



EXPLORATION & MINING CONSULTING

DON MARIO MINE OPERATION 2016 TECHNICAL REPORT

San Juan Canton
Chiquitos Province
Bolivia

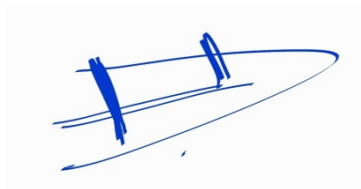
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Report Date: January 27, 2017

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Date and Signature Page

The effective date of this technical report is September 30th, 2016.

“Original signed and stamped by”

A handwritten signature in blue ink, consisting of a stylized 'G' followed by a series of loops and a final flourish.

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DGCS Exploration and Mining Consulting

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1.0 Summary

1.1 Executive Summary

DGCS SA (“DGCS”) was retained by Orvana Minerals Corp. (“Orvana”) to prepare an update of the technical report in accordance with National Instrument 43-101 (“NI43-101”) for the EMIPA S.A. – Don Mario operation (“Don Mario” or the “Don Mario Operation” or the “Project”) located in the San Juan Canton, Chiquitos Province of eastern Bolivia, in the department of Santa Cruz, and specifically the last NI43-101 report dated November 14, 2015 prepared by Mercator Geological Services Limited (“Mercator”) and DGCS (“Mercator (2015)”). The purpose of this report is to update mineral resource and mineral reserve statements for the total Don Mario Operation and to support the upgrade of mineral resources to mineral reserves at the Lower Mineralized Zone (“LMZ”) as at September 30, 2016.

The Don Mario operation currently consists of the exploitation of the Upper Mineralized Zone (“UMZ”) and the LMZ units by open pit that produces a nominal 2,500 tonnes per day of ore of two material types – transitional and sulphides. A gravity-flotation processing plant located at Don Mario produces gold concentrate, copper concentrate with gold and silver credits and a limited amount of lead concentrate. Total production for the fiscal year ending September 30, 2016 was approximately 21,102 ounces of gold, 10.5 million pounds of copper and 381,523 ounces of silver

At September 30, 2016 total mineral resources for the Don Mario Operation, inclusive of reserves, is presented in Table 1.1 below. Total stockpile resources at the same date are presented in Table 1.2 below. Total in-situ mineral reserves for the Don Mario Operation at September 30, 2016 are presented in Table 1.3. Total stockpile reserves at the same date are presented in Table 1.4 below. Mineral reserve estimates reflect remaining depleted reserves from those reported in 2015 by Mercator (2015) and the addition of the upgraded mineral resources to reserves from the LMZ.

**Table 1.1: Don Mario Total In-situ Mineral Resources Inclusive of Mineral Reserves
September 30, 2016**

Measured							
Zone	Tonnage	Grade	Grade	Grade	Contained Metal	Contained Metal	Contained Metal
	(000 t)	(g/t Au)	(% Cu)	(g/t Ag)	(000 oz Au)	(t Cu)	(000 oz Ag)
UMZ	51	1.35	1.10	30.70	2.2	563.1	50.3
LMZ	0	0.00	0.00	0.00	0.0	0.0	0.0
CerroFelix	0	0.00	0.00	0.00	0.0	0.0	0.0
Total	51	1.35	1.10	30.70	2.21	563.1	50.3
Indicated							
Zone	Tonnage	Grade	Grade	Grade	Contained Metal	Contained Metal	Contained Metal
	(000 t)	(g/t Au)	(% Cu)	(g/t Ag)	(000 oz Au)	(t Cu)	(000 oz Ag)
UMZ	0	0	0	0	0	0	0
LMZ	793	2.62	0.60	5.94	66.8	4,794.6	151.4
CerroFelix	490	3.15	0.09	2.53	49.6	441.0	39.9
Total	1,283	2.82	0.41	4.64	116.5	5,235.6	191.2
Measured + Indicated							
Zone	Tonnage	Grade	Grade	Grade	Contained Metal	Contained Metal	Contained Metal
	(000 t)	(g/t Au)	(% Cu)	(g/t Ag)	(000 oz Au)	(t Cu)	(000 oz Ag)
UMZ	51	1.35	1.10	30.70	2.2	563.1	0.0
LMZ	793	2.62	0.60	5.94	66.8	4,794.6	151.4
CerroFelix	490	3.15	0.09	2.53	49.6	441.0	39.9
Total	1,334	2.77	0.43	5.63	118.67	5,798.7	191.2
Inferred							
Zone	Tonnage	Grade	Grade	Grade	Contained Metal	Contained Metal	Contained Metal
	(000 t)	(g/t Au)	(% Cu)	(g/t Ag)	(000 oz Au)	(t Cu)	(000 oz Ag)
UMZ	0	0.00	0.00	0.00	0.0	0.0	0.0
LMZ	0	0.00	0.00	0.00	0.0	0.0	0.0
CerroFelix	80	3.14	0.14	3.21	8.1	112.0	8.3
Total	80	3.14	0.14	3.21	8.08	112.0	8.3

Notes applicable to LMZ and Cerro Felix mineral resource estimates

1. CIM definitions were followed for Mineral Resources and were prepared in Mercator (2015).
2. An average block density factor of 2.89 was applied for both estimates.
3. Mineral resources are considered to have reasonable expectation for economic development using open-pit mining methods based on the deposit history, resource amount and metal grades and current metal pricing.
4. Mineral resources that are not mineral reserves do not have demonstrated economic viability. The quantity and grade of reported inferred mineral resources in this estimation are uncertain in nature and there has been insufficient exploration to define these inferred mineral resources as indicated or measured mineral resources; it is uncertain if further exploration will result in upgrading of inferred resources to indicated or measured status.
5. Tonnes are rounded to nearest 10,000.
6. Ounces are rounded to the nearest 1,000 and pounds are rounded to the nearest 10,000. Calculated contained metal sums may not match reported tonnes and grade due to rounding.

7. The resource estimate cut-off value is 0.70 g/t Au is reflective of open-pit mining methods, a long-term gold price of US\$1,300 per ounce, copper price of US\$3.00 per pound and a silver price of US\$18 per ounce.
8. Both resource estimates are based on validated core drilling program results and do not incorporate production sampling data..
9. Contained copper tonnes were calculated from original resource statement pound values by the factor 2204.62lb/tonne.
10. Numbers may not add due to rounding
11. CIM definitions were followed.

Notes applicable to UMZ mineral resource estimate

1. CIM definitions were followed for Mineral Resources and were prepared by G. Zandonai (2013), a qualified person for the purposes of NI43-101, who is an employee of DGCS SA and is independent of the Company.
2. Mineral Resources are estimated at a Cu equivalent cut-off grade of 0.85% for the UMZ.
3. Mineral Resources are estimated using a long-term gold price of US\$1,300 per ounce, copper price of US\$3.00 per pound and a silver price of US\$18 per ounce.
4. Mineral Resources are inclusive of Mineral Reserves.
5. Mineral Resources contained in stockpiles are exclusive of In-situ Mineral Resources.
6. Numbers may not add due to rounding.

**Table 1.2: Summary Statement of Don Mario Stockpile Mineral Resources (exclusive of in-situ)
September 30, 2016**

Measured							
Location/Zone	Tonnage	Grade	Grade	Grade	Contained Metal	Contained Metal	Contained Metal
	(000 t)	(g/t Au)	(% Cu)	(g/t Ag)	(000 oz Au)	(t Cu)	(000 oz Ag)
DM1 Oxide	492	2.24	1.74	54.4	35.4	8559.6	861.0
DM2 (Oxide Pre-strip)	278	1.90	1.98	17.9	17.0	5508.8	160.5
DM3 (Dolomite Oxide)	190	1.89	1.96	21.6	11.5	3724.0	132.1
Plant Stockpile Oxide)	515	1.61	1.57	57.8	26.7	8108.3	958.3
DM4 Stock Talco	506	1.61	2.38	63.5	26.2	12067.4	1033.2
DM5 (Dolomite Oxide)	202	1.86	1.64	48.7	12.1	3314.4	316.2
DM6 (Tremolite Oxide)							
Total	2184	1.84	1.89	49.3	129.0	41282.6	3461.2

All these stocks will be processed by Flotation and will not be included in the CIL process

Notes to UMZ stockpile mineral resources:

1. CIM definitions were followed for Mineral Resources and were prepared by G. Zandonai, a qualified person for the purposes of NI43-101, who is an employee of DGCS SA and is independent of the Company.
2. Mineral Resources are estimated at a Cu equivalent cut-off grade of 0.85% for the Stockpiles of the UMZ.
3. Mineral Resources are estimated using a long-term gold price of US\$1,300 per ounce, copper price of US\$3.00 per pound and a silver price of US\$18 per ounce.
4. Mineral Resources contained in stockpiles are exclusive of In-situ Mineral Resources. Mineral Resources that are not mineral reserves do not have demonstrated economic viability. The UMZ Oxide Stockpile resources are currently not economically viable to process through the gravity flotation plant.
5. Numbers may not add due to rounding.

**Table 1.3: In-situ Mineral Reserves
September 30, 2016**

Proven							
Zone	Tonnage	Grade	Grade	Grade	Contained Metal	Contained Metal	Contained Metal
	(000 t)	(g/t Au)	(% Cu)	(g/t Ag)	(000 oz Au)	(t Cu)	(000 oz Ag)
UMZ	51.0	1.35	1.10	30.70	2.2	563.1	50.3
LMZ	0	0	0	0	0	0	0
Total	51.0	1.35	1.10	30.70	2.2	563.1	50.3
Probable							
Zone	Tonnage	Grade	Grade	Grade	Contained Metal	Contained Metal	Contained Metal
	(000 t)	(g/t Au)	(% Cu)	(g/t Ag)	(000 oz Au)	(t Cu)	(000 oz Ag)
UMZ	0	0	0	0	0	0	0
LMZ	793	2.62	0.60	5.94	66.8	4794.6	151.4
Total	793	2.62	0.60	5.94	66.8	4794.6	151.4
Total Proven and Probable							
Zone	Tonnage	Grade	Grade	Grade	Contained Metal	Contained Metal	Contained Metal
	(000 t)	(g/t Au)	(% Cu)	(g/t Ag)	(000 oz Au)	(t Cu)	(000 oz Ag)
Proven	51	1.35	1.10	30.70	2.2	563.1	50.3
Probable	793	2.62	0.60	5.94	66.8	4794.6	151.4
Proven & Probable	844	2.54	0.63	7.43	69.0	5357.7	201.7

Notes:

1. CIM definitions were followed for Mineral Resources and were prepared by G. Zandonai, a qualified person for the purposes of NI43-101, who is an employee of DGCS SA and is independent of the Company.
2. Mineral Reserves are estimated using copper equivalent cut-off grade of 1.0% CuEq for the UMZ and cut-off grade of 0.70g/t AU for the LMZ. Cut-offs were calculated using recent operating results for recoveries, off-site concentrate costs, and on-site operating costs.
3. Mineral Reserves are estimated using average long-term prices of US\$1,100 per ounce, copper price of US\$2.75 per pound and a silver price of US\$16.5 per ounce.
4. Numbers may not add due to rounding.
5. The mineral reserves at the LMZ have been based on processing by the CIL and flotation methods.

Certain material mined was transported to the waste dump or various stockpile locations. Certain oxide, transitional and sulphide materials that were above the specified cut-off grades were classified as either stockpile mineral resources or stockpile mineral reserves. A summary

of the mineral reserves stockpile estimates completed as part of the Company's annual mineral reserve and resource estimates update process is provided in the Table 1.4 below.

**Table 1.4: Stockpile Mineral Reserves (exclusive of in-situ)
September 30, 2016**

Location/Zone	Proven						
	Tonnage	Grade	Grade	Grade	Contained Metal	Contained Metal	Contained Metal
	(000 t)	(g/t Au)	(% Cu)	(g/t Ag)	(000 oz Au)	(t Cu)	(000 oz Ag)
DM1 OS (Trans+Sulph)	8	1.93	1.10	27.63	0.5	88.4	7.1
Plant Deposit (DPL2)	26	1.33	0.99	16.32	1.1	255.1	13.5
Plant Pushback LMZ	19	0.70	2.06	5.08	0.4	382.3	3.0
UMZ Tremolita Talco	160	2.18	1.65	16.90	11.2	2648.2	87.0
Total	212	1.94	1.59	16.10	13.2	3374.1	110.6

Notes:

1. CIM definitions were followed for Mineral Resources and were prepared by G. Zandonai, a qualified person for the purposes of NI43-101, who is an employee of DGCS SA and is independent of the Company.
2. Mineral Reserves are estimated using a copper equivalent cut-off grade of 1.0% CuEq. Copper equivalent cut-offs were calculated using recent operating results for recoveries, off-site concentrate costs, and on-site operating costs.
3. Mineral Reserves are estimated using average long-term prices of US\$1,100 per ounce, copper price of US\$2.75 per pound and a silver price of US\$16.5 per ounce.
4. Numbers may not add due to rounding.
5. UMZ stock for processing by Flotation
6. LMZ Stock for processing by CIL
7. UMZ Tremolita, upgrade to reserve from resource stock pile. It is possible to process by flotation.

1.2 Technical Summary

1.2.1 Property Description and Location

The Don Mario mine is located within the San Juan Canton, Chiquitos Province, Santa Cruz Department in Eastern Bolivia, about 380 km east of the departmental capital of Santa Cruz de la Sierra. Orvana currently operates the mine through its wholly owned subsidiary, Empresa Paititi S.A. (EMIPA, or EMIPA S.A.). The operation commenced commercial production in July of 2003 through mining at the LMZ underground mine and in April 2011 production transitioned to open pit mining of the overlying UMZ deposit. Commercial production of the UMZ was achieved in January 2012 is being phased out and replaced with production from the LMZ upper extension. The Don Mario property consists of 10 contiguous mineral concessions covering approximately 58,325 ha.

1.2.2 Existing Infrastructure

Surface and underground infrastructure at the Don Mario Operation include the following:

- A 2,500 tpd processing facility
- A tailings storage facility (TSF) and freshwater dam
- Modern 300 person camp facility, consisting of sleeping accommodation (both single, double and multiple occupancy types), recreation facilities, kitchens and lunch rooms.
- Shops, offices and warehouse facilities
- On site natural gas power plant and substation
- De-commissioned sulphuric acid plant
- Carbon in leach (“CIL”) circuit which is being recommissioned (the “CIL Project”)
- A decline and a series of ramp-connected levels used to access the historic LMZ underground mine

1.2.3 History

Cerro Pelado, also referred to as Cerro Don Mario, is the prominent hill formed by the Don Mario UMZ deposit. This location is known to be an ancient site of mining for oxidized copper mineralization. Following the discovery of gold at the site in 1991, the area was sequentially explored by three main companies, these being La Rossa, Billiton Limited and Orvana. This resulted in the discovery and/or delineation of the LMZ, CF and Las Tojas (“LT”) Au-Cu deposits and the UMZ Cu-Au deposit, plus several other prospects within 20 km of the mine site. Orvana acquired the property in 1996 from four Bolivian companies that jointly owned the Don Mario concessions in eastern Bolivia and initiated LMZ deposit mining in 2003. Underground mining of the LMZ deposit ceased in 2009 and was replaced by open pit production from the UMZ deposit, augmented by lesser open pit production from the LT and CF deposits. Orvana reported mineral resource estimates at September 30, 2015 at the upper extension of the LMZ and CF and at September 30, 2016 the mineral resources at the upper extension of the LMZ were upgraded to mineral reserves by DGCS. The depleting UMZ is being phased out and replaced with production from the LMZ upper extension

1.2.4 Geology and Mineralization

The Don Mario property is underlain by Lower to Middle Proterozoic metamorphic rocks of the Cristal Sequence that comprise a portion of the Bolivian Shield’s Adventura Complex. The Cristal Sequence is composed of medium to high grade metasedimentary units such as biotite schist, mica schist, quartzite, biotite–plagioclase gneiss and calcsilicates gneiss, as well as lesser amounts of pegmatite and amphibolite dikes. The Cristal Schist belt subunit hosts the Don Mario mine’s Upper and Lower Mineralized Zones as well as the nearby CF, Don Mario North, and Don Mario South gold prospects (Wright et al., 2009).

Mining and exploration programs to date on the property have shown the Don Mario deposit to consist of the gold-enriched LMZ and the copper-enriched UMZ. The LMZ is characterized by a well-developed northwest striking and steeply northeast dipping structural/lithologic corridor that constrains gold-copper-silver mineralization as well as distinctive alteration assemblages. Alteration associated with gold-copper-silver mineralization commonly takes the form of iron carbonate, white mica, biotite, quartz, albite, andalusite, staurolite, garnet, cordierite, gedrite and anthophyllite-cummingtonite. Spatial disposition of the LMZ and UMZ deposits may be of structural derivation, with the calc-silicate dominated and synclinally folded UMZ host sequence representing a shearing-associated “flower structure” above the sheared LMZ.

Past workers have characterized mineralization at the Don Mario deposit as being structurally focused or shear zone related. However, as outlined by Wright et al. (2009), alternative views on deposit genesis include skarn association, banded iron formation-hosted structural association, and deformed, syngenetic massive sulphide association,. In contrast to these, the deposit was more recently classified by Arce Burgoa (2009) as being a deformed example of the Iron Ore copper Gold (IOCG) association.

1.2.5 Mineral Resources

The 2016 mineral resource statement of Don Mario includes mineral from the UMZ, LMZ and CF.

LMZ and CF mineral resources were estimated in Mercator (2015) and have been updated in this report, accounting for production depletion from September 30, 2015 to September 30, 2016. The LMZ and Cerro Felix mineral resource estimates, inclusive of mineral reserves, as at September 30, 2016 appear in Tables 1.5 and 1.6. Remaining UMZ mineral resources were estimated by DGCS at September 30, 2013 and have been updated in this report as at September 30, 2016, accounting for production depletion. The UMZ mineral resource estimates, inclusive of mineral reserves, appear in Table 1.7 and 1.8 respectively.

**Table 1.5: Don Mario LMZ Deposit In-situ Mineral Resources Inclusive of Mineral Reserves
September 30, 2016**

Au (g/t) Cut-off	Category	Tonnes	Au (g/t)	Cu (%)	Ag (g/t)
0.70	Indicated	793,000	2.62	0.60	5.94

See notes table 1.6

**Table 1.6: Don Mario Cerro Felix In-situ Mineral Resources Inclusive of Mineral Reserves
September 30, 2016**

Au (g/t) Cut-off	Category	Tonnes	Au (g/t)	Cu (%)	Ag (g/t)
0.70	Indicated	490,000	3.15	0.09	2.53
	Inferred	80,000	3.14	0.14	3.21

Notes: Applicable to both LMZ and CF mineral resource estimates .

1. CIM definitions were followed for Mineral Resources and were prepared in Mercator (2015).
2. An average block density factor of 2.89 was applied for both estimates.
3. Mineral resources are considered to have reasonable expectation for economic development using open-pit mining methods based on the deposit history, resource amount and metal grades and current metal pricing.
4. Mineral resources that are not mineral reserves do not have demonstrated economic viability. The quantity and grade of reported inferred mineral resources in this estimation are uncertain in nature and there has been insufficient exploration to define these inferred mineral resources as indicated or measured mineral resources; it is uncertain if further exploration will result in upgrading of inferred resources to indicated or measured status.
5. Tonnes are rounded to nearest 10,000.
6. Ounces are rounded to the nearest 1,000 and pounds are rounded to the nearest 10,000. Calculated contained metal sums may not match reported tonnes and grade due to rounding.
7. The resource estimate cut-off value is 0.70 g/t Au is reflective of open-pit mining methods, a long-term gold price of US\$1,300 per ounce, copper price of US\$3.00 per pound and a silver price of US\$18 per ounce.
8. Both resource estimates are based on validated core drilling program results and do not incorporate production sampling data..
9. Contained copper tonnes were calculated from original resource statement pound values by the factor 2204.62lb/tonne.
10. Numbers may not add due to rounding
11. CIM definitions were followed.

**Table 1.7: UMZ Deposit In-situ Mineral Resources Inclusive of Mineral Reserves
September 30, 2016**

Measured							
Zone	Tonnage	Grade	Grade	Grade	Contained Metal	Contained Metal	Contained Metal
	(000 t)	(g/t Au)	(% Cu)	(g/t Ag)	(000 oz Au)	(t Cu)	(000 oz Ag)
UMZ	51	1.35	1.10	30.70	2.2	563.1	50.3
Total	51	1.35	1.10	30.70	2.2	563.1	50.3

Notes:

1. CIM definitions were followed for Mineral Resources and were prepared by G. Zandonai (2013), a qualified person for the purposes of NI43-101, who is an employee of DGCS SA and is independent of the Company.
2. Mineral Resources are estimated at a Cu equivalent cut-off grade of 0.85% for the UMZ.

3. Mineral Resources are estimated using a long-term gold price of US\$1,300 per ounce, copper price of US\$3.00 per pound and a silver price of US\$18 per ounce.
4. Mineral Resources are inclusive of Mineral Reserves.
5. Mineral Resources contained in stockpiles are exclusive of In-situ Mineral Resources.
6. Numbers may not add due to rounding.

Table 1.8: Stockpile Mineral Resources Exclusive of In-situ Mineral Resources – September 30, 2016

Location/Zone	Measured						
	Tonnage	Grade	Grade	Grade	Contained Metal	Contained Metal	Contained Metal
	(000 t)	(g/t Au)	(% Cu)	(g/t Ag)	(000 oz Au)	(t Cu)	(000 oz Ag)
DM1 (Oxide)	492	2.24	1.74	54.4	35.4	8559.6	861.0
DM2 (Oxide Pre-strip)	278	1.90	1.98	17.9	17.0	5508.8	160.5
DM3 (Dolomite Oxide)	190	1.89	1.96	21.6	11.5	3724.0	132.1
Plant Stockpile (oxide)	515	1.61	1.57	57.8	26.7	8108.3	958.3
DM4 Stock Talco	506	1.61	2.38	63.5	26.2	12067.4	1033.2
DM5 (dolomite Oxide)	202	1.86	1.64	48.7	12.1	3314.4	316.2
DM6 (tremolite Oxide)							
Total	2184	1.84	1.89	49.3	129.0	41282.6	3461.2

All these stocks will be processed by for Flotation and will not be included in the CIL process

Notes:

1. CIM definitions were followed for Mineral Resources and were prepared by G. Zandonai, a qualified person for the purposes of NI43-101, who is an employee of DGCS SA and is independent of the Company.
2. Mineral Resources are estimated at a Cu equivalent cut-off grade of 0.85% for the Stockpiles of the UMZ.
3. Mineral Resources are estimated using a long-term gold price of US\$1,300 per ounce, copper price of US\$3.00 per pound and a silver price of US\$18 per ounce.
4. Mineral Resources contained in stockpiles are exclusive of In-situ Mineral Resources. Mineral Resources that are not mineral reserves do not have demonstrated economic viability. The UMZ Oxide Stockpile resources are currently not economically viable to process through the gravity flotation plant.
5. Numbers may not add due to rounding.

1.2.6 Mineral Reserves

Mineral resources identified as measured and indicated within the final pit that can be mined and processed economically are classified as proven and probable reserves.

Mineral Reserves for the UMZ deposit were last estimated by DGCS and are documented in the associated Zandonai (2013) NI43-101 technical report. Reserves reflect pit optimization work completed by Cube Consulting Ltd. (Cube) plus dilution and extraction modifying factors applied to measured and indicated resources. After depleting 2014, 2015 and 2016 production from the 2013 reserves, DGCS has estimated remaining in-situ and stockpile mineral reserves at September 30, 2016 to be as presented below in Tables 1.9 and 1.10.

Mineral resources of the LMZ deposit were last estimated by Mercator (2015) and upgraded to reserves in this report. LMZ mineral reserves are presented in Table 1.9.

**Table 1.9: In-situ Mineral Reserves
September 30, 2016**

Total Proven and Probable							
Zone	Tonnage	Grade	Grade	Grade	Contained Metal	Contained Metal	Contained Metal
	(000 t)	(g/t Au)	(% Cu)	(g/t Ag)	(000 oz Au)	(t Cu)	(000 oz Ag)
Proven (UMZ)	51	1.35	1.10	30.70	2.2	563.1	50.3
Probable (LMZ)	793	2.62	0.60	5.94	66.8	4794.6	151.4
Proven & Probable	844	2.54	0.63	7.43	69.0	5357.7	201.7

Notes:

1. CIM definitions were followed for Mineral Resources and were prepared by G. Zandonai, a qualified person for the purposes of NI43-101, who is an employee of DGCS SA and is independent of the Company.
2. Mineral Reserves are estimated using copper equivalent cut-off grade of 1.0% CuEq for the UMZ and cut-off grade of 0.70g/t AU for the LMZ. Copper equivalent cut-offs were calculated using recent operating results for recoveries, off-site concentrate costs, and on-site operating costs.
3. Mineral Reserves are estimated using average long-term prices of US\$1,100 per ounce, copper price of US\$2.75 per pound and a silver price of US\$16.5 per ounce.
4. Numbers may not add due to rounding.
5. The mineral reserves at the LMZ have been based on processing by the CIL and flotation methods.

**Table 1.10: Stockpile Mineral Reserves (exclusive of in-situ)
September 30, 2016**

Proven							
Location/Zone	Tonnage	Grade	Grade	Grade	Contained Metal	Contained Metal	Contained Metal
	(000 t)	(g/t Au)	(% Cu)	(g/t Ag)	(000 oz Au)	(t Cu)	(000 oz Au)
DM1 OS (Trans+Sulph)	8	1.93	1.10	27.63	0.5	88.4	7.1
Plant Deposit (DPL2)	26	1.33	0.99	16.32	1.1	255.1	13.5
Plant Pushback LMZ	19	0.70	2.06	5.08	0.4	382.3	3.0
UMZ Tremolita Talco	160	2.18	1.65	16.90	11.2	2648.2	87.0
Total	212	1.94	1.59	16.10	13.2	3374.1	110.6

Notes:

1. *CIM definitions were followed for Mineral Resources and were prepared by G. Zandonai, a qualified person for the purposes of NI43-101, who is an employee of DGCS SA and is independent of the Company.*
2. *Mineral Reserves are estimated using a copper equivalent cut-off grade of 1.0% CuEq. Copper equivalent cut-offs were calculated using recent operating results for recoveries, off-site concentrate costs, and on-site operating costs.*
3. *Mineral Reserves are estimated using average long-term prices of US\$1,100 per ounce, copper price of US\$2.75 per pound and a silver price of US\$16.5 per ounce.*
4. *Numbers may not add due to rounding.*
5. *UMZ stock for processing by Flotation*
6. *LMZ Stock for processing by CIL*
7. *UMZ Tremolita, upgrade to reserve from resource stock pile. It is possible to process by flotation.*

1.2.7 Mining Methods

The current mining methods used at Don Mario UMZ are conventional open pit mining. Ore and waste are loaded into 20 to 25 tonne nominal capacity trucks using a 10 tonne nominal capacity front end loader. The ore is hauled directly to the process plant ore stockpile area and waste is hauled directly to the waste dump facility. Any oxide or low grade material is hauled to various surface stockpiles located near the plant and mine.

1.2.8 Mineral Processing

The Don Mario Operation processing plant consists of the following sequence of macro unit operations:

1. Crushing and Screening
2. Grinding and Cycloning
3. Gravity Concentration
4. Flotation Concentration
5. Tailings Storage Facility (TSF)

The processing plant can process 876,000 tpa with a daily throughput of 2,500 tpd. Overall recoveries achieved in recent operation for Fiscal Year 2016 are 56.3% for gold, 62.2% copper and 73.4% for silver respectively. Products include gold concentrate, copper concentrate with gold and silver credits and a very limited amount of lead concentrate.

The commissioning of the CIL is also expected to position Don Mario to leverage other potential business opportunities. Higher gold grades ores from the LMZ will be processed in the CIL plant according to a metallurgical study prepared for EMIPA.

In recent months, the Company has been re-evaluating the economic potential of processing existing mineral stockpiles, including the oxides previously treated through the leach-precipitation-flotation process, and expects to have the results of this testing in the first

quarter of fiscal 2017. As at September 30, 2016, EMIPA had stockpile mineral resources of approximately 2.2 tonnes with an average gold grade of 1.84 g/t. The Company will also be commencing an evaluation of processing of tailings material through the CIL circuit to determine the viability of recovering gold that has been deposited into the tailings facility as a result of the flotation-only process used since 2011.

1.2.9 Project Infrastructure

The Don Mario Operation main infrastructure was completed in 2003 for underground mining of the LMZ deposit. The mill was expanded in 2011 to accommodate higher throughput from mining the UMZ deposit as an open pit.

Surface facilities other than the process plant include a 300 person modern camp facility with kitchens, lunch rooms, changing rooms, clinic, warehouses, maintenance shops, electromechanical workshops, a laboratory, a core storage facility, a freshwater dam, a natural gas power plant, electrical power lines and substations, and a complete telecommunication system providing phone lines and fast internet and intranet connections for the various offices. The surface facilities also include a de-commissioned sulphuric acid plant and a CIL circuit which is being recommissioned.

Underground facilities in place to service the mined out LMZ underground deposit include, but are not limited to, a mine portal, decline and underground accesses, various service and ventilation raises.

The Tailings Storage Facility (TSF) is located approximately 1.0 km to the northeast of the plant facility and is properly lined and has an adequate pumping system. The plant-tailings circuit is a no-discharge facility.

1.2.10 Markets

The principal commodities at the Don Mario Operation are freely traded, at prices that are widely known, so that prospects for sale of any production are virtually assured, subject to achieving product specifications.

As per industry norms for copper concentrate, penalty charges are incurred for various deleterious elements when they are over specified concentrations.

1.2.11 Environmental, Permitting and Social Considerations

The Don Mario Operation is permitted. EMIPA S.A. has obtained all material permits to operate the mine, processing plant, and tailings storage facility.

1.2.12 Capital and Operating Cost Estimates

The Don Mario Operation capital costs are based on the fiscal year 2016. The estimated sustaining annual capital costs totaled \$6.8 million, and include plant equipment and maintenance, equipment costs, exploration, and tailings management. Capital costs incurred over the remaining operational years are expected to remain around these levels unless there are significant changes made to the plant facilities, exploration budget or increased capital costs associated with mining future deposits.

The cash operating costs (“COC”) are calculated on a co-product basis. The COCs (co-product) are \$1,023 per ounces gold, \$1.93 per pound of copper and \$15.06 per ounce of silver.

1.2.13 Recommendations

DGCS has prepared the following Don Mario LMZ and CF deposit recommendations with respect to advancement of their technical and economic assessments within the Don Mario Operation. Additional recommendations arising from a review of general exploration information for the Don Mario property are also offered.

- Additional diamond drilling is required to better define and confirm metal grade trends within the CF deposit. It is recommended that infill drilling of the currently defined deposit be carried out at 25 meter spaced sections along the length of the deposit. This program should include initial testing of potential deposit extension areas both down dip and along strike to both northeast and southwest.
- After completion of recommended CF core drilling, DGCS recommends creating a new mineralization model and resource estimate for the Cerro Felix deposit. This should be based on revised geological and grade distribution models that reflect all new drilling results.
- The potential future impact of CF mineral resources on the Don Mario life of mine plan, assuming conversion to reserves, should be assessed in detail.
- Significant exploration potential is present along the under-explored strike extensions of the Cristal Schist Belt and Eastern Schist Belt and this should be systematically explored for new deposits similar in style to those mined to date at the Don Mario Operation.
- Further detailed assessment of the LT deposit by remodeling and assessment of deposit extension drilling opportunities should be undertaken.

