

# **EXCELLON RESOURCES INC.**

# TECHNICAL REPORT ON THE PLATOSA PROPERTY, BERMEJILLO, DURANGO STATE, NORTH CENTRAL MEXICO

NI 43-101 Report

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### Report Control Form Technical Report on the Platosa Property, Bermejillo, Durango **Document Title** State, North Central Mexico Excellon Resources Inc. Client Name & Address 20 Victoria Street, Suite 900 Toronto, Ontario M5C 2N8 **Document Reference** Status & **FINAL** Issue No. Project #2170 Version Issue Date March 25, 2014 Lead Author **David Ross** (Signed) Robert Michaud (Signed) Peer Reviewer Luke Evans (Signed) Project Manager Approval **David Ross** (Signed) Project Director Approval Deborah McCombe (Signed)

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# 1 SUMMARY

### **EXECUTIVE SUMMARY**

Roscoe Postle Associates Inc. (RPA) was retained by Excellon Resources Inc. (Excellon) to prepare an independent Technical Report on the Platosa Property in Mexico (Platosa). This report conforms to National Instrument 43-101 Standards of Disclosure for Mineral Projects (NI 43-101). Excellon requires this report to support the updated Mineral Resource estimate for the Platosa Property. RPA has visited the property multiple times, most recently from July 30 to August 1, 2013.

Excellon's wholly-owned subsidiary, Minera Excellon de Mexico S.A. de C.V., operates a polymetallic (Ag, Pb, Zn) mine on the Platosa Property, exploiting a series of high-grade mantos, located five kilometres north of the village of Bermejillo, northeastern Durango State, Mexico, approximately 45 km north of the major city of Torreón.

In the spring of 2009, Excellon acquired Silver Eagle Mines Inc. (Silver Eagle). Silver Eagle's primary asset was the Miguel Auza Mine, flotation mill, and exploration property located 220 km south of Platosa in Zacatecas State.

An underground test-mining program to access the mantos and to extract, crush, and sell mineralized material began in August 2004. During 2008, Excellon received permits from Mexican authorities for the construction of a flotation mill and tailings management facility at Platosa. With receipt of these permits, the Platosa operation transitioned from a "test-mine" to a "mine" under the Mexican regulatory system. Mill construction began in September 2008 but was suspended in mid-December 2008 in response to declining metal prices and technical difficulties encountered underground at Platosa. Until the end of January 2009, crushed material was sold to Minera Maple, S.A. de C.V. (Maple), a subsidiary of Industria Peñoles (Peñoles). Since March 2009, Excellon has been shipping all the Platosa crushed ore to the mill at Miguel Auza for processing.

RPA (and its predecessor Scott Wilson Roscoe Postle Associates Inc., or Scott Wilson RPA) has previously prepared seven independent NI 43-101 Technical Reports on the Platosa Property. These include a Mineral Resource estimate in 2002, a mine plan for underground



and surface exploration in 2003, an update to the Mineral Resource estimate in 2006, a report to support Excellon's move from the TSX Venture Exchange to the TSX in mid-2007, and Mineral Resource estimate updates in 2008, 2010, and 2011.

### CONCLUSIONS

The Platosa Property is underlain by folded and faulted Mesozoic sedimentary rocks, locally intruded by dykes and sills of Laramide age. The Platosa mineral deposit is thought to represent the distal portion of a high-temperature epigenetic silver-lead-zinc carbonate replacement deposit (CRD). This distal portion, located at the intersection of the Platosa Structural Zone with a northeast-striking lineament, is characterized by series of mantos and chimneys collectively forming the current Mineral Resource. A regional exploration program is underway to search for proximal-style CRD mineralization. This could be a mineralized intrusive body and/or a mineralized skarn adjacent to such an intrusive and may represent a large-tonnage deposit.

Excellon provided a title opinion regarding the validity of its mining concessions prepared by RB Abogados of Mexico City, Mexico and bearing the date of March 14, 2014. In the document, RB Abogados concluded that the concessions were in good standing and faced no claims or challenges as to their validity. The opinion does not comment on surface rights.

