basin between the towns of Miami and Globe, more than 10km, and extends northward along Miami Wash and Pinal Creek. It was deposited as two alluvial fan complexes that washed down from the Apache Peaks to the north and from the Pinal Mountains to the south. Gila Conglomerate is covered by variably thick surficial deposits of alluvium and outwash. Figure 7-3 provides a cross-section of part of the Miami-Inspiration trend.

7.2 Mineralization in the Globe-Miami Mining District

The Globe-Miami mining district of east-central Arizona occupies part of the Laramide magmatic-hydrothermal arc of southwestern North America, one of the world's premier copper provinces (Titley, 1982b; Long, 1995). The district is known for a cluster of large disseminated or porphyry copper deposits, many of which have been or are actively being mined and copper-rich polymetallic vein deposits (Ransome, 1903). The vein deposits, based on their predominant metals, have been further divided by Peterson (1962) into copper veins, zinc-lead veins, zinc-lead-vanadium-molybdenum veins, manganese-zinc-lead-silver veins, gold-silver veins, and molybdenum veins. Many vein deposits were important producers during the early history of the district.

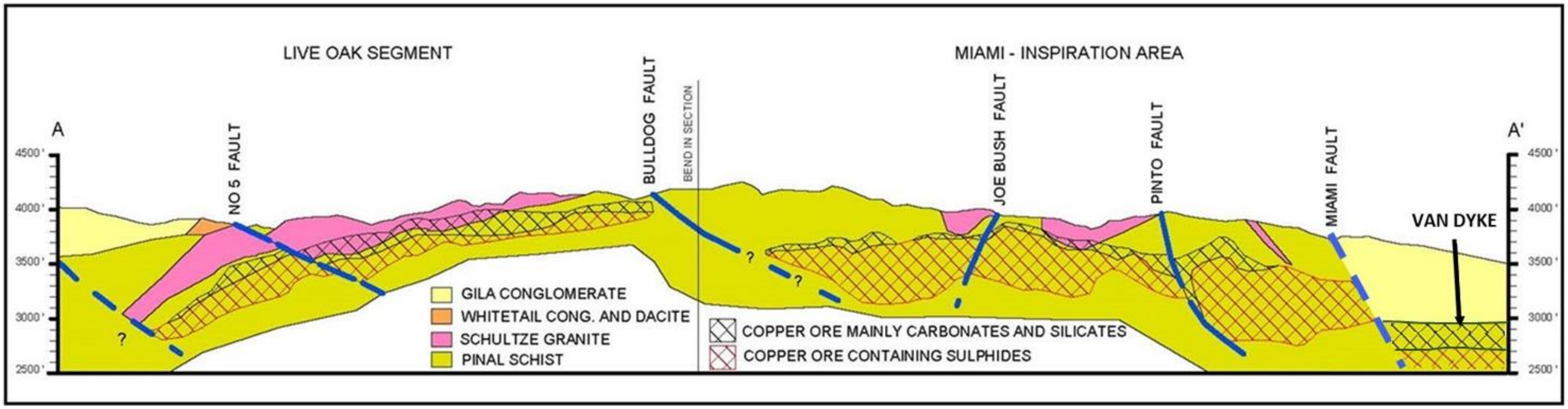


Figure 7-3 West to East Section of the Miami-Inspiration Trend (modified by L.J. Bernard after Peterson, 1962, modified by Stewart 2020)

The district's porphyry copper deposits include Miami-Inspiration, Miami East, Pinto Valley, Copper Cities, Castle Dome and Carlota. Potassic, argillic, sericitic and propylitic phases of alteration are associated with the deposits. Mineralization consists of hypogene (primary sulphide) (and secondary enrichment (oxide, silicate, and sulphide) or supergene. Hypogene zones consist of the primary sulphide minerals pyrite and chalcopyrite with minor amounts of molybdenite, occasional sphalerite and galena; gold and silver may be recovered in small amounts as by-products. Supergene enrichment zones, and locally exotic copper deposits, are dominated by chrysocolla, malachite, azurite, and tenorite as replacements of sulphide species or as infiltrations along late fracture systems. Chalcocite locally occurs as 'blankets' proximal to hypogene ore. The development of supergene mineralization was so extensive and the process of copper enrichment so thorough, that it led to the formation of numerous large, copper-rich ore bodies. Almost all the ore mined in the Globe-Miami district came from supergene-enriched deposits.

The hydrothermal deposits are genetically and spatially related to the emplacement of Paleocene (59 to 64 Ma) calc-alkaline hypabyssal intrusions, specifically the younger porphyritic phases of the Schultz Granite (Pederson, 1962; Creasey, 1980; Titley, 1982b; Seedorff et al., 2008). The mean intrusive age of the main phase of the Schultz Granite is 61.2 +/ - 0.4 Ma. The isotopic age of the porphyry phase is uncertain because of extensive alteration and because of multiple periods of intrusion. The age of mineralization differs from place to place across the district and spans about 5m.y. From oldest to youngest, the known periods of mineralization are: Copper Cities orebody, 63.3 +/- 0.5 Ma; regional quartz-sericite veins, 61.1 +/- 0.3 Ma; Miami-Inspiration orebody, 59.5 +/- 0.3 Ma; and Pinto Valley orebody, 59.1 +/- 0.5 Ma (Creasey, 1980).

Following their formation, porphyry copper systems were affected by faulting, erosion, and oxidation and, in the Oligocene-Miocene, by extensional tectonism that dismembered and variably tilted the upper crustal rocks in the area through the development of grabens and half-grabens (Creasey, 1980; Spencer and Reynolds, 1989; Wilkins and Heidrick, 1995; Seedorff et al., 2008; Mayer et al., 2008).

The Van Dyke copper deposit is located within the Inspiration-Miami trend of deposits that includes five principal orebodies; from west to east they are Live Oak, Thornton, Miami Caved, Miami East and Copper Cities (Ransome, 1919; Peterson, 1962; Olmstead and Johnson, 1966; Creasey, 1980).

7.3 Structural Setting, Geology and Mineralization of the Van Dyke Copper Deposit

7.3.1 Structural Setting and Deposit Geometry

The main structural element in the Miami area is the Miami fault; a district-scale north 020-trending, east-dipping (60 degrees) normal fault that outcrops approximately 400m west of the Van Dyke shaft and can be traced to the Copper Cities mine three miles to the north (Figure 7-1). The Van Dyke copper deposit lies to the east, and on the hangingwall side, of the Miami fault (Figure 7-3). The Miami fault developed during the Tertiary; forms the western edge of a graben that extends eastward to the city of Globe. The graben is filled with Late Miocene and younger Gila Conglomerate that thickens to the east and to the north.

Eastside down displacement on the Miami fault is estimated to be approximately 200 m, placing the Van Dyke deposit at deeper levels than the adjacent Miami Caved deposit. In the mid to late 1970's diamond drilling and deposit modeling identified the presence of at least two or more sympathetic normal faults in the hangingwall of the Miami fault. They include the Porphyry and Azurite faults which was interpreted to further dismember the Van Dyke deposit. Interpretive cross-sections produced by Occidental in the early 1970s illustrate a deposit that consists of two (or more) structural blocks or segments each bound by moderately east-dipping, east-side down normal faults. The deposit was originally interpreted as a continuous, sub-horizontal sheet-like body that dips eastward at 15-20°. The portion of the deposit bound by the Porphyry fault and the Azurite fault consisted of two crude, gently east-dipping panels separated by a barren to weakly mineralized core.

The work completed by Occidental indicated that the hangingwall of the mineralization was defined by a "leach cap" that underlies a layer of red hematitic clay. The hematitic clay layer marks the erosional unconformity between the Gila Conglomerate and the Pinal Schist. About 60m (200 feet) northeast of the Van Dyke shaft, mineralization is truncated by the Van Dyke fault, a post mineral structure coincident with the footwall of a granite porphyry dyke. The fault and dyke strike 110° and dip 70°NE. The localization of higher-grade secondary copper mineralization appears to have been controlled by the intersection of a low-angle (20 degree) fault zone with the Van Dyke fault (Figure 6-1). The greatest amount of brecciation and the highest copper grades occur near this intersection. The Van Dyke fault and its interpreted eastern extension (the "CW fault"), was interpreted to have formed barriers to the copper-bearing solutions that seeped into the low-angle fault zone. The amount of offset along these structures is uncertain.

The Van Dyke copper deposit has a drill-defined, north-easterly strike length of 1500m, a width of 1300m, and a thickness between 40m to over 230m.A three dimensional view of the deposit is illustrated in Figure 7-4, indicating the major faults, and the mineralized solid used in modelling, as well as the drillholes used. Additional plans and sections can be found in Section 14.

7.3.2 Geology

The Van Dyke deposit is not exposed at surface, therefore all known geological information for the deposit has been gained from exploration diamond drilling programs and from development of the Van Dyke shaft and related level workings. Based on diamond drilling, the deposit is covered by between 186 - 627m of alluvium and post-mineral Gila Conglomerate.

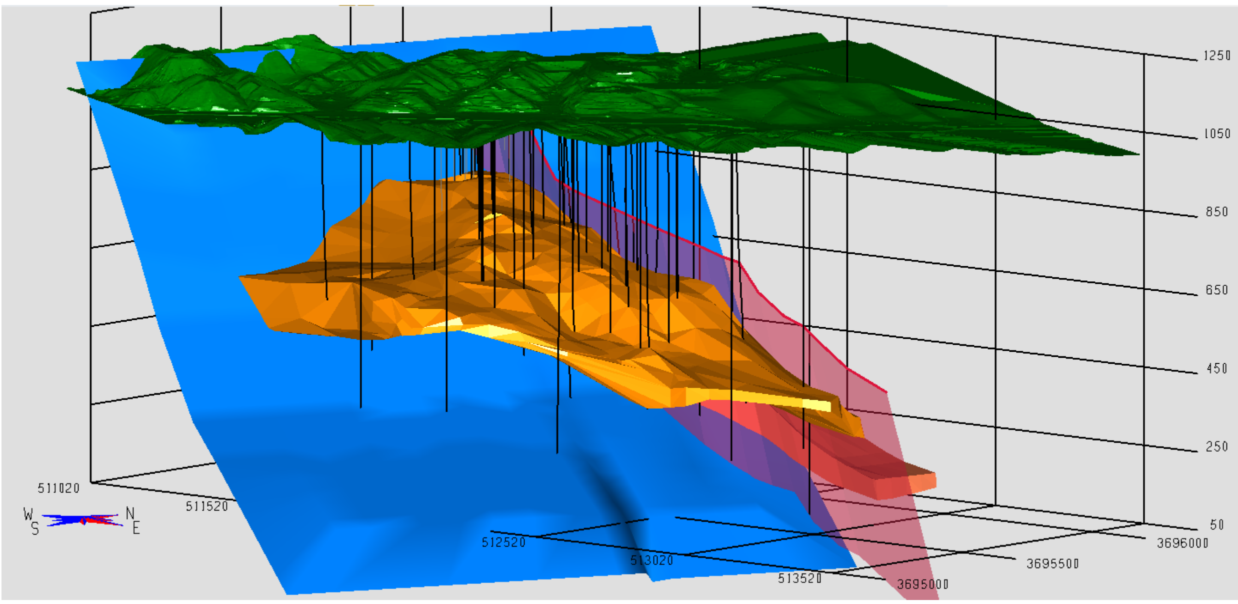
Almost all the Van Dyke deposit is hosted by Lower Precambrian Pinal Schist; a minor amount of copper mineralization occurs in altered porphyritic dikes of the Paleocene Schultz Granite that intruded the Pinal Schist.

Stratified Rocks

Pinal Schist

Lower Precambrian (~1.7 - 1.6 Ga) Pinal Schist is typically pale to medium grey, strongly foliated meta-sedimentary rock consisting of up to 75-80% muscovite (or sericite) and quartz, and varying amounts of biotite, chlorite, k-feldspar, and clay. It ranges from coarse-grained quartz-sericite schist to fine-grained quartz-sericite-chlorite schist. Evidence of early ductile deformation is provided by sections of schist that display tight (ie. chevron) to isoclinal folds (Plate 7-1). More recent brittle deformation is demonstrated by extensive intervals of fractured to brecciated (and re-cemented) schist (Plate 7-2), quartz vein and fracture-controlled copper mineralization. The interconnected open spaces created during brittle deformation served as conduits and depositional sites for secondary copper minerals. Late-stage quartz ± sulphide veinlets and oxidized equivalents cut the foliation (Plate 7-5 and Plate 7-6).

Diabase, an important host to secondary copper mineralization at Miami East, has not been observed at Van Dyke.



Source: MMTS, 2021

Figure 7-4 Three-Dimensional View of the Van Dyke Copper Deposit – Mineralized Solid (orange), Van Dyke Fault (red), Miami East Fault (blue), Topo and Drillholes

Plate 7-1 Chevron-folded Pinal Schist, Drillhole VD-14-05 at 439.7m

Plate 7-2 Brecciated Pinal Schist re-cemented in part by azurite and malachite, Drillhole VD-14-04 at 473.3m [the linear alignment of the mineralized structure suggests mineralized fracture]

Gila Conglomerate

The Tertiary and Quaternary Gila Conglomerate is the youngest of all sedimentary rock units on the Project. Its deposition was preceded by periods of faulting, uplift and extensive erosion. The base of the unit rests on a pronounced angular unconformity. In the Van Dyke area, Gila Conglomerate lies directly on weathered and leached Lower Precambrian Pinal Schist.

The composition of the conglomerate is highly variable, often representing the dominant local lithology. It is typically poorly sorted, but generally is moderately to well-stratified and is compositionally matrix-supported (Plate 7-3). Clasts range in size from pebbles to large cobbles and small boulders and are typically sub-rounded. This unit overlies and postdates mineralization, and therefore has little economic potential. Clasts of Pinal Schist containing secondary copper minerals have been observed at the base of the Gila Conglomerate in several drillholes within the deposit area.

Intrusive Rocks

Schultz Granite

The only intrusive rock identified to-date on the Project is Granite Porphyry of the Schultz Granite intrusion. The most continuous interval of intrusive rock encountered in drilling is a pale greenish grey, porphyritic biotite granodiorite. The rock is composed of up to 10% clear quartz phenocrysts, 2% zoned K-feldspar phenocrysts (Plate 7-4) set in a finer grained groundmass consisting mostly of plagioclase, K-feldspar, quartz, sericite, biotite, and hornblende.

The granite is often moderately to intensely sericite-altered and ranges from being non or weakly mineralized to strongly mineralized, particularly where it is intensely fractured to shattered or brecciated. Copper Fox's first hole, VD14-01, located on the west side of the property passed through Pinal Schist and into Schultz Granite porphyry at a depth of 576.1m and stayed in intrusive to the end of the hole at 639.2m. Near the contact both units are weakly mineralized with pyrite±chalcopyrite and late quartz-molybdenite veinlets. The Pinal Schist exhibited phyllic-alteration, and Schultz Granite exhibited phyllic to potassic-alteration.

Re-modeling of the geological data for the Van Dyke deposit in 2019 identified a series of NNW trending porphyritic dikes cross the central and northern parts of the property. These dikes in places contain fragments of the Pinal Schist and are interpreted to have the same strike and dip orientation as the dike occupying the Van Dyke Fault.

Alluvium

Tertiary alluvium is composed primarily of reworked detritus derived from Gila Conglomerate. It contains appreciable brown clay and an assortment of pebbles, cobbles, and boulders. It forms thin (<1m to ~ 20m) poorly sorted and poorly cemented deposits that are well-exposed in Bloody tanks Wash through the town of Miami. Recent erosion is dissecting these deposits and the underlying Gila Conglomerate.

Plate 7-3 Gila Conglomerate, Drillhole VD-14-01 at 45.7m

Source: MMTS, 2020

Plate 7-4 Schultz Granite, Drillhole VD-14-01 at 628.4m showing porphyritic biotite granodiorite with one zoned K-feldspar megacryst

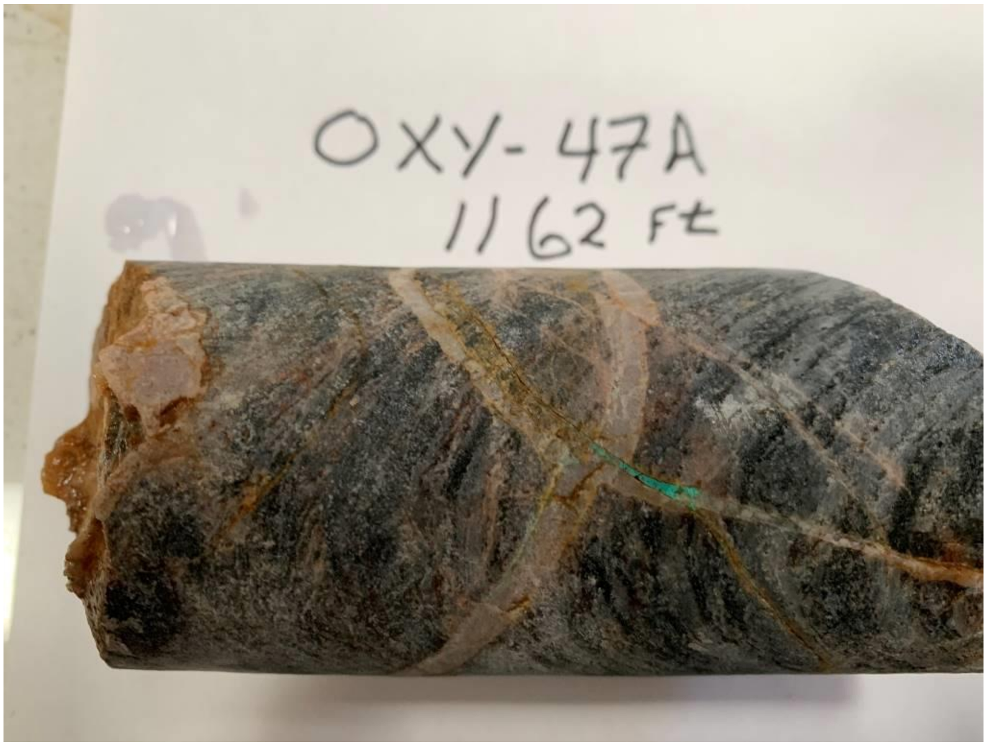
7.3.3 Mineralization

Mineralization includes both hypogene (primary sulphide) and supergene (secondary oxidization/enrichment -oxide-silicate+/-sulphide) types, but the latter far outweighs the former in terms of abundance, grade, and therefore economic potential.

Secondary copper mineralization comprises most of the Van Dyke deposit. Mineralization, consisting primarily of malachite, chrysocolla, azurite, cuprite and tenorite occurs over a 1,500m horizontal distance principally in tectonically fractured to brecciated panels of Pinal Schist (5). The secondary minerals in the vicinity of the Van Dyke shaft occur primarily as bands and crustifications, textures that suggest formation was by filling of open spaces, whereas in other parts of the deposit, the secondary copper minerals occur as staining on cleavage planes, in fractures and as in-situ replacement in quartz veins (Plate 7-5 and Plate 7-6). There are no relict sulphide grains in the upper part of the deposit. Beneath the secondary copper mineralization there exists a weakly developed Supergene zone; containing primarily chalcocite with sparse malachite, azurite and chrysocolla and is transitional down-section locally into weakly-developed zones of hypogene mineralization, primarily located in the central and western parts of the project area.

Source: MMTS, 2020

Plate 7-5 Malachite, azurite and chrysocolla in fractured Pinal Schist, 294.5m, Drillhole M-3



Source: MMTS, 2020

Plate 7-6 Malachite in cross-cutting quartz vein Pinal Schist, 354.3m, Drillhole OXY-47A

The secondary copper mineralization that comprises most of the Van Dyke copper deposit is believed to have formed from multiple weathering/oxidization/erosion cycles of primary hypogene copper mineralization. These oxidization/erosional cycles created copper laden solutions that over a significant period migrated laterally and vertically along interconnected fractures and zones of brecciation. In general, the grade of the secondary copper mineralization is a function of the number weathering/oxidization/erosions cycles ("enrichment factor") and the fracture/brecciated nature of the country rock prior to weathering/oxidization of primary sulphide copper mineralization.

Source: MMTS, 2020

Plate 7-7 Malachite, azurite and chrysocolla in fractured to brecciated Pinal Schist, 412.46 – 417.67m, Drillhole VD-14-0

8 Deposit Types

The Globe-Miami mining district in which the Van Dyke project occurs is known mainly for its large porphyry copper deposits, including the Miami-Inspiration, Miami East, Pinto Valley, Copper Cities and Castle Dome mines, and copper-bearing veins of the Old Dominion mine. The Miami-Inspiration operation consisted of a complex of ore bodies, including the main Live Oak and Thornton pits, and the underground Miami Caved deposit, that together covered an arcuate west-to-east strike length of about 4km (Creasey, 1980). The Miami East deposit is the eastern down-faulted extension of Miami-Inspiration (Peterson, 1962; Titley, 1989). About half of the Miami-Inspiration ore was mined from a porphyritic quartz monzonite phase of Paleocene Schultz Granite and about half came from the Proterozoic Pinal Schist. The deposits consisted of partly eroded leached caps, well-developed supergene enrichment zones, and underlying lower grade hypogene zones. At the Miami East deposit, a chalcocite-bearing diabase sill was an important source of ore.

Porphyry copper deposits consist of disseminated copper minerals and copper minerals in veins, stockworks and breccias that are relatively evenly distributed throughout large volumes of rock. Porphyry copper deposits are typically high tonnage (greater than 100 million tons) and low to medium grade (0.3–2.0% Cu). They are the world's most important source of copper, accounting for more than 60% of the annual world copper production and about 65% of known copper resources. Porphyry copper deposits also are an important source of other metals, notably molybdenum, gold, and silver.

The geometry and dimensions of porphyry copper deposits are diverse, in part because of post-ore intrusions, varied types of host rocks that influence deposit morphology, relative amounts of hypogene and supergene ore each of which has different configurations, and erosion and post-ore deformation including faulting and tilting. Porphyry copper deposits commonly are centered on small cylindrical porphyry stocks or swarms of dikes. A generalized model for a classic or calc-alkalic porphyry copper deposit is presented in Figure 8-1.

The vertical extent of hypogene mineralization in porphyry copper deposits is generally less than or equal to 1 to 1.5km. The predominant hypogene copper sulphide minerals are chalcopyrite, which occurs in nearly all deposits, and bornite, which occurs in about 75% of deposits. Molybdenite, the only molybdenum mineral of significance, occurs in about 70% of deposits. Gold and silver, as by-products, occur in about 30% of deposits.

Oxidization Processes in Porphyry Copper Deposits:

Supergene alteration and mineral assemblages are formed when copper and iron bearing sulphide minerals are exposed to near-surface groundwater as they are exhumed by erosion and exposed to weathering.

The distribution and percentage of mineral species within a porphyry copper deposit exert a pronounced effect on the resulting copper minerals and associated gangue. In porphyry copper deposits, the leached cap (minimal copper content) and enrichment blanket are features that form because of several weathering/oxidation cycles of sulfide-bearing minerals. As these rocks are exposed to weathering; during the oxidation process, the iron contained in minerals is transformed into red, reddish brown, orange, and yellow colored iron oxides, while the sulfur combines with groundwater to produce a weak acid solution.

The copper is dissolved from the copper bearing minerals (typically chalcopyrite and bornite) by these acidic solutions, which percolate downward to the water table, where they encounter reducing conditions that allow the copper to precipitate out as chalcocite (a copper-bearing sulfide). Over time this action can forms a thick, copper rich, blanket-shaped zone, known as an enrichment blanket.

The leached cap and the underlying enrichment blanket typically occur above the phyllic altered zone of a porphyry copper deposit due to copper sulfides and abundant amounts of pyrite (Figure 8-2). The enrichment process requires more pyrite than copper sulfides because pyrite is the primary source for the acidic solution required for enrichment blanket development. The leached cap and the enrichment blanket are generally thin or absent above the potassic and propylitic alteration zones due to the low pyrite content.

In rocks where the formation of acidic solutions does not occur due to either the absence of pyrite or in rocks with low pyrite content that generate weak acidic solutions, the copper-bearing sulfides are oxidized in place to form chrysocolla, malachite, azurite, atacamite and brochantite.

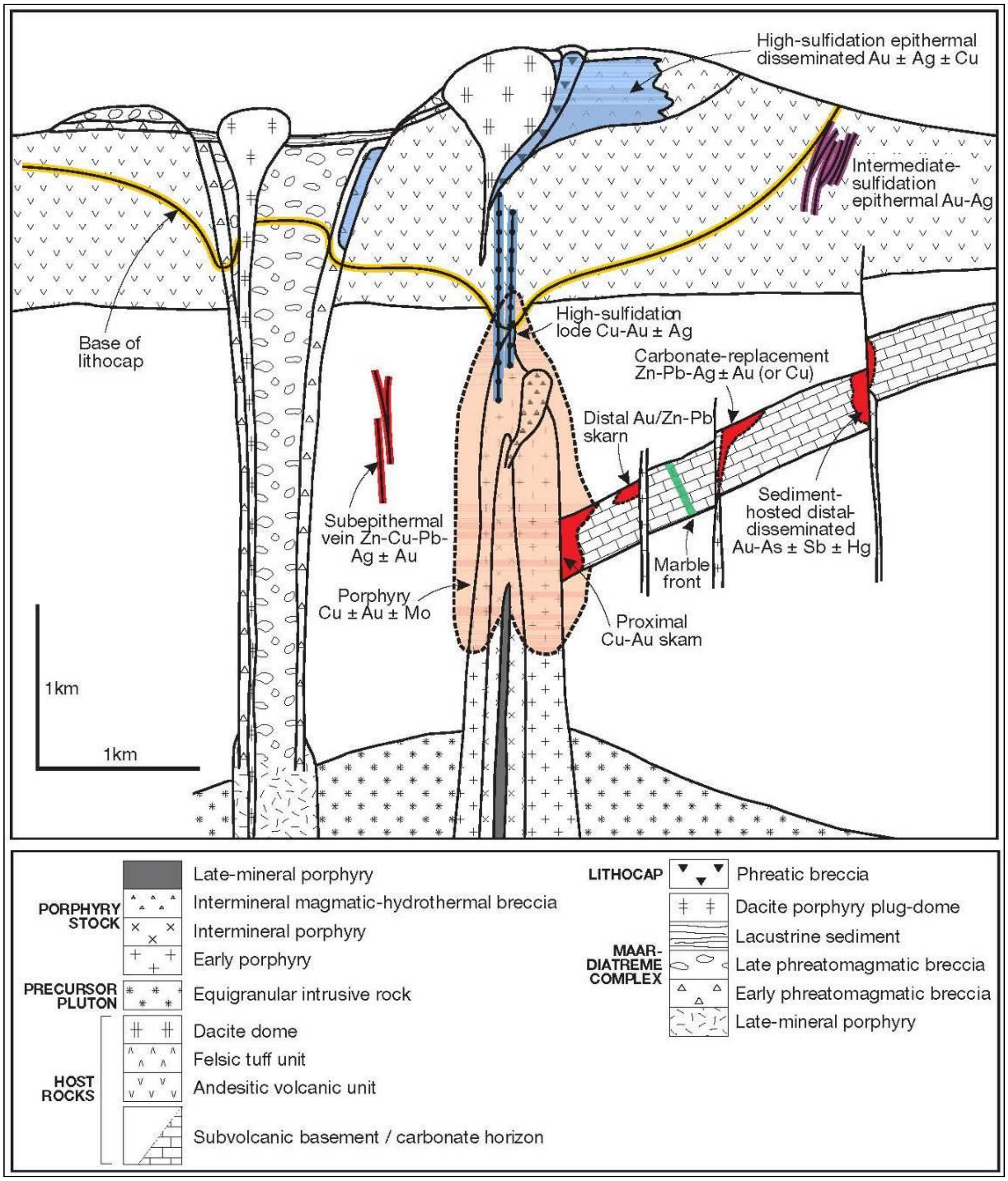


Figure 8-1 Generalized Model for a Telescoped Porphyry Copper System (After Sillitoe, 2010)

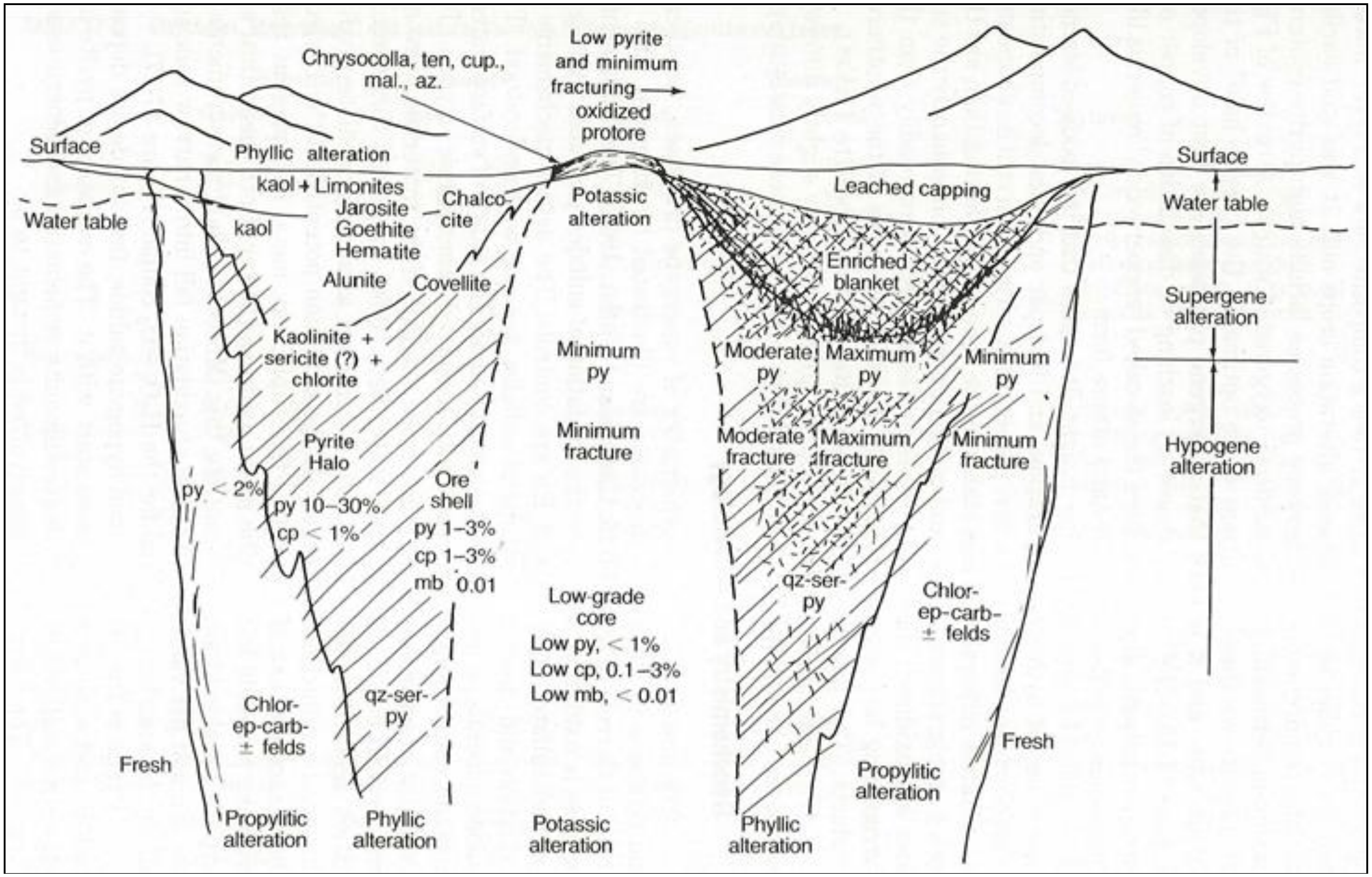


Figure 8-2 **Idealized Results of the Interaction between Hypogene and Supergene Mineralization at an Exposed and Oxidizing Porphyry Copper Deposit (Guilbert And Park, 1986)**

Van Dyke Oxide Copper Deposit:

The Van Dyke deposit is located immediately southwest of the Miami Caved deposit and east of the Miami East deposit. It is separated from the Miami Caved deposit and from the Miami East deposit by the Van Dyke fault. The Van Dyke deposit is interpreted to be the eastern extension of the porphyry copper deposit mined by the Miami-Inspiration operation and the southern extension of the Miami caved porphyry copper deposit. The deposit is covered by from 186m to 627m of alluvium and post-mineral Gila Conglomerate.

The Van Dyke deposit is hosted primarily in the Pinal Schist and to a lesser extent in porphyritic dykes of Schultz granite. Secondary copper mineralization comprises much of the Van Dyke deposit. The Oxide zone consists primarily of malachite, chrysocolla, azurite and cuprite. These copper minerals occur in fractures, in quartz veins and along cleavage planes but primarily in fractured to brecciated areas of Pinal Schist. Beneath the oxide copper mineralization there exists a weakly developed Supergene zone containing mainly chalcocite with sparse malachite, azurite and chrysocolla; it is transitional down-section into local, weakly-developed zones of hypogene chalcopyrite-pyrite-molybdenite mineralization particularly in the center and western parts of the project area. Hypogene copper-molybdenum mineralization is subordinate to the secondary copper mineralization that comprises much of the Van Dyke copper deposit.

The mineral zonation, secondary copper mineralogy, significant molybdenum concentrations within the Oxide zone (Table 8-1) combined with the features typical of a Leach Cap, supports the interpretation that the Van Dyke oxide deposit resulted from several weathering/oxidization/erosional cycles similar to that documented at the Lakeview and Morenci porphyry deposits in central and southern Arizona.

Table 8-1 Molybdenum concentrations from selected drillholes within the Oxide zone, Van Dyke deposit

DDH	From	To	Interval	ASCu		Mo (ppm)	
ID	(m)	(m)	(m)	(%)	average	Min	Max
VD14-01	246.90	368.40	121.50	0.251	10	5.0	420
VD14-02	375.21	458.72	83.51	0.507	70	20.0	640
	481.58	593.14	111.56	0.230	30	3.0	150
VD14-03	315.47	434.64	119.17	0.391	80	6.0	250
VD14-04	452.32	616.18	163.86	0.287	40	50.0	1100
VD14-05	401.30	448.06	46.76	0.513	4	0.5	27
VD14-06	249.02	281.64	32.62	0.595	20	6.0	123
	310.29	318.82	8.53	0.326	10	5.0	40
	350.82	383.74	32.92	0.192	20	5.0	106
OXY-10A	338.57	379.17	40.60	0.709	50	20.0	110
OXY-11	309.37	379.17	69.80	0.162	70	20.0	290
OXY-15	407.52	457.50	49.98	0.427	30	10.0	50
OXY-17B	308.76	446.23	137.47	0.291	40	12.0	208
OXY-18	398.67	529.13	130.46	0.302	40	20.0	501

The above intervals do not represent true thickness of the mineralized interval. Min=minimum, Max = maximum

9 Exploration

9.1 Historical Exploration

Exploration on the Van Dyke property began in 1916 with the collaring of rotary drillhole V-1 by Van Dyke Copper Co. from a ridge top located 1000 feet southwest of the Miami Copper's No. 5 Shaft in the northwest corner of the patented claim area. The drillhole intersected abundant copper oxide and copper silicate mineralization within a fault zone at a depth of 1,182ft (Peterson, 1962). A second drillhole, V-2 collared 2,600ft east-southeast of V-1 also intersected mineralized breccia, and a third hole, V-3, collared 6,700ft farther to the southeast was abandoned at a depth of 1,400ft in Gila Conglomerate Gila.

The results of the drilling program led to the sinking of the Van Dyke shaft, located just 200ft south of drillhole V-1. The excavation of the 6' by 11' vertical shaft began in 1919 and was completed to a depth of 1,692ft in 1920 (Rice, 1921). The shafts' intended use was for exploration and development, but three levels of underground workings were advanced from it that supported two short periods of mining. The mine was closed in 1945.

Two small inconsequential exploration drilling programs were later completed. In 1947, AMICO Mining Corp., a consortium of three major copper producers, leased the property and drilled four deep churn holes to test the deposit. All four holes were collared in Gila Conglomerate and were spaced equally along a northeast-oriented line starting approximately 2500 feet south of the Van Dyke shaft near Cherry Flats Road. Three of four holes penetrated the base of the Gila Conglomerate, beneath which only traces of copper oxide and iron oxide minerals were noted in generally fresh and unmineralized Pinal Schist (Clary et al., 1981). In 1964, Freeport Sulfur Company leased the property and drilled two holes that failed to intersect mineralization (Clary et al., 1981). Data does not exist for any of the six holes mentioned above.

In 1968, Occidental Minerals Corporation leased the property and began what became a systematic exploration diamond drilling program. Occidental optioned the property to other operators periodically during the ensuing 12 years that it held the lease, including Utah and AMAX, but those entities did not earn an interest in the property. By 1975, a total of 50 holes had been drilled throughout the project area covering a polygonal area with maximum dimensions of approximately 1300m east-west by approximately 1000m north-south.

From 1976-1980 Occidental's work focused on in-situ leach pilot testing in an area west of the Van Dyke shaft, and area that was later leached in the late 1980s by Kocide and evaluated on a broader scale by Arimetco.

The historical exploration data base includes detailed logs for 45 holes drilled between 1968 and 1975 that describe lithology, alteration, and mineralization. The logs also provide a complete total copper and acid soluble copper analytical results for each interval sampled. Several the logs also list analytical results for silver, gold, sulphur and molybdenum. The recorded values for silver, gold and sulphur, where present, typically cover a series of sample intervals and may represent weighted averages. The recorded values for molybdenum are shown on a sample-by-sample basis, but only for a select number of the drillholes. The lack of a complete or near complete historic data set for silver, gold and molybdenum excludes these elements from further evaluation.

In 2019, total of 2,193 historical sample pulps, and core samples from 38 drillholes were re-analyzed for Total Copper, Acid Soluble Copper and Cyanide Soluble Copper. Re-analysis of the remaining historical drillholes was not possible due to the lack of drill core and sample pulps. The 2019 analytical results were compiled with the historical analytical results and reviewed in detail. However, there are no assay certificates for the any of the historical analytical data to back up the manually recorded analytical data. Core recovery data and any QA/QC procedures were not apparent from the drillhole logs or from any other historical documentation reviewed. All 2014 and 2019 analytical results have assay certificate and was subjected to a robust QA/QC program.

A review of drill logs, drill core and pulps by MMTS served as a means of verifying the authenticity and accuracy of the data recorded manually on the drill logs.

The historical data base also includes underground data for total copper.

MMTS Assessment of Exploration Data

Late in 2013, MMTS took part in the evaluation of the exploration materials which included: a detailed assessment of core, drillhole logs and pulps remaining from seven selected drillholes; a core box and drill footage determination of core remaining from drillholes OXY-1 through OXY-30, and a general account of the pulps that remain from core sample analysis.

The six drillholes selected for detailed review (OXY-6, -7, -8, -15, -27 and VD-73-6) cover 800m of eastward strike length and up to 550m of width. They provide an accurate representation of the geology and mineralization of the copper deposit. However, most of the material remaining in the core boxes was not split (ie. halved) core but consisted of ~3/8" minus material. The reason for this was that the core was so badly broken that it could not be halved with a splitter, so Occidental ran each sample through a jaw crusher, took a riffle-split of the material to send to the lab, and returned the remainder to the core box as the reference sample (Tim Marsh, personal communication, December 2013). This procedure would likely have resulted in a more homogeneous and representative sample than using a conventional core splitter.

Drillhole Collar Locations – Conversion of Grid and Resurvey

All historical drillholes were originally surveyed in local mine grid coordinates; there is no record of where the mine grid originates nor which way it is oriented. Copper Fox undertook a search for historic drillhole collars using existing exploration plan maps of the project area and was able to positively identify numerous collars in the field. A Trimble GeoHX GPS with sub-metre accuracy was used to survey the located collars in North American Datum (NAD) 27, UTM zone 12 (metres). The locations of 15 exploration drillhole collars and 9 ISCR test well collars have been confirmed and surveyed. Three old survey monuments that had old mine coordinates associated with them were also located and surveyed. The location information for the survey monuments and drillhole collars was then used to perform a regression that translated undiscovered collar locations from mine grid coordinates into NAD 27 UTM coordinates.

9.2 Assessment of Historic Exploration Data

Following acquisition of the Project in 2013, Copper Fox initiated compilation and detailed re-examination of all available historical information that existed for the Project. The information included public and private hard copy reports, underground level plan maps, surface drillhole plan maps and cross-sections, and drillhole logs. All the information was scanned and organized into an electronic data base that was made available to MMTS. Hard copies were re-filed and safely stored in the company's corporate offices.

In addition to capturing project information from the paper files, Desert Fox was also able to locate historic drill core and pulps for most of the holes drilled between the years 1968 and 1976. Fortunately, careful storage and a dry climate preserved most of the materials. Core and pulps were removed from the basement of a storage building located within the town of Miami and paper files were retrieved from trailers located on patented claims near the Van Dyke shaft. All the materials were relocated to Desert Fox's new office and storage facilities located in the town of Miami.

The Copper Fox 2019 drill core chip, reject, and pulp sampling program is described in Section 10-3.

10 Drilling

10.1 Historic Drilling

Prior to Copper Fox acquiring the Project, a total of 70 exploration holes and 17 ISCR wells had been drilled on the property. Of the 70 historic exploration holes, 23 were drilled between 1916 and 1964; they were a combination of churn, rotary or reverse circulation (RC) and diamond drillholes that tested the breadth of the property, and for which only anecdotal information is known. The remaining 48 exploration holes were diamond drillholes completed from 1968-1975 to systematically assess the Van Dyke deposit area; near-complete technical data has been compiled for many of these holes. The 17 ISCR wells were drilled near one-another from 1976-1978 and in 1988 in an area immediately west of the Van Dyke shaft. At least seven were diamond drillholes for which limited core, but no written descriptions, has been recovered. Mineralized intervals for these wells were sampled, analyzed, and later reported as weighted averages in Clary et al. (1981), but no other detail exists for the wells. Drilling campaigns completed prior to Copper Fox's acquisition of the Project, for which abundant exploration data exists, are believed to have been conducted using industry best management practices consistent with the era in which the work took place.

In 2013, BHP mistakenly drilled hole MU-13-2, located near historic drillhole OXY-6, on the north-central part of the Van Dyke project where it owns surface rights but not the mineral estate patent. BHP completed the RC hole to a depth of 1166.5m to assess the area's potential to host deeply buried porphyry copper mineralization. Once the trespass was realized, BHP provided all data collected for the drillhole to Copper Fox. The "quick log" for the drillhole prepared by BHP noted the presence of a significant clay component in the samples from 265m to 402.4m and chrysocolla and native copper (cuprite) in the interval from 402.44m to 591.10m; the interval of particular interest to Copper Fox. BHP only retained chip samples for the interval from 487.68 to 591.01 which Copper Fox analyzed for TCu, ASCu and CNCu. Unfortunately, the "quick log" provided by BHP reports that the strongest concentrations for chrysocolla and cuprite were observed in the interval 402.44 and 487.68 for which no samples were collected.

10.2 Drilling by Copper Fox

In 2014, from late-March to mid-June, Copper Fox completed six PQ diameter diamond drillholes with an aggregate length of 3,211.7m. The holes were drilled across the Van Dyke copper deposit, covering a west-to-east distance of approximately 825m and a north-south distance of approximately 500m. All six drillholes were completed to their desired depth and encountered geology, alteration, and mineralization consistent with a secondary or enriched copper deposit. The first drillholes bottomed in Schultz granite. The other five drillholes penetrated the base of the post-mineral Gila Conglomerate, passed through broad intervals of secondary copper mineralization, through the oxide/sulphide contact and was terminated in unoxidized, weakly to non-mineralized Pinal Schist. Mineralization is hosted primarily by variably broken to shattered or brecciated Pinal Schist, and by intrusive breccia and granite porphyry of the Schultz Granite. The first hole was drilled to evaluate the area that had been the subject of an earlier ISCR test program. It encountered minerals that are common by-products of ISCR, but still returned important intervals of supergene and hypogene copper mineralization. The remaining five drillholes were twins of original holes. One of the five twin holes encountered the effects of incidental leaching which resulted in a marked reduction in its overall grade relative to the original hole. The four-remaining twin drillholes encountered intervals of copper mineralization consistent with those of their respective original holes. Drilling procedures were provided in detail in a NI 43-101 technical report by Bird and Lane (2015).

Table 10-1 lists exploration drillholes and ISCR wells completed on the property by year and operator. Figure 10-1 shows the locations of all drillholes and wells completed within the property. Results for the 2014 Copper Fox drillholes are listed in Table 10-2.

Table 10-1 List of Drillholes, Van Dyke Project

Year	Hole Identification Range	Exploration Company	Drillhole Type	Number of Holes Drilled	Reported Meters Drilled
1916-1917	V-1 to V-3	Van Dyke Copper	unknown	3	unknown
1947	Amico-1 to Amico-4	AMICO	Churn	4	unknown
1964	Freeport-1 & Freeport-2	Freeport Sulphur	unknown	2	unknown
1967(?)	Sho-Me-1 & Sho-Me-2	Sho-Me Copper / Van Dyke Copper	unknown	2	unknown
1968-1974	OXY-1 to OXY-31, OXY-33	Occidental Copper	Core	34	19,825.0
1972-1973	VD-1 to VD-7, VD-9, VD-10, VD-16	AMAX	Core	9	5,367.8
1975	C-UOXY-24, UVD-8, UVD-11 to UVD-14, UCV-17, LC-UVD-1	Utah International	Core	8	4,184.9
1976-1978	OXY-41 & OXY-42	Occidental Copper	Core	2	832.1
1978	OXY-44 to OXY-48, M-1 to M-5	Occidental Copper	Core; ISCR Monitoring Wells	10	3,384.3
1988	K-1 to K-5	Kocide Chemical	ISCR Wells	5	unknown
2013	MU-13-2	BHP Copper	RC	1	1,166.5
2014	VD14-1 to VD14-6	Copper Fox Minerals	Core	6	3,211.7

Table 10-2 2014 Diamond Drill Intersections, Van Dyke Copper Project

Drillhole ID	From (m)	To (m)	Interval (m)	Total Copper (%)	Acid Soluble Copper (%)
VD14-01	246.9	368.4	121.5	0.357	0.249
VD14-02	375.2	591.6	216.4	0.444	0.359
incl	375.2	398.1	22.9	1.41	1.299
VD14-03	315.5	434.7	119.2	0.681	0.391
VD14-04	452.3	598.0	145.7	0.376	0.316
VD14-05	401.3	448.1	46.8	0.583	0.528
VD14-06	249.0	383.7	134.7	0.346	0.246
incl	249.0	281.6	32.6	0.749	0.631

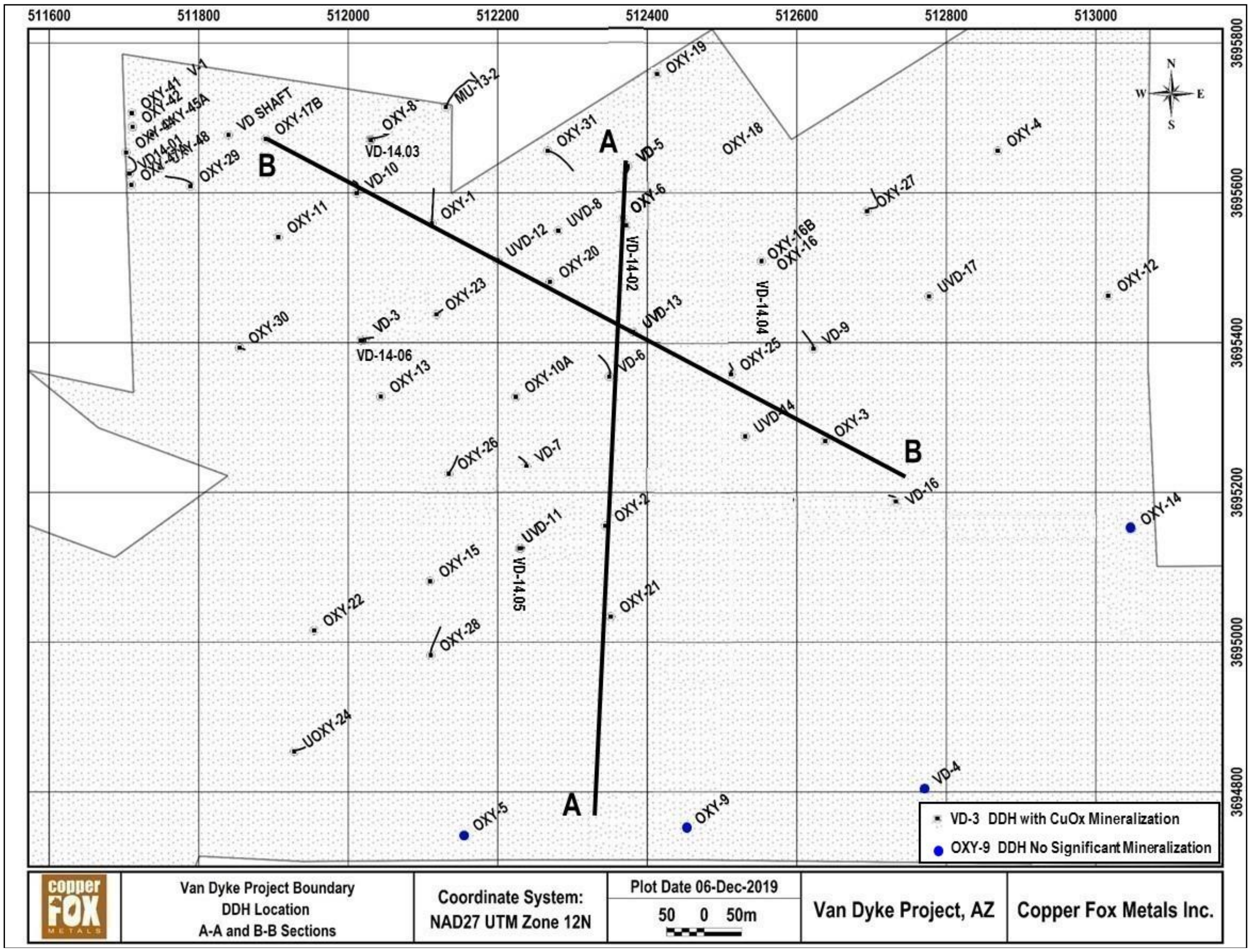


Figure 10-1 Exploration Drillhole and ISCR Well Locations, Van Dyke Copper Project

10.3 2019 Re-analysis of Drill Core, Pulps and Rejects

A total of 2,465 samples (1,810 drill core pulp, 341 drill core chips, and 42 drill core reject samples), including 157 CRMs, 62 duplicates and 53 blanks, from the 2019 resampling program were submitted to Skyline.

MMTS is of the opinion that the 2019 Copper Fox re-sampling program,

1. generated analytical results that are suitable for use in resource estimation; and
2. where both historic data and 2019 data exist, the more recent data will be used for resource estimation.

A brief description of each of the mineral zones identified by the 2019 analytical program is given below.

Oxide Zone:

The Oxide zone is defined at that interval containing greater than 0.025% Total Soluble Copper. The Oxide zone typically occurs below and interval of hematitic and limonitic leached Pinal Schist. The leach cap above the Oxide zone typically contains between 10 and 100 parts per million copper. In places across the deposit, the Oxide zone is exposed at the erosional unconformity between the Gila Conglomerate and the Pinal Schist (Figure 10-1 and Figure 10-2). The weighted average grades for the mineralized intervals in the Oxide zone are shown in Table 10-3.