2.0 Introduction and Terms of Reference

2.1 Scope of Reporting

DGCS was retained by Orvana to prepare a technical report on the Don Mario Operation, located in the San Juan Canton, Chiquitos Province of eastern Bolivia in the department of Santa Cruz. The purpose of this report is to update the mineral resource and reserve inventory for the UMZ, LMZ and CF for the total Don Mario Operation as at September 30, 2016. This Technical Report was prepared in accordance with both NI43-101 - Standards of Disclosure for Mineral Projects and the Canadian Institute of Mining, Metallurgy and Petroleum's Definition Standards on Mineral Resources and Mineral Reserves.

Orvana is a gold, silver and copper producer with operations in Spain and Bolivia. In February 1996, Orvana acquired four Bolivian companies that jointly owned the Don Mario concessions. Orvana operates Don Mario through its wholly owned subsidiary, EMIPA. The Operation commenced commercial production in July 2003 from the LMZ underground mine and achieved commercial production in January 2012 from the UMZ open pit mine. Underground mining of the LMZ has been completed.

The Don Mario operation currently consists of the exploitation of the UMZ and the LMZ units by open pit that produces a 2,500 tonnes per day of ore of two material types – transitional and sulphides. A gravity-flotation processing plant located at Don Mario produces gold concentrate, copper concentrate with gold and silver credits and a limited amount of lead concentrate. Total production for the fiscal year ending September 30th, 2016 was approximately 21,102 ounces of gold, 10.5 million pounds of copper and 381,523 ounces of silver.

In 2015 Mercator completed new mineral resource estimates for an unmined portion of the LMZ, immediately below and adjacent to the current UMZ open pit, and for the CF satellite deposit located 500 metres northwest of the UMZ open pit. DGCS was retained by Orvana in 2015 to review and update reporting of mineral resources and reserves related to the UMZ. DGCS also provided this professional service in 2013 and 2014.

2.2 Sources of Information

Site visits was carried out by DGCS Qualified Person Gino Zandonai, QP, MSc. Mining, twice in 2016, from August 3rd to 10th, 2016 and October 3rd to 8th, 2016.

During the site visits by DGCS discussions were held with personnel from Orvana and EMIPA, specifically Mr. Luis Isla, Technical Services Manager of EMIPA.

DGCS Qualified Person Gino Zandonai has visited the Don Mario site on several occasions since year 2002, the most recent being the August and October, 2016. At that time, and subsequent to the site visit, he discussed various aspects of Don Mario mineral resources and reserves with Orvana and EMIPA operating and management staff. He most recently addressed such issues with Mr. Luis Isla. Additional documentation referred to in this report is detailed in report Section 28.0 - References.

Mr. Zandonai was responsible for reviewing and updating the mineral resources and reserve models for the UMZ, LMZ and CF deposits as well as the stockpile inventory of the Don Mario Mine to the September 30th, 2016 fiscal year end and review of Orvana's 2016 Don Mario production data.

2.3 List of abbreviations

Units of measurement used in this report conform to the metric system. All currency in this report is US dollars (US\$) unless otherwise noted.

Table 2.1: Listing of Abbreviations and Conversions

a	Annum	kWh	kilowatt-hour
A	ampere	L	litre
bbl	barrels	lb	pound
btu	British thermal units	L/s	litres per second
°C	degree Celsius	m	metre
C\$	Canadian dollars	M	mega (million); molar
cal	Calorie	m ²	square metre
cfm	cubic feet per minute	m ³	cubic metre
cm	centimetre	μ	micron
cm ²	square centimetre	MASL	metres above sea level
d	Day	μg	microgram
dia	diameter	m ³ /h	cubic metres per hour
dmt	dry metric tonne	mi	mile
dwt	dead-weight ton	min	minute
°F	degree Fahrenheit	μm	micrometre
ft	Foot	mm	millimetre
ft ²	square foot	mph	miles per hour
ft ³	cubic foot	MVA	megavolt-amperes
ft/s	foot per second	MW	megawatt
g	gram	MWh	megawatt-hour
G	giga (billion)	oz	Troy ounce (31.1035g)
Gal	Imperial gallon	oz/st, opt	ounce per short ton
g/L	gram per litre	ppb	part per billion
Gpm	Imperial gallons per minute	ppm	part per million
g/t	gram per tonne	psia	pound per square inch absolute
gr/ft ³	grain per cubic foot	psig	pound per square inch gauge
gr/m ³	grain per cubic metre	RL	relative elevation
ha	hectare	s	second
hp	horsepower	st	short ton
hr	hour	stpa	short ton per year
Hz	hertz	stpd	short ton per day
in.	inch	t	metric tonne
in ²	square inch	tpa	metric tonne per year
J	joule	tpd	metric tonne per day
k	kilo (thousand)	US\$	United States dollar
kcal	kilocalorie	USg	United States gallon
kg	kilogram	USgpm	US gallon per minute
km	kilometre	V	volt
km ²	square kilometre	W	watt
km/h	kilometre per hour	wmt	wet metric tonne

kPa	kilopascal	wt%	weight percent
kVA	kilovolt-amperes	yd ³	cubic yard
kW	kilowatt	yr	year

3.0 Reliance on Other Experts

This report was prepared by DGCS for Orvana and the information, conclusions and recommendations contained herein are based upon information available at the time of report preparation. This includes data and reports made available by Orvana as well as publicly available reporting. Sources of such information are referenced in this report and are detailed in the References Cited section of the report. Information contained in this report is believed to be reliable, but parts of the report are based upon information not within the control of DGCS. DGCS have no reason, however, to question the quality or validity of data used in this report. Comments and conclusions presented herein reflect the authors' best judgment at the time of report preparation.

DGCS relied upon Orvana with respect to provision of opinions and information regarding Bolivian mining law and regulations, mineral titles, surface titles and mineral agreements that pertain to the Don Mario operation. DGCS also relied upon Orvana with respect to provision of opinions on site environmental liabilities and details of current status and nature of site environmental and production permits that exist for the Don Mario operation. Summarized information pertaining to these items that appears in this report was confirmed by Orvana.

This report expresses opinions regarding exploration and development potential for the Don Mario operation as well as recommendations for further investigations and analysis. These opinions and recommendations are intended to serve as future guidance but should not be construed as a guarantee of success.

4.0 Property Description and Location

4.1 General

The Don Mario Operation is located within the San Juan Canton, Chiquitos Province, Santa Cruz Department in Eastern Bolivia, about 380 km east of the departmental capital of Santa Cruz de la Sierra. The coordinates for the property are at an approximate position of 59°47' W and 17°15' S (Figure 4.1).

The property includes:

1. the UMZ deposit, which is nearing depletion;
2. the LMZ deposit, where approximately 420,000 ounces were produced by principally underground mining methods from 2003 to 2009;
3. the upper extension of the LMZ deposit, from which production is replacing UMZ production;
4. the CF deposit, located 500m Northwest of the current UMZ open pit; and
5. the LT deposit, located 12 km from the Don Mario mine infrastructure and mined by open pit methods from 2009 to 2011.

Figure 4.1: Location map of Don Mario Mine



4.2 Land Tenure and Surface Rights

The following comments on land tenure and surface rights were summarized by Orvana from Zandonai (2013). DGCS has relied upon Orvana for provision of this information and is not providing a professional opinion in this regard. Orvana has advised that all mineral rights, production and environmental titles and permits were in good standing at the effective date of this report and that all related regulatory obligations with respect to the Don Mario operation have been met.

The Don Mario district consists of 10 contiguous mineral concessions covering approximately 58,325 ha (“Property”) (Figure 4.2 and Table 4.1). The Bolivian Government granted concessions that were called later ATE (Autorizaciones Transitorias Especiales) conferring the right to explore, exploit, refine, and sell all mineral substances within the concession’s borders. The Superintendent of Mines for the Department of Santa Cruz has granted EMIPA a 100% interest in the Mineral ATEs (ex Concessions) listed in Table 4.1 and, as a result, EMIPA has all the required rights to develop, mine and market the minerals and metals within its boundaries. The cancellation or reversion in favour the State of ATEs occurs only if (a) EMIPA does not fulfill its “social economic function” which is fulfilled with the development of mining activities or (b) EMIPA does not comply with the “economic social interest” by failing to pay the required annual mining patent (approximately \$24 per unit for the first five years and approximately \$48 per unit each additional year). EMIPA is fulfilling its social economic function and has paid the mineral ATEs fees for the 10 concessions.

The perimeters of the mineral ATE have not been surveyed or physically marked in the field with the exception of Point 1 of the Don Mario Mineral ATE, which was surveyed with reference to the nearest National Topographic System datum point. The UMZ, LMZ and CF deposits are located in the Don Mario ATE.

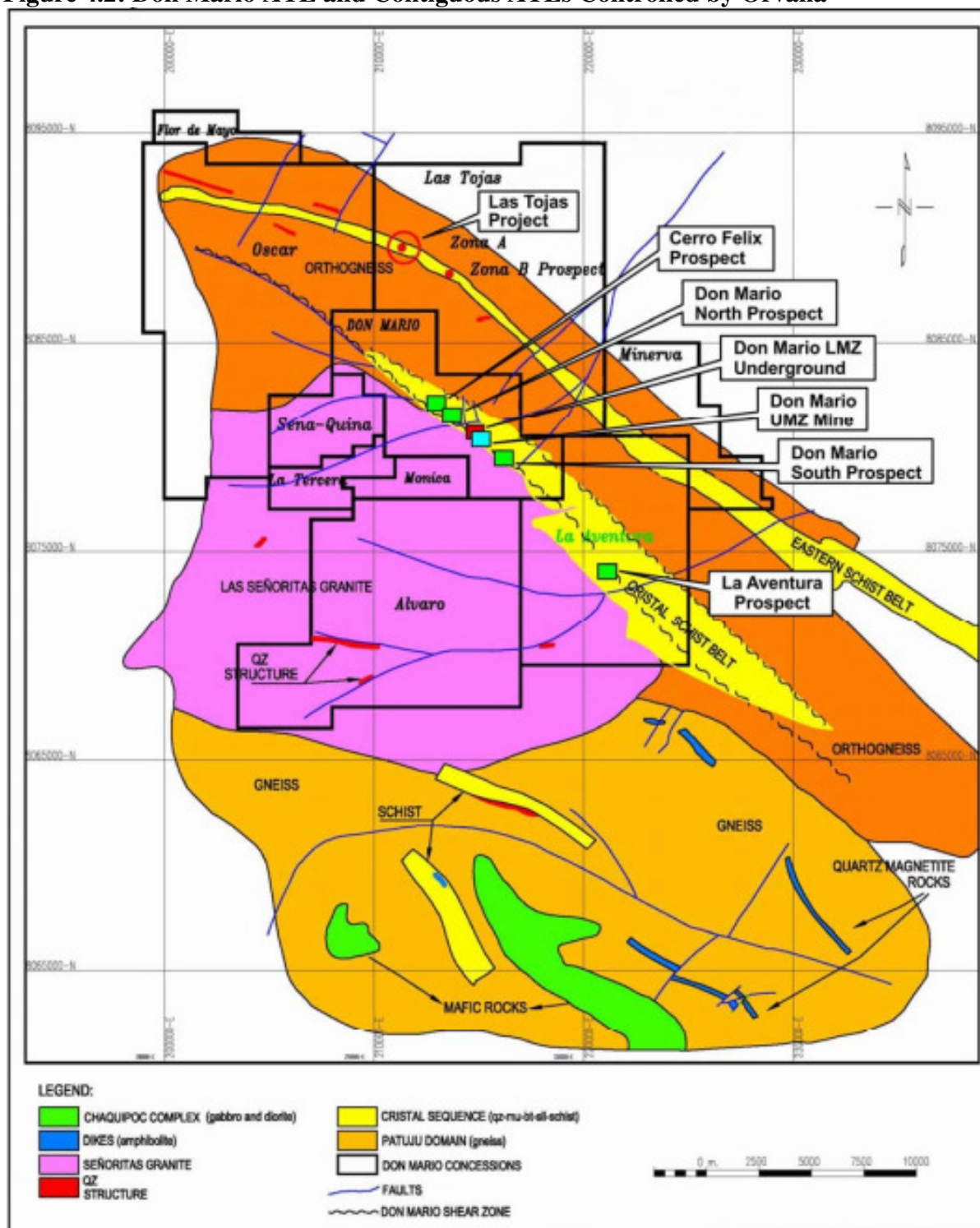
Figure 4.2: Don Mario ATE and Contiguous ATEs Controlled by Orvana

Table 4.1: EMIPA Mineral ATE at September 30, 2016 Report Effective Date

Concession	Area, ha	Title Date	Title Number	Registration Date	Registration Number	Title Holder
Don Mario	5,300	09-Jul-98	108/98	05-Oct-98	705-00293	EMIPA
Oscar	13,500	28-Dec-98	203/98	03-Feb-99	705-00600	EMIPA
Las Tojas	11,700	08-Jan-07	004/2007	31-Aug-07	705-00298	EMIPA
La Aventura	8,200	08-Jan-07	004/2007	31-Aug-07	705-00853	EMIPA
Alvaro	11,300	08-Jan-07	004/2007	31-Aug-07	705-00299	EMIPA
La Tercera	1,150	12-Nov-03	282/2003	17-Aug-04	705-02022	EMIPA
Sena Quina	1,825	13-Nov-03	283/2003	17-Aug-04	705-02023	EMIPA
Mónica	925	12-Nov-03	281/2003	17-Aug-04	705-02024	EMIPA
Minerva	3,225	01-Nov-02	270/2002	18-Mar-06	705-01754	EMIPA
Flor De Mayo	1,200	01-Nov-02	271/2002	12-Jan-06	705-01947	EMIPA

4.3 Mineral Exploration and Mining Rights in Bolivia

All mineral substances in Bolivia belong to the State. A mineral concession conveys to the owner of the concession the exclusive rights to carry out any or all of the following mining activities: prospecting and exploration, exploitation (mining), beneficiation of ores, smelting and refining, and marketing of minerals and metals. The Bolivian government, through the Mining Code, Law No. 535, recognizes mining activities to be projects of national interest and of public utility. This recognition gives preference to mining rights over other surface rights or competing economic interests such as forestry or agriculture. If necessary, a mine operator can use arbitration and expropriation procedures to acquire use, surface easements, or water rights owned by third parties, if such rights or easements are required to operate a mine.

In accordance with Articles 96 and 107 of the Mining Code, a concession owner is entitled to erect and construct within or outside his concession all the facilities and means of communication and transportation deemed necessary to carry out the activities permitted under the Mining Code. Within the perimeter of the concession, the concession owner may use the lands under public domain without charge, including extracting construction materials, timber and other materials from such lands.

The sale and purchase of public lands is administered by the National Service of Agrarian Reform, in accordance with the provisions of the National Agrarian Reform Law.

Articles 111 and 112 of the Mining Code address the waters freely in the public domain as well as waters that flow out of or through the concession. These surface waters are subject to the Law on Waters, the Environmental Law and other dispositions governing water resources.

A referendum at the end of January, 2009 approved the revised Bolivian constitution. Changes to governmental regulations concerning mining activities, environmental compliance, foreign ownership of property, and export controls and repatriation of profits are included in the new Constitution and could affect the ownership of the Property. These changes were implemented by regulation subsequent to FY2016. EMIPA is taking all steps necessary to preserve its rights in the Property.

4.4 Implications of Bolivia's New Mining and Metallurgy Law

On May 28, 2014, Law 535 of Mining and Metallurgy (the "New Mining Law") was promulgated. Pursuant to the New Mining Law, the Company must develop its mining activities to comply with the economic and social function, which means observing the sustainability of the mining activities, work creation, respecting the rights of its mining workers, and ensuring the payment of mining patents and the continuity of existing activities. The New Mining Law does not make any substantial changes to the current tax and royalty regimes in relation to mining activities. Regulations were promulgated pursuant to the New Mining Law subsequent to FY2016. EMIPA is taking all steps necessary to preserve its rights in the Property and convert Don Mario's mineral concessions to mining contracts under the regulations. DGCS has relied upon this information provided by Orvana for current report purposes and is not providing an independent professional opinion.

4.5 Environmental Liabilities

DGCS has been advised by Orvana that all required environmental permits and related documentation are in place to allow present and currently planned future operation of the Don Mario site. It is understood that these include reference to eventual performance of detailed mine closure and site reclamation activities.

At the report date, DGCS was not aware of any environmental liabilities on the property that are not addressed under the terms of existing mining, milling and environmental permits. Orvana has advised that all such material permits are in place to operate, and continue to operate, the Don Mario mine. DGCS is not aware of any other significant factors and risks that may affect access, title, or the right or ability to continue operation of the Don Mario mine, but is not providing a professional opinion in this regard.

4.6 Royalty

Production from Don Mario is subject to a 3% NSR payable quarterly. This expense totaled \$1.2 million for fiscal 2016. The Bolivian government collects a mining royalty tax on the revenue generated from copper, gold and silver sales from Don Mario at rates of 5%, 7% and 6%, respectively. These amounts totaled \$2.9 million for fiscal 2016.

5.0 Accessibility, Climate, Local Resources, Infrastructure and Physiography

5.1 Introduction

Information in this report section has been taken with only minor modification from the Wright et al. (2009) NI 43-101 technical report prepared by Amec for Orvana.

5.2 Accessibility

The Don Mario mining camp is located within the Don Mario mineral concessions and is easily accessible either by air, a distance of 380 km, by road, or a combination of rail and road, a distance of 458 km from Santa Cruz de la Sierra (Table 5.1). Santa Cruz de la Sierra is the Santa Cruz Department capital and has a population of approximately 1.5 million habitants and is serviced by an international airport, Viru Viru. The city of Santa Cruz de la Sierra can be reached by regularly scheduled international flights arriving at Viru Viru.

A 1,200m long gravel airstrip, suitable for light, twin engine, and short takeoff and landing (STOL) aircraft, is located 6 km southwest of the Don Mario camp. The airstrip is well constructed, but can be subject to damage from severe rainfall. Several air charter companies serve the region from the Trompillo civilian airport in Santa Cruz de la Sierra, and the journey to the camp takes approximately 60-90 minutes. Road travel from Santa Cruz de la Sierra is mainly along improved gravel roads and the 458 km journey takes 8 to 12 hours to complete. The access route can be classified into the four segments described in Table 5.1.

Table 5.1: Road Segment Distances ((From Alcalde, 2012)

From	To	Incremental Length	Cumulative Distance	Road Type
Santa Cruz de la Sierra	San Jose de Chiquitos	280 km	280 km	280 km paved, open year round
San Jose de Chiquitos	Taperas	42 km	322 km	42 km paved (rail-head at Taperas)
Taperas	San Juan	60 km	382 km	Improved gravel road
San Juan	Don Mario Camp	76 km	458 km	Improved gravel road

5.3 Climate

The climate is sub-humid tropical. Average monthly maximum temperatures range from 29°C in July to 34°C in October. Minimum average temperatures range from 16°C in June to 25°C in November. Annual rainfall is approximately 1,200 mm, mostly falling in sharp downpours during the rainy season between November and March. Access roads may become impassable in the rainy season. The annual evaporation is 1,600 mm, with daily rates ranging from 3.5 mm to 5.0 mm. Mining and exploration activities take place year round.

5.4 Local Resources

No permanent settlements exist within the concessions' perimeter. The nearest settlement is the village of San Juan (population 350), 76 km south. The largest settlement in the region is the local administrative centre of San José de Chiquitos (population 29,000). The local employees are hired from these and other nearby communities such as Robore (Zandonai, 2013). EMIPA's labour force as of September 30, 2016 consists of approximately 196 full time employees and approximately 233 contractors. Contractors include workers related to camp catering services, tailings dam expansion phase IX and other services related to the UMZ&LMZ open pit mine operation.

5.5 Infrastructure

Surface and underground infrastructure at Don Mario include the following:

- (i) A 2,500 tpd processing facility
- (ii) A tailings storage facility ("TSF") and freshwater dam
- (iii) Modern 300 person camp facility
- (iv) Shops, offices and warehouse facilities
- (v) Natural gas power plant and substations
- (vi) De-commissioned sulphuric acid plant
- (vii) CIL circuit which is being recommissioned
- (viii) A decline and a series of ramp-connected levels to access the historic LMZ underground mine

The 300-person camp facility houses all staff and general labour while on their rotation at the mine. Individual and shared rooms are provided for permanent mine staff whereas dormitory lodging is provided for contractors. Lodgings have independent bathrooms, shower facilities and electrical supply for personal devices. The camp is located to the southwest of the main mine facilities and at a slightly higher elevation than the main mine offices and plant. The offices are a short walk from the camp. Meals are served in a typical cookhouse fashion in three buildings adjacent to the dormitory buildings with kitchens serving main and secondary dining rooms. The site has a direct satellite, telephone, fax and television services. For entertainment, televisions are provided in the dining rooms, and there is a football pitch immediately adjacent to the camp facilities (Wright et al., 2009).

In March, 2003, the Don Mario mine was connected to the Cuiaba–Bolivia Natural Gas Pipeline via a 4-km long pipeline with a rated capacity of 660 Mcf/d of natural gas. A pressure-reducing valve at the junction with the main pipeline reduces the pressure from 1,200 psi to 300 psi in the line to the plant, where it is reduced again to 50 psi for operating purposes. Natural gas has two main uses on the property: 1) electrical power generation, and 2) for use in the process plant for historical processes such as making doré. Current power is generated by three 875 kVA, 3300 V, 50 Hz Waukesha generators; two additional 2,200 kVA, 3300 V, 50Hz generators were added for a total rated capacity of 8,100kVA. An 875 kVA, 2200 V generator provides backup power. Power is distributed at 3300 V in high tension lines for major power consumption areas such as the SAG mill in the process plant, while it is stepped down through two 1,000 kVA, 3,300/440 V transformers at substations for the plant and the mine. For minor power consumers, such as the camp and fresh water pumps, power is distributed through medium tension lines (10 kV).

EMIPA has a natural gas contract with a government owned entity. This contract expires in 2018. EMIPA does not expect future contracts to have a material impact on costs.

Other surface facilities include changing rooms, lunch rooms, clinic, warehouses, maintenance shops, electromechanical workshops, a laboratory, a core storage facility, and a complete telecommunication system providing phone lines and fast internet and intranet connections for the various offices.

5.6 Physiography

The Property is located near the central point of South America and at the northern limit of the Paragua Platte River drainage basin near the watershed divide with the Amazon River system to the north. The region is characterized by gently undulating terrain at an elevation range of 300 meters above sea level (masl) to 450 masl with a few local peaks, including Cerro Pelado. To the south and east, the relief is generally low, but with several peaks rising to over 500 masl. The peak of Cerro Pelado is at 424 masl and approximately 120 m above the Don Mario camp.

There are no perennial streams within 20 km of the Don Mario camp.

With the exception of Cerro Pelado, the area is thickly forested with deciduous trees, including timber varieties such as morado, tajibo and verdolaga. In contrast, Cerro Pelado is essentially bare of trees and vegetated with only scattered scrub and copper tolerant grasses. The region is part of the Chiquitano dry forest.

Local fauna includes tapirs, monkeys, wild pigs, and a variety of birds.

6.0 History

6.1 Introduction

With the exception of report entries that pertain to the post-2009 period that appear in report Sections 6.2.1, 6.2.2 and 6.2.4, content of Section 6.0 has been taken with minor modification from the Wright et al. (2009) technical report by Amec, which was also extensively cited by Zandonai (2013), plus other applicable disclosure.

6.2 Summarized Property History

Cerro Pelado, also referred to as Cerro Don Mario, is the prominent hill formed by the Don Mario UMZ deposit. This location is known to be an ancient site of mining for oxidized copper mineralization. Following the discovery of gold at the site in 1991, the area was explored by four companies (Table 6.1). This resulted in the discovery and/or delineation of the LMZ, the UMZ, LT, and several other prospects within 20 km of the mine site.

Table 6.1: Summarized History of the Don Mario Property

Period	Operator	Phase
Colonial	Republican	Pre-industrial copper mining on Cerro Don Mario by local peoples and Jesuit missionaries
1988		British Mission geological survey carries out mapping in the Bolivian shield but does not reach Don Mario
1991-1993	La Rosa	Early exploration of the UMZ
1993-1995	Billiton	Billiton operates and funds a JV with La Rosa to explore the UMZ. Early drillholes discover the LMZ and exploration focus turns to the LMZ
1996	Orvana	Billiton JV is terminated and La Rosa sells Don Mario to Orvana, a TSE-listed junior exploration company. Orvana advances exploration of the LMZ
2002-2004	Comsur	Orvana attracts investment to develop the LMZ
2005-2006	Orvana	Management assumed by Orvana. LMZ in full operation, exploration programs carried out on the UMZ
2007-present	Orvana	Exploration and initial investment are made to advance the Las Tojas and UMZ projects to production as the LMZ reserves are depleted

6.2.1 Don Mario LMZ History

As described in Wright et al., (2009) the Don Mario District has been evaluated by a series of studies carried out internally by Orvana or original explorer, Billiton Limited, as well as by various independent consulting firms. The large body of work is covered in reporting prepared by the respective firms, which include documents by Billiton Ltd., Micon Limited, Pincock Allen and Holt (PAH), MRDI/Minproc, Amec and Orvana.

Billiton Ltd. prepared the first mineral resource estimate for the deposit in 1995 and this was followed by further deposit studies by Micon in 1995, leading to reporting by PAH in 1996, an updated scoping study by Orvana in 1996, and further updating of resources and scoping documents through 2002. Orvana completed a resource estimate in 2002 that was audited by MRDI in the same year and followed by a NI43-101 resource estimate by Amec in 2003.

Construction of the LMZ mine by Orvana was carried out throughout 2002 and commercial production was achieved in July 2003 by processing ore from a small pit and crosscuts in the upper part of the underground mine. Mine planning was guided by rock chip sampling on development faces. Production reconciliation was achieved by comparing the number of ounces produced by the mill against the estimated ounces in the stopes mined during the period.

In 2005, the mineral resource estimates for the LMZ were documented in an NI 43 101-compliant Technical Report by Orvana (Hodgson, 2005). The updated mineral resource estimate included 193 diamond drill holes and 5,843 channel samples from cross cuts on developed levels in the mine and reflected the depletion of resources by production from the mini pit and underground mining since 2003.

Between August, 2007 and February, 2008, Orvana drilled 21 underground exploration drill holes (DM 244 to DM 264) testing the down plunge limits of the LMZ ore body. Holes intersected the structure hosting the LMZ mineralization, but the widths and gold grades were not sufficient to warrant further work.

In August, 2008, cross-cut development was completed, allowing access to all remaining ore in the LMZ, including stopes in the deepest part of the mine, sill pillars, and other remnants in a crown pillar below the mini pit. An audit of quality assurance data from sampling and the mineral resource and mineral reserve estimates are documented in the AMEC 2008 report.

The LMZ underground orebody was depleted in July 2009 after yielding over 420,000 ounces of gold. In 2015, EMIPA conducted a diamond drilling campaign consisting of 12 holes from the current UMZ pit into the historic LMZ underground workings in order to evaluate the status of the crown pillar and historical voids in order to assist with the resource estimation

work associated with the Don Mario LMZ resource estimate. Results from the drilling confirmed that no significant voids were encountered.

As a near term mine life extension opportunity, two outside consulting firms were engaged to conduct geotechnical and geological reviews of the old resource block model of the LMZ and the current resource block model of UMZ, to investigate the potential of mining the upper extension of the LMZ. The results of this work have demonstrated that a pushback of the pit to allow for the mining of this upper extension of the LMZ is technically feasible. A resource estimate for the LMZ was prepared and Mercator (2015) documented this mineral resource. The Company began replacing tonnes previously mined at the UMZ with production from the LMZ upper extension in the second quarter of fiscal 2016. As at September 30, 2016, LMZ resources have been upgraded to mineral reserves..

6.2.2 Don Mario UMZ History

The Don Mario UMZ was probably worked by the Jesuits as early as the 1700s. No historical production records exist, but a series of small excavations on the top portions of the hill indicate that probably a few thousand tonnes of oxide mineralization were extracted from outcrops of green copper oxides and carbonates. This mineralization is the surface expression of the Don Mario UMZ. There is evidence of rudimentary, colonial-age copper smelting but no evidence of gold extraction either from rocks or soils.

Compañía Minera La Rosa (“La Rosa”) commenced modern exploration of the Don Mario UMZ in 1991 when gold was detected in samples of copper-oxide material brought to La Rosa by loggers for assaying. EMIPA was established by the owners of La Rosa as the legal entity holding the Don Mario mineral concessions. Cerro Pelado was then renamed Cerro Don Mario in honour of Don French and Mario Mercado, the business partners involved in the initial discovery of gold.

La Rosa formed a joint venture (“JV”) with Compañía Minera La Barca S.A. (“La Barca”), a Bolivian subsidiary of the USA company, Battle Mountain Gold. The JV drilled 6 RC holes and 4 core holes (DM 01 to DM 10) along the crest of Cerro Don Mario. Limited trenching, surface sampling and preliminary metallurgical work were also conducted. Based on the limited drilling, La Barca defined a small mineral resource.

La Barca withdrew from the project in July, 1992. La Rosa continued exploration and drilled 10 core holes (DM 11 to DM 20), including 7 holes on Cerro Don Mario. High grade gold mineralization at the south end of Cerro Don Mario, now known as the LMZ, was discovered. In July, 1993, La Rosa completed an updated mineral resource estimate.

In July, 1993, La Rosa and Billiton Exploration and Mining (“Billiton”) formed a JV. The JV conducted significant systematic prospecting and exploration in the area including grid

establishment, soil sampling, air and ground geophysics, detailed geologic mapping, 46 core holes (DM 21 to DM 67) at Don Mario and 8 core holes at the Cerro Felix prospect, as well as mineralogical, petrographic, and structural studies. The initial mineral resource estimates for the UMZ and LMZ projects conducted in 1994 were completed using cross sections for the UMZ and longitudinal polygons for the LMZ. An updated mineral resource estimate for the UMZ was completed by Billiton in 1995.

In late 1995, Orvana conducted a comprehensive review of Billiton's mineral resource estimates and proposed work to advance the project into production. While the efforts of the previous owners had concentrated on the outcropping UMZ deposit, Orvana decided to focus on the higher grade and less metallurgically complex LMZ deposit.

In February, 1996, Orvana acquired 100% of the property by acquiring four Bolivian companies that jointly owned the Don Mario concessions.

In April, 1999, Orvana re-evaluated the gold resources of the UMZ and concluded that the mineral malachite is widespread and therefore the recovery of gold without first removing copper-oxide minerals was highly improbable. Between June and September 2004, Orvana completed an underground diamond-drill program consisting of 44 holes (DM 200 to DM 243) totalling 2,819 m. The exploration program also included several trenches and channels across the slopes of the Cerro Don Mario UMZ outcrops.

Orvana compiled, updated, and re-evaluated all the data relevant to the UMZ mineralization and prepared an internal resource estimate using cross-sectional polygons for the Porous, Oxide, Transition (mixed), and Sulphide zones. The study included a brief review of previous metallurgical test work, but no mining, capital, or operating cost estimates were provided. A process flow sheet involving the recovery of copper, gold and silver by flotation of sulphide and transitional mineralization, and heap leaching of oxide and porous mineralization was contemplated in this report.

In 2006, Orvana performed a re-sampling campaign for UMZ drill holes without assays for soluble copper and updated the UMZ mineral resource database to include the new assays. The NCL-2006 Report includes an estimated mineral resource for the UMZ using the updated database, a 3D wireframe model for the Sulphide, Transition, Oxide and Porous ore types, and a block model with grades for Au, Ag, Cu and soluble copper ("CuS") using ordinary kriging. The NCL-2006 Report included a review of process work, an open-pit optimization study, and basic capital and operating cost estimates for an open-pit mine, flotation circuit to treat Sulphide and Transition mineralization, and a heap-leach circuit to treat Oxide and Porous mineralization. The pit shell was modified to a more practical operational shape. After applying 2.5% dilution, the mineral resources were converted to mineral reserves. A mine plan, with four phases or push backs, was developed. The mine plan was based on a

throughput rate of 2,500 tpd. Mineral reserves were declared for Sulphide, Transition, Oxide and Porous ore types on the basis of the study.