Excellon owns or leases several parcels of land and reports that the combined area is sufficient to carry out the current mining activities. Part of the leased land is currently under dispute with the local Ejido. Depending on the outcome of the dispute and associated legal proceedings, Excellon may be required to move some mining related infrastructure. Although this will add cost and may delay access to some parts of the deposit, RPA does not consider it to be a fatal flaw in the operation.

The exploration work conducted by Excellon on the Platosa Property has been performed in a competent manner according to accepted industry standards. The exploration methods and strategies are appropriate for the geological environment and styles of mineralization present. The drill hole database was verified by RPA and is suitable for Mineral Resource estimation work.

The sulphide mineralization intersected at and around the mine has not been completely closed off by drilling. There is excellent potential to discover additional manto style



mineralization around the current Mineral Resources. In addition, several excellent exploration targets, including the Rincon del Caido prospect, may lie on the periphery of a large-tonnage, intrusive-related proximal CRD deposit similar to those found elsewhere in Mexico.

Mineral Resources were estimated and classified by RPA following Canadian Institute of Mining, Metallurgy and Petroleum (CIM) best practices. Using a nominal incremental Net Smelter Return (NSR) cut-off value of US\$189/t, Measured plus Indicated Mineral Resources are estimated to total 484,000 tonnes grading 777 g/t Ag, 8.42% Pb, and 10.15% Zn, containing 12.094 million ounces Ag, 89.864 million pounds Pb, and 108.427 million pounds Zn. Inferred Mineral Resources are estimated to total 3,000 tonnes grading 2,324 g/t Ag, 16.93% Pb, and 1.74% Zn, containing 255,000 ounces Ag, 1.274 million pounds Pb, and 131,000 pounds Zn. The Mineral Resources are insensitive to both NSR cut-off value and silver price.

The estimate is of Mineral Resources only and, because these do not constitute Mineral Reserves, they do not have any demonstrated economic viability. There are no Mineral Reserves estimated on the property. Underground mining to date has confirmed that the individual mantos are highly irregular and unpredictable with respect to shape, dip, thickness, extent, and grade. This variability extends both horizontally and vertically. The design of stope mining shapes, a necessary pre-cursor in the process of estimating of Mineral Reserves, cannot be accurately accomplished based on the current drill information. Mining shapes, mining sequences, and modifying factors cannot be determined with a sufficient level of accuracy to convert Mineral Resources to Mineral Reserves based on the CIM definition standards for reporting Mineral Reserves.

For most underground deposits, the inability to define accurate stope shapes and prepare an accurate mining sequence and Life-of-Mine Plan (LOMP) would be a significant production and economic risk. This is not the case at Platosa, however, due to the high operating margin which results from the higher than average grade of the deposit.

The ground has been very competent and, in general, very little ground support is required. There has been no problem to date extracting all the mineralized material. As the mineralized material is high grade, there can be a tendency to over-excavate the mining headings to ensure full extraction. Back calculation of previously mined areas compared to



the Mineral Resource estimate suggests that the mining recovery factor is approximately 85% and dilution is in the range of 10% to 25% depending on the size and orientation of the manto.

During 2013, Excellon pumped an average of approximately 12,500 gpm, or 800 L/s, of water to surface 24 hours per day. In order to maintain pumping in the event of disruptions from the primary provider of electricity, Excellon has installed a sufficient number of generators to power all of the dewatering pumps. The current capacity of the mine water pumping system is in the order of 26,000 gpm.

Historical records show that pumping requirements are increasing by an average of 2,000 gpm per year. Based on this trend, Excellon are projecting pumping needs to average 16,500 gpm in 2014 and 18,000 gpm in 2015. Although there is sufficient pumping and generating capacity to absorb the projected increases in water inflow as more laterally extensive and deeper ground is opened up for mining, additional pumps and the relocation of some of the current pumps will be required over time.

The Miguel Auza concentrator produces both marketable silver-lead and silver-zinc concentrates with metal recovery rates that meet industry standards for similar ore types.