Table 10-3 2019 Drillhole Intersections for Total Copper (TCu), Acid Soluble Copper (ASCu), Cyanide Soluble Copper (CNCu) & Total Soluble Copper (TSCu) Van Dyke Copper Deposit (using a cut-off grade of 0.025% TSCu)

DDH ID	From (m)	To (m)	Interval (m)	TCu (%)	ASCu (%)	CNCu (%)	TSCu (%)
OXY-1	293.83	422.15	128.32	0.234	0.128	0.009	0.138
OXY-2	402.64	496.52	93.88	0.397	0.228	0.051	0.339
OXY-3	591.92	628.19	36.27	0.262	0.131	0.088	0.219
OXY-4	672.69	745.85	73.16	0.122	0.035	na	0.035
OXY-5	448.36	474.88	26.52	0.059	na	na	na
and	519.38	563.58	44.20	0.064	na	na	na
OXY-6	376.12	583.69	207.57	0.572	0.495	na	0.495
OXY-7	396.24	548.03	151.79	0.474	0.432	0.005	0.438
OXY-8	316.99	440.70	123.71	0.621	0.432	na	0.432
OXY-9	NO SIGNIFICANT MINERALIZATION						
OXY-10	336.80	512.06	175.26	0.383	0.294	0.045	0.339
OXY-11	303.28	393.80	90.52	0.316	0.138	0.109	0.247
OXY-12	647.70	680.01	32.31	0.341	0.307	0.004	0.311
OXY-13	304.19	373.38	69.19	0.183	0.108	0.005	0.113
and	387.71	437.69	49.98	0.304	0.183	0.019	0.202
OXY-14	NO SIGNIFICANT MINERALIZATION						
OXY-15	378.56	457.50	78.94	0.366	0.309	0.005	0.315
OXY16	DDH OXY-16 RE-DRILL OXY-16B						
OXY16B	411.48	612.04	200.56	0.247	0.160	na	0.178
OXY-17B	284.99	462.99	178.00	0.425	0.235	0.099	0.334
OXY-18	394.11	629.11	235.00	0.298	0.212	0.039	0.251
OXY-19	NO ANALYTICAL DATA IN OXIDE ZONE						
OXY-20	333.45	541.32	207.87	0.313	0.194	0.041	0.236
OXY-21	474.88	498.35	23.47	0.624	0.154	0.432	0.586
OXY-22	406.60	563.86	157.26	0.136	0.087	0.011	0.098
OXY-23	295.05	466.34	171.29	0.225	0.139	0.017	0.157
OXY-24	NO DATA						
OXY-25	435.86	600.46	164.60	0.506	0.424	0.014	0.438
OXY-26	321.62	481.58	159.96	0.156	0.092	0.021	0.114
OXY-27	522.12	660.50	138.38	0.345	0.279	0.008	0.287
OXY-28	403.25	503.22	99.97	0.177	0.111	0.008	0.129
OXY-29	265.18	437.39	172.21	0.440	0.286	0.025	0.311
OXY-30	NO DATA - HOLE DID NOT REACH GILA/PINAL SCHIST CONTACT						
OXY-31	515.11	560.83	45.72	0.198	0.078	0.009	0.087
OXY-32	676.66	799.19	122.53	0.066	0.020	na	0.038
OXY-41	256.64	375.51	118.87	0.273	0.170	0.010	0.180
OXY-42	250.85	336.19	85.34	0.334	0.241	0.013	0.255
OXY-44	265.48	354.48	89.00	0.265	0.191	0.001	0.192
OXY-45*	284.68	358.14	73.46	0.395	0.296	0.004	0.300
OXY-47A	267.71	359.05	91.34	0.295	0.202	0.003	0.205
OXY-48*	276.45	394.41	117.96	0.519	0.325	0.009	0.334

Table 10-3 continued…

V-1**	356.31	371.55	15.24	1.256	na	na	1.165
VD-1	553.52	592.53	39.01	0.552	0.319	0.219	0.537
VD-2	MISSING						
VD-3	249.94	392.48	142.54	0.331	0.212	na	0.231
VD-4	NO SIGNIFICANT MINERALIZATION						
VD-5	390.75	594.66	203.91	0.268	0.202	0.014	0.220
VD-6	361.49	511.45	149.96	0.318	0.277	0.007	0.284
and	544.98	557.48	12.50	0.157	0.131	0.015	0.146
VD-7	384.66	490.12	105.46	0.246	0.187	0.008	0.204
UVD-8	336.80	546.96	210.16	0.148	0.107	na	0.107
VD-9	547.12	576.99	29.87	0.334	0.154	0.145	0.299
VD-10	298.40	429.46	131.06	0.325	0.103	0.194	0.297
UVD-11	386.18	456.74	70.56	0.416	0.305	na	0.307
UVD-12	310.29	337.41	27.12	0.228	0.143	0.009	0.152
and	358.14	508.71	150.57	0.280	0.127	0.042	0.168
UVD-13#	355.09	515.87	160.78	0.434	0.377	0.003	0.387
UVD-14	521.06	597.10	76.04	0.440	0.274	0.118	0.393
VD-15	MISSING						
VD-16	527.30	578.21	50.91	0.121	0.090	0.002	0.092
and	603.50	630.94	27.44	0.087	0.059	0.001	0.061
VD-17	MISSING						
VD14-01	231.65	390.30	158.65	0.312	0.195	0.020	0.216
VD14-02	375.21	594.66	219.45	0.431	0.338	0.037	0.375
VD14-03	313.94	434.64	120.70	0.674	0.386	0.143	0.529
VD14-04	413.61	435.56	21.95	0.091	0.060	0.003	0.062
and	450.80	616.18	165.38	0.348	0.285	0.012	0.297
VD14-05	399.59	459.79	60.20	0.469	0.402	0.014	0.416
VD14-06	240.49	283.16	42.67	0.565	0.459	0.013	0.472
and	310.29	323.09	12.80	0.278	0.225	0.015	0.241
and	349.61	383.74	34.13	0.345	0.186	0.034	0.220
MU-13-02	490.73	591.01	100.28	0.185	0.125	0.025	0.150

Notes:
* = inserting historical average grade in intervals where pulp/core/reject not available
** = historical value, zero grade inserted in intervals where data is missing
# = ddh terminated in oxide copper mineralization (0.215% TCu, 0.180% ASCu)

Supergene Zone:
The Supergene zone is defined as CNCu concentrations in excess of 0.10% or where the CNCu concentrations exceed the ASCu concentrations. The mineralogy identified on the historical drill logs and the 2019 analytical results was used in determining the limits and extent of the Supergene zone.

The upper boundary of the Supergene zone is typically very sharp and occurs over a one sample interval. The lower boundary is typically gradational and is selected where the cyanide soluble copper concentration decreases to less than 0.10% and total copper content represents the copper concentration downhole.

The Supergene zone shows an irregular distribution within the Van Dyke deposit. In general, the higher chalcocite concentrations are located along the northern edge of the project area and in the southern portion of the project area. The thickness and weighted average grade of the chalcocite mineralization is shown in Table 10-4. Drillholes OXY-23 and VD-10 contain several intervals ("stacked") of chalcocite mineralization.

Table 10-4 2019 Mineralized Intersections for Cyanide Soluble Copper (CNCu) Van Dyke Copper Deposit (using a cut-off grade of 0.10% CNCu)

DDH	From (m)	To (m)	Interval (m)	CNCu (%)
OXY-2	481.58	494.69	13.11	0.323
OXY-3	623.32	628.19	4.87	0.250
OXY-10	461.16	474.88	13.72	0.481
OXY-11	352.35	379.17	26.82	0.371
OXY-13	434.95	439.12	4.17	0.164
OXY-17B	399.59	457.2	57.61	0.277
OXY-18	598.93	629.11	30.18	0.270
OXY-20	515.42	534.92	19.50	0.336
OXY-21	483.41	498.35	14.94	0.665
OXY-22	555.96	563.88	7.92	0.138
OXY-23	398.07	399.29	1.22	0.136
	408.43	409.65	1.22	0.136
OXY-25	589.79	595.56	5.77	0.131
OXY-26	463.30	470.92	7.62	0.233
OXY-28	476.40	479.45	3.05	0.100
OXY-29	381.00	398.07	17.07	0.163
VD-1	564.18	592.53	28.35	0.298
VD-5	577.9	582.47	4.57	0.383
VD-6	498.65	500.48	1.83	0.180
VD-9	562.36	576.99	14.63	0.290
VD-10	315.77	349.30	33.53	0.413
	369.42	395.63	26.21	0.268
	415.14	421.54	6.4	0.100
VD-12	488.29	504.44	16.15	0.290
UVD-14	562.05	592.99	30.94	0.278
VD14-02	552.33	591.62	39.29	0.173
VD14-03	335.58	384.8	49.22	0.315
VD14-04	614.23	616.18	1.95	0.491
VD14-06	382.68	383.74	1.06	0.268

The above intervals do not represent true thickness.

Hypogene Zone:

The 2019 modelling also mapped the distribution of the primary sulphide mineralization across the Van Dyke property based on historical analytical results for total copper and molybdenum. Unfortunately, most of the historical drillholes were not analyzed for molybdenum. Table 10-5 shows weighted average grades for total copper and molybdenum for selected drillholes in the Hypogene zone. Three areas of greater than 0.10% Hypogene copper mineralization occur within the Van Dyke deposit. Two of these areas are located on the northern border of the Project adjacent to the Miami caved area and the Thornton Pit. The third area is oriented in a north-south direction and is located approximately in the center of the property.

Table 10-5 Weighted average grades of total copper and molybdenum concentration in selected drillholes in the Hypogene zone of the Van Dyke deposit

DDH ID	From (m)	To (m)	Interval (m)	Cu (%)	Mo (%)
OXY-1	655.32	901.28	245.96	0.167	0.01
OXY-10	515.11	531.57	16.46	0.106	0.004
OXY16B	617.83	651.66	33.83	0.108	0.006
OXY-17B	496.21	520.60	24.39	0.234	0.005
OXY-18	636.12	644.35	8.23	0.217	0.004
OXY-19	716.89	785.16	68.27	0.136	0.019
OXY-29	437.39	501.09	63.70	0.200	na
OXY-32	676.66	708.96	32.30	0.105	na
VD-7	493.17	508.41	15.24	0.128	na
VD14-01	379.48	630.94	251.46	0.161	0.024
MU-13-2	710.18	786.38	76.20	0.145	0.020

The above mineralized intervals do not represent true thickness; na=not analyzed

Updated Geological Model:

In 2019, Copper Fox undertook a review of all (historical, 2014 drilling and DDHMU-13-02) drillholes information from the property to gain a better understanding of the geology and the controls on distribution of the secondary copper mineralization. The 2019 re-modelling demonstrated that the geology in more complex than previously depicted and that the distribution of the secondary mineralization and mineralogical zoning is consistent with multiple cycles of weather/ oxidization/erosion of a porphyry copper deposit.

The modelling demonstrated the presence of a thick layer of hematitic clay located at the erosional unconformity between the Gila Conglomerate and underlying Precambrian age Pinal Schist. The modelling shows that the Pinal Schist was intruded by a series of WNW trending porphyritic dike related to the Schultz granite that outcrop at the unconformity across the property.

The re-analysis of pulp and core samples from 38 drillholes in 2019 in conjunction with the drill log descriptions from the property allowed a more precise definition of the: leach cap and mineral zonation within the deposit. The review of available molybdenum concentrations indicated that all three mineralogical zones contain significant concentrations of molybdenum that supports the concept of weathering and oxidization of a porphyry copper deposit. The review of historical drillholes from the Van Dyke deposit that were not previously split for analytical purposes, show textures consistent with in-situ oxidization of mineralized fractures, quartz veins and disseminated mineralization.

The copper mineralogy in the Oxide zone (malachite, chrysocolla and azurite) and vertically stacked zones of Supergene mineralization (chalcocite) within the deposit is consistent with oxidization of primary copper minerals in a low pyrite environment.

Figures 10-2 and 10-3 are schematic cross-sections that show the distribution of the Oxide, Supergene (chalcocite) and Hypogene (sulphide) zones as well as the location of the >0.025% Total Soluble Copper (TSCu) zone across the property. The locations of the schematic sections are shown in Figure 10-1. The cross-sections are for schematic purposes and do not represent the true thickness of the various mineral zones.

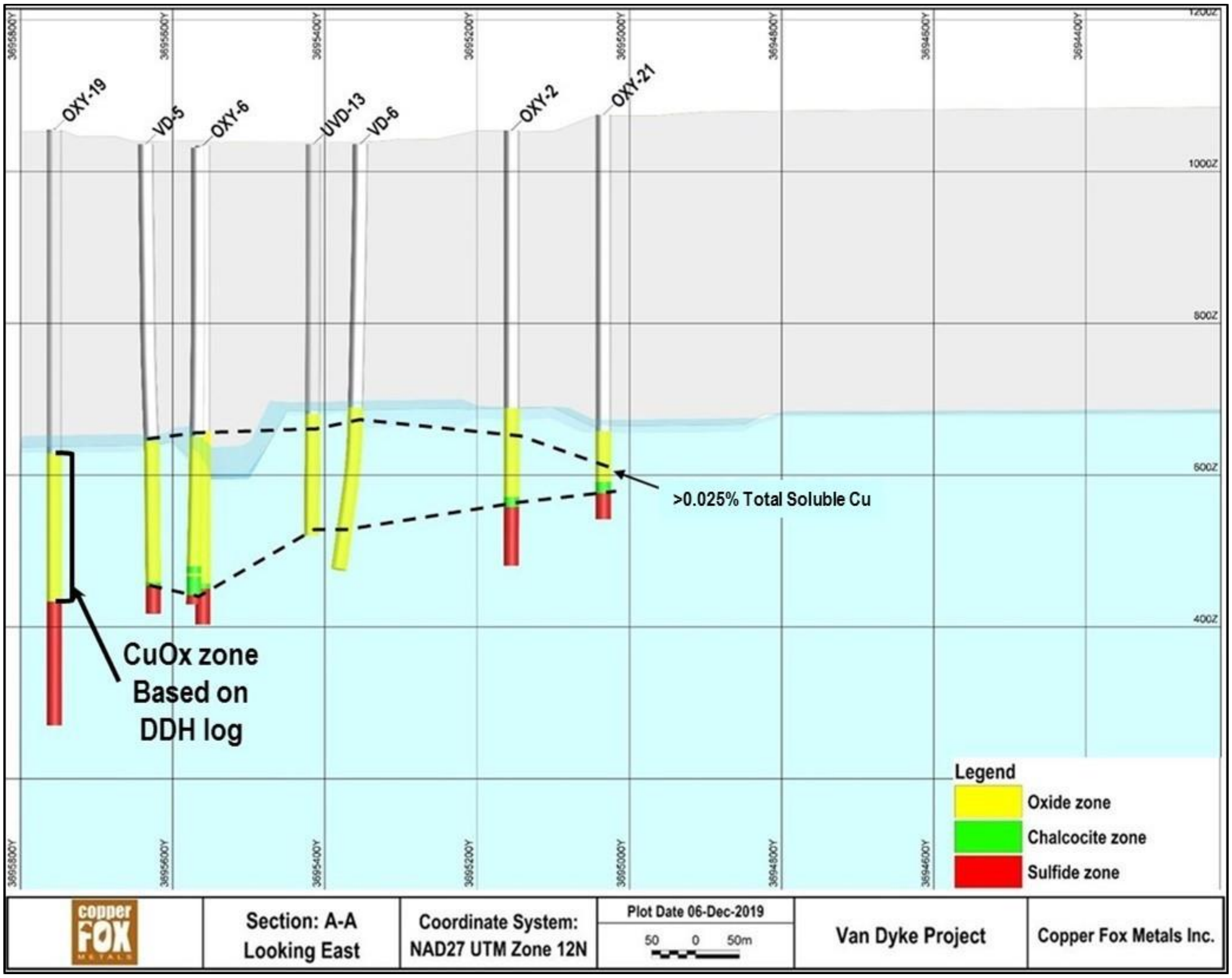


Figure 10-2 Schematic North-South Cross-Section (A-A' looking east) of Van Dyke Copper Deposit

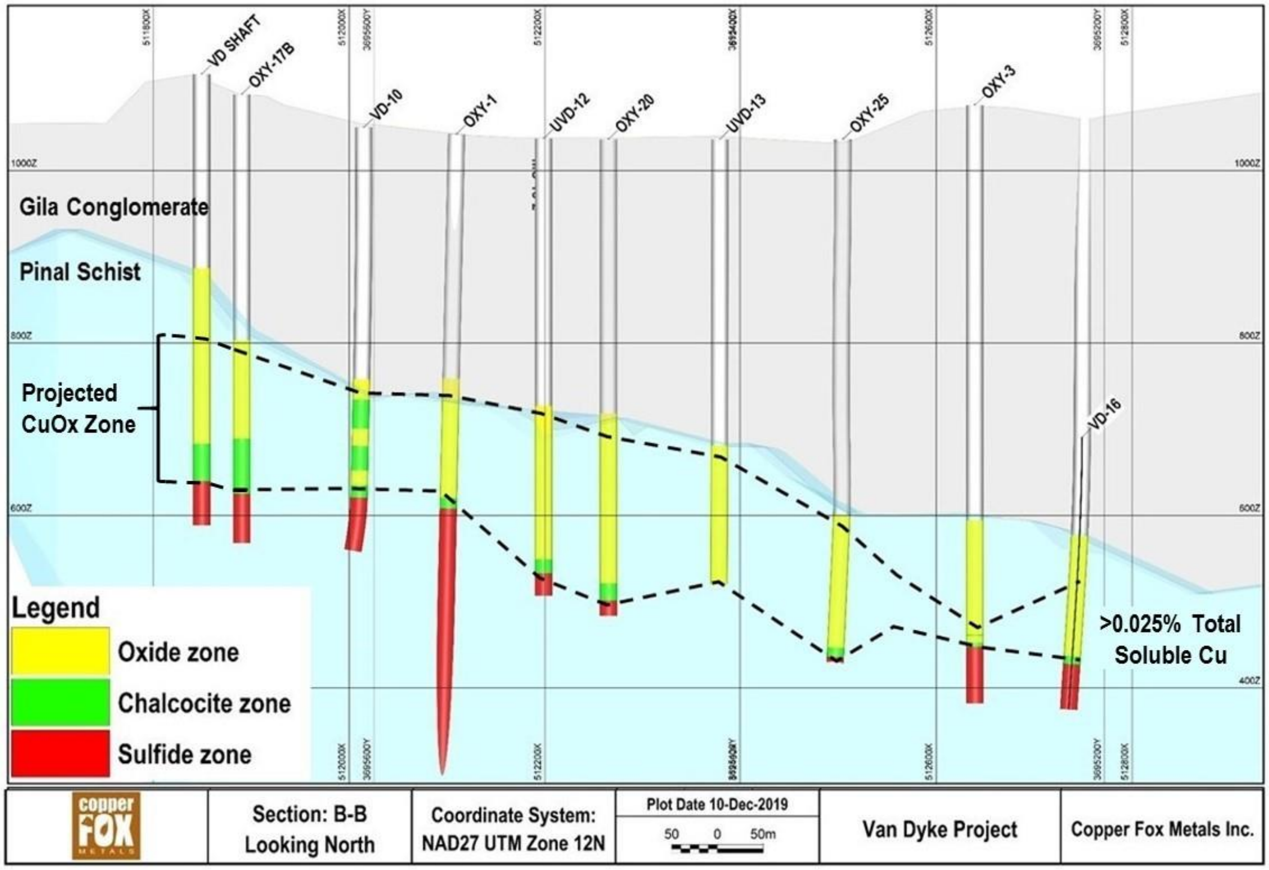


Figure 10-3 Schematic West to East Cross-Section (B-B' looking North) of Van Dyke Copper Deposit

Secondary Copper Distribution:

The distribution of total copper, total soluble copper, and the mineral zonation within the Van Dyke deposit, based on the 2019 remodelling, are shown in Figure 10-4 and 10-5.

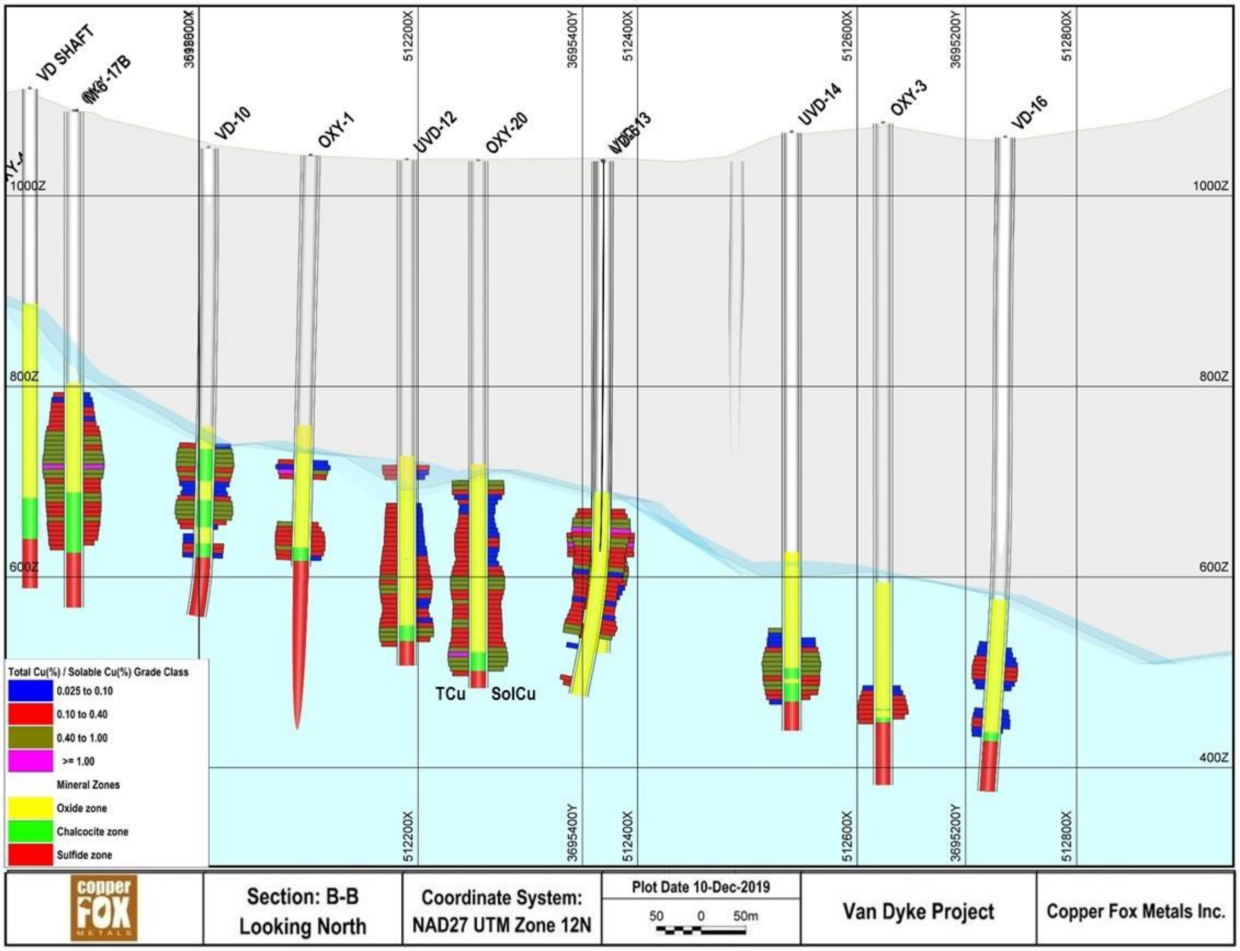


Figure 10-4 Total Copper (TCu), Total Soluble Copper (TSCu) and mineral zonation across Van Dyke deposit

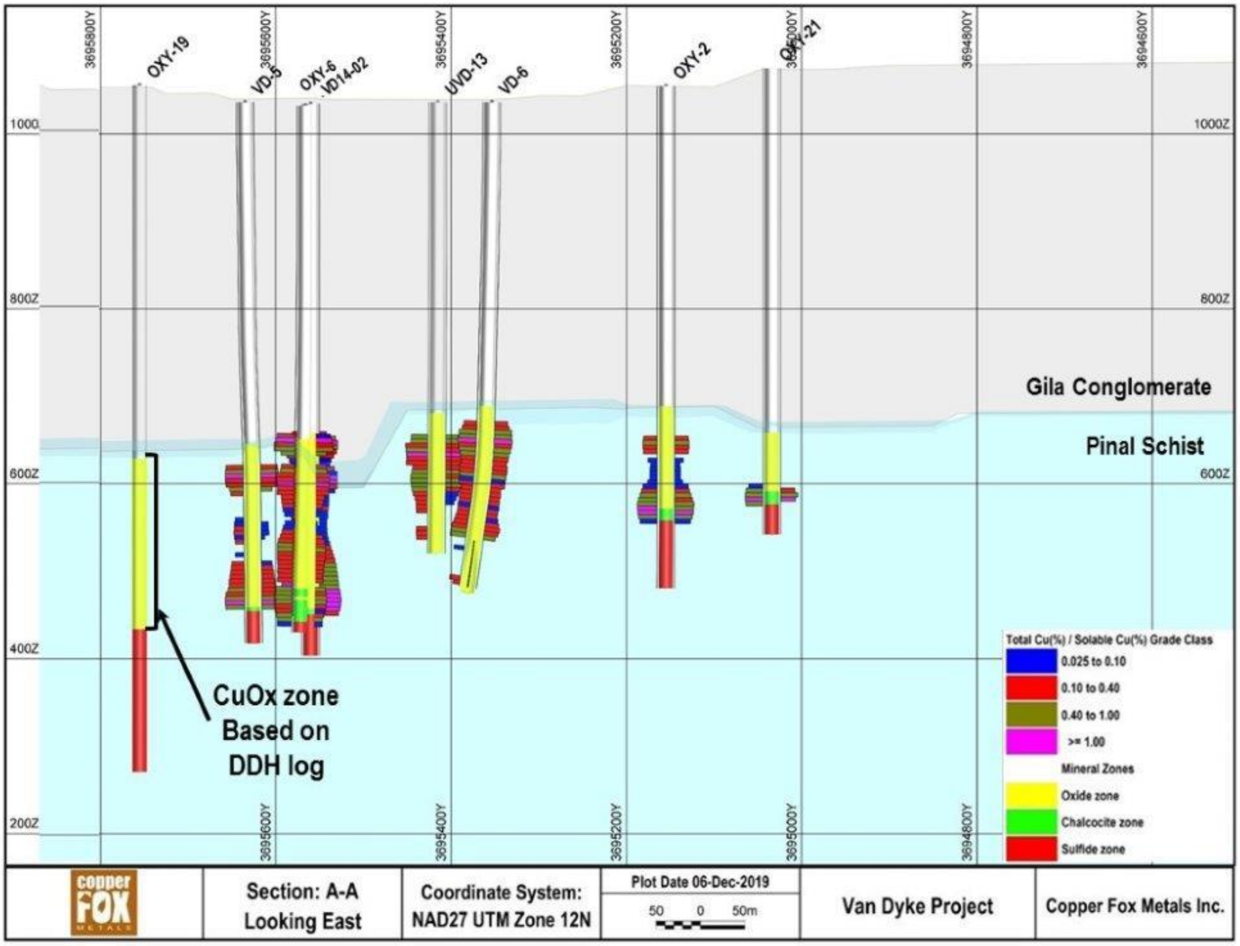


Figure 10-5 Total Copper (TCu), Total Soluble Copper (TSCu) and mineral zonation across Van Dyke Deposit

11 Sample Preparation, Analyses and Security

All the samples that were analyzed in 2019 were sourced from Copper Fox's secure storage facilities located at the company's office in Miami, Arizona. Sample security was provided by Copper Fox personnel who abided by rigorous chain of custody practices. The samples selected for analysis were transported to Skyline Laboratories in Tucson either by an employee of Copper Fox or picked up at site by Skyline personnel.

11.1 Sample Handling Procedures in 2019

Drill core chip, reject and pulp sampling procedures were as follows:

- Core boxes to be sampled were laid out in numerical order, and lids removed.
- All core looked at in 2019 was previously split or crushed; intervals selected for analysis were collected and bagged with the sample tag.
- Once sampling was complete, lids were placed back onto core boxes and return to Copper Fox's core storage facility in Miami, AZ.
- Drill core pulp and reject samples to be re-analyzed were identified, given a new unique sample number, and submitted to the lab.
- Sample batches were assembled as per the Sample Record forms provided and completed by inserting the standards and blanks as prescribed.
- All samples were entered into Skylines' Laboratory Information Management System (LIMS) and the three-letter prefix BUR (reserved for samples from Copper Fox's Van Dyke Copper Project) was added to each unique sample number.
- Samples were then advanced for preparation and analysis.

11.2 Analytical Methods

Copper Fox used Skyline Laboratories for the analysis of all historic drill core pulp, chip, and reject samples collected in 2019. Check sampling of 2019 Skyline analysis was conducted by Activation Laboratories Ltd. (Actlabs) located in Ancastor, Ontario, Canada.

Skyline has ISO/IEC 17025:2005 certification for FA, AAS, ICP-OES and ICP-Mass Spectroscopy ("MS") and its quality management system has been certified as conforming to the requirements defined in the International Standard ISO 9001:2015. MMTS has no information regarding analytical laboratories used prior to Copper Fox's involvement in the Project. Actlabs has ISO 17025 accreditation with CAN-P-1579 (Mineral Lab) and CAN-P-1578 (forensic lab). In addition to ISO 17025 accreditation, Actlabs is accredited/certified to ISO 9001:2015.

The Quality Assurance/Quality Control ("QA/QC") program described in the following sections was designed to allow for verification of analytical results from historical exploration programs for which there were no laboratory analytical certificates.

11.2.1 Sample Preparation and Analysis – Skyline

A total of 2,465 samples (1,810 drill core pulp, 341 drill core chips, and 42 drill core reject samples), including 157 CRMs, 62 duplicates and 53 blanks, from the 2019 resampling program were submitted to Skyline.

Upon arrival at Skyline's Tucson lab, samples are arranged based on the sample identification supplied by Copper Fox. Extra samples, missing samples, damaged containers, illegible sample IDs, or possible cross contamination are noted and reported to the lab manager, who in turn will contact the client for instructions. If needed, samples are dried at 105˚C for 8-24 hours. Each batch of samples is assigned a Job Number consisting of 3 letters followed by a 3- or 4-digit number. The 3-letter prefix identifies the client (in the case of Copper Fox the 3-letter prefix was BUR) and the number is assigned sequentially to each batch of samples submitted by the client. Sample IDs are digitally recorded, and corresponding adhesive-backed labels and laboratory worksheets are generated for each Job. Each label and laboratory worksheet contains an Item Number (assigned sequentially to the samples based on the client's transmittal form) and the Sample Identity for each sample. Samples are labeled, checked for proper sample IDs, and then lined up for sample reduction.

Each drill core chip or reject sample is reduced in a jaw crusher to a nominal 75% minus 10 mesh. The crushed material is then transferred back into the original sample bag. The crushed product is then riffle split, re-blended and re-split three times. One half of the final split is further reduced (if needed) by the same process using a Jones riffle splitter until a final split of 200-300 grams is obtained. Any remaining minus 10 mesh material is poured back into the original labeled sample bag. The 200-300-gram split is then pulverized in a ring and puck mill to a nominal 95% minus 150 mesh product. The pulverized material is then placed in a manila envelope, to which a sample ID label has been affixed. The pulps for the entire job are then located on a numbered shelf in the pulp storage room, which is recorded on the job file cover sheet. Preparation equipment is cleaned between each batch of samples using river rock and silica sand. The preparation equipment is cleaned between samples using compressed air. The Sample Preparation supervisor randomly selects samples of the crushed material and pulverized product for a screen analysis to ensure that this protocol is observed.

The following laboratory procedures, used in 2019 to analyze historic drill core chips, pulps and rejects, were provided by Skyline.

Total Copper

Weigh 0.2000 to 0.2300 grams of sample into a 200 mL flask. Weigh samples in batches of twenty. At end of each rack, weigh the first and last sample as checks plus two standards. In the last rack of the entire job add the tenth sample of every previous rack. Add 10.0 mL HCl, 3.0 mL HNO_3 and 1.5 mL $HClO_4$ to each flask. Place on a medium hot plate (about 250°C). Digest to near dryness until the only remaining acid present is $HClO_4$. Remove from the hot plate and cool. Add about 30 to 40 mL DI water and 10.0 mL HCl. Bring to a rolling boil and remove from hot plate. Cool the flask and contents to room temperature, dilute to the mark (200 mL) with DI water, stopper and shake well to mix. Read the solutions for copper by Atomic Absorption (AA) using standards made up in 5% hydrochloric acid.

Sequential Leach
Acid Soluble Component
Weigh 0.2500 to 0.2600g of sample into a 50 mL centrifuge tube. Weigh samples in batches of sixteen. At end of each rack, weigh the first and last sample as checks plus two standards. In the last rack of the entire job add the tenth sample of every previous rack. Add 10mL 5% H_2SO_4, cap and shake for one hour at room temperature. Centrifuge and decant the supernatant solution into a 100mL flask. Wash the residue once by adding 40mL deionized water to centrifuge tube and shaking for 5 minutes. Centrifuge and decant the supernatant solution into the 100mL flask. Dilute the 100mL flask to the mark with deionized water, stopper and shake well to mix. Read samples on AA using 0.5% H_2SO_4 calibration standards.

Cyanide Soluble Component
Add 10mL of 10% NaCN solution to the residue. Cap and shake for thirty minutes at room temperature. Centrifuge and decant the supernatant solution into a 100mL flask. Wash the residue once by adding 40mL deionized water to centrifuge tube and shaking for five minutes. Centrifuge and decant the supernatant solution into the 100mL flask. Dilute the 100mL flask to the mark with deionized water, stopper and shake well to mix. Read samples on AA using 1% NaCN calibration standards.

11.2.2 Sample Preparation and Analysis – Actlabs

A total of 153 pulps, including 11 CRMs, 6 blanks and 1 duplicate, from the 2019 sampling program were submitted to Actlabs for check analysis. For all samples, splits weighing 1.0g were submitted for copper sequential leach analysis (Code 8). Procedures used for Total Copper (4 acid ICPOES), Acid Soluble Copper (5% H_2SO_4 leach/AA) and residual Cyanide Soluble Copper (10% NaCN leach of residue/AA) analyses were intended to mimic, as closely as possible, the procedures used by Skyline.

11.3 Quality Assurance/Quality Control Procedures

11.3.1 Quality Assurance/Quality Control Procedures - Skyline

Quality Assurance/Quality Control (QA/QC) samples used by Copper Fox include blanks, certified reference standards (CRS) and sample duplicates. Copper Fox used seven different CRMs for its 2019 sampling program. Five CRMs were purchased from Ore Research and Exploration P/L, Bayswater North, Australia (OREAS) and two CRMs were purchased from CDN Resource Laboratories, Ltd., Langley, B.C., Canada (CDN). Two commercially available blanks were used: CDN-BL-10 purchased from CDN and OREAS-21e purchased from OREAS.

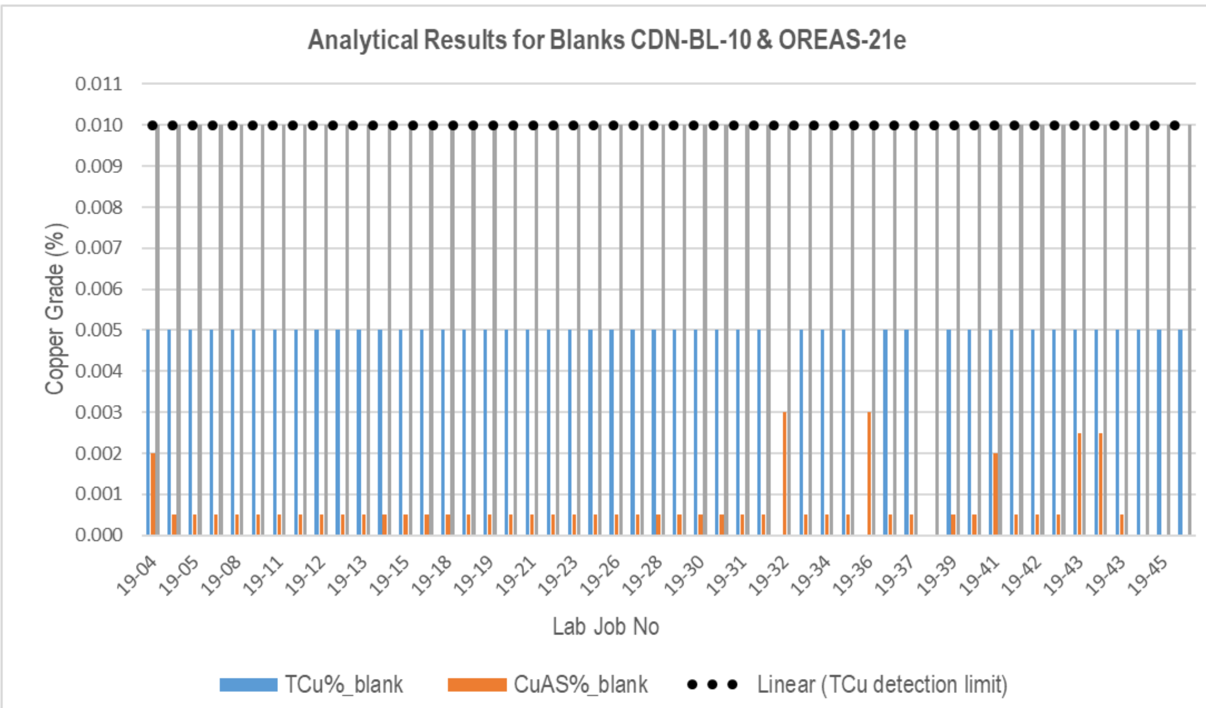
Copper Fox inserted QA/QC samples into the sample stream on a per batch basis. Each batch of samples typically consisted of two CRMs (including low to medium value for total copper (TCu) and a low to medium value for Acid Soluble Copper (ASCu) along with values low to medium values for gold, silver and molybdenum), one blank, one duplicate and twelve core samples, or twelve pulp samples, as per the list shown below:

- #1: Standard (CDN-CM-26 or CDN-CM-27)
- #2: Standard (OREAS-901, OREAS-902, OREAS-903, OREAS-904 or OREAS-906)
- #3: Blank (CDN-CM-10 or OREAS-21e)
- #4 though N-1: unknown, drill samples

- N: Duplicate of N-1
- N=16, thus 12 unknowns and 4 controls per batch.
- Value of N (size of batch) depends on size of the sample tray used by the lab

Blanks Analysis

Copper Fox submitted 50 pulp blanks to Skyline to monitor sample preparation during the 2019 sampling program. All the blanks returned total copper values of less than the detection limit (< 0.01% Cu) for the analytical method used; for plotting purposes they have been assigned a value of 0.005% Cu (Figure 11-1). All the blanks returned Acid Soluble Copper values of 0.005% Cu or lower. Overall, the results indicate good sample preparation at Skyline.



(Source: MMTS, 2020)

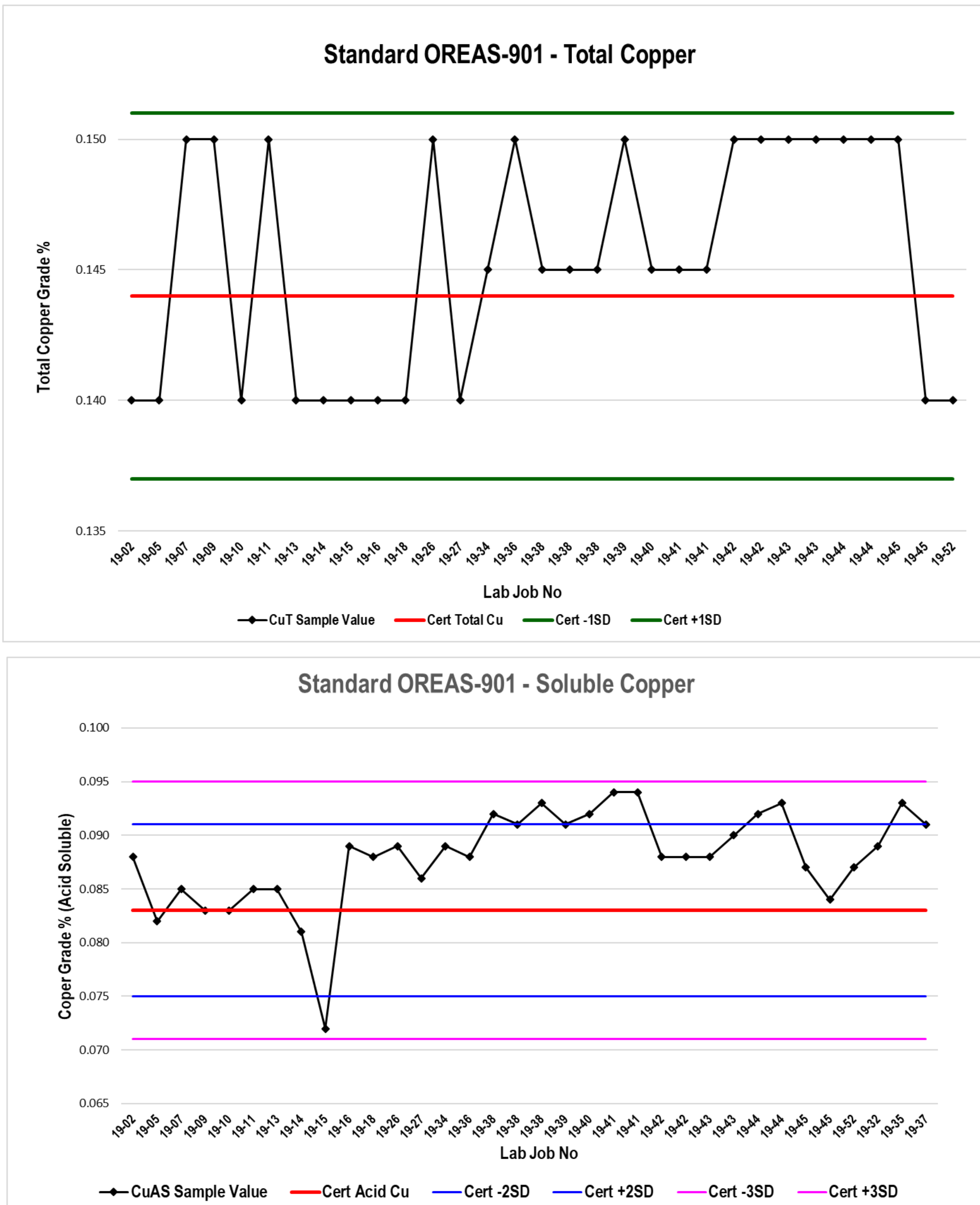
Figure 11-1 Analytical Results for Blank CDN-BL-10 & OREAS-21e

Standards Analysis

A total of 157 certified reference material (CRM) standards were submitted as part of the 45 lab batches that were processed and analyzed by Skyline. The CRMs in each batch included one of two porphyry copper-gold (+/-molybdenum+/-silver) sulphide standards and one of three transitional to oxide copper standards and covered a range of total copper and Acid Soluble Copper values.

On the following figures, the red horizontal lines represent the certified value for each CRM, green horizontal lines are +/-1 standard deviation (σ) from the certified value for each CRM, blue horizontal lines are +/-2 σ from the certified value for each CRM, and magenta horizontal lines +/-3 σ from the certified value for each CRM.

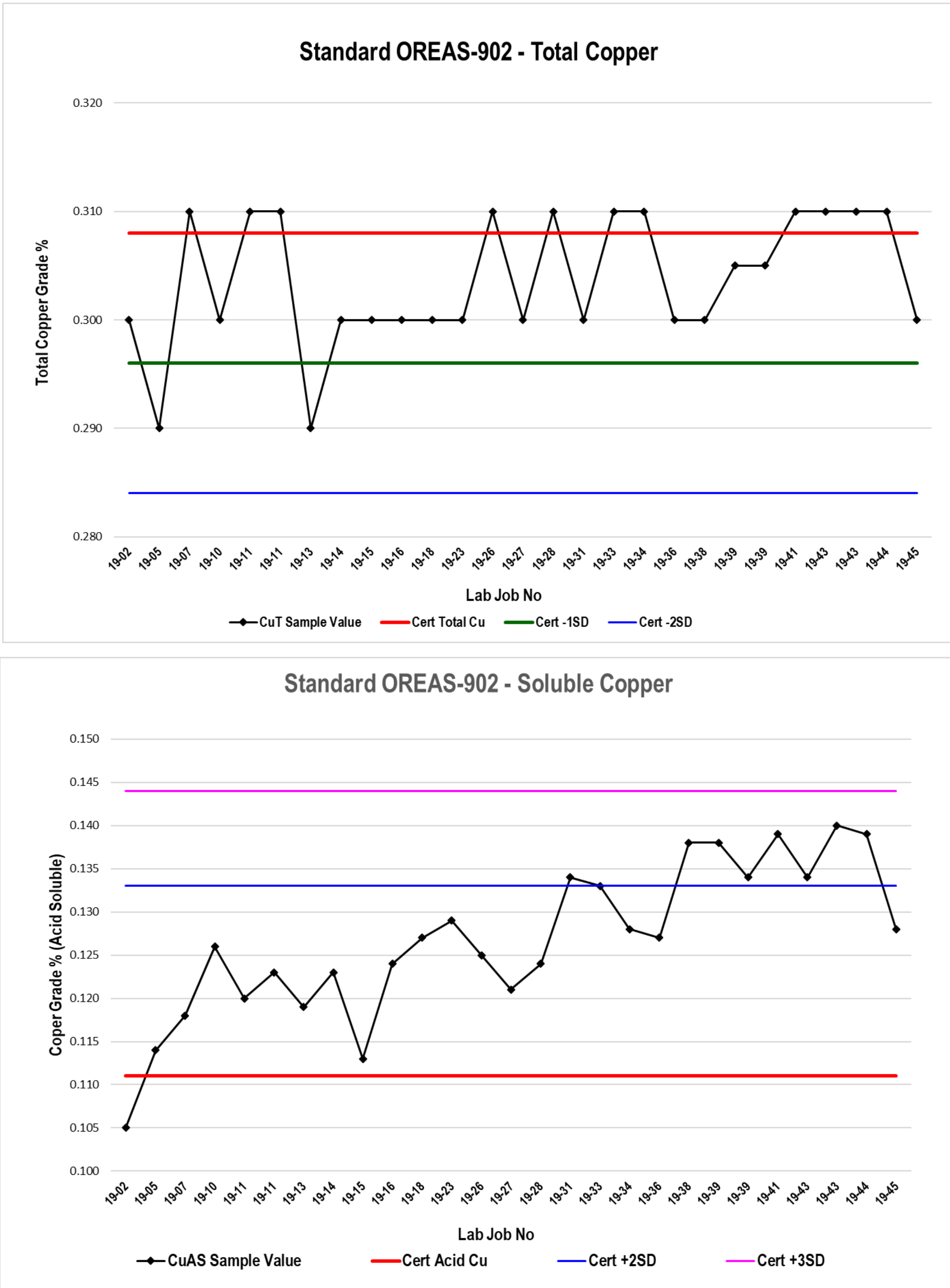
All the TCu values for CRM OREAS-901 plot within +/- 1 σ of the certified value. All but three of the ASCu values for CRM OREAS-901 plot above the certified value with 9 of 34 samples plotting between +2 and +3 σ (Figure 11-2). A slightly positive bias is indicated by the acid soluble data for CRM OREAS-901.



Source: MMTS, 2020

Figure 11-2 Total Copper (TCu) & Acid Soluble Copper (ASCu) Results for OREAS-901

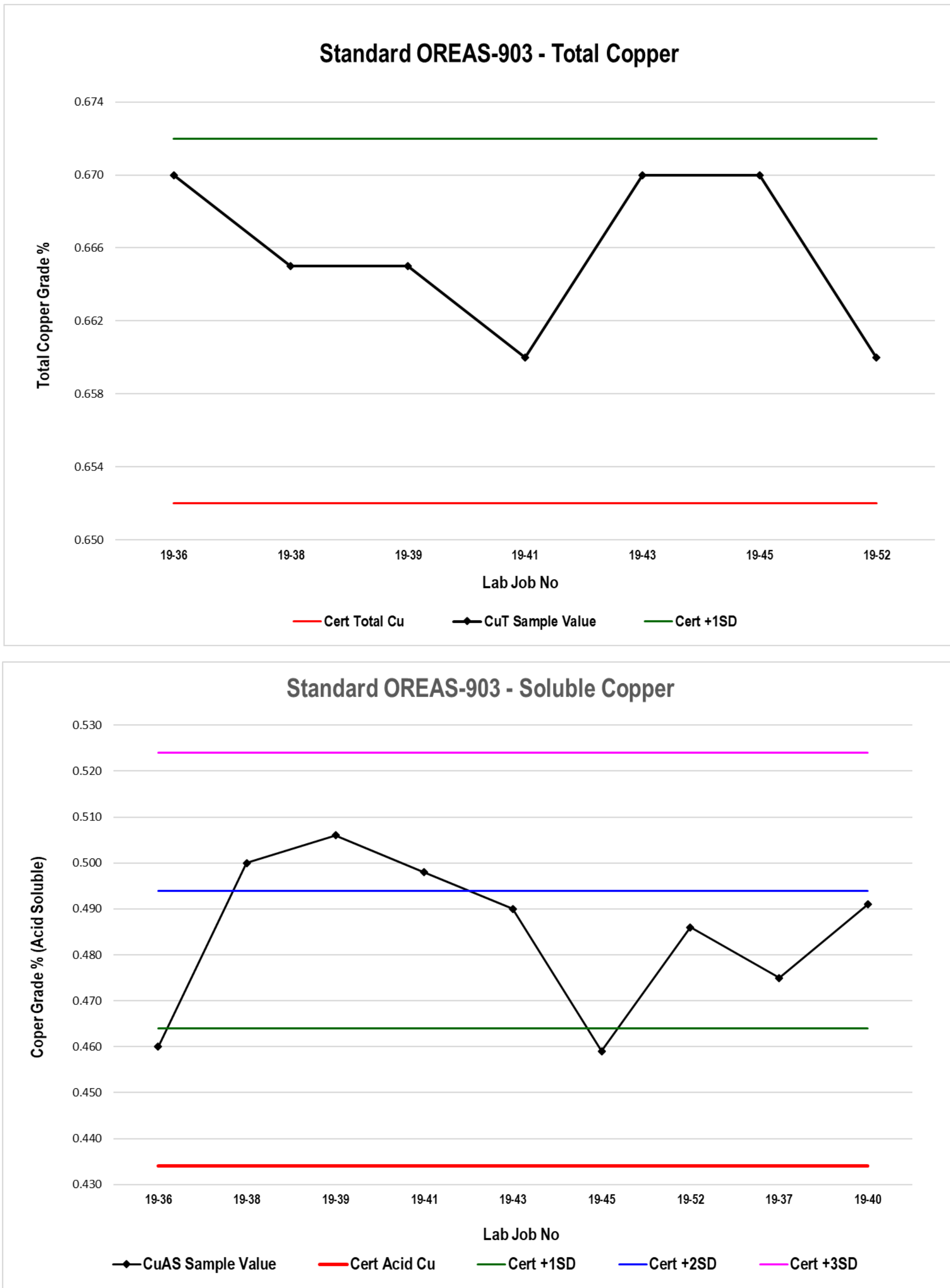
The TCu values for CRM OREAS-902 are distributed at or within -1 σ of the certified value except for two values which plot between -1 and -2 σ of the certified value (Figure 11-3); this distribution suggests a weak, but almost negligible negative bias. All but one of the ASCu values for CRM OREAS-902 plot above the certified and a total of 8 of the 27 ASCu values plot between +2 and +3 σ. A slightly positive bias is indicated by the acid soluble data for CRM OREAS-902.



Source: MMTS, 2020

Figure 11-3 Total Copper (TCu) & Acid Soluble Copper (ASCu) Results for OREAS-902

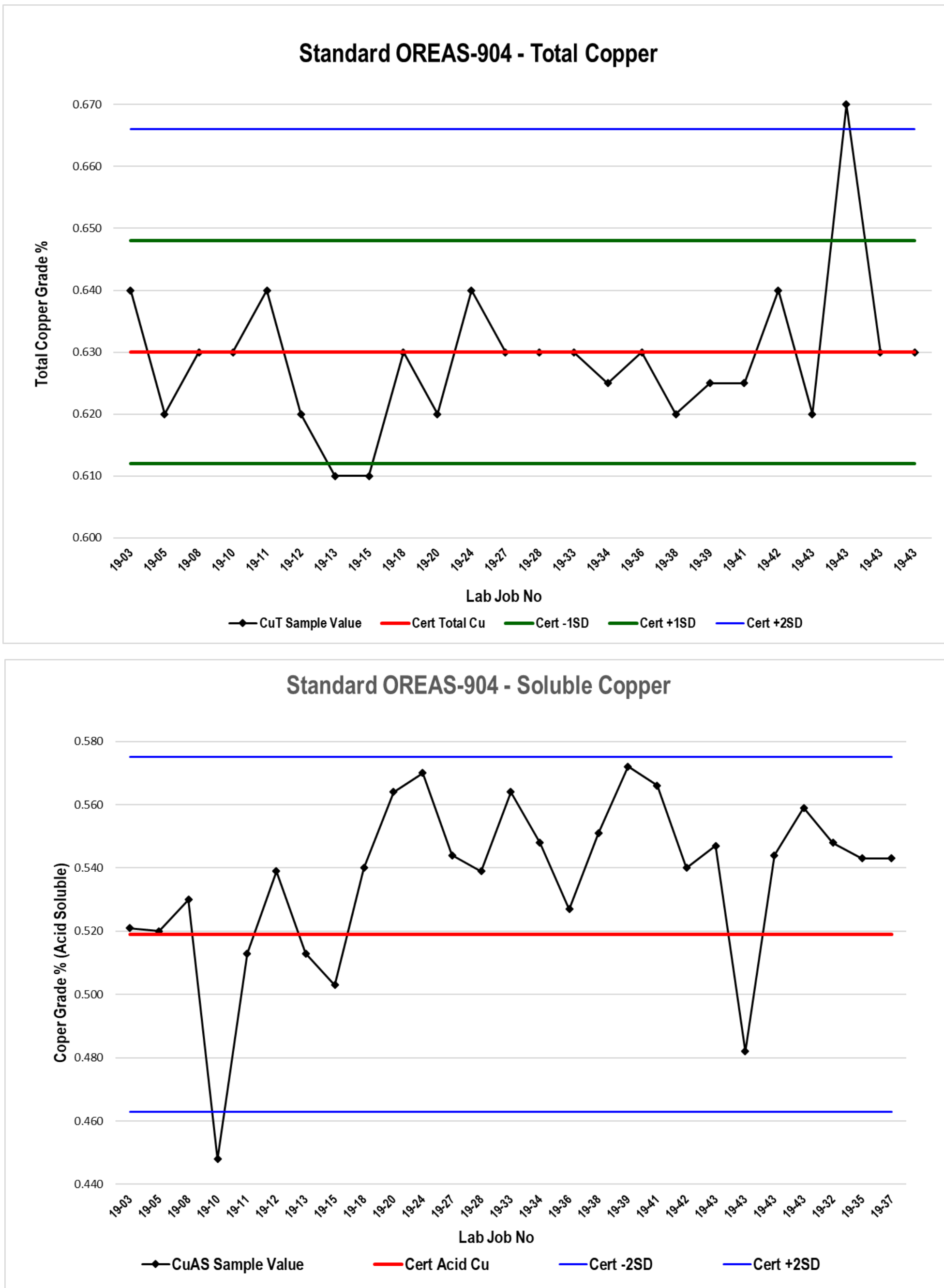
The TCu values for CRM OREAS-903 are within + 1 σ of the certified value with perhaps a weak positive bias. The ASCu values for CRM OREAS-903 are distributed from +1 to +3 σ suggesting a weak positive bias (Figure 11-4).