In September 2007, due to the rapid change in metal prices, Orvana commissioned Strategic Mining Consultants (“SMC”) to follow up the NCL-2006 Report (Zandonai and Urbaez, E, 2008). Whittle 4X pit optimization software was used to create mining phases, a production schedule, and a strategic analysis for the project based on the block model developed in 2006. In addition, SMC performed several sensitivity analyses.

An unpublished mining and process study of the UMZ was carried out during 2007 and updated in 2008 by KCA to include process flow sheets for a conceptual 640 ktpa flotation plant and a 360 ktpa heap-leach operation to treat Oxide and Porous ore types. The study was based on the mineral resource estimate pit optimization and mine design developed by NCL and did not include diamond drilling completed on the UMZ in 2008. KCA concluded that the capital expense for an acid heap-leach circuit to treat Oxide and Porous ore types was not justified.

In December 2008, Orvana updated the geological model and mineral resource estimate for the UMZ to include diamond drilling completed in 2007. AMEC reviewed the mineral resource database and mineral resource estimation procedures used by Orvana, and considered that the processes were reasonable in light of best practices for mineral resource estimation recommended by the Canadian Institute of Mining, Metallurgy and Petroleum (CIM, 2003), and reported their findings in the technical report prepared by AMEC in 2009. At the same time, KCA completed a detailed operational study that demonstrated the economic viability of processing UMZ mineralization by based on the reserve estimates discussed in the NCL-2006 Report.

In May 2009, KCA updated the earlier analysis by inputting a preliminary mine plan developed on the resource estimate summarized in the AMEC-2008 report. After further metallurgical testing justified the application of the LPF process to Porous, Oxide and Transition ores and the CFF processing of Sulphide ores, the KCA 2010 Report summarized a reserve estimate and mine plan.

In April 2011, open pit mining of the UMZ began and since that time, to the effective date of this Technical Report, over 3 million tonnes of ore have been mined and processed by both LPF and the current gravity-flotation methods.

In July 2012, due to the talc-rich nature of some UMZ ore, the LPF processing unit was unable to process oxide phase mineralization. This resulted in higher costs, lower recoveries, high sulphur acid consumptions and technical failures in the LPF process unit as well as the flotation unit.

Due to the poor performance of the LPF circuit in 2011 and 2012, such processing was stopped completely and only the gravity-flotation circuit continued processing sulphide and transitional type mineralization from the UMZ pit.

In light of the changes to the UMZ Mine's processing operations and the discontinuance of the LPF process which was used to process oxides ore, the Company commissioned the DGCS 2013 Report which updated the resource and reserve estimates for the UMZ Mine and concluded, among other things, that (i) the Company's decision to discontinue the LPF processing operations due to the lower than anticipated performance of the recoveries and higher than anticipated costs was the correct approach, (ii) the current flotation processing layout and operation by the Company is showing viable recovery of copper, gold and silver from the sulphide and transition ores, (iii) there is no need to adjust the current layout of the UMZ Mine, (iv) all oxide ores and ores with a high talc content should continue to be stockpiled, and (v) with the UMZ Mine processing only sulphide and transitional ores, the mine's resources and reserves have been re-categorized resulting in a reduction of the reserve model to 1.97 million tonnes.

In the fourth quarter of fiscal 2013, the Company completed a review of its opportunities to increase its resource estimates at its existing UMZ mine through the potential to identify new resources in the surrounding area to the UMZ mine that previously had some geochemical, trenching and drilling results indicating gold mineralization. During the first quarter of fiscal 2014 drilling targets were reviewed and an exploration drilling plan was prepared. Drilling commenced during the second quarter of fiscal 2014 and continued in the third and fourth quarters of fiscal 2014. Although gold mineralization has been encountered, to date, there are no new defined resources.

During 2015 Orvana completed an internal assessment of potential to carry out a final pushback of the UMZ pit to access LMZ mineralization not included in the current final pit shell. This assessment was carried out in conjunction with the LMZ assessment completed by DGCS in 2015 and was further supported by results of a new geotechnical study carried out early in 2015 by SRK Limited for Orvana. Exploration activities on mineralized zones surrounding the open pit were ongoing in 2015. The Company is currently processing UMZ ore by flotation-only producing a copper concentrate and a gold concentrate. UMZ material is being phased out.

6.2.3 Don Mario Cerro Felix History

The CF area is located northwest of the UMZ and LMZ deposits. The area was originally defined by a series of gold soil anomalies, is located within the same airborne magnetic trend as the LMZ and UMZ deposits, and has several small, isolated, magnetic anomalies along strike from the anomaly associated with gold and base-metal mineralization at the Don Mario

mine. Two favourable zones have been defined on the property and extend roughly 2.5 km along strike from the Don Mario mine.

Twenty-five shallow historic reverse-circulation (“RC”) holes drilled along the trend encountered anomalous gold mineralization of approximately 1 g/t Au over widths of several metres at depths of less than 100 m. Deeper diamond drilling to depths of several hundred metres below surface failed to intersect significant mineralization in the down-plunge trend of the LMZ that extends into the Cerro Felix area.

In early 2008, 14 diamond drill holes targeted favourable soil, magnetic and historic RC results within 500 m of the Don Mario mine. Two further holes were completed before the end of April. Additional drilling was carried for the second target zone, extending 500 m to 2,500 m from the Don Mario mine. The exploration drilling did not return significant grades or thicknesses.

From 2009 to 2011, approximately 207,000 tonnes of ore at an average grade of 1.77 g/t of gold was processed from mineralized zones north-west and south-east of the UMZ, including Cerro Felix. In 2015, Orvana completed a drilling program consisting of 39 holes totalling 3,600 meters at Cerro Felix.

7.0 Geological Setting and Mineralization

7.1 Introduction

The following descriptions of geological setting and mineralization present at the Don Mario operation have been taken with local modification from descriptions in the Zandonai (2013) Technical Report by DGCS, which cites the Brisbois et al. (2003) technical report by AMEC as the original information source.

7.2 Geological Setting

7.2.1 Regional Geology

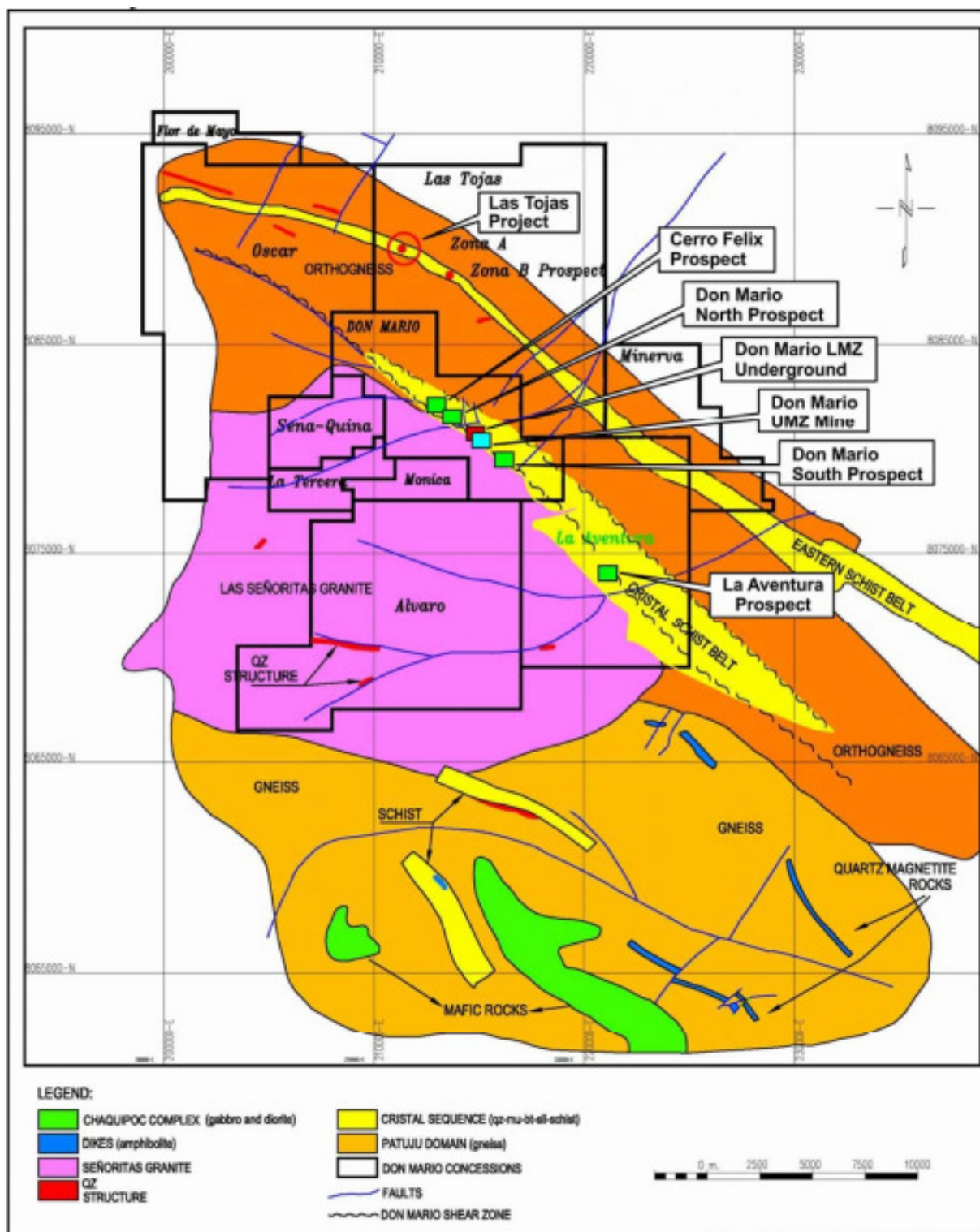
The Don Mario concessions are located within one of approximately twenty Lower to Middle Proterozoic schist belts in the Bolivian Shield (Litherland et al., 1986, Annels et al., 1986). The Bolivian Shield forms the southwestern edge of the Brazilian Precambrian Shield and has been subdivided into a Middle Proterozoic Paragua Craton, which is up to 270 km wide and is bordered by two parallel Middle to Upper Proterozoic orogenic belts: the Sunsas Mobile Belt along its western edge and the Aguapei Mobile Belt along its eastern margin. The entire Bolivian Shield was mapped by the British Mission in the 1976 to 1983 period with the results published as a series of 16 maps at 1:250,000; however because of the reconnaissance nature of the project, Cerro Don Mario was not investigated at that time.

Remapping by the Bolivian Geological Survey, SERGEOMIN, in the 1990's provided more details of the region surrounding Don Mario (Curro, 1997). As shown in Table 6 1, the oldest rocks underlying the Paragua Craton are two metamorphic Lower Proterozoic Superunits: the Lomas Manechas Granulite Complex and the Aventura Complex.

Recent mapping has indicated that the Cristal Belt Sequence that hosts the Don Mario mineralization forms part of the Aventura Complex and is not one of the schist belts of the San Ignacio Supergroup to which it has been assigned in the past. The San Ignacio Supergroup outcrops in the form of discrete belts composed of quartzites, feldspathic psammites and micaceous schists or phyllites, with subordinate ferruginous, calc silicate, metavolcanic and graphitic rich units (Figure 7.1). In the south, many of the belts contain metamorphosed mafic igneous rocks. These belts are not regarded as true analogues of the classic Archean greenstone belts, which are predominantly multicycle, metavolcanic sequences cored by granite intrusions with subordinate metasedimentary rocks. The Bolivian schist belts are certainly younger and mainly sedimentary; however, like the greenstone belts that have been subjected to multiple periods of deformation, are generally surrounded by gneisses and granitoids, and appear to be favourable sites for precious metal mineralization (Litherland et al., 1986).

Table 7.1: Generalized Geology of the Bolivian Shield and Lithologies on the Property (From Curro, 1997)

~500 Ma Brasiliano Orogenic Cycle	Late to post tectonic intrusions		Las Señoritas Granite (994-1020 Ma.)
	Chaquipoc Complex	gabbro and diorite	
unconformity			
~1000 Ma Sunsas Orogenic Cycle	Late to Post tectonic Vibosi Group Sunsas Group	Guanaco Fm. Peñasco Fm. Tacuaral Fm. Guapama Fm.	
~1300 Ma	El tigre Alkaline Complex		
	Late to post kinematic granitoids		
unconformity			
~1600 -1280 Ma	Syn-to late tectonic intrusions		Amphibolite Dykes/Sills
San Ignacio Orogenic Cycle	San Ignacio Schist Supergroup	~15 - 20 Schist Belt	
	hiatus		
~1800 Ma Trans Amazonian Orogenic Cycle		Bahia Las Tojas Sequer	Meta-sandstone with quartzite and meta-arkose Muscovite schist
	Aventura Complex	Cristal Sequence	Biotite Schist Sillimanite Schist + LMZ Quartzite + LMZ Cal-Silicate gneiss + UMZ
		Patuju Domain	Banded orthogneiss Paragneiss
	Los Maneches Granulite Complex	Granulites	
	~2000 Ma		

Figure 7.1: Regional Geology of Don Mario Mine

7.2.2 Property Geology

The property lies within the southeast margin of the Sunsas Mobile Belt of the Bolivian Shield, in a region characterized by highly deformed and metamorphosed Lower Proterozoic rocks of the Aventura Complex. The Property covers a series of northwest trending schist belts (Cristal Sequence), orthogneiss (Patuju Domain) and a granite intrusive body within an area of approximately 25 km east west by 25 km north south (previous Figure 7.1).

The schist belts are part of the Cristal Sequence, which is characterized by a mixture of highly metamorphic assemblages of phyllites, psammites and quartzites with relatively minor calc silicate and ferruginous units. All are inferred to be metasediments that were folded and regionally metamorphosed to medium to high grade at about 1,350 Ma during the San Ignacio Orogeny. A large block, or mega boudin, of resistant calc silicate formed Cerro Don Mario. The most common lithologies are varieties of biotite schist, sillimanite schist, quartzite and calc silicate gneiss. The Cristal Sequence may be distinguished from the enclosing Patuju Domain biotite plagioclase gneisses by a characteristic air photo texture and the presence of mica schists and pegmatitic textures.

Four schist belts were mapped on or near the property. The two northern schist belts, the Eastern Schist Belt, also known as the Las Tojas Schist Belt, and the Cristal Schist Belt, are approximately 5 km apart and bounded by Patuju Domain orthogenesis. Both of these belts are part of the Aventura Complex. The 2 southern schist belts are south of the property. They are unnamed and are bounded by paragneiss of the Patuju Domain. The dominant structural trend is northwest.

As shown on Figure 7.1, the northwest trending Cristal Schist Belt is approximately 25 km in length and up to 4 km in width. It is composed of steeply dipping metamorphic strata, and hosts the LMZ and UMZ, as well as the Cerro Felix, Don Mario North and Don Mario South gold prospects. The Eastern Schist Belt, which hosts the Las Tojas deposit, is narrower, generally less than 1 km in width, but more than 40 km long.

The most detailed mapping of Patuju Domain orthogneiss has been in the area that separates the Cristal Schist Belt from the Las Tojas Schist Belt. These rocks are described as dominantly coarse grained K feldspar quartz muscovite biotite gneiss. Mineralogical banding is typified by segregation of phyllosilicate minerals into bands of fine grained quartz and feldspar that alternate with coarse grained quartz and feldspar rich layers. K feldspar quartz muscovite biotite gneiss alternates with intervals of muscovite quartz K feldspar biotite schist. An anomalously high airborne radiometric signature of the gneiss is considered to be evidence of an intrusive protolith.

Separating the two southern schist belts and emplaced along the orthogneiss paragneiss contact is the Las Señoritas Granite (Table 7.1). The 994 1,020 Ma intrusive is a medium grained leucocratic mass and is 10 to 15 km in diameter. In contrast to the enclosing rocks, it commonly exhibits weakly developed schistosity. Some workers have observed that it is predominantly composed of quartz, plagioclase, muscovite and biotite. Potassic feldspar is far less abundant than in true granite indicating classification should be in the range of tonalite to granodiorite. Although granite outcrops have been mapped within 400 meters of the Cristal Schist Belt, the Las Senoritas Granite has not been positively identified in drill core from the Property.

The property has been extensively intruded by amphibolite dykes and sills. In addition, a series of intermittent outcrops of Cretaceous silica breccia dykes that follow a well-defined east west trend coincide with the northern termination of the Las Señoritas Granite. These are not represented in Figure 7.1 but commonly form small hills rising above the surrounding area of low topographic relief. Numerous narrow, subvertical amphibolite dykes which crosscut the schist sequence also occur in the area covered by Figure 7.1 but are not individually identified in the figure.

The British Mission mapped the San Diablo Structure, a major regional shear that reaches up to 5 km in width and parallels the Cristal Schist Belt approximately 20 km to the north of Don Mario (Litherland et al., 1986). A segment of this feature that crosses the Don Mario property has subsequently been designated as the Sunsas Shear Zone. This regional structure is interpreted to subdivide into multiple subparallel shear zones and strike slip faults. One of these passes along the length of the Cristal Schist Belt and has been designated as the Don Mario Shear Zone. In the vicinity of the Don Mario deposits, the this shear zone is approximately 700 m wide, strikes northwest, and associated planar fabrics shows near vertical to 80° northeast dips.

Based on geological relationships mapped in the underground and open pit exposures at Don Mario, Orvana staff interpret the age of the mineralization in the Don Mario deposits to be no older than the San Ignacio Orogeny and no younger than the Las Señoritas granite.

7.3 Mineralization

7.3.1 Introduction

There are four principal mineral deposits on the Don Mario property that have contributed to commercial mining operations to date. The most significant of these are the UMZ and LMZ. The CF deposit is located 500 meters northwest along strike from the LMZ and UMZ and supported a limited amount of open pit mining from 2009 to 2011. All occur within the Cristal Schist Belt and the Don Mario Shear Zone. Orvana also mined LMZ style mineralization from the Las Tojas (LT) deposit during the 2009 to 2011 period. This deposit is located about 12 km northwest of Don Mario mine and is associated with an un-named shear zone within the Eastern Schist Belt that is separate from, but parallels, the Cristal Schist Belt (Figure 7.1). Summary points relating to the main gold-copper-silver deposits of the Don Mario property are highlighted below:

Don Mario Shear Zone (Cristal Schist Belt)

- (i) LMZ gold deposit: mined out by predominantly underground methods in 2009; the upgrade of LMZ resources to reserves are supported by this technical report; being mined by open pit mining.
- (ii) UMZ copper-gold-silver deposit: overlies the LMZ; UMZ nearing depletion
- (iii) CF gold deposit: 0.5 km north of LMZ and UMZ; new resource estimate presented in Mercator (2015); saw limited open pit production from 2009 to 2011; CF is a low copper grade and high gold grade deposit amenable for the CIL plant.

Unnamed Shear Zone (Eastern Schist Belt)

- (iv) LT gold deposit – mined out in 2011
- (v) Oscar gold prospect northwest of LT has not been thoroughly tested by drilling and trenching to date
- (vi) In addition to the known deposits, several geophysically and geochemically defined targets for exploration drilling have been identified along the 40 km length of this schist belt

7.3.2 Don Mario UMZ (Modified after Wright et al. (2009))

The UMZ forms a prominent, oval shaped, treeless hill that is oriented at approximately 315°, parallel to the regional shear fabric trend of the Cristal Schist Belt. The mineralized zone plunges northwest at approximately 15°.

The UMZ has been divided into 9 main rock types, the most prevalent of which are calc-silicates such as diopside tremolite rock and massive tremolite rock plus dolomite/opicalcite and talc schist. The logging codes and rock types used by Orvana for the UMZ are presented below in Table 7.2.

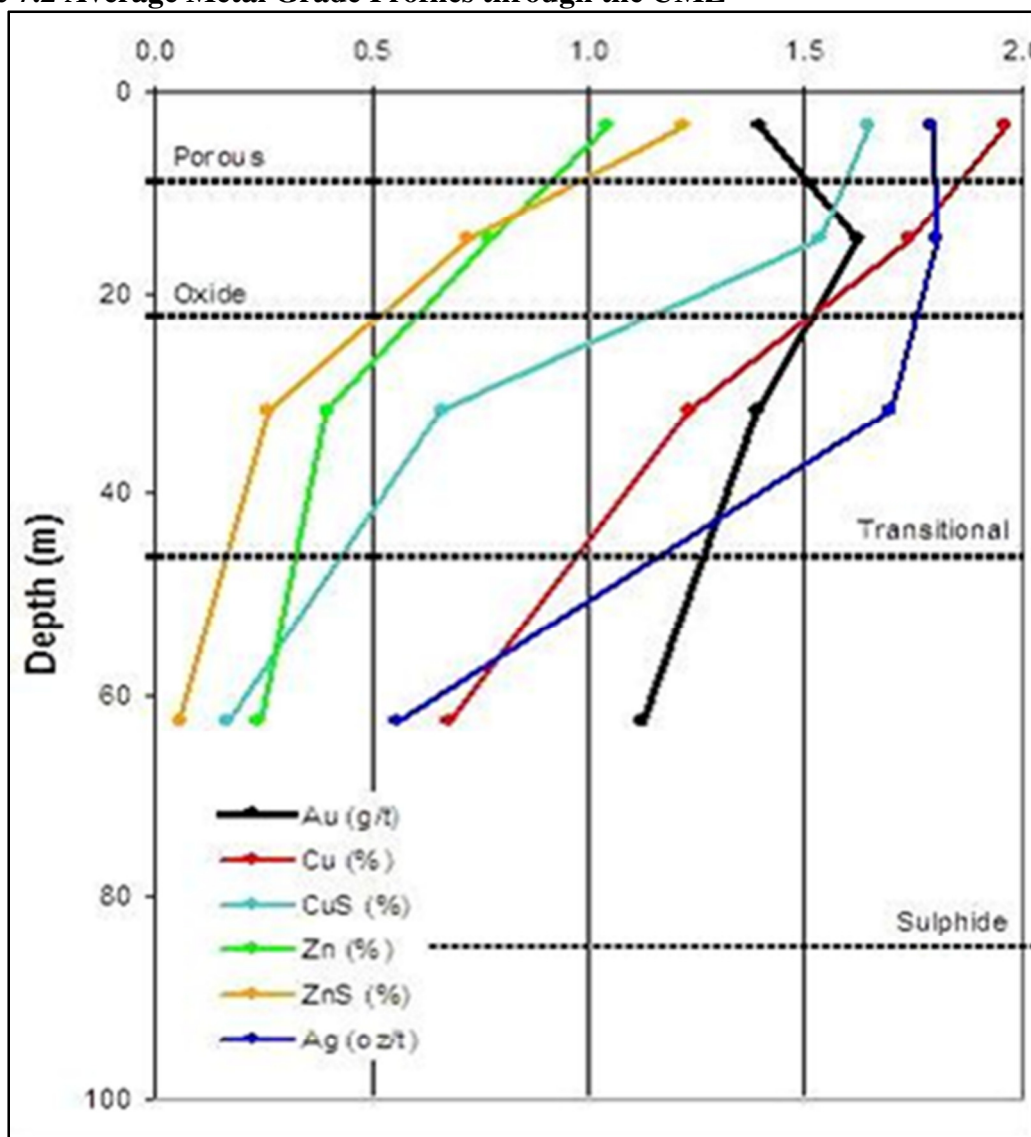
Table 7.2: Core Logging Lithocodes Common to UMZ

Deposit Area	Orvana Core Logging Lithocode	Rock Description
UMZ	51	Chlorite serpentine talc schist
UMZ	62	Dolomite/opicalcite rock
UMZ	64	Diopside tremolite rock
UMZ	65	Massive tremolite rock
UMZ	67	Talc schist
UMZ	71	Amphibolite
UMZ	91	Quartz vein/pervasively silicified zone
UMZ	44	Tremolite magnetite rock (LMZ lithology)
UMZ	16	Quartz muscovite biotite schist (Don Mario intrusive)

The main UMZ calc silicate bearing zone is approximately 500 m long and forms the Cerro Don Mario, which is a ridge approximately 120 m high. This rock package has a maximum horizontal width of approximately 150 m and ranges from 5 m to 100 m thick. Part of the magnesio-silicate alteration and UMZ mineralization is weathered and is divided into four mineralization zones based on mineralogy:

- The Porous zone is characterized by vuggy cavities left by the dissolution of calcite and locally abundant masses of white and orange brown amorphous zinc carbonates and hydroxides, including smithsonite.
- The Oxide zone is characterized by abundant malachite with lesser chrysocolla, azurite, native copper, cuprite, pitch-imonite, and silver sulfosalts
- The Transition zone features traces of pyrite, bornite, sphalerite, and galena with weathered limonite and chalcocite coatings, as well as minor copper oxides
- The Sulphide zone consists of dark green tremolite with bornite, chalcopyrite, and sphalerite. Gold and silver grades are associated with chalcopyrite and bornite mineralization.

For current report purposes, the Porous zone, if not expressly cited otherwise, is included in any general discussions of the Oxide zone. As a result, the three main categories of mineralization considered for operational purposes are Oxide, Transition, and Sulphide. Average grade profiles downward through the UMZ are shown in Figure 7.2. A strong enrichment trend with weathering is shown for total copper and zinc grades as well as acid soluble copper and zinc grades. Gold and silver also show strong enrichment from the primary Sulphide zone through the Oxide zone, but show weak depletion in the porous zone due to secondary remobilization and leaching. The copper mineralization tends to be more evenly distributed whereas gold and silver are more irregular.

Figure 7.2 Average Metal Grade Profiles through the UMZ

(Taken from Wright et al, 2009)

7.3.3 Don Mario LMZ (Modified after Wright et al., 2009)

The predominant quartz-biotite rock is characterized by a dark gray, fine grained, moderately foliated siliceous character with a compact granular texture. Aligned biotite grains are disseminated throughout a fine grained quartz groundmass and have not been segregated into laminae. Because the rock lacks micaceous bands, cleavage is poor. Muscovite is present only in trace to locally accessory amounts. The absence of muscovite in the quartz-biotite rock, as well as its absence in other subdivisions of the LMZ, is the single most important feature of the LMZ. This is considered by Orvana to reflect a potassic alteration event in which all original muscovite was replaced by biotite. The contact between quartz-biotite rock and overlying quartz-muscovite-sillimanite schist is defined by a relatively abrupt change in muscovite content from >20% to trace amounts over a distance of 1-3 meters. When quartz-biotite rock is present along the basal portion of the LMZ, a similar gradational contact with the footwall schist is present. The LMZ has been divided into 4 main rock types dominated by quartz-biotite-garnet rock and massive magnetite rock.

7.3.4 Don Mario CF and LT Deposits and Regional Prospects

Mineralization characterizing the CF and LT deposits has been investigated by substantial amounts of core drilling and lesser amounts of RC drilling. In addition, limited open pit mining programs have been carried out on each deposit, with production processed in the Don Mario mill from 2009 to 2011 for both CF and LT. Results of drilling and pit mapping programs have shown that in both of these cases, gold is the predominant metal of interest and that the style of mineralization present closely resembles that seen within the LMZ. This further underlines the unique nature of the UMZ deposit and demonstrates that economically important mineralization characterizes both the Cristal Belt and the Eastern Schist Belt.

Regional exploration work such as soil geochemistry and mapping in the early 1990's defined other areas of exploration significance within the Don Mario property and the Adventura area southeast of the Don Mario UMZ deposit is an example of such. Detailed descriptive information for lesser known prospects along the Cristal and Eastern schist belts was not available to DGCS for report purposes but it is assumed that these prospects and showings represent additional examples of either LMZ or UMZ styles of mineralization. At present, none of the known prospects or showings has been investigated to the degree necessary to define a significant mineral deposit. Completion of such follow-up work, particularly through geophysical, trenching and drilling programs is necessary to better define their economic potential.

8.0 Deposit Types

8.1 Introduction

The two main deposits types present on the Don Mario property are exemplified by the copper-dominated UMZ deposit that shows direct association with a large, hosting calc-silicate zone, and the gold-dominated LMZ deposit that occurs beneath the UMZ and shows direct association with shearing focused silicification, calc-silicate, potassic and iron oxide alteration. The LT and CF deposits are similar in style and association to the LMZ but no substantive additional examples of the UMZ style have been identified on the property to date.

Mining and exploration programs to date on the property have shown that the LMZ occurs within a well-developed northwest striking and steeply northeast dipping structural/lithologic corridor that constrains gold-copper-silver mineralization as well as distinctive alteration assemblages. Alteration associated with gold-copper-silver mineralization commonly takes the form of iron carbonate, white mica, biotite, quartz, albite, andalusite, staurolite, garnet, cordierite, gedrite and anthophyllite-cummingtonite that occur in highly strained, steeply dipping mineralized corridors. The current spatial disposition of the LMZ and UMZ deposits may be of structural derivation, with the calc-silicate dominated and synclinally folded UMZ host sequence representing a shearing-associated “flower structure” located structurally above the sheared LMZ (L. Isla Moreno, personal communication, 2015).

Each deposit style is summarized below under separate headings. These deposit descriptions were taken with local modification for current context from original text presented in the Wright et al. (2009) Technical Report prepared by Amec for Orvana and filed previously on SEDAR.

8.2 LMZ, LT and Cerro Felix Deposits

The LMZ, LT, and CF gold mineralization is spatially associated with shear zones. On a regional scale, these gold deposits occur in the central parts of regional faults, or shears. They are characterized by silicification of the host rocks and a calc silicate mineral assemblage. The LMZ and CF deposits are proximal to a granitic intrusion, but no such spatial relationship is noted at LT. Shear hosted gold deposits are generally found in greenstone terrains that have greenschist grade metamorphism. Despite the higher metamorphic grade characteristic of the host rocks in the Don Mario district, it is not unreasonable to classify the subject deposits as shear hosted gold deposits that are common in Archean greenstones belts throughout the world (Roberts, 1988).

Given its tabular nature, the EMIPA geological staff has applied the shear hosted model to the LMZ and LT for the purposes of exploration and exploitation.

8.3 UMZ Deposit

The copper gold silver UMZ deposit occurs in the hangingwall of the shear zone that hosts the LMZ. It is characterized by a calc silicate mineral assemblage that includes tremolite, talc (serpentine) and magnetite, which, along with the occurrence of a dolomite unit in the rock package, suggests a metamorphosed carbonate replacement or skarn deposit with chalcopyrite and native gold as the economic minerals. The causative intrusive could be the amphibolite dykes. For purposes of grade modelling and mining, the EMIPA staff considers the UMZ deposit to be similar to a metamorphosed massive sulphide zone.

8.4 Other Possible Deposit Models

Original workers on the Don Mario property variously characterized mineralization at the Don Mario deposit as being structurally focused, shear zone related or to be of volcanogenic massive sulphide association. As noted above by Wright et al. (2009), alternative views on deposit genesis include skarn association, banded iron formation-hosted structural association, and deformed, syngenetic massive sulphide association,. The deposit was more recently classified by Arce Burgoa (2009) as being a deformed example of the Iron Ore Copper Gold (IOCG) association.

DGCS notes that original stratigraphic and intrusive relationships on the property have been substantially modified by development of regional deformation and metamorphism imprints, as well as by shearing that occurred along the Don Mario Shear Zone. These factors combine to make the assignment of most applicable deposit models difficult.