The current tailings pond had an original capacity of 305,800 tonnes. A final 1.8 m high lift of the tailings dam is planned for the summer of 2014. When this is completed, the tailings pond will have a remaining capacity of 95,000 tonnes, sufficient for 21 months of operation (until early 2016). Excellon estimates a total time frame of eight months to design the facility and obtain the necessary permits followed by a six-month construction period. Excellon has initiated the tailings pond permitting and design process.

Ongoing capital costs have been estimated by RPA to total \$27.2 million and include mine development, mine equipment and infrastructure, mill equipment and infrastructure, tailings management and closure costs.

In RPA's opinion, operating costs will increase by approximately 5% annually from 2015 onward as mining productivities decrease due to increased depth, and the transition from flat to more steeply dipping and smaller tonnage mantos.



RPA is not aware of any environmental liabilities on the property. Excellon reports that it has all required permits to conduct the proposed work on the property. RPA is not aware of any other significant factors and risks that may affect access, title, or the right or ability to perform the proposed work program on the property.

In early July 2012, three days following a government supervised union election at the mine, the losing union launched a blockade of the mine with the support of an NGO, and the support of a local agrarian community. The blockade closed the mine completely for two months and halted production for three months. Excellon reports that the allegations against the company have since been reviewed and dismissed by the Organization for Economic Cooperation and Development (the OECD) and the Mexican Federal Environmental Protection Agency (PROFEPA).

Excellon reports full support of its workers, the local communities, and all levels of Mexican government and states that it is in full compliance with all of its commitments and all Mexican laws.

### RECOMMENDATIONS

Prior to suspending drilling in mid-May 2013 in response to the sudden unanticipated drop in the price of silver, Excellon was in the midst of an aggressive 2013 drilling program. The initial focus was on the Rincon del Caido area, which hosts significant skarn-hosted, proximal style CRD mineralization. Drilling was also carried out near the known mantos in the search for additional high-grade massive sulphides. RPA supports Excellon's intention to resume drilling on a modest scale when market conditions permit. A portion of the proceeds from exploiting the Platosa deposit finances the ongoing compilation and planning work and will fund renewed diamond drilling, as it has done since August 2005.

The proposed 2014 exploration budget for Platosa is \$5,000,000 (Table 1-1). Excluding concession rental payments, approximately 90% of the proposed expenditures are budgeted for diamond drilling. The proposed drilling budget will largely be spent within three kilometres of the mine. Over 90% of the drilling will target additional high-grade manto CRD sulphides similar to those currently being mined at Platosa, and the remaining drilling will be dedicated to the search for a high-tonnage intrusive-related CRD, which may represent the source of the mantos. The initial proximal holes will follow up on the encouraging skarn-sulphide mineralization found at Rincon del Caido in 2012 and early 2013. The split between manto



and source drilling will be subject to change depending on results as the program progresses. The remainder of the field budget will be spent on a small amount of geological mapping and small geophysical surveys.

TABLE 1-1 PROPOSED EXPLORATION WORK PLAN AND BUDGET Excellon Resources Inc. – Platosa Property

Туре	Units	Unit Cost (US\$)	Total Cost (US\$ 000)
Downhole PEM survey, incl. equipment mob/demob cost from Canada & consulting fees	3 holes	8,000	24
Seismic survey, incl. equipment mob/demob cost from the USA & consulting fees			40
Geology	60 man days	400	24
Geochemical & biogeochemical surveying			30
Specific Gravity determinations	200 samples	40	8
Manto diamond drilling – contractor, water, core boxes, other supplies & environmental rehab costs	27,000 m	125	3,375
Source diamond drilling – contractor, water, core boxes, other supplies & environmental rehab. costs	2,000 m	200	400
Local supervisory & core logging labour (geologists)			335
Field technician & draftsman labour			40
Core handling & splitting labour			25
Core assaying	7,000 samples	39	273
Drill hole orientation surveying			16
Software/hardware, technical studies, research & QA/QC consulting fees			50
Property submissions, seminars, Mexican staff travel			30
Government concession rental payments/holding costs			330
Total			5,000