Source: MMTS, 2020

Figure 11-4 Total Copper (TCu) & Acid Soluble Copper (ASCu) Results for OREAS-903

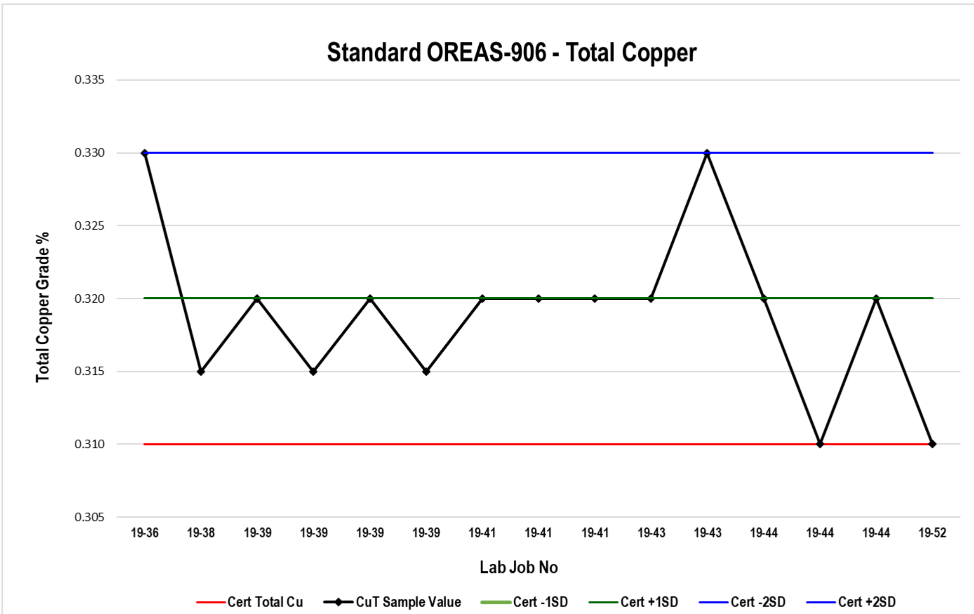
The TCu values for CRM OREAS-904 are distributed approximately evenly about the certified value without any apparent bias and, with one exception, within the range of +/-2 σ (Figure 11-5). The ASCu values for CRM OREAS-904 are also distributed evenly about the certified value within the range of +/-2 σ (with one exception).

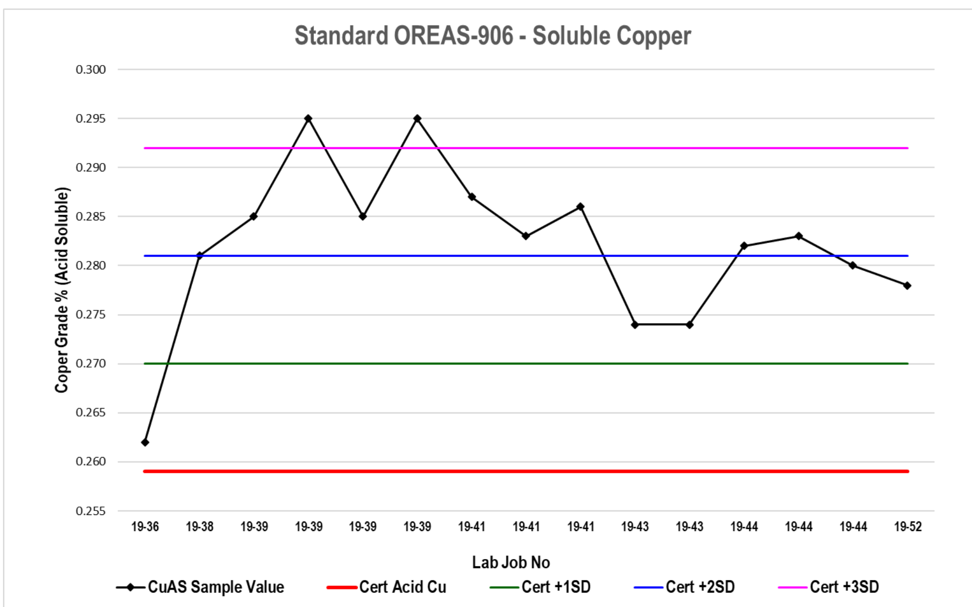


Source: MMTS, 2020

Figure 11-5 Total Copper (TCu) & Acid Soluble Copper (ASCu) Results for OREAS-904

The TCu values for CRM OREAS-906 are distributed between the certified value and +2 σ, showing an acceptable albeit slight positive bias (Figure 11-6). The ASCu values for CRM OREAS-906 are distributed between the certified value and +3 σ, showing a positive bias, but two ASCu values greater than +3 σ indicating a positive bias. Results are generally acceptable.

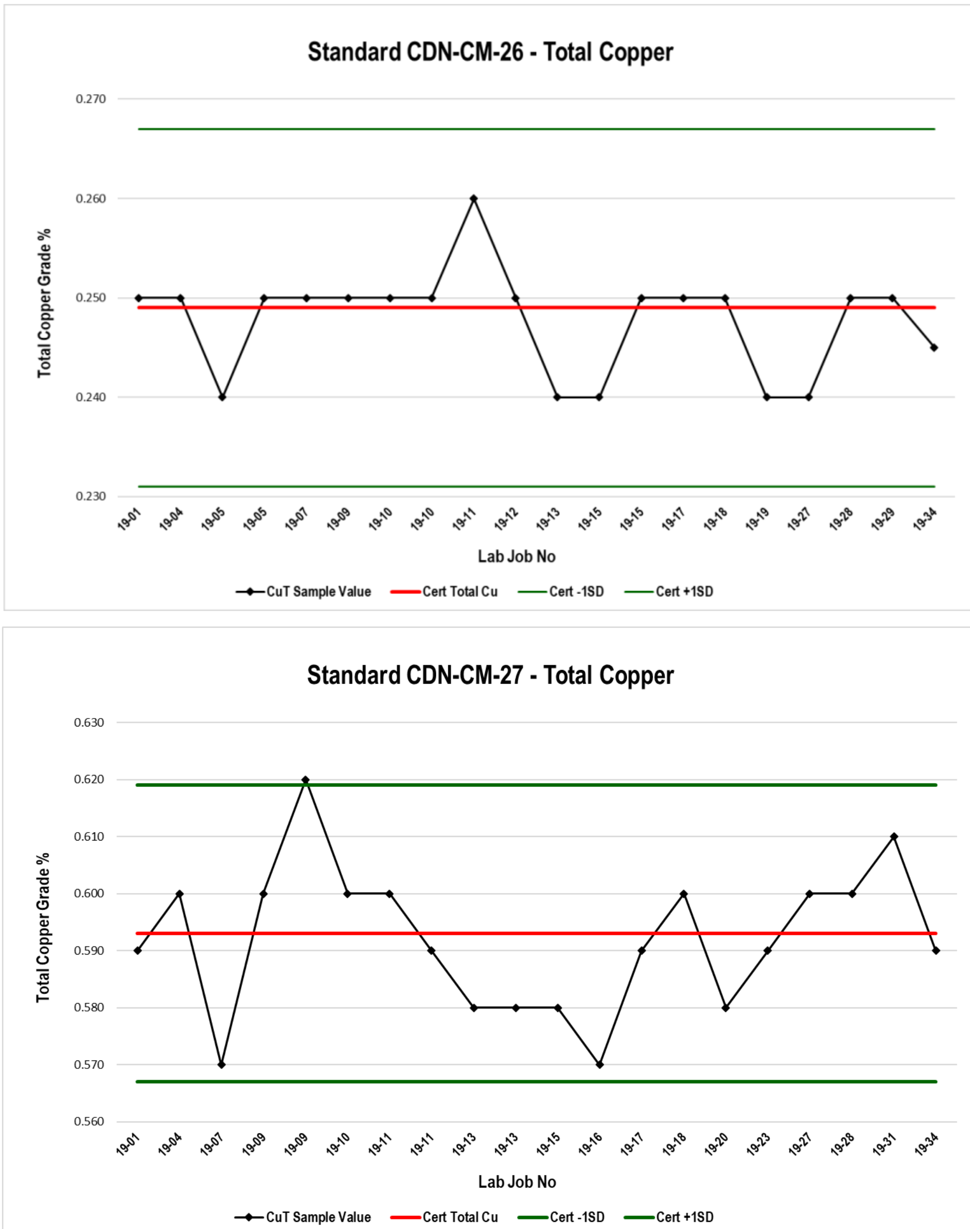




Source: MMTS, 2020

Figure 11-6 Total Copper (TCu) & Acid Soluble Copper (ASCu) Results for OREAS-906

The TCu values for CRM CDN-CM-26 plots within one 'between lab' standard deviation of the certified value (Figure 11-7) and TCu values for CRM CDN-CM-27 also plot within one 'between lab' standard deviations of the certified value.



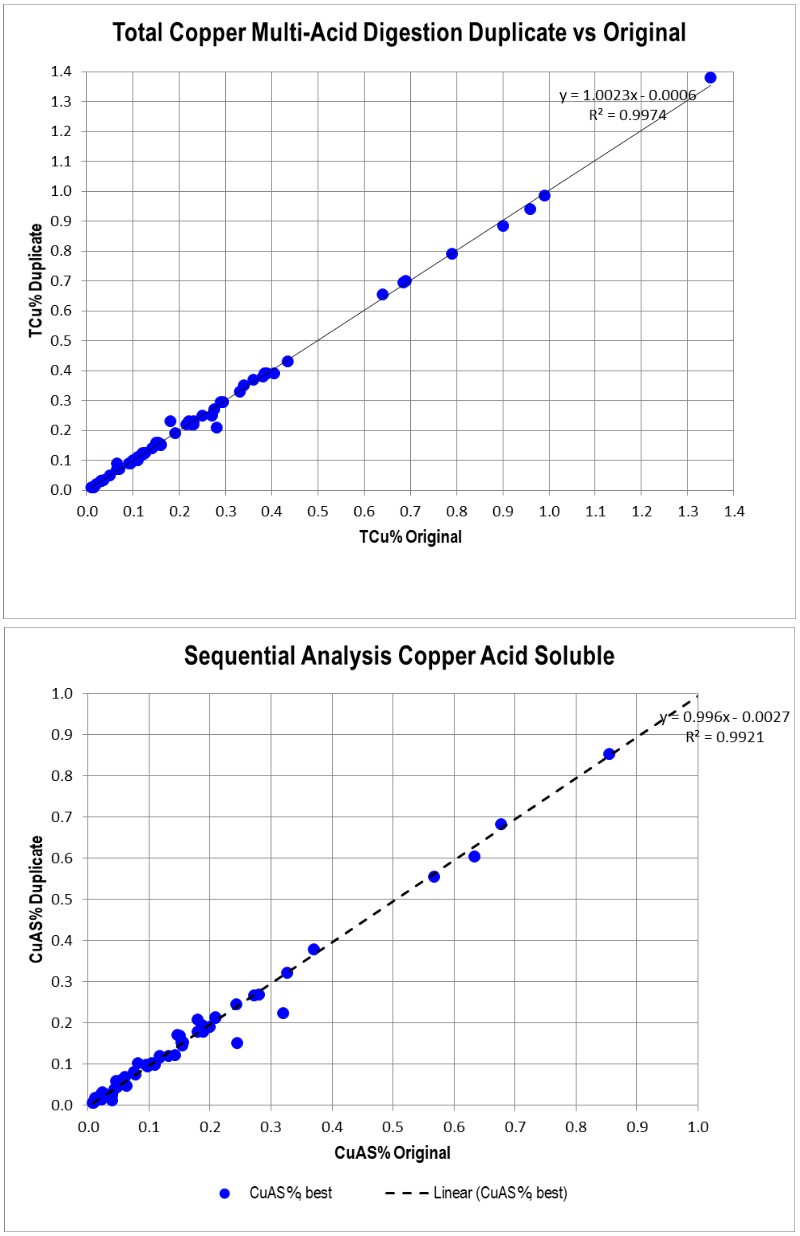
Source: MMTS, 2020

Figure 11-7 Total Copper (TCu) Values for Standards CDN-CM-26 & CDN-CM-27

The total copper (TCu) values for all CRMs are within +/- 2 σ and do not show any appreciable bias. The Soluble Copper (ASCu) values for four of the five CRMs from OREAS consistently plot above the certified value and occasionally beyond + 3 σ from it suggesting a slight positive bias.

Sample Duplicates

Drill core duplicates are used to monitor sample batches for switched samples, data variability due to laboratory error and homogeneity of sample preparation. Results for total copper in original sample versus duplicate sample and for Acid Soluble Copper in original sample versus duplicate sample are shown in Figure 11-8. The data presented on the figures plot close to a 45° slope as indicated by r values that are close to 1; results are acceptable.



Source: MMTS, 2020

Figure 11-8 Total Copper (TCu) and Acid Soluble Copper (ASCu) Duplicate Analysis

11.3.2 Adequacy of Sample Preparation, Security and Analytical Procedures

MMTS concludes that the sample preparation, security and analytical procedures utilized by Copper Fox meet or exceed current industry best management practices.

Continued use of a comprehensive QA/QC program is recommended to ensure that all analytical data can be confirmed to be reliable. The consistent, positive bias observed for Acid Soluble Copper results for CRMs OREAS-901 through OREAS-906 from Skyline in 2019 suggests that analytical procedures used were more aggressive in extracting Soluble Copper than those used to establish the certified values for each CRM. A review of commercially available Acid Soluble Copper CRMs should be conducted, and Copper Fox should consider developing one or more of its own Acid Soluble Copper CRM developed from local oxide copper mineralization.

Overall, the analytical data confirms that adequate care and proper procedures were used to obtain reliable Total Copper and Acid Soluble Copper results values for the Van Dyke Copper Project.

12 Data Verification

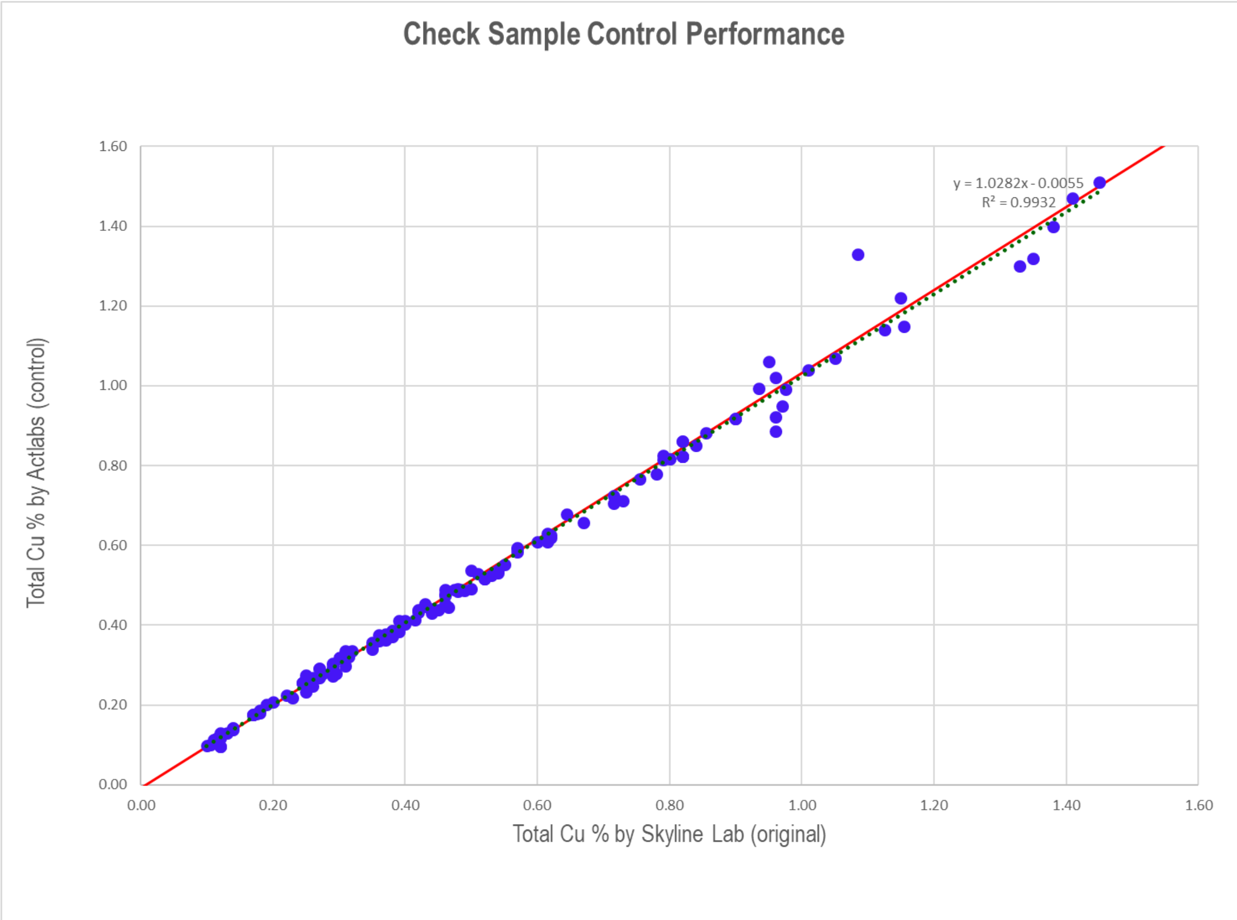
An audit of the historic exploration database obtained from Copper Fox was completed by MMTS by Bird and Lane (2015). This included a review of all available information provided in the form of electronic files and of full-size hard electronic and hard copy versions of the detailed historical drillhole logs and plan maps. The historic drillhole database was built from data and descriptive information recorded on copies of detailed and comprehensive, large format hard copy geological logs for 45 holes. These hand-written logs list analytical results for Total Copper and Acid Soluble Copper in percent (up to 3 significant figures), and sparse analytical data for molybdenum in parts per million (up to 3 significant figures), data that has been carefully compiled in Copper Fox's electronic files. Laboratory certificates for the historic drillholes have not been located. Verification of available historic data was conducted utilizing two principal methods. Firstly, boxed drill core and drill core pulps retained from drilling completed from 1968-1975 were examined to identify drillholes with complete or near complete physical records, and therefore suitable for sampling and re-analysis. Drill core pulp samples from seven holes and drill core samples from one hole, representing complete or near complete mineralized intervals, were collected and submitted for analysis. Secondly, a six-hole diamond drilling program was completed. It included twinning of five historical drillholes and drilling of one hole to assess an area west of the Van Dyke Shaft where ISCR had been conducted in the late 1970s and late 1980s (Bird and Lane, 2015).

Copper Fox's 2019 sampling program of historic drillhole pulps, core (chips) and rejects were designed to provide a complete as possible modern data set to support the estimation of an updated resource estimate for the Van Dyke Copper Project. Lane visited the site while the 2019 sampling and shipping program was actively underway and verifies that sampling procedures employed by Copper Fox personnel was consistent with modern best exploration management practices, including use of a comprehensive QA/QC program.

A total of 2,465 historic drill core chip, reject, and pulp samples were collected and analyzed for copper using a sequential analysis to determine Total Copper (TCu), Acid Soluble Copper (ASCu) and Cyanide Soluble Copper (CNCu).

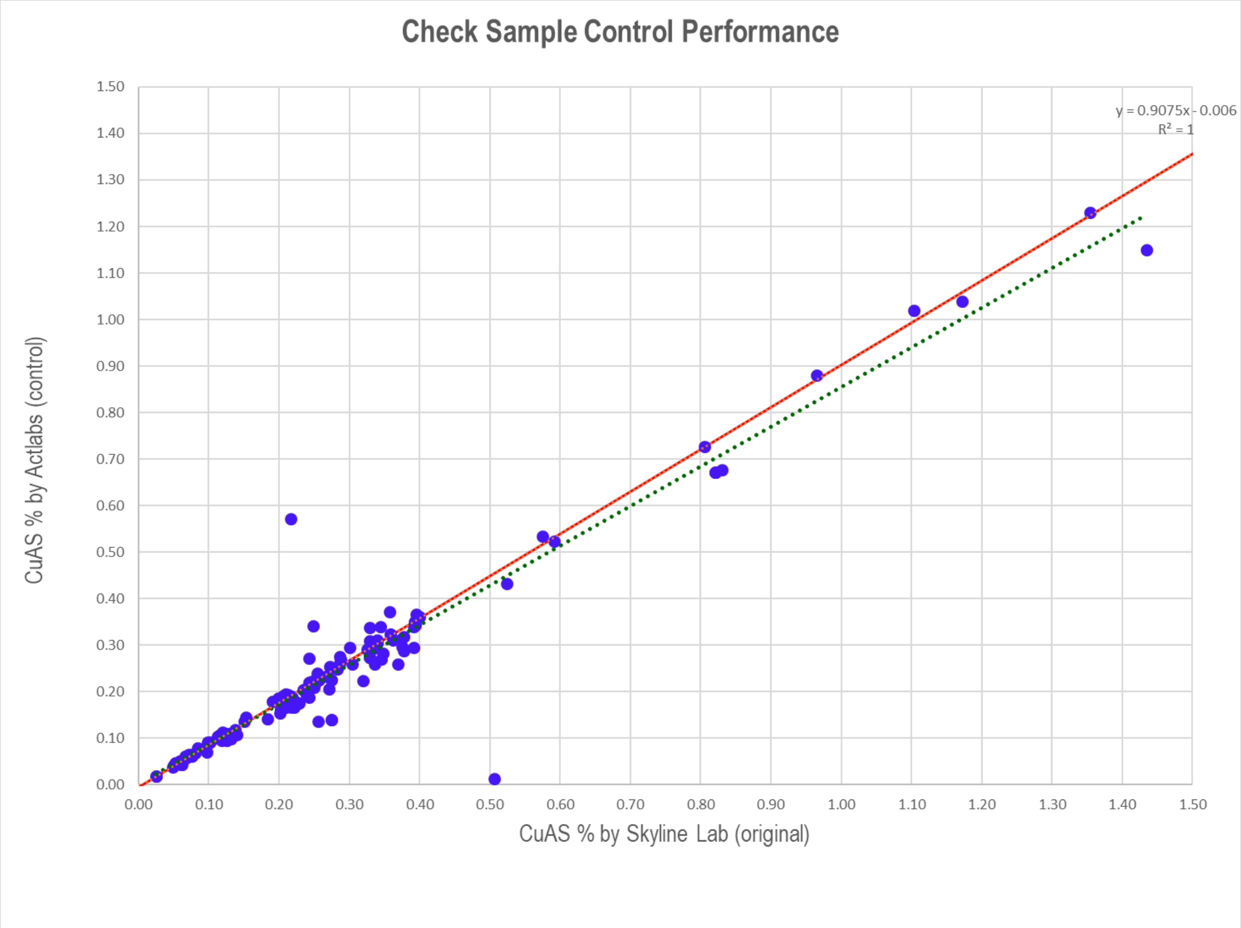
12.1 2019 Check Analysis

A total of 153 pulps from the 2019 sampling program were submitted to Actlabs for check analysis. This total represents approximately 6% of the entire suite of samples analyzed earlier in the program by Skyline. Results of the check assay program are shown in a three-part Figure below. These results compare reasonably well with the initial analytical data for the 2019 samples and confirm the veracity of the Skyline data.



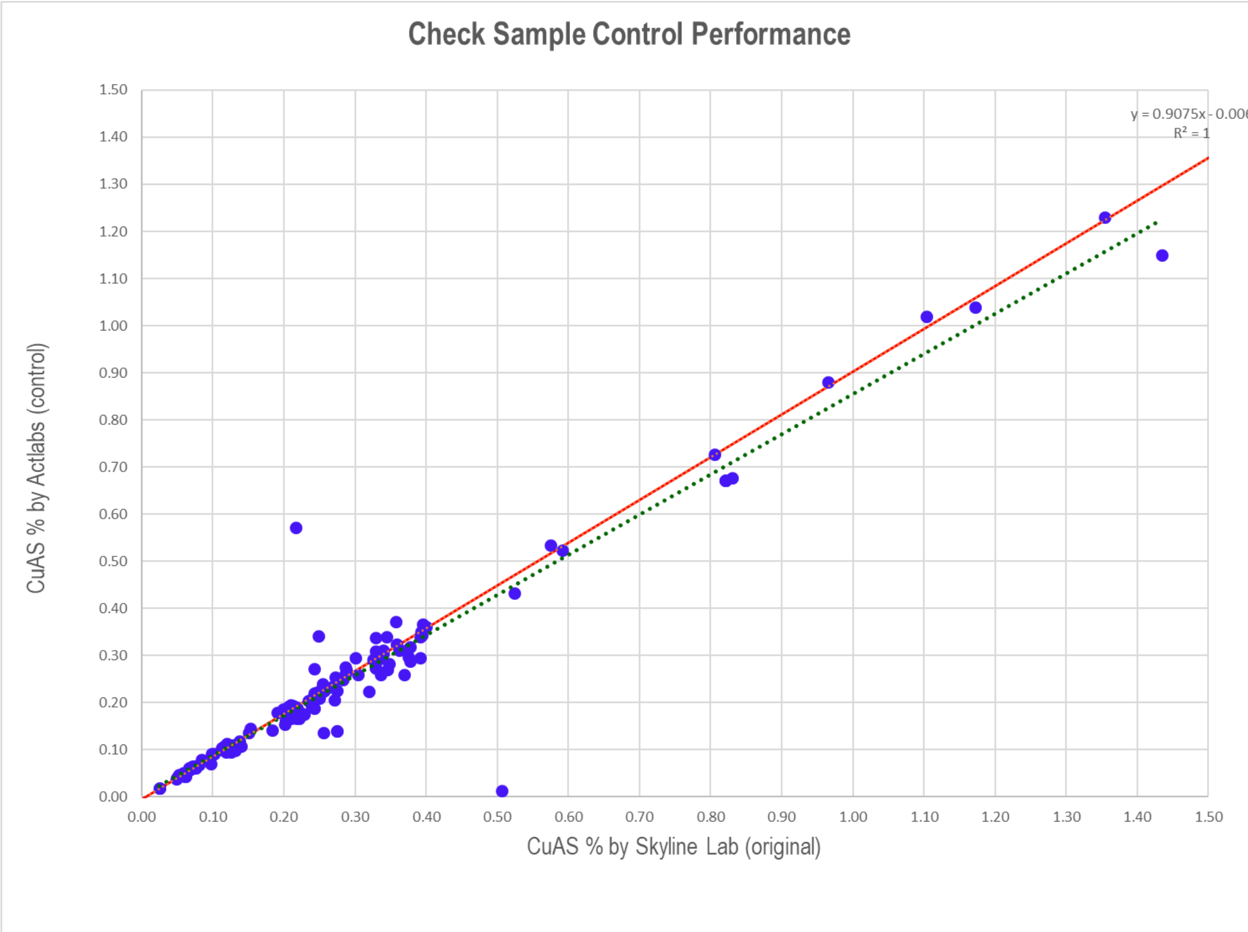
Source: MMTS, 2020

Figure 12-1 Check Assays vs. Original Assays for TCu (top), ASCu (mid) & CNCu (bottom)



Source: MMTS, 2020

Figure 12-1b Check Assays vs. Original Assays for TCu (top), ASCu (mid) & CNCu (bottom)



Source: MMTS, 2020

Figure 12-1c Check Assays vs. Original Assays for TCu (top), ASCu (mid) & CNCu (bottom)

12.2 Adequacy of Data

The verification program determined that the historical data captured from hard copy drillhole logs, cross-sections and maps, and unpublished private reports, are valid and generally representative of the Van Dyke Copper Project.

The data generated from the re-analysis of historic drill core chips, rejects and pulps generally correlated well with the historic data recorded on drillhole logs and compiled in electronically. Total copper content of the re-analyzed samples correlates very well with the original data. Acid Soluble Copper content of the re-analyzed historic drill core and drill core pulps is consistently higher than the original data. This may suggest that modern soluble copper analysis techniques are more thorough than techniques of the late 1960s and early 1970s. Overall, the re-analysis demonstrated that the historic data set is acceptable and representative of the Van Dyke Copper Project. All the 2014 and 2019 drillhole data is suitable for use in the calculation of a resource estimate for the Van Dyke Copper Project.

13 Mineral Processing and Metallurgical Testing

13.1 Introduction

Copper has been extracted from copper oxide minerals in the Van Dyke Deposit periodically over the past 100 years using conventional copper oxide leach technology. Historical copper extraction has been carried out by underground extraction with surface leach operations, and in-situ leach (ISL).

ISL, or in-situ copper recovery (ISCR) is a leach extraction process where barren leach reagent is injected into the orebody using injection wells allowing the leach reaction to occur in-situ. Pregnant solution (PLS) containing leached copper is extracted using recovery wells. Copper is produced onsite using conventional solvent extraction (SX) and Electrowinning (EW) processes.

The depth, grade and minerology of the Van Dyke Deposit make ISCR the preferred option for economic extraction. This Section summarizes the results of metallurgical testing programs.

13.2 Historical Metallurgical Testing

The Van Dyke copper deposit has been subject to underground mining and numerous metallurgical testing and research work since approximately 1916. Historical data (see Table 13-1) indicates that approximately 150 samples have been submitted to various laboratories for acid leaching studies including: bottle roll leach tests, agitated leaching, pressure leaching, and column leach tests.

Table 13-1 Historical Metallurgical Work at the Van Dyke Deposit

Year			Company	Work Completed
1916	to	1945	Van Dyke Copper Co.	Underground mining
1968	to	1980	Occidental Minerals Co.	Drilling and ISL pilot program
1970	to	1971	Occidental Minerals Co.	Bottle rolls, agitation leach tests at Metcon Lab, Tucson, AZ
1971	to	1972	Occidental Minerals Co.	Column leach, pressure leach at New Mexico Tech Research Foundation, Socorro, NM
1971			Occidental Minerals Co.	Bottle rolls, agitation leach tests at Colorado School of Mines Research Institute, Golden, CO
1972			Occidental Minerals Co.	Pressure leach tests at Arizona Bureau of Mines, Tucson, AZ
1973	to	1976	Occidental Minerals Co.	Column leach test, agitation leach at Mountain States R&D, Tucson, AZ
1973	to	1975	Occidental Minerals Co.	Column tests, computer simulation at New Mexico Bureau of Mines & Mineral Resources, Socorro, NM
1974	to	1977	Occidental Minerals Co.	Pressure leach and others at Colorado School of Mines, Golden, CO
1975			Occidental Minerals Co.	Columns leach test at Utah International, Palo Alto, CA
1979			Occidental Minerals Co.	Core leaching test at Exoil Services, Golden CO
1979			Occidental Minerals Co.	Core leaching test at Science Application Inc., La Jolla, CA
1986	to	1989	Kocide Chemical Co.	Drilling and ISL pilot program
2014	to	2014	Desert Fox Van Dyke Co.	Drilling, sampling and metallurgical laboratory Pressure Leach testing, SGS, Tucson, AZ

13.2.1 Occidental Laboratory Metallurgical Tests

Column leach tests conducted by Occidental with varying particle size distributions and head grades ranging from 0.3% to 0.8% Acid Soluble Copper (ASCu) recovered approximately 90% or more of the ASCu in leach times ranging from three days to approximately fifteen days. Corresponding sulfuric acid consumption averaged approximately 2.7kg H_2SO_4/kg of Cu.

These positive metallurgical results are consistent with the highly soluble minerals contained in the Van Dyke deposit, i.e., Chrysocolla ($(Cu,Al)_2H_2Si_2O_5(OH)_4 \cdot nH_2O$), Malachite ($Cu_2(CO_3)(OH)_2$), and Azurite ($Cu_3(CO_3)_2(OH)_2$), with presence of Cuprite (Cu_2O) and Chalcocite (Cu_2S).

Results from historical bottle rolls tests and column leaching tests confirm the highly soluble nature of the copper mineralization in the Van Dyke Deposit.

13.2.2 Pilot ISL Tests

Data from Occidental pilot ISL tests in 1979 and 1980 shows daily average concentration of PLS ranging from 0.5g/l to 3.5g/l. The pilot ISL test operations suffered significant mechanical problems and lacked proper process control. Future ISL operation using modern technologies could achieve significantly higher PLS concentrations than the historical pilot tests.

13.3 2014 Laboratory In-situ Pressure Leaching Test Results

In 2014, a total of eight fresh Van Dyke drill core samples were submitted to SGS E&S Engineering Solutions Inc. for simulated in-situ pressure leach tests. The pressure leach tests were conducted using 26 inch long, 4-inch diameter pressurized stainless steel vessels in locked cycle regime for 120 days. The purpose of pressure (nominal pressure of 120psi) inside the vessels was to simulate the underground hydraulic pressure in in-situ leach process.

Mineralogical analysis of the samples sent to SGS is shown in Table 13-2. Copper oxide minerals account for most of the copper bearing minerals. Only one out of the six samples (VD14-03) contained primarily chalcocite, a copper sulphide mineral. It should be noted that this sample is outside of the Oxide Resource and has been analyzed as an up-side potential in the material surrounding the oxide body which may contain soluble copper not accounted for in the leachable resource or cash flow.

The 2014 metallurgical test work supports previous data indicating that Chrysocolla, Malachite, and Azurite are the primary copper bearing minerals in Van Dyke deposit, with secondary minerals Chalcocite and native copper.

13.3.1 Copper Extraction and Acid Consumption

The SGS pressure leach test results are summarized in Table 13-2. Highest TCu extraction (and iron extraction) was achieved in test PRT#06 which also has the highest chrysocolla content. ASCu extraction ranged from 53% to 93%.

Table 13-2 Summary of the 2014 Pressure Leach Test Results

Test	Leach Cycle	Calculated Head Assay			Cumulative Extraction			Gangue Acid Consumption
No.	Days	TCu	ASCu	Fe	TCu	ASCu	Fe	
		(%)	(%)	(%)	(%)	(%)	(%)	(kg/kg Cu)
PRT#01	126	0.47	0.33	2.23	65.37	93%	6.23	8.64
PRT#02	125	2.03	1.99	0.46	53.88	55%	1.61	0.72
PRT#03(1)	124	0.35	0.11	2.20	23.93	76%	5.7	23.69
PRT#04	124	0.38	0.36	2.16	77.01	81%	2.88	5.13
PRT#05	124	0.42	0.35	2.88	45.09	53%	4.95	12.24
PRT#06	124	1.04	1.03	0.22	86.63	88%	20.32	1.12
PRT#07	124	0.69	0.66	0.33	73.37	77%	10.05	2.01
PRT#08	124	0.76	0.66	0.74	78.96	92%	14.36	4.2

Note (1): Sample PRT#03 is in the mixed zone and is outside of the area being considered for ISL

The lowest TCu extraction (and relatively low iron extraction) was 23.9% achieved in test PRT 03 that also has the lowest chrysocolla content (and the highest chalcocite content).

ASCu Recovery plotted against calculated ASCu head grade in Figure 13-1 shows variability in recovery at the various head grades. Leaching is strongly impacted by the leach conditions and the specific test procedure used has a high probability of solution channeling. In addition, samples PR#05 and PR#02 collected are thought to have been previously leached and or contain chalcocite. The variability in the results confirms the importance of the physical conditions required for effective leaching including ensuring adequate permeability, proper solution presentation to mineral surfaces, and the prevention of channeling.

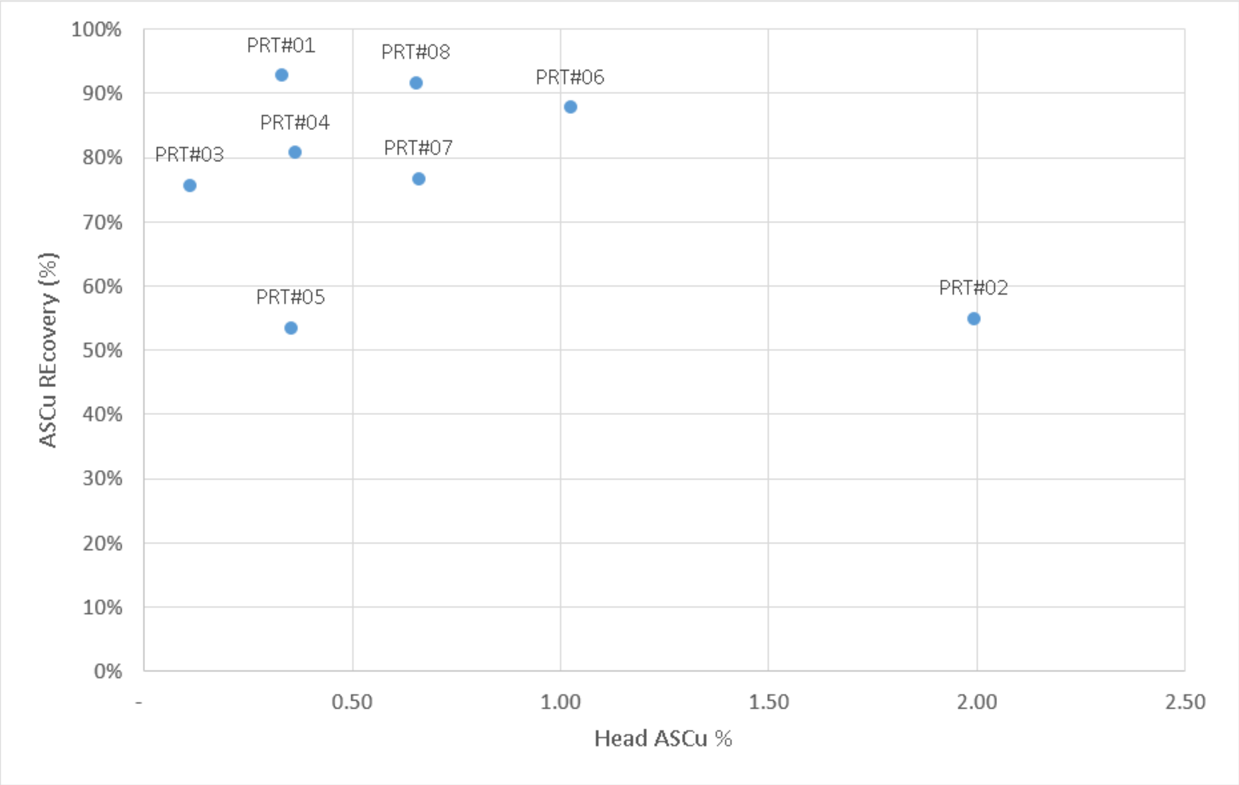


Figure 13-1 ASCu Recovery vs Head Grade (Source: MMTS, 2020)

MMTS notes reconciliation between direct assays and calculated assays for head grades was poor for the 2014 testwork as shown in Figure 13-2, and consequently the copper extraction calculations are potentially subject to significant variation from the reported values in Table 13-2. The poor reconciliation could be due to the assay head sampling methodology not being a good representation of the sample tested, and potentially due to some samples collected within a leach zone.

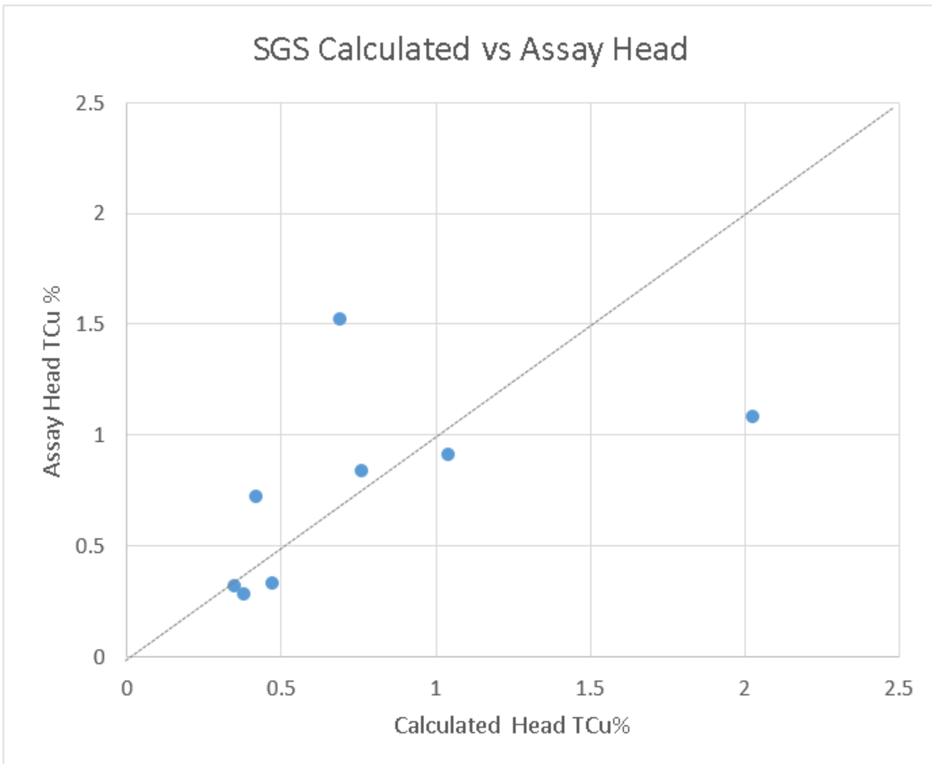


Figure 13-2 Calculated vs Assay Head Grades (Source: MMTS, 2020)

Net acid consumption (kg/kg Cu) is presented in Figure 13-3 as a function of the iron head grade. Once sample VD14-03 (PRT#3), which is primarily chalcocite, is excluded the correlation coefficient reaches a value of R^2=0.9. Note that Van Dyke's average copper head grade of approximately 0.35% will be equivalent to approximately 1.5kg acid/kg Cu.

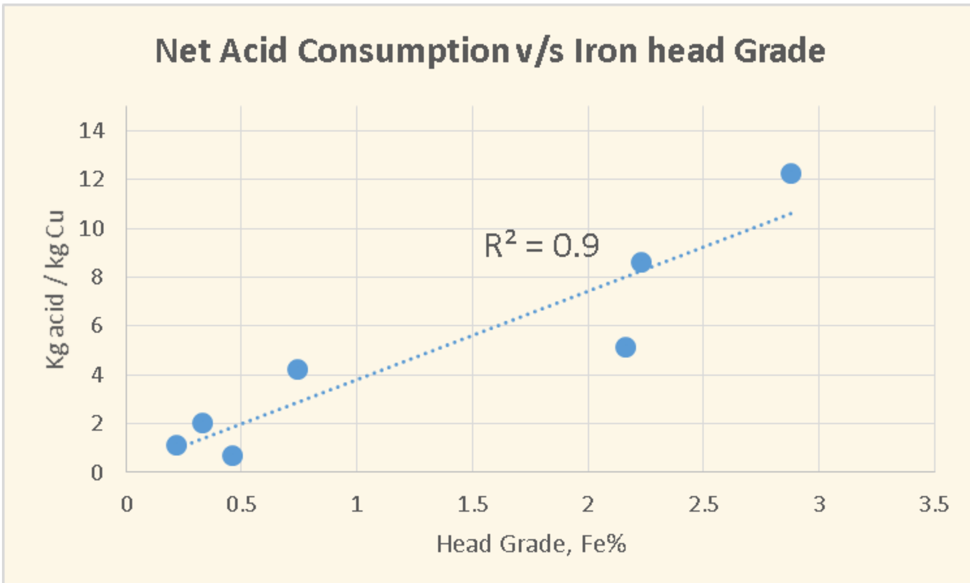


Figure 13-3 Net Sulfuric Acid Consumption (Source: MMTS, 2020)

13.3.2 Leached Drill Core Preparation and Residue Assays

At the completion of rinse cycle, the pressure leach vessels were drained, unloaded and the leached drill core samples were unwrapped, weighed, and dried in a laboratory oven at 100°C. The dried weight for each sample was recorded and the samples were stage crushed to 100% minus 10 mesh and a 1,000 gram sample was split, pulverized and a pulverized portion was submitted for total copper, total iron and sequential copper analysis (Table 13-3).

Table 13-3 Summary of Residue Assay Results

Test No.	Sample ID	Analysis		Sequential Copper Analysis(1)			(%) Soluble Copper(2)
		Cu (%)	Fe (%)	ASCu (%)	CNCu (%)	ResCu (%)	
PRT-01	VD14-02	0.163	2.11	0.024	0.002	0.137	15.95
PRT-02	VD14-02	0.95	0.46	0.9	0.017	0.025	97.35
PRT-03	VD14-03	0.269	2.1	0.027	0.17	0.067	74.62
PRT-04	VD14-04	0.088	2.11	0.07	0.002	0.015	82.76
PRT-05	VD14-05	0.248	2.92	0.165	0.006	0.078	68.67
PRT-06	VD14-06	0.148	0.19	0.125	0.002	0.02	86.39
PRT-07	VD14-06	0.186	0.3	0.154	0.003	0.025	86.26
PRT-08	VD14-06	0.169	0.67	0.055	0.002	0.106	34.97

*Remarks: (1) AsCu = acid soluble copper, CNCu = cyanide soluble copper, ResCu = residual total copper. (2) % Soluble Copper = [(ASCu + CNCu)/(ASCu + CNCu + ResCu)*100]*

The sequential copper analysis determined that copper in the leach residues was mostly soluble in sulfuric acid, indicating that the reduction or elimination of channeling or improved fracturing of the rock could significantly increase leach recoveries. The residual copper indicates copper mineralization that is associated with primary sulfide copper mineralization such as chalcopyrite, which is not soluble in sulfuric acid solution or cyanide solution.

ICP analyses conducted on the head samples of the eight drill core samples are summarized in Table 13-4.

Table 13-4 ICP Scan on Head Samples

Elements		VD14-02 (1801.9 - 1805.3)	VD14-02 (1266.6 - 1270.6)	VD14-03 (1161.5 - 1165.4)	VD14-04 (1682.0 - 1686.7)	VD14-05 (1437.0 - 1440.7)	VD14-06 (896.0 - 900.5)	VD14-06 (1021.0 - 1025.5)	VD14-06 (1231.0 - 1234.5)
Ag	ppm	<1	3	1	<1	<1	<1	<1	<1
Al	ppm	13,380	7,836	11,510	11,530	13,320	8,434	9,118	15,230
As	ppm	2	44	<1	<1	<1	<1	<1	<1
Ba	ppm	81	435	61	93	73	67	78	112
Bi	ppm	<1	<1	<1	<1	<1	<1	<1	<1
Ca	ppm	1,390	726	1,173	1,343	1,243	1,340	1,020	2,595
Cd	ppm	<1	<1	<1	<1	<1	<1	<1	<1
Co	ppm	9	<1	9	9	17	<1	<1	3
Cr	ppm	86	66	99	74	62	15	21	15
Cu	ppm	3,563	12,320	3,727	3,061	8,189	9,309	15,190	8,498
Fe	ppm	22,330	4,938	18,470	17,110	28,580	3,003	5,710	10,710
Hg	ppm	<1	<1	<1	<1	<1	<1	<1	<1
K	ppm	6,674	3,851	6,133	7,646	6,145	5,590	4,861	5,151
La	ppm	24	27	30	40	43	12	24	14
Mg	ppm	4,102	1,052	3,936	4,240	4,896	612	1,045	3,273
Mn	ppm	127	46	157	85	180	26	31	66
Mo	ppm	33	95	86	12	<1	<1	<1	<1
Na	ppm	2,722	2,494	2,433	2,508	3,084	3,499	3,777	3,913
Ni	ppm	98	79	95	101	77	5	6	17
P	ppm	356	179	250	470	133	130	125	212
Pb	ppm	6	29	18	15	19	2	2	<1
Sb	ppm	<1	<1	<1	<1	<1	<1	<1	<1
Sc	ppm	2	1	2	2	1	<1	<1	<1
Sr	ppm	12	102	34	4	24	54	105	106
Ti	ppm	740	124	763	659	1,135	59	114	333
Tl	ppm	<1	<1	<1	<1	<1	<1	<1	<1
V	ppm	25	8	24	25	30	2	4	10
W	ppm	<1	<1	<1	2	2	<1	<1	<1
Zn	ppm	69	37	55	90	118	25	22	45
Zr	ppm	8	8	7	7	8	<1	<1	<1

The ICP analysis indicates that copper, aluminum, iron, potassium, magnesium, and sodium are the most abundant elements in the samples. Mercury was not detected in the samples and low concentrations of arsenic were detected in the VD14-02 (1801.9 - 1805.3) and VD-14-02 (1266.6-1270.6) samples.

13.3.3 Pregnant Leach Solution Impurities and Deleterious Elements

Historical records identified anomalous concentrations of calcium, aluminum, magnesium, and iron. No deleterious elements in the PLS were identified during the laboratory testing at SGS. At this stage there are no concerns of deleterious elements in Van Dyke PLS that may negatively impact the performance of the SX plant and therefore the recovery of copper.

13.3.4 Representativeness of Samples and Testing

The location of the 2014 drilling and sampling, as well as the location of the historical pilot test site are all contained within the boundaries of the project area. Figure 14-1 illustrates the location of the 2014 DHs used in the metallurgical sampling. Of the eight metallurgical samples, only PRT#3 is within the mixed zone. This has been included to determine the potential for recovery of the less oxidized portion of the deposit.

Sample used for laboratory testing at SGS are generally representative of the Van Dyke deposit spatially. Samples covered a wide range of head grades but none of the samples are representative of the average grades in the resource estimate tabulated in Section 14.

13.4 QP Comments

Metallurgical test work confirms that the Van Dyke deposit is suitable for ISCR extraction using sulphuric acid followed by an SX/EW process.

The metallurgical test work had:

- poor assay vs calculated head grade reconciliation;
- the samples were not representative of the average resource estimate head grade;
- and some of the test work showed clear indication of lack of fracturing and presence of channelling.

The next study phase of Van Dyke Project should incorporate an onsite modern pilot ISCR operation to support the metallurgical parameters. The pilot ISCR programs should include at least the following:

- Detailed monitoring of injected and PLS solutions including flow rate, concentrations of copper, acid, iron, calcium, and base metals.
- Complete geochemistry on the core samples obtained from drilling the well holes.

Historical pilot ISCR testing has been carried on the northwest end of the property in the vicinity of VD14-01. A future pilot test should be in an undisturbed area of the deposit.

For the resource estimate purposes it is reasonable to assume an overall copper recovery of 90% from the Acid Soluble Copper portion of the deposit as well as some recovery from the cyanide copper (CNCu) estimated to be (CNCu – 0.067)/ CNCu x 100%.

The metallurgical performance could vary significantly with the degree of fracturing and solution channeling.

14 Mineral Resource Estimates

The Mineral Resource estimate for the Van Dyke deposit has been prepared by Sue Bird, P. Eng. of Moose Mountain Technical Services (MMTS). Updated assays and re-interpretation of the geology model since the previous Resource Estimate have resulted in the need for an update.

The Resource Estimate of the Van Dyke deposit with an effective date of January 9, 2020 is listed in Table 14-1. Mineral resources are estimated within both a 0.025% Recovered Cu grade shell and within a "reasonable prospects for eventual economic extraction" shape, which includes internal dilution or all "must take" material within the confining shape.

The mineral resources are estimated using criteria consistent with the CIM Definition Standards (2014) and the "CIM Estimation of Mineral Resources and Reserves Best Practice Guidelines" (2019).

To account for 12.7 Mlbs of Cu removed during historic mining operations, it has been assumed that all previous mining occurred in the Oxide Zone. The tonnage has been reduced by the amount required to reduce the total resource by the mined amount, with the average grades remaining constant.

Table 14-1 Resource Estimate for the Van Dyke Deposit, effective date January 9, 2020

							Cu Metal (Mlbs)	
Class	**KTonnes (000)**	**Rec Cu (%)**	**TCu (%)**	**ASCu (%)**	**CNCu (%)**	**Recovery (%)**	**Soluble Cu**	**Total Cu**
Indicated	97,637	0.24	0.33	0.23	0.04	90	517	717
Inferred	168,026	0.19	0.27	0.17	0.04	90	699	1007

Notes:

1. *The "reasonable prospects for eventual economic extraction" shape has been created based on a copper price of US$2.80/lb, employment of in-situ leach extraction methods, processing costs of US$0.60/lb copper, and all in operating and sustaining costs of $US 1.25/tonne, a recovery of 90% for total soluble copper and an average Specific Gravity of 2.6t/m3.*
2. *Approximate drill-hole spacing is 80m for Indicated Mineral Resources*
3. *The average dip of the deposit within the Indicated and Inferred Mineral Resource outlines is 20 degrees. Vertical thickness of the mineralized envelope ranges from 40m to over 200m.*
4. *Numbers may not add due to rounding.*

The author is not aware of any environmental, permitting, legal, title, taxation, socio-economic, marketing, political, or other relevant factors that could materially affect the Mineral Resource estimate for the Van Dyke deposit that have not been accounted for in the reporting.

14.1 Introduction

The Van Dyke deposit is a copper oxide deposit that includes both an Oxide and Supergene zone. The term Supergene in the context of this report is defined as a zone that typically occurs below the Oxide zone and that contains both acid soluble and cyanide soluble Cu bearing minerals. Chalcocite is the primary sulfide in the mixed zone. Total Copper (TCu), Acid Soluble Copper Oxide (ASCu) and Cyanide Soluble Copper (CNCU) grades are interpolated within geologic solids by ordinary kriging (OK). The geology has been interpreted in section and plan, with fault surfaces and solids of the domains used to restrict the interpolation volumes during ordinary kriging.