9.0 Exploration

9.1 Introduction

A summary of all exploration carried out to date on the Don Mario property was presented earlier in Section 6.0. This included all work carried out prior to acquisition of the property by Orvana in 1996, as well as point form summaries of work completed during the Orvana period. A summary of exploration work carried out by Orvana between 1995 and 2009 was presented by Wright et al. (2009), with this being built on summaries presented in preceding technical reports. Exploration activities carried out subsequent to 2009 was summarily noted in Zandonai et al. (2013) and also in internal Orvana documents. By means of the past NI43-101 technical reports for the property, descriptions of the majority of past exploration have already been publicly disclosed on SEDAR. Therefore, the reader is directed to Wright et al. (2009) and Zandonai (2013) for original detailed reviews of such activities and results. For current report purposes, the major components of previously reported exploration work programs have been highlighted below in bulleted format. Brief descriptions of exploration programs carried out by Orvana since the last more detailed exploration description in the technical report prepared by Amec, as found in Mercator (2015), have also been included in chronologic sequence.

Exploration throughout the Don Mario concessions between 1995 and 2011 included:

1. Regional airborne geophysics
2. Prospecting with line cutting and mapping
3. Soil, stream-sediment, rock-chip and trench sampling
4. Ground geophysical surveys of induced polarization (IP) and magnetometer surveys
5. Exploration reverse-circulation (“RC”) diamond drilling.

Orvana systematically expanded the coverage of prospecting, geochemical and geophysical surveying, trenching, and diamond drilling outward from the core of the Don Mario property to include the LT project, Don Mario North and Don Mario South, Cerro Felix and the La Aventura areas Figure 7.1 and Table 9.1: Work was focused on the northern and southern extensions of the Cristal Schist Belt, as defined by results of the regional airborne magnetometer survey by Orvana. In 2009, over 200 km of dipole-dipole Induced Polarization (IP) surveying was carried out at approximate 250-m line spacing along the length of the Eastern Schist Belt (Figure 7.1). Drill targets were identified in this program as areas of strong chargeability response with associated moderate to high apparent resistivity responses. The chargeability component is interpreted as reflecting alteration zone disseminated sulphides, while the high resistivity response is attributed to potential silicification and/or massive calc-silicate alteration.

Table 9.1: Exploration Work on the Don Mario Property

Work	Don Mario LMZ	Don Mario UMZ	Las Tojas	Cerro Felix	Don Mario North	Don Mario South	Cerro Cristal	La Aventura
Regional airborne Magnetometer Survey	x	x	x	x	x	x	x	x
Regional Stream Sediment Geochemistry	x	x	x	x	x	x	x	x
Mapping	x	x	x	x	x	x	x	x
Soil Geochemistry	x	x	x	x	x	x	x	x
Rock Chip Geochemistry	x	x	x	x	x	x	x	x
Ground Magnetometer	x	x	x	x	x	x		
Induced Polarization	x	x	x	x	x	x		
Trenching	x	x	x	x	x	x	x	x
RC Drilling	x	x	x	x		x		
Diamond Drilling	x	x	x	x	x	x		
Underground Drifting	x							
Pit for Bulk Sample	x	x	x					

In 2012, EMIPA drilled 2 holes that targeted IP anomalies in the LMZ and UMZ. Only one hole, DM 302, intercepted significant mineralization in the upward projection of the LMZ. This body is included in the UMZ mineralized envelope with 90% of that mineralization now considered in the reserve estimate.

In 2014 Orvana drilled 12 core holes that targeted geophysical and geochemical anomalies in the Don Mario South, Las Tojas & Oscar Concessions. None of these holes returned significant mineralization.

In 2015 Orvana completed a diamond drilling program consisting of 36 holes at the Cerro Felix deposit, 12 holes in the Don Mario LMZ and 2 holes in the LT deposit. Significant mineralization was intercepted in each area. The CF core drilling program was followed up by estimation of mineral resources for the CF deposit by Mercator in 2015, results of which were disclosed by Orvana by a press release dated September 30, 2015 and are documented in this technical report (originally documented in the Mercator (2015)).

During fiscal year 2016, the Company identified a great outcrop of granite located approximately 500 to 1000 meters west of Don Mario mine, which appears likely to have a gold mineralization in quartz veinlets. Very low soil anomalies and gold values have been identified in soil samples and 1.0 g/t Au in panned concentrate. The Company hopes to find potential in the (señoritas granite) intrusive and in the past has concentrated on the crystal schist same of Don Mario with high grade gold content. Prior to fiscal year 2016, some samples were collected in this area which denote a low anomaly in gold and base metals (Pb & Zn).

9.2 Exploration Potential

Orvana staff are of the opinion that the Don Mario property holds substantial exploration potential with respect to discovery of new LMZ and UMZ styles of mineralization. DGCS concurs with this assessment and cites in particular the relative lack of systematic drilling assessments to date along the strike extent of the Eastern Schist Belt that hosts the Las Tojas deposit. The Cristal Schist Belt that hosts the Don Mario Shear Zone, the LMZ, UMZ and CF deposits, and several lesser prospects measures approximately 40 km in defined extent and also has also not been extensively tested by drilling to date.

EMIPA has budgeted \$2M to explore Las Tojas and Don Mario, and exploration targets such as Oscar, Minerva and La Aventura.

9.2.1 Las Tojas

Soil geochem sampling has been planned to be done in the “Las Tojas Gap” which is situated between the Las Tojas A and B areas.

10.0 Drilling

10.1 Introduction

The discussion of drilling presented below consists of three components. The first component summarizes information that pertains the historical drilling carried out prior to Orvana's acquisition of the property in 1995. The second presents information of the drilling carried out by Orvana to explore and develop and mine (LMZ and UMZ deposits) between 1995 and 2015, and the third component shows the information drilling programs carried out during 2015 that define and confirm the mineralization of CF, LMZ and LT. The information summarized below has already been publicly disclosed in past NI43-101 technical reports prepared for the property. Table 10.1 provides a summary of drilling carried out to date on the property and basic information for the major programs is presented below in chronologic order. Records viewed by DGCS show that 490 core drill holes, 35 reverse circulation drill holes and 22 underground core drill holes were completed on the property up to the end of 2010.

All details and descriptions for pre-2015 programs have been taken with only slight modification from previously disclosed drilling program descriptions provided in earlier NI43-101 technical reports by Wright et al., (2009) and Zandonai (2013). The 2015 information was obtained by Mercator and DGCS (2015) from Orvana and reported in the Mercator (2015) and highlights of associated drill holes have been disclosed in press releases by Orvana. A total of 48 additional RC and core holes (2175m) were completed during the 1996 to 1998 period for hydrologic or geotechnical purposes (Table 10.2).

10.2 UMZ and LMZ Drilling Program Details

The UMZ has been drilled in seven campaigns since 1991. All programs recovered NQ diameter (47mm) diamond drill core with the exception of six RC holes drilled by La Barca JV in 1991 and La Rosa in 1992). The 123 diamond drill holes have an average length of 78 m and are drilled on section lines oriented 135° and spaced approximately 25 m apart (Figure 10.1). Approximately 40% of holes are vertical and remaining holes are drilled to the northwest and dip from -80 to -45°. The inclined holes provide high-core angle intercepts with the mineralized body when viewed in section. Thirty-three holes drilled in campaigns targeting the LMZ also intersected UMZ mineralization. These holes are identified as LMZ holes in table 10.1 but have also been used for UMZ mineral resource and reserve estimations.

Table 10.1 Core and RC Drilling by Project: 1991 to 2013 Incl.

Diamond Drilling	Holes	Metres	Average Depth (m)	Dominant Az./Dip
LMZ	181	25,206	144	225/-60°
UMZ	90	6,774	75	225/-60°
Las Tojas	111	15,480	152	225/-60°
Cerro Felix	72	7,621	106	045/-60°
Don Mario North	27	6,620	229	225/-60°
Don Mario South	9	1,390	274	225/-60°
Oscar Concession	3	500	166	5/55°
Total	490	63,591		
Reverse Circulation	Holes	Metres	Average Depth (m)	Dominant Az./Dip
Cerro Felix	25	3,472	139	045/-60°
Las Tojas	4	440	110	045/-60°
UMZ	6	647	107	vertical
Total	35	4,559		
Underground Diamond	Holes	Metres	Average Depth (m)	Dominant Az./Dip
LMZ	22	2,793	127	225/-60°
Total All Types	547	70,943		

Table 10.2 Drilling Not Directly for Mineral Exploration at Don Mario

Program	Type	Year	Holes	Metres
Hydrology/Geotechnical	RC	1996	18	541
Geotechnical/Condemnation	DDH	1998	14	239
Geotechnical/Condemnation	RC	1998	2	201
Hydrology	RC	1997	3	224
Hydrology	RC	1998	11	971
Total			48	2175

Drilling programs to define the LMZ were initiated by La Rosa/La Barca Joint Venture in 1991 and were followed up by Billiton through 1995 when the property was purchased by Orvana. All major campaigns recovered NQ size core and were carried out along northeast-southwest oriented section lines that systematically cross the northwest strike of the deposit. Initial drilling was carried out on a more widely spaced basis, but final definition of the deposit prior to mining saw a nominal drill section spacing of 25 m over much of the deposit extent. Most holes are inclined between -45 and -70 degrees and were drilled on-section along southwest azimuths. A few inclined holes were also drilled along northeast azimuths to further test the near-vertical LMZ.

In 2015, a 12 drillhole program was completed by Orvana on the upper portion of the LMZ, just below the UMZ pit, to assess certain areas for void space and to obtain geotechnical information needed for UMZ pit wall pushback scenarios being considered by the company.

Figure 10.1 presents drill holes labelled as being LMZ holes in the Orvana drilling database and a larger scale drill collar location plan showing these is included in Appendix 1.

10.3 Cerro Felix Deposit Drilling Program Details

Drilling assessment of the Cerro Felix deposit was originally carried out by Billiton in 1995 and consisted of 8 core holes totaling 1,027 m. Drilling was carried out along northeast-southwest oriented section lines spaced about 50 m and 100 m apart. In 2006, Orvana completed 25 reverse circulation drill holes totaling 3,471 m and in 2008, Orvana completed a 27 hole core drilling program totaling 3,195 m. In 2015 Orvana completed two additional CF core drilling programs totaling 39 drill holes (3600 m) at the Cerro Felix deposit and HQ (67 mm) size core was recovered. Figure 10.2 presents CF drill hole locations from the Orvana drilling database. Coordinates appear in Appendix 1.

10.4 Las Tojas Deposit Drilling Program Details

Drilling assessment of the LT deposit was originally carried out by Orvana 1996 and between that time and 2008, a total of 110 holes totalling 15,080 m of drilling had been completed. Drilling was carried out along northeast-southwest oriented section lines spaced about 50 and 100 m apart. Orvana completed two additional core HQ (67 mm) drill holes at LT in 2015 and these tested depth extensions of the known mineralized zone. Both holes intersected narrow mineralized zones. The LT deposit is not included in any of the resource or reserve estimation work covered by this report. Las Tojas A and B are the two areas that were targeted for a future drilling program to test the southern extensions of previously mined out areas of Las Tojas.

10.5 Drilling Contractors and Equipment Information

All core, RC, hydrologic and geotechnical drilling programs summarized above were carried out under contract by qualified independent drilling services firms. Wright et al. (2009) and Zandonai (2013) documented details associated with programs carrier out up to the dates of their respective NI43-101 technical reports. The reader is directed to these previously disclosed reports for additional information as may be required.

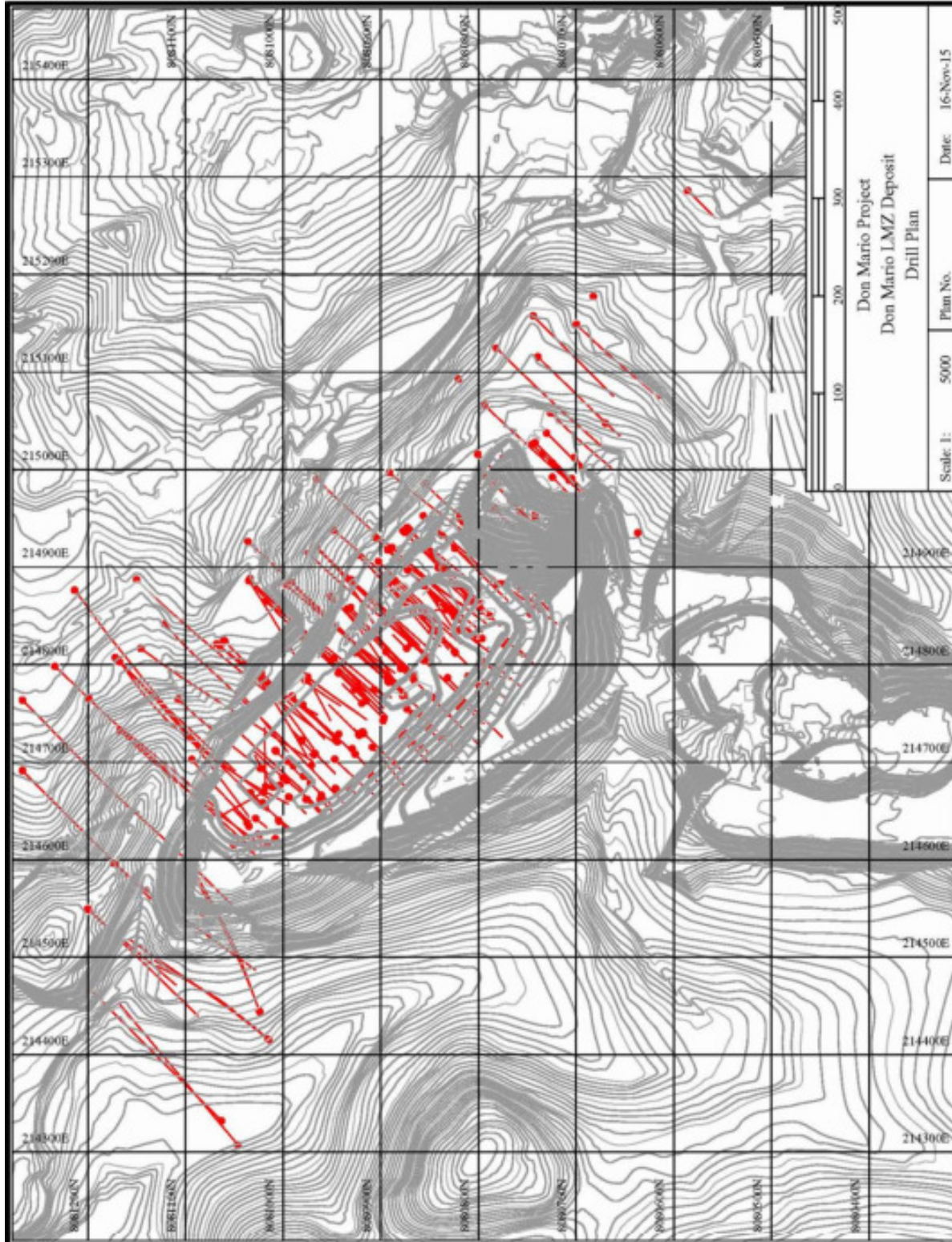
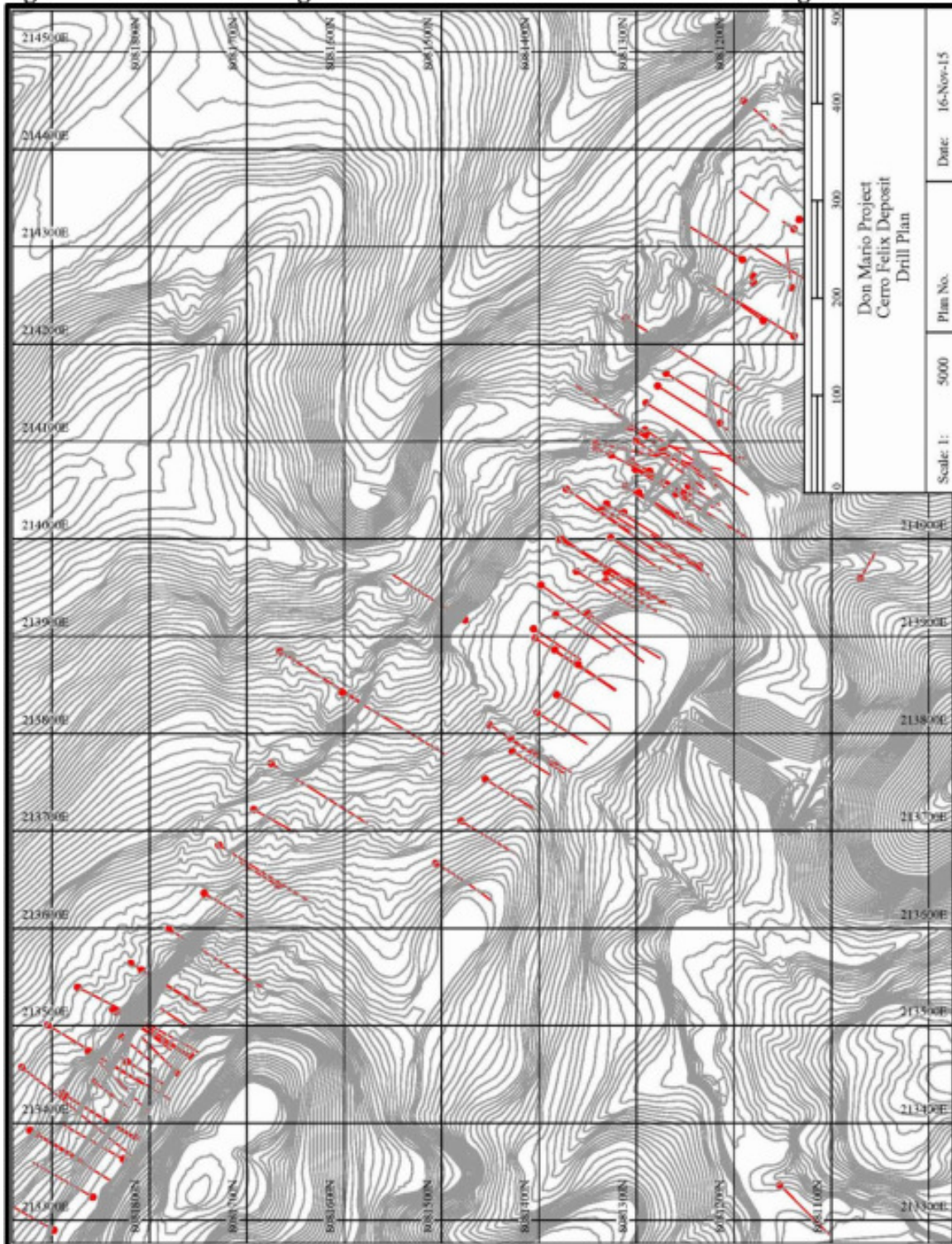
Figure 10.1: Plan Showing UMZ and LMZ drill holes from Orvana drilling database

Figure 10.2: Plan Showing Cerro Felix drill holes from Orvana drilling database

11.0 Sample Preparation, Analyses and Security

11.1 Introduction

The following discussion of sample preparation, analyses and security items is organized chronologically. Details of programs pertinent to the current report that were completed up to the September 30, 2013 effective date of the Zandonai (2013) are first considered. The Wright et al. (2009) technical report prepared by Amec provided the most detailed prior review of such items and was extensively referenced in the Zandonai technical report.

The information presented below that pertains to 2013 and an earlier program has been sourced from the two technical reports noted above. Information pertaining to subsequent programs was obtained from Orvana staff during site visits by DGCS staff in August and October, 2016 as well as in year 2015 and Mercator (2015).

11.2 Sampling Method and Approach

11.2.1 1991 to 1995 Period Procedures (Pre-Orvana)

Documentation of core logging and sampling procedures are in most cases incomplete. Indications of sampling procedures before 2003 are found in reports by The Winters Company (TWC, 1999), the AMEC-2003 NI43-101 technical report by Brisbois et al. (2003) and the NCL 2006 report. TWC (1999) reported that Billiton established detailed core logging, sample collection and sample preparation protocols, and implemented procedures for the collection of geotechnical data.

11.2.2 Orvana Procedures

Wright et al (2009) reported that AMEC representatives were present at the Don Mario site in 2007 and 2008 and observed then-current core handling and sampling procedures for the LMZ, UMZ, LT, and Cerro Felix projects. They note that detailed lithologic logging, geotechnical logging and core sampling were systematically carried out by site staff and that core recovery and geotechnical parameters were calculated for all holes.

Based on review of previous reporting, clear protocols for core logging and sampling by Orvana staff are interpreted by Mercator and DGCS (2015) to have been in place since approximately 2003. These are described as follows by Wright et al. (2009).

Core boxes are brought to an open core logging and storage area and laid out on benches at waist height. Core is washed with water from a gallon paint can and an 8" brush and marked at metre intervals on the core and on the core box divider. Geotechnical logging for recovery,

rock quality (RQD), fracture spacing (AS), fracture frequency (FF), nature of fracture surface (FS), fracture filling (FF), and degree of weathering (DW) is carried out on a metre by metre basis using well defined parameters and standardized scales and entered on a standardized paper template. Measurements of magnetic susceptibility are taken for each metre of core and recorded in the geotechnical log. Geology staff and helpers log approximately 20 m to 30 m of core per day.

Density determinations have been taken since the initial Billiton drill programs for each metre of core having sufficient recovery to permit collection of a 250 500 g sample.

For each metre of coherent core, weights are taken for density determination. A 250 g to 500 g piece of core is collected utilizing preexisting core breaks where possible. The sample is marked with its depth, and delivered to the balance shack in the core area for weighing. The balance shack is a 1.5 m x 2 m x 3 m area covered with plastic sheeting and with a cardboard door to keep out wind. Samples are weighed on a steel table with a 10 cm x 20 cm hole over an open nominal 50 gallon tank filled with water. A 500 g mechanical, three row balance with 0.01 g precision is used. For each sample lot comprising 15 to 20 samples, the scale is manually equilibrated with a hanging, dry balance tray and then with a hanging, wet balance basket. The baskets hang from the balance through a hole in the table and immersed in water. Small pieces of wire are hung from the basket to equilibrate it with the dry tray. Samples are weighed and recorded one by one in the geotechnical log using the dry sample tray. The tray is switched with the basket, and the 15 to 20 samples are weighed suspended in water, and weights recorded one by one in the geotechnical log. Core samples are returned to the core boxes.

EMIPA reported that the procedure for density determinations has not changed over time. However, in the NCL 2006 report, it was reported that the above method did not accurately reflect the density for the porous zone mineralization. Therefore, samples from this zone were sent to ALS Laboratory for wax sealed density determinations.

Geological logging is recorded on a standardized paper logging form with fields for basic drilling information, e.g., hole number, depth, diameter, azimuth, dip, logging geologist, logging dates and logging data for rock codes, alteration, mineralization type and intensity, and general comments. A graphic column is used to capture fracture, joint and contact angles. Logging is to scale with approximately 20 m on a page.

Mineralized core was sampled at the EMIPA core shed at the Don Mario mine. The original core facility was located 100 m north of the mine engineering offices immediately below the LMZ hoist. The core processing facility was not built with the intention to process and store the amount of core being handled by EMIPA in recent years, and in early 2008, EMIPA had established a new core processing facility that included covered racks to better store core and reject materials. Sample intervals were marked by an EMIPA project geologist during

geotechnical and geological logging. Intervals were marked at nominal 1.5 m lengths respecting changes in lithology and alteration intensity through the mineralized zone. One to two additional samples were taken above the upper and below the lower margins of the mineralized zone.

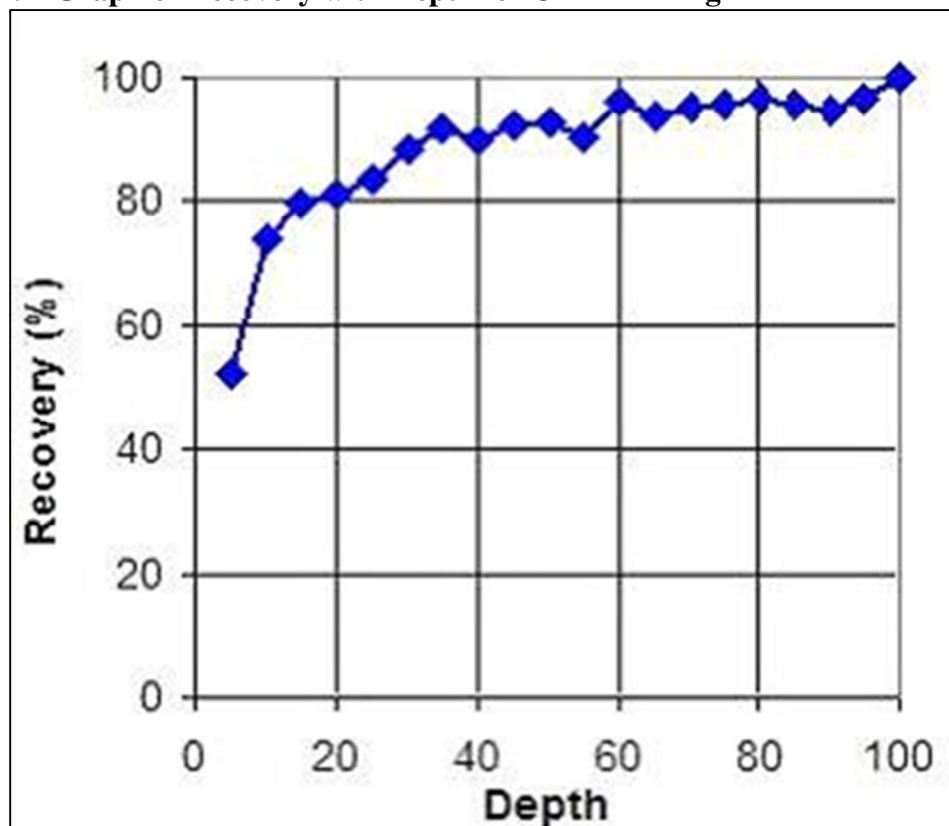
Samples were cut following a line marked with a wax pencil such that the dominant foliation is perpendicular to the core axis on the cut surface. One half of the cut core is stored in core boxes now in the new core processing facility at the Don Mario mine; the other half was tagged, put in heavy polyethylene sample bags with two part waterproof sample tags and shipped to the preparation laboratory."

During several site visits in 2015 and the last in August 2016 by DGCS, discussions were held with Orvana staff regarding core logging and core sampling procedures as well as core analysis and security. From these discussions it is concluded that the systematic data collection and sampling documentation protocols described above have generally been continued at the Don Mario site for both exploration and mine-related drilling.

11.3 Core Recovery

Calculation of core recovery factors has been carried out for all Orvana drilling to date and this practice continues. Wright et al. (2009) reported on analysis of spatial systematics of recovery and determined that poorest documented recovery in the 50% range typically occurs in the first 10 meters of coring below the overburden interface. This factor was noted as rising to about 80% at a depth of 20m below overburden and to 90% or greater by a depth of 30m. Poor near-surface recovery was attributed to prevalence of fractured, broken and oxidized material in the near-surface zone, with this transitioning with depth to more coherent bedrock that typically produces core recoveries ranging from 80% to 90% or better.

Mercator (2015), reviewed in details the drill core from several CF and LMZ programs plus several holes from earlier LMZ programs. It was noted that while very good recovery is typical of most drilled sections, barring intervals immediately below overburden, some amphibole and garnet bearing mineralized intervals are characterized by strong fracturing, core fragmentation and local reduction in recovery. An assessment of database core recovery entries against gold and copper grades was carried by Wright et al. (2009) and no strong correlation of high mineralization levels with poor recovery intervals was detected. Figure 11.1 compares core recovery data for UMZ holes considered in the 2009 assessment and illustrates the shallow core loss relationship mentioned above. Mercator reviewed recovery data for all Cerro Felix and LMZ drill holes used in the current resource estimates and recovery factors calculated show recoveries of 80% or more.

Figure 11.1 Graph of Recovery with Depth for UMZ Drilling

Taken from Wright et al. (2009)

11.4 Sample Preparation and Analysis

11.4.1 Summary

A summary of the laboratories used for sample preparation and analytical methods that apply to core sampling in the LMZ, CF, UMZ, LT and general exploration drilling programs carried out at Don Mario is presented in Table 11.1. This shows that independent commercial laboratories were consistently accessed to provide drill core preparation and analytical services. Despite that no drilling has been made during FY2016, EMIPA will maintain high standards for the core preparation and sampling for future drilling programs.

Table 11.1 Summary of Sample Preparation and Analytical Methods

Period	Operator	Holes	Preparation	Analysis
1991-1993	La Rosa	DM-01 - DM-20	Inti Raymi	Inti Raymi- 30g fire assay with AA, Cu-Pb-Zn-Ag by AA
1993-1995	Billiton	DM-21 - DM-45	Bondar Clegg, Santa Cruz 150 g pulp for CFA, 500 g pulp for SFA	Bondar Clegg, Santa Cruz- 30-50g CFA, 150g SFA on select samples , Cu-Pb-Zn-Ag by AA with aqua regia digestion, CuS with H ₂ SO ₄
1993-1995	Billiton	DM-045 – DM-69	Don Mario, 150 g pulp for CFA, 500 g pulp for SFA	Bondar Clegg, Santa Cruz- 30-50g CFA, 150g SFA on select samples , Cu-Pb-Zn-Ag by AA with aqua regia digestion, CuS with H ₂ SO ₄
1996-1999	Orvana	DM-70 – DM-191	Don Mario, 150 g pulp for CFA 500 g pulp for SFA, upgrade Beco disc pulverizer to ring and puck mill	Bondar Clegg, Oruro- 50g CFA, 150g SFA on select samples, Cu-Pb-Zn-Ag by AA with aqua regia digestion, CuS with H ₂ SO ₄
2002	Comsur	DM-192 – DM-197	Don Mario	Bondar Clegg, Oruro- 50g CFA, 150g SFA on select samples, Cu-Pb-Zn-Ag by AA, CuS with H ₂ SO ₄
2004	Orvana	DM-198 – DM-242	ALS Chemex, Oruro	ALS Chem ex, Vancouver- 50 g CFA, Cu-Pb- Zn-Ag by AA with aqua regia digestion, check assays with CuS in Alex Stewart, Mendoza
2005	Orvana	DM-243 – DM-246	Don Mario	Don Mario- 30 g CFA with AA finish, ALS Chemex (as 2004)
2006	Orvana	LT-01 – LT-109	ALS Chemex, Oruro	Don Mario- 30 g CFA with AA finish, ALS Chemex (as 2004)
2007	Orvana	DM-247 – DM-300	Alex Stewart, Mendoza	Alex Stewart Mendoza, 50 g fire assay, Cu-Pb- Zn-Ag by AA, acid soluble Cu (CuS) and Zn (ZnS) from H ₂ SO ₄ digestion
2002-present	Orvana	Channel Sampling	Don Mario	Don Mario- 30 g CFA with AA finish
2015	Orvana	LMZ, Cerro Felix programs	ALS Global	30 g CFA with AA finish, multi-element,

NOTE: Abbreviations are FA (fire assay – 30 g pulp used), SFA (screen fire assay – 500 g pulp used), CFA (common fire assay – 159g pulp used), AA (atomic absorption spectroscopy)

The TWC (1999) reported that samples from the 1991-1992 La Rosa – La Barca and La Rosa campaigns were analyzed using a 30g fire assay preparation for Au and Au-Cu-Pb-Zn-Ag were determined by atomic absorption spectroscopy by the Inti Raymi Mine laboratory in Bolivia. There are no records of Quality Assurance and Quality Control (QA/QC) parameters established for this program. However, the Inti Raymi laboratory is believed to have carried out routine internal QAQC monitoring through use of standards, blanks and duplicate samples. Details of the sampling procedure, sample security, and preparation are not known for the initial campaigns carried out by La Rosa and La Barca in 1991-92.