### TECHNICAL SUMMARY

### PROPERTY DESCRIPTION AND LOCATION

The Platosa Property is located in the State of Durango, north-central Mexico, approximately 45 km north of the city of Torreón. Torreón is an industrial centre of more than one million people when combined with the adjacent cities of Gomez Palacio and Lerdo. The Torreón International Airport is serviced by several daily non-stop flights to and from Mexico City and the United States. The property is approximately a one-hour drive from the airport, via Mexico Highway 49, which is a major north-south trucking route. Rail and power transmission lines run parallel to the highway, and the entire project area is easily accessible year-round with two-wheel-drive vehicles.

The property consists of 76 Mining Concessions covering a total area of approximately 40,854 ha. These concessions and fractional concessions are held directly by Excellon, although some are subject to royalty agreements. Excellon reports that it is current with respect to all applicable taxes and work commitments. Excellon also holds certain surface rights for portions of the property.

The Excellon-owned Miguel Auza flotation mill is located in the town of Miguel Auza, State of Zacatecas, 220 km south of the mine.

### SITE INFRASTRUCTURE

The Platosa Property site and mine facilities include the following:

- The surface mine site and associated facilities, including offices, shops, compressors, fuel storage, electric substations, standby generators, crushing and stockpile facilities, portal, ventilation fan, run-of-mine (ROM) ore storage, underground and surface water settling ponds, diamond drill core logging and storage facilities, and dry facilities.
- Facilities providing basic infrastructure to the mine, including access roads, and electric power distribution.
- Underground infrastructure, including ramps, raises, ventilation/service raises, explosives magazines, dewatering pumps, and underground mobile equipment fleet.
- Excellent access by paved highway and gravel roads to the company-owned mill at Miguel Auza.
- Grid electric power supply to the site.



The Miguel Auza Property site and mill facilities include the following:

- The surface mill site and associated facilities, including offices, shops, compressors, fuel storage, electric substations, fine ore stockpile facilities, crushing, grinding, flotation, filtering circuits, concentrate storage facilities and assay laboratory.
- Facilities providing basic infrastructure to the mill, including access roads, electric power distribution, and process water supply.
- A tailings disposal site.
- Grid electric power supply to the site.

### **HISTORY**

Records of the early history of prospecting and mining in the Platosa area are not known to exist, however, it is speculated that the deposits were discovered by Spanish explorers in the 16<sup>th</sup> or 17<sup>th</sup> century. Small-scale mining was carried out at Platosa sporadically from that period up to the 1970s. The Villalobos family mined at Platosa in the early 1970s. Production records from the historic workings are poor, but from the extent of these mine workings, the total historic production from Platosa is estimated to be in the range of 25,000 t to 50,000 t.

Excellon acquired the historic Platosa mine property from the Villalobos family in 1996 and conducted reconnaissance mapping and sampling in 1997, after which time, Apex Silver Mines Limited (Apex) optioned the Platosa Property from Excellon.

Apex carried out mapping and geochemical sampling in 1998, and a diamond drilling program in 1999. The drilling discovered a sulphide body to the east of the old mine workings. In 1999, Apex carried out a Controlled Source Audio-Frequency Magnetotelluric (CSAMT) survey and an orientation soil gas mercury sampling program. In 2000, Apex completed additional drilling at Platosa. Excellon participated to some extent in the Apex exploration programs and then assumed control of the project in 2001 and continued the exploration work.

### **GEOLOGY**

The Platosa area is underlain by Mesozoic shelf and slope facies sedimentary rocks which lie atop of the Coahuila Platform, which is a fault-bounded uplifted basement block measuring approximately 100 km by 150 km. Surrounding the Coahuila Platform are



Jurassic and Cretaceous sedimentary rocks of the Chihuahua Trough and Central Mexican Basin. Basement rocks are part of the Paleozoic Coahuila Terrane. Platosa lies near a major northwest fault structure on the southwestern margin of the Coahuila Platform, along a northwest-trending line of major CRDs.