A three-dimensional geologic model has been created using both the historic dhs and underground samples. The updated geologic model includes interpretation of the Gila Conglomerate-Pinal Schist boundary, the Van Dyke Fault, and mineralized solids for interpolation. A block model of the deposit has been created with two zones per block and a percent of the block within each domain used to define the resource.

Statistical analysis (cumulative probability plots, histograms, and classic statistical values) of the assay data is used to confirm the domain selection and to determine if capping of metal grades for variography and interpolation is necessary. Assay data is then composited into 5m intervals, honoring the domain boundaries. Composite statistics have been compiled for comparison with assay data. The composites are used to create correlograms for TCu, ASCu and CNCu grades using the MSDA module of the MineSight® software, thus establishing rotation and search parameters for the block model interpolation, as well as kriging parameters.

Validation of the model is completed by comparison of the block values with de-clustered composite values (Nearest Neighbor values corrected for change of support). A volume-variance correction factor is applied to the de-clustered data to calibrate the model using Grade-Tonnage curves. Further model validation is completed through comparisons of Swath Plots, Cumulative Probability Plots (CPP), as well by a visual inspection of assay and modelled values in section and plan across the mineralization.

14.2 Data Set

14.2.1 Historic Drilling, Underground Sampling and 2014 Drilling

The following outlines the data available for use in the interpolation of copper grades. Assay data within the Van Dyke model bounds includes 35 historic drillholes, historic channel samples from underground workings on three levels, re-assayed historic drill core and core pulps, analytical results from recent metallurgical testwork, and data from 6 drillholes completed in 2014. Five of the 2014 holes were twinned holes used to validate historic assay values. The total length of core within the block model bounds that has been sampled for TCu is 13,017m from drilling, with an additional 1,424m of underground sampling.

Figure 14-1 is a plan view of the drillhole collars (red is 2014 drillholes), the underground sampling area and the model boundary (in blue).

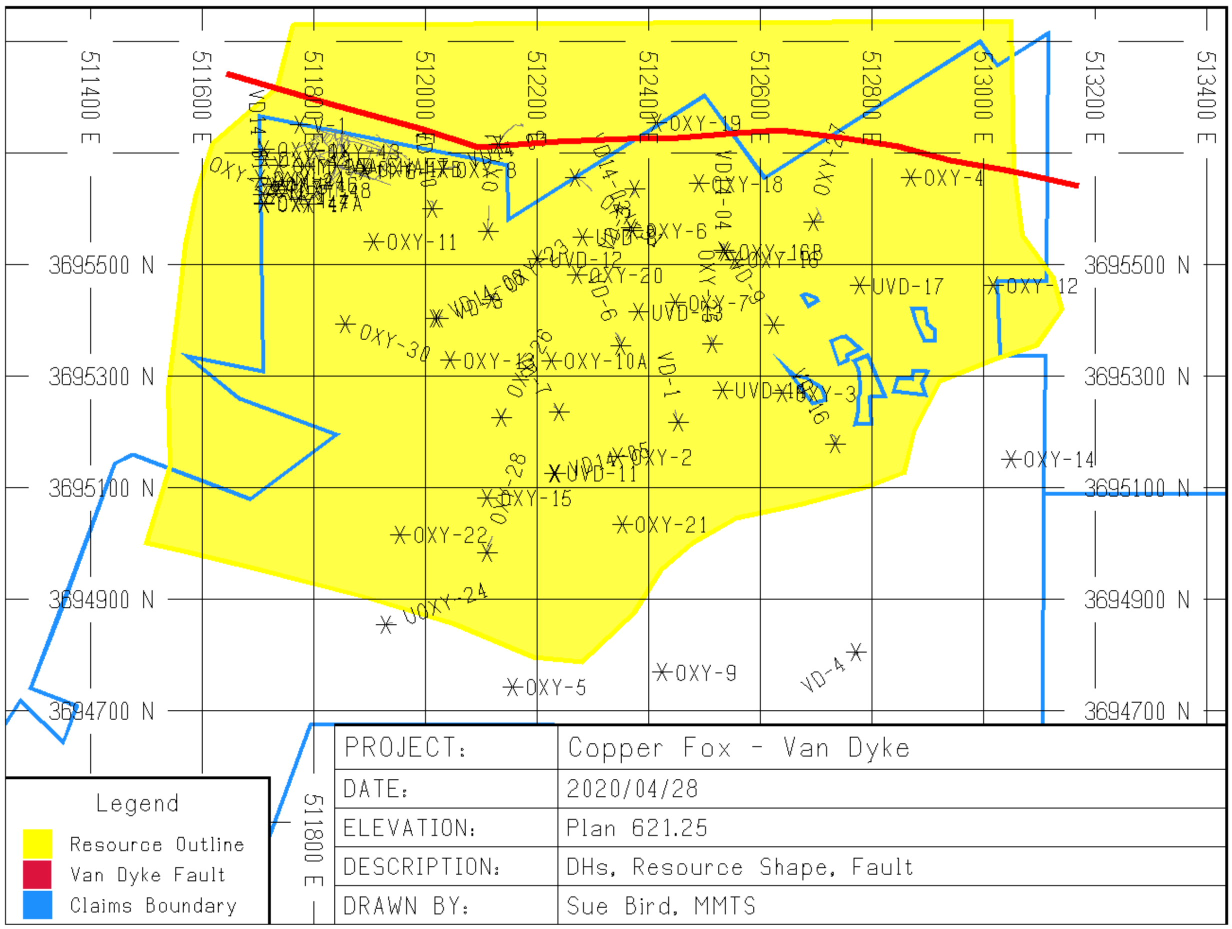


Figure 14-1 Drillholes within the Modelled Van Dyke Deposit

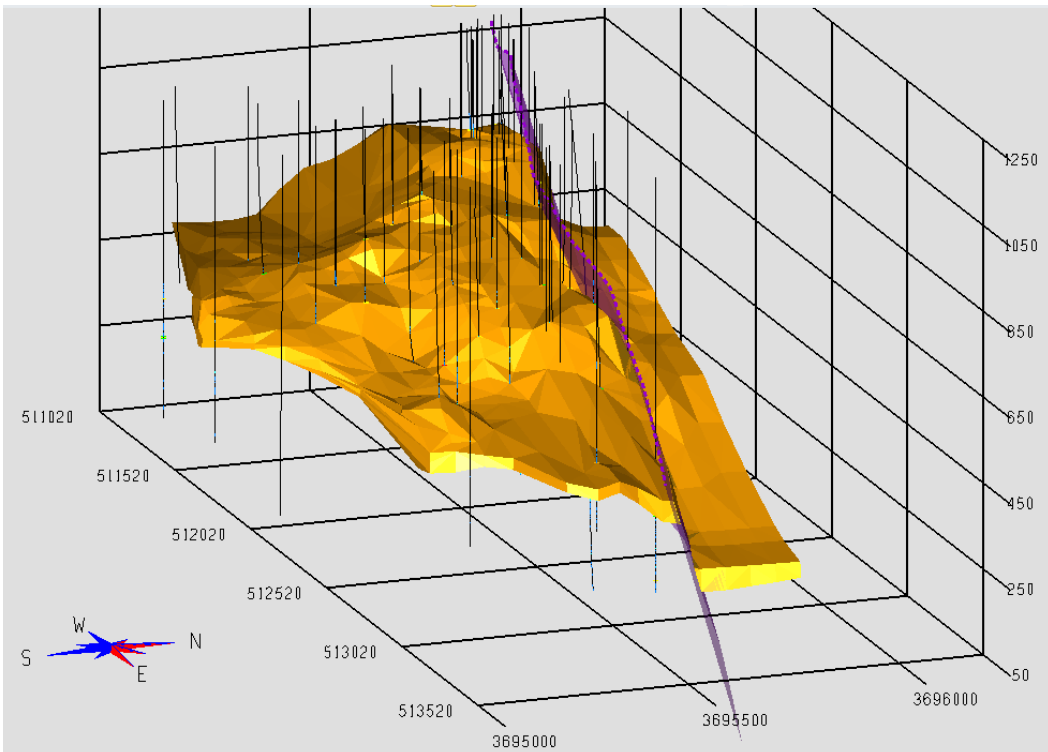
14.3 Geologic Model

The oxide and surrounding mixed oxide-sulphide copper mineralization has been interpreted in three dimensions. The Van Dyke fault at the northern end of the deposit has been re-interpreted as a steeply dipping E-W trending fault, with the mineralization to the north down-dropped. Mineralization remains open to the south and southwest. The Gila Conglomerate surface in places defines the upper boundary to the mineralization. Most of the mineralization occurs within the Pinal Schist at variable depths below the Gila/Pinal Schist contact or minor Porphyritic intrusions. An additional Domain has been created within the area of the previous underground workings, as higher-grade oxide/mixed zone.

Solids of total copper mineralization were created and used to code the assays, composites, and the three-dimensional block model. The solids are based on a 0.025% TOTAL Soluble Cu (TSCU) cut-off. Surfaces of the faults have been used to create domain boundaries and used to code the assays, composites, and block model. The block model has been created to encompass all the drillholes and channel samples available, within 30m x 30m x 10m (vertical) blocks.

A three-dimension view of the resulting fault surface and mineralized solids is illustrated in Figure 14-2, with domains defined as follows:

- Domain 1 – material within the mineralized solids and remote from underground channel sampling.
- Domain 2 – within the area of underground channel sampling.

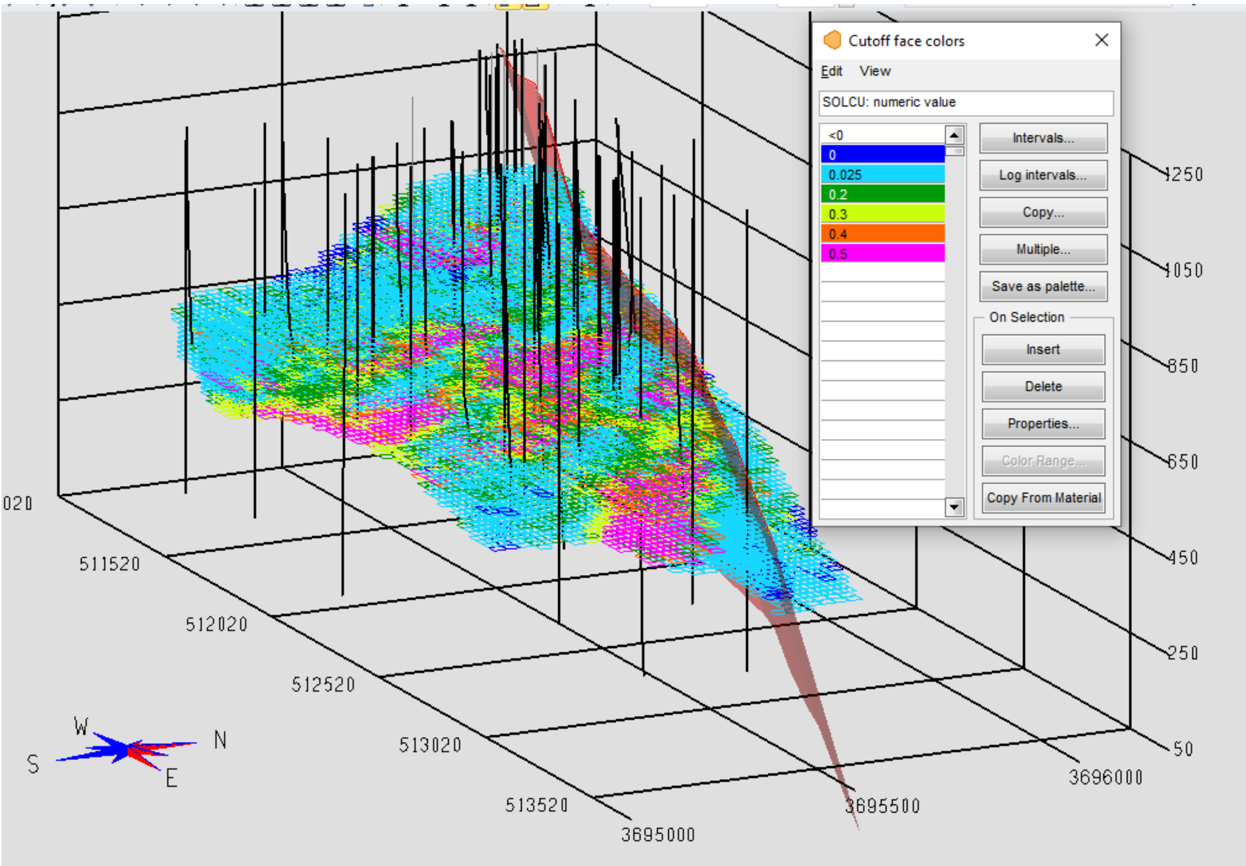


Source: MMTS, 2020

Figure 14-2 3D View of Geology Looking N75E, Dip of -20: Van Dyke Fault (purple) and Mineralized Solids (orange)

The mineralization is shallowly dipping to the east. The resulting modelled mineralization in the plane of mineralization (dipping 25degrees eastward) is illustrated in Figure 14-3 which illustrates the Total Soluble cu grades, the claim boundary, and Van Dyke Fault.

14.4 Exploratory Data Analysis – Assay Data



Source: MMTS, 2020

Figure 14-3 3D View of Soluble Copper Block Model Grades Looking N75E, Dip of -20

14.4.1 Assay Coding

The assay data has been tagged by domain for use in determining capping values, for compositing and eventually in block matching during interpolation. The section plots the mineralized boundaries, and the drillhole coding is illustrated in Figure 14-4 below.

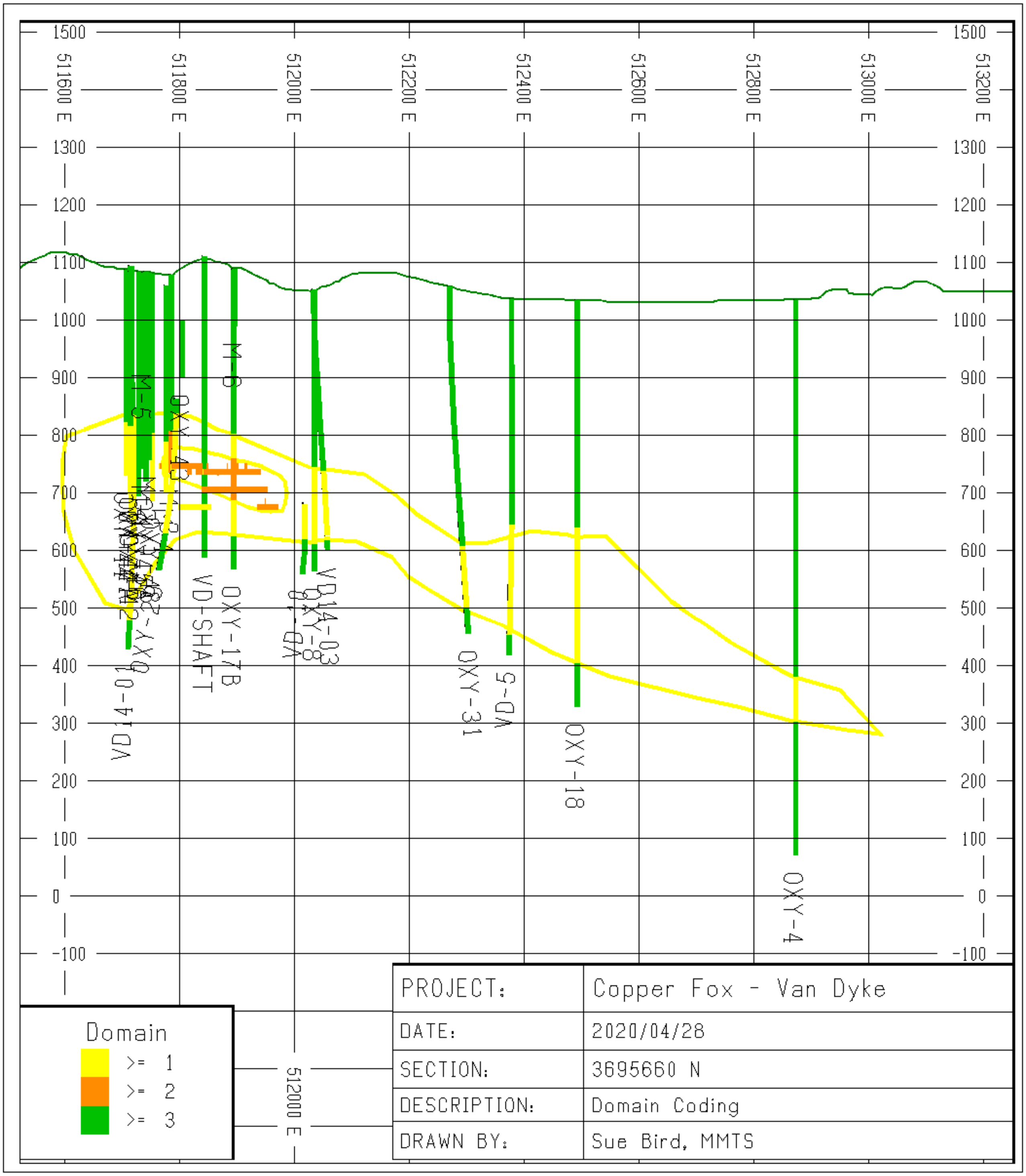
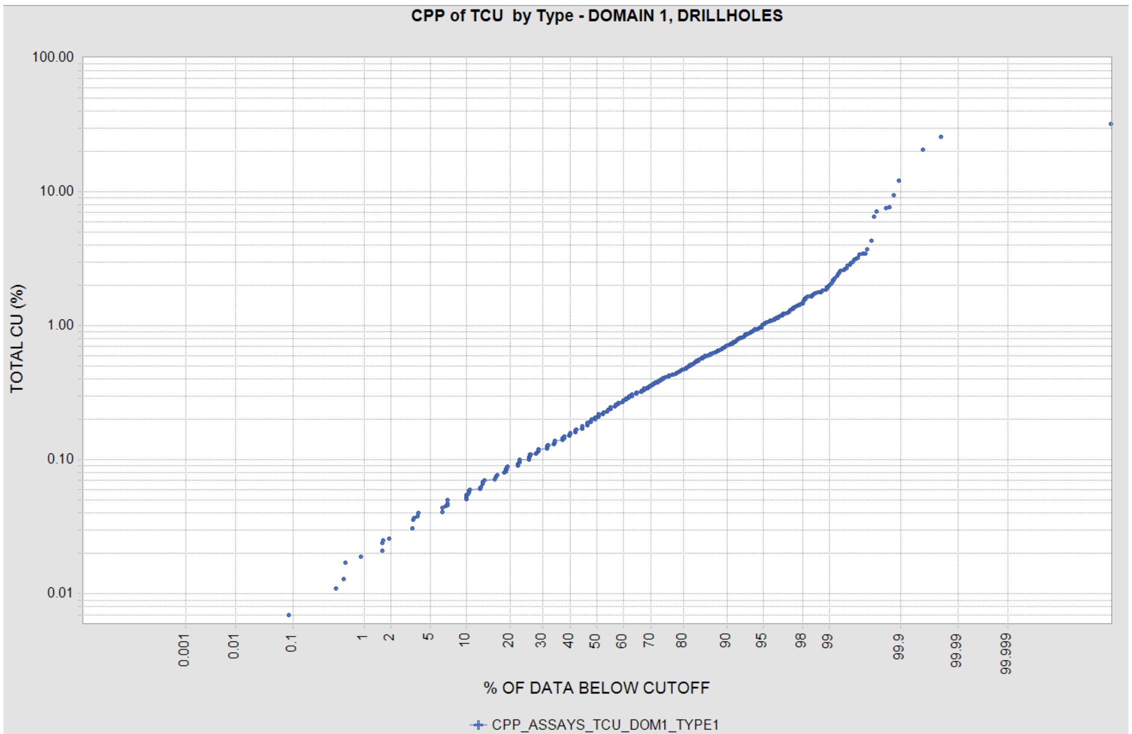


Figure 14-4 **Cross-section Looking North – Domain Boundaries and Assay Coding**

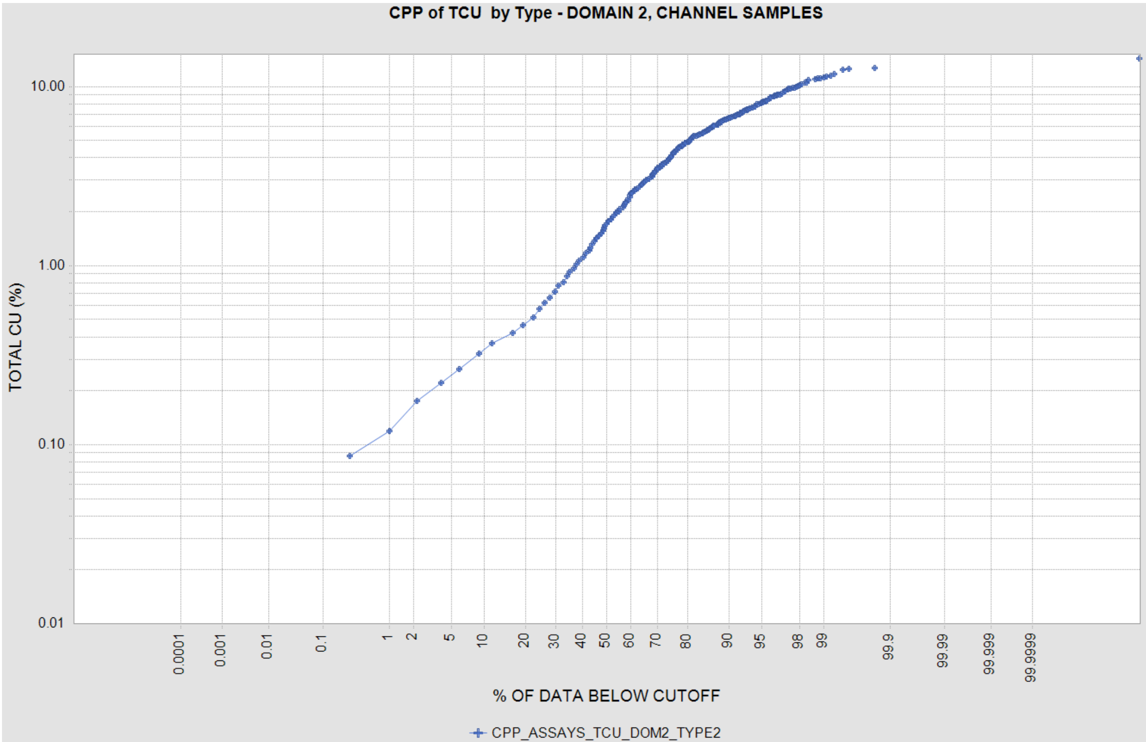
14.4.2 Assay Capping and Compositing

Cumulative probability plots are used to determine that the grades are lognormally distributed and to define the capping of high-grade outliers by domain and by sample type (drillhole or channel sample). The capped data is then composited for use in the interpolation. The capped values of assays and composites are compared to validate the compositing procedure used. Figure 14-5 and Figure 14-6 show the CPP plots for TCu in Domains 1 and 2 for Drillholes and Channel samples, respectively.



Source: MMTS, 2020

Figure 14-5 CPP Plot Assays – TCu for Domain 1 - Drillholes



Source: MMTS, 2020

Figure 14-6 CPP Plot Assays – CuOx for the Oxide Zone

Based on the CPP plots, values at which to cap the assay grades have been defined for domains that illustrate a break in grades at the upper end of the distribution. The Table below summarizes the capping values by domain, metal, and sample type. The capped, composited values are used for variography and interpolations.

Table 14-2 Capping Values of Assays during Compositing

	DOMAIN	TCU	ASCU	CNCU
Drillholes	1	10	-	1.2
	2	2	3	3
Channel Samples	1	1	na	na
	2	12	na	na

Specific Gravity Data

Specific gravity measurements have been done for the 2014 drillholes. Samples are measured by Copper Fox prior to shipment, and by Skyline using ASTM Method C127-01. The friability of the Gila Conglomerate required kerosene-based immersion to limit expansion of the clay component. The Gila Conglomerate samples were sent to Mountain States R&D for this process.

The average specific gravity below the Gila Conglomerate (within the Pinal Schist and porphyritic units) is 2.60. This is the value used for all mineralized and waste blocks in the reporting of the resource.

14.5 Compositing and Composite Statistics

Compositing of grades has been done as 5m fixed length composites and honoring the Domain boundaries. Table 14-3 summarized and compares the assay and composites statistics by Domain and metal. The small differences in weighed mean grades for each metal illustrate compositing is representative of the assay grades.

Table 14-3 Summary Statistics by Domain

	Parameter	TCu		ASCu		CNCu		TCu	ASCu	CNCu
		Dom1	Dom2	Dom1	Dom2	Dom1	Dom2	All	All	All
Assays	Num Samples	4833	1146	4524	52	3667	49	8258	5193	4001
	Num Missing	105	14	414	1108	1271	1111	1326	4391	5583
	Min	0.005	0.080	0.001	0.041	0.001	0.007	0.001	0.001	0.001
	Max	31.950	14.420	30.929	3.784	1.476	0.444	31.950	30.929	1.476
	Wtd mean	0.319	2.439	0.227	0.481	0.038	0.025	0.399	0.199	0.036
	Wtd CV	1.809	1.037	2.417	1.017	2.965	2.273	2.750	2.587	3.052
Composites	Num Samples	2411	470	2251	25	1817	25	5098	2711	2020
	Num Missing Samples	86	3	246	448	680	448	8664	11051	11742
	Min	0.006	0.124	0.001	0.076	0.001	0.007	0.001	0.001	0.001
	Max	9.642	11.359	8.976	1.784	0.876	0.444	11.359	8.976	0.876
	Weighted mean	0.320	2.443	0.226	0.481	0.038	0.025	0.395	0.195	0.035
	Weighted CV	1.385	0.985	1.833	0.773	2.705	1.941	2.614	1.997	2.789
Mean Grade Difference (%)		0.6%	0.2%	-0.4%	0.0%	-2.1%	-1.2%	-0.9%	-2.0%	-2.6%

14.6 Variography

Correlograms have been created within the oxide and mixed zone at 30-degree azimuth intervals and 15-degree plunges over the entire directional sphere. Due to lack of data in Domain 2, only Domain 1 has been used to define the variogram parameters for both domains. The major and minor axes for all domains followed the generally south-easterly down dip and north-easterly strike directions of the mineralization.

Downhole variograms of all DH data are used to define the nugget in each domain.

The resulting variogram parameters are given in Table 14-4 for TCu, ASCu and CNCu. Note that the Rotation is given as Z=Rotation of the azimuth from north of the major axis, X=Plunge of the major axis in the ROT direction, Y=Plunge of the minor axis as an east axis (down is negative).

Table 14-4 Variogram Parameters

Domain	Rotations (GSLIB-MS)		Axis	Total Range (ft)	Nugget	Sill1	Sill2	Sill3	Range 1 (m)	Range 2 (m)	Range 3 (m)
	Z	115	Major	210					30	180	210
TCU	X	-20	Minor	170	0.1	0.4	0.3	0.2	25	60	170
	Y	-10	Vert	70					20	50	70
	Z	115	Major	190					100	190	
ASCU	X	-5	Minor	150	0.1	0.3	0.6		50	150	
	Y	-10	Vert	60					8	60	
	Z	0	Major	210					30	140	210
CNCU	X	0	Minor	210	0.2	0.3	0.1	0.4	30	140	210
	Y	0	Vert	80					20	25	80

The major and minor axes of the variogram model for TCu are illustrated in Figure 14-7 and Figure 14-8 below.

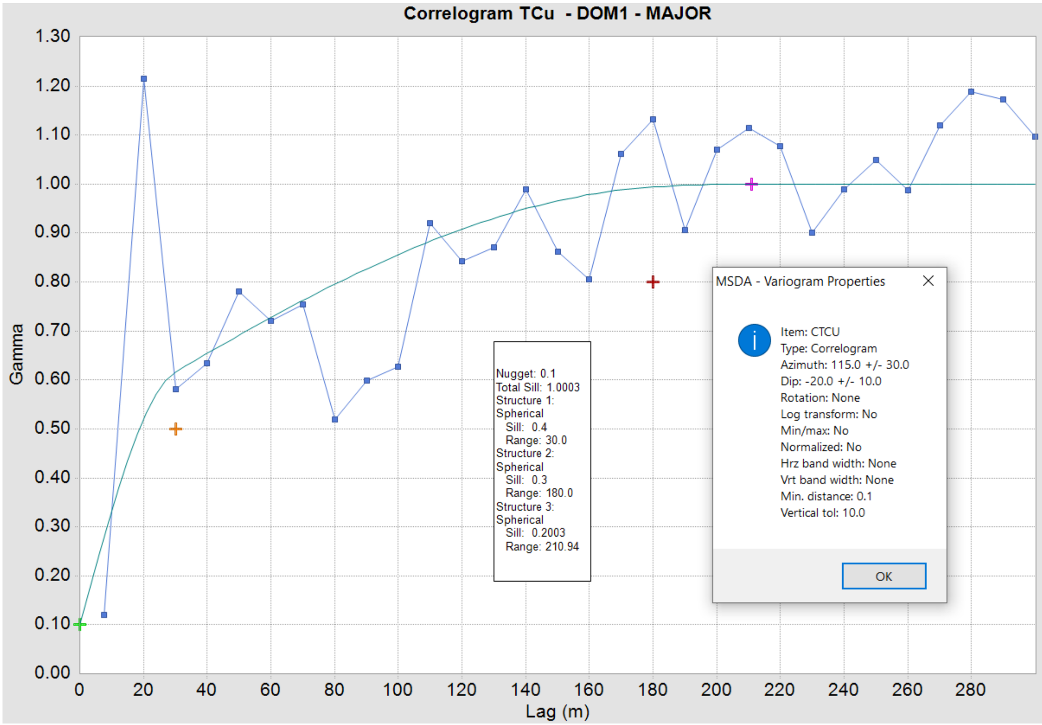


Figure 14-7 Variogram Model for TCu - Major Axis

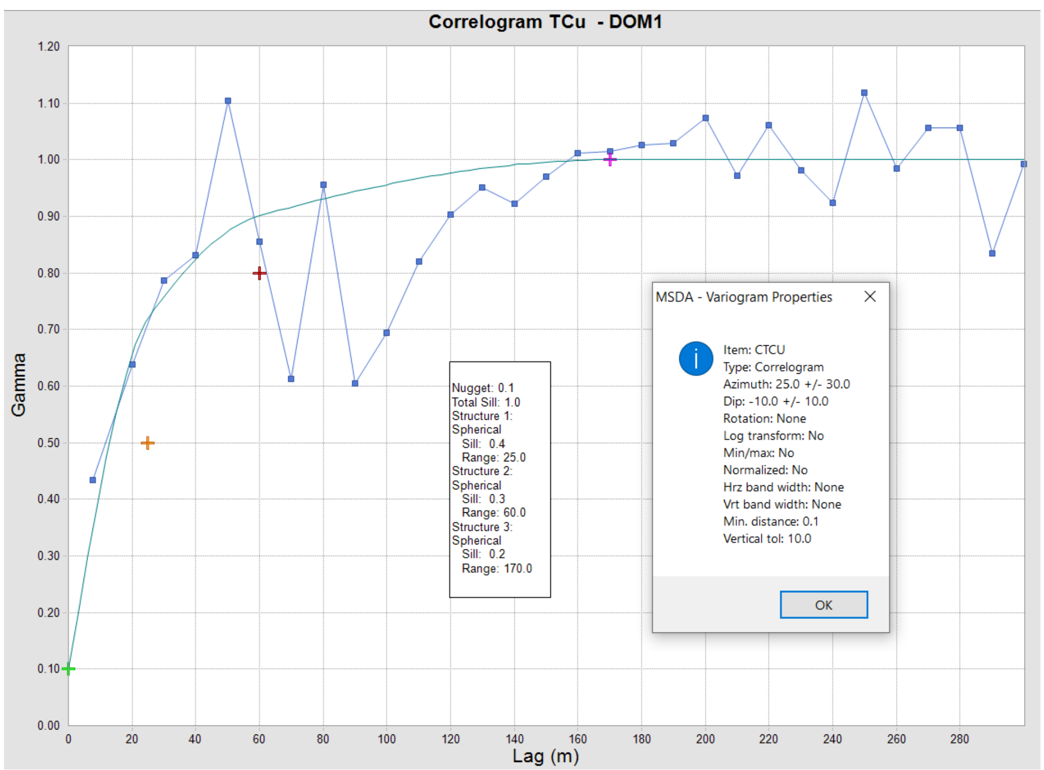


Figure 14-8 Variogram Model for TCu - Minor Axis

14.7 Block Model Interpolation

The coordinate system used for all Van Dyke project files is NAD27. The block model limits, and block size are as given in Table 14-5.

Table 14-5 Block Model Limits

Direction	Origin	Length (m)	Block Dimension (m)	# of Blocks
Easting	511400	513290	30	63
Northing	3694700	3695900	30	40
Elevation	200	1000	10	80

Interpolation of TCu, ASCu and CNCu is done by Ordinary Kriging (OK). Interpolation is restricted by the geologic boundaries, with composites and block codes required to match within each domain. The down-dropped mineralization north of the Van Dyke fault was effectively "moved up" to its position prior to fault movement by using a "relative elevation" during interpolation to calculated distances. The interpolation has been done for up to 2 different domains per block, with a block percent of each domain. The final grades used in the resource estimate are the weighted average grades of the block grades in each domain. The interpolation is done in five passes based on the variogram parameters. Search criteria for each pass for each item interpolated by domain are summarized in Table 14-6 and Table 14-7.

Outlier restriction has also been imposed on the composite values during interpolation. This is to limit the influence of high grades by constraining the distance of influence. Table 14-8 summarizes the Outlier Restrictions used. For distance greater than those in the Table, a maximum of the outlier grade is used.

Table 14-6 Interpolation Search Distances by Domain

			Distance (m)				
Metal	**Rotation Axis**	**Rotation (degrees)**	**Pass 1**	**Pass 2**	**Pass 3**	**Pass 4**	**Pass 5**
TCU	Z	115	30	60	120	210	315
	X	-20	25	50	100	170	255
	Y	-10	18	35	53	70	105
ASCU	Z	115	48	95	143	190	285
	X	-5	38	75	113	150	225
	Y	-10	8	16	32	60	90
CNCU	Z	0	30	60	120	210	315
	X	0	30	60	120	210	315
	Y	0	20	40	60	80	120

Table 14-7 Composite Restriction during Interpolation

Parameter	Pass 1	Pass 2	Pass 3	Pass 4	Pass 5
Minimum # composites	4	6	6	6	2
Maximum # composites	8	18	18	18	8
Max / DH	2	3	3	3	2
Max / Split Quadrant	4	4	4	4	2

Table 14-8 Outlier Restriction during Interpolation

Domain	Item	Pass 1-4		Pass 5	
		Outlier Grade	Outlier Distance	Outlier Grade	Outlier Distance
1	TCu	5	10	5	10
	ASCu	5	10	5	10
	CNCu	0.7	10	0.7	10
2	TCu	9	10	5	10
	ASCu	---	---	5	10
	CNCu	---	---	0.7	10

14.8 Resource Classification

Classification has been updated to include Indicated blocks for Domain 1 only, in which the average distance to the nearest two drillholes for which ASCu has been assayed is equal to or less than 80m. This distance is based on the variography which indicates that the Range of the Correlogram at 80% of the sill (R80) is approximately 80m in the major and minor axis. Domain 2 and all other blocks are classified as Inferred. Domain 2 is excluded from Indicated Classification due to its dependence on channel sampling. Figure 14-9 below illustrates the Indicated and Inferred blocks within the resource shaped used for resource estimation.

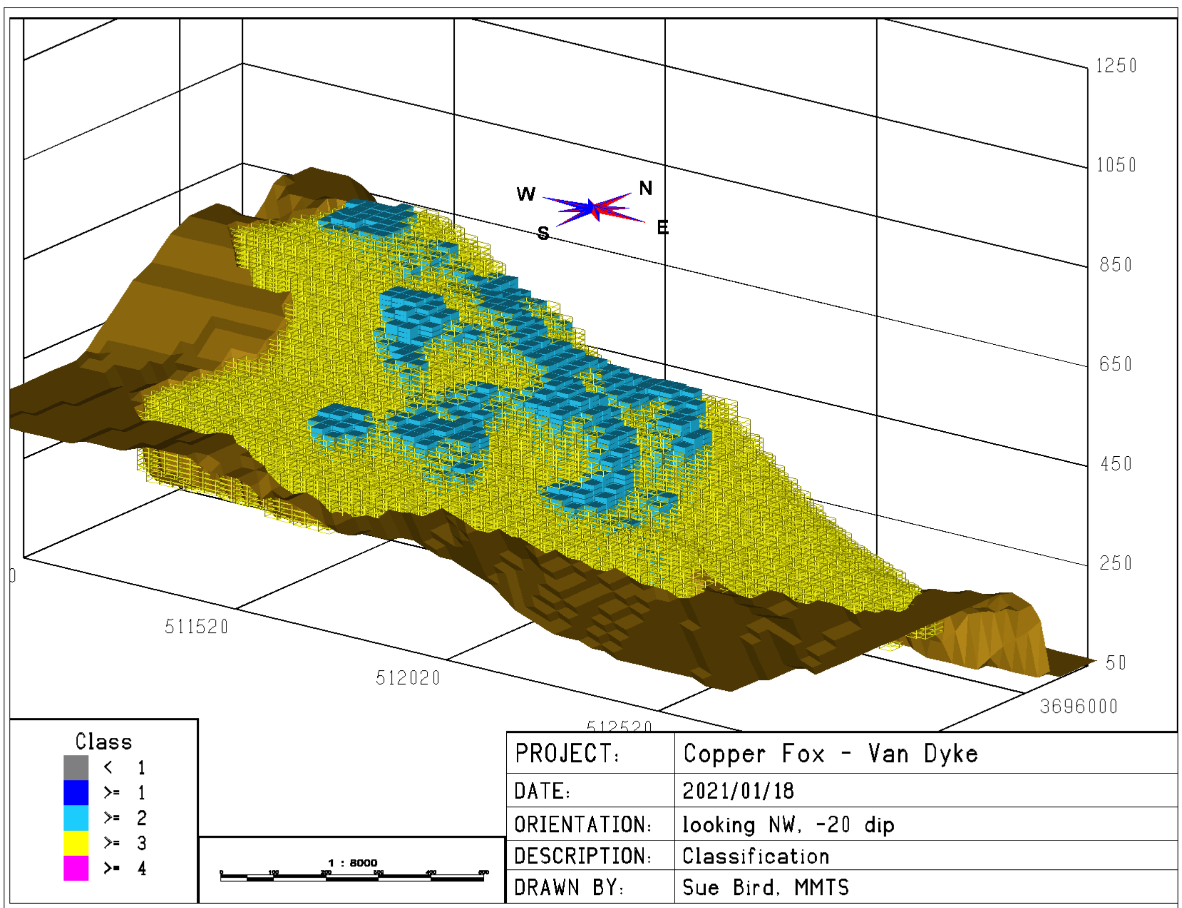


Figure 14-9 Resource Classification within ISCR Shape (2 = Indicated, 3 = Inferred)

14.9 Block Model Validation

Validation of the model is completed by comparison of the Ordinary Kriged (OK) grades, with Nearest Neighbor (NN) interpolated block value, which has been corrected for the Volume-Variance effect due to the change in sample size from composite to block. Validation is completed through inspection and analysis of swath plots, grade tonnage curves, mean grade comparisons, and a visual inspection in section and plan across the property.

14.9.1 Comparison of Mean Grades to Composite Data

The mean grades in each Domain and by Class has been done to ensure that the OK interpolated grades of the Resource Estimate are no globally biased with respect to the data. A Nearest Neighbour model has been created to serve as the de-clustered composites. Results of this comparison are presented in Tables 14-9 through 14-11. The results show the difference between the OK and NN grades is less than 4% for Indicated blocks and within 1% for the ASCu values. Inferred blocks show slightly greater difference for TCu with the interpolated grades 9% lower. The very small number of blocks influenced by the channel samples (Domain 2) means that the overall grade differences are essentially the same as for Domain 1, as illustrated in Table 14-11.

Table 14-9 Comparison of OK Grades to NN Grades – Domain 1

CLASS	Parameter	DOMAIN 1					
		TCu-OK	TCu-NN	ASCu -OK	ASCu-NN	CNCu-OK	CNCu-NN
Measured+Indicated	Num Samples	5,495	5,495	5,495	5,495	5,495	5,495
	Num Missing Samples	0	0	0	0	0	0
	Min	0.025	0.011	0.002	0.002	0.001	0.001
	Max	2.815	6.748	2.495	3.071	0.502	0.689
	Weighted mean	0.337	0.330	0.229	0.226	0.037	0.038
	Weighted CV	0.671	1.038	0.965	1.299	1.701	2.430
	Difference (%)		2%		1%		-4%
Measured+Indicated +Inferred	Num Samples	19,629	19,629	19,629	19,629	19,629	19,629
	Num Missing	0	0	0	0	0	0
	Min	0.000	0.000	0.002	0.000	0.000	0.000
	Max	5.000	7.326	2.495	3.071	0.627	0.689
	Wtd mean	0.311	0.339	0.183	0.175	0.042	0.042
	Wtd CV	0.937	2.180	0.946	1.289	1.612	2.477
	Difference (%)		-9%		4%		-2%

Table 14-10 Comparison of OK Grades to NN Grades – Domain 2

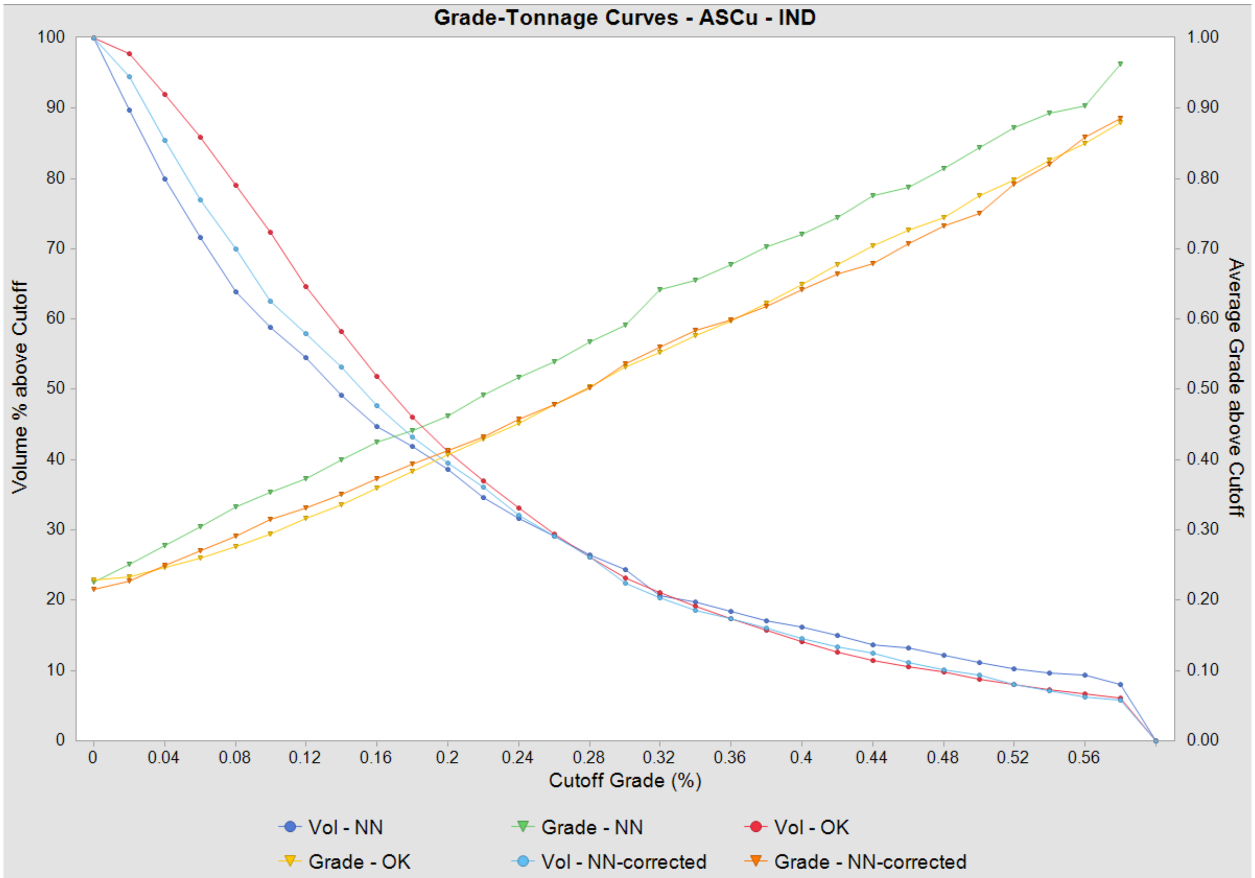
CLASS	Parameter	DOMAIN 2					
		TCu-OK	TCu-NN	ASCu -OK	ASCu-NN	CNCu-OK	CNCu-NN
Measured+Indicated +Inferred	Num Samples	181	181	181	181	181	181
	Num Missing	0	0	0	0	0	0
	Min	0.223	0.246	0.124	0.087	0.008	0.010
	Max	5.978	10.197	1.150	1.122	0.310	0.311
	Wtd mean	1.635	1.800	0.474	0.466	0.058	0.058
	Wtd CV	0.756	1.118	0.447	0.593	1.344	1.316
	Difference (%)		-10%		2%		1%

Table 14-11 Comparison of OK Grades to NN Grades – Domain 2

CLASS	Parameter	ALL DOMAINS					
		TCu-OK	TCu-NN	ASCu -OK	ASCu-NN	CNCu-OK	CNCu-NN
Measured+Indicated	Num Samples	5495	5495	5495	5495	5495	5495
	Num Missing Samples	0	0	0	0	0	0
	Min	0.025	0.011	0.002	0.002	0.001	0.001
	Max	2.815	6.748	2.495	3.071	0.502	0.689
	Weighted mean	0.337	0.330	0.229	0.226	0.037	0.038
	Weighted CV	0.671	1.038	0.965	1.299	1.701	2.430
	Difference (%)		2%		1%		-4%
Measured+Indicated +Inferred	Num Samples	19810	19810	19810	19810	19810	19810
	Num Missing	0	0	0	0	0	0
	Min	0.000	0.000	0.002	0.000	0.000	0.000
	Max	5.978	10.197	2.495	3.071	0.627	0.689
	Wtd mean	0.326	0.355	0.186	0.179	0.042	0.043
	Wtd CV	1.063	2.195	0.947	1.281	1.609	2.461
	Difference (%)		-9%		4%		-2%

14.9.2 Volume-Variance Correction

Grade-Tonnage curves have been constructed for each metal to check the validity of the change of support in the grade estimations. The Nearest Neighbour (NN) grade estimates are first corrected by the Indirect Lognormal (ILC) method using the Block Variance, the weighted mean and Coefficient of Variation (C.V.) values of the NN model for each grade item. The corrected values for grades in each domain have been plotted and compared to the kriged (OK) value. See Figure 14-10 for an example of the ASCu Grade-tonnage curve comparisons.



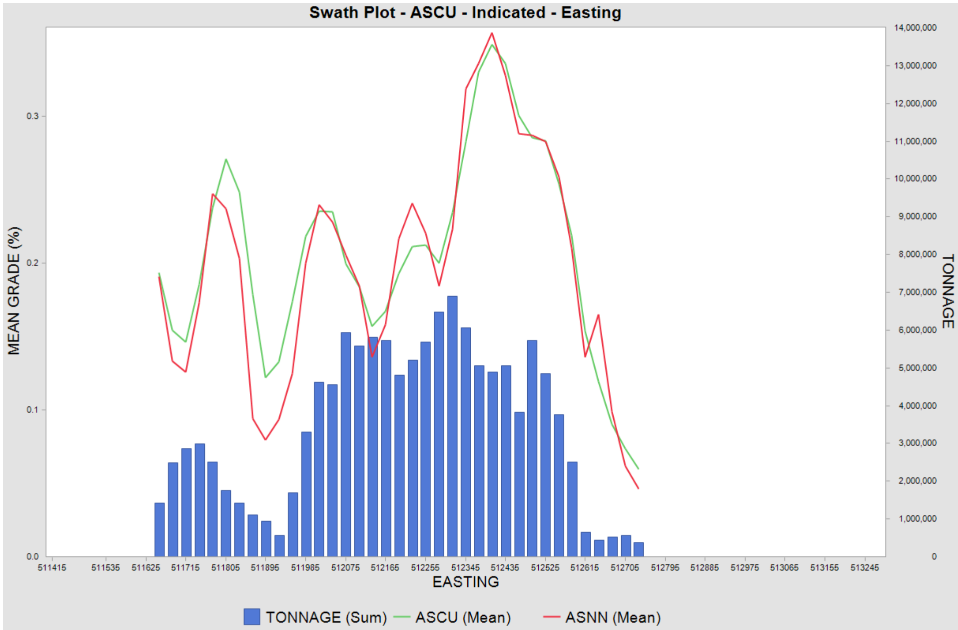
Source: MMTS, 2020

Figure 14-10 Tonnage-Grade Curves for ASCu

14.9.3 Swath Plots

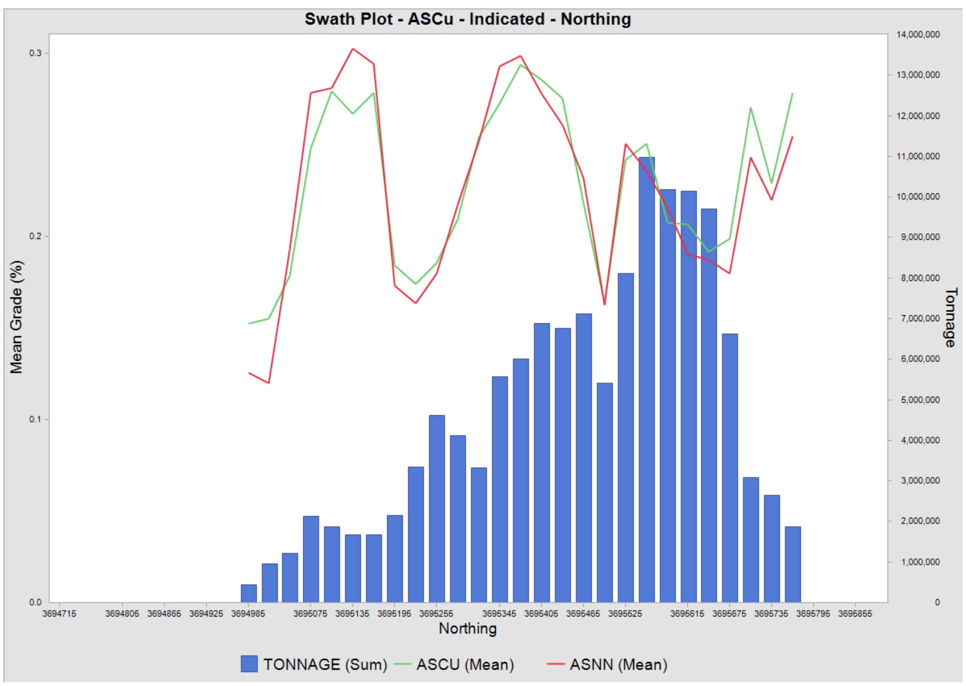
Swath plots by domain have been created in northing, easting, and vertical directions to compare the OK grades, the Nearest Neighbour (NN), and Nearest Neighbor-correct (NNC) grades. Acid Soluble Copper oxide grades (ASCu) are illustrated in Figure 14-11 through Figure 14-13, with total copper (TCu) in the mixed zone plotted in Figure 14-10 through Figure 14-12. The bar graph in each plot indicates the volume of blocks used for the swath plot averaging.

The swath plots indicate no global bias in the kriged values, and good correlation in the main body of the data.



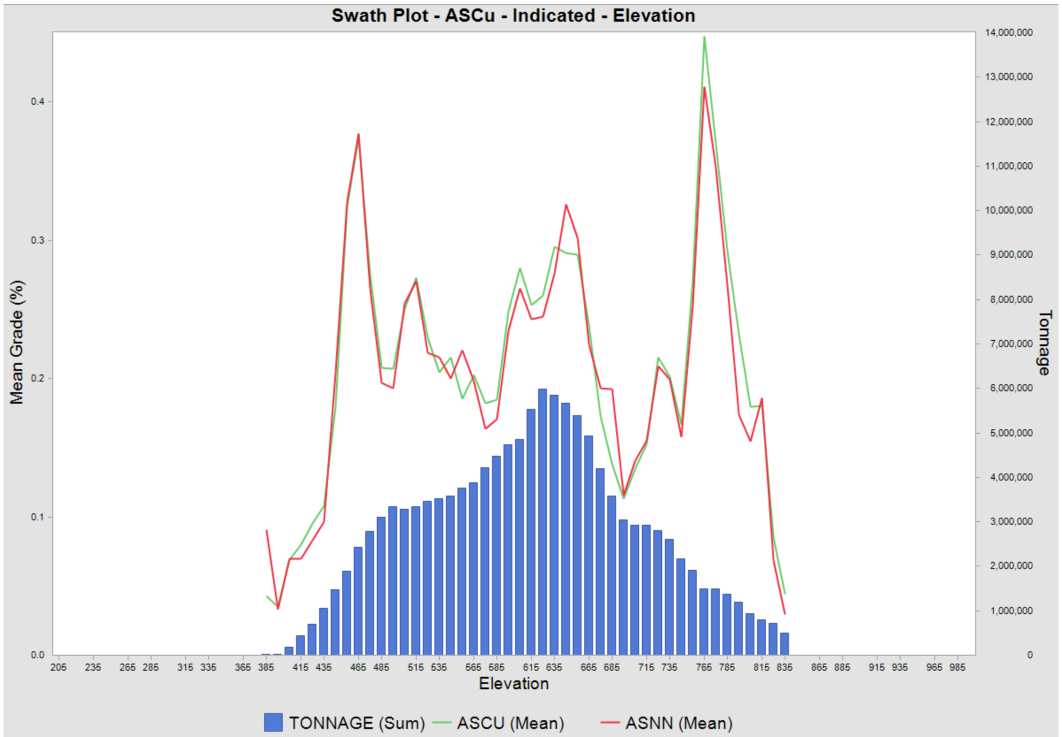
Source: MMTS, 2020

Figure 14-11 Swath Plot by Easting of ASCu



Source: MMTS, 2020

Figure 14-12 Swath Plot by Northing of ASCu



Source: MMTS, 2020

Figure 14-13 Swath Plot by Elevation of ASCu

Visual Validation

A series of E-W, N-S sections (every 30m) and plans (every 10m) corresponding to the block dimensions have been inspected to ensure that the OK interpolation is representative of the original assay data throughout the model. Figure 14-14 through Figure 14-16 are E-W and N-S sections illustrating the block model TSCu grades and assay grades, as well as the mineralized domain solids and Van Dyke fault.