Wright et al. (2009) reported that samples from initial drilling by Billiton were routinely prepared and analyzed by Bondar Clegg and Company Ltd. (Bondar Clegg) in Santa Cruz. They also noted that samples from the final hole drilled in the Billiton campaign were prepared at the Don Mario Mine laboratory prior to submission to Bondar Clegg. Sample preparation methodology used in the Bondar-Clegg laboratory is reported as being the same as that followed at the Don Mario mine laboratory, which was initially operated by Billiton personnel. Sample preparation involved:

1. Primary crushing in a 5-inch by 6-inch jaw crusher re-crushing any material not passing a 10 mm screen.
2. Secondary crushing in a 6-inch cone crusher, re-crushing any material not passing a 1 mm screen.

The crushed sample was passed through a ¼ inch Jones splitter until either a nominal 800-g sample was obtained for further preparation for screened (metallic) fire assay (SFA), employed on samples with suspected coarse gold, or a 500-g sample split was made for analysis by conventional fire assay (CFA). The remaining fraction of the crushed material was saved as a coarse reject and stored.

Samples from the beginning of the Orvana drill campaign in 1996 were prepared at the Don Mario preparation facility and sent to the Bondar-Clegg laboratory in Oruro for assay; by the end of the 1996 drill campaign, the Orvana Don Mario laboratory was carrying out fire assays. Assay for acid-soluble copper on selected samples was initiated during the Orvana 1998 drill campaign.

During the 2004 campaign, samples were cut with a rotary diamond carbide saw and prepared and analyzed at the Don Mario laboratory. Splits of pulps of 30% of the samples were sent to the Alex Stewart laboratory in Mendoza, Argentina for referee analyses.

Core samples from the 2007 campaign were cut and sampled at the Don Mario mine site and sent to the Alex Stewart Assayers Argentina laboratory in Mendoza, Argentina for preparation and analysis. Preparation and analysis processes were similar to those used for

the 2004 campaign with the addition of analyses for acid-soluble Zn. A quality control program including the analysis of blanks, a high- and low-grade standard for Au, and pulp duplicates was carried out by Orvana (Wright et al., 2009).

Core samples for the 2015 drill campaign were sent as half core to ALS Global Labs in Oruro for preparation and analysis and were subject to a QAQC program that included analysis of blanks, a high- and low-grade standard for Au, and ¼ core duplicates. No drilling has been made during FY2016.

11.4.2 Laboratory Accreditation

Bondar-Clegg, which provided early project analytical services for Orvana, was a large, independent, fully accredited analytical services firm based in Ottawa, Canada that was acquired in 2001 by ALS Chemex, now ALS Global. Alex Stewart Assayers Argentina is an independent, international analytical services firm that provided 2007 services and is currently certified to ISO 9001:2008, ISO 14001:2004 and ISO 17025:2005 standards for certain procedures. ALS Global, which provided 2015 project analytical services, is an independent, fully accredited, international analytical firm with analytical facilities certified to ISO 9001:2008, ISO 14001:2004, and, typically, ISO 17025:2005 standards for certain procedures. DGCS is not aware of any accreditation documentation that may apply to the Inti Raymi Mine laboratory used in the 1991-1992 drilling programs by La Rosa that accounts for drill holes DM-01 to DM-20.

11.5 Sample Security

Security considerations with respect to drill core samples was not specifically addressed in early project reporting. However, descriptions of site logging and sampling protocols are interpreted by DGCS as indicating an industry standard level of attention to such activities. On this basis, it is assumed that a comparable standard of diligence was applied to documentation and transport of core samples from the mine site to the commercial analytical laboratories mentioned in the preceding report section. In addition to

Wright et al. (2009) described as follows the standard protocols for supervision of drilling, core logging core sampling and sample transport that were maintained by Orvana at the time of related site visits by Amec staff.

“Drilling is supervised by Orvana staff during daytime hours. Access to the drills is limited to contract drill and Orvana staff. Drill core is transported from the drill to the core shed on the Don Mario property by Orvana and contract drill staff. Drill core is logged, cut, and sampled and bagged by Orvana staff. Samples are delivered to the Orvana Santa Cruz office in a company truck with staff or contract driver. Samples are shipped from the office in Santa Cruz to Oruro by a private, contracted, trucking firm. ALS and Alex Stewart sent an electronic confirmation of receipt to Orvana staff upon arrival of the samples at the preparation facility.

The relatively small size of the mine and its remote location in a relatively unpopulated region of Bolivia ensure that mine operations maintain a low profile with little public interaction. The mine receives few visitors and security is relatively easy to maintain. The use of reputable contractors and of EMIPA staff for supervision ensures reasonable control over sample security”.

The same authors concluded that Orvana had established reasonable security measures at that time to prevent outside tampering of samples. Zandonai et al. (2013) described the same system as being in effect at the time of the DGCS site visit and similarly assessed the system as being acceptable.

Mercator (2015) discussed drill core security and core sample chain of custody topics with Orvana staff. Site procedures were found to be well organized and basically the same as those described above. It is also understood that these protocols remain in effect at the present time. Based on the 2015 and 2016 DGCS's site visits findings and comparison to descriptions provided in previous NI43-101 technical reports, it is DGCS's opinion that Orvana's past and ongoing approach to drill core and core sample security is reasonable and appropriate.

12.0 Data Verification

12.1 Introduction

The data verification discussion presented below have been taken from Mercator (2015) and consists of reporting on work completed by Mercator and DGCS in 2015 specifically for the CF and LMZ resource estimates plus summations of programs carried out previously in support of either the current Zandonai (2013) UMZ estimate or the most recent previous LMZ and UMZ estimates prepared by Amec and reported in Wright et al.(2009). In each of the mentioned cases, a Qualified Person(s) as defined under NI43-101 reviewed the associated drilling database and support data and determined that they were acceptable for use in a mineral resource estimate prepared in accordance with the CIM Standards and disclosed in accordance with NI43-101. Reviews of site drilling operations, core sampling and logging procedures and available quality control and quality assurance (QAQC) program results returned similar determinations.

Mercator (2015) carried out independent desktop data verification checks of drilling database records for the CF deposit and also for records pertaining to the near-surface portion of the LMZ deposit that is addressed in the LMZ resource estimate by Mercator (2015). During the 2016 site visits, DGCS checked the work completed by Mercator (2015)'s staff. The work completed by Mercator (2015) was similar to those carried out by earlier resource estimate authors and included detailed review of core and associated sampling and logging records for mineralized drill holes from the CF deposit and mineralized drill holes from the LMZ deposit, collection and analysis of a total of 16 quarter core check samples pertaining to the two deposits, field checking of lithologic surface mapping in the deposit areas and field checking of database drill collar coordinates for a combined total of 18 CF deposit and LMZ deposit drill holes using a Garmin Model Map 61 hand-held GPS instrument.

Results of the Mercator (2015) verification programs are presented below along with pertinent summarized information from previous NI43-101 resource estimate reporting by Wright et al.(2009) and Zandonai (2013).

12.2 Review and Validation of CF and LMZ Project Data Sets

Data from core sample records, lithologic logs, laboratory reports and associated drill hole information for all drilling programs completed in the LMZ, UMZ and CF deposit areas to date has been digitally compiled by Orvana and Mercator (2015) was provided with the latest version of this database for resource estimation purposes. Information pertaining to the exploration history in the property area was also provided and was reviewed to assess consistency and validity of recorded results.

Digital database drill hole records for the CF and LMZ resource areas were checked against scanned image file records of the original file information. The purpose of this was to assess consistency and accuracy of such records. Parameters reviewed in detail include collar coordinates, down hole survey values, hole depths, sample record entries, corresponding analytical results and database lithocodes. All drill holes for the CF deposit and approximately 20% of the drill holes supporting the LMZ resource drilling database were checked in detail against original source documents. Review of logging and sample records showed generally good agreement between original image file or hard copy records and drilling database records for the LMZ holes, but differences were recognized between some CF database lithocodes received from Orvana and lithocodes entered in original logging documents for the corresponding drill hole intervals. Database analytical results were also checked in detail against original drill log sample intervals and, where possible, against actual marked sample intervals and tags present in drill cores viewed during the site visits. Original assay certificate entries for checked drill hole core samples were compared at this point to drilling database entries.

Based on its database review, DGCS and Mercator (2015) recommended that Orvana update its CF drilling database through incorporation of original drill log lithocoding for several holes identified as requiring such attention. These changes were documented in the database and entries were updated where necessary to support the current CF resource estimate by DGCS.

After completion of all manual record checking procedures, the drilling and sampling database records were further assessed through digital error identification methods available through the Gemcom-Surpac Version 6.2.1® software by Mercator (2015). This provided a check on items such as sample record duplications, end of hole errors, survey and collar file inconsistencies and some potential lithocode file errors. The digital review and import of the manually checked datasets through Surpac provided the validated Microsoft Access® database that DGCS considers to be acceptable with respect to support of the CF deposit and LMZ deposit mineral resource estimation programs described in this report.

12.3 Site Visits by DGCS – August, 2016

12.3.1 August, 2016 Site Visit Summary

A site visit to the Don Mario mine was carried out between August 3rd and 10th of 2016. G. Zandonai of DGCS was accompanied by L. Isla of EMIPA. The purpose of the visit was to support DGCS's review of the UMZ, LMZ and CF mineral resource model, as set out in the original project scope of work. Mr. Luis Isla, Technical Services Manager of Geology and Planning at the Don Mario operation, provided primary technical and professional guidance during the visit, supported by other EMIPA management, professional and technical staff.

12.3.2 LMZ and CF Drill Collar Coordinate Checking By Mercator (2015) and DGCS

Collar coordinate field checks for LMZ and CF drill holes were completed by Mercator (2015) site visits. A Garmin Map 60 handheld GPS unit was used to collect collar coordinate check data that was compared to validated resource database collar file values. Collar locations were easily located in the field and those checked were typically marked by plastic or steel drill casing.

Excellent correlation exists between the LMZ resource drilling database and the check coordinate data set with respect to database values, while greater variation was noted with elevation. CF program results showed that database entries for three holes differed from database entries. These were investigated and database entries were adjusted accordingly. This prompted a review of all CF collars coordinates against the current surface DTM and most up to date survey records and several other minor adjustments to the database resulted from this program. Mercator (2015) recommended a new survey pickup of all accessible CF drill hole collars be made prior to the next drilling program at CF to ensure maximum drill hole location accuracy in future CF resource and reserve models.

12.4 Quality Assurance and Quality Control

12.4.1 Introduction

Quality Assurance and Quality Control (QAQC) programs and protocols applicable to the core drilling data set that support the LMZ mineral resource estimate and UMZ mineral reserve estimate are essentially the same as those described in the preceding NI43-101 reports on UMZ and LMZ resource estimates prepared by Wright et al. (2009) and Zandonai (2013). CF drill holes completed up to 2009 are also addressed in Wright et al (2009). The CF and LMZ drilling carried out by Orvana in 2015 is additional to these earlier programs but was also subject to standard Orvana protocols.

The previous authors reviewed all available QAQC results for the LMZ and UMZ drilling programs completed to their respective effective dates and determined that no systematic QAQC program results are available for the 1991 through 1995 period. Based on their review of available data for this period, it was concluded that associated data were assembled under industry standard programs for period and were acceptable for use in mineral resource estimations prepared in accordance with the CIM Standards.

Mercator (2015) reviewed all available QAQC data for pre-2015 LMZ and CF deposit drilling programs that support the current mineral resource estimate and concurs with the earlier opinions expressed by Amec and DGCS that the data sets are of acceptable quality for use in mineral resource estimation programs. DGCS came to the same conclusion with respect to data supporting the 2015 UMZ resource and reserve estimate made by Mercator.

Mercator (2015) independently reviewed QAQC data for the 2015 CF and LMZ drilling programs carried out by Orvana and results of this assessment appear in the following section of this report.

12.4.2 Orvana 2015 Program

12.4.2.1 Introduction

Drill core sampling carried out by Orvana during 2015 on the CF and LMZ deposits was subject to a QAQC program administered by the company. This included submissions of blank samples, duplicate quarter core split samples, and certified reference materials. Additionally, internal laboratory reporting of quality control and assurance sampling was monitored by Orvana on an on-going basis during the course of the project. Details of the various components are discussed below under separate headings.

12.4.2.2 Certified Reference Materials

Orvana used two gold standards during the 2015 program to monitor accuracy of results. These are designated ST-1 and ST-2 for core lab use and were sourced from Rocklabs in Auckland, New Zealand. ST-1 and ST-2 have accepted average values of 3.47 g/t Au and 0.034 g/t Au respectively. The sample material was prepared by the Don Mario Operation laboratory that provides analytical services for the mining operation. Analytical results for a total of 81 standard analyses were reviewed by Mercator (2015) and this reflects an average insertion rate for the program of 1 in 15. Results for the two materials appear below in Figures 12.1 and 12.2 and both show consistent data distribution above and below the mean value through the time sequence represented by sampling. Maximum values reflect departure from the data set means by 5.2% or less. No systematic trend of gold data inaccuracy appears to be present and respective mean values reflect the accepted values for these materials.

DGCS recommended in 2015 that for future drilling programs carried out for exploration and resource delineation purposes to retain the current insertion level for standards but that in-house standard material be augmented or replaced by pre-packaged, commercially produced certified reference materials.

12.4.2.3 Blank Sample Programs

Orvana used two blank sample materials during the 2015 program to monitor potential preparation stage cross-contamination of core sample materials. One material is a coarse product, while the other is finely crushed. Both products were sourced and prepared by Don Mario operations staff. The materials are designated BLK G (blanco grueso) and BLK F (blanco fino). Analytical results for a total of 81 blank sample analyses were reviewed by

Mercator (2015) and this reflects a realized average insertion rate of approximately 1 in 14. Gold results for the two materials appear below in Figures 12.3 and 12.4. BLK F has a mean value of 0.007g/t Au and shows no spiking in results that could indicate cross contamination. BLK G results have a mean value of 0.038 g/t Au and include a 1.22 g/t spike. The mean value exclusive of the spike is 0.007 g/t Au. The sample immediately preceding the spike returned a gold value of 0.07 g/t Au and the four samples preceding that returned values of 0.02 g/t Au or less. This indicates that preparation stage cross contamination not an indicated cause of the spike.

Figures 12.5 and 12.6 present Blank F results for silver and copper and these both show substantial variation in results through time. A review of selected preceding samples for elevated copper and silver results did not indicate sample preparation stage cross contamination to be the likely explanation for variation in results. The most likely explanation may be non-homogeneity of the sample material. Figures 12.7 and 12.8 present Blank G silver and copper results and both data sets have low and relatively consistent metal levels.

Figure 12.1: 2015 Orvana standard ST-1 gold results

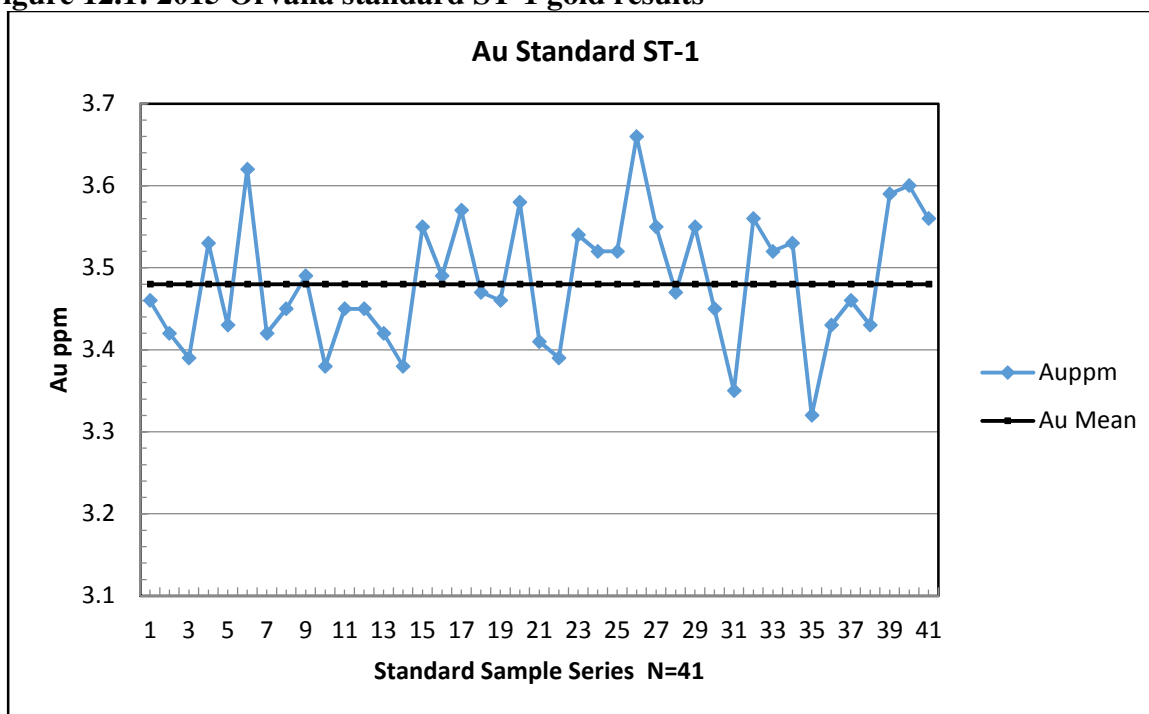


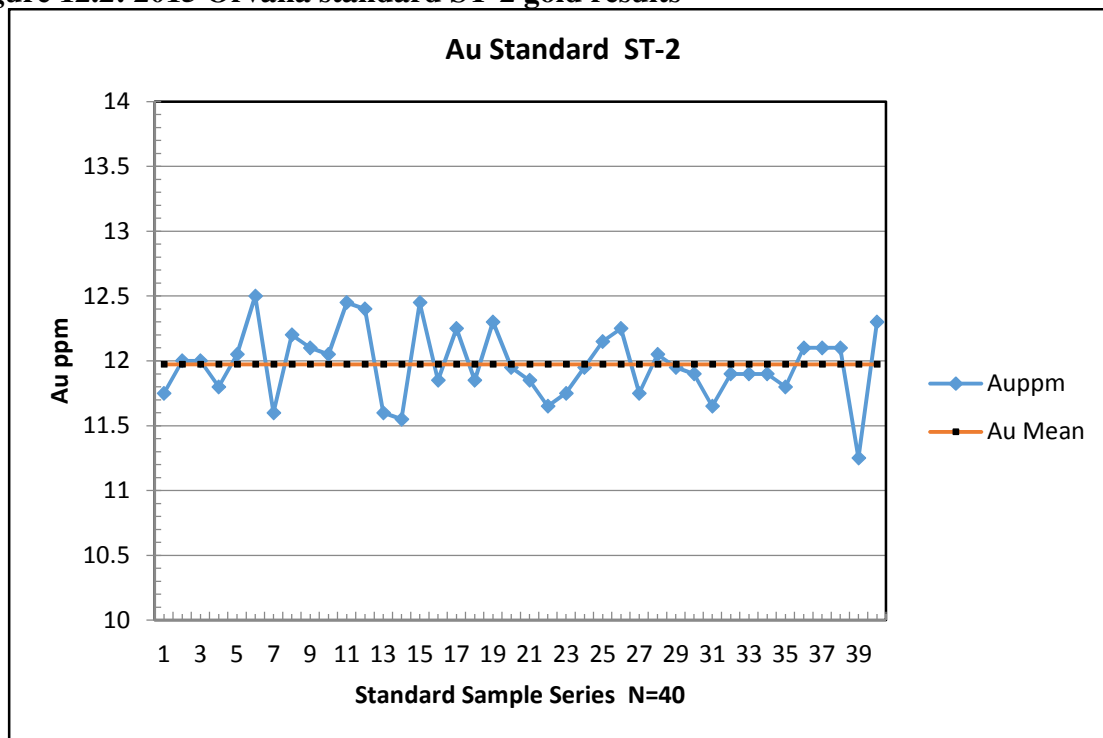
Figure 12.2: 2015 Orvana standard ST-2 gold results

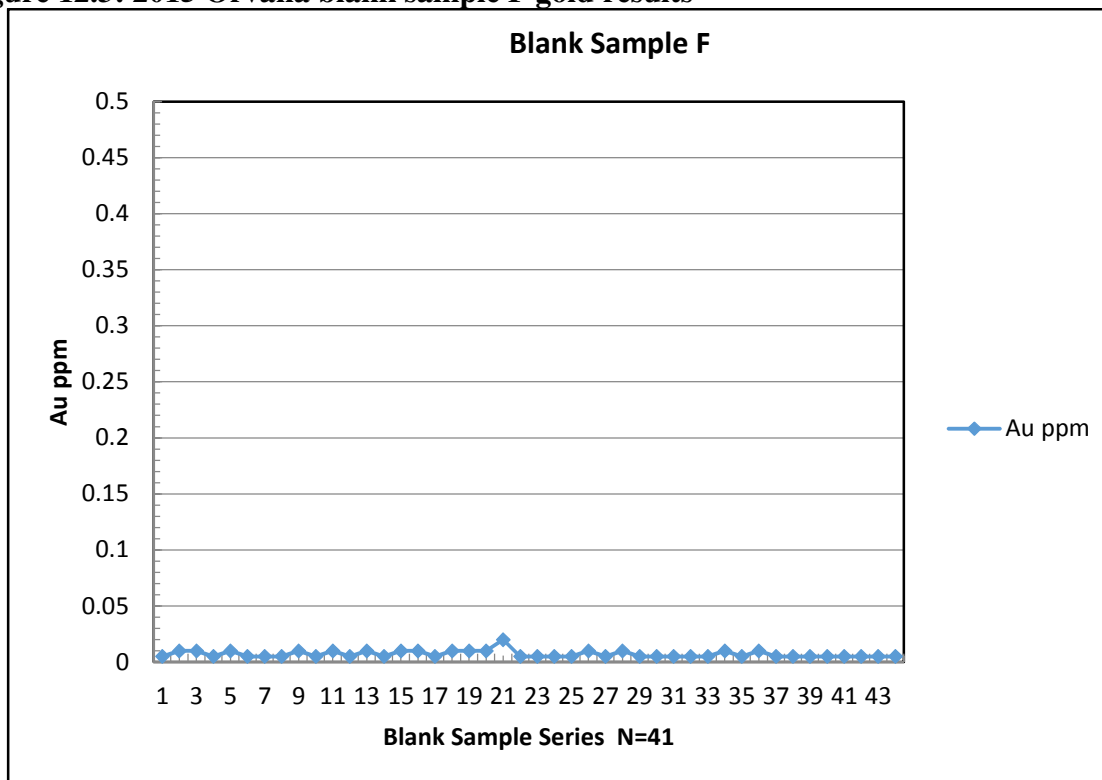
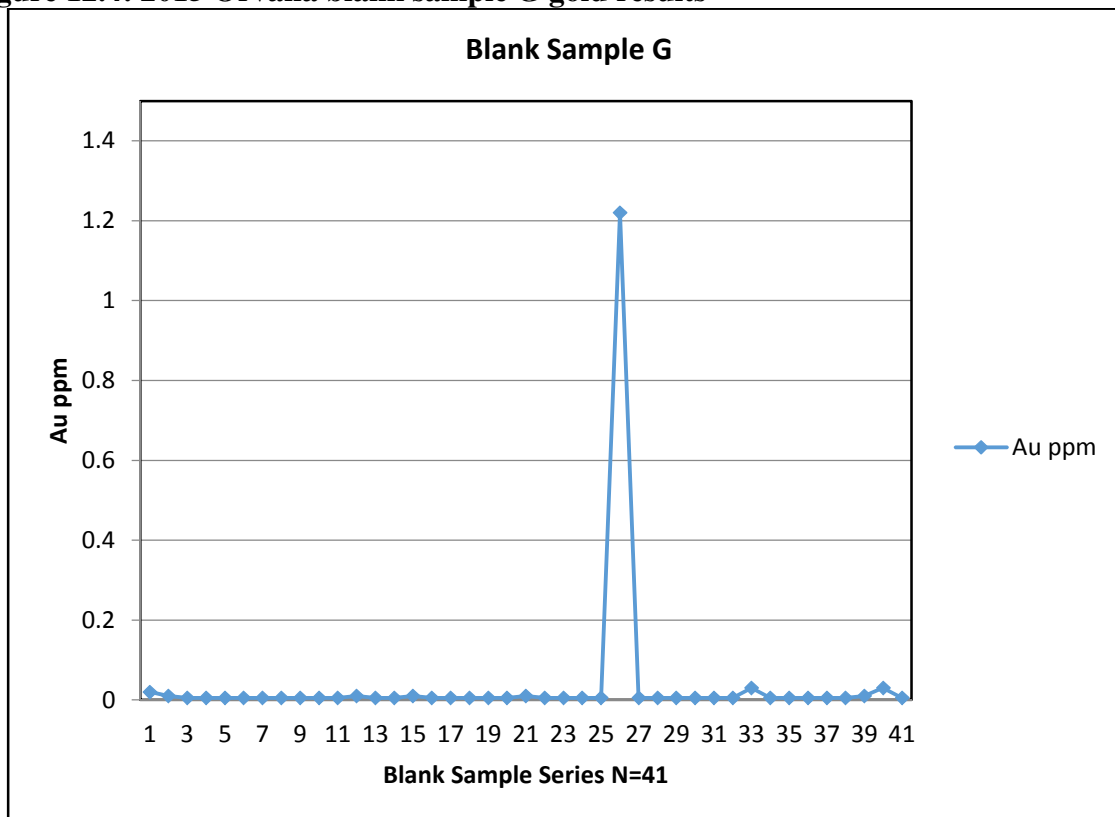
Figure 12.3: 2015 Orvana blank sample F gold results**Figure 12.4: 2015 Orvana blank sample G gold results**

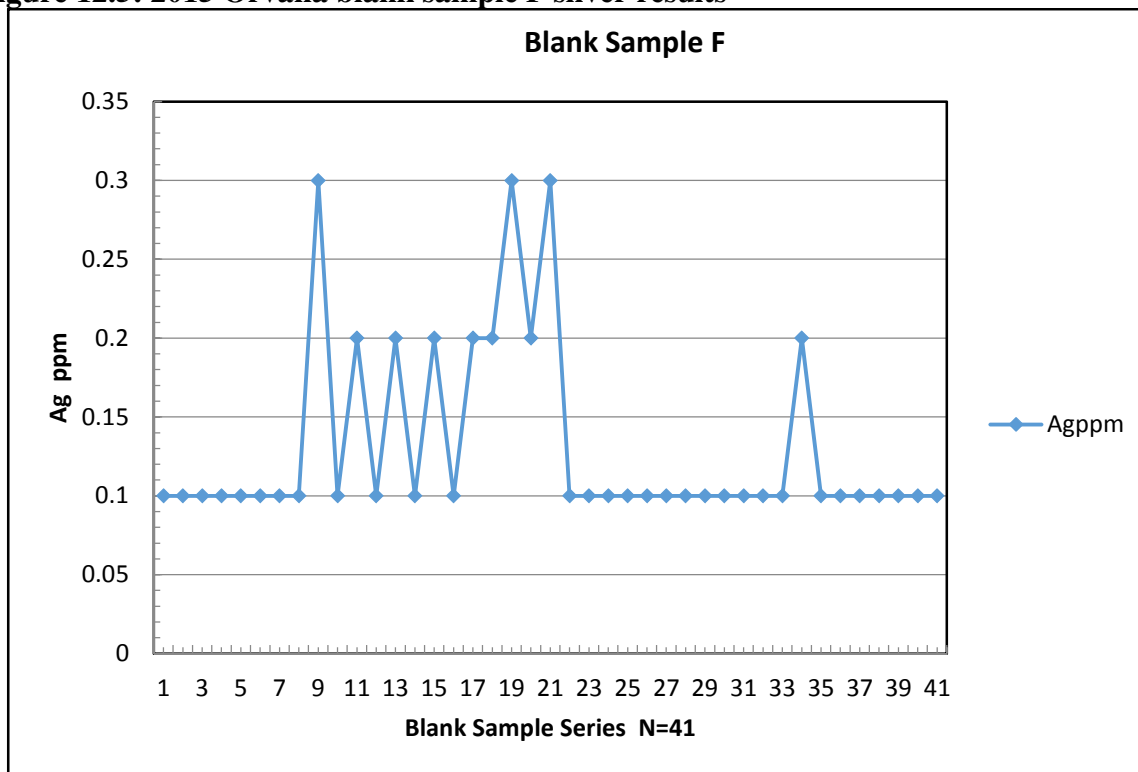
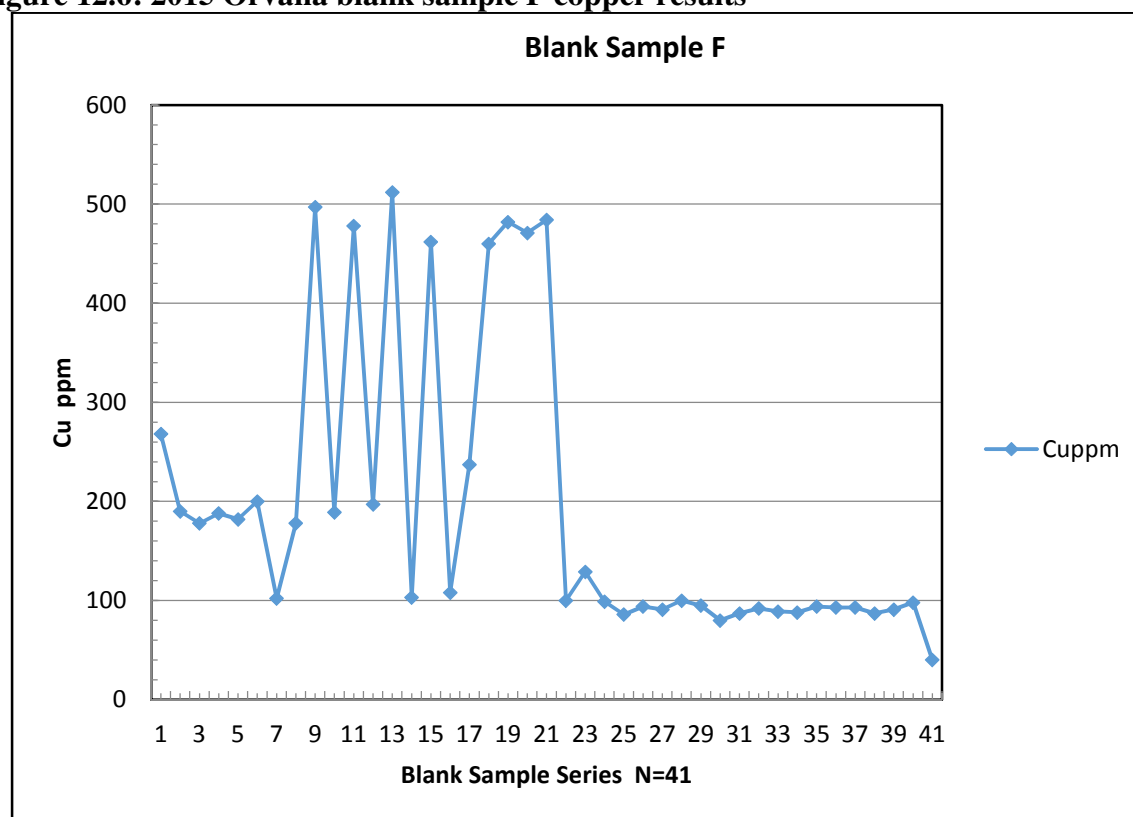
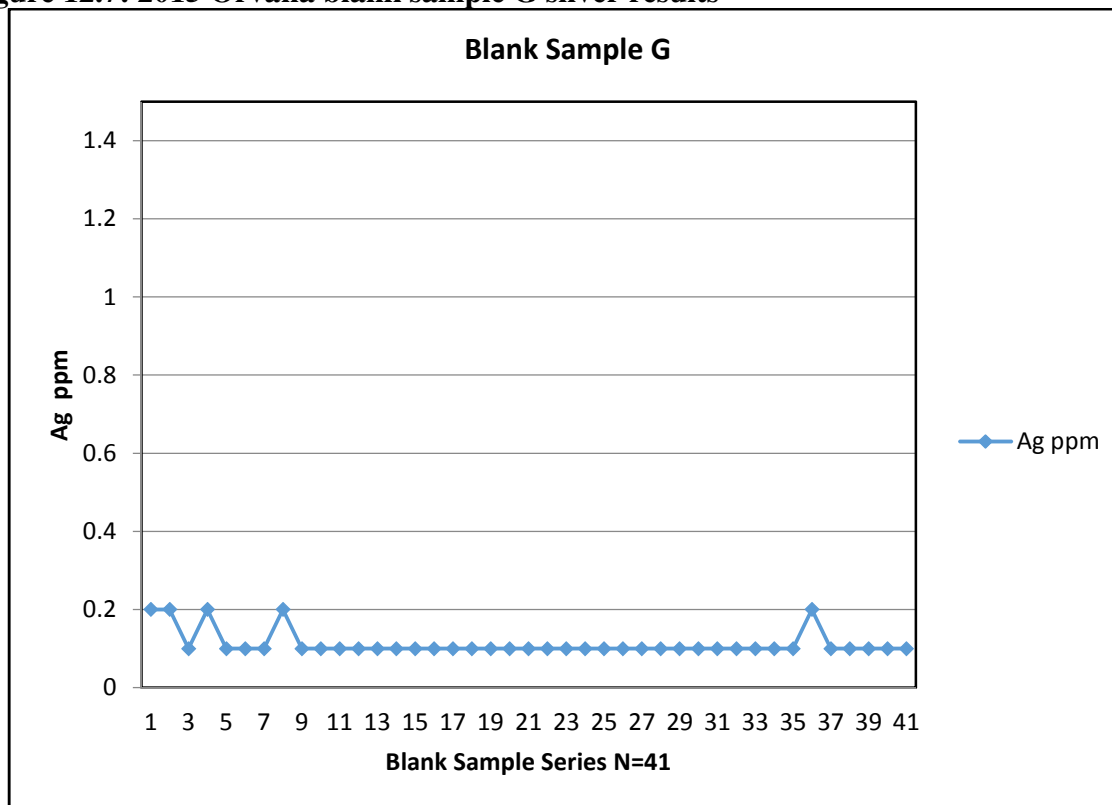
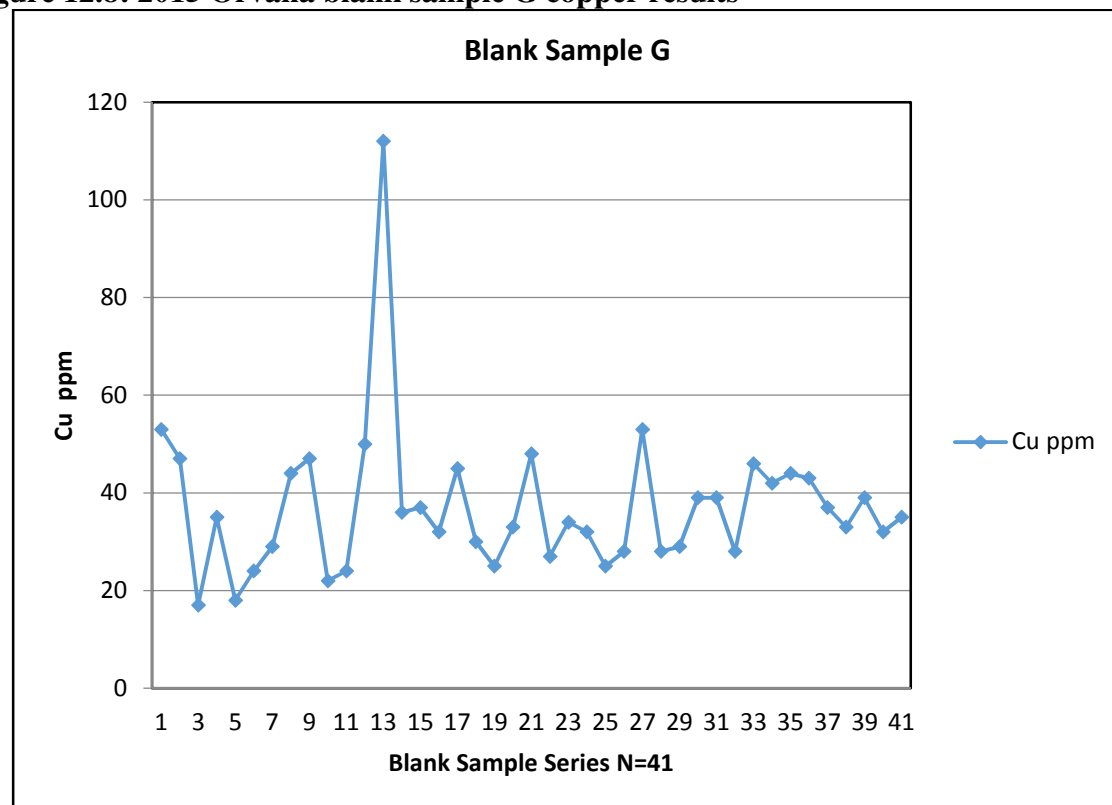
Figure 12.5: 2015 Orvana blank sample F silver results**Figure 12.6: 2015 Orvana blank sample F copper results**