The Platosa-Saltillera area is underlain by Cretaceous-age sedimentary rocks that have been intruded by Tertiary felsic to intermediate dykes and plutons. The sedimentary rocks strike generally northwest-southeast and have been extensively folded and faulted, with variable development of hornfels, marble, skarn, and recrystallization. The principal fault system in the property area is the Platosa Structural Zone (PSZ), a 250 m to 1,500 m wide zone of fractures and shearing that traverses the eastern margin of the Sierra Bermejillo. The fault comprises at least five separate fault planes that strike north-northeasterly and dip steeply east and west. The structure has been traced for five kilometres northwest and southeast of Platosa. The Platosa Mine, along with the recent discoveries, lies near the intersection of the PSZ with northeasterly-trending fractures that are also controls to mineralization at other occurrences in the area.

### **EXPLORATION**

To December 31, 2013, a total of 336,127.58 m in 1,307 diamond drill holes had been completed at Platosa. Additional diamond drilling is recommended to explore for new high-grade manto CRD sulphides similar to those currently being mined at Platosa, and for a high-tonnage intrusive-related CRD deposit, which may represent the source of the mantos.

Excellon has tested and used numerous exploration methods including airborne and ground geophysical surveying plus various types of geochemistry. Biogeochemical results combined with ground geophysical results plus knowledge of regional and local geology and characteristics of mineralization still prove to be the most effective exploration tools.

### MINERAL RESOURCES

RPA prepared an updated Mineral Resource estimate for the Platosa Property based on production and drill hole data current to December 31, 2013. The previous resource estimate was current to July 31, 2011.



RPA employed a block model constrained by wireframes, with an inverse distance method of grade interpolation. Block size was 5 m by 5 m by 2 m, and an initial search ellipsoid was spherical with a radius of 25 m followed by a second search with a radius of 50 m. The influence of high-grade composites was restricted to 25 m. The sample database comprised drill hole samples composited to two-metre downhole lengths. The minimum width for the mineralization used in construction of the wireframe models was nominally 1.5 m and an NSR cut-off cost of US\$189/t was used (Table 1-2).

TABLE 1-2 MINERAL RESOURCE ESTIMATE SUMMARY AS OF DECEMBER 31, 2013

Excellon Resources Inc. - Platosa Property

	Tonnage	Ag	Pb	Zn	AgEq	Ag	Pb	Zn
	(kt)	(g/t)	(%)	(%)	(g/t)	(oz x1,000)	(lb x1,000)	(lb x1,000)
Measured	42	825	8.62	11.31	1,358	1,108	7,939	10,416
Indicated	443	772	8.40	10.05	1,270	10,985	81,925	98,011
M+I	484	777	8.42	10.15	1,277	12,094	89,864	108,427
Inferred	3	2,324	16.93	1.74	2,922	255	1,274	131

### Notes:

- 1. CIM definitions were followed for the classification of Mineral Resources.
- 2. Mineral Resources are estimated at an incremental NSR cut-off value of US\$189 per tonne.
- 3. NSR metal price assumptions: US\$20.00/oz Ag, US\$1.00/lb Pb, US\$1.00/lb Zn.
- Metal recovery assumptions: 93% Ag, 81% Pb, 83% Zn.
- The silver equivalent (AgEq) is estimated from metallurgical recoveries, metal price assumptions, and smelter terms, which include payable factors, treatment charges, penalties, and refining charges.
- The estimate is of Mineral Resources only and, because these do not constitute Mineral Reserves, they do not have any demonstrated economic viability.
- 7. Totals may not add or multiply accurately due to rounding.