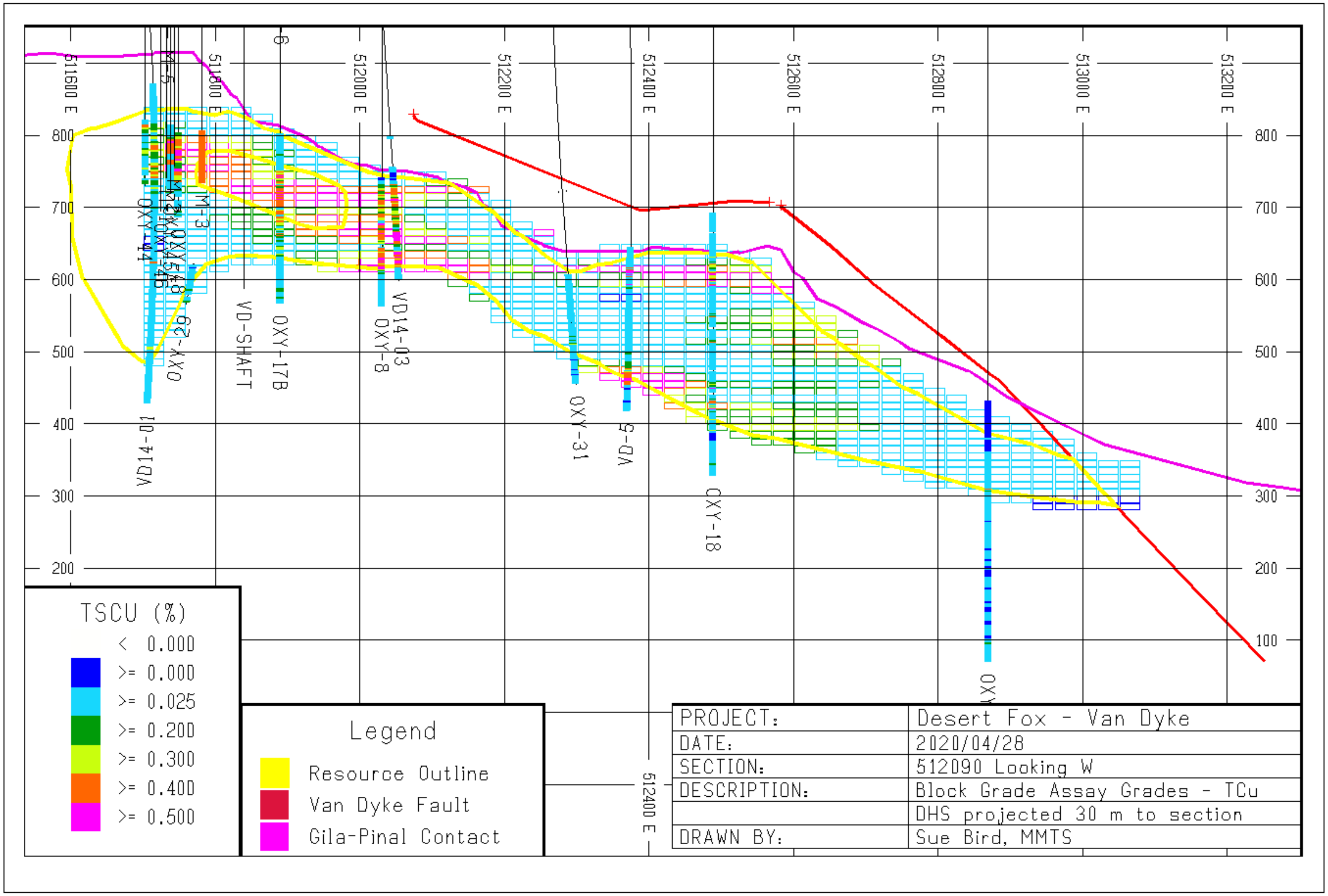


Figure 14-14 Cross-section at 3695650N, Looking North - Model and Assay Grades- TSCu

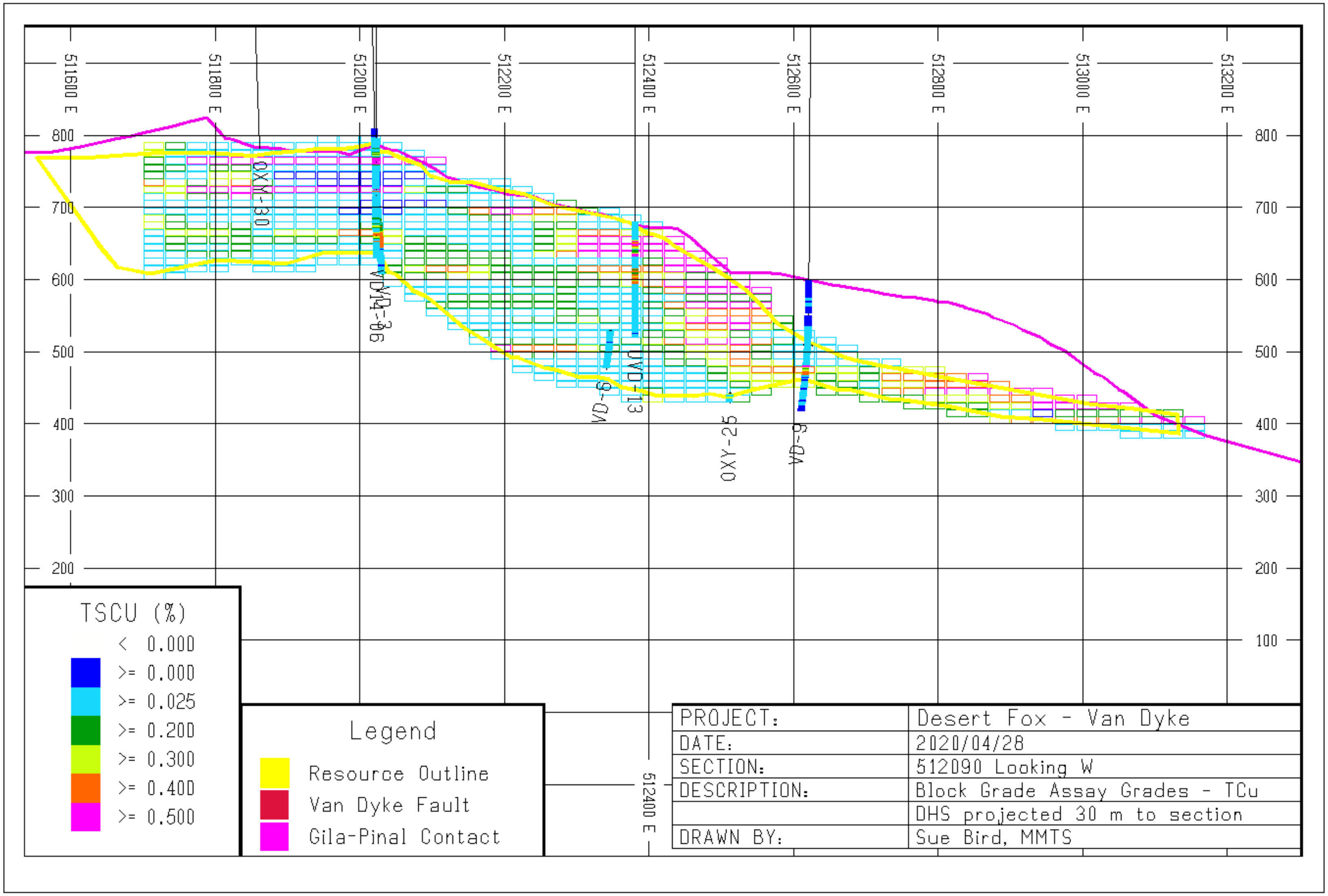


Figure 14-15 Cross-section at 3695400N, Looking North - Model and Assay Grades- TSCu

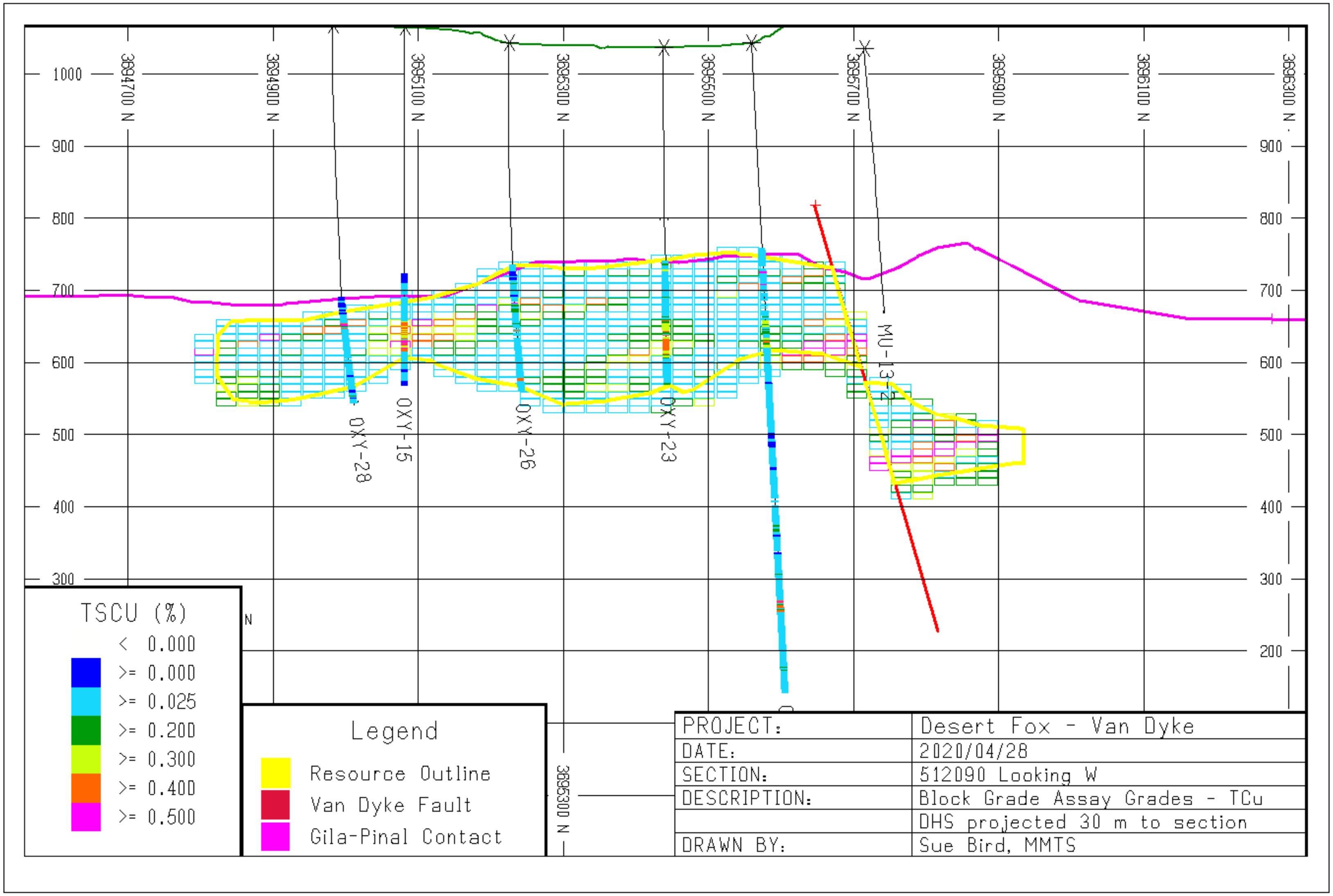


Figure 14-16 Cross-section at 512090E, Looking West - Model and Assay Grades- TSCu

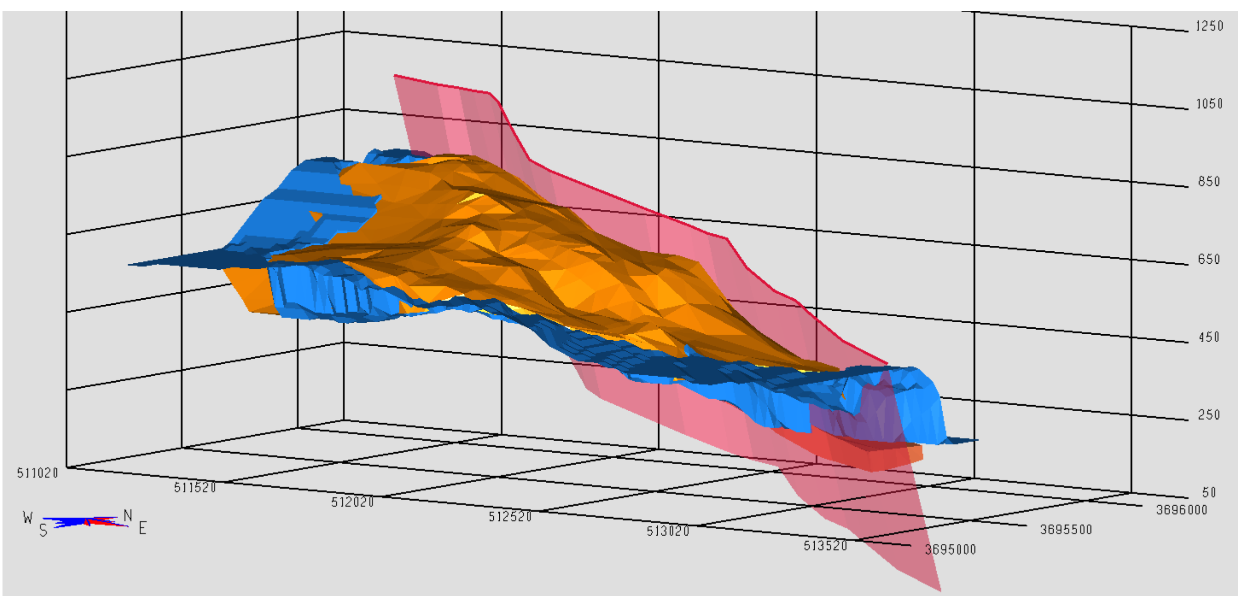
14.9.4 Resource Estimate Confining Shape and Adjustments

For determination of a resource cut-off grade to create the mineralized solid shapes for Van Dyke, MMTS conducted a very preliminary [high level/conceptual] analysis including a review of cost information from similar projects. The following assumptions were used:

- copper price of US$2.80/lb
- employment of in-situ leach extraction methods
- processing costs of US$0.60/lb copper
- an all in operating and sustaining costs of $US 1.25/tonne
- a recovery of 90% for ASCu and variable for CNCu as described below
- an average Specific Gravity of 2.6t/m3.

The metallurgical recovery of 90% is based on the updated metallurgical analyses in Chapter 13 of this report with ASCu recovery of 90% and CNCu estimated to be (CNCu – 0.067)/ CNCu x 100%. To determine the volume of rock within the mineralized solid shapes that is amenable to potential in-situ leach, a series of Lerchs-Grossman "pit" shapes have been created, varying the costs. The Total Recovered Cu was used to calculate the value of the blocks, using the bottom of the Gila Conglomerate as the upper surface, and vertical "pit walls" with the price and cost assumptions listed above.

It was found that the "reasonable prospects of eventual economic extraction" shape was not sensitive to mining costs, and the base case cost of $US 1.25/tonne recovered much of the modelled resource. This is illustrated by the 3D image of the mineralized solid compared to the Lerchs-Grossman shape at the base case assumptions in the Figure 14-17 below.



Source: MMTS, 2020

Figure 14-17 "Reasonable prospects of eventual economic extraction" shape (blue) compared to mineralized solid (orange) with Van Dyke Fault (red)

To account for 12.7 Mlbs of Cu removed during historic mining operations, it has been assumed that all previous mining occurred in the Oxide Zone. The tonnage has been reduced by the amount required to reduce the total resource by the mined amount, with the average grades remaining constant.

A further adjustment to the resource has been made to account for the volume of mineralized material within the Quiet Title area of the deposit. Through research on past titles and claims, it has been determined by Desert Fox that 62% of the material within the Quiet Title boundary may not be recoverable by Desert Fox. Therefore, the resource tonnage within this boundary has been reduced by 38% to give the final tonnage used in the Resource Estimate.

15 Mineral Reserve Estimates

This technical report is a PEA; therefore, reserves are not reported.

16 Mining Method

16.1 General In-situ Copper Recovery

The proposed mining method for copper recovery from the Van Dyke deposit is In-situ Copper Recovery methods (ISCR). ISCR is a proven technology and has been successfully demonstrated in Arizona with Taseko's Florence Copper producing copper cathode beginning in 2019. (Florence Copper, 2019). ISCR has also been commercially evaluated in Arizona at Santa Cruz (1988-1999), Gunnison from 2010 to the present (Excelsior, 2017), as well as historically at the Van Dyke Property.

ISCR has been selected because the Van Dyke deposit is near the town of Miami AZ. Further to this, the fractured nature of the host rock, the presence of saturated joints and fractures within the mineralized zone, and copper mineralization that preferentially occurs along fracture surfaces makes the project a good candidate for ISCR. The technical criteria listed above are based on scoping level assumptions and will need to be quantified and verified in future studies.

The in-situ well field will leach and extract copper from the deposit from a series of wells. The dissolved copper in solution will be pumped to the surface for processing. It is proposed that Solvent Extraction and Electrowinning (SX-EW) be applied where the copper is removed and deposited as copper cathode. Once the copper is extracted, the leachate solution is recirculated in the well field. The final product on site is Grade A copper cathode (99.99% pure) for shipment to the market.

Management of surface and underground water, and control of the leach solutions is paramount to the successful application of this technology and has been demonstrated to be successful at other existing operations. The purpose of this scoping level study is to test the economic viability of an ISCR project using a range of typical values for the above parameters. The results of this study establish where additional data and field testing is required.

16.2 Surface vs Underground In-situ Leaching

A trade-off study was completed as part of the 2015 PEA (MMTS 2015) to compare the viability of different methods of extraction of the Van Dyke oxide copper. The study analyzed various underground mining methods as well as in-situ leaching from surface using directional drilling and drilling from underground development. Due to the grade, depth and location of the deposit, conventional underground methods are deemed inappropriate for the current oxide resource. Therefore, the trade-off study concentrated on in-situ leach options.

Analysis of in-situ leaching included three options, directional drilling from surface, passive drainage from underground galleries, and active pumping from underground. Based on this study, the chosen option is active pumping from underground with wells drilled above the deposit, as the best combination of both lower risk and costs. Below is a summary of each of the three options considered in a trade-off analysis by Schlumberger Water Services (SWS, 2015).

16.2.1 Directional Drilling from Surface

Directionally drilled wells pose the highest cost estimate of the three ISCR methods considered, due to the length and expense per well, and the number of wells estimated for in-situ leaching. Drilling directional wells are believed to be technically feasible given the land holding footprint and depth to the mineralization body. However, there are potential risks with maintenance of the wells and difficulty in providing complete coverage of the deposit (SWS, 2015).

16.2.2 Passive Drainage from Underground

Passive drainage from an underground tunnel is the least expensive option owing to the smaller diameter drainage holes and reduced equipment to collect copper-bearing solution from the formation. This option also requires additional hydrogeologic characterization and analysis to constrain and optimize the design of drainage bays and arrays. This option has not been used in this PEA as a viable option for in-situ mining due to the recognition of potentially poorer recovery than with active pumping.

16.2.3 Active Pumping from Underground

Angled pumping of well arrays from underground galleries above the deposit is considered the best option for ISCR at Van Dyke. This option uses active pumping of injection and recovery wells to maintain a saturated rock mass. Injection and extraction of lixiviant from above, maintains saturation in the mineralization, which increases recovery of copper. Active pumping also maintains a stress field that is more likely to contain and capture pregnant solution than the passive drainage option (SWS, 2015).

16.3 Existing Development

As described in Section 6, there has been historical underground and ISCR mining within and in the immediate vicinity of the current Van Dyke deposit.

Existing development and infrastructure at Van Dyke and the surrounding area is illustrated in the plan map of Figure 16-1. Mining development in the immediate vicinity includes:

- A 520m deep shaft at Van Dyke, completed in 1912 by the Van Dyke Copper Company
- Drifts and stoping at Van Dyke on three levels (1212, 1312 and 1412 levels) with total extraction of 11.85Mlbs of Cu having an average grade of 5% Cu from underground mining
- ISL wells drilled by Occidental from 1976 to 1977 including 2 test wells, a 5-spot pattern of production wells and eight monitoring wells (15 ISL wells total)
- A recovery well intercepting the main drift at the 1312 level, drilled by Kocide in 1987 to recover ISL copper from the underground workings
- A shaft at the adjacent BHP Miami East mine, approximately 500m to the northeast of the Van Dyke shaft
- A portal on the BHP surface rights area, but within Desert Fox's underground rights, adjacent to and connected with the Van Dyke deposit
- An SX/EW plant at the adjacent BHP-Miami East property, currently on care and maintenance
- An open pit, smelter, and rod mill at Freeport-McMoRan's Miami operation adjacent to and just north of the Van Dyke deposit

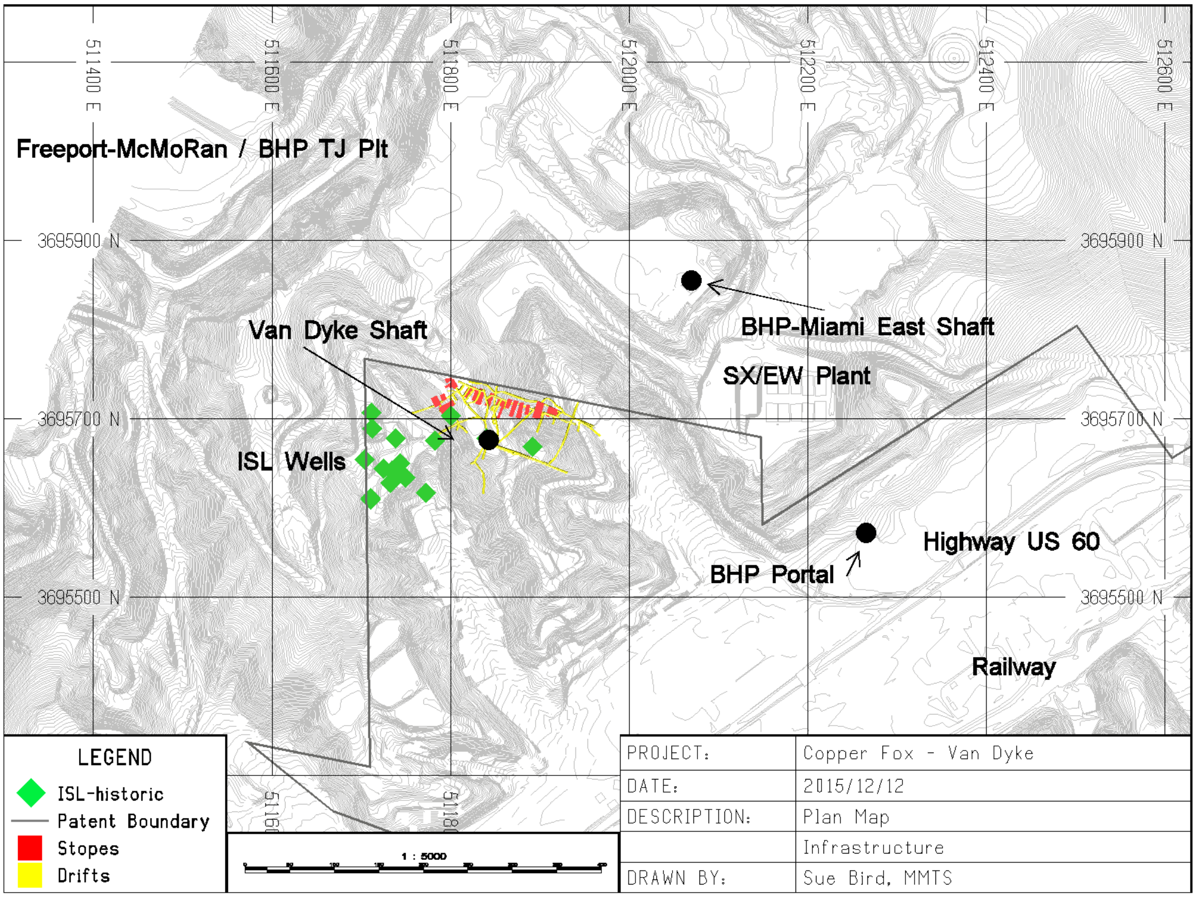


Figure 16-1 Existing Infrastructure

16.4 Geotechnical Parameters for Mine Design

16.4.1 General

Knight Piésold Ltd. has carried out a site investigation to investigate the hydrogeologic and geotechnical parameters of the site (see Appendix B) and has prepared a supporting memorandum which comprises a preliminary assessment of the ground support requirements for the underground development (Knight-Piésold, 2015). The purpose of this assessment is to update PEA level design and costing and to provide recommendations for rock mechanic considerations that will require further investigation during Pre-feasibility and Feasibility Level engineering.

16.4.2 Lithology and Rock Mass Characteristics

The geology at the project area comprises the Gila Conglomerate overlying the Pinal Schist with minor Granodioritic intrusions. West of the Miami East fault, there is Schultze Granite based on regional geology and 2014 drilling of VD14-01 which intersected Schultze Granite at depth. Within the Pinal Schist, Granites and Gila Conglomerate there are breccia zones and landslide breccias, particularly at the contact between the conglomerate and the schist. These in turn are overlain by alluvium up to approximately 30m (100ft) thick within the valley bottom. The primary rock types include:

- Gila Conglomerate
- Pinal Schist
- Granodioritic Intrusions

Data collected during the 2014 Geological and Hydrogeological Site Investigation Program by Knight-Piésold on the 6 holes drilled in 2014, has been used to characterize the rock mass in the vicinity of the proposed underground development. Table 16-1 summarizes the main geotechnical parameters by both the rock type (as logged by Copper Fox geologists), and by the zones as modelled for the Resource Estimate. Based on Bieniawski's 1989 Rock Mass Rating (Bieniawski, 1989) the rock types are categorized as "FAIR", except for the Gila Conglomerate, which is categorized as "POOR". It should be noted that the Gila Conglomerate is a heterogeneous material that has few fractures (0-2 fractures per 10-foot interval), but poor strength of the matrix (Knight- Piésold, 2015a). Additional investigation of this rock type is necessary at the next stage of investigation to better define the rock mass strength of this material for underground development purposes.

Table 16-1 Summary of Geotechnical Parameters by Rock Type and Zone

		Rock Type			Zone (all rock types)		
		Gila Conglomerate	Pinal Schist	Granite	Breccia	Oxide	Mixed Oxide/Sulfide
Number of Samples		**472**	**701**	**118**	**107**	**570**	**324**
RQD	Wtd. Mean	n/a	53.2	52.8	43.8	53.3	43.1
	Wtd. CV	n/a	0.7	0.6	0.8	0.7	0.8
RMR89[1]	Wtd. Mean	30.26	48.61	52.22	43.81	47.92	44.05
	Wtd. CV	0.06	0.25	0.29	0.24	0.27	0.25
FRACTURE SPACING (m)	Wtd. Mean	n/a	0.263	0.285	0.158	0.261	0.186
	Wtd. CV	n/a	1.034	1.062	1.335	1.042	1.375
UCS (MPa)[2]	Wtd. Mean	9.6	26	58.6	20.8	21.6	18.8
	Wtd. CV	0.8	1	0.8	0.7	0.7	0.8

[1] RMR89 – Bieniawski's 1989 Rock Mass Rating. Note that no adjustment for Joint orientation has been made to this average rating.
[2] UCS- the unconfined compressive strength of the intact rock has been estimated in the field based on hardness

16.4.3 Ground Support Recommendations

The following recommendations are based on typical mechanical parameters for rocks in the characteristic ranges above. The proposed underground development will be constructed within the Gila Conglomerate and does not intersect the Van Dyke fault to the north of the deposit. The wells will be drilled from within the Gila Conglomerate into the oxide zone within the Pinal Schist. A three-dimensional view of the proposed ramp, Phase 1 and Phase 2 declines from which the underground galleries for ISCR drilling will emanate, the vent and egress raise to surface, and existing Van Dyke shaft, and how this development relates to the geology is illustrated in Figure 16-2.

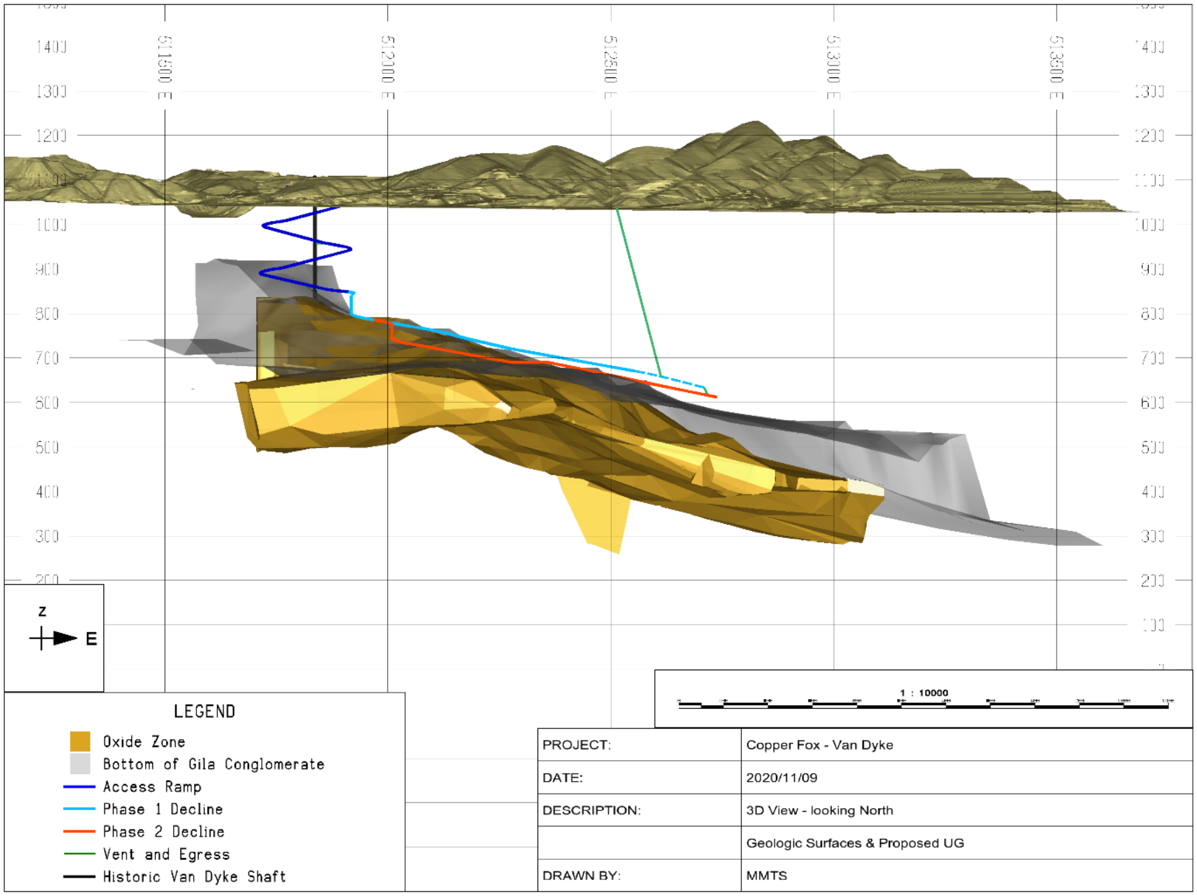


Figure 16-2 Proposed Underground Development as related to Main Geologic Components

In accordance with review by Knight Piésold in 2020 (Mercer and Starzyk, Personal Communication, 2020), the following recommendations are adhered to in this design, and the 2015 ground support and future work recommendations remain appropriate:

- The ramp and drifts are entirely within the Gila Conglomerate;
- The ramp and drifts are 10m away from the Gila-Pinal contact and do not cross it;
- The main drive spans remain within the 4.5m to 6m range.

Gila Conglomerate

The ground support design for the Gila Conglomerate will be controlled by the need to limit ravelling and rock mass deformations. The design concept will be to provide a stiff arch around the periphery of the excavation to control the weak rock mass. The following preliminary ground support recommendations are provided to support PEA level costing:

- An approximately 100mm (4”) thick lining of fibre reinforced shotcrete should be applied to the walls and backs of the heading as soon as practical following mucking. The shotcrete will provide immediate stiff support to the rock mass and to help with collaring the bolt holes.
- Bolts should be installed in the backs and walls of the excavation to further reinforce the rock mass and help the shotcrete manage potential deformations. For these preliminary recommendations, it should be assumed that the bolts are 1.8m (6ft) long on a 1.2m (4ft) square pattern to within 1.5m (5ft) of the invert. Either an MN12 plastic coated Swellex or #6 un-tensioned fully resin grouted dowel are considered appropriate bolt options. It has been assumed that split sets are not an appropriate bolt option given the expected difficulties in maintaining the drillhole diameter within the required tolerances.
- Additional support or alternative support strategies may be required in the following cases:
    - In particularly weak areas, pre-supporting (sub-horizontal forepoling) in advance of the heading to better control ravelling and deformation within the back. Shotcrete on the face of the heading may also be required.
    - If higher load carrying capabilities are required, shotcrete arches (reinforced ribs of shotcrete) could be utilized.
    - Longer bolts in large span areas (e.g., intersections), in the case where there are persistent discontinuities present in the back.
    - Vertical access or ventilation development in the Gila Conglomerate is expected to require a 100mm (4”) fibre-reinforced shotcrete.

16.5 Hydrogeological Characterization

16.5.1 General

Knight Piésold Ltd. has carried out a review of historic groundwater data for the project to develop a conceptual hydrogeological model describing groundwater flow at the site. The purpose of the study is to support PEA level costing and to provide comments on permeability and the groundwater flow regime relevant for the proposed development and provide direction for future investigation. The conceptual model is presented in a technical memorandum dated December 15, 2015 (Knight- Piésold, 2015).

The re-interpreted geology, updated lithology model and revised proposed mine workings were reviewed by Knight Piésold in 2020 (Starzyk and Friedman, 2020), and the conceptual hydrogeologic model and interpretation of groundwater flow from 2015 remain appropriate.

Groundwater data were historically collected at the site in support of underground mining activities and several phases of testing of in-situ leach mining conducted in the late 1970s by Occidental Minerals Corporation (Occidental) and Kocide. The available data includes permeability estimates based on hydraulic testing, water level measurements, and effects of hydraulic fracturing and well stimulation within the mineralized zone. The following key activities and groundwater data collection efforts were conducted by Occidental as part of the historic leach testing:

- Installation of seven production wells and eight monitoring wells
- Hydraulic testing, including water level response tests, packer testing, and a pump test to assess permeability within the mineralized zone at seven wells
- Tracer tests to assess hydraulic connection between production wells

- Downhole geophysical surveys of exploration holes and production wells
- Several phases of leach testing to assess feasibility of in-situ leach technologies. Testing was initially conducted between two wells, Oxy-41 and Oxy-42, and then extended to a 5-spot well pattern. Hydraulic fracturing within the leach interval was conducted at several wells and resulted in a noted improvement in hydraulic connection between wells. Copper recovery by in-situ leaching was successful over a testing period of approximately one year.
- Water level measurements and water quality sampling as part of ongoing monitoring during leach operations

Desert Fox Van Dyke collected groundwater data during a geotechnical site investigation in 2014. Three drillholes instrumented with vibrating wire piezometers and downhole geophysics surveys, including an acoustic televiewer (ATV) survey, were conducted in each drillhole as part of this program.

The following sections describe the key water bearing units and groundwater flow at the site based on the available groundwater data.

16.5.2 Hydrostratigraphic Units/Water-Bearing Units

The following groundwater units are expected to control groundwater flow at the site:

- Alluvium
- Gila Conglomerate
- Gila Clay
- Weathered Pinal Schist
- Pinal Schist, and
- Faults

Alluvium – The alluvial deposit, existing above the Gila Conglomerate, is the primary water bearing unit at the site and considered an aquifer. The unit consists of unconsolidated sand, silt and gravel deposits along the floodplain of Bloody Tanks Wash. The alluvium unit in the vicinity of the Project is less than 30 m thick based on historic drillhole logs (Harshbarger, 1975) and drillholes advanced in 2014 (Knight-Piésold, 2015a4). The unit is approximately 100 to 250 m wide within the Project footprint and widens eastward toward the intersection with Miami Wash. Depth to water in Occidental monitoring wells MW-1 and MW-2 installed in the alluvium aquifer was historically reported to be between 12 and 17 metres below ground surface (mbgs).

The hydraulic conductivity of the alluvium unit is expected to be high and is estimated regionally to be on the order of 10^{-3} m/s (Neaville and Brown, 1994). Historic municipal wells completed in this unit just downstream of the Project were reported to have produced up to 500gpm in the wet season, with a decrease in production (200gpm) in the dry season when water levels declined (Harshbarger, 1971). Water for historic leach operations has been obtained from one of two wells installed in the alluvium aquifer (Huff & Associates, 1988). Several monitoring wells in the groundwater monitoring network for the Pinal Creek WQARF site are installed in the alluvium unit near the Project, and as a result an abundance of groundwater data for the hydrostratigraphic unit are available.

Gila Conglomerate – The conglomerate is a semi-consolidated and consolidated unit with a matrix of clay and silt. The unit ranges in thickness in the immediate project area between 140 and 600m with thickness increasing to the east. Well logs indicate that the conglomerate is not homogeneous throughout its depth and that several lenses likely consisting of water-bearing sand and gravel zones occur at varying depths throughout (Young and Clark, 1978). Instances of lost circulation during drilling in the Gila Conglomerate suggest the presence of local zones of enhanced permeability, such as that noted, between 220 and 260mbgs while drilling at Oxy-41 and Oxy-42 (Jacoby, 1977).

Onsite estimates of hydraulic conductivity of the Gila Conglomerate are limited to tests conducted adjacent to the Miami East fault. The results of this limited testing suggest a hydraulic conductivity in the order of 10^{-9} to 10^{-8} m/s (Harshbarger, 1978). This calculated apparent hydraulic conductivity may be lower than actual conditions due to the proximity of faults to these sites and therefore is not considered representative of the bulk unit in areas located away from the faults. Regional reports describe the Gila Conglomerate in the Miami-Claypool area as having low transmissivity and storage capacity with hydraulic conductivity locally estimated to be less than $5x10^{-7}$m/s (Harshbarger and Associates, 1971). The Gila Conglomerate is described to have increased water bearing potential beyond the Van Dyke project area, with hydraulic conductivity in the Gila Conglomerate ranging from $3x10^{-7}$m/s to $6x10^{-6}$m/s (Young and Clark, 1978; Brown and Favor, 1996). Pumping tests conducted to the east of the Project at wells owned by City Services Corporation and installed in the Gila Conglomerate yielded hydraulic conductivity estimates ranging from $2x10^{-7}$ to $1x10^{-6}$m/s (Envirologic Systems Inc., 1981).

The Gila Conglomerate is cut by several major and small faults that are expected to have a strong effect on impeding and directing groundwater flow (Young and Clark, 1978). Groundwater flow within the unit is expected to be focused within fracture zones and more permeable lenses.

Gila Clay – Swelling (hematitic) clays may be present in and at the contact of the Gila Conglomerate and the Pinal Schist. Clay deposits are inferred to be of lower permeability. The clay was encountered at the location of the 5-spot wells installed for the historic leach testing conducted by Occidental as a 40m thick clay unit (Moon and Axen, 1980). A clay layer is noted in 2014 drillholes at the base of the Gila Conglomerate that is up to 0.3m thick (Knight Piésold, 2014). Where present, the Gila Clay is expected to serve as an aquitard and limit vertical groundwater flow between the Gila Conglomerate and the underlying bedrock. Therefore, it is expected to act as a barrier between the ISCR operation and the overlying Gila Conglomerate.

Weathered Pinal Schist – A weathered zone at the top of Pinal Schist has potential to have a higher permeability than the underlying schist and serve as a preferential groundwater flow pathway. Estimates of hydraulic conductivity were not encountered during review of historic data, but circulation losses were reported in this unit during drilling at several locations. Where present, the weathered zone may be up to 20m thick based on descriptions provided on geotechnical logs from 2014 drillholes (Knight Piésold, 2014) and notes from geophysical logging conducted on the historic Occidental production wells and monitoring wells (Harshbarger, 1971).

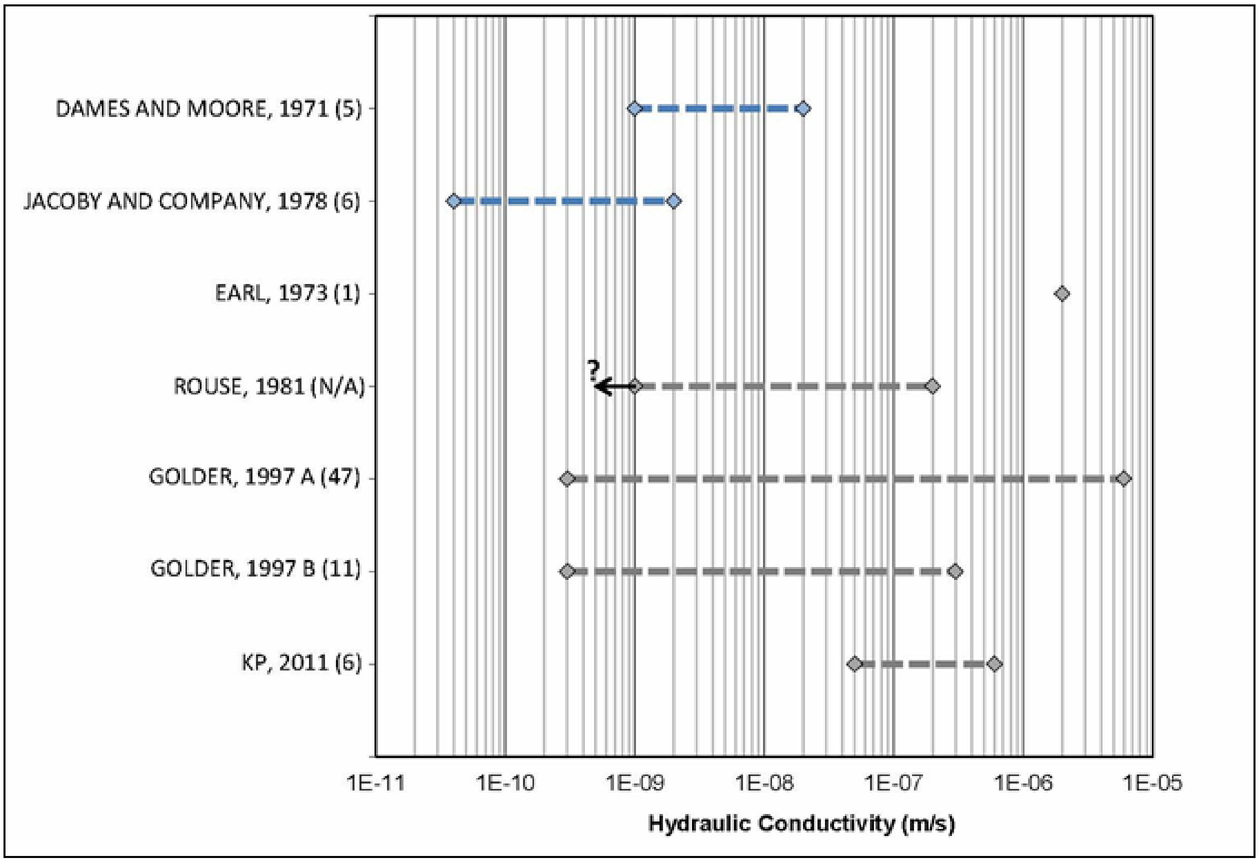
Monitoring well M-1 was installed in the weathered schist zone to monitor water level conditions during historic leach testing. An increase in water level was reported in the well concurrent with solution injection, which suggests that hydraulic connection may have existed between the leached interval and the weathered interval and that fluid may have been lost to the weathered zone (Harshbarger, 1979; Walters, 1979 and 1980). Results of groundwater sampling suggested that water quality remained unchanged at the well.

Pinal Schist –The unit is extensively faulted and is highly fractured with an RQD of 53% and Fracture Spacing of 0.26m, based on drill logging. Fractures within the Pinal Schist range from 4 to 10 fractures per 3 m interval (Fracture Spacing of 0.3 to 0.75) based on Acoustic Televiewer Survey data (Knight Piésold, 2014). The Pinal Schist is a low permeability unit with groundwater flow limited to fractured zones (Young and Clark, 1978). Primary porosity of the unit is sealed off by intense silicification (Jacoby, 1978) and secondary porosity (i.e., fractures) is infilled with mineralization.

Permeability testing carried out within the Pinal Schist at the site is mostly limited to the area near the Van Dyke Shaft where historic leach testing was conducted. The range of values from permeability testing conducted onsite in the Pinal Schist is presented in Table 16-1 and on Source: *Knight-Piésold, 2020*
Figure 16-3. The site data suggests a typical range of permeability values centered between 10^{-9} to 10^{-8}m/s. Since the available test results are focused within a small area of the Project, they may not characterize the variability of permeability that exists across the site. Regional estimates of permeability in the Pinal Schist based on testing conducted at nearby properties and regional studies are provided in Table 16-1 and Figure 16-3 for comparison with onsite values. In general, permeability values at the adjacent sites (Miami and Copper Cities) have a higher upper range of values than the results of onsite testing.

Hydraulic fracturing, inducing fractures in the bedrock by injecting water into a drillhole at a pressure that exceeds the critical formation pressure of the rock, was successfully conducted during historic leach testing by injecting to a bottom hole pressure of between 0.8 to 1.3psi/ft depth (Dames and Moore, 1971). Hydraulic testing conducted after inducing fractures in the Pinal Schist suggests that hydraulic connection between wells was achieved and that the effective permeability of the bedrock between the injection and recovery wells was between $2x10^{-9}$m/s and $5x10^{-7}$m/s (0.15 and 50 millidarcies (md); Szyprowski, 1977; Poollen, 1979; Walters, 1980). Copper recovery using in-situ leaching techniques was successful following hydraulic fracturing of several production wells at the Van Dyke project. It should be noted that the historic ISCR wells had a larger distance from injection to recovery wells than the average distance for the current PEA plan.

Faults – Faults at the project site contain gouge and are generally expected to act as barriers to groundwater flow perpendicular to the fault. Faults can be expected to act as preferential pathways for groundwater flow along strike. Post-mineralization faults within the Gila Conglomerate may serve as conduits for flow. One such fault, the Eureka Fault, is suspect to provide a source of groundwater inflows to the Van Dyke shaft at the 300 level (Golder, 1997). Several secondary faults exist at the site in addition to the primary faults.



Source: Knight-Piésold, 2020

Figure 16-3 Range of Hydraulic Conductivity Values in the Pinal Schist

NOTES:

1. *BLUE LINES REPRESENT HYDRAULIC CONDUCTIVITY ESTIMATES FROM TESTING CONDUCTED ONSITE IN THE PINAL SCHIST AND GREY LINES REPRESENT REGIONAL ESTIMATES.*
2. *INFORMATION ON HYDRAULIC CONDUCTIVITY ESTIMATE FOR EACH REFERENCE PROVIDED IN TABLE 16-1.*
3. *VALUES IN BRACKETS REPRESENT THE NUMBER OF TESTS/ANALYIS. N/A INDICATES THE NUMBER OF TESTS IS NOT AVAILABLE.*
4. *GOLDER 1997A IS THE RANGE OF HYDRAULIC CONDUCTIVITY VALUES FOR TESTS CONDUCTED WITHIN 12 m (40 FEET) OF THE TOP OF THE PINAL SCHIST AND ARE LIKELY REPRESENTATIVE OF WEATHERED BEDROCK CONDITIONS. GOLDER 1997B IS THE RANGE OF VALUES FOR TESTS CONDUCTED AT A DEPTH GREATER THAN 12 m BELOW THE TOP OF THE SCHIST UNIT.*
5. *DATA FROM EARL, 1973 AND ROUSE, 1981 WAS PRESENTED IN BROWN AND FAVOR, 1996.*

Table 16-1 Hydraulic Conductivity in Pinal Schist

SUMMARY OF HYDRAULIC CONDUCTIVITY VALUES IN PINAL SCHIST

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SOURCE	LOCATION	TEST OR ANALYSIS METHOD	NUMBER OF TESTS	HYDRAULIC CONDUCTIVITY OF PINAL SCHIST (m/s)	NOTES
VAN DYKE SITE DATA					
DAMES AND MOORE, 1971	OXY-16B	PACKER TESTING	5	<2E-9 to 2E-8	
JACOBY AND COMPANY, 1977	OXY-41, OXY-42	INFILTRATION TESTS	2	NEGLIGIBLE [1]	TIGHT FORMATION, WOULD NOT ACCEPT FLUID WHEN WELLS FILLED WITH WATER
JACOBY AND COMPANY, 1978	5-SPOT WELLS (OXY-44, OXY-45A, OXY-46, OXY-48); MONITORING WELLS M-3 AND M-4	INFILTRATION AND RECOVERY TESTS	6	4E-11 to 2E-9 [2]	
REGIONAL DATA					
KP, 2011 [3]	CONFIDENTIAL	PACKER TESTING	6	5E-8 to 6E-7	
GOLDER, 1997 [4]	CYPRUS MIAMI MINE	N/A [5]	47	3E-10 to 6E-6	UPPER 12 m (40 FEET) OF PINAL SCHIST, LIKELY REPRESENTATIVE OF WEATHERED BEDROCK UNIT
	CYPRUS MIAMI MINE	N/A	11	3E-10 to 3E-7	RESULT OF TESTS CONDUCTED MORE THAN BELOW 12 m (40 FEET) BELOW TOP OF UNIT
BROWN AND FAVOR, 1996	CYPRUS MINE, OXHIDE PIT	PACKER TESTING	N/A	NEGLIGIBLE TO 2E-7 [6]	VALUES FROM LOWER OXHIDE PIT (REFERENCE ROUSE, 1981)
	COPPER CITIES MINE, SLEEPING BEAUTY PIT	FLOW NET ANALYSIS	1	2E-06 [6]	FRACTURED BEDROCK IN PIT (REFERENCE EARL, 1973)
	REGIONAL	-	-	-	"GROUNDWATER IN ROCKS OF PRECAMBRIAN TO TERTIARY AGE IS RESTRICTED TO INTENSELY FRACTURED AND (OR) FAULTED AREAS. ELSEWHERE, THESE ROCKS ARE IMPERMEABLE"
HAZEN AND TURNER, 1946	REGIONAL	-	-	-	"UNIT IS NOT SUFFICIENTLY POROUS OR PERMEABLE TO STORE OR TRANSMIT GROUNDWATER TO LOWER ELEVATIONS"

\\knightPiésold.local\VA-Prj$\1\01\00565\05\A\Correspondence\VA15-03565 Van Dyke - Conceptual Hydrogeologic Model\Table\[PEA Table 16-1 -Pinal Schist Permeability.xlsx]Table 1 - Pinal Permeability

NOTES:

1. QUANTITATIVE VALUE NOT PROVIDED.

2. VALUES PROVIDED IN PERMEABILITY UNITS OF MILLIDARCIES (md) AND CONVERTED TO HYDRAULIC CONDUCTIVITY (m/s) USING 1 md = 1X10-8 m/s.

3. CONFIDENTIAL PROJECT IN GILA COUNTY. DATA NOT PUBLICALLY AVAILABLE.

4. VALUES PROVIDED IN TABLE II-6.2.1-2 AND FIGURE II-6.2.9-1 OF REPORT. A DISCUSSION OF THE TESTING METHODS WAS NOT IN THE DOCUMENT SECTIONS AVAILABLE FOR REVIEW.

5. N/A = NOT AVAILABLE.

6. VALUES ARE FOR CRYSTALLINE ROCK.

16.5.3 Groundwater Occurrence and Flow

The Project is located within a dry environment; therefore, average annual groundwater recharge is expected to be low and limited to the wet season. Recharge in the regional Salt River Basin (in which the project is located) is 10 to 20mm/year (Arizona Department of Water Resources, 2009. The surface water drainage at the project site, Bloody Tanks Wash, is an ephemeral stream reach that only flows in response to rainfall. When flowing, infiltration of surface water from the Bloody Tanks Wash will recharge the groundwater system. Groundwater from the alluvial aquifer may discharge to the wash during wet periods.