Figure 12.7: 2015 Orvana blank sample G silver results**Figure 12.8: 2015 Orvana blank sample G copper results**

In 2015 Technical Report, DGCS was of the opinion that drilling program blank sample results indicate that no systematic preparation stage cross-contamination effects are represented in the associated gold dataset. However, it is recommended that efforts be made to access a more homogenous blank sample material for future programs.

12.4.2.4 Core Duplicate Split Program

Orvana collected quarter cored duplicate samples during the 2015 program and submitted these for analysis in the continuous project sample stream. Analytical results for a total of 42 quarter core samples were reviewed by DGCS and this reflects a realized average insertion rate of approximately 1 in 27. Gold, silver and copper results for the sample pairs appear below in Figures 12.9, 12.10 and 12.11. Copper correlates most closely and defines a correlation coefficient of 0.98. This is followed by silver with a correlation coefficient of 0.93 and gold with a correlation coefficient 0.81.

Figure 12.9: 2015 Orvana quarter core duplicate gold results

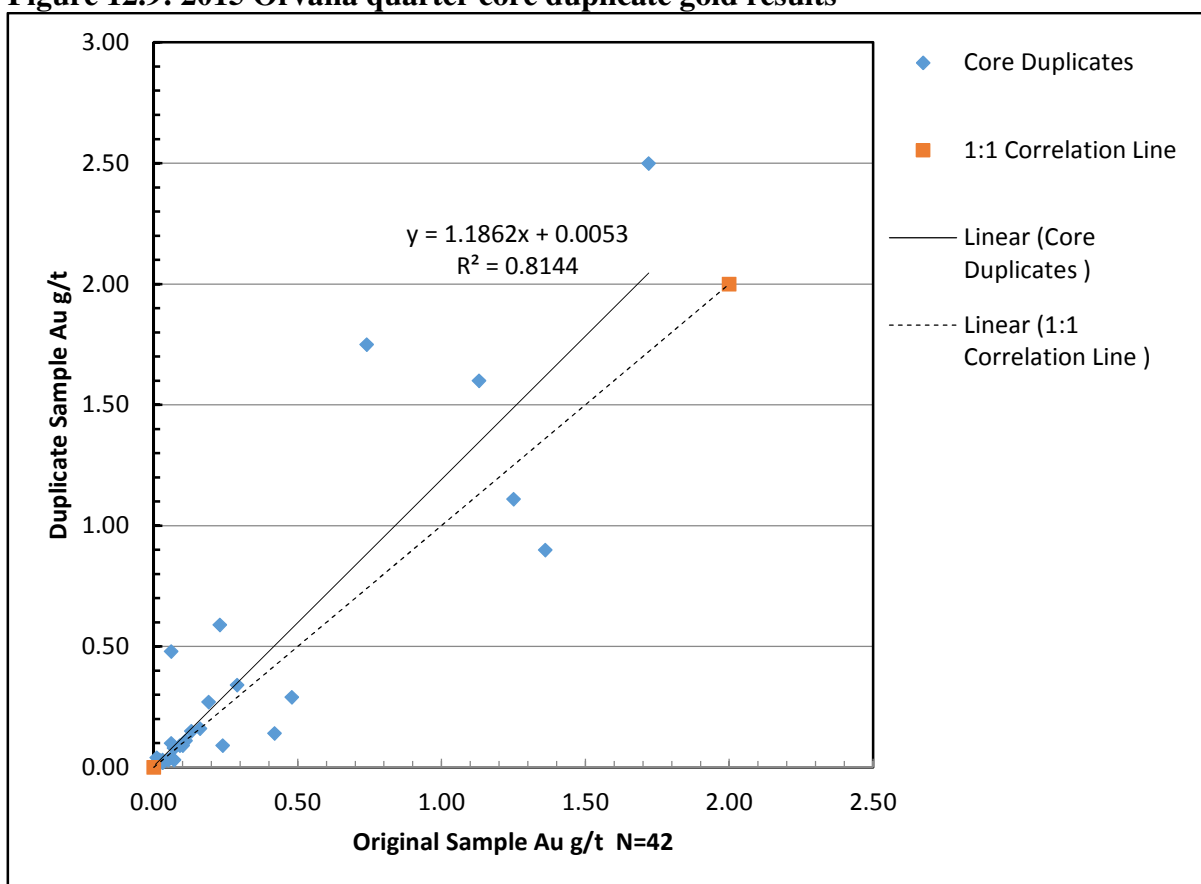
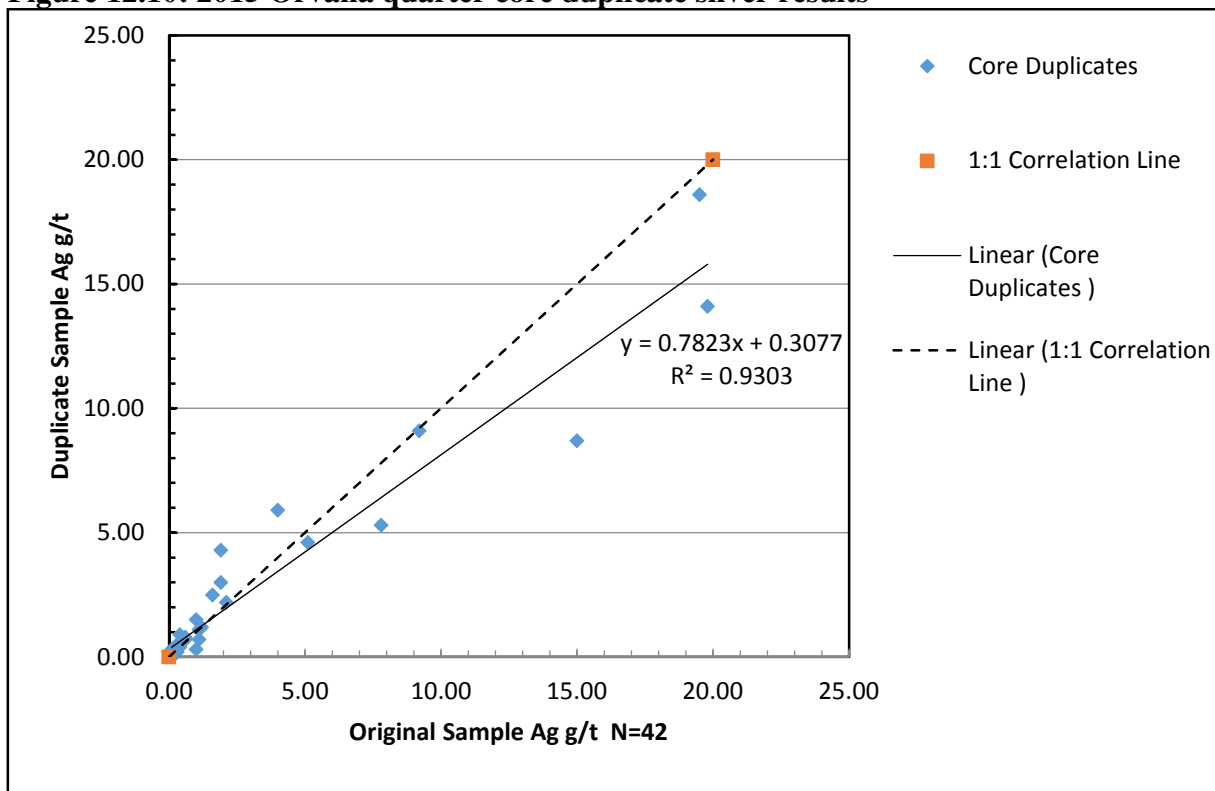
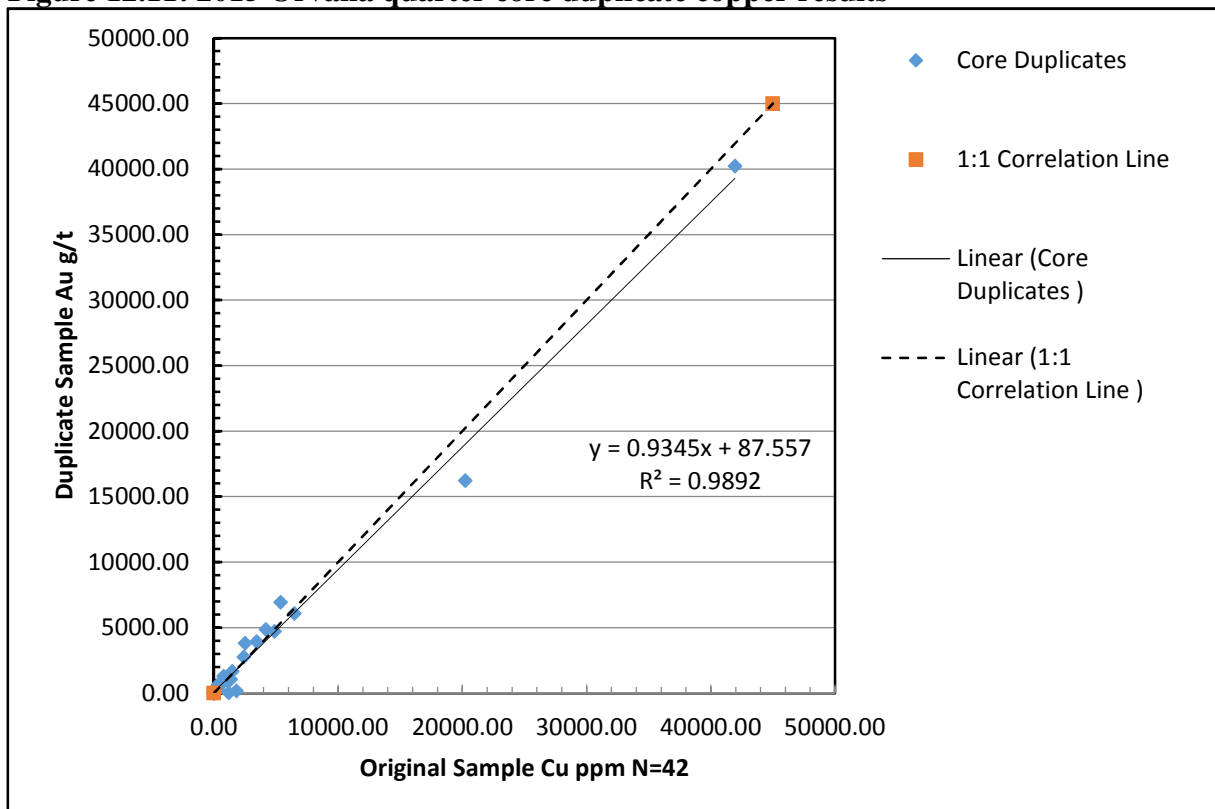


Figure 12.10: 2015 Orvana quarter core duplicate silver results**Figure 12.11: 2015 Orvana quarter core duplicate copper results**

Results of the quarter core program suggest that copper and silver are more homogeneously distributed within the mineralized core samples. The poorer correlation shown by gold almost certainly reflects a combination of factors. Gold grain size distribution (nugget effect) within the coarsely crystalline amphibole/magnetite/garnet aggregates of the LMZ style mineralization may account for a substantial portion of the data spread seen in Figure 12.9. However, this cannot be confirmed without close study of mineralized intercepts and associated gold particles. The broader QAQC program results indicate that laboratory analytical issues are not significant contributors.

12.4.2.5 DGCS Comment on 2015 QAQC Program by Mercator (2015)

However, in FY2016 there have been no drilling, DGCS assessed the issue in when Mercator and DGCS (2015) has concluded that results of the systematic QAQC protocols applied by Orvana to the 2015 drilling program provided an effective assessment of data quality and that analytical results for the associated core sampling program were suitable for resource estimation use.

DGCS recommends that future core drilling programs carried out to support exploration and resource or reserve definition work should continue to include independent, accredited commercial laboratories for analytical services.

12.4.3 Mercator 2015 Check Sample Program

Mercator (2015) carried out an extensive successful check sampling program which is documented in Don Mario Mine Operation 2015 Technical Report.

13.0 Mineral Processing and Metallurgical Testing

13.1 Introduction

The most recent information on mineral processing and metallurgical testing at Don Mario was presented in Mercator (2015). The following summary descriptions were taken from that report and updated as required with technical and production information provided by Orvana.

13.2 Mineralization

Currently the Don Mario processing facility processes transitional and sulphide ores from UMZ, and LMZ deposits. UMZ ore will be processed by flotation and LMZ ore by CIL. CF ores will be processed in the near future by flotation.

The predominant copper minerals in sulphide zones are chalcopyrite, with minor bornite, chalcocite, digenite and tetrahedrite. Lead and zinc are present as their sulfides, galena and sphalerite. Non-sulphide gangue is composed of calc-silicate schists, containing clay, mica and complex calcium/magnesium silicate minerals (Diopside, Tremolite, Actinolite etc.) Transitional ores typically contain higher levels of secondary copper minerals as well as higher content of clay and carbonate gangue.

Gold is present as free gold, electrum and calaverite and is associated with chalcopyrite and pyrite. Silver is present in the sulfosalt tetrahedrite and native silver has also been documented. Galena, pyrite and sphalerite occur in association with tetrahedrite. Bismuth is present as bismuthinite and commonly shows association with galena and sphalerite.

13.3 Mineral Processing and Metallurgical Testing

The Don Mario processing facility processes the UMZ and LMZ ores and can process 876,000 tonnes per annum (tpa) on a run of mine ROM basis, depending on the ore type. The feedstock is comprised of UMZ and LMZ sulphides and transition ores as well as ore from the stockpiles. Ore produced by the mine is transported to the processing plant which is capable of running at a throughput rate of 2,500 tonnes per day (tpd) using a conventional gravity-flotation process to produce a bulk copper, gold, and silver concentrate and a gravity concentrate.

The plant as currently configured has been in operation since early 2013 when the LPF circuit was shut down due to poor economics associated with processing the oxide material. No recent metallurgical test work has been reported since the start of plant operation in 2011 to process the UMZ ore.

The following data was provided by EMIPA:

- Historical mill production and recovery data
- Metallurgical reports

Total average metal recoveries are summarized for the last 3 operating years in Table 13.1

Table 13.1: Total Average Metal Recoveries for Don Mario Operation

Metal	Fiscal Year 2014	Fiscal Year 2015	Fiscal Year 2016	Comments
Gold	46.3	53.8	56.3	Copper recovery primarily from gravity and flotation
Copper	56.0	74.4	62.2	Copper recovery primarily from gravity and flotation
Silver	57.2	63.3	73.4	Copper recovery primarily from gravity and flotation

Orvana has reported that the following summary statements apply to milling carried out over the last three years:

- Tonnages treated include approximately 90% sulphide ore, 8% transition ore and 2% oxide ore.
- The operation has a sound basis of consistent production data.
- Total average Au and Ag recoveries were 52% and 65%, respectively.
- Total average Cu recovery was 64%, and it is highly dependent on the type of feed (sulphide, transition or oxide ore) and grades of soluble copper, amongst other things.

The CIL Project

Historically, gold and silver from the LMZ were leached with cyanide in a CIL circuit and a gold doré was produced, due to the higher gold grades and lower copper and silver grades associated with the LMZ as compared to the UMZ. Average historical recoveries achieved from the CIL were over 80%. The CIL circuit was placed on care and maintenance in April 2011 when the Company commenced mining the metallurgically more complex UMZ. Consultants to the Company completed a capital cost estimate to recommission the CIL circuit. For the selected process option, the capital cost estimate is \$6.4 million to accuracy estimate of +/- 15% including owner's costs and 15% contingency. Results of a metallurgical testing program undertaken by the Company indicate potential gold recovery of higher than historical rates can be achieved by processing LMZ resource material through a re-commissioned CIL circuit.

During fiscal 2016, the Company closed the Bolivian Bank Loan and entered into a contract with a third party for the construction of the CIL Project, targeting completion of construction

by the end of December 2016 with commissioning early in the second quarter of fiscal 2017. The CIL Project is expected to result in lower unitary cash costs and maximize the value of recently defined Don Mario resource estimates, along with providing the processing capabilities necessary to leverage exploration and potential business opportunities. Upon commissioning of the CIL circuit, Don Mario will shift to production of gold doré in lieu of the current gold concentrate, and will continue to produce copper concentrate.

The commissioning of the CIL is also expected to position Don Mario to leverage other potential business opportunities. In recent months, the Company has been re-evaluating the economic potential of processing existing mineral stockpiles, including the oxides previously treated through the leach-precipitation-flotation process, and expects to have the results of this testing in the first quarter of fiscal 2017. As at September 30, 2016, EMIPA had stockpile mineral resources of approximately 2.2 tonnes with an average gold grade of 1.84 g/t. The Company also commenced an evaluation of processing of tailings material through the CIL circuit to determine the viability of recovering gold that has been deposited into the tailings facility as a result of the flotation-only process used since 2011.

14.0 Mineral Resource Estimates

14.1 Introduction

The definition of mineral resource and associated mineral resource categories used in this report are those recognized under National Instrument 43-101 and set out in the Canadian Institute of Mining, Metallurgy and Petroleum Standards on Mineral Resources and Reserves *Definitions and Guidelines* (the CIM Standards) as well as disclosure requirements of National Instrument 43-101.

The current mineral resources model of the CF and LMZ deposits have not been estimated or upgraded geostatistically and are based on Mercator (2015). The current mineral resources model of the UMZ deposit has not been estimated or upgraded geostatistically and is based on Zandonai, 2013.

Mineral resources are considered to have reasonable expectation for economic development by open-pit mining methods based on recent Don Mario open pit mine production history, resource amounts and metal grades, and current metal pricing.

14.2 LMZ and CF Mineral Resource Inventory

Block grade, block density and block volume parameters for the Don Mario LMZ and CF deposits were estimated using geostatistical methods described in Mercator (2015).

Subsequent application of resource category parameters resulted in the Don Mario LMZ and CF mineral resource statements, inclusive of mineral reserves, and are presented in Table 14.1

and Table 14.2 respectively. Resources having a reasonable expectation of economic development by means of open-pit methods were reported at a gold cut-off value of 0.70g/t.

Table 14.1: Don Mario LMZ Deposit In-situ Mineral Resources Inclusive of Mineral Reserves
Effective September 30, 2016

Category	Ktonnes	Au (g/t)	Cu (%)	Ag (g/t)	(000 oz Au)	(t Cu)	(000 oz Ag)
Indicated	793	2.62	0.60	5.94	66.8	4794.6	151.4
Total	793	2.62	0.60	5.94	66.8	4794.6	151.4

Table 14.2: Cerro Felix Deposit In-situ Mineral Resources Inclusive of Mineral Reserves
Effective September 30, 2016

Category	Ktonnes	Au (g/t)	Cu (%)	Ag (g/t)	(000 oz Au)	(t Cu)	(000 oz Ag)
Indicated	490	3.15	0.09	2.53	49.6	441.0	39.9
Inferred	80	3.14	0.14	3.21	8.1	112.0	8.3

Notes: Applicable to both LMZ and CF mineral resource estimates

- 1. CIM definitions were followed for Mineral Resources and were prepared in Mercator (2015).*
- 2. An average block density factor of 2.89 was applied for both estimates.*
- 3. Mineral resources are considered to have reasonable expectation for economic development using open-pit mining methods based on the deposit history, resource amount and metal grades and current metal pricing.*
- 4. Mineral resources that are not mineral reserves do not have demonstrated economic viability. The quantity and grade of reported inferred mineral resources in this estimation are uncertain in nature and there has been insufficient exploration to define these inferred mineral resources as indicated or measured mineral resources; it is uncertain if further exploration will result in upgrading of inferred resources to indicated or measured status.*
- 5. Tonnes are rounded to nearest 10,000.*
- 6. Ounces are rounded to the nearest 1,000 and pounds are rounded to the nearest 10,000. Calculated contained metal sums may not match reported tonnes and grade due to rounding.*
- 7. The resource estimate cut-off value is 0.70 g/t Au is reflective of open-pit mining methods, a long-term gold price of US\$1,300 per ounce, copper price of US\$3.00 per pound and a silver price of US\$18 per ounce.*
- 8. Both resource estimates are based on validated core drilling program results and do not incorporate production sampling data..*
- 9. Contained copper tonnes were calculated from original resource statement pound values by the factor 2204.62lb/tonne.*
- 10. Numbers may not add due to rounding*
- 11. CIM definitions were followed.*

14.3 UMZ Mineral Resource Inventory

The 2016 updated mineral resource inventory for the Don Mario UMZ deposit was completed by DGCS S.A., in conjunction with EMIPA personnel. The Mineral Resources include

reporting out the remaining resources for the UMZ pit based on the remaining material between the September 30, 2016 year end topography survey and the pit design previously completed by Cube Consulting (referenced in Zandonai, 2013), and the application of cut-off grades for mineral resource reporting purposes.

A summary of the updated Mineral Resources effective as of September 30, 2016 inclusive of Mineral Reserves is given in Table 14.3. In addition to the in-situ mineral resources, there are existing surface stockpiles containing oxide mineral resources. Table 14.4 summarizes the current estimated stockpile mineral resource by location and lithology.

DGCS reviewed the resource assumptions, input parameters and depletion methodology and is of the opinion that the Mineral Resource estimate is appropriate for the style of mineralization and that the approach taken is reasonable and acceptable to support the updated 2016 mineral resource and mineral reserve estimates.

**Table 14.3: UMZ Deposit In-situ Mineral Resources Inclusive of Mineral Reserves
September 30, 2016**

Zone	Measured						
	Tonnage	Grade	Grade	Grade	Contained Metal	Contained Metal	Contained Metal
	(000 t)	(g/t Au)	(% Cu)	(g/t Ag)	(000 oz Au)	(t Cu)	(000 oz Ag)
UMZ	51	1.35	1.10	30.70	2.2	563.1	50.3
Total	51	1.35	1.10	30.70	2.2	563.1	50.3

Notes:

1. CIM definitions were followed for Mineral Resources and were prepared by G. Zandonai (2013), a qualified person for the purposes of NI43-101, who is an employee of DGCS SA and is independent of the Company.
2. Mineral Resources are estimated at a Cu equivalent cut-off grade of 0.85% for the UMZ.
3. Mineral Resources are estimated using a long-term gold price of US\$1,300 per ounce, copper price of US\$3.00 per pound and a silver price of US\$18 per ounce.
4. Mineral Resources are inclusive of Mineral Reserves.
5. Mineral Resources contained in stockpiles are exclusive of In-situ Mineral Resources.
6. Numbers may not add due to rounding.

Table 14.4: Stockpile Mineral Resources Exclusive of In-situ Mineral Resources – September 30, 2016

Measured							
Location/Zone	Tonnage	Grade	Grade	Grade	Contained Metal	Contained Metal	Contained Metal
	(000 t)	(g/t Au)	(% Cu)	(g/t Ag)	(000 oz Au)	(t Cu)	(000 oz Ag)
DM1 (Oxide)	492	2.24	1.74	54.4	35.4	8559.6	861.0
DM2 (Oxide Pre-strip)	278	1.90	1.98	17.9	17.0	5508.8	160.5
DM3 (Dolomite Oxide)	190	1.89	1.96	21.6	11.5	3724.0	132.1
Plant Stockpile (oxide)	515	1.61	1.57	57.8	26.7	8108.3	958.3
DM4 Stock Talco	506	1.61	2.38	63.5	26.2	12067.4	1033.2
DM5 (dolomite Oxide)	202	1.86	1.64	48.7	12.1	3314.4	316.2
DM6 (tremolite Oxide)		0.00	0.00	0.0	0.0	0.0	0.0
Total	2184	1.84	1.89	49.3	129.0	41282.6	3461.2

All these stocks will be processed by Flotation and will not be included in the CIL process

Notes to UMZ stockpile mineral resources:

1. CIM definitions were followed for Mineral Resources and were prepared by G. Zandonai, a qualified person for the purposes of NI43-101, who is an employee of DGCS SA and is independent of the Company.
2. Mineral Resources are estimated at a Cu equivalent cut-off grade of 0.85% for the Stockpiles of the UMZ.
3. Mineral Resources are estimated using a long-term gold price of US\$1,300 per ounce, copper price of US\$3.00 per pound and a silver price of US\$18 per ounce.
4. Mineral Resources contained in stockpiles are exclusive of In-situ Mineral Resources. Mineral Resources that are not mineral reserves do not have demonstrated economic viability. The UMZ Oxide Stockpile resources are currently not economically viable to process through the gravity flotation plant.
5. Numbers may not add due to rounding.

15.0 Mineral Reserve Estimates

15.1 Method of Estimation and Results

Mineral reserves for the UMZ were estimated by DGCS, in conjunction with EMIPA personnel, based on evaluating the remaining open pit material between the September 30, 2016 year end topography survey and the pit design previously completed by Cube Consulting Limited and referenced in Zandonai (2013), applied to Measured and Indicated Resources, the application of cut-off grades and with dilution and extraction factors applied. Mineral reserves for the LMZ were estimated by DGCS, in conjunction with EMIPA personnel, using the resource block model generated in Mercator (2015) and latest topography data provided by EMIPA.

The methodology to upgrade mineral resources to mineral reserves can be summarized as follows:

The optimum pit envelopes are calculated using Whittle 4X optimization software and a set of mining, metallurgical and economic parameters provided by EMIPA (gold price of US\$1,100/oz, copper price of US\$2.75/lb and silver price of US\$16.5/oz) as at September 30, 2016. The final pit is selected from the Whittle pit series at the metal prices adopted by EMIPA. The final optimum pit shell is smoothed and designed to eliminate non-operational areas and now the pit is considered as the final pit for reserve reporting.

Mineral resources identified as measured and indicated within the final pit that can be mined and processed economically are classified as proven and probable reserves. The UMZ's measured resources are classified as proven and the LMZ's indicated resources are classified as probable. Table 15.1 shows the current mineral reserves of the UMZ and LMZ deposits.

In-situ Mineral Reserves are restricted to the UMZ and LMZ and are summarized by reserve category in Table 15.1. Additionally, more ore tonnes were mined during fiscal 2016 than processed at the plant. This ore has been classified as "broken" ore and is summarized in Table 15.2.