### MINERAL RESERVES

A Mineral Reserve estimate has not been prepared for the Platosa deposit. Underground mining to date has confirmed that the individual mantos are highly irregular and unpredictable with respect to shape, dip, thickness, extent, and grade. This variability is as prevalent horizontally as vertically. The design of stope mining shapes, a necessary precursor in the process of estimating of Mineral Reserves, cannot be accurately accomplished based on the current drill information. Given the flat nature of the deposit, there is no practical and cost effective method of establishing underground diamond drilling horizons. Alternatively, the cost of increasing the drill density from surface would be prohibitive. Mining shapes, mining sequences, and modifying factors cannot be determined with a sufficient level of accuracy to convert Mineral Resources to Mineral Reserves based on the CIM definition standards for reporting reserves. At Platosa, the detailed geological and spatial



information required to accurately estimate Mineral Reserves is only available when mining is underway and the mining parameters are only applicable to the limited volume of material located within close proximity of the mining faces.

For most underground deposits, the inability to define accurate stope shapes and prepare an accurate mining sequence and LOMP would be a significant production and economic risk. This is not the case at Platosa, however, due to the high operating margin which results from the higher than average grade of the deposit.

### MINING METHODS

Historically the mine has operated an average 26 days per month, however, recently this has been approaching 30 days per month. During 2013, Excellon mined approximately 5,820 tonnes per month (tpm), 97% of the budgeted amount. Prior to 2011, the mine suffered several water inflow incidents that disrupted production and the main risk to the production rate was excessive groundwater inflow and related flooding. The last of these major disruptions occurred in August 2010. Since then, improvements in water management practices, increased pumping capacity, the installation of three water-tight doors, which enable areas of the mine to be isolated if necessary, and installation of an alternative power supply for the pumps have reduced the impact of water inflows into the mine to a manageable level.

Once a manto has been accessed, mineralized material is mined by a "Pilot and Slash" mining method, using jacklegs with some mining carried out using jumbos. Depending on the shape and orientation of the manto, the pilot heading can be inclined, declined or flat, to remain in mineralization. Several phases of back slashing (breasting), wall slashing, or floor slashing (benching) from the pilot heading may be required to extract all mineralized material. When larger openings are developed, rock bolting has been carried out or a pillar left for support until mining of the area has been completed. Mining to date indicates that the mantos are very irregular in shape and orientation, and are in many cases connected.

A significantly higher than normal number of mining faces is required to achieve production targets. This increased flexibility is required as headings can move in and out of ore from one round to the next or become unavailable due to unexpected water inflow requiring grouting.



The ground has been very competent and, in general, very little ground support is required. There has been no problem extracting all the mineralized material (in the mined-out areas). As the mineralized material is high grade, there can be a tendency to over-excavate the mining headings to ensure full extraction. Back calculation of previously mined areas compared to the Mineral Resource estimate suggests that the mining recovery factor is approximately 85% and dilution is in the range of 10% to 25% depending on the size and orientation of the manto.

The underground ventilation system is currently at capacity and this is limiting the number of active work areas available at any one time. Excellon plans to install an additional raise and fresh air fan which, when completed, will double the ventilation system capacity.

### MINERAL PROCESSING

There is currently no mineral processing carried out at the Platosa site. The ore produced from the mine is crushed to 3/8 inch on site and since mid-March 2009, has been processed at the Excellon-owned flotation mill in the town of Miguel Auza located 220 km south of the mine. The mill was purchased from Silver Eagle in early 2009. The Miguel Auza mill operates a conventional grinding/flotation/filtering circuit producing separate silver-lead and silver-zinc concentrates. It has the capacity to process approximately 350 tpd of the high-grade Platosa ore with size of the flotation circuit being the limiting factor. This capacity exceeds the mine production rate and, as a consequence, the mill operates on a variable schedule of several days on then several days off depending on mine and shipping schedules. Certain maintenance activities are carried out on the days when the mill is not operating in order to minimize disruptions.

The Miguel Auza concentrator produces both marketable silver-lead and silver-zinc concentrates with metal recovery rates that meet industry standards for similar ore types.

The current tailings pond had an original design capacity of 305,800 tonnes. A final 1.8-m high lift of the tailings dam is planned for the summer of 2014. When this is completed, the tailings pond will have a remaining capacity of 95,000 tonnes, sufficient for 21 months of operation (until early 2016).