The water table at the site is in the alluvium unit or in the Gila Conglomerate where the alluvium unit is not present. The elevation of the water table is generally between 1020masl and 1040masl and generally ranges from 15 mbgs within the alluvium to 100mbgs near the Van Dyke shaft. The Van Dyke Oxide Resource is located several 100m below the water table and is fully saturated.

Groundwater level data are available at three drillholes that had vibrating wire sensors installed in 2014 (Knight Piésold, 2014). Five vibrating wire sensors were installed in each drillhole at depths ranging from 145 to 568mbgs. Piezometric heads reported at the sensors range from 1,030masl in the alluvium at Bloody Tanks Wash to 960masl at deeper sensors located in the Pinal Schist. The water level data at the vibrating wires indicates the shallow groundwater flow direction (145m – 167m) is to the east/northeast and groundwater flow at depth is toward the north. The vibrating wire piezometer data indicates the vertical direction of groundwater flow is primarily downward at a gradient of approximately 0.1 to 0.2m/m. A negligible or slightly upward hydraulic gradient is only observed between the uppermost sensors at drillhole VD14-02. These relatively deep bedrock groundwater levels and the variety of vertical gradients near the wash are indications that the groundwater flow regime is significantly influenced by the presence of the nearby mine workings. The elevation of the water level in the TJ Pit during a site visit in 2015 was 983 masl (3,225 ft asl). This water level is significantly lower than the water level in the alluvium (approximately 1,020 masl), and suggests the open pit likely influences groundwater flow directions at the site by acting as a sink.

Information on groundwater flow directions in the area is available from historic groundwater reports compiled using water level measurements in monitoring wells at adjacent properties (Golder, 1997; Montgomery Watson Harza, 2003). These reports show a groundwater flow direction within the alluvium unit that is toward the northeast and parallel to the Bloody Tanks Wash drainage. The groundwater flow direction within the Gila Conglomerate is similarly reported to follow topography and flows toward Bloody Tanks Wash, except where influenced by two groundwater sinks that exist on the neighbouring mining properties. The first sink is created by Freeport-McMoRan/BHP's joint open pit (the TJ Pit) and active in-situ leach in a block-caved section of the Pinal Schist located north of the Van Dyke shaft. The second notable hydraulic sink is the No. 5 shaft of BHP's Miami East mine, which is hydraulically connected to the first sink by shafts and tunnels where ongoing pumping is reported to maintain the depressed water level below the Gila Conglomerate (see Figure 16-1 for pit and shaft locations; Golder, 1997). Under the influence of these two sinks, groundwater flow in the vicinity of the Van Dyke shaft is expected to be northwest toward the open pit, northeast toward the No.5 shaft, and southeast toward Bloody Tanks Wash.

Historic underground workings are located within the north-western extent of the Van Dyke Oxide Resource and within the adjacent BHP property and these open tunnels will be preferential pathways for water flow. Historic underground drifts on the Van Dyke property were advanced to approximately 700 masl (1412 level) and the bottom of the No. 5 shaft extends to an elevation of 75 masl (250 ft asl; Golder, 1997). A drift connects the Van Dyke shaft with the No. 5 shaft of the Miami East mine at the 1120 level (790 masl. The difference in water levels measured recently in the two shafts suggests the drift is currently sealed.

Additional permeability testing is recommended to optimize the potential ISCR operation at Van Dyke. Historic testing was constrained to a small area near the Van Dyke shaft and future testing should be conducted across the project site to evaluate the variability of hydrogeological conditions.

16.6 Mine Plan

The mine plan is divided into two phases which benefits the cash flow, as detailed later in this report. Phase 1 consists of approximately 60% of the total underground development required for access before copper production can commence and is treated as Initial Capital. Phase 2 development, occurring after copper production has commenced, is considered sustaining capital. Both the development and production phases are discussed in the following sections.

16.6.1 Mine Development Plan

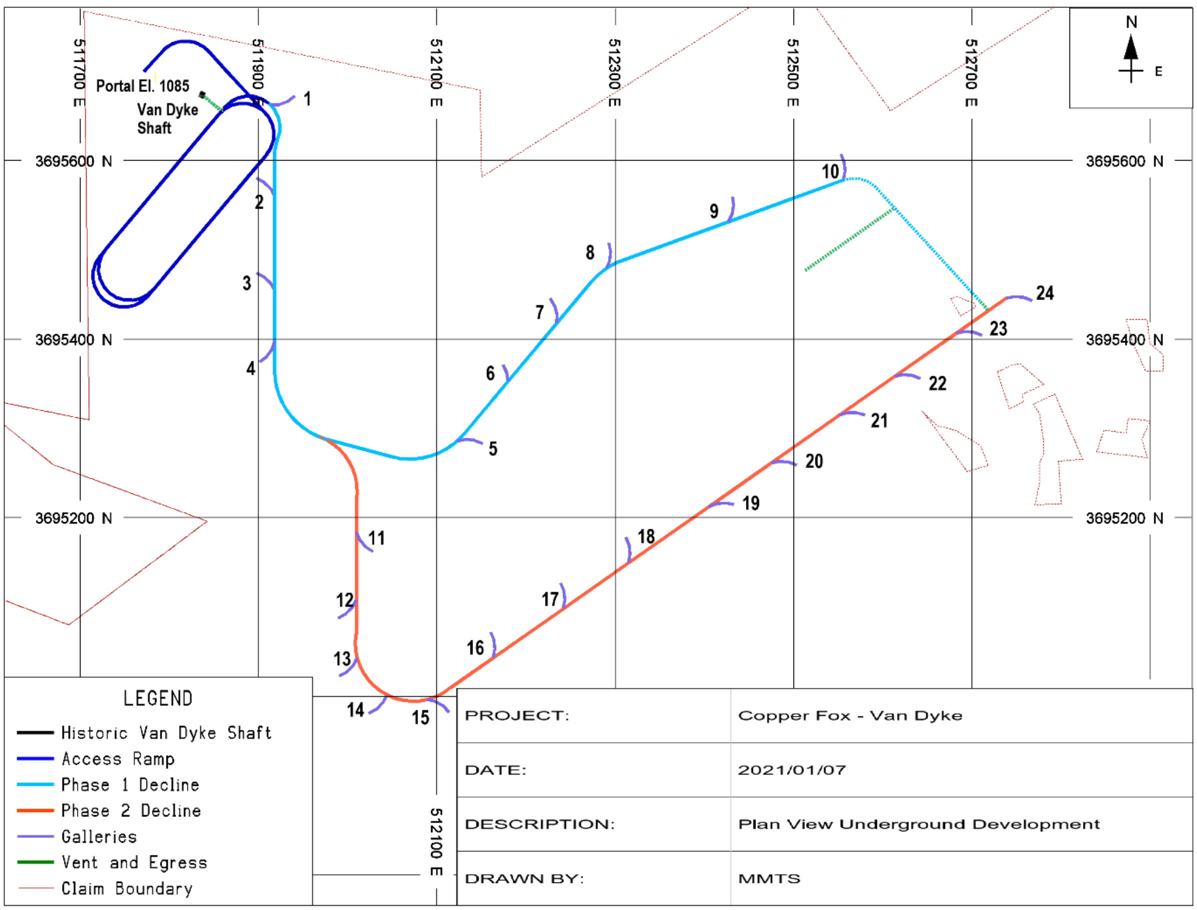
The mine development plan comprises an access ramp from surface for mobile equipment, two declines for access to the production galleries, gallery development within the targeted production zones, and service and ventilation facilities. The excavations, with length, dimension and shape are summarized in Table 16-2.

Table 16-2 Van Dyke Underground Development Summary

Excavation Type	Qty	Length (m)	Dimensions	Shape	Total Length (m)
Main Access Ramp to Portal	1	1,456	4.6m W x 4.6m H	Arch (wall 3.1m)	1,456
Vents/ Access from Ramp to Van Dyke shaft	2	15	3.6m W x 3.6 m H	Flat	30
Phase 1 Decline	1	1,141	4.6m W x 4.6m H	Arch (wall 3.1m)	1,141
Phase 1 Vent/Egress Decline	1	216	3.6m W x 3.6 m H	Flat	216
Vent/Egress Raise	1	401	3.0m dia	Bore	401
Galleries	10	74	6.1m W x 6.1m H	Arch (wall 4.6m)	740
Phase 1 Total Excavation					**3984**
Phase 2 Decline	1	1,173	4.6m W x 4.6m H	Arch (wall 3.1m)	1,173
Phase 2 Vent/Egress way	1	23	2.0 m x 2.0 m	Flat	23
Galleries	14	54	6.1m W x 6.1m H	Arch (wall 4.6m)	756
Phase 2 Total Excavation					**1,952**
Combined Total Excavation					**5,936**

All underground development is carried out using conventional drill and blast tunneling techniques with mechanized equipment. Appropriate ground support has been estimated at a scoping study level of detail, according to the Knight Piésold criteria based on ground conditions and size of openings.

Figure 16-4 shows the underground development with production following the numerical order of the galleries.



Source: MMTS, 2020

Figure 16-4 Van Dyke Underground Development Plan

The portal will be collared northwest of the Van Dyke Shaft at the 1,085m elevation, and the Main Access ramp (dark blue) will be driven at a 17% grade to the beginning of the Phase 1 Decline (turquoise) elevation of 849m. From there, the Phase 1 Decline descends at grade no more than 17% with 10 galleries (purple) extending level off the decline. At the end of the main Phase 1 Decline at elevation 670, gallery 10 branches off to the north and the Phase 1 Egress/Vent Decline (dashed turquoise line) continues to the southeast at 17%, ending at elevation 634. The ventilation shaft will be driven by raisebore method to surface at a 72° dip and is to be fitted with a ladder for secondary egress. The Phase 2 Decline (red) branches off the Phase 1 Decline and descends at no more than 17% from elevation 786m to 612m. A short egress way (green) connects the Phase 2 Decline to the Phase 1 Egress/Vent Decline at 53°.

16.6.2 Contractor Mining Services

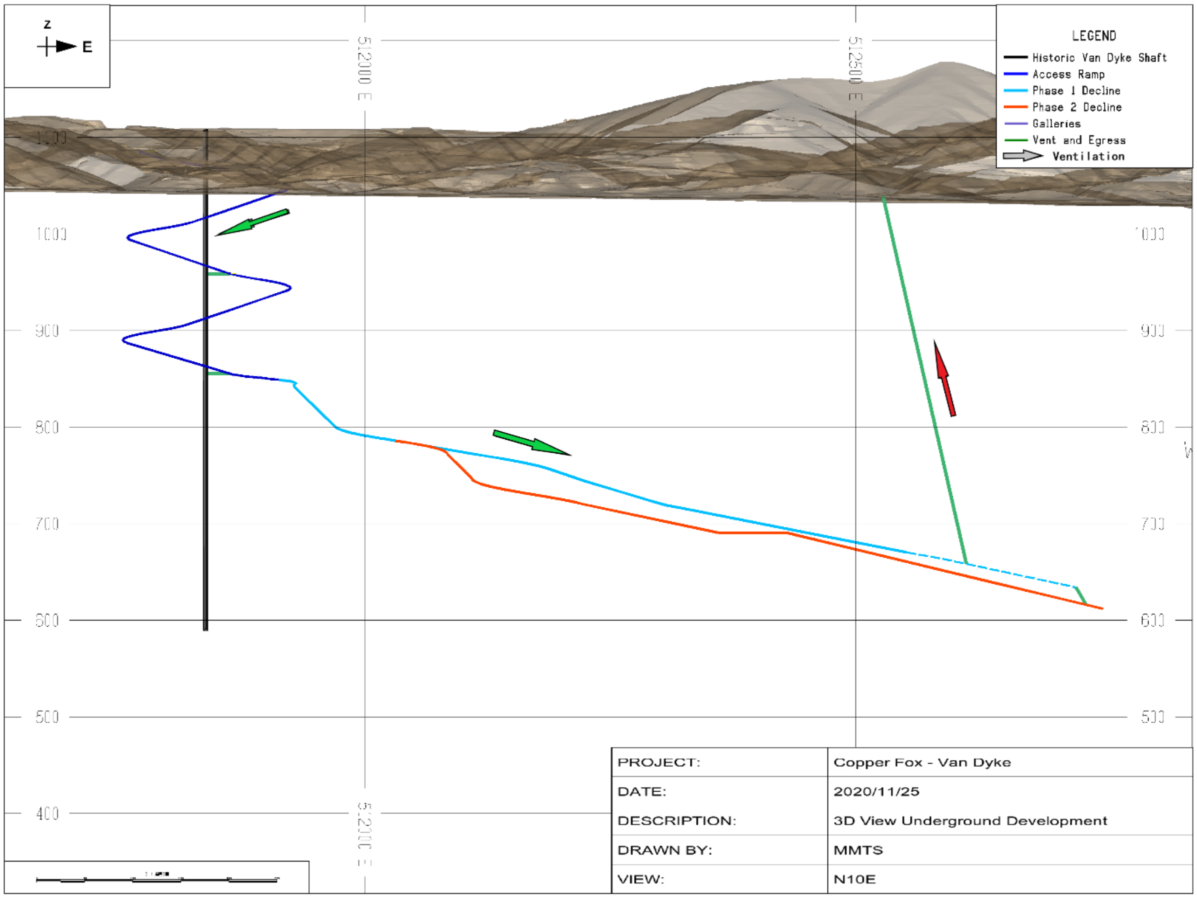
Over 60% of the underground development is completed during preproduction. It is deemed that contractor mining service is the most cost-effective manner to carry out the development. The contractor will provide all operating labour, maintenance labour and supervision as well as all mobile and stationary equipment.

After completion of Phase 1, the contractor will demobilize, and remove most of the mobile equipment except for a service truck, personnel carrier, rock bolter and small scooptram, which will be used for operations. Stationary equipment comprising ventilation fans, compressors and dewatering pumps will also be left underground for the operations phase.

For Phase 2, the contractor will remobilize all the equipment required to complete development and then demobilize in the same manner as in Phase 1.

16.6.3 Ventilation

The primary ventilation elements are the portal, the Van Dyke shaft and a fresh air raise, which are illustrated in Figure 16-5.



Source: MMTS, 2020

Figure 16-5 Van Dyke Underground Longitudinal View with Ventilation

Initial ramp development will be with a fan at the portal providing forced air to the face. As the ramp passes the Van Dyke shaft, a crosscut will be driven to the shaft at the 959m to use it as a fresh air source. This will happen again with a second crosscut at the 855m level. Bulkheads will be constructed as required to direct the flow.

A permanent ventilation circuit will be established once the Phase 1 decline is finished. From this point, a fresh air raise will be driven to surface by raisebore method. The raise will also act as a means of secondary egress and as such will be equipped with a ladderway. The primary circuit therefore will comprise the main ramp providing fresh air through the Phase 1 decline, past the galleries and through the raise to bring exhaust air to surface. The galleries will be ventilated by auxiliary fans intercepting the fresh air flow in the decline. The Van Dyke shaft will then be completely isolated from the primary ventilation circuit although can easily be accessed if needed as a third route of egress.

For Phase 2, the decline will be ventilated using forced air with a fan located at the intersection of the Phase 1 and Phase 2 declines. Booster fans will be required as the decline advances. At the end of the decline, to establish permanent ventilation, a conventional raise will be driven to connect with the Phase 1 raise.

During development, as much as 60,000CFMs of ventilating air will be required. Once into operations, only 25,000CFMs will be needed.

16.6.4 Underground Development Schedule

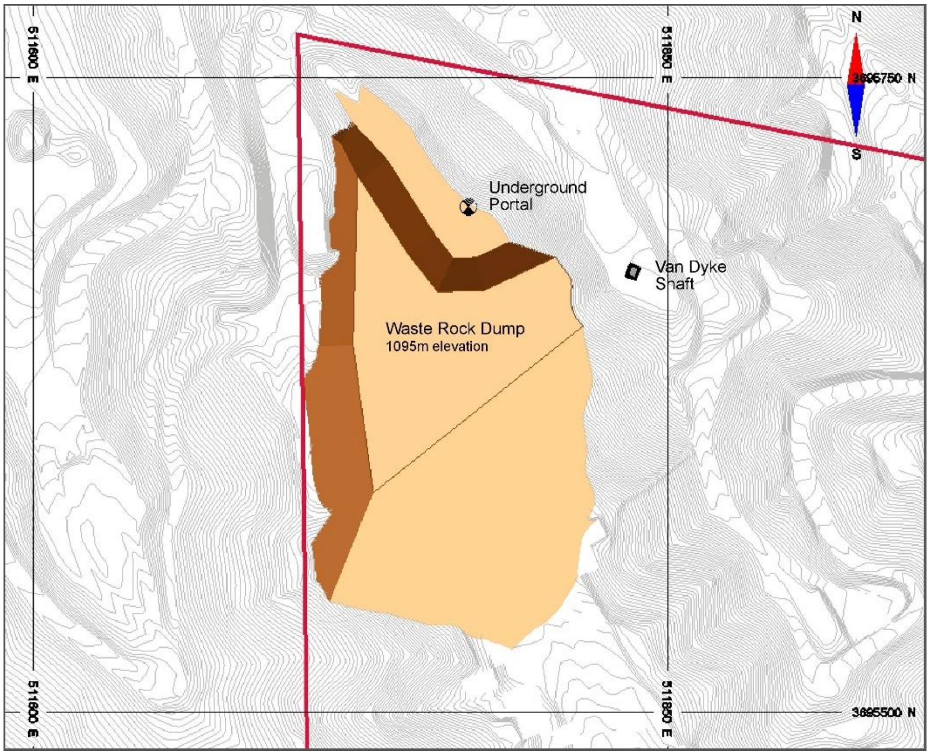
Mobilization of contractor underground crews and equipment commences midway through Year -2 through to demobilization at the end of Year -1. Crews have been generally scheduled to complete 5m/day in the main access ramp once full productivity has been reached and 8 m/day once multiple faces are available. All development will be carried out by crews working 11hour shifts, two shifts per day. After four weeks on site, crews will be sent out and replaced by a team of fresh workers. The contractor will need three crews when working at full productivity levels, two of which will be on site at any one time, with the third crew on days off. The contractor's crew at peak development labor is shown in Table 16-3.

Table 16-3 Contractor Labour Requirements per Crew

	Project Labour	On Site
Indirect	Project Superintendent	1
	Night Captain	1
	Safety Superintendent	1
	Project Engineer	1
	Purchaser/Clerk	1
	Lead Mechanic	1
	Mechanics	2
	Electrician	1
Direct	Shift Bosses	2
	Jumbo Operators	2
	Bolter Operators	2
	Scooptram Operators	2
	Truck Operators	2
	Raise Miners	2
	Nippers	2
	Total:	**23**

16.6.5 Mining Waste Rock

The underground development will produce roughly 190,000 m^3 of waste rock. All waste rock will be stored in the valley directly adjacent to the portal as shown in Figure 16-6. The waste rock dump will be built in lifts with an overall slope of 26 degrees. Funds are set aside to reclaim the rock pile at the end of the mine life (see Section 20).



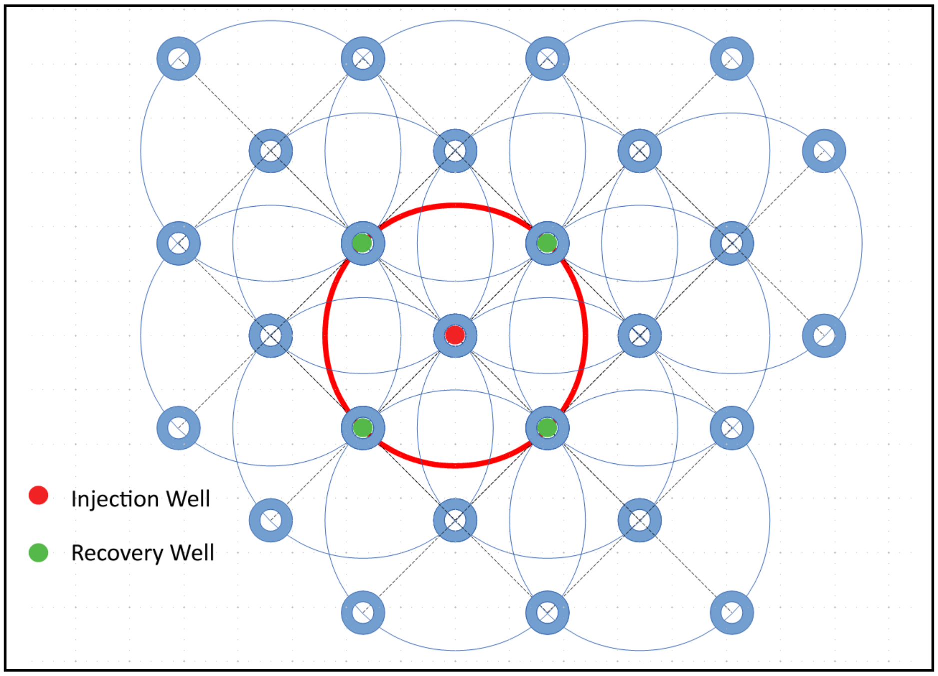
Source: MMTS, 2020

Figure 16-6 Van Dyke Waste Rock Dump (claim boundary in red)

16.7 ISCR Production - Well Field Design

In-situ leaching of the oxide resource at Van Dyke is proposed to occur by an injection and recovery well system from underground galleries located just above the oxide deposit, within the Gila Conglomerate. Injection wells will deliver the leachate to the oxide zone, with recovery wells then transporting the dissolved copper in solution to the SX/EW plant at surface.

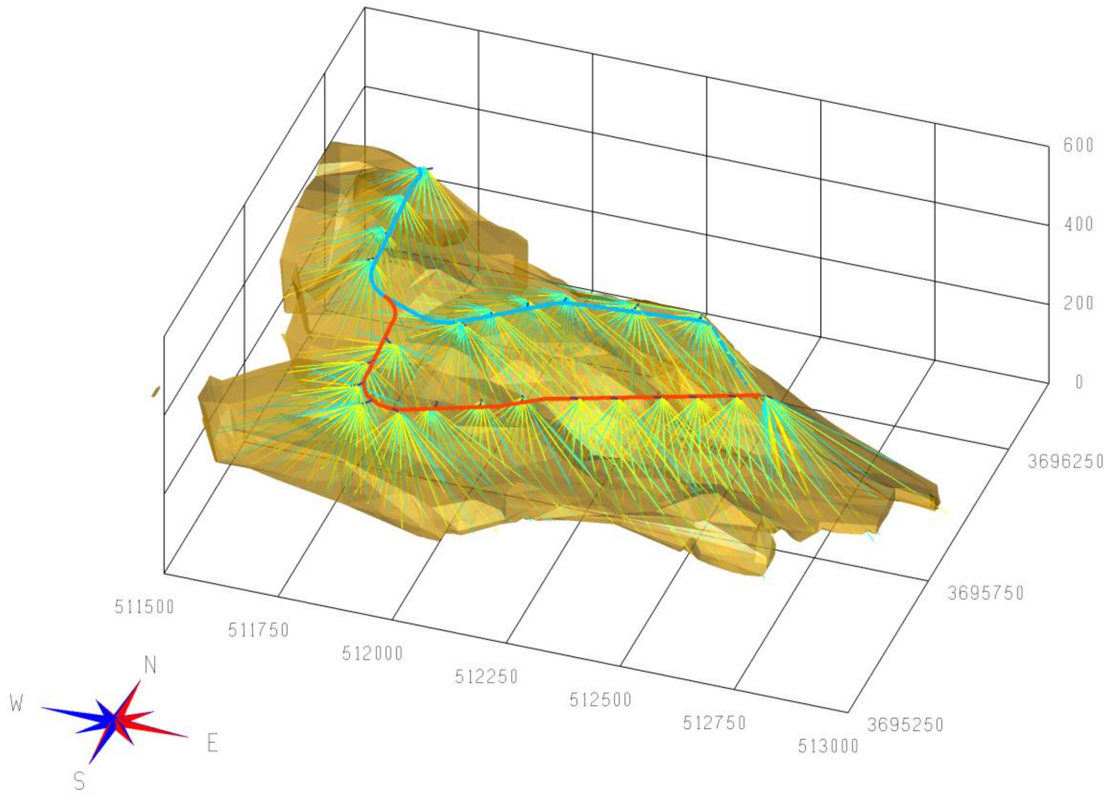
The well holes will be drilled in angled fan patterns from underground galleries and follow an approximate 5-spot pattern with four recovery wells surrounding a single injection well in a repeating pattern, with the average distance between injection and recovery wells designed to be 21m. The idealized 5-spot pattern for vertical parallel holes is illustrated in Figure 16-7.



Source: MMTS 2015

Figure 16-7 5-Spot Well Configuration

Angled drillholes from the underground galleries will access the deposit as demonstrated in Figure 16-8, where the injection wells are shown in yellow, recovery wells in turquoise, the Phase 1 decline in blue, the Phase 2 decline in red, and the galleries in dark blue. For clarity, this figure does not show all wells that are currently estimated to be necessary for recovery.



Source: MMTS, 2020

Figure 16-8 Van Dyke Deposit Showing Proposed Declines and ISCR Wells (injection in yellow, recovery in turquoise)

Table 16-4 gives the total estimated number of wells for recovery along with average length by phase. The number of wells is designed to target an average distance between segments within the deposit of 21m and approximates the well density of the Florence project of 455m^3/m of well length. It is expected that future investigation including hydraulic characterization based on in-situ testing and permeability enhancement will provide better estimates of the number of wells anticipated.

Table 16-4 Van Dyke Proposed Number of ISCR Wells and Average Length

Phase	Number of Wells	Average Length (m)
Phase 1	960	227
Phase 2	965	233
Total	**1,925**	**230**

16.7.1 Well Design and Construction

Well construction details will meet the criteria of the Arizona Department of Environmental quality (ADEQ) for the Pinal Creek WQARF zone. Injection wells must also be constructed to meet well design criteria specified by the EPA's UIC regulation group for Class III wells. Class III wells are wells used to inject fluids into rock formations to dissolve and extract minerals. Additional requirements for well drilling and installation will apply because the project is located within a State-designated Water Quality Assurance Revolving Fund (WQARF) site. To meet these requirements, all wells will be drilled and constructed in accordance with the criteria set out in the document *Special Well Construction and Abandonment Procedures for Pinal Creek Water Quality Assurance Revolving Fund Site* (ADWR, 2007).

Piteau Associates have updated the injection and recovery well designs of the 2015 PEA to better exclude the Gila Conglomerate and the weathered Pinal Schist at the top of the deposit, as it has the potential to be a preferential flow path, and to incorporate recent experience. The new designs (Dowling and Zimmerlund, 2020) are shown in Figure 16-9 and Figure 16-10 and include the following recommendations:

- A 14-inch borehole from 0 to 20 ft.
- A 12-inch low carbon steel (LCS) surface casing from 0 to 20 ft, cemented into place with Type V acid-resistant cement.
- A 10-inch borehole into competent Pinal Schist. The depth of which will depend on individual borehole geology and encountered conditions.
- A 6-inch 316L stainless steel casing into competent Pinal Schist, pressure-grouted into place with Type V acid-resistant cement.
- A 5.5-inch borehole to total depth.

The updated well design is currently conservative and allows for zone-specific injection via packers and installation of submersible pumping equipment. Additional testing during pilot trials may lead to smaller diameter borehole and development of less expensive well designs. ISCR projects can use open boreholes as small as 2-inch diameter without need for submersible pumping equipment due to pressurization of the formation. This PEA assumes the following downhole equipment is specified for operation of the injection and recovery wells:

- An IPI 120mm, 5,000 psi straddle packer system will be installed in each injection well to control zones in which sulfuric acid is injected. The packer systems will be installed on 2-inch 316L stainless steel threaded and coupled riser pipe.
- 40 ft of 2-inch 316L stainless steel slotted screen will be installed between the packers. However, this length will ultimately depend on pilot testing and could be increased.
- A 316L stainless steel well head and surface piping will be required to tie each injection well into the acid delivery system.
- A small 316L stainless steel submersible pump will be installed in each recovery well. Each pump will be installed on 2-inch 316L stainless steel riser pipe.
- Assuming a 25 gpm recovery rate per well and moderately pressurized formation conditions from sulfuric acid injection, the submersible pumps will likely need to be in the 5 HP range.
- Each recovery well will require a starter panel and submersible cable.

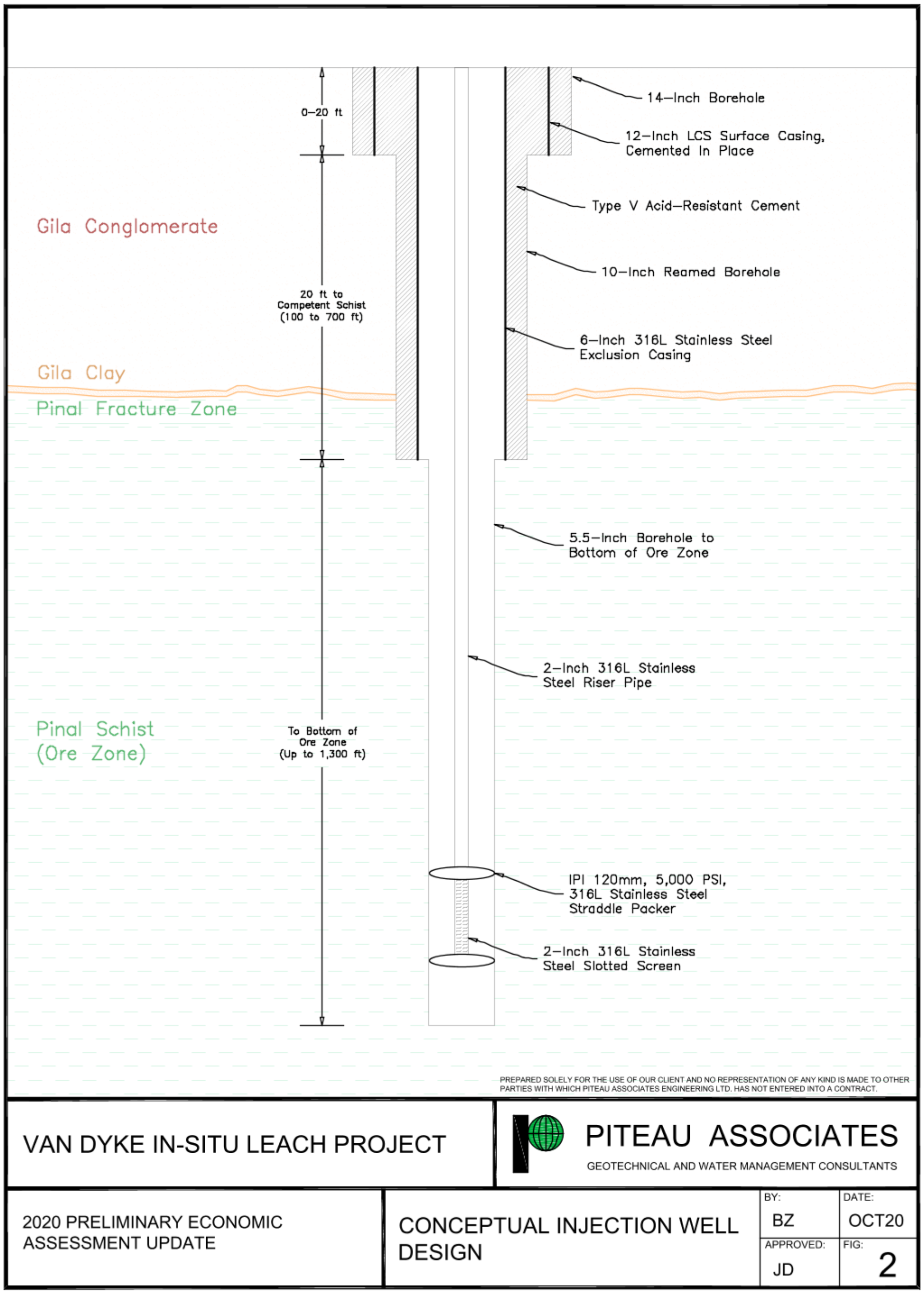


Figure 16-9 Van Dyke Conceptual Injection Well Design (after Dowling and Zimmerlund, 2020)

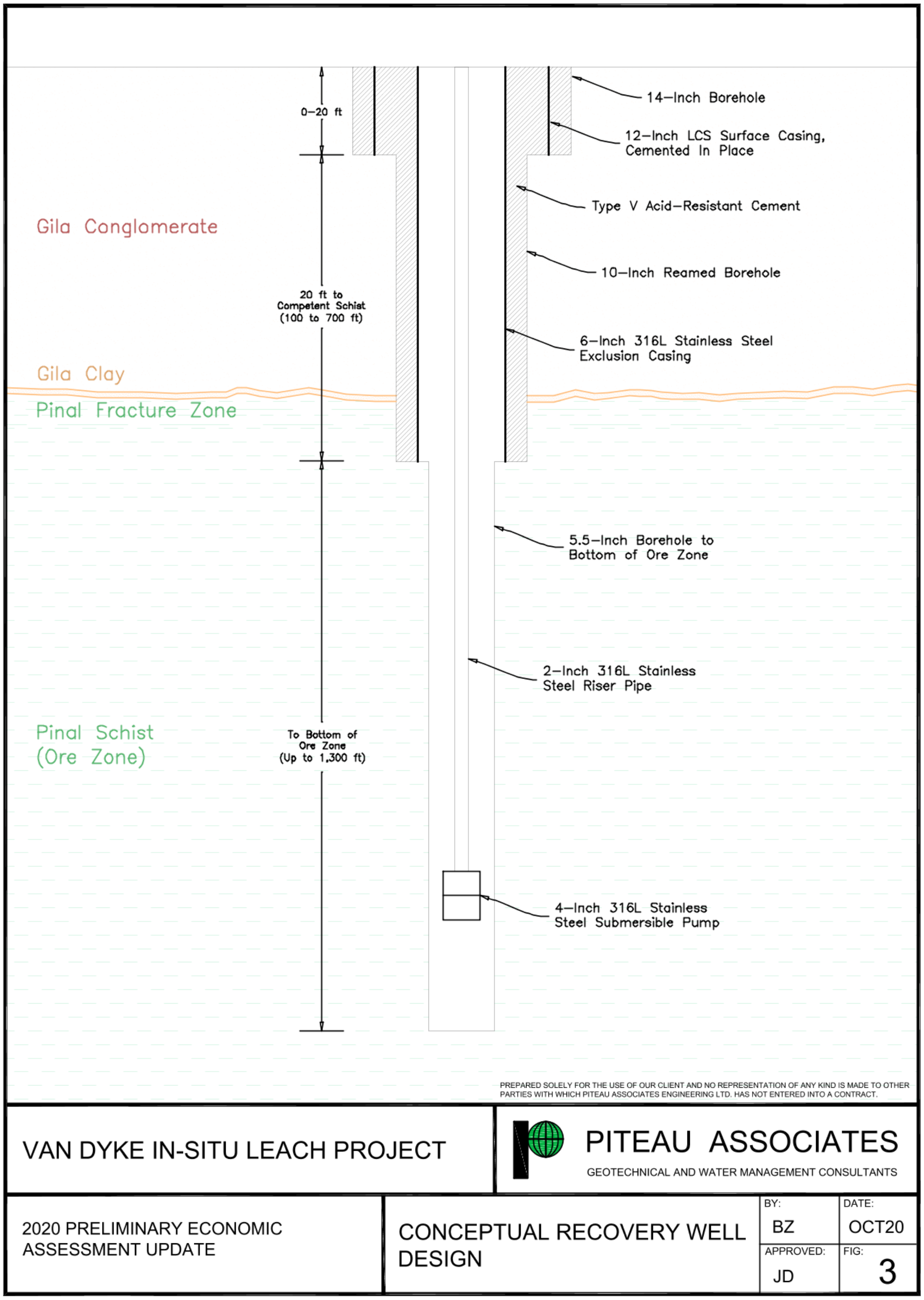


Figure 16-10 Van Dyke Conceptual Recovery Well Design (after Dowling and Zimmerlund, 2020)

16.7.2 Monitoring Wells

Attention to aquifer protection must be demonstrated to obtain permitting and the groundwater monitoring plan was reviewed by Piteau (Dowling and Zimmerlund, 2020). A Point of Compliance (POC) monitoring well network will be required to access the groundwater system. This is proposed to consist of 10 monitoring well locations drilled from surface with 2 or 3 nested monitoring points in each. Exact well locations will depend upon the hydrogeologic conceptual model and permitting strategy. The total number of wells is assumed to be 25 and to consist of:

- Five (5) shallow PVC alluvial aquifer monitoring wells, each 50ft deep.
- Ten (10) Gila Conglomerate reinforced fiberglass monitoring wells, each 1200ft deep.
- Ten (10) Pinal Schist reinforced fiberglass monitoring wells, each 1500ft deep.

Conceptual designs of the monitoring wells are presented in Figure 16-11.

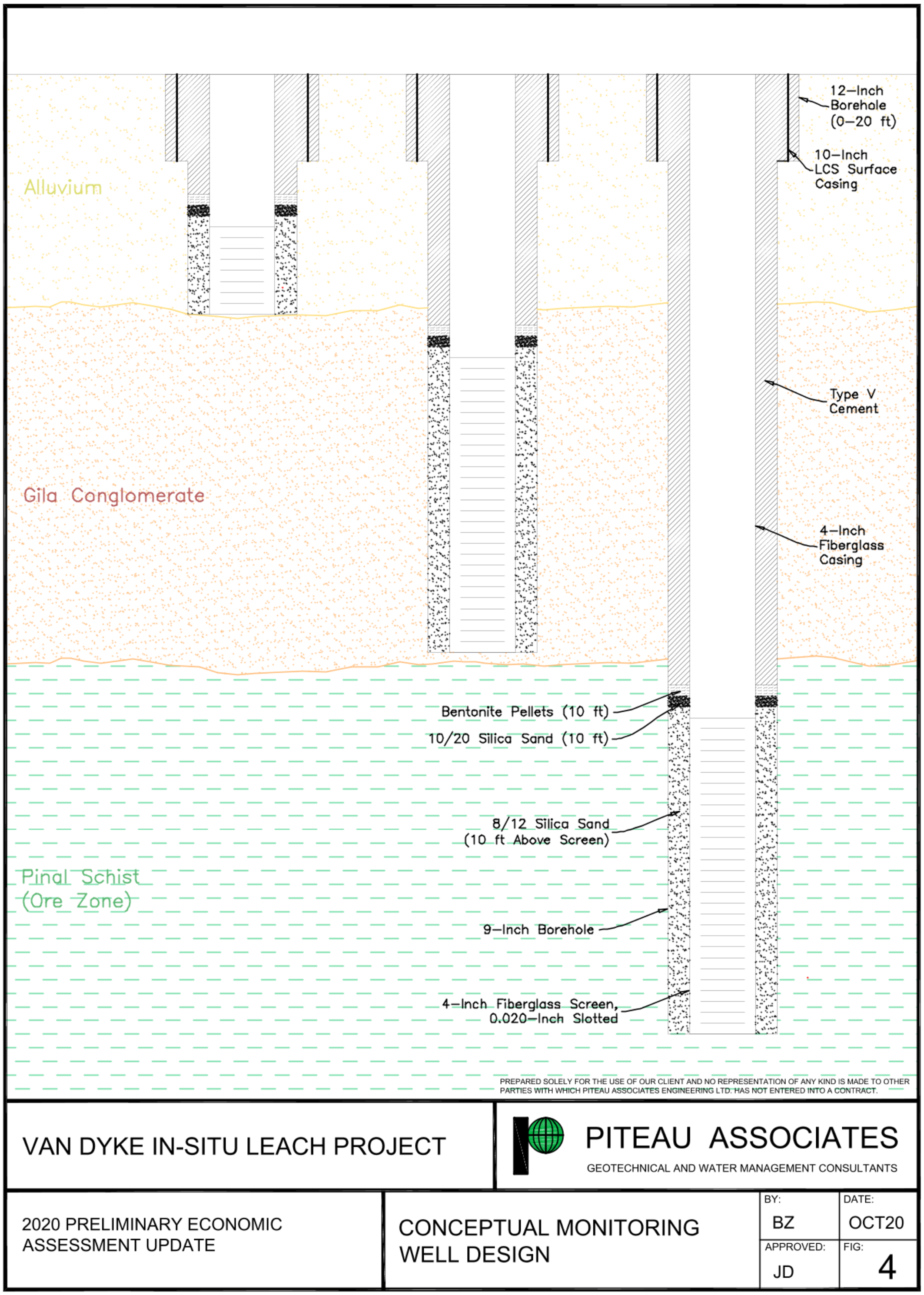


Figure 16-11 Van Dyke Conceptual Monitoring Well Design (After Dowling and Zimmerlund, 2020)

16.7.3 Well Abandonment

Clean water will be circulated through the leach field, and may be accompanied by other specified solutions, at the completion of operations to restore water quality in the leach field at concentrations established in the ADEQ discharge permit. Rinsing will take place after PLS grades from wells have dropped to unproductive levels and are to continue to until water quality standards are met. Projections of the length of time for rinsing will be better established upon further metallurgical testing, and for now a one-year rinse operation is considered reasonable.

Production wells will be abandoned in compliance with the APP and UIC permit after groundwater quality criteria have been met. The process will be documented and reported to the regulating authorities. Wells will also be abandoned in accordance with criteria established for the WQARF zone, as specified in the document *Special Well Construction and Abandonment.*

16.8 Permeability Enhancement

Production estimates are based on flow rate estimates of 1.24l/min per linear meter of well (0.1gal/min per linear ft). The permeability of the Pinal Schist, which is the host to the mineralization, has been estimated to range from “negligible” (Jacoby and Company, 1977) to $6x10^{-6}$ m/s within the upper weathered zone of the rock (Golder, 1997) as presented previously in Table 16-1. Due to the variability in results, further testing is necessary, and this testing may indicate that the target production rate is not achievable without permeability enhancement, also known as hydraulic fracturing. This process is therefore assumed, and these costs are included this PEA. Details on the theory of radial flow from an injection well with and without permeability enhancement applied are available in Appendix C.

Hydraulic fracturing in the mineralized zone was demonstrated at the Project during historic leaching testing by Occidental Minerals Corp. (Harshbarger, 1978 and 1979). The leach testing was conducted near the Van Dyke shaft using a 5-spot well pattern geometry with well spacing ranging from 24 to 38m. Hydraulic testing conducted prior to fracturing suggested limited to no hydraulic communication between the test wells. Hydraulic fractures were developed in the wells by pressurizing the test interval to a pressure that exceeded the critical fracture pressure of the formation, which ranged from 0.8 to 1.3psi/foot of depth (Dames and Moore, 1971; Jacoby, 1977; Occidental, 1979). Hydraulic fractures were created at the bottom of the leach interval in the injection well and at the top of the leach interval in the recovery well. After fracturing, hydraulic communication was established between injection and recovery wells, and injection rates varied between 15 to 45gpm (Walters, 1979 and 1980). Observed extraction rates are used to estimate an average effective permeability of the test zone after hydraulic fracturing was conducted. These calculations suggest an effective permeability 0.15md assuming linear fluid flow was established between fracture planes or 5.5md assuming radial fluid flow is the dominant model of flow between the wells. These calculated permeability values bracket the 1.7 L/s (26gpm) and leach zone permeability of 15md (equivalent to a hydraulic conductivity of $1.5x10^{-7}$m/s).

The results of pilot testing will inform the implementation of permeability enhancement and the wellfield design. If fracturing is conducted in the leach interval to increase production rates, the effect of fracturing on the production rates that can be achieved will depend on the geometry, length, and spacing of the fracture planes. Hydraulic fracturing will generally create horizontal fracture planes at shallow to moderate subsurface depths due to the lower lithostatic pressure. Fracture orientation is favoured along the rock formation bedding plane. A high pressure/moderate flow rate pump with a packer system was proposed to induce a fracture set with 10m to 30m radius (see Appendix D: SWS, 2015). Schistosity of the Pinal Schist is reported to be at 70° to vertical with secondary joint sets oriented at a 35 to 70° to vertical (Jacoby, 1978; Knight Piésold, 2014). The near horizontal schistosity is favorable for creating near horizontal fracture planes. Efforts to determine fracture plane orientation during historic leach testing wells were unsuccessful except in one case where results of a downhole geophysical survey suggested that an induced fracture plane may have been dipping at a 49° angle (Axen and Cole, 1980).

Review by Piteau (Dowling and Zimmerlund, 2020) indicate the SWS assumptions from 2015 are still reasonable and make the following additional recommendations:

- An IPI 120mm, 5,000 psi straddle packer system will be deployed in each injection and recovery well on 2-inch 316L stainless steel pipe.
- A high-pressure pumping system, capable of delivering continuous pressure of up to 2,000 psi at flows up to 50 gpm will be required.
- It is assumed that a silica sand slurry will be used as a proppant, but this may not ultimately be necessary, depending on the results of pilot testing.
- An injection manifold will be used to track changes in injection pressure and flow.
- It is currently assumed that permeability enhancement will take an additional 1 day per each well, the straddle packer system will be moved from the bottom to the top of the hole, creating as many additional flow planes as is necessary to achieve desired flow rates.
- The packer assembly and 2-inch installation pipe can be re-used in the injection wells limiting the amount of equipment needed.
- Injection pumps, surface piping and manifolds will be reusable, but will require replacement. It is assumed that each pump can be used in 40 boreholes before replacement.

16.9 ISCR Recovery and Production

Copper recovered and used in the cash flow analysis is based on recovery of acid soluble copper. Estimates of recoverable copper based on metallurgical testing are included in the block model and vary around 90% in the deposit. The production model simulates 95% plant efficiency and a sweep efficiency that increases to 89% over five years. The overall recovery is therefore estimated at approximately 76%.

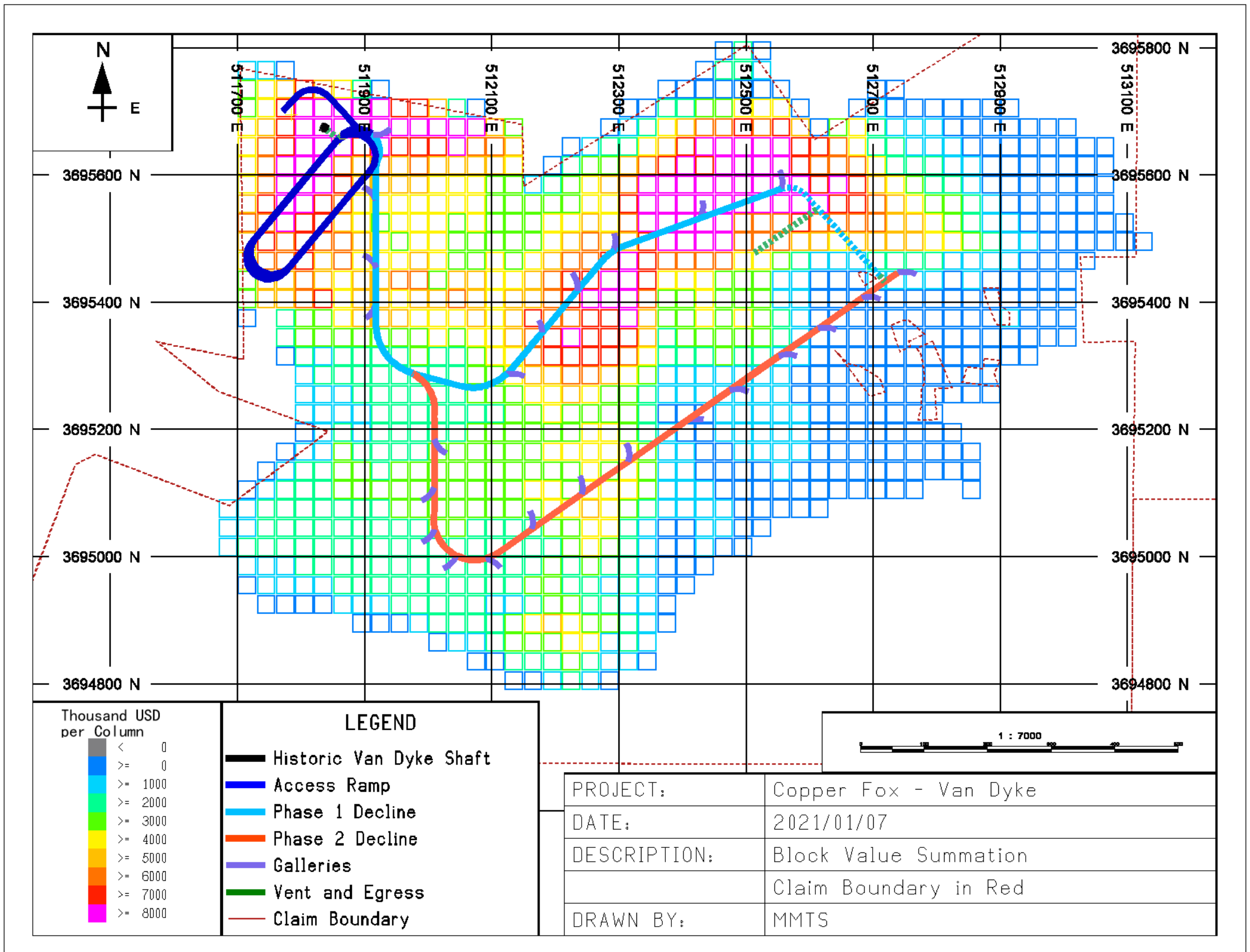
The sweep efficiency is primarily dependent on the ability to maintain flow and establish hydraulic communication between an injection well and a recovery well and is affected by the in-situ fracture length, density, orientation, aperture, interconnectedness and will also be affected by the degree of hydraulic enhancement. In the absence of further testing, sweep efficiency is for now assumed to follow the recovery model presented in Table 16-5.

Table 16-5 Van Dyke Estimated Sweep Efficiency Over Five Years

Year	1	2	3	4	5
Sweep Efficiency	54%	75%	84%	88%	89%

16.9.1 Copper Extraction Sequence

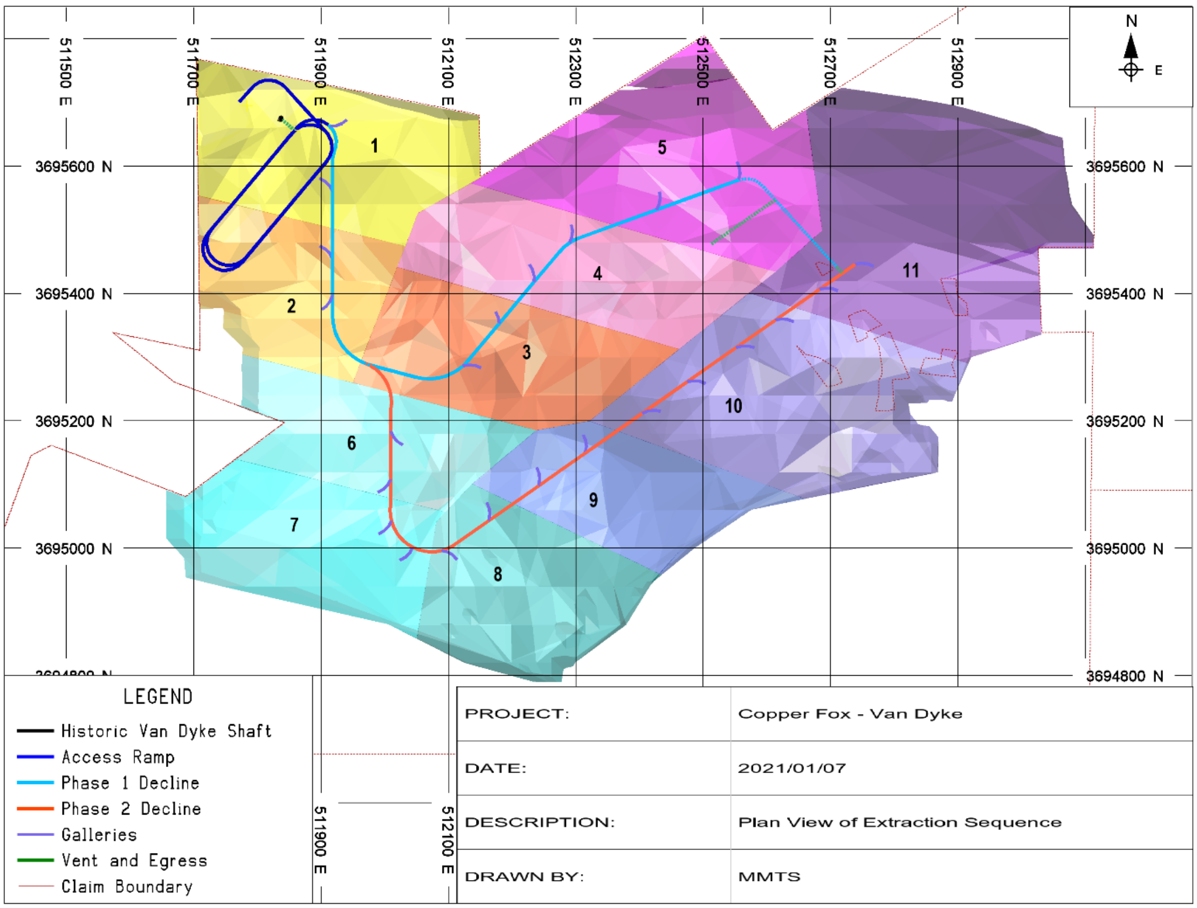
A summation of block values in each column has been created to determine the optimal region of the deposit to initiate in-situ leach (ISCR) mining of the deposit. For this plot, the NSR values are summed vertically and multiplied by the total tonnes per block for a column of blocks the width of the mineralization. The result is a 2D map, like an isopach, as shown in Figure 16-12 with the CDN$ value per vertical column. The highest values are illustrated to be near the Van Dyke shaft and generally in the north, adjacent to the Van Dyke fault. The corner of the deposit near the access ramp (blue) and the Van Dyke Shaft are also higher elevation with the deposit dipping generally southward. The Phase 1 decline (turquoise) slopes continuously downhill and allows access to the higher value sections of the deposit. The Phase 2 decline also slopes continuously downhill and accesses the lower value section of the deposit in later years.