**Table 15.1: UMZ and LMZ In-situ Mineral Reserves
September 30, 2016**

Total Proven and Probable							
Category	Tonnage	Grade	Grade	Grade	Contained Metal	Contained Metal	Contained Metal
	(000 t)	(g/t Au)	(% Cu)	(g/t Ag)	(000 oz Au)	(t Cu)	(000 oz Ag)
Proven (UMZ)	51	1.35	1.10	30.70	2.2	563.1	50.3
Probable (LMZ)	793	2.62	0.60	5.94	66.8	4794.6	151.4
Proven & Probable	844	2.54	0.63	7.43	69.0	5357.7	201.7

Notes:

1. CIM definitions were followed for Mineral Resources and were prepared by G. Zandonai, a qualified person for the purposes of NI43-101, who is an employee of DGCS SA and is independent of the Company.
2. Mineral Reserves are estimated using copper equivalent cut-off grade of 1.0% CuEq for the UMZ and cut-off grade of 0.70g/t AU for the LMZ. Copper equivalent cut-offs were calculated using recent operating results for recoveries, off-site concentrate costs, and on-site operating costs.
3. Mineral Reserves are estimated using average long-term prices of US\$1,100 per ounce, copper price of US\$2.75 per pound and a silver price of US\$16.5 per ounce.
4. Numbers may not add due to rounding.
5. The mineral reserves at the LMZ have been based on processing by the CIL and flotation methods.

**Table 15.2: Stockpile Mineral Reserves (exclusive of in-situ)
September 30, 2016**

Location/Zone	Proven						
	Tonnage	Grade	Grade	Grade	Contained Metal	Contained Metal	Contained Metal
	(000 t)	(g/t Au)	(% Cu)	(g/t Ag)	(000 oz Au)	(t Cu)	(000 oz Au)
DM1 OS (Trans+Sulph)	8	1.93	1.10	27.63	0.5	88.4	7.1
Plant Deposit (DPL2)	26	1.33	0.99	16.32	1.1	255.1	13.5
Plant Pushback LMZ	19	0.70	2.06	5.08	0.4	382.3	3.0
UMZ Tremolita Talco	160	2.18	1.65	16.90	11.2	2648.2	87.0
Total	212	1.94	1.59	16.10	13.2	3374.1	110.6

Notes:

1. CIM definitions were followed for Mineral Resources and were prepared by G. Zandonai, a qualified person for the purposes of NI43-101, who is an employee of DGCS SA and is independent of the Company.
2. Mineral Reserves are estimated using a copper equivalent cut-off grade of 1.0% CuEq. Copper equivalent cut-offs were calculated using recent operating results for recoveries, off-site concentrate costs, and on-site operating costs.
3. Mineral Reserves are estimated using average long-term prices of US\$1,100 per ounce, copper price of US\$2.75 per pound and a silver price of US\$16.5 per ounce.
4. Numbers may not add due to rounding.
5. UMZ stock for processing by Flotation
6. LMZ Stock for processing by CIL
7. UMZ Tremolita, upgrade to reserve from resource stock pile. It is possible to process by flotation.

15.2 Modifying Factors for Reserve Definition

15.2.1 Dilution

An overall dilution of 5% was applied to the resource estimate. The dilution estimates are based on typical operating results for open pit mining methods.

15.2.2 Extraction

An extraction of 95% was used and applied to the resource estimate.

15.2.3 Cut-off Grade

Cut-off grades were based on copper equivalent calculations for the UMZ and gold equivalent calculations for the LMZ. They include consideration for:

- Process recoveries, based on recent operating performance
- Metal prices and exchange rates, consistent with long-term forecasts
- Off-site costs for gold and copper concentrate, including:

- a. Payability
- b. Transportation
- c. Treatment
- d. Refining
- e. Penalty elements
 - NSR Royalty of 3%.
 - Operating costs, based on recent history

Resulting copper equivalent factors, break-even reserve cut-off grades and long term commodity prices are summarized below in Table 15.3.

Table 15.3: Mineral Reserve Cut-off Grade Parameters

Ore Type	
Cut-off (CuEq %)-UMZ	1.0% Cu
Cut-off (Au g/t)-LMZ	0.70g/t Au
Au Factor	0.5
Cu Factor	1
Ag Factor	0.1
Gold Price (\$/oz)	\$1,100
Copper Price (\$/lb)	\$2.75
Silver Price (\$/oz)	\$16.50

16.0 Mining Methods

16.1 Introduction

The Don Mario operation currently consists of the exploitation of the UMZ and the LMZ) units by open pit that produces a nominal 2,500 tonnes per day of ore of two material types – transitional and sulphides. Future mining of the remaining LMZ resource and Cerro Felix (CF) resources are expected to utilize open pit mining methods.

Mining of ore and waste occurs on 5m benches. The overall mining sequence was generated by Cube Consulting Ltd. (Cube) and was reported previously by Zandonai (2013). The sequence consists of 4 main phases or pushbacks. All the design parameters associated with the pit design were provided by EMIPA. Standard haul road design width for a double lane

system is 10 m. This complies with that specified by EMIPA and it includes the drainage ditch and the safety berm.

16.2 UMZ Design Parameters and Productivities

The UMZ mine design and planning were carried out using the current UMZ resource block model generated by DGCS and reported in Zandonai (2013) and includes nested pit shells (phases and end of year maps) generated by Gemcom-Whittle™ mine planning and optimization software.

A review of the current mine plan was developed using a merged block model consisting of the Zandonai (2013) UMZ model and the new LMZ model developed by Mercator and described in Section 14.0 of this report. The current mining phases developed by Cube were retained and EMIPA added an additional pushback located in the highwall of Cube's Phase 3. This new pushback has been identified as Phase 5 (LMZ). Phases 1, 2 and 4 defined by the original Cube plan have now been mined out and are illustrated in Figure 16.2. The Phase 5 pushback is illustrated in Figure 16.3.

The Don Mario mine is an operating open pit mine. Access to the existing workings areas is through one main ramp; located in Phase 3 providing good access to the plant to waste dumps and stockpiles. This ramp is used for transport of people, materials and equipment to the open pit workings as well as for hauling ore to the plant and stockpiles and waste. The final ramp located in Phase 2 is open for transportation and access to upper benches.

The current pit design assumes the mine is operated with small equipment (20-25 tonnes capacity) and all the design parameters have been provided by EMIPA. Standard haul-road design width for a double-lane system is 10 meters. This complies with that specified by EMIPA and it includes the drainage ditch and the safety berm.

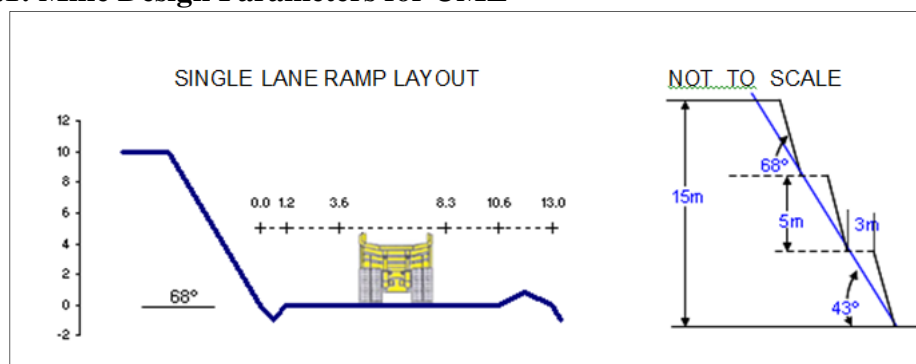
Design parameters as specified by EMIPA are:

- Inter-ramp angle: 35 degrees.
- Bench face angle: 65 degrees.
- Berm width: 5 metres.
- Haul roads width: 10 metres.
- Bench height: 5 metres.

The estimated overall pit slope angle for this configuration is equal to 32 degrees. The overall geometry of the pit is designed on 5-m benches with a batter angle of 65° and inter-ramp angles of 35°, berm width of 5 m and haul roads of 10 m. These assumptions should be confirmed by a geotechnical study regarding the rock properties of the Sulphide zone.

In order to maximize the ore exposed, several criteria need to be satisfied. These include minimum width of cutbacks, including access for mining for every bench, identification of high grade areas, and minimum number of working faces per period of time, among others. It is considered that applying a truck and excavator mining method for the operation will satisfy these requirements and this method is applied to each cutback plan for the operation. Figure 16.1 illustrates the basic Don Mario pit design parameters.

Figure 16.1: Mine Design Parameters for UMZ



The UMZ mine design and planning were carried out using the current UMZ resource block model generated by DGCS and reported in Zandonai (2013) and includes nested pit shells (phases and end-of-year maps) generated by Gemcom-Whittle™ mine planning and optimization software.

A review of the current mine plan was developed using a merged block model consisting of the Zandonai (2013) UMZ model and the new LMZ model developed by Mercator and DGCS (2015). The current mining phases developed by Cube were retained and EMIPA added an additional pushback located in the highwall of Cube's Phase 3. This new pushback has been identified as "Phase 3 Pushback (LMZ)". Phases 1, 2 and 4 defined by the original Cube plan have now been mined out and are illustrated in Figure 16.2. The Phase 3 pushback is illustrated in Figure 16.3 and shows in blue the LMZ extension.

Figure 16.2: Cube Phase 1 to 4 Pushbacks of UMZ – Plan View

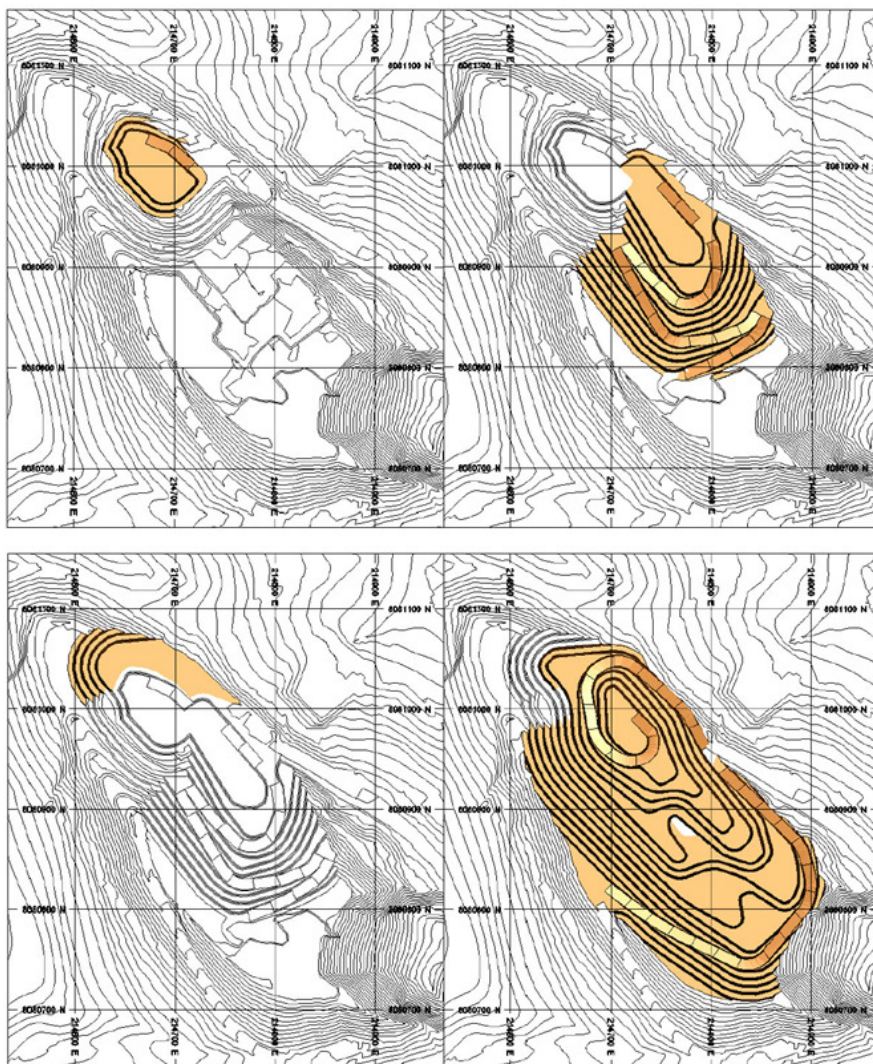
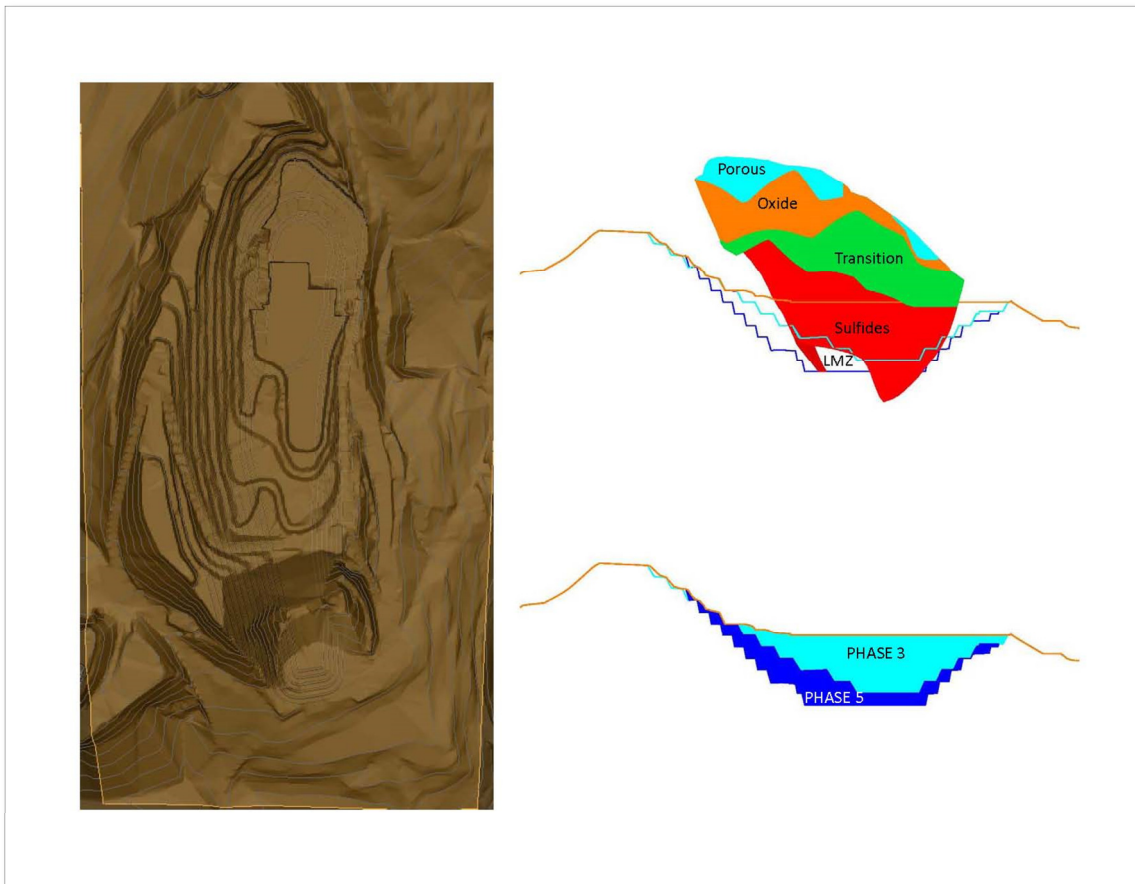


Figure 16.3: End of September 2015 pit design layout and sections – schematic

16.3 Mine Infrastructure

The infrastructure at the Don Mario open pit mine is minimal as most of the key infrastructure is located in or around the process plant facility. There are two main ramps providing access to the open pit. One provides access to the plant, waste dumps and stockpiles and the other provides access the upper benches of the pit.

Electrical power is produced at the on-site power plant operated by Orvana. Substations exist at the mill to provide electricity to the working areas and camp. Power is provided to the pit area through mobile power units.

Maintenance for the mobile equipment fleet is done in the maintenance workshops located near the plant facilities.

Mine operation communication is via “two-way” radios.

16.4 Mobile Equipment

The mining equipment used for open pit mining, summarized in Tables 16.1 is sourced from various vendors and consists of a mix of owner and contractor owned equipment. The main truck fleet is comprised of 10 trucks from contractors and two CAT trucks owned by EMIPA that hauls all material from the pit to the plant, surface stockpiles and waste dump. Bench drilling is completed using one of two production drill rigs and broken material is loaded into the trucks using a front end loader or excavator. Any oversize material generated through drill and blast operations is handled through the combination of jackleg drilling and secondary blasting or directly broken using the mobile rock breaker.

Table 16.1: Don Mario Mine Equipment Fleet, Orvana Minerals Corp.

Type	Brand	No.	Model	Capacity (t)
Production Drill Rig	Atlas Copco	1	ECM 720	
Production Drill Rig	Sandvik	1	DP 1500	
Front End Loader	CAT	2	980H	10
Front End Loader	CAT	1	980G	10
Excavator	CAT	1	330D	
Dozer	CAT	1	D8N	
Dozer	CAT	1	D8T	
Grader	CAT	1	120G	
Haul Truck-Emipa	CAT	1	D25C	25
Haul Truck-Emipa	CAT	1	D25D	25
Haul Truck-Contractor	Various	10	Varied	20-25
Mobile Rock breaker	CAT	1	320DL/H130	

17.0 Recovery Methods

17.1 Introduction

Figure 17.1 is a simplified process flow sheet of the Don Mario processing plant, which consists of the following sequence of macro unit operations:

- Crushing and Screening
- Grinding and Cycloning
- Gravity Concentration
- Flotation Concentration
- Tailings Storage Facility (TSF)

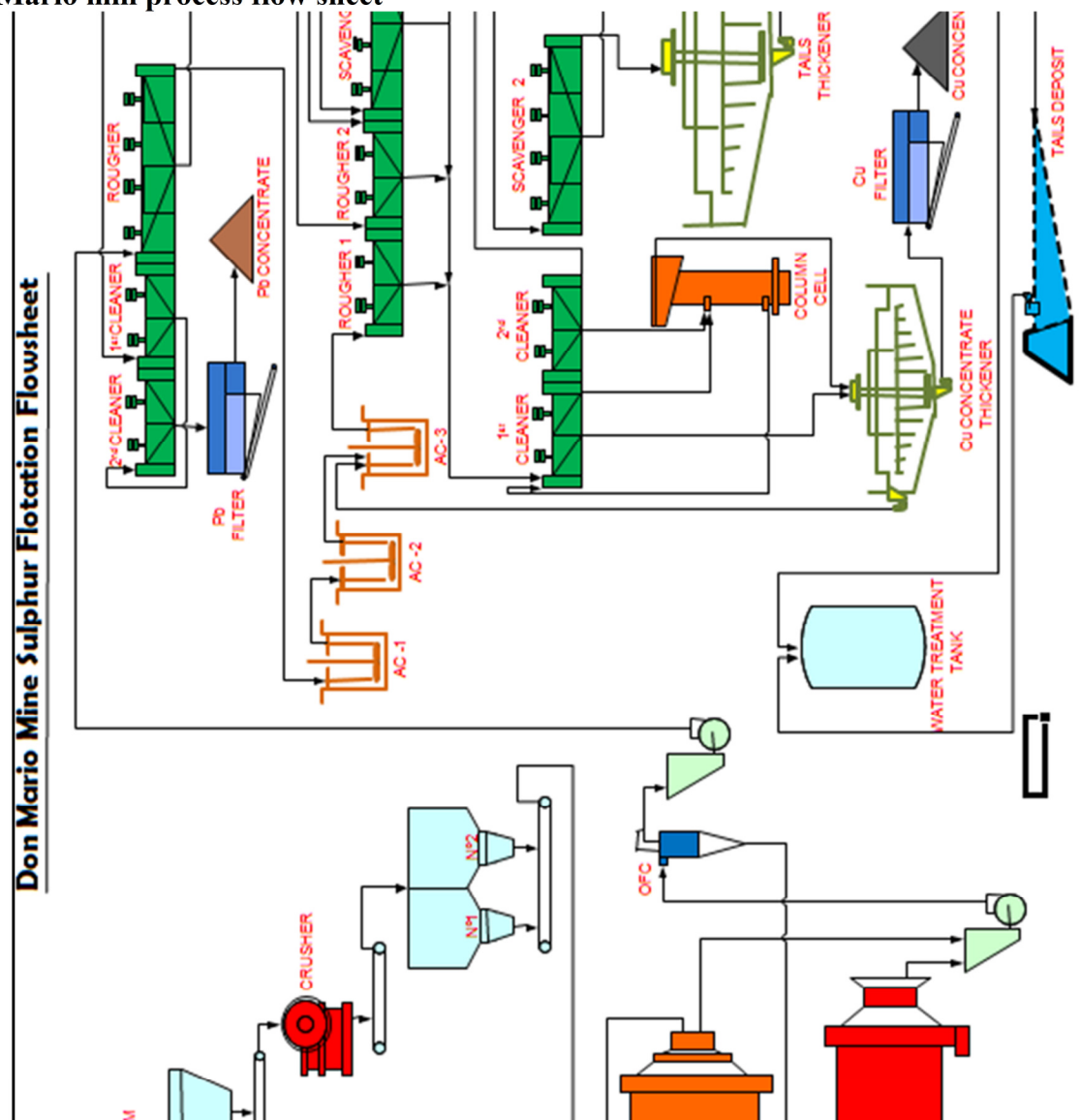
Table 17.1 shows the mill performance for 2015 and 2016. Less tonnage, lower copper and silver grades and recoveries were reflected in the reduction of silver and copper outputs, however, an increase of the gold grade and the recovery increased the gold produced.

Table 17.1: Summary of Production, Orvana Minerals Corp. – Don Mario Operation

Item	*Fiscal Year 2015	*Fiscal Year 2016
Tonnes milled	837,722	806,187
Au Grade (g/t)	1.32	1.44
Ag Grade (g/t)	25.20	20.10
Cu Grade (%)	1.20	0.95
Total Au Recovery (%)	53.8	56.3
Total Ag Recovery (%)	63.3	73.4
Total Cu Recovery (%)	74.4	62.2
Au Production (oz)	19,084	21,102
Ag Production (oz)	431,295	381,523
Cu Production (lb)	16,473	10,477

**Fiscal year ends on September 30th, 2016*

Figure 17.1: Don Mario mill process flow sheet



The plant has a zero discharge system and both fresh and recycled water is used. Energy is supplied from the on-site natural gas power plant and is sufficient to maintain operations of all circuits.

A description of each unit operation is presented in this section. The process description is largely extracted from the Technical Report (Zandonai, 2013).

17.2 Process Description

17.2.1 Introduction

A description of each unit operation is presented in this section. The process descriptions are taken with only minor modification from the Zandonai (2013) technical report.

17.2.2 Crushing

Ore extracted from the UMZ pit is stockpiled and classified according to mineralogy, gold, copper, and/or deleterious element grades. When possible, a suitable ore blend is prepared to feed the mill. A front end loader collects the ore from the plant stockpile and delivers it to the crusher feed bin equipped with a 500 mm aperture slotted grizzly screen. The crusher feed bin has an apron feeder that feeds the primary single toggle jaw crusher and any apron feeder spillage is collected on a conveyor belt below. The jaw crusher set to 153 mm. The spillage and the crushed ore which is less than 90 mm in size are transferred to the next conveyor belt equipped with load cell type belt weightometer and this belt discharges into the 800 ton fine ore mill feed bin. A level indicator and controller in the mill feed bin controls the apron feeder feed rate to the jaw crusher to maintain the set level in the bin.

17.2.3 Grinding

Dry crushed ore at $P_{80} < 90$ mm is fed to the SAG mill (5.5 m internal diameter by 2.7 m effective grinding length) by means of a conveyor belt equipped with a load cell type belt weightometer. The load signal controls the feed rate from the mill feed bin discharge conveyor onto the conveyor belt feeding the SAG mill. The pulp density in the mill is controlled by adding process water to the SAG mill inlet. Oversize material is removed from the mill discharge pulp with the discharge end trommel screen. The oversize fraction is delivered back to the SAG mill inlet, while the undersize fraction flows to the common pump box for both the SAG mill discharge and the ball mill discharge. The combined mill discharge is pumped to a cluster of three 380 mm diameter Krebs hydrocyclones for classification (there is one on standby). The cyclone overflow reports to the flotation section and the cyclone underflow is split, with part reporting to the gravity concentration section (approximately 100 tph) and the balance reporting to the ball mill feed. The ball mill has a 3.6 m internal diameter by 6 m effective grinding length. The cyclone overflow at 40% solids has a size of $P_{80} < 106$ μm .

17.2.4 Gravity Concentration

Milling reduces the size of the ore to less than one mm and liberates metallic gold, copper and silver particles (in sizes between 100 μm to 500 μm) that are recovered by gravity concentration due to their density differences in comparison to the host rock. One product is obtained from this circuit:

Article I.

Low grade gold concentrate – final product for packaging.

The cyclone underflow that is split off to the gravity circuit passes over a vibrating screen with 1.5 mm metal panels. The screen oversize material returns to the ball mill discharge box. The screen undersize material is split between three Falcon SB750 (F-SB750) centrifugal concentrators. The F-SB750 concentrate is discharged to a concentrate tank, while part of the tails of the F-SB750 1 and 2 units feed two Falcon i350 (F-i350) units, respectively (working in series), the remaining tails flow returns to the ball mill discharge pump box.

The F-i350 concentrate is sent to a pre-concentrated gold tank which also receives the F-SB750 concentrate. The final concentrate is pumped to the initial bagging station where it is filtered in the bag to reduce the moisture content to approximately 20%. The bagged gold concentrate is moved to a final “drying” area, where it is removed from the bags and allowed to dry out in an effort to reach a final moisture content of approximately 12% prior to re-packaging in bags required for off-site delivery.

17.2.5 Flotation

After grinding and gravity concentration, significant quantities of fine native gold and variable amounts of copper sulphide (mostly chalcopyrite) remain. The native metals and sulphides can be recovered in flotation.

Flotation process consists of a pre-flotation circuit, with a rougher stage, first and second cleaning, to remove contaminants, two copper rougher stages, two scavenger stages, two cleaner circuits and a final column cleaning stage. There are two additional columns to clean more copper concentrate if necessary.

The froths flotation of the pre-flotation circuit, go to tailings, while the non-float rougher stage goes to a conditioning tank where flotation reagents are added and the material is sampled. The slurry is conditioned by the addition of the following reagents:

- 1) Lime to modify pH,
- 2) Danafloat 245 promoter
- 3) Xantato Z-11
- 4) MIBC frothing agent

The conditioned slurry flows by gravity to the rougher cells for copper. The flotation tails are pumped to the tails thickener, while the rougher and scavenger concentrates are directed to two stages of cleaning and then a final column cleaning. The final concentrate moves to the concentrate thickener where it is sampled just before the thickener.

17.2.6 Thickening and filtration

Cleaned copper concentrate flows to an eleven metre diameter concentrate thickener. The concentrate is sampled before being discharged to the thickener. The underflow from the thickener and clarifier is pumped to a transfer tank where the slurry is sampled and then to a pressure filter feed tank. The concentrate is then pumped from the pressure filter feed tanks to the recessed plate pressure filter. The filter feed is sampled. The filtered concentrate at approximately 10% moisture is discharged and drops to the floor or directly to bagging stations below the pressure filter. The copper concentrate is then loaded onto trucks and transported to the port warehouse in Arica where it is stored, sampled and loaded onto a ship for sale.

17.2.7 Tailings Disposal

Plant tailings are pumped to the tailings storage facility located approximately 1 km from the plant facilities. The tailings impoundment is properly lined with polyethylene liners and has an adequate pumping system. The Don Mario Operation is a zero discharge facility.

18.0 Project Infrastructure

18.1 Introduction

The Don Mario Operation main infrastructure was completed in 2003 for underground mining of the LMZ deposit. The mill was expanded in 2011 to accommodate higher throughput from mining the UMZ deposit as an open pit. Figure 18.1 presents an aerial view of the operation and a full layout plan is included in Appendix 2.

Surface facilities other than the process plant include a 300 person modern camp facility with kitchens, lunch rooms, changing rooms, clinic, warehouses, maintenance shops, electromechanical workshops, a laboratory, a core storage facility, a freshwater dam, a natural gas power plant, electrical power lines and substations, and a complete telecommunication system providing phone lines and fast internet and intranet connections for the various offices. The surface facilities also include a de-commissioned sulphuric acid plant and carbon in leach circuit.

Underground facilities in place to service the mined out LMZ underground deposit include but are not limited to a mine portal, decline and underground accesses, various service and ventilation raises.

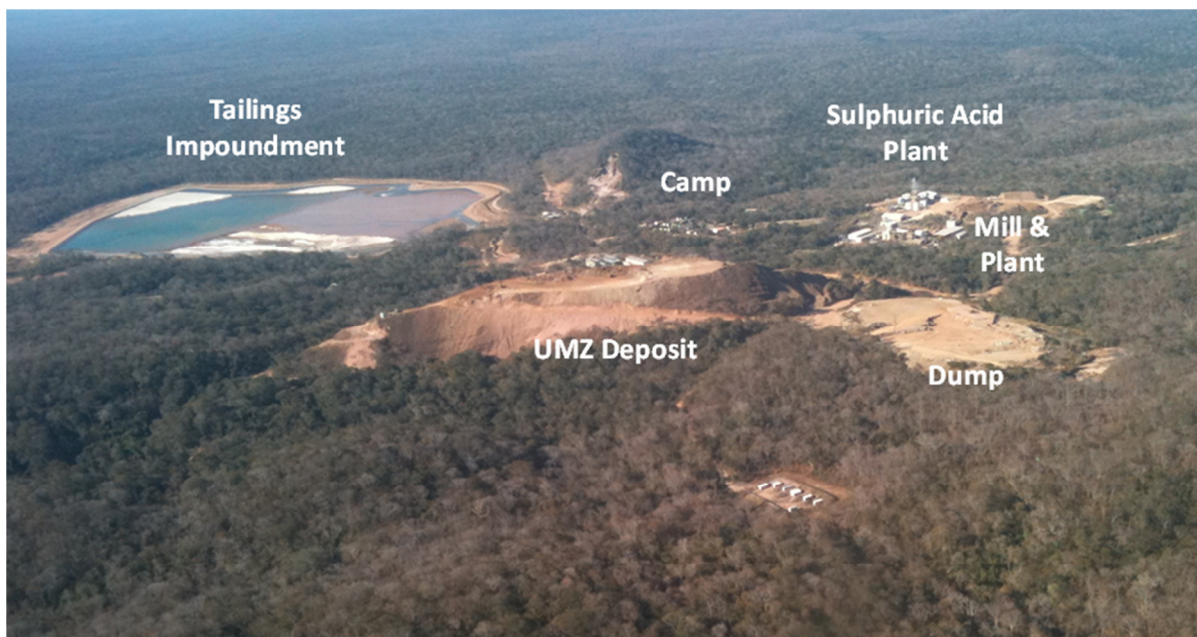
The Tailings Storage Facility (TSF) is located approximately 1.0 km to the northeast of the plant facility and is properly lined and has an adequate pumping system. The plant-tailings circuit is a no-discharge facility.

18.2 Existing Infrastructure

Surface and underground infrastructure at the Don Mario Operation include the following:

1. A 2,500 tpd processing facility
2. A tailings storage facility (TSF) and freshwater dam
3. Modern 300 person camp facility, consisting of sleeping accommodation (both single, double and multiple occupancy types), recreation facilities, kitchens and lunch rooms.
4. Shops, offices and warehouse facilities
5. On site natural gas power plant and substation
6. De-commissioned sulphuric acid plant
7. Carbon in leach (“CIL”) circuit which is being recommissioned (the “CIL Project”)
8. A decline and a series of ramp-connected levels used to access the historic LMZ underground mine

Figure 18.1: Aerial view of the Don Mario operation looking southwest



19.0 Market Studies and Contracts

19.1 Markets

The principal commodities at the Don Mario Operation are freely traded, at prices that are widely known, so that prospects for sale of any production are virtually assured, subject to achieving product specifications discussed below. Orvana used metal prices of US\$1,300 per ounce gold, US\$3 per lb copper, and US\$18 per ounce silver for defining mineral resources and reserves.

Products include gold concentrate, and copper concentrate with gold and silver credits. The copper concentrate is subject to limitations on certain deleterious elements, including:

- Arsenic
- Bismuth
- Antimony
- Lead
- Zinc
- Mercury
- Selenium
- Fluorine

As per industry norms, penalty charges are incurred for the deleterious elements when they are over specified concentrations.