Source: MMTS, 2020

Figure 16-12 Van Dyke Block Value Summation with Underground Development

The resource is divided into eleven zones which are used to estimate the recoverable copper applied to the estimated wells in each gallery. These zones are shown in Figure 16-13 showing the sequential development of solution mining and extraction along the Phase 1 decline (blue) and Phase 2 decline (red).



Source: MMTS, 2020

Figure 16-13 Van Dyke Extraction Sequence by Zone

The number of wells in each zone is estimated based on the number drawn and the volume of the zone to achieve targeted well density. An average drillhole length is calculated for the wells as drawn within each zone. The production length of wells in each zone is averaged from the length of segments intersecting the deposit. Individual well production is estimated by zone and is based on a nominal 0.1gpm per linear ft of production length, estimates of the recovery well lengths and production are given in Table 16-6.

Table 16-6 Van Dyke Recovery Well Estimates

Phase	Zone	Number Recovery Wells	Average Well Length (m)	Average Well Production gpm	Average Well Production (m^3/hr)
1	1	116	210.4	45.5	10.3
	2	68	199.9	51.2	11.6
	3	82	222.9	52.9	12.0
	4	84	233.9	65.0	14.8
	5	131	252.7	48.8	11.1
2	6	72	212.2	36.2	8.2
	7	83	236.7	46.6	10.6
	8	57	189.8	38.2	8.7
	9	45	157.5	33.4	7.6
	10	106	248.1	28.3	6.4
	11	124	276.3	29.7	6.7

16.9.2 Copper Production Schedule

The copper extraction plan is designed to provide the SX-EW plant with PLS to produce 85Mlbs per year, the PLS grade and volume of solution produced by each well varies according to zone, and PLS grade declines with increasing year of operation. Additional wells are brought online each year to meet the targeted needs of the plant. The production schedule is detailed in Table 16-7Table 16-7 which shows the projected copper production, estimated number of operating recovery wells, the zones in which wells are operating, the flow rates and PLS grade to the plant, and the rinsing rates for each year of operation.

Table 16-7 Van Dyke Production Schedule

Period	Mlbs Cu	Operating Recovery Wells	Active Production Zones	Flow Rate (m^3/hr)	PLS Grade (g/l)	Rinsing Flow Rate (m^3/hr)
Y-2	0	0	N/A	-	-	-
Y-1	0	0	N/A	-	-	-
Y1	47.0	56	1	586	4.20	-
Y2	85.1	137	1,2	1,462	3.05	-
Y3	84.7	202	1,2,3	2,235	1.99	-
Y4	84.0	266	1,2,3	3,013	1.46	-
Y5	85.4	309	1,2,3,4	3,655	1.22	-
Y6	82.8	294	1,2,3,4	3,682	1.18	586
Y7	85.1	271	2,3,4,5	3,457	1.29	876
Y8	85.3	263	3,4,5	3,324	1.34	773
Y9	84.7	304	4,5,6,7	3,506	1.27	778
Y10	85.2	375	4,5,6,7,8	3,993	1.12	643
Y11	84.4	408	5,6,7,8,9,10	3,935	1.12	613
Y12	85.3	460	5,6,7,8,9,10,11	3,604	1.24	651
Y13	75.7	503	5,6,7,8,9,10,11	3,646	1.09	640
Y14	29.8	398	7,8,9,10,11	2,686	0.58	960
Y15	11.8	284	8,9,10,11	1,557	0.40	1,129
Y16	4.1	210	10,11	1,002	0.21	555
Y17	0.8	100	11	682	0.06	320
Y18	0	0	0	-	-	682

17 RECOVERY METHODS

17.1 Proposed Process Flowsheet

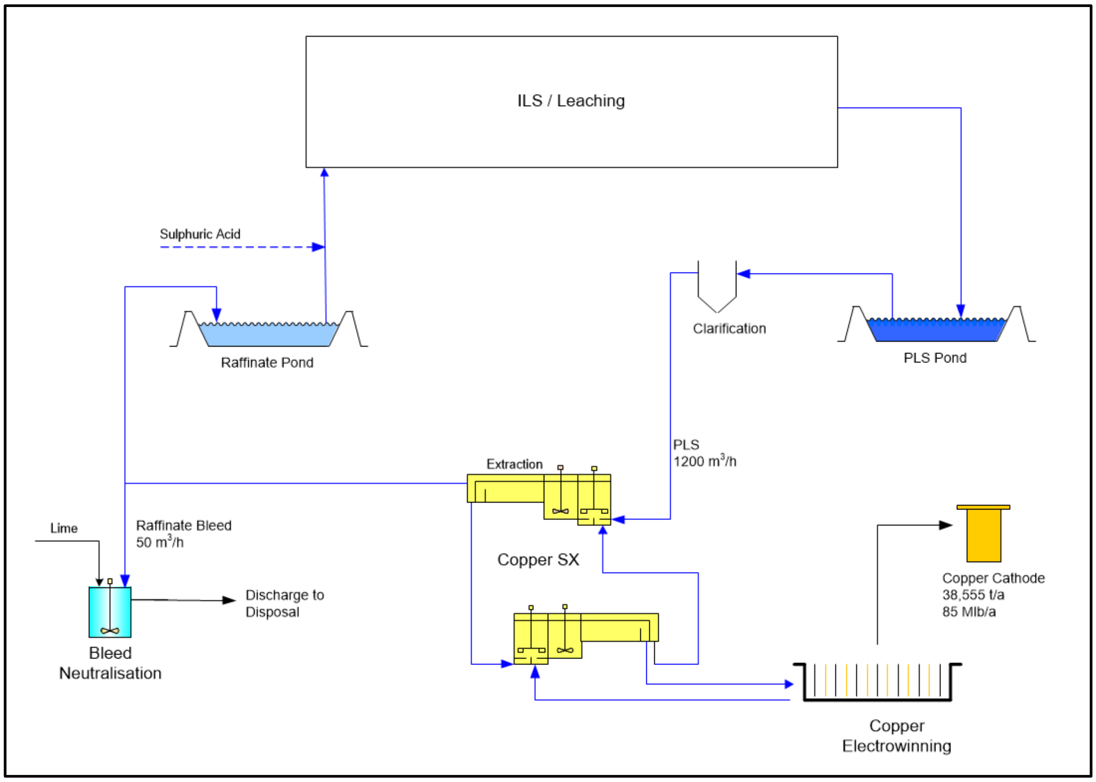
The processing plant will receive pregnant leach solution (PLS) from the In-situ Copper Recovery (ISCR) leaching operation. The plant will process between 580 to 3900 m3/hr, averaging 2,800 m^3/h PLS and produce 38,555 t/year 85Mlb/year as LME grade copper cathode.

The results of preliminary metallurgical test work were used to select the recovery method for the project (refer to Section 13). The design criteria used for the process facility described in this section were based on industry typical standards due to the nature of this study. However, copper solvent extraction and electrowinning are well established commercial processes, and the process design is based on conventional equipment used in these applications.

The main processing areas will include:

- Copper solvent extraction (SX)
- Copper electrowinning (EW)
- Bleed solution neutralisation
- Reagents and services

The simplified process flowsheet for the solvent extraction, electrowinning and bleed neutralisation is presented in Figure 17-1.



Source: Ausenco, 2020

Figure 17-1 Process Flowsheet

17.2 Key Process Design Criteria

The process design criteria were generated based on industry typical parameters, as no testwork has been completed for the downstream process plant to date. However, copper solvent extraction and electrowinning are well established commercial processes. In addition, the mineral processing and metallurgical testing of the ILS process to date did not identify any deleterious elements in the Van Dyke PLS that may negatively impact the performance of the SX plant and therefore copper recovery. A summary of the Van Dyke PLS processing design criteria is presented in Table 17-1.

Table 17-1 Key Process Design Criteria

Description	Unit	Value
PLS		
PLS flowrate (design)	m^3/h	1,200
PLS copper grade	g/L	3.9
PLS pond storage capacity	h	24
PLS pond volume	m^3	28,800
PLS Clarification		
Clarifier type		Dynamic bed
Clarifier flux	$m^3/h/m^2$	7
Number of clarifiers		2
Clarifier diameter	m	10.5

Description	Unit	Value
Clarifier flocculant addition	g/m^3	2
Clarifier overflow suspended solids	ppm	< 50
Copper Solvent Extraction		
Number of SX trains		1
Number of extract stages		2
Number of strip stages		1
Extractant type		oxime
Extractant concentration	% v/v	16
Copper extraction	%	97.1
Mixer residence time – extract	minutes	3
Mixer residence time – strip	minutes	2
Mixer O/A ratio		1 : 1
Mixer tank volume (per tank)	m^3	57
Settler type		Side entry or equivalent with covers
Settler flux	$m^3/h/m^2$	4.5
Settler organic space velocity	cm/s	5
Organic depth	mm	300
Settler dimensions (W x L x H)	m	22 x 29 x 1
Raffinate pond storage capacity	h	24
Raffinate pond volume	m^3	28,800
Raffinate treatment		after settler
Entrained organic recovery from raffinate pond		Rope skimmer type
Loaded organic treatment		Coalescer plus after settler
Loaded organic coalescer volume	m^3	330
Loaded organic after settler volume	m^3	1,000
Loaded organic treatment residence time	minutes	60
Spent electrolyte copper	g/L	37
Rich electrolyte copper	g/L	50
Rich electrolyte treatment		After settler plus co-matrix filtration
Rich electrolyte after settler volume	m^3	210
Copper Electrowinning		
Cathode production rate	Mlb/a	85
Cathode production rate	t/a	38,555
Cathode production design	t/a	40,000
Number of cells		82
Cell size (L x W X H)	m	7.1 x 1.2 x 1.5
Number of cathodes/cell		84
Cathodes		3.25 mm thick 316L SS
Anodes		6 mm thick lead anodes
Current density – nominal	A/m^2	320
Cell voltage – nominal	V	2.1
Current efficiency	%	90
Number of rectiformers		2
Rectiformer output	kW	5,815

Description	Unit	Value
Plating cycle	days	6
Cathode stripping		Fully automatic
Cathode stripping machine capacity	number/h	135
Bleed Neutralisation		
Bleed solution volume	m^3/h	50
Neutralising agent		Lime
Target pH		7
Neutralisation residence time	minutes	90
Number of neutralisation tanks		2
Neutralisation tank volume (per tank)	m^3	42
Lime slurry concentration	% w/w	20

17.3 Process Description

17.3.1 Copper Solvent Extraction (SX)

PLS solution received from the ILS operation will be stored in the PLS pond, which will have a residence time of 24 hours and will provide a buffer between ILS and SX, as well as allowing some of the suspended solids in the PLS to settle out of the solution. The PLS solution will be pumped from the pond to two dynamic bed clarifiers operating in parallel. The clarifiers will be used to reduce any suspended solids in the PLS further and thereby mitigate the risk of crud formation caused by fine solids in the SX. Some clarifier underflow will be recirculated to the feed to maintain a sludge bed in the clarifier. Flocculant and coagulant will be added to assist with settling the solids. The clarifiers will produce an overflow PLS that will contain <50 ppm of suspended solids and will be pumped to SX.

It is anticipated that the PLS flowrate will have a range of 580 – 3,900 m3/hr and copper grade will range between 0.4 to 4.2 g/l over the life of the mine. The average PLS flowrate is 2,800 m3/hr and factors have been included in the processing capital cost to address PLS averages. Recommendations for future considerations for fluctuation in PLS volume and grades are addressed in Section 26.

The SX circuit will consist of two extract stages and a single strip stage. Based on the expected iron and manganese concentrations in the PLS, a wash stage should not be required in this circuit. Aqueous entrainment to the electrowinning tankhouse will be managed by:

- Operating extraction stage 1 in aqueous continuous mode.
- Designing the settlers with appropriate flux and organic space parameters to ensure stable operation and reduce aqueous entrainment.
- Proving a coalescer and after settler on the loaded organic process stream with adequate residence time to maximise entrained aqueous removal.

The clarified PLS will be pumped to the first extraction stage (E1) in the copper SX plant. The PLS will enter the first of three agitated mix tanks (termed the pump mixer) where it will be mixed with partially loaded organic existing in the second extraction stage (E2). The pump mixer will overflow to two additional mix tanks in series, and the mixing system will provide a residence time for the aqueous and organic mixing.

During mixing, the copper in the PLS will be loaded onto the extractant in the organic phase. As the copper is extracted, sulphuric acid will be generated according to the reaction:

$$CuSO_4 + H_2\text{-Organic} = \text{Cu-Organic} + H_2SO_4$$

The mixed solution will then overflow from the third mix tank into the settler feed distribution launder. The solution will be distributed evenly across the width of the settler by turning vanes. The solution will then flow down the settler, through a series of picket fences that will further even out the flow distribution. As the solution flows through the settler, the lighter organic phase will separate from the heavier aqueous phase. At the end of the settler, the organic phase will be floating on top and the aqueous phase flowing at the bottom of the settler. Each phase will be collected at the end of the settler in a weir. Either aqueous or organic can be recycled to the pump mixer to adjust the organic to aqueous ratio (O/A) in the mixer settler to the required set point. All settlers will be covered to mitigate evaporation of organic diluent.

The aqueous stream exiting E1 settler will flow to the pump mixer in E2, where it will be combined with stripped (or barren) organic. The aqueous solution exiting E2 is termed raffinate and will contain approximately 110 ppm copper and 7.8 g/L sulphuric acid. The raffinate will pass through an after setter to recover entrained organic before being pumped to the raffinate pond. The raffinate pond will have a 24-hour residence time and will provide a surge capacity between SX and ILS. Raffinate will be returned to the ILS operation where additional sulphuric acid will be added to the solution before being used in the leaching process.

Loaded organic from E1 will flow to a coalescing tank containing coalescing media which will act to coalesce and remove entrained aqueous from the loaded organic stream. Aqueous will be drained from the coalescer periodically and returned to the extract circuit. Organic from the coalescer will be pumped to the loaded organic tank (after settler), which will provide surge capacity as well as additional residence time to remove aqueous entrainment.

Spent electrolyte from the copper electrowinning process will be used to strip the copper from the loaded organic back into the aqueous phase. The spent electrolyte will have a high sulphuric acid concentration (180 g/L) and this will reverse the extraction reaction, consuming sulphuric acid and producing copper sulphate. The flow of spent electrolyte will be controlled to maintain the copper concentration of the aqueous exiting the strip settler at a target copper concentration of 50 g/L. This stream is termed advance electrolyte (or rich electrolyte) and will be returned to electrowinning to recover the copper as cathode product.

Loaded organic from the after settler will be pumped to the strip (S1) pump mixer tank where it will be mixed with spent electrolyte. After flowing through a second mixing tank, the solution will overflow to the settler, which will be identical to the extract settlers. The organic stream recovered from the settler is termed stripped organic, and this will report to the E2 pump mixer, where it will be reloaded with copper. The recovered aqueous will report to an after settler, which allows entrained organic to be separated from the aqueous phase. Recovered organic is returned to the extract circuit. The rich electrolyte from the after settler is pumped to the rich electrolyte filter feed tank in the copper electrowinning circuit.

Crud is a stable emulsion of solids, aqueous solution, and organic solution. Crud will be formed in the interface of the organic and aqueous solutions of the SX settlers or settles to the bottom of the settlers. Solids and impurities in the PLS can accelerate the crud formation, as well as too intense mixing in the SX mix tanks. The crud formation rate is plant specific and difficult to predict.

Crud handling will be a batch operation conducted when required. Crud will be removed from the settlers via a dedicated removal system and report to the crud tank. Diluent will be added in the crud tank to aid the phase separation. The crud will be processed in a crud centrifuge. The solids waste will be collected in the drum while the centrate will be returned to the E1 mixing tank.

Some organic oxidation products affect to the performance of the organic extractant leading to extended phase separation times and reduced stripping efficiency. Therefore, it is important to have a clay treatment for organic, where clay is added in the crud tank and mixed with the organic solution and then pumped to the clay filter. The clay filter cake will be collected as waste and the treated organic is returned to the E1 settler.

In the solvent extraction area, fire monitoring instrumentation will be provided together with a foam-based surface flooding fire protection system. The AFFF connections will flood the inside of the mixer settlers and tanks containing organic solutions. All substations will be equipped with dedicated fire suppression equipment to protect the motor control panels and plant control systems.

17.3.2 Copper Electrowinning (EW)

Rich electrolyte from the filter feed tank will be pumped through co-matrix filters, which will contain anthracite, sand, garnet, and coalescing media to remove entrained organic from solution and any solids remaining entrained in the electrolyte. Periodically the filters will be drained and backwashed.

The filtered rich electrolyte stream will be pumped to the electrolyte inter-exchanger where the solution temperature will be increased by the spent electrolyte returning to the SX area. The strong electrolyte will continue to the trimming heat exchanger where the solution will be either heated on start-up or cooled during normal operation. After two heat exchangers, the strong electrolyte will continue to the electrolyte circulation tank where it will; be mixed with the recirculating spent electrolyte.

In the EW plant, copper-rich electrolyte will be circulated through electrowinning cells that will contain a series of anode and cathode plates. The electrolyte will be subjected to a direct current passing between anode and cathode plates and the copper ions will migrate from the solution to the cathode and be electrochemically reduced to form elemental copper sheets. The copper EW tank house will consist of 82 cells, each cell containing 84 cathodes and 85 anodes. Nominal copper cathode production will be 38,555 t/y, with the tankhouse being capable of producing 40,000 t/y copper at maximum capacity.

Most of the solution exiting the cells will be mixed with rich electrolyte and returned as feed solution to the EW cells. A portion of the solution exiting the EW cells will be used as spent electrolyte and will be pumped to the electrolyte inter-exchanger and then to the SX strip circuit after make-up water and sulphuric acid have been added.

The spent electrolyte will be split, with the majority being sent to the SX strip circuit and a small flow being diverted to the SX extract circuit. The portion of the spent electrolyte reporting to the extract circuit will serve as a bleed to prevent the build-up of impurities in the electrolyte in EW.

The cathode plates will be periodically removed from the cells (nominally using six-day growth cycles) with an overhead crane and will be washed and stripped of copper deposits in a fully automatic stripping machine. The resulting LME grade 'A' copper sheets (>99.99% copper) will be the final product. Acid mist generation will be mitigated by placing plastic balls on top of the solution in the cells.

Cobalt sulphate and a polyacrylamide smoothing agent will be dosed into the electrolyte solution to mitigate anode corrosion and assist in copper plating on the cathodes.

17.3.3 Bleed Solution Neutralisation

A small flow of process solution will be bled from the system to remove any excess water in the system and provide a bleed to prevent the potential build-up of deleterious elements in the process solution. The bleed stream will be pumped to the neutralisation tanks, where the pH of the solution will be increased to 7 by the addition of lime slurry. The lime will neutralise the acid and precipitate the soluble metals.

The neutralisation of sulphuric acid forms gypsum will precipitate, while precipitated metals will be in hydroxide form. The neutralised bleed solution will be pumped to a lined cell for disposal.

17.4 Reagents

17.4.1 Sulphuric Acid

Sulphuric acid (98% concentration) will be delivered to site by road tanker and stored in a tank, which will provide a 14-day capacity. The tank will be located within a bunded area to contain any spillage. Dosing pumps will supply the various usage points within the process. Most of the acid will be consumed in the ILS process, with the remainder to be used in the electrowinning copper EW circuit.

17.4.2 Lime

Lime will be delivered to site in tanker trucks and pneumatically unloaded into a lime silo, from where it will be fed to the slaking mill to produce milk of lime slurry. The lime slurry will be pumped to the bleed solution neutralisation tanks via a ring main.

17.4.3 Flocculant

Flocculant will be supplied as a dry powder and made up in a mixing system with process water to the required storage strength. Flocculant will be dosed to the PLS clarifiers.

Coagulant will be supplied in liquid form and dosed to the PLS clarifiers to assist with the coagulation of the suspended solids in the solution.

17.4.4 SX Extractant

Organic extractant will be used for copper SX. Loss of organic is anticipated from various sources including entrainment in raffinate, spillage and crud loss. On-site storage for a 30-day supply for make-up purposes will be in 1,000 L bulk boxes.

17.4.5 SX Diluent

A one-month inventory of diluent will be stored on site to meet the make-up requirements of the SX circuit. A diluent storage tank located adjacent to the SX circuit will supply diluent to the loaded organic tank as required for make-up.

17.4.6 Cobalt Sulphate

Cobalt sulphate will be added to the copper electrolyte at a rate sufficient to maintain a cobalt solution concentration of 120 ppm in the circulating electrolyte stream. Cobalt assists in protecting the anodes from corrosion. Cobalt sulphate will be supplied in powder form in 25 kg bags and batch mixed in an agitated mixing tank, as required to meet the plant demand. A 90-day on-site inventory will be provided.

17.4.7 Smoothing Agent

A neutral anionic polyacrylamide will be used as a smoothing agent in copper electrowinning. It will be supplied in powder form in 25 kg bags, which will be batch mixed. A 90-day on-site inventory will be provided. Smoothing agent will be dosed to the copper electrowinning circuit at a rate of approximately 100 g/t of copper cathode produced.

17.5 Services

17.5.1 Water Services

Raw water will be provided at the battery limit to the raw water tank.

Fire water will be supplied to the fire water package from the raw water tank. The fire water package will include a fire water tank, fire water jockey pump and fire water pump. The fire water jockey pump will be required to maintain pressure in the firewater distribution system. The fire water pump will automatically start as required and will supply fire water to hydrants and hose reels.

Potable water will be supplied at the battery limit to a storage tank. This will service the general amenities and the safety shower system. Potable water will also be used to dilute the EW smoothing agent and cobalt sulphate, electrowinning make-up, cleaning of the EW cells and copper cathode.

17.5.2 Air Services

The plant and instrument air system will consist of air compressors, receivers, and air driers, which will provide the plant with sufficient air at 700 kPa for equipment and instrument actuation.

17.5.3 Power Services

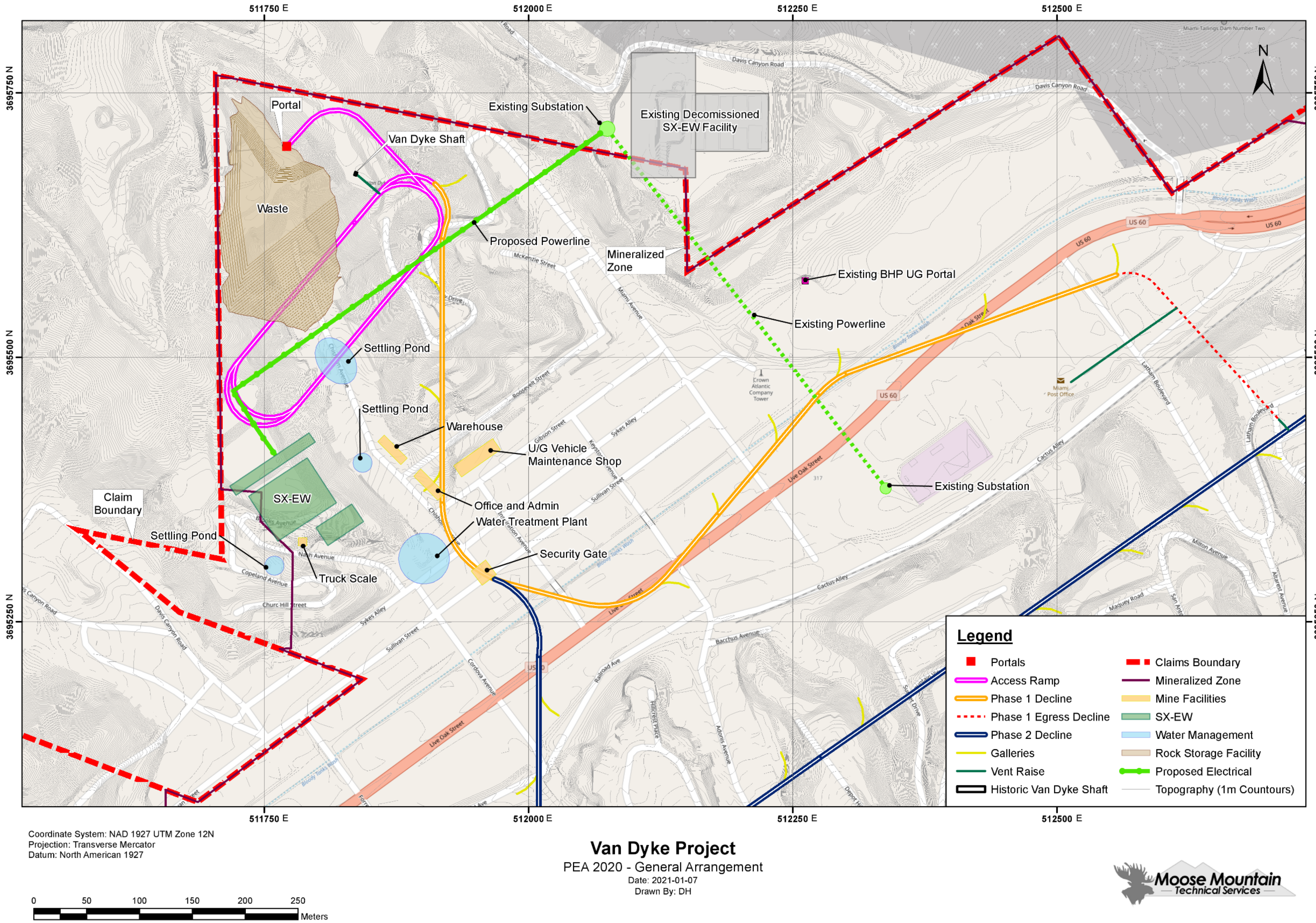
There is existing power and communication facilities to the project site. A new substation and approximately 500 meters of new power line will be constructed to tie into the new site facilities. The battery limit is the incoming side of the new substation.

18 PROJECT INFRASTRUCTURE

The Van Dyke Copper project is located within the town limits of Miami, Arizona. The Globe-Miami district is an active mining district, and currently supports several mining operations including Freeport-McMoRan operates an open pit mine, smelter, and rod mill. Capstone mining operates the Pinto Valley open pit copper mine, and KGHM operates the Carlota SX-EW copper plant and open pit copper mine, BHP owns the adjacent Miami underground operation and SW/EW plant which is currently under care and maintenance. As such, there are mining services and support in the local area, in the municipality adjacent to the property as well as infrastructure from previous operations on and surrounding the property.

A wide array of infrastructure exists nearby and can be utilized for the planned ISCR project. The property lies along the northern town limit and town services such as sewer, water, and communications are assumed to be present on or nearby the property.

Powerlines run adjacent to the property to a closed SX-EW facility adjacent to the east. The planned main site buildings (administration, maintenance, and warehouse) are sited along Chisholm Avenue, the main access road. To the west, the SX-EW and truck scale are sited at the end of Nash Avenue. See Figure 18-1 for the planned General Arrangement.



Source: MMTS, 2020

Figure 18-1 General Site Arrangement

18.1 Access

Highway 60 is the main corridor through the town of Miami, and the project is located 0.5km from the highway, with direct access on Live Oaks Street via Cordova Avenue. Live Oaks is a 4-lane road. An allowance for road upgrades for site traffic is included in the capital estimate. This is assumed to cover turning lanes for trucks and upgrades to traffic signals. Additional allowance is included for road widening and access road construction along Chisholm Ave.

Access to the site is controlled by a security gate at Cordova Avenue, and perimeter fencing installed along the west, south, and eastern sides of the site.

18.2 Power

Site power is assumed to be available from nearby de-commissioned SX-EW facility adjacent to the proposed Van Dyke property. An approximately 500m long powerline and new substation are included in the capital costs to connect the Van Dyke facilities (see Figure 18-1). Future studies must confirm ownership of the existing powerline and substation.

18.3 Water

Potable water is assumed to be drawn from new wells for drinking, shower, and washroom facilities. Fresh and fire water will be supplied by new wells, with sufficient storage capacity provided by on-site tanks. An allowance for tanks and water services is included in the capital estimate. Process water is addressed in Section 17.

18.4 Waste Management

Because the project is located within municipal service area, septic, sewer, and solid and sanitary waste disposal are assumed to be provided by the town.

18.5 Communications

Telephone and internet services are assumed to be present within Miami town limits, and readily accessible to the project.

18.6 SX-EW Processing Facility

The Van Dyke project produces copper using a Solvent Extraction and Electrowinning (SX-EW) plant. The plant site is located on the west of the property, with access from Nash Avenue, past the security gate at Chisholm Ave. The site is located on a plateau west of the administration and maintenance buildings. The plant consists of the SX facility, the EW facility, and tank farm. Trucks load at the plant loading dock and exit past the truck scale and through the gate.

18.7 Underground Mine Portal and Infrastructure

Access to the underground is via the main mine portal located approximately 80m northwest of the existing Van Dyke mine shaft. Underground infrastructure, including power supply and distribution, dewatering, compressed air and ventilation air are all included in the contract mining capital costs, and managed by the contractor.

18.8 Buildings and Facilities

An office facility for administration, management, engineering, and other office personnel are situated along the main access corridor of Chisholm Ave. Nearby are the maintenance and warehousing facilities serving the underground mining operations and underground ISCR operations.

A main contractor laydown facility is also provided for the underground mining operations. The maintenance facility, warehouse, and laydown area are nearby and have easy access to the underground portal.

18.9 Water Management

18.9.1 General

The site water management plan is shown schematically on Figure 18-1 and will include the following features:

- A water management pond (WMP) below the waste rock dump from the underground development muck. The WMP will collect runoff and toe seepage
- Clean water diversion ditches as required to route water around the project infrastructure
- Contact water collection channels down gradient of the project infrastructure
- Sediment control ponds (storm water collection ponds) down gradient of disturbed areas, particularly during construction
- A water treatment plant (WTP) to treat all surplus water from the site before it is discharged.

The design of the ponds, ditches, and channels for the Project will be in accordance with the Best Available Demonstrated Control Technology (BADCT) guidance manual (Publication # TB 04-01), entitled "Arizona Mining Guidance Manual BADCT". The impoundments will be designed to meet or exceed the prescriptive criteria and requirements set out in the BADCT manual.

18.9.2 Water Management Pond

The WMP will be located immediately down gradient of the toe of the waste rock dump shown on Figure 18-1. The WMP will be constructed and commissioned prior to the start of underground development and placement of waste rock within the dump.

The pond will be designed to manage runoff and seepage from the waste rock dump, as well as surplus process flows from the Project before removal to the WTP. The impoundment will be classified as a Process Solution Pond under the BADCT guidelines and will therefore need to be designed based on the criteria outlined in Section 2.3 of the BADCT manual.

The WMP will be designed to manage up to approximately 60m^3/h of surplus water from the ISCR process that will be generated throughout the operations phase of the project and an additional 4m^3/h of runoff and seepage that is expected from the waste rock dump on an average annual basis. The water level in the WMP will be maintained as low as possible by promptly transferring water directly to the WTP prior to discharge. The WMP has been sized with capacity to attenuate the inflow resulting from approximately the 1 in 100-year storm. Flood flows in excess of the 1 in 100-year storm will be discharged via an overflow spillway. The WMP will be maintained in the closure phase of the project until such time that the seepage and runoff from the waste rock dump can be discharged directly to the environment.

The pond will be constructed using a balanced cut and fill grading plan to the extent possible, while providing an allowance for potentially unsuitable excavated material. An appropriate quantity of excess cut will be stockpiled during construction to provide material for reclamation at closure. The pond will be constructed with a double liner and a leakage collection and recovery system (LCRS).

18.9.3 Plant Site Runoff Ponds

The plant site runoff ponds will be constructed directly down gradient of the SX-EW plant site as shown on Figure 18-1. All storm water runoff from the plant site area during construction will be collected in the plant site runoff ponds. Water will be promptly transferred to the WMP, thereby keeping the runoff ponds empty to the extent possible. The plant site runoff ponds will be maintained throughout operations as a contingency measure but are not expected to be active since internal ditching and ponds will be used to manage runoff within the plant site.

The ponds will be classified as Non-Stormwater Ponds under the BADCT guidelines and will therefore be designed based on the criteria outlined in Section 2.2 of the BADCT manual.

18.9.4 Water Treatment

The operational phase of the project will generate a net surplus of water from the following sources:

1. The requirement for hydraulic control within the ISCR area: a positive hydraulic gradient will be always maintained towards the mining area during operations which will result in a net inflow of groundwater to the project area.
2. Raffinate bleed from the SX-EW process: a portion of the raffinate stream will be bled off to accommodate the addition of sulfuric acid to the process.
3. Rinsing water: clean water will be flushed through the exhausted leach interval until target return water quality objectives are met.
4. Runoff and seepage collected from the waste rock pile.

These water sources will be combined in the water management pond below the waste rock dump and treated at a WTP prior to discharge. The total estimated design flow for the WTP during operations is 600,000m^3/y. The WTP will continue to operate for two years into the closure phase of the project to treat rinse water from ongoing reclamation of the resource blocks still undergoing rinsing and drainage from the waste rock dump. It is expected that the flows requiring treatment in closure will be less than the total WTP design flow during operation.

The WTP has been assumed to comprise a lime neutralization process designed to increase pH and remove metals from the influent. The plant design may incorporate the addition of other reagents to effectively meet the treatment targets. A high-density sludge or similar process will be used to reduce the volume of the solids that will be produced at the plant. The actual treatment process is to be determined during future design work once the influent has been characterized and the treatment objectives have been defined.

The deposition of the underflow solids from the WTP will be sent to a secure cell for permanent disposal or removed from the site.

19 MARKET STUDIES AND CONTRACTS

No formal marketing study has been completed for Van Dyke.

Van Dyke will produce and sell a Grade A copper cathode (99.99% pure) to generate revenue for the Project. Sales contracts that may be entered into are expected to be consistent with standard industry practice and like typical contracts for the supply of copper cathode. Much of the copper cathode produced at Van Dyke is expected to be sold on the spot market, and prices are expected to be metal spot prices fixed by the London Metals Exchange (LME).

20 ENVIRONMENTAL STUDIES, PERMITTING AND SOCIAL OR COMMUNITY IMPACT

20.1 Environmental Permitting

Environmental permitting for the Van Dyke mine is prescribed by the federal US Code (USC) laws, the US Code of Federal Regulations (CFR) and Arizona Revised Statutes (ARS). The environmental permitting process is managed by the USEPA and the Arizona Department of Environmental Quality (ADEQ). Other federal and state agencies could also be involved, ie. compliance with the Endangered Species Act would be managed under the authority of the US Fish and Wildlife Service and the Arizona Game and Fish Department. Permitting and environmental information for this report is provided by Greenwood Environmental.

There is a high likelihood that pilot testing will be a permitting necessity. Such tests will need to demonstrate hydraulic control of sub-surface liquids.

The main environmental permits required for the Pilot Test and the commercial-scale operation are presented in Table 20-1. The Table also shows to which project phase the permit applications should be submitted as well as key components of the permit applications. The authority agency is indicated in brackets for each permit.

Table 20-1 Major Steps for Environmental Permitting

Project Phase	Permit Application for in-situ leaching - pilot test (no SX-EW process)	Permit Application for in-situ leaching – commercial- scale operation (with SX-EW process)	Key Components
Feasibility Study and Pilot Test Design (one year prior to pilot testing)	Aquifer Protection Permit for leaching operations and surface impoundments (ADEQ)	-	- Best Available Demonstrated Control Technology - compliance with Aquifer Water Quality Standards - hydrogeological study demonstrating pollutants will not reach the aquifer - monitoring plan - contingency plan with alert levels - closure plan
	Underground Injection Control Permit for injection wells (USEPA)	-	- hydrogeological study demonstrating hydraulic control of injected fluids - well casing integrity - injection conditions - monitoring plan - contingency plan - injection wells closure plan
Basic Engineering of the commercial-scale operation (One year prior to commercial- scale plant construction)	-	Aquifer Protection Permit (ADEQ) for leaching operations and surface impoundment	- Best Available Demonstrated Control Technology - compliance with Aquifer Water Quality Standards

Project Phase	Permit Application for in-situ leaching - pilot test (no SX-EW process)	Permit Application for in-situ leaching – commercial- scale operation (with SX-EW process)	Key Components
			- hydrogeological study demonstrating pollutants will not reach the aquifer - monitoring plan - contingency plan with alert levels - closure plan
	-	Underground Injection Control Permit for injection wells (USEPA)	- hydrogeological study demonstrating hydraulic control of injected fluids - well casing integrity - monitoring plan - injection conditions - contingency plan - injection wells closure plan
	-	AZPDES/Stormwater Pollution Prevention Plan for “point source” discharge to waters of the US, including stormwater, mining activities and process water (ADEQ)	- surface water drainage plan including discharge points, effluent characteristics and flow rates - control measures - effluent limitations (technology based and Water Quality Standards) - monitoring plan
	-	Air Quality Control Permit for point sources e.g. SX-EW and area sources e.g. impoundments, dust (ADEQ)	- air emission rates and factors - control equipment - air dispersion model - compliance with National Air Quality Standards
Detailed Engineering of the commercial-scale operation (6 months prior to commercial-scale plant construction)	-	Survey of cultural resources (SHPO) and endangered species and migratory birds (USEPA)	If cultural resources, endangered species and/or migratory birds are present, mitigation measures will be developed in consultation with government agencies.
	-	Native Plants Notice (ADA)	Authorization to remove protected Native Plants prior to construction.
	-	CWA 404 (USACE) and 401 (ADEQ) for discharge of dredged or fill material into waters of the US	USACE assesses the requirement for a certification managed by ADEQ.
	-	Hazardous waste generator Identification Number (ADEQ)	A system that tracks hazardous materials from their point of generation to their ultimate disposal site.

The main permits required for the pilot test are the APP and the UIC permits with an expected processing time of one year. After the pilot test is designed (at least six months prior to initiating testing), it will be determined if additional environmental authorizations are required for air emissions, storm water, native plants, and hazardous waste. Surveys could also be required for potential cultural resources and endangered species and migratory birds.

For the commercial-scale operation, during the Detailed Engineering phase (at least six months prior to commercial-scale plant construction), a review will be performed to ensure compliance to all applicable environmental legislation.

A review of the major permits and regulatory requirements for the Project is presented in Major Permit Requirements (Knight-Piésold, 2014a).

Key steps to obtain the APP and UIC permits are expected to include the following:

1. Develop APP and UIC Work plans in consultation with ADEQ and EPA. Consultation will be sought from the regulatory agencies to ensure that the data collection program is designed to support an efficient permit application process.
2. Groundwater sampling will be conducted at monitoring wells prior to operations to establish baseline water quality at the site. The results of monitoring and water quality sampling will be used to characterize baseline groundwater conditions and to define site specific water quality conditions for permitting, such as alert levels (AL) and aquifer quality limits (AQLs).
3. Point of Compliance (POC) wells will be installed outside the perimeter of the mineralized zone to monitor the water quality and confirm that no solution migrate downgradient of the facility. POC wells will be installed at various elevations within multiple geologic formations, including the mineralized oxide and mixed zones. Results of groundwater monitoring at POC wells will be reported to EPA and UIC as part of the permit requirements.
4. Hydraulic testing will be conducted to confirm hydraulic control and refine the understanding of test zone hydrogeology, such as porosity and permeability. Numerical models will be developed to evaluate groundwater flow, transport, and geochemistry. This information will be used to support applications for APP and UIC permits that are required for pilot testing.
5. A pilot test will be conducted to evaluate copper recovery rates within a targeted area of the mineralization. Monitoring and reporting criteria during the pilot test will be the same as full-scale commercial operations, including a rinsing period to restore water quality to permit requirements. The pilot test facility will be operated for a period of approximately one year.
6. Application for the commercial-scale APP permit will be made that incorporates results of the pilot test.
7. Quarterly reporting during pilot testing and commercial-scale operations is required to the EPA and ADEQ as part of the UIC and APP permits, respectively.

20.2 Archeological Investigations

To ensure compliance with the National Historic Preservation Act, Desert Fox will consult with the State Historic Preservation Officer who will determine if a cultural resources field survey is needed. If the cultural resources field survey is conducted and indicates that cultural resources are present, the State Historic Preservation Officer will be informed and consulted on cultural resources treatment measures.

According to A.R.S § 41-865, if burial sites, human remains or funerary objects are discovered on site, all activities will be ceased temporarily, and the director of the Arizona State Museum will be notified of the discovery and will determine the appropriate treatment in consultation with the landowner.

20.3 Community Relations

In April 2014, Desert Fox held an open house in Miami to present the project to community members and answer questions about its activities at the Van Dyke project. An information pamphlet was distributed to participants. Desert Fox Project Manager and Corporate personnel also had informative and collaborative meetings with Miami Mayor and other representatives of the Town of Miami. Desert Fox is committed to meet and effectively inform the Town of Miami and its community members at each phase of the Van Dyke project. These meetings will provide opportunities for two-way dialogue and active public involvement in project design and associated mitigation strategies.

The Desert Fox office in Miami is opened to the public for inquiries about the project.

By using in-situ leaching, the copper will be extracted through underground wells with minimal effects for local communities related to surface land use, visual landscape, and noise level during mine operation.

20.4 Environmental Management Plans

Environmental Management Plans are site-specific plans developed to ensure that all necessary measures are identified and implemented to protect the environment and comply with environmental legislation. They include legislative requirements, best management practices, mitigation measures, and monitoring and reporting commitments. Environmental management plans may include but are not limited to:

- Surface Water Management and Monitoring Plan
- Groundwater Management and Monitoring Plan
- Contingency Plans including alert levels and aquifer quality limits
- Sediment and Erosion Control Plan
- Air Quality Management and Monitoring Plan
- Emergency and Spill Response Plan
- Wildlife Management and Monitoring Plan
- Hazardous Materials Management Plan
- Archaeological and Cultural Resources Management Plan
- Transportation Management Plan

20.5 Water Rights and Water Usage

Under the Water Rights Registration Act (A.R.S. § 45-180, et seq.), Desert Fox will file a Statement of Claim of Rights to use public (surface) water of the State of Arizona[1]. There is no groundwater right system (Active Management Areas) in Gila County.

To maintain hydraulic control (an inward hydraulic gradient) in the leach zone, the ISCR operation will operate with a net water surplus and water is not expected to be needed for the leach operations. If water is needed to support operations, it can be sourced from groundwater wells installed in the alluvium unit. Water supply wells installed in the alluvium unit supplied water to historic leach operations. These

[1] *ADWR, 2015. http://www.azwater.gov/AzDWR/SurfaceWater/SurfaceWaterRights/SurfaceWater_FAQ.htm#Statement. 30 June 2015*

wells were reported to produce 250 to 500 gpm. If no longer accessible, similar wells will be installed and used as needed. Water from these wells will have to be reviewed to ensure the water quality is appropriate for use in the process.

20.6 Mine Closure

Closure will require remediation, decommissioning, removal, and reclamation of the project components at such time that they are no longer required and in accordance with the project permits.

The following major activities will be carried out:

- The wellfield will be remediated (rinsed) to restore groundwater quality within the mined areas to levels specified in the project permits
- Buildings and other infrastructure, including the SX-EW plant will be decommissioned and removed
- The earth structures and disturbed areas will be reshaped to achieve long term stability and protection against erosion
- The waste rock dump containing mine development muck will be reshaped and a vegetative cover will be constructed
- Excess water generated from the site, including wellfield rinse water will be treated and released for two years following the cessation of commercial operations
- The water management structures will be decommissioned
- The water treatment plan will be decommissioned

The total estimated closure and reclamation cost for the site is approximately $19M as summarized in Table 20-2. The key activities are described below.

Table 20-2 Estimated Closure and Reclamation Cost

Reclamation and Closure		(000's)
Wellfield Decommissioning		$4,800
Infrastructure Decommissioning		$4,400
SX-EW Decommissioning		$5,400
Water Treatment Plant Decommissioning		$4,600
Total Reclamation and Closure Costs		**$19,200**

20.6.1 Wellfield Decommissioning

The groundwater within the mining area will be remediated by rinsing with water or other solutions as described in Section 16 such that groundwater quality meets the objectives set out in the project permits. It is assumed that one year of rinsing will be required after mining is completed. Rinse water and solutions will be disposed of in accordance with the permit requirements; this may include treatment at the water treatment plant prior to discharge.

The individual wells will be decommissioned and abandoned after the rinsing objectives are met, in accordance with agency and permit requirements. All piping, cables, instrumentation, equipment, and other minor infrastructure will be removed and disposed of.

20.6.2 Infrastructure and Process Plant Decommissioning

Buildings, equipment, and other facilities will be decommissioned as follows:

- All surface facilities and buildings will be removed.
- All equipment will be removed from the underground mine and the access portal will be sealed.
- Concrete foundations will be demolished and buried on site.
- Building materials, pipelines, pumps, electrical equipment, septic systems, and machinery will be trucked to the nearest acceptable disposal facility.
- Solution ponds will be inspected, removed, and disposed of in accordance with the permit and regulatory requirements.
- Disturbed areas will be scarified, re-contoured, and revegetated as needed to minimize erosion.

20.6.3 Waste Rock Dump Reclamation

The waste rock dump and other disturbed areas will be graded to attain a stable configuration, establish effective drainage, minimize erosion, and protect surface water resources. To the extent practicable, grading will blend the topography of disturbed areas with the surrounding natural terrain. The regraded surface will be scarified where necessary prior to placement of topsoil to establish a bond between subsoil and topsoil. The stable surfaces of the waste rock dump will be revegetated in accordance with applicable post-mining land use plans and permit requirements.

20.6.4 Water Management Ponds and Water Treatment Plant

Closure of the water management pond (WMP) and plant site runoff ponds will consist of water removal, characterization testing of the residual sediment, liner removal, regrading, and revegetation. Water or solutions contained within the ponds will be pumped to the water treatment plant (WTP) prior to discharge. Following removal of all free liquids from the WMP and plant site runoff ponds, any deposited sediments will be allowed to desiccate to the extent possible to permit safe access for personnel and equipment. Sediment will be removed and disposed of as appropriate.

The liners will be washed with water following removal of all remaining liquid from the pond. The wash water will be pumped to the WTP prior to discharge. The liners will be cut, removed, and inspected for potential use elsewhere, sold, or disposed of in an off-site landfill. The embankment fill material and stockpiled soils will be removed and used to fill the pond excavations. The area will be re-graded to its natural slope, covered with any stockpiled growth medium (topsoil), and revegetated with appropriate plant species.

21 CAPITAL AND OPERATING COSTS

21.1 Capital Cost Estimate

21.1.1 Basis of Estimate

The Van Dyke Copper Project estimated cost is prepared at a scoping level. This estimate conforms to the American Association of Cost Engineers (AACE) Class 5 estimate and the accuracy level is -30% to +50% based on an engineering definition of 0-2%. A detailed Work Breakdown Structure (WBS) is not provided, however, a WBS code is assigned to separate the estimate into sections, described in Table 21-1.

All costs expressed in this section are in US dollars for Q4 2020. Escalation, financing interest, force majeure, labour disputes, and currency fluctuations are excluded from this estimate. All costs for exploration testing and continued study are excluded from this estimate.

21.1.2 Capital Estimate Sources

The Class 5 estimate is prepared by Moose Mountain Technical Services (MMTS) with contributions from Ausenco, Piteau, and Knight-Piésold (KP). The following Table describes the estimate methodology, source, and expected accuracy of the estimate by WBS code.

Table 21-1 Estimate Type, Source, and Accuracy

WBS Code	Description	Estimate Type	Source	Expected Accuracy
A	General Site	Factored	MMTS	-20% / + 30%
B	ISCR Drilling and Development	Estimated	Piteau	-20% / + 30%
C	Underground Mining	Factored	MMTS	-20% / + 30%
D	SX-EW Plant and Processing	Estimated	Ausenco	-20% / + 30%
E	Buildings and Facilities	Factored	MMTS/KP	-20% / + 30%
X	Project Indirects	Factored	MMTS	-20% / + 30%
Y	Owner's Costs	Factored	MMTS	-20% / + 30%
Z	Contingency	Factored	MMTS	-20% / + 30%

21.1.3 Capital Cost Summary

The capital cost estimate consists of the above direct costs, plus indirect cost factors, for the underground mining, ISCR drilling and wellfield development, the SX-EW plant, and buildings and facilities. (See Section 18 for descriptions of the facilities and services). MMTS uses factored estimates for Work Breakdown (WBS) codes A, C, E, and all Indirects. For Code B, ISCR drilling costs, Piteau analyzed and produced detailed estimates for drilling and permeability enhancement unit costs. For Code D, SX-EW Plant, Ausenco estimated costs are based on similar local projects and past internal studies.

The capital cost estimate is a factored estimate using similar projects in the region as data sources. As such, material and labour costs are not detailed, but are assumed part of the line-item cost. The capital estimate is divided into Initial Capital and Sustaining Capital. Initial Capital is defined as all costs incurred until start-up of the processing facility, including pre-production operating costs. Sustaining capital is all capital required after start-up for additional or replacement equipment. Initial Capital costs are presented in the following Table:

Table 21-2 Initial Capital Cost Summary

WBS Code	Description	Cost (US$ 000s)
A	General Site	11,440
B	ISCR Well Field	6,035
C	Underground Mining	49,676
D	Processing	62,225
E	Buildings and Facilities	9,750
PP	Pre-Production Operating Costs*	22,287
Total Direct Costs		**161,413**
X	Indirect Costs	48,827
Y	Owner's Costs	23,913
Total Indirect Costs		**74,740**
Z	Contingency (30% of Direct and Indirect))	56,386
Total Capital Cost		**290,539**

**Indirects, Owner's Costs, or Contingency is not applied to Pre-Production Operating costs.*

21.1.4 Indirect Costs

Factors used for estimating indirect costs are shown in Table 21-3.

Construction Indirect costs are calculated as a percentage of direct construction costs. This line captures charges that construction contractors might apply or include in their rates, including but not limited to:

- Temporary facilities and structures, support systems, fencing
- Temporary utilities such as power, sewer, waste disposal
- Mob and Demob charges
- Construction tools, small tools, and other consumables
- Safety training, orientation, safety officers and inspections
- Medical/First Aid facilities
- Contractor margin, supervision, and staff support.

Table 21-3 Indirect Cost Factors

Indirect Categories and Factors	
Construction Indirects - % of Direct Costs	15%
Spares - % of Processing Costs	5%
Initial Fills - % of Processing Costs	0%
Freight and Logistic - % of Direct Costs	5%
Commissioning and Pre-operational Start-up	Allowance
EPCM - % of Direct Costs	10%
Vendors	Allowance
Taxes and Duties	3%

21.1.5 Contingency

Contingency is included based on the expected level of accuracy and engineering definition. Recognizing this is a scoping level estimate with engineering definition consistent with a scoping study; the contingency covers undefined items of work within the scope of the project and is set at 30% of direct and indirect costs.

21.2 Sustaining Capital Costs

Sustaining capital costs are all capital expenditures incurred after production start-up. The Van Dyke project requires additional underground development and continuous well field expansion. Sustaining capital costs for the Van Dyke project, excluding closure and reclamation are shown in Table 21-4.

Table 21-4 Sustaining Capital Cost Summary

Sustaining Capital Estimate Summary (000's)		
WBS Code	**Description**	**COST ($US 000s)**
A	General Site	0
B	ISCR Well Field	46,147
C	Underground Mining	23,903
D	Processing	5,420
E	Buildings and Facilities	0
Total Sustaining Capital		75,470
		US$ 0.07 /lb Cu

21.3 Operating Costs

Operating costs are summarized in Table 21-5 below for the Life of Mine (LOM).

Table 21-5 Total Operating Cost Summary

Operating Costs	LoM Cost (000's)	LoM Unit Cost (US$/lb Cu)
Drilling Cost	156,417	0.14
Frac Cost	88,009	0.08
Pump Costs	23,641	0.02
Drill Electricity	5,106	0.00
ISCR Well Field Acid Costs	82,579	0.08
Wellfield Monitoring (KP)	7,540	0.01
Pumping Electricity Costs	122,466	0.11
Maintenance Costs	130,348	0.12
Processing Costs	220,210	0.20
G&A, Offsite Costs	187,179	0.17
Water Treatment	33,150	0.03
Reclamation and Closure Costs	19,184	0.02
TOTAL OPEX	1,075,830	0.98

** All numbers are rounded following Best Practice Principles.*

21.3.1 ISCR Well Field Acid Costs

See Section 16 for details on drilling and stimulation for operating the well field, a cost for procuring acid required for the ISCR operations is used. This cost is based upon a delivered sulphuric acid cost of $100/ton and a consumption rate of 0.68kg acid per lb Cu.

All other costs for well field development, instrumentation, piping, etc., are included as capital and sustaining capital costs.

21.3.2 ISCR Pumping and Electrical Costs

Pumping costs are based on the average flow rate for both leaching and rinsing for each year. Flow rates are detailed in the mine plan (see Table 16-7). An average operating depth is used over the LOM to estimate the required head pressure, and thereby estimate the horsepower and power consumption requirements.

21.3.3 ISCR Well Maintenance Costs

For this study, a detailed analysis of well field maintenance requirements was not completed. A factored estimate using $500/well is used based on comparable projects.

21.3.4 Processing Costs

Processing costs are estimated by Ausenco based on the processing and operations design as outlined within Section 17.

21.3.5 G&A and Offsite Costs

G&A costs include labour and administration costs, office supplies, insurance, legal fees, and head office expenses. This is a factored estimate based on similar projects and scaled for throughput volume.

Offsite costs include all transport and transaction fees associated with the copper product sales.

21.3.6 Water Treatment Costs

Water Treatment costs are estimated by Knight-Piésold. Section 18.9 describes the water treatment facilities and activities, including the water treatment plant.

21.3.7 All in Sustaining Costs (AISC)

The total cash cost per pound of copper produced includes all operating costs, royalties, severance taxes, reclamation and closure costs and is estimated to be US$1.14/lb Cu over the life of the mine, as summarized in Table 21-6.

Table 21-6 All in Sustaining Costs

Cash Cost Category	Unit Cost ($US/lb)
Total Operating Costs	0.98
Royalties	0.07
Severance Tax	0.02
Sustaining Capital Costs	0.07
All in Sustaining Cost (AISC)	1.14

21.4 Closure and Reclamation

Closure and reclamation will be in accordance with the requirements set out in the State and Federal permits required to develop and operate the project and includes the following major activities:

- Rinse the underground wellfield to restore groundwater quality within the mined area to levels specified in the project permits,
- Decommission, sell and remove all Buildings and other infrastructure, including the SX-EW plant
- Reshape the earth structures and disturbed areas to achieve long term stability and protection against erosion,
- Reshape the waste rock dump and construct vegetative cover,
- Treat the excess water, including wellfield rinse water, for two years following the cessation of commercial operations,
- Decommission the water management structures, and
- Decommission the water treatment plant.

The estimated Reclamation and Closure costs are summarized in the Table below:

Table 21-7 Estimated Reclamation and Closure Costs

Reclamation and Closure	Cost (US$ 000's)
Well Field Decommissioning	$4,434
Infrastructure Decommissioning	$4,043
SX-EW Decommissioning	$3,180
Water Treatment Plant Decommissioning	$4,054
Total Reclamation and Closure Costs	**$15,711**

21.5 Manpower Estimate

The Van Dyke Project is estimated to employ up to 134 workers directly as summarized in Table 21-8. Indirect jobs are estimated as a factor of three times direct jobs for an additional 402.

Table 21-8 Direct and Indirect Jobs

Department / Area	# Positions		Department / Area	# Positions
ISCR Operations	**19**		**Processing**	**56**
Operations Superintendent	1		Plant Superintendent	1
Surveyor	1		Maintenance Superintendent	1
Drilling Engineer	1		Metallurgist (Snr. and Plant)	2
Geologist	2		Gen Foreman	2
Environmental Superintendent	1		Foreman	4
Environmental Engineer	1		Operator	8
Environmental Tech	4		Labourers/Helpers	8
Hydrologist	1		Mechanics	8
Sampling Technician	4		Electricians	4
Laboratory Scientist	1		Welders	4
Laboratory Technician	2		Instrumentation Technician	4
			Crane Operators	2
Underground	**24**		Clerks	2
Underground Project Manager	1		Maintenance Planner	2
Project Superintendent	1		Lab Technicians	4
Night Captain	1			
Safety Superintendent	1		**ISCR Maintenance**	**20**
Project Engineer	1		Maintenance Superintendent	1
Purchaser/Clerk	1		Pipefitter	4
Lead Mechanic	1		Mechanic	4
Mechanics	2		Electrician	4
Electrician	1		Instrument Mechanic	4
Shift Bosses	2		Field Technician	4
Jumbo Operators	2			
Bolter Operators	2		**General and Administration**	**15**
Scooptram Operators	2		General Manager	1
Truck Operators	2		Administrative Assistant	1
Raise Miners	2		Warehouse Supervisor	2
Nippers	2		Warehouseman	8
			Purchasing Manager	1
			Purchasing Assistant	2
			Estimated Total	**134**
			Indirect Jobs (factor of 3)	**402**

22 ECONOMIC ANALYSIS

22.1 Cautionary Statement

The results of the economic analyses discussed in this section represent forward-looking information as defined under Canadian securities law. The results depend on inputs that are subject to known and unknown risks, uncertainties, and other factors that may cause actual results to differ materially from those presented here. Information that is forward-looking includes the following:

- the mineral resource estimate
- the assumed commodity prices and exchange rate (exchange rate not used in study $US only)
- the proposed mine production plan
- projected mining and process recovery rates
- operating and sustaining costs
- closure costs and requirements
- environmental permitting and social risks
- Additional risks to the forward-looking information include:
  - changes to costs of production
  - unrecognized environmental risks
  - unanticipated reclamation expenses
  - mineralized material grade, continuity, or recovery rates
  - geotechnical or hydrogeological parameter assumptions
  - plant processes assumptions
  - changes to availability of electrical power and the power rates
  - ability to maintain the social licence to operate
  - accidents, labour disputes, and other risks of the mining industry
  - changes to interest rates
  - potential unknown changes to tax rates

Calendar years used in the financial analysis are provided for conceptual purposes only. Permits still must be obtained in support of operations.

22.2 Financial Model Parameters

The economic analysis has been performed using a base case copper price of US$3.15/lb, like long term copper prices used for recently published NI43-101 reports. Additional input parameters include a three-year pre-production period, a 17-year mine life and five post-production years for reclamation/closure and monitoring. The economic analysis includes allowances for capital, operating, sustaining, royalties, reclamation, and closure costs. The post-tax cashflow also considers city, county, state, and federal taxes. No price inflation or escalation factors have been accounted for.

Economic Analysis for the Van Dyke Copper project is based upon the following inputs:

- A LOM Copper price of $3.15/lb Cu as recommended by Desert Fox.
- No inflation or escalation applied to revenues or costs.
- A Capital Cost Estimates prepared by MMTS. Factored estimate including Indirect Costs, EPCM, Owner's Costs and Contingency.
- Capital Costs also include a 3% tax factor for the Arizona Privilege tax.
- Mine Production Schedule and Operating Costs prepared by MMTS, based on copper production rate, and factored $/lb Cu operating costs.
- Water treatment capital and operating cost estimate prepared by Knight-Piésold
- Results are based on 100% ownership (except in the Quiet title Area) and an NSR royalty of 2.5%
- Revenue split based in the Quiet Title (QT) Area of 62.5% Desert Fox, 37.5% QT.
- Capital costs to be funded with 100% equity (no financing costs are included).
- Taxes are calculated as described below.
- Property taxes are not included in this study.

22.3 Taxes

The Van Dyke project has been evaluated on a post-tax basis by R&A CPAs of Tucson, Arizona. Federal and state income tax laws and rates in effect as of December 30, 2020 were used for all tax calculations unless there is a known change to become effective at a future date. The federal corporate tax rate is 21% and the Arizona corporate tax rate is 4.90%.

Year Y-3 represents year 2021. This factor is important when determining federal depreciation and the applicable bonus depreciation percentage. The applicable percentages for bonus depreciation are as follows:

- 2021 – 2022 – 100%
- 2023 – 80%
- 2024 – 60%
- 2025 – 40%
- 2026 – 20 %
- 2027 and forward – 0%

Based on the Capital Schedule of the spreadsheet, assets were classified according to the current IRS rules. Section A (General Site) were classified as 15-year land improvements, Section E (Building and Facilities) were classified as 39-year nonresidential property, and Sections B – D were classified as 7-year mining assets. In addition, the indirect costs were allocated to the pools based on the ratio of total capital spending.

For federal purposes, depreciation was calculated using the Modified Accelerated Cost Recovery System (MACRS) schedules for the lives notated above as well as bonus depreciation being claimed at the allowable percentages. Beginning in 2021, federal net operating loss carryforwards are limited to 80 percent of taxable income. Arizona separately calculates net operating losses and does not apply this limitation. There is no interest expense included in the cash flow operating or other costs. If incurred, this expense could be limited under 163(j) of U.S. federal tax code.

For Arizona purposes depreciation was calculated using the MACRS depreciation table. Bonus depreciation is not allowed for corporations and the cost of property placed in service during each year exceeded the limits to fully expense assets under IRC Section 179. Arizona state and local severance tax is 2.5% for state and 0.01% for the city of Miami.

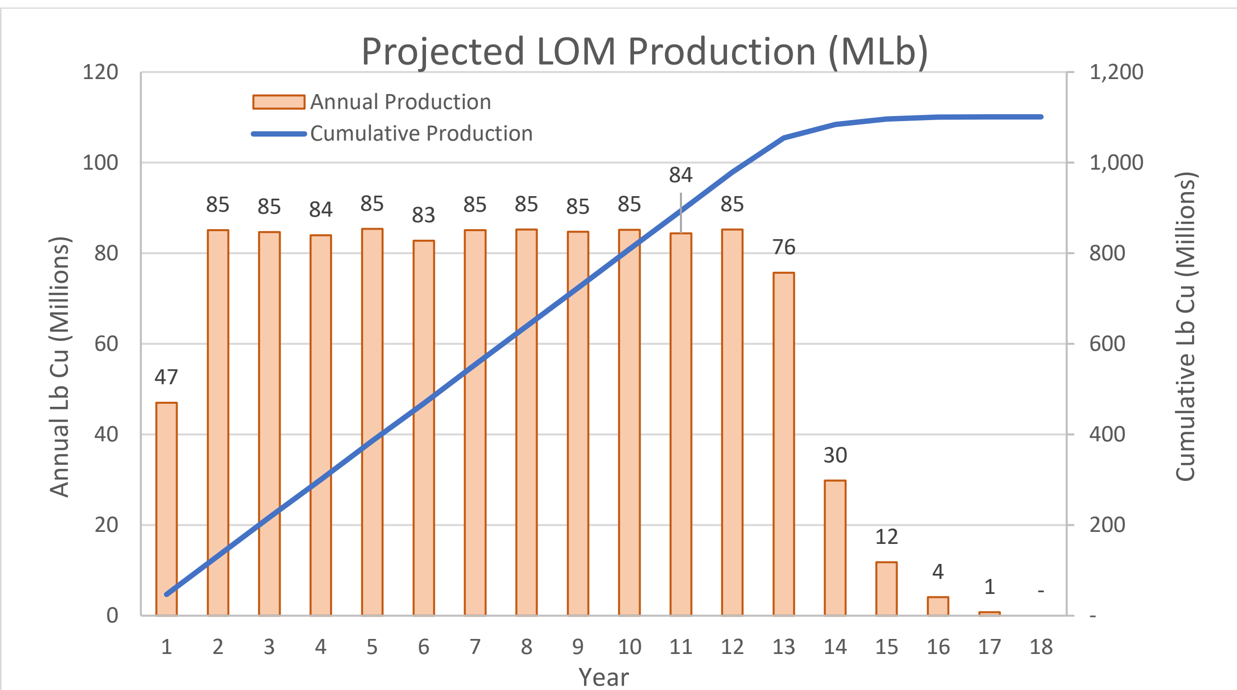
Gila County, Arizona imposes a personal property tax on certain business assets. The amount of projected tax due is not able to be determined and is not included in the Post-Tax Cash Flow. The pre-tax and post-tax cashflows are summarized in Table 22-1 and Table 22-2.

22.4 Cashflow Analysis

The cashflow analysis was performed using a base case discount rate of 7.5%, which is the same as other ISCR projects in Arizona (Florence, 2017).

22.4.1 Copper Production

Copper production over the life of the mine is 1.1 billion pounds of copper. The copper production in Years 2 through 12 is approximately 85Mlbs annually (106tpd) with ramp up and ramp down as illustrated in the plot of Figure 22-1.



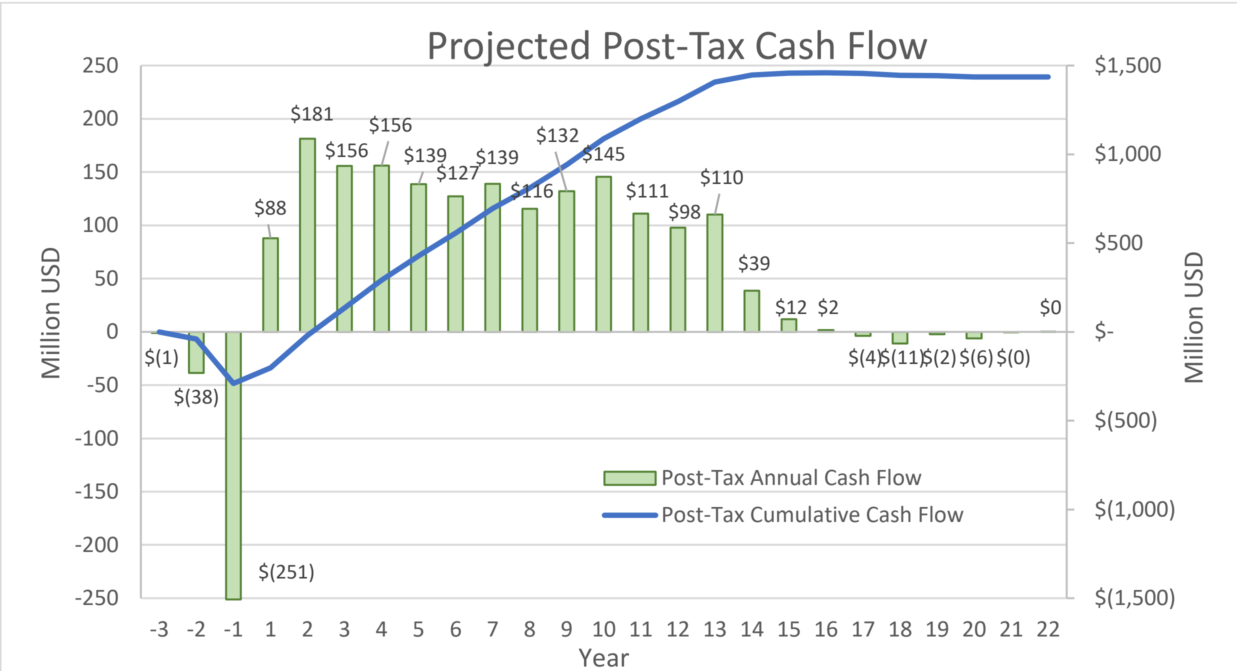
Source: MMTS, 2021

Figure 22-1 Annual and Cumulative Copper Production (Mlbs)

22.4.2 Cashflow Results

The economic analysis for the Base Case before taxes indicates an IRR of 48.4%, an NPV of US$798.6 million and a payback period of 2.0 years. The economic analysis after taxes indicates an IRR of 43.4%, and NPV of US$644.7 million and a payback period of 2.1 years. The Base Case Net Free Cash Flow after recovery of all operating capital and sustaining costs before tax is estimated to be US$1.757 billion and US$1.436 billion after tax.

The cashflow on an annualized basis is shown in Figure 22-2 for the post-tax case.



Source: MMTS, 2021

Figure 22-2 Projected Post-Tax Cashflow

A summary of the Project Base Case economics on a pre-tax basis are shown in Table 22-2. The summary also compares the results to the 2015 PEA results, illustrating the improved economics. The cashflow on an annualized basis is provided in Tables 22-2 and 22-3 for the pre-tax and post-tax cases, respectively.

Table 22-1 Summary and Comparison of Economic Parameters

		Base Case	
Production and Cost Summary	**Units**	**2015 PEA**	**2020 PEA**
Life of Mine (LOM)	years	11	17
Copper Cathode Sold	Million lbs.	456.9	1101.0
Copper Price	$US/lb	3.00	3.15
Gross Revenue	M$US	1,370.0	3,468.3
Royalties	M$US	31.5	82.5
Total Cash Costs	M$US	550.2	1,075.8
Total Cash Costs ($/lb recovered copper)	$US/lb copper	1.20	0.98
C1 Cash Costs ($/lb recovered copper) *	$US/lb copper	1.08	0.86
Sustaining Costs ($/lb recovered copper)	$US/lb copper	0.15	0.07
All In sustaining cost (AISC)**	$US/lb copper	1.36	1.14
Initial Capital Costs (includes contingency)	M$US	204.4	290.5
Taxes	M$US	110.9	321.0
Cashflow Parameters and Outputs			
Discount Rate	%	8.0%	7.5%
Pre-tax Net Free Cash Flow - EBIDTA	M$US	453.1	1,757.3
Pre-tax NPV	M$US	213.1	798.6
Pre-tax IRR	%	0.4	48.4%
Pre-tax Payback	years	2.3	2.0
Post-tax Net Free Cash Flow	M$US	342.2	1,436.3
Post-tax NPV	M$US	149.5	644.7
Post-tax IRR	%	27.9%	43.4%
Post-tax Payback	years	2.9	2.1

EBIDTA is a financial term showing earnings before deduction of interest, taxes, depreciation and amortization
* includes mining, processing, site services, G&A, transportation, and Royalty Costs
** includes Total Cash Cost, Sustaining Capital, Royalties, Severance Taxes
lbs=pounds, M$US=million United States dollars. Numbers are rounded

Note 1: AISC and C1 costs are non-GAAP financial measures which do not have standardized meanings prescribed by International Financial Reporting Standards (IFRS). These measures are meant to provide further information to investors and should not be considered in isolation or used as a substitute for other measures of performance prepared in accordance with IFRS.

Table 22-2 Pre-Tax Cash Flow

	Period	Y-3	Y-2	Y-1	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11	Y12	Y13	Y14	Y15	Y16	Y17	Y18	Y19	Y20	Y21	Y22	LoM
Total Copper Produce	lbs		-	-	46,994,237	85,110,241	84,661,816	83,976,337	85,359,184	82,778,502	85,134,530	85,253,585	84,713,768	85,202,348	84,381,518	85,271,086	75,701,416	29,812,401	11,830,076	4,088,755	781,012	-	-	-	-	-	1,101,050,811
Total Revenue	(000's)		$ -	$ -	$ 148,032	$ 268,097	$ 266,685	$ 264,525	$ 268,881	$ 260,752	$ 268,174	$ 268,549	$ 266,848	$ 268,387	$ 265,802	$ 268,604	$ 238,459	$ 93,909	$ 37,265	$ 12,880	$ 2,460	$ -	$ -	$ -	$ -	$ -	$ 3,468,310
Costs:																											$ -
Royalties			$ -	$ -	$ (3,701)	$ (6,702)	$ (6,663)	$ (6,596)	$ (6,353)	$ (6,030)	$ (6,502)	$ (6,620)	$ (6,633)	$ (6,674)	$ (6,053)	$ (5,656)	$ (5,186)	$ (2,028)	$ (800)	$ (280)	$ (55)	$ -	$ -	$ -	$ -	$ -	$ (82,533)
Initial Capital	(000's)	$ (1,021)	$(38,419)	$(228,812)																							$ (268,252)
Sustaining Capital	(000's)				$ (4,139)	$ (3,329)	$ (3,278)	$ (2,216)	$ (7,115)	$ (2,975)	$ (7,973)	$ (23,787)	$ (5,808)	$ (3,784)	$ (5,606)	$ (5,100)	$ (40)	$ (40)	$ (40)	$ (40)	$ (40)	$ (40)	$ (40)	$ (40)	$ (40)	$ 350	$ (75,120)
Operating Costs:																											
Surface ISL Operations																											
Surface ISL Mainten.																											
ISL Well Field	(000's)		$ -	$ (21,839)	$ (26,456)	$ (24,608)	$ (24,464)	$ (18,259)	$ (17,873)	$ (24,756)	$ (24,638)	$ (40,857)	$ (40,475)	$ (24,526)	$ (39,078)	$ (36,767)	$ (6,576)	$ (3,135)	$ (1,786)	$ (1,205)	$ (957)	$ (61)	$ (61)	$ -	$ -	$ -	$ (378,377)
ISL Pumping	(000's)		$ -	$ -	$ (1,300)	$ (3,241)	$ (4,955)	$ (6,680)	$ (8,105)	$ (9,463)	$ (9,607)	$ (9,084)	$ (9,501)	$ (10,278)	$ (10,084)	$ (9,435)	$ (9,504)	$ (8,085)	$ (5,956)	$ (3,453)	$ (2,222)	$ (1,513)	$ -	$ -	$ -	$ -	$ (122,466)
ISL Maintenance	(000's)		$ -	$ (448)	$ (3,288)	$ (4,848)	$ (6,384)	$ (7,416)	$ (7,056)	$ (6,504)	$ (6,312)	$ (7,296)	$ (9,000)	$ (9,792)	$ (11,040)	$ (12,072)	$ (9,552)	$ (6,816)	$ (5,040)	$ (2,400)	$ -	$ -	$ -	$ -	$ -	$ -	$ (115,264)
Processing	(000's)		$ -	$ -	$ (19,338)	$ (33,441)	$ (33,275)	$ (33,021)	$ (33,533)	$ (32,578)	$ (33,450)	$ (33,494)	$ (33,294)	$ (33,475)	$ (33,171)	$ (33,500)	$ (29,960)	$ (12,981)	$ (6,327)	$ (3,463)	$ (2,239)	$ -	$ -	$ -	$ -	$ -	$ (440,539)
Reclam. and Closure			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ (1,639)	$ (9,238)	$ (2,189)	$ (6,119)	$ -	$ -	$ (19,184)
TOTAL COSTS		$ (1,021)	$(38,419)	$(251,099)	$ (58,221)	$ (76,169)	$ (79,019)	$ (74,188)	$ (80,035)	$ (82,306)	$ (88,481)	$ (121,138)	$ (104,711)	$ (88,529)	$ (105,033)	$ (102,531)	$ (60,818)	$ (33,085)	$ (19,949)	$ (10,841)	$ (7,152)	$ (10,852)	$ (2,290)	$ (6,159)	$ (40)	$ 350	$ (1,501,735)
PRE-TAX Profit&Loss	(000's)	$ (1,021)	$(38,419)	$(251,099)	$ 89,811	$ 191,928	$ 187,666	$ 190,337	$ 188,846	$ 178,446	$ 179,693	$ 147,411	$ 162,137	$ 179,859	$ 160,769	$ 166,073	$ 177,642	$ 60,824	$ 17,316	$ 2,038	$ (4,692)	$ (10,852)	$ (2,290)	$ (6,159)	$ (40)	$ 350	$ 1,966,575
Quiet Title Revenue	62.5%	$ -	$ -	$ -	$ -	$ -	$ (274)	$ (1,106)	$ (22,833)	$ (29,489)	$ (11,964)	$ (4,544)	$ (2,027)	$ (2,125)	$ (31,573)	$ (57,720)	$ (50,971)	$ (18,254)	$ (5,379)	$ (581)	$ 1,106	$ -	$ -	$ -	$ -	$ -	$ (237,735)
Quiet Title Capital	####	$ -	$ -	$ -	$ -	$ -	$ 30	$ 119	$ 2,514	$ 3,333	$ 1,381	$ 640	$ 258	$ 245	$ 4,037	$ 7,220	$ 5,292	$ 2,180	$ 895	$ 284	$ 45	$ -	$ -	$ -	$ -	$ -	$ 28,474
Net Quiet Title Rev.		$ -	$ -	$ -	$ -	$ -	$ (244)	$ (988)	$ (20,319)	$ (26,156)	$ (10,583)	$ (3,904)	$ (1,769)	$ (1,880)	$ (27,536)	$ (50,499)	$ (45,679)	$ (16,074)	$ (4,483)	$ (297)	$ 1,151	$ -	$ -	$ -	$ -	$ -	$ (209,260)
Quiet title portion																											$ -
Net Quiet Title Rev.							$ (244)	$ (988)	$ (20,319)	$ (26,156)	$ (10,583)	$ (3,904)	$ (1,769)	$ (1,880)	$ (27,536)	$ (50,499)	$ (45,679)	$ (16,074)	$ (4,483)	$ (297)	$ 1,151	$ -	$ -	$ -	$ -	$ -	$ (209,260)
*royalty =2.5%*ProfiT-(QT * 62.5%*CUPRICE). Capital Allocation is Initial Capital / Total lb Cu = $/lb Cu * lb Cu from Quiet Title *62.5% ownership*																											
Pre-Tax Profit and Loss		$ (1,021)	$(38,419)	$(251,099)	$ 89,811	$ 191,928	$ 187,422	$ 189,350	$ 168,527	$ 152,290	$ 169,110	$ 143,507	$ 160,368	$ 177,979	$ 133,234	$ 115,574	$ 131,963	$ 44,750	$ 12,832	$ 1,741	$ (3,541)	$ (10,852)	$ (2,290)	$ (6,159)	$ (40)	$ 350	$ 1,757,315
Pre-tax P&L Cum.	(000's)	$ (1,021)	$(39,439)	$(290,539)	$(200,728)	$ (8,800)	$ 178,622	$ 367,971	$ 536,499	$ 688,789	$ 857,899	$ 1,001,406	$ 1,161,774	$ 1,339,753	$ 1,472,986	$ 1,588,560	$ 1,720,523	$ 1,765,273	$ 1,778,106	$ 1,779,847	$ 1,776,306	$ 1,765,454	$ 1,763,164	$ 1,757,005	$ 1,756,965	$ 1,757,315	

Table 22-3 Post-Tax Cash Flow

	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	
Period	**Y-3**	**Y-2**	**Y-1**	**Y1**	**Y2**	**Y3**	**Y4**	**Y5**	**Y6**	**Y7**	**Y8**	**Y9**	**Y10**	**Y11**	**Y12**	**Y13**	**Y14**	**Y15**	**Y16**	**Y17**	**Y18**	**Y19**	**Y20**	**Y21**	**Y22**	**LoM**
Total revenue	$ -	$ -	$ -	$ 148,032	$ 268,097	$ 266,685	$ 264,525	$ 268,881	$ 260,752	$ 268,174	$ 268,549	$ 266,848	$ 268,387	$ 265,802	$ 268,604	$ 238,459	$ 93,909	$ 37,265	$ 12,880	$ 2,460	$ -	$ -	$ -	$ -	$ -	$ 3,468,310
Operating Costs	$ -	$ -	$ (22,287)	$ (50,381)	$ (66,138)	$ (69,078)	$ (65,377)	$ (66,567)	$ (73,301)	$ (74,006)	$ (90,730)	$ (92,270)	$ (78,071)	$ (93,373)	$ (91,774)	$ (55,592)	$ (31,017)	$ (19,109)	$ (10,521)	$ (7,057)	$ (10,812)	$ (2,250)	$ (6,119)	$ -	$ -	$ (1,075,830)
Depletion	$ -	$ -	$ -	$ -	$ (39,209)	$ (39,003)	$ (38,689)	$ (39,379)	$ (38,208)	$ (39,251)	$ (39,289)	$ (39,032)	$ (39,257)	$ (38,962)	$ (39,442)	$ (34,991)	$ (13,782)	$ (4,320)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ (482,817)
Depreciation	$ -	$ -	$ -	$ (164,605)	$ (25,495)	$ (18,878)	$ (13,995)	$ (11,614)	$ (12,339)	$ (13,060)	$ (12,518)	$ (10,622)	$ (9,379)	$ (8,471)	$ (7,952)	$ (7,237)	$ (5,988)	$ (4,122)	$ (2,373)	$ (1,698)	$ (1,283)	$ (808)	$ (582)	$ (582)	$ (347)	$ (333,947)
Royalties	$ -	$ -	$ -	$ (3,701)	$ (6,702)	$ (6,663)	$ (6,596)	$ (6,353)	$ (6,030)	$ (6,502)	$ (6,620)	$ (6,633)	$ (6,674)	$ (6,053)	$ (5,656)	$ (5,186)	$ (2,028)	$ (800)	$ (280)	$ (55)	$ -	$ -	$ -	$ -	$ -	$ (82,533)
Severance tax (Arizona)	$ -	$ -	$ -	$ (796)	$ (1,790)	$ (1,926)	$ (2,078)	$ (1,969)	$ (1,702)	$ (1,974)	$ (1,937)	$ (2,025)	$ (2,237)	$ (1,703)	$ (1,476)	$ (1,621)	$ (503)	$ (110)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ (23,847)
Net quiet title revenue split	$ -	$ -	$ -	$ -	$ -	$ (244)	$ (988)	$ (20,319)	$ (26,156)	$ (10,583)	$ (3,904)	$ (1,769)	$ (1,880)	$ (27,536)	$ (50,499)	$ (45,679)	$ (16,074)	$ (4,483)	$ (297)	$ 1,151	$ -	$ -	$ -	$ -	$ -	$ (209,260)
Federal Taxable Income	$ (50)	$ (50)	$ (22,337)	$ (73,247)	$ 124,113	$ 125,703	$ 131,012	$ 117,329	$ 98,620	$ 117,430	$ 108,334	$ 108,929	$ 124,515	$ 85,345	$ 68,322	$ 83,871	$ 23,353	$ 4,145	$ (642)	$ (5,249)	$ (12,144)	$ (3,108)	$ (6,751)	$ (632)	$ (397)	$ 1,196,414
Cumulative Federal Taxable Income	$ (50)	$ (100)	$ (22,437)	$ (95,684)	$ 28,429	$ 154,132	$ 285,144	$ 402,473	$ 501,093	$ 618,523	$ 726,857	$ 835,787	$ 960,302	$ 1,045,647	$ 1,113,969	$ 1,197,840	$ 1,221,192	$ 1,225,338	$ 1,224,696	$ 1,219,447	$ 1,207,302	$ 1,204,194	$ 1,197,443			
Income taxes																										
Federal corp. income tax	$ -	$ -	$ -	$ -	$ 5,970	$ 26,398	$ 27,513	$ 24,639	$ 20,710	$ 24,660	$ 22,750	$ 22,875	$ 26,148	$ 17,923	$ 14,348	$ 17,613	$ 4,904	$ 871	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 257,321
Arizona corp. income tax	$ 50	$ 50	$ 50	$ 1,796	$ 4,650	$ 5,189	$ 5,791	$ 5,350	$ 4,396	$ 5,368	$ 5,217	$ 5,568	$ 6,375	$ 4,359	$ 3,482	$ 4,283	$ 1,164	$ 175	$ 50	$ 50	$ 50	$ 50	$ 50	$ 50	$ 50	$ 63,663
Total income taxes	$ 50	$ 50	$ 50	$ 1,796	$ 10,620	$ 31,587	$ 33,304	$ 29,990	$ 25,106	$ 30,028	$ 27,967	$ 28,443	$ 32,523	$ 22,281	$ 17,829	$ 21,895	$ 6,068	$ 1,045	$ 50	$ 50	$ 50	$ 50	$ 50	$ 50	$ 50	$ 320,983
Effective tax rate	N/A	N/A	N/A	N/A	9%	25%	25%	26%	25%	26%	26%	26%	26%	26%	26%	26%	26%	25%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
POST-TAX Profit and Loss	$ (1,071)	$ (38,469)	$(251,149)	$ 88,015	$ 181,308	$ 155,835	$ 156,046	$ 138,538	$ 127,184	$ 139,082	$ 115,540	$ 131,925	$ 145,456	$ 110,952	$ 97,745	$ 110,068	$ 38,682	$ 11,787	$ 1,691	$ (3,591)	$ (10,902)	$ (2,340)	$ (6,209)	$ (90)	$ 300	$ 1,436,332
POST-TAX P&L Cumulative	$ (1,071)	$ (39,539)	$(290,689)	$ (202,674)	$ (21,366)	$ 134,469	$ 290,515	$ 429,052	$ 556,237	$ 695,318	$ 810,859	$ 942,783	$ 1,088,239	$ 1,199,191	$ 1,296,936	$ 1,407,004	$ 1,445,685	$ 1,457,472	$ 1,459,163	$ 1,455,572	$ 1,444,670	$ 1,442,331	$ 1,436,122	$ 1,436,032	$ 1,436,332	

22.5 Sensitivity Analyses

Several sensitivity analyses have been run to determine the projects robustness. The effect of discount Rate, Copper Price, metallurgical recovery, capital cost and operating costs have all been evaluated.

The pre-tax and post-tax Net Present Value (NPV) for the Van Dyke ISCR project at various discount rates is summarized in the Table below with the 7.5% Base Case discount rate highlighted.

Table 22-4 Net Present Value – Sensitivity to Discount Rate

Discount Rate	NPV Pre-tax (M$US)	NPV Post-tax (M$US)
5.0%	$ 1,031.0	$ 835.6
7.5%	$ 798.6	$ 644.7
8.0%	$ 759.9	$ 612.4
10.0%	$ 623.4	$ 499.8
12.0%	$ 513.2	$ 408.8

The effect of an increase in copper price on the both the pre-tax and post-tax cashflow, NPV and IRR is summarized in the Table below.

Table 22-5 Project Economics Sensitivity to Copper Price

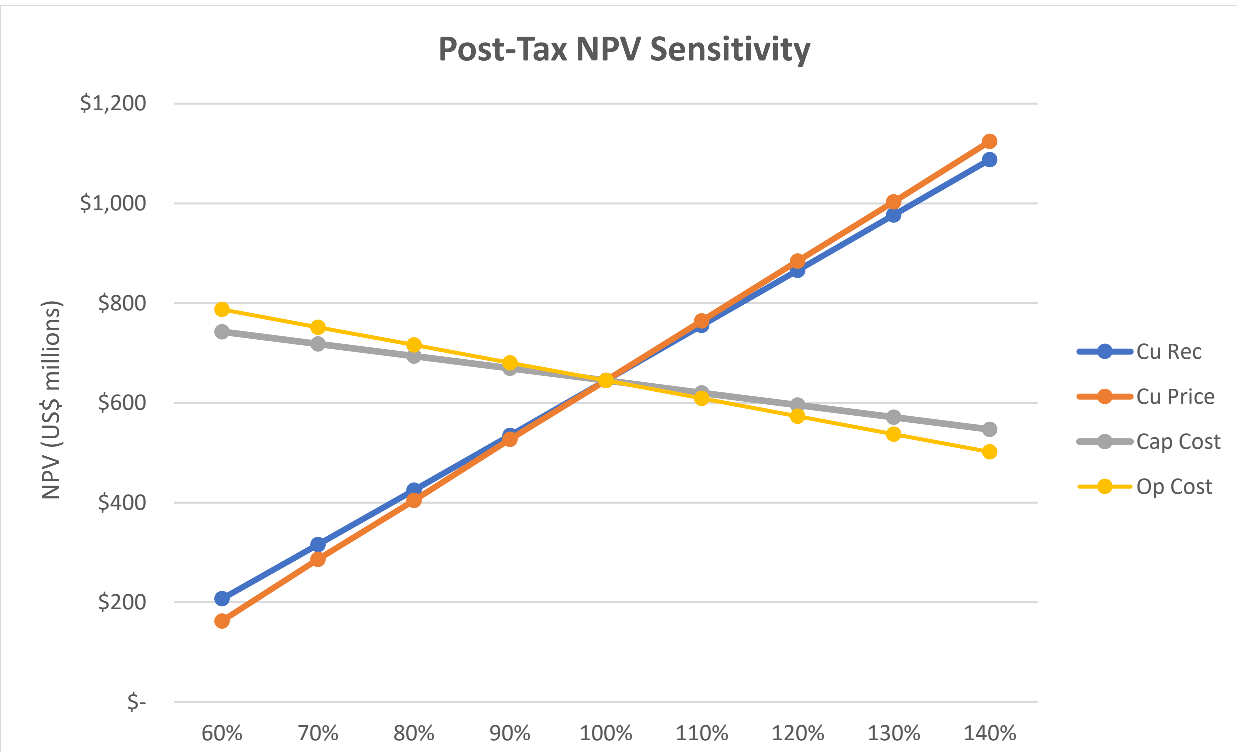
		Copper Price ($US)		
Production	**Unit**	**$US3.15**	**$US3.30**	**$US3.50**
Copper Cathode sold	Millions of lbs.	1,101.0	1,101.0	1,101.0
Gross Revenue	M$US	3,468.3	3,633.5	3,853.7
Royalties	M$US	82.5	86.4	91.7
Total Operating Costs	M$US	1,075.8	1,075.8	1,075.8
Initial capital	M$US	268.3	268.3	268.3
Sustaining capital	M$US	75.1	75.1	75.1
QT revenue split	M$US	209.3	226.4	249.3
Taxes	M$US	321.0	350.4	389.7
C1 Cost ($lb/recovered copper)*	$US/lb.	0.98	0.98	0.98
AISC ($lb/recovered copper)**	$US/lb.	1.14	1.15	1.15
Cashflow Parameters and Outputs	**Unit**	**$US3.15**	**$US3.30**	**$US3.50**
Discount Rate	%	7.5	7.5	7.5
Pre-tax Net Free Cash Flow - EBITDA	M$US	1,757.3	1,901.4	2,093.5
Pre-tax NPV	M$US	798.6	870.9	966.7
Pre-tax IRR	M$US	48.4%	51.3%	55.1
Post-tax Net Free Cash Flow	M$US	1,436.3	1,551.0	1,703.8
Post-tax NPV	M$US	644.7	701.8	777.9
Post-tax IRR	M$US	43.4%	45.8%	49.1%

EBIDTA is a financial term showing earnings before deduction of interest, taxes, depreciation and amortization
* includes mining, processing, site services, G&A, transportation, and Royalty Costs
** includes Total Cash Cost, Sustaining Capital, Royalties, Severance Taxes

The Project NPV and IRR has been evaluated for sensitivity to the following parameters:

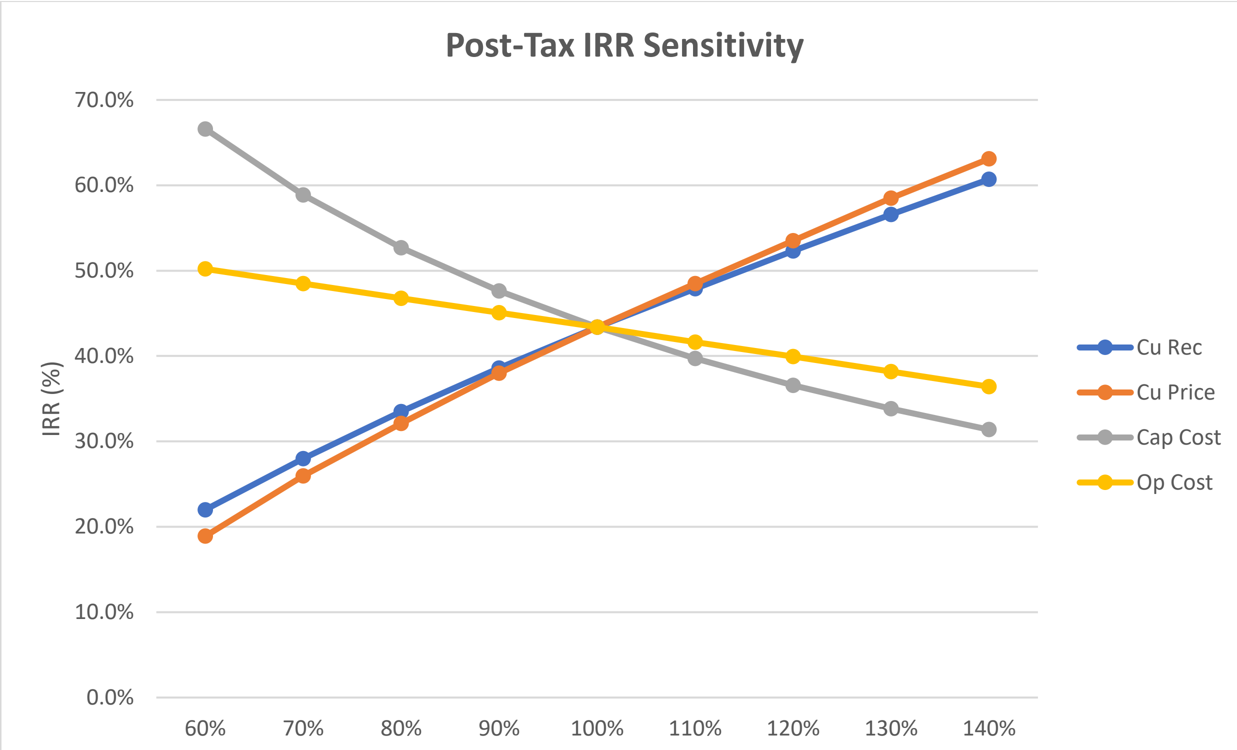
- Copper Price
- Operating Cost
- Capital Cost
- Oxide Recovery

The project NPV is most sensitive to the copper price and metallurgical recovery as illustrated in Figure 22-3 for the post-tax case. The IRR is sensitive to the copper price, metallurgical recovery and shows a large increase with a reduction in capital initial capital costs, as illustrated in Figure 22-4 for the post-tax case.



Source: MMTS, 2021

Figure 22-3 Post-Tax NPV Sensitivity



Source: MMTS, 2021

Figure 22-4 Pre-Tax IRR Sensitivity

23 Adjacent Properties

The Van Dyke project is situated in the Globe-Miami mining district, a historically prominent and current copper producing region in southeastern Arizona. The Van Dyke copper deposit occupies a position within the Miami-Inspiration trend of porphyry copper deposits, two of which are adjacent to the Van Dyke project. The Van Dyke copper deposit is separated from the two adjacent copper deposits by faults which are believed to be predominantly extensional. The structural deformation dismembered what was once a contiguous zone of mineralization.

The Miami Unit property of BHP Copper, Inc. (BHP) lies north and northeast of the Van Dyke property. It was a leaching-only facility since underground mining was completed in 1959; producing copper through in-situ leaching of the former block caved underground mine. Additionally, copper was produced by hydraulic mining and reprocessing of historical tailings. Full-scale operations were discontinued in July 2001; while the site has been primarily on care-and-maintenance since that time, limited production has occurred, but has been included in the company's annual summaries for the Pinto Valley Unit.

The Inspiration mine of Freeport McMoRan Copper & Gold Inc. (Freeport) is located immediately west and northwest of the Van Dyke property. Freeport is mining towards closure at Inspiration. Current operations include leaching by solution extraction/electrowinning (SX/EW), and a smelter and rod mill that also treat cathodes shipped to Inspiration from several of Freeport's other Arizona copper mines.

The principal orebodies of the Miami-Inspiration trend formed along the intrusive contact equally within fractured to brecciated Proterozoic Pinal Schist and Early Tertiary Schultz Granite. The deposits at Inspiration and Miami Unit consisted of irregular, elongate zones of disseminated supergene copper mineralization in which chalcocite was by far the most important ore mineral until later development of lower grade copper oxide zones became economically attractive.

Mineralization on adjacent properties is not necessarily indicative of the mineralization on the Van Dyke project.

24 Other Relevant Data and Information

24.1 In-situ Copper Recovery in Arizona

Arizona has nine historical and current copper ISCR projects. ISCR recovery methods were employed at the Pinto Valley and Miami-East mines in the Globe-Miami mining district. The large San Manuel copper mine, Pinal County, Arizona, was a successful operation that integrated ISCR methods with open pit and underground mining methods.

The Florence Copper project of Taseko Mines Ltd., located approximately 65km southwest of the Globe-Miami area, has completed Phase 1 of operations, known as the Production Test Facility with 24 injection, recovery, monitoring and observation wells on site and SX/EW plant completed. The intent of the Florence Copper pilot-scale facility is to demonstrate that the proposed in-situ copper recovery process can be carried out in an environmentally safe manner that protects the groundwater resources of the area. Taseko is now "moving forward with the final design engineering of the commercial production facility as well as procurement of certain critical components" (Taseko, February 10, 2021 News Release).

The Gunnison Project owned by Excelsior Mining Corp. has produced their first copper cathode from ISCR mining as of December 2020.

At the Van Dyke Copper Project, detailed descriptions of the Phase 1 and Phase 2 ISCR tests conducted by Occidental are presented in Huff et al. (1981) and Huff et al. (1988). The later ISCR performed at Van Dyke by Kocide is summarized by Beard (1990).

25 Interpretation and Conclusions

25.1 Overall Project Conclusion

The Van Dyke Copper Project hosts a copper deposit of significance within the prolific Miami-Inspiration trend of porphyry copper and related deposits. The Van Dyke Copper Project has been the subject of limited historic underground development, widespread surface exploration drilling and localized in-situ leaching. This PEA has indicated that, based on industry standards, the project is technically sound and has positive economics. Therefore, it is concluded that the project should proceed with additional infill Drilling, Permitting, and a Pilot Test.

25.2 Geology and Mineralization

Re-assaying undertaken in 2019 as well as re-assessment of the metallurgy contributed to an updated Resource Estimate with an effective date of January 9, 2020. The updated resource has been used to update the Preliminary Economic Assessments as the subject of this report, with positive results.

25.3 Drilling and Analytical Data Collection

This Technical Report was prepared by MMTS who, in the preparation of the report, reviewed historical geological data and laboratory results to develop an understanding of the Project. In 2019, a comprehensive re-sampling program of drill core chips, rejects, and pulps from 36 historic drillholes added 2193 new analyses for Total Copper (TCu), Acid Soluble Copper (ASCu) and Cyanide Soluble Copper (CNCu). This data, coupled with the use of a robust Quality Assurance/Quality Control program, adequately verified the historical data base.

The results of the work are believed to adequately characterize the deposit at an early stage in its assessment, but the geometry, length, width, depth, and continuity of the mineralized body may change with additional exploration.

25.4 Metallurgical Testwork

Metallurgical testwork has been minimal within the Cu grades within the Project Area. The metallurgical recoveries are determined to be adequate for this stage of study.

25.5 Mine Plan

The mine plan including underground development, waste rock storage and well layout design is considered to be reasonable with the projected schedule, capital and operating costs developed for the project based on similar projects and scaled factors. The mine plan and input parameters are considered adequate for cashflow analysis and financial used for the PEA.

25.6 Recovery Plant

The recovery plant is considered to be the appropriate technology for the production of saleable copper. The design criteria is consistent with other operating SX/EW plants and is adequately specified for this stage of study.

25.7 Project Risks

25.7.1 Operational Risk

The business of mineral exploration, development and production by their nature contain significant operational risks. The business depends upon, amongst other things, successful prospecting programs, and competent management. Profitability and asset values can be affected by unforeseen technical issues and operational circumstances.

25.7.2 Environmental Risks

Environmental permits have not yet been acquired for the Project. However, the Aquifer Protection Permit for the nearby Florence ISCR project has been obtained and have not been appealed with commercial production at Florence to commence.

The Van Dyke Copper Project, and the town of Miami, are encompassed to the west and north by large mining developments including pits, leach pads, dumps, and other mining infrastructure. The Project itself has been the subject of underground development and in-situ leaching in the northwest corner of the Project, and widespread surface exploration drilling. The infrastructure remaining from those activities, all of which occurred prior to 1990, includes access roads, equipment laydown areas, drill sites and steel drillhole collars, a copper cementation plant and ancillary facilities, and the Van Dyke Shaft. Most of the historic drill sites occur within the town of Miami and many are encumbered by town infrastructure.

25.7.3 Political and Economic Risk

Factors such as political and industrial disruption, currency fluctuations and interest rates could have an impact on future operations; these risks are beyond the control of the company.

25.8 Project Opportunities

25.8.1 Modelling Opportunities

The resource model has opportunities to be updated based on exploration and infill drilling to both increase the potential size of the deposit and upgrade the resource classification from Inferred to Indicated.

25.8.2 Metallurgical Opportunities

Additional testing, particularly in the range of Cu grades applicable to the Project could provide additional support for increased metallurgical recovery.

25.8.3 Mine Plan Opportunities

Underground support requirements have been designed assuming conservative geotechnical parameters. Geotechnical studies of the Pinal Schist at depth and the Gila Conglomerate could reduce support requirements and cost. Additional drilling studies and in-situ test results could help optimization the well layout plan to increase efficiency and reduce costs.

25.8.4 Process Plant Opportunities

Processing plant has been specified based on typical SX/EW facilities within the area and worldwide. Further process design optimization, based on a refined production schedule, is an opportunity to potentially reduce capital and operating costs.

26 Recommendations

This PEA has shown the Van Dyke deposit to be a technically sound potential in-situ leach copper recovery (ISCR) operation with positive economic indicators. Therefore, it is recommended to advance the project to higher levels of study, to eventually support a production decision and financing. The initial steps toward completion of a PFS is exploration drilling which would include hydrogeologic and geotechnical studies as well as metallurgical sampling. It is recommended for Desert Fox to concurrently obtain the Pilot Test permits, with a Pilot Test undertaken once the permits are received.

The components of the data collection necessary for a pre-feasibility Study and their estimated costs are summarized in the Table below.

Table 26-1 Budget Estimates for Future Studies

Study Component	Budget Estimate ($US 000)
Exploration Drilling	1,500
Geology, QAQC, Resource Model	100
Metallurgic Testing	400
Hydrogeologic Drilling	1,500
Water Management	230
Pilot Testing	9,000
Pilot Test Permitting	1,000
Geotechnical Testing	250
Infrastructure Studies and Costing	200
Process Design	100
Environmental & Socio-economic	400
Reporting	600
Total	**15,540**

26.1 Recommendation for Exploration Drilling

Future drill programs should utilize robust QA/QC procedures similar to those implemented in 2014 and used in 2019. The use of drillhole logs that allow for detailed geological descriptions is encouraged, as is the collection of geotechnical data and metallurgical samples.

The recommended exploration program includes the following elements:

1. Diamond Drilling & Analysis: an 8-hole, 4500-metre program is recommended to test the possible extension of the deposit westwards towards the property boundary and to the southwest and to collect core for metallurgical test work.
2. Down-Hole Geophysics (acoustic televiewer)
3. Metallurgical Test Work: 6-8 pressure leach tests on whole core from select areas of the deposit

4. Hydrogeology: Installation of piezometers to measure water levels

The recommended program has an estimated cost of $1.86 million as summarized below. Cost for metallurgy, hydrology and geotechnical drilling and studies are detailed in their respective sub-sections below (Table 26-2).

Table 26-2 Summary of Exploration Drilling Expenditures

Item	Estimated Cost ($CDN)
Drilling	$1,500,000
Assaying	$30,000
Geological Labour	$125,000
Accommodation & Meals	$80,000
Field Supplies	$25,000
Transportation & Travel	$45,000
Community Relations	$20,000
Permitting & Legal	$15,000
Data Compilation & Reporting	$20,000
Total	**$1,860,000**

26.2 Recommended Pilot Test

It is recommended that a Pilot Project of a 5-spot ISCR injection and recovery well system be set up in an area of the deposit east of the historic underground workings and previous ISCR development. The estimated cost for this Pilot Project is $7.0M - $8.5M, with costs as summarized in Table 26-3. Testing procedure is detailed in Appendix E.

Table 26-3 Summary of Pilot Test Costs

Item	Quantity	Cost
Pilot Test Wells	8	$ 3,500,000
Hydraulic Test Wells	3	$ 800,000
Monitoring Wells	5	$ 300,000
Hydrofracture Tests	8	$ 2,000,000
Tracer Tests 1	1	$ 500,000
Sub Total	na	$ 7,100,000
Contingency 20%		$ 1,416,000
Total		**$ 8,496,000**

There are two main permits needed to support the Pilot Project: Arizona Protection Permit (issued by the Arizona Department of Environmental Quality) and the Underground Injection Control Permit for Class III Wells (issued by the US Environmental Protection Agency). It is anticipated to take about a year to develop the applications and collect the necessary environmental data and it would take 6 months to one year to go through the review process. Permitting for the pilot program is estimated to cost $1M as summarized in Table 26-4.

Table 26-4 Summary of Pilot Permitting Costs

Item	Cost
Baseline Water Quality	$ 120,000
Aquifer	$ 310,000
Underground Injection control permit – Class III well	$ 370,000
Application Review Process	$ 200,000
Total Cost	$ 1,000,000

26.3 Metallurgical Testing and Costs

Additional testing of metallurgical samples collected during the proposed drill program is expected to Cost approximately $500,000.

26.4 Recommended Geotechnical Data Collection

Future work should include a trade-off study that compares the cost of underground development that crosses the Gila Conglomerate and Pinal Schist transition zone and includes operation in galleries directly above the deposit to savings in well field development resulting from shorter wells.

Additional geotechnical work and analysis recommended is estimated to cost $200,000 and includes:

- Geotechnical data collection during drilling to define RQD, RMR, to better define major Fault locations and ATV to better define joint set orientations
- Laboratory strength and index testing on samples recovered from the drill program, including:
    - Unconfined Compressive Strength Point Load and potentially Atterberg Limits on the clay material
- Review of the ground support requirements based on a review of existing mining experience in the area, as well as the updated information from drilling, from testing and from the Pilot Test.
- Better definition of the corrosion protection requirements for the ground support
- Report and analysis

26.5 Recommended Water Management Studies

Additional water management work is expected to cost $200,000 and includes the following goals:

- Characterize the hydrometeorology of the site.
- Characterize the expected effluent water quality for the sources of surplus water on the site.
- Confirm the period over which the resource blocks need to be rinsed in closure and what the
- flow rates are expected to be.
- Define the water quality targets for discharge.

26.6 Underground Design

The following recommendation are made to help improve the underground design:

- Several geotechnical holes should be drilled along the alignment of the access decline and the two ramps (north and south ramps) so that rock qualities can be determined, and more detailed ground support regimes can be forecast.

- Trade-off studies should be carried out to see if using a contractor for life of mine development, rehabilitation of mine workings, life of mine supervision of drilling crews is the most cost-effective approach to developing and operating the mine.

26.7 Recommended Process Design Studies

Additional optimization needs to be completed regarding the processing equipment operations to address future variability within the PLS flowrate and concentration throughout the life of the mine. The estimated cost of this study is US$40,000-US$70,000.

Currently there is no geotechnical information at the proposed process plant site or surface infrastructure. In the next phase a small geotechnical program should be performed to determine both the surface and subsurface conditions at the proposed plant site, surface infrastructure and borrow sources. The program should consist of reviewing any geotechnical and geology information in the area, perform surface mapping and small geotechnical test pit, borehole and laboratory campaign in the process plant and infrastructure along with a small geochemical program to understand both geotechnical and geochemical conditions to develop these facilities

This area has a long history of mining and should have a significant amount of metrological data to develop hydrological and hydraulic characteristics in the area of the process plant and surface infrastructure. This can be utilized to develop the climate and hydrology condition in the area of the surface facilities to develop surface water management for the site for the next phase.

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