19.2 Contracts

The Don Mario Operation employs local contractors to assist with mining in the UMZ pit, providing site security, transportation of concentrate from site to the port in Arica, Chile, work on the tailings dam lift, and to carry out diamond drilling.

Orvana considers current rates and charges for all such contracts to be within industry norms.

20.0 Environmental Studies, Permitting, and Social or Community Impact

20.1 Introduction

Orvana has an environmental management plan based on regulatory requirements, company policies and procedures, preventive design and identified impacts and associated risks. The Don Mario site is fully permitted for on-going production and Orvana has established effective relationships with the surrounding communities of San Juan, Buena Vista and Entre Rios. No significant changes have occurred with respect to these categories since reporting provided in Zandonai (2013). The following summaries are sourced with minor modification from Zandonai (2013).

20.2 Environmental Studies

Based on the Integrated Environmental License (IEL), monitoring at the Don Mario Project is carried out every six months, and includes assessment of the following environmental components: air, underground water, surface water (tailings dam and fresh water), noise, sediments, soils and vegetation. Surface water sampling is carried out at locations specified under the IEL and these are presented in Figure 20.1. Analytical services required in association with this monitoring program are provided by the Envirolab SRL through its Potosi, Bolivia operations. Envirolab SRL is an accredited, independent, commercial laboratory services firm certified to ISO9001 (ITA and ENG) standards.

Monitoring results are presented annually to the environmental authority (Environmental Ministry, Mining Ministry and Autonomous Departmental Government of Santa Cruz). Orvana has advised that to date, results for all monitored elements have consistently fallen within permissible limits, save for iron in some surface water testing points. Anomalous iron in surface water was documented through the Environmental Base Line Audit for the Don Mario operation and continued comparable results have not been considered problematic by Bolivian environmental authorities.

20.3 Project Permitting

The Don Mario operation is fully permitted as required under Bolivian legislation. EMIPA S.A. has obtained all the material permits to operate the mine, processing plant, and tailings storage facility and Table 20.1 lists the applicable permits. Orvana has advised that all permits and authorizations required to carry on mining and processing operations at the Don Mario site were in good standing at the effective date of this report. DGCS has not independently confirmed the status of the Don Mario environmental and operating permits listed in Table

20.1 and both firms have relied upon Orvana with respect to this status statement. However, neither firm has any reason at this time to doubt the permitting assertions made by Orvana.

Figure 20.1: Surface Water Monitoring Points at Don Mario operation

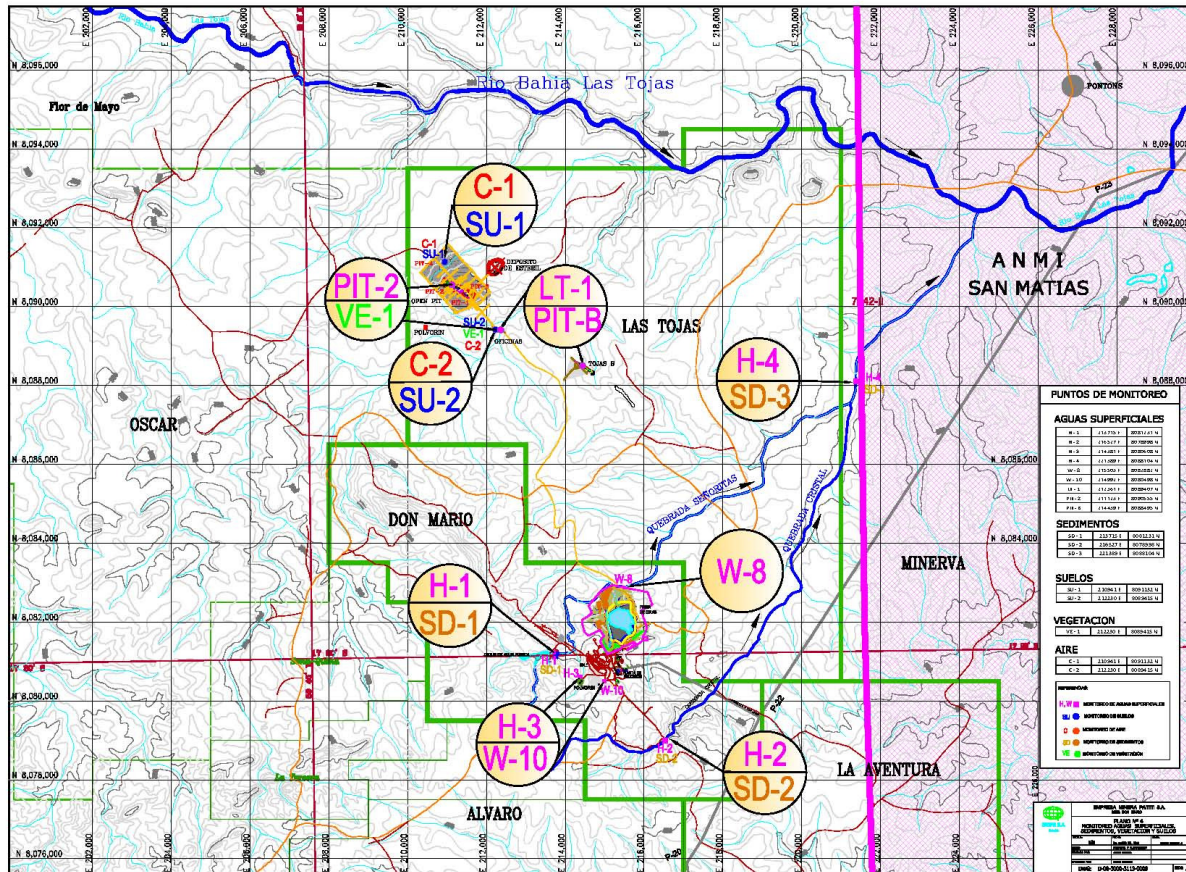


Table 20.1: Existing Permits for Don Mario Operation

Category	Permit Details
General	1. Licencia Ambiental Integrada (Don Mario UMZ – Las Tojas) N° 070501-02-DIA-1091/12. Resolución MMAyA-VMA-DGMACC-EEIA N° 1091(a)/12. Febrero 2012 (Integrated Environmental License “IEL”)
	• Licencia para la construcción y operación Línea Lateral o ramal de gas natural. Resolución Superintendencia Hidrocarburos SSDH N° 0252/2002. Junio 2002 (Construction and Operation license for natural gas line) •
	• Licencia Desmonte de Áreas. Resolución Superintendencia Forestal RU-ABT-SJC-PDM-na-148-2010. Proyecto UMZ. Agosto 2010 (Forest Removal Area License)
	• Uso de combustible diesel. ANH-Certificado de Gran Consumidor N° Graco 073/2016 (Diesel usage permit).
Mine	1. Certificado de Registro Actividades con Explosivos. Resolución Ministerio de Defensa Nacional, Certificado N° 0066/2014. Octubre 2014 (Certificate of Registration for Activities using Explosives)
Plant	• Licencia instalación medidor de densidad (radiactivo). IBTEN-I-N°-029-2015 (Radioactive density gauge) • Licencia instalación equipo XRF. IBTEN –I-N° 08-2015 (License to install X-ray equipment)
Tailings Storage Facility	• TSF is included in the IEL
Water	• Water usage is included in IEL
Chemical/Hazardous Materials	• Licencia Actividades con Sustancias Peligrosas (LASP) actualizada. Resolución MMAyA N° 070501-02-LASP-0363/13. Diciembre 2013 (Licensed Activities with Hazardous Substances)
	• Certificado de Inscripción Sustancias Controladas. Resolución Dirección General Sustancias Controladas N° 3000-01239-027. Octubre 2014 (Controlled Substances Registration Certificate)
Construction	• Included in the IEL Construction permit for works or ditches, around the camp, plant, mine and tailings storage facility

20.4 Social or Community Relations

Orvana provided the following summary statement on current social and community relations and obligations associated with the Don Mario operation:

“Orvana is committed to the social development and wellbeing of the communities in which it operates. To this end, in addition to the payment of income taxes and other local community taxes such as royalty taxes, Orvana continues to support, financially and otherwise, local community endeavors associated with these objectives. Orvana has supported the communities surrounding Don Mario by donating funds to community projects and to local municipalities.”

20.5 Mine Closure Requirements

A study of the closure costs for the Don Mario mine based on historical LMZ underground mining, LT, and UMZ, mine process-plant operations and tailings disposal was completed by Anddes SAC Peru (Dennis Córdova ,Ernesto Najar, Franco Sánchez 2016). The asset retirement obligations (ARO) include waste-rock remediation, removal of mine-site buildings, mine closure, mine-water treatment, reforestation, tailings-dam rehabilitation, remediation of soil contamination and monitoring for 4 years. Orvana reviews the ARO on an annual basis.

The current plan for the Don Mario district is to continue operating the UMZ and LMZ by open pit while continuing to define new resources such as the Cerro Felix deposit, which will postpone mine-site reclamation beyond the timeframe of when the UMZ and LMZ mineral reserves are depleted.

21.0 Capital and Operating Costs

21.1 Capital Costs

21.1.1 Sustaining Capital Costs

The Don Mario Operation capital costs are based on the fiscal year 2016. The estimated sustaining annual capital costs totaled \$6.8 million, and include plant equipment and maintenance, equipment costs, exploration, and tailings management. Capital costs incurred over the remaining operational years are expected to remain around these levels unless there are significant changes made to the plant facilities, exploration budget or increased capital costs associated with mining future deposits.

21.1.2 Reclamation & Closure

In addition to sustaining capital costs, an estimated undiscounted cost of \$7.0 million for reclamation and closure, is included. This estimate includes installation and operation of a post-closure water treatment plant, and decommissioning liabilities.

21.2 Operating Costs

The cash operating costs (COC) are calculated on a co-product basis. The COCs (co-product) are \$1,023 per ounces gold, \$1.93 per pound of copper and \$15.05 per ounce of silver as at September 30, 2016.

21.2.1 Manpower

The current manpower for the Don Mario Operation is summarized in Table 21.3. The table includes company and contractor employees. It includes the company workforce for mine production, process plant, mechanical and electrical work, and technical and administrative staff, plus contractors for mining, diamond drilling, ore transport, and tailings dam work.

Table 21.1: Workforce Summary for Don Mario Operation

Department	Company	Contractor	Total
Mine	32	17	4
Plant	77	-	77
Maintenance	27	-	27
Technical Services	25	-	25
Administration	16	1	17
Santa Cruz Office	19	-	19
Catering/Housekeeping	-	53	53

Security	-	13	13
Tailings/Civil Works	-	69	69
Transport/Haulage		7	7
Diamond Drilling			
CIL Project		73	73
Total	196	233	429

22.0 Economic Analysis

No economic analysis is required for this report, as the property is currently in production and there is no material expansion of current production incorporated in this report.

23.0 Adjacent Properties

DGCS is not aware of any adjacent properties as defined by NI 43-101 that are pertinent to the content of this technical report.

24.0 Other Relevant Data and Information

DGCS is not aware of any other relevant data or information that is pertinent to the content of this technical report, inclusion of which is necessary to make this technical report understandable and not misleading.

25.0 Interpretation and Conclusions

25.1 Introduction

DGCS was retained by Orvana to prepare an update of the technical report in accordance with NI43-101 for the EMIPA S.A. – Don Mario Operation, and specifically Mercator (2015).

The mineral resource estimates for the Don Mario LMZ and Cerro Felix gold-copper-silver deposits were prepared by Mercator in 2015, with these being focused on gold mineralization amenable to open pit mining methods. Following completion of those projects, Orvana retained DGCS to update the LMZ and CF mineral inventory in a NI 43-101 technical report that documents these new resources and reserves of Don Mario Operation to September 30th, 2016. DGCS also updated the UMZ inventory based on depletion of resources and the related UMZ's stockpiles at September 30, 2016.

The interpretations and conclusions presented below reflect the separate fields of responsibility that assign to DGCS.

25.2 LMZ and CF Deposit Mineral Resource and Reserve Estimates

The mineral resources estimates in Mercator (2015) for the LMZ and CF deposits, were reviewed and tabulated by DGCS and have an effective date of September 30th, 2016. Indicated mineral resources of the LMZ deposit (last estimated by Mercator (2015)) were upgraded to reserves in this report.

The Don Mario LMZ and CF mineral resource estimates, including databases, geological interpretation, compositing, capping, variography, block models, interpolation strategy, validation, cut-off grade, classification and mineral resource reporting are appropriate for the respective styles of mineralization and the resource models are acceptable to support the 2016 fiscal year-end mineral resource and reserve estimates. The mineral inventory for LMZ is presented in Table 25.1 and CF in Table 25.2.

Table 25.1 Mineral Inventory LMZ

Don Mario LMZ In-situ Mineral Resources Inclusive of Mineral Reserves Effective September 30, 2016

Category	Ktonnes	Au (g/t)	Cu (%)	Ag (g/t)	(000 oz Au)	(t Cu)	(000 oz Ag)
Indicated-LMZ	793	2.62	0.60	5.94	66.8	4794.6	151.4

Notes applicable to LMZ Indicated mineral resource estimate by Mercator (2015).

1. CIM definitions were followed for Mineral Resources and were prepared by M. Cullen, a qualified person for the purposes of NI43-101, who is an employee of Mercator and is independent of the Company.
2. Mineral resources are considered to have reasonable expectation for economic development using open-pit mining methods based on recent Don Mario open pit mine production history, resource amounts and metal grades and current metal pricing.
3. Mineral resource estimate gold cut-off value of 0.70 g/t Au is reflective of open-pit mining methods and resource estimate values are bolded.
4. Mineral Resources are estimated using a long-term gold price of US\$1,100 per ounce, copper price of US\$2.75 per pound and a silver price of US\$16.5 per ounce.
5. Both resource estimates are based on validated core drilling program results and do not incorporate production sampling data.
6. Contained copper tonnes were calculated from original resource statement pound values by the factor 2204.62lb/tonne.
7. CIM definitions were followed.

Don Mario LMZ In-situ Mineral Reserves Effective September 30, 2016

Category	Ktonnes	Au (g/t)	Cu (%)	Ag (g/t)	(000 oz Au)	(t Cu)	(000 oz Ag)
Probable-LMZ	793	2.62	0.60	5.94	66.8	4794.6	151.4

1. CIM definitions were followed for Mineral Resources and were prepared by G. Zandonai, a qualified person for the purposes of NI43-101, who is an employee of DGCS SA and is independent of the Company.
2. Mineral Reserves are estimated using a cut-off grade of 0.70g/t AU for the LMZ. Copper equivalent cut-offs were calculated using recent operating results for recoveries, off-site concentrate costs, and on-site operating costs.
3. Mineral Reserves are estimated using average long-term prices of US\$1,100 per ounce, copper price of US\$2.75 per pound and a silver price of US\$16.5 per ounce.
4. Numbers may not add due to rounding.
5. The mineral reserves at the LMZ have been based on processing by the CIL and flotation methods.
6. For information on stockpiles, see tables 1.2 and 1.4 herein.

Table 25.2: Cerro Felix Deposit In-situ Mineral Resources Inclusive of Mineral Reserves – Effective September 30, 2016

Category	Ktonnes	Au (g/t)	Cu (%)	Ag (g/t)	(000 oz Au)	(t Cu)	(000 oz Ag)
Indicated	490	3.15	0.09	2.53	49.6	441.0	39.9
Inferred	80	3.14	0.14	3.21	8.1	112.0	8.3

Notes applicable to CF mineral resource estimate by Mercator (2015)

1. CIM definitions were followed for Mineral Resources and were prepared by M. Cullen, a qualified person for the purposes of NI43-101, who is an employee of Mercator and is independent of the Company.
2. Mineral Resources are estimated at a gold equivalent cut-off grade of 0.70 g/t Au.
3. Mineral Resources are estimated using a long-term gold price of US\$1,300 per ounce, copper price of US\$3.00 per pound and a silver price of US\$18 per ounce.
4. Mineral Resources are inclusive of Mineral Reserves.
5. Numbers may not add due to rounding.

25.3 UMZ Deposit Mineral Resources and Reserves

The current UMZ mineral resource and mineral reserve estimates were prepared by DGCS in 2013 and reported in the associated Zandonai (2013) NI 43-101 technical report prepared by DGCS at that time. DGCS reviewed UMZ production and technical data in the following years and reported mineral resources and reserves associated with the UMZ that remained as at September 30, 2016.

In-situ mineral resources estimated by DGCS to be remaining in the UMZ at September 30, 2016, inclusive of mineral reserves, appear below in Table 25.3. UMZ stockpile mineral resources, exclusive of In-situ mineral resources are reported in Table 25.4.

Table 25.3: UMZ Deposit In-situ Mineral Resources Inclusive of Mineral Reserves – September 30, 2016

Zone	Measured						
	Tonnage	Grade	Grade	Grade	Contained Metal	Contained Metal	Contained Metal
	(000 t)	(g/t Au)	(% Cu)	(g/t Ag)	(000 oz Au)	(t Cu)	(000 oz Ag)
UMZ	51	1.35	1.10	30.70	2.2	563.1	50.3
Total	51	1.35	1.10	30.70	2.2	563.1	50.3

1. CIM definitions were followed for Mineral Resources and were prepared by G. Zandonai (2013), a qualified person for the purposes of NI43-101, who is an employee of DGCS SA and is independent of the Company.
2. Mineral Resources are estimated at a Cu equivalent cut-off grade of 0.85% for the UMZ.
3. Mineral Resources are estimated using a long-term gold price of US\$1,300 per ounce, copper price of US\$3.00 per pound and a silver price of US\$18 per ounce.
4. Mineral Resources are inclusive of Mineral Reserves.
5. Mineral Resources contained in stockpiles are exclusive of In-situ Mineral Resources.
6. Numbers may not add due to rounding.

Table 25.4: Stockpile Mineral Resources Exclusive of In-situ Mineral Resources – September 30, 2016

Location/Zone	Measured						
	Tonnage	Grade	Grade	Grade	Contained Metal	Contained Metal	Contained Metal
	(000 t)	(g/t Au)	(% Cu)	(g/t Ag)	(000 oz Au)	(t Cu)	(000 oz Ag)
DM1 (Oxide)	492	2.24	1.74	54.4	35.4	8559.6	861.0
DM2 (Oxide Pre-strip)	278	1.90	1.98	17.9	17.0	5508.8	160.5
DM3 (Dolomite Oxide)	190	1.89	1.96	21.6	11.5	3724.0	132.1
Plant Stockpile (oxide)	516	1.61	1.57	57.8	26.7	8108.3	958.3
DM4 Stock Talco	506	1.61	2.38	63.5	26.2	12067.4	1033.2
DM5 (Dolomite Oxide)	202	1.86	1.64	48.7	12.1	3314.4	316.2
DM6 (Tremolite Oxide)							
Total	2184	1.84	1.89	49.3	129.0	41282.6	3461.2

All these stocks will be processed by Flotation and will not be included in the CIL process

Notes to UMZ stockpile mineral resources:

1. CIM definitions were followed for Mineral Resources and were prepared by G. Zandonai, a qualified person for the purposes of NI43-101, who is an employee of DGCS SA and is independent of the Company.
2. Mineral Resources are estimated at a Cu equivalent cut-off grade of 0.85% for the Stockpiles of the UMZ.
3. Mineral Resources are estimated using a long-term gold price of US\$1,300 per ounce, copper price of US\$3.00 per pound and a silver price of US\$18 per ounce.

4. Mineral Resources contained in stockpiles are exclusive of In-situ Mineral Resources. Mineral Resources that are not mineral reserves do not have demonstrated economic viability. The UMZ Oxide Stockpile resources are currently not economically viable to process through the gravity flotation plant.
5. Numbers may not add due to rounding.

In-situ mineral reserves estimated by DGCS to be remaining in the UMZ at September 30, 2016, appear below in Table 25.5. UMZ stockpile mineral reserves estimated by DGCS to be remaining in the UMZ inventory at September 30, 2016 are reported in Table 25.6.

Table 25.5: UMZ In-situ Mineral Reserves – September 30, 2016

Total Proven							
Category	Tonnage	Grade	Grade	Grade	Contained Metal	Contained Metal	Contained Metal
	(000 t)	(g/t Au)	(% Cu)	(g/t Ag)	(000 oz Au)	(t Cu)	(000 oz Ag)
Proven	51	1.35	1.10	30.70	2.2	563.1	50.3
Proven	51	1.35	1.10	30.70	2.2	563.1	50.3

1. CIM definitions were followed for Mineral Resources and were prepared by G. Zandonai, a qualified person for the purposes of NI43-101, who is an employee of DGCS SA and is independent of the Company.
2. Mineral Reserves are estimated using copper equivalent cut-off grade of 1.0% CuEq for the UMZ and cut-off grade of 0.70g/t AU for the LMZ. Copper equivalent cut-offs were calculated using recent operating results for recoveries, off-site concentrate costs, and on-site operating costs.
3. Mineral Reserves are estimated using average long-term prices of US\$1,100 per ounce, copper price of US\$2.75 per pound and a silver price of US\$16.5 per ounce.
4. Numbers may not add due to rounding.
5. The mineral reserves at the LMZ have been based on processing by the CIL and flotation methods.

Table 25.6: UMZ Stockpile Mineral Reserves (exclusive of in-situ) – September 30, 2016

Proven							
Location/Zone	Tonnage	Grade	Grade	Grade	Contained Metal	Contained Metal	Contained Metal
	(000 t)	(g/t Au)	(% Cu)	(g/t Ag)	(000 oz Au)	(t Cu)	(000 oz Ag)
DM 1 OS (Tran.+ Sulph)	8	1.93	1.10	27.63	0.5	88.4	7.1
Plant deposit DPL2	26	1.33	0.99	16.32	1.1	255.1	13.5
UMZ TREMOLITA/TALCO	160	2.18	1.65	16.90	11.2	2648.2	87.0
TOTAL	194	2.06	1.54	17.27	12.8	2991.7	107.6

Notes:

1. CIM definitions were followed for Mineral Resources and were prepared by G. Zandonai, a qualified person for the purposes of NI43-101, who is an employee of DGCS SA and is independent of the Company.

2. *Mineral Reserves are estimated using a copper equivalent cut-off grade of 1.0% CuEq. Copper equivalent cut-offs were calculated using recent operating results for recoveries, off-site concentrate costs, and on-site operating costs.*
3. *Mineral Reserves are estimated using average long-term prices of US\$1,100 per ounce, copper price of US\$2.75 per pound and a silver price of US\$16.5 per ounce.*
4. *Numbers may not add due to rounding.*
5. *UMZ stock for processing by Flotation*
6. *LMZ Stock for processing by CIL*
7. *UMZ Tremolita, upgrade to reserve from resource stock pile. It is possible to process by flotation.*

26.0 Recommendations

DGCS makes the following recommendations based on the work programs described in this report.

26.1 DGCS Recommendations

DGCS has prepared the following Don Mario LMZ and CF deposit recommendations with respect to advancement of their assessments within the Don Mario Operation. Additional recommendations arising from a review of general exploration information for the Don Mario property are also presented.

- Additional diamond drilling is required to better define and confirm metal grade trends within the CF deposit. It is recommended that infill drilling of the currently defined deposit be carried out at 25 meter spaced sections along the length of the deposit. This program should include initial testing of potential deposit extension areas both down dip and along strike to both northeast and southwest.
- Revision of the structural and geological model of Cerro Felix to prepare a new resource estimate. This should be based on revised geological and grade distribution models that reflect all new drilling results.
- Revision and update of the mining parameters to run Whittle optimization of CF.
- Further metallurgical assessment such as blending options for the ores from Cerro Felix, LMZ and UMZ Stockpiles to support the conversion to reserves of the UMZ stockpiles.
- Significant exploration potential is present along the under-explored strike extensions of the Cristal Schist Belt and Eastern Schist Belt and this should be systematically explored for new deposits similar in style to those mined to date at the Don Mario Operation.
- Further detailed assessment of the Las Tojas deposit by remodeling and assessment of deposit extension drilling opportunities should be undertaken.

- Further metallurgical assessments for blending options to classify or upgrade resources either from stockpiles or the CF, and LT mines to mineral reserves and further processing.

27.0 Statements of Qualifications

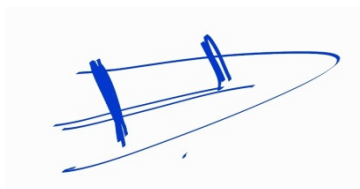
CERTIFICATE of AUTHOR

I, Gino Zandonai, M.Sc. Mining, CP, Mining Engineer, do hereby certify that:

- I am an independent mining engineer and qualified person, residing at Camino de Los Refugios 17770, Comuna de Lo Barnechea, Santiago, Chile, tel +56 (9) 97915596, email gino.zandonai@dgcs.cl. I am employed as managing director by DGCS SA.
- I graduated in civil & mining engineering from the University of La Serena, Chile with degrees of Licenciado en Ciencias de la Ingenieria (B.Sc) in 1989, and from the Colorado School of Mines, Golden, Co, USA with a M.Sc. in Mining Engineering in 1999.
- I am a Competent Person duly qualified in Estimation of Mineral Resources and Reserves (Record No. 0155) from the Examination Board of Competences in Mining Resources and Reserves of Chile, Law 20.235, subscribed to the Committee for Mineral Reserves International Reporting Standards (CRIRSCO #0155). I am a “qualified person” for the purposes of NI 43-101 due to my experience and current affiliation with a professional organization as defined in NI 43-101.
- I have practiced my profession continuously for 28 years. Since 1989, I have continually been involved in minerals projects for precious and base metals and industrial minerals in Australia, Argentina, Chile, Bolivia, Peru, Mali, Botswana, Mauritania, Greenland, Finland, Sweden, Kyrgyzstan, Russia and Mexico. I have been involved directly in the preparation of feasibility studies and resource estimation of gold, copper and silver projects.
- I have read the definition of “qualified person” set out NI 43-101 and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a “qualified person” for the purposes of NI 43-101.
- I am the qualified person responsible for preparation of the technical report titled “Don Mario Mine Operation 2016 Technical Report, Effective Date: September 30th, 2016”.
- I visited the mine on several occasions between July and September 2016 for several days.
- I am responsible for the preparation of all sections of the Technical Report.

- I have had prior involvement with the property that is the subject of the Technical Report.
- I am not aware of any material fact or material change with respect to the subject matter of the Technical Report that is not reflected in the Technical Report, the omission to disclose which makes the Technical Report misleading.
- I am independent of Orvana Minerals Corp. as described in section 1.5 of NI 43-101.
- I have read NI 43-101 and Form 43-101F1, and believe that this Technical Report has been prepared in compliance with that instrument and form.
- I consent to the filing of the Technical Report with any stock exchange and other regulatory authority and any publication by them for regulatory purposes, including electronic publication in the public company files on their websites accessible by the public, of the Technical Report.

Dated this 27th Day of January, 2017

A handwritten signature in blue ink, consisting of a stylized 'G' followed by a series of loops and a final flourish.

Gino Zandonai, M. Sc., Mining, CP
DGCS SA - Exploration and Mining Consulting

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Appendix 1

Resource Estimate Support Documents

Don Mario Project
Database Drill Collar Records for All 2015 Drill Programs

Hole Id	UTM WGS-84 Coordinates			Depth(m)	Azimuth	Dip
	Northing(m)	Easting (m)	Elevation (masl)			
CF-75	8082118	213004	353	80.00	30.00	-45
CF-76	8082096	213033	355	85.00	30.00	-45
CF-77	8082057	213096	358	90.00	30.00	-45
CF-78	8081898	213290	368	90.00	30.00	-45
CF-79	8081858	213324	368	100.00	30.00	-45
CF-80	8081827	213363	370	100.00	30.00	-45
CFNW-1	8082138	212969	351	90.00	32.00	-45
CFNW-2	8082192	212883	356	90.65	32.00	-45
DDH-SB1A	8081803	213413	370	75.00	46.00	-45
DDH-SB2	8081772	213452	374	88.07	45.00	-55
DDH-SB3	8081749	213492	370	85.27	33.00	-55
DM-01	8081065	214534	340	58.00	44.90	-46
DM-03	8081084	214519	337	76.00	44.90	-51
DM-05	8081101	214677	334	121.00	225.00	-50.4
DM-07	8081036	214578	361	122.00	45.00	-47
DM-08	8081062	214567	359	75.00	45.00	-45
DM-2A	8081131	214604	336	88.00	224.00	-51
DM-4A	8081125	214556	335	31.00	227.00	-45
DM-6A	8081065	214642	351	83.00	223.00	-60
DM-9A	8081110	214613	340	67.00	223.00	-61
DMEXT1	8081170	214224	308	90.00	35.00	-45
DMEXT2	8081138	214318	308	95.00	35.00	-45
DMEXT3	8081190	214450	326	78.00	220.00	-45
DMPT-10	8080895	214813	340	70.00	224.90	-50
DMPT-13	8080927	214775	340	61.00	224.90	-50
DMPT-14	8080944	214791	340	89.00	224.90	-47
DMPT-17	8080991	214768	340	85.00	224.90	-45
DMPT-18	8080820	214950	348	100.00	224.00	-55
DMPT-19	8080820	214950	348	91.13	225.00	-42
DMPT-2	8080840	214900	353	85.90	224.90	-46
DMPT-20	8080793	214994	331	85.00	225.00	-42
DMPT-3	8080840	214900	353	107.00	224.90	-63
DMPT-6	8080847	214836	344	55.00	225.00	-52
DMPT-7	8080847	214836	344	80.00	0.00	-90
DMPT-9	8080879	214798	340	50.30	224.90	-54
DMSE-1	8080620	215235	317	125.00	225.00	-45
DMSE-2	8080537	215333	334	125.00	225.00	-45
DMSE-3	8080473	215423	346	130.00	225.00	-45
LTB-1X	8088493	214548	280	80.00	212.00	-45
LTB-2X	8088463	214585	280	87.00	212.00	-45
LTB-3X	8088523	214503	280	80.00	212.00	-45
SA-1	8081428	213782	330	69.00	212.00	-50
SA-10	8081301	214101	307	120.00	212.00	-43
SA-11	8081287	214070	309	100.00	212.00	-39
SA-12	8081260	214025	311	65.00	212.00	-60
SA-13	8081290	214140	306	150.00	212.00	-40
SA-14	8081312	214054	312	120.00	212.00	-45

Don Mario Project
Database Drill Collar Records for All 2015 Drill Programs

Hole Id	UTM WGS-84 Coordinates			Depth(m)	Azimuth	Dip
	Northing(m)	Easting (m)	Elevation (masl)			
SA-2	8081402	213822	330	85.00	212.00	-45
SA-3	8081383	213922	325	107.00	212.00	-50
SA-4	8081362	213967	321	105.60	212.00	-45
SA-5	8081326	214001	318	85.00	212.00	-45
SA-6	8081298	214048	312	90.60	212.00	-45
SA-7	8081275	214090	307	100.00	212.00	-45
SA-8	8081270	214170	306	115.00	212.00	-45
SA-9	8081271	214096	307	115.00	189.00	-39
SB1-NW	8081857	213443	357	61.00	217.00	-45
SB2-NW	8081829	213489	356	55.00	220.00	-45
TW-03	8081331	213966	321	76.00	211.00	-45
TW-05	8081247	214055	306	55.00	211.59	-46
TW-06	8081306	214080	308	100.00	211.21	-45
TW-10A	8081308	214115	304	160.00	212.00	-47
TW-11	8081331	214036	313	95.00	212.00	-46
TW-71	8081406	213908	326	101.00	213.00	-55
TWB-01	8081823	213463	363	40.00	212.00	-45
TWB-04	8081862	213474	347	80.00	226.00	-45
TWB-56	8081835	213515	349	80.00	212.00	-45

Don Mario Operation Site Plan