Excellon estimates a total time frame of eight months to design a new tailings facility and obtain the necessary permits followed by a six-month construction period. Excellon has initiated the tailings pond permitting and design process.

### MARKET STUDIES

The principal commodities at Platosa are freely traded, at prices that are widely known, so that prospects for sale of any production are virtually assured.

The concentrates produced from the Platosa deposit are of marketable grade and do not contain any deleterious elements or contaminants which would limit the number of smelters capable of processing the concentrates.

### **CAPITAL AND OPERATING COST ESTIMATES**

Excellon uses the Annual Budget as its planning guide for the operation. As this only covers the current year's production, RPA has estimated the ongoing capital costs required to extract the estimated recoverable portion of the Measured and Indicated Mineral Resources. Future capital cost estimates are based on 2013 actual capital expenditures. Ongoing capital costs total \$27.2 million, summarized in Table 1-3 which includes mine development, mine equipment and infrastructure, mill equipment and infrastructure, tailings management and closure costs.

TABLE 1-3 CAPITAL COST ESTIMATE Excellon Resources Inc. – Platosa Property

Year	Mine Development (\$000)	Mine Equipment and Infrastructure (\$000)	Mill Equipment and Infrastructure (\$000)	Mine and Mill Closure (\$000)	Total (\$000)
2014	2,000	1,800	300		4,100
2015	2,000	1,800	800		4,600
2016	2,000	1,800	800		4,600
2017	2,000	1,800	300		4,100
2018	2,000	1,800	300		4,100
2019	2,000	1,800	300		4,100
2020					0
2021				1,600	1,600
Total	12,000	10,800	2,800	1,600	27,200



Cash operating costs for 2013 were \$19.8 million with unit costs shown in Table 1-4.

TABLE 1-4 UNIT OPERATING COSTS Excellon Resources Inc. – Platosa Property

Item	2013 Budget (\$)	2013 Actual (\$)
Mining	237.97	189.77
Milling	62.75	51.37
G & A	35.52	42.54
Total	309.49	283.68

RPA considers 2013 actual costs to be representative of the current mining conditions and expected conditions for the remainder of 2014. In RPA's opinion operating costs will increase by approximately 5% annually from 2015 onward as mining productivities decrease due to increased depth and the transition from flat to more steeply dipping and smaller tonnage mantos.

### **ECONOMIC ANALYSIS**

RPA notes that Excellon is a producing issuer, the Platosa Mine is currently in production, and a material expansion is not being planned. RPA has performed an economic analysis of the Platosa Mine using the estimates presented in this report and confirms that the outcome is a positive cash flow. In the analysis, RPA used a silver price of \$20.00 per ounce, a lead price of \$1.00 per pound, and a zinc price of \$1.00 per pound for the Base Case.



# **2 INTRODUCTION**

Roscoe Postle Associates Inc. (RPA) was retained by Excellon Resources Inc. (Excellon) to prepare an independent Technical Report on the Platosa Property in Mexico (Platosa). This report conforms to National Instrument 43-101 Standards of Disclosure for Mineral Projects (NI 43-101). Excellon requires this report to support the updated Mineral Resource estimate for the Platosa Property.

Excellon is a TSX-listed Canadian company involved in exploration for copper, zinc, lead, gold, and silver deposits, with its corporate office in Toronto. Its wholly-owned subsidiary, Minera Excellon de Mexico S.A. de C.V., operates a polymetallic (Ag, Pb, Zn) mine on the Platosa Property, exploiting a series of high-grade mantos, located five kilometres north of the village of Bermejillo, northeastern Durango State, Mexico, approximately 45 km north of the major city of Torreón. In the spring of 2009, Excellon acquired Silver Eagle Mines Inc. (Silver Eagle), another Toronto-based TSX-listed company. Silver Eagle's primary asset was the Miguel Auza Mine, flotation mill, and exploration property located 220 km south of Platosa in Zacatecas State.

An underground test-mining program to access the mantos and to extract, crush, and sell mineralized material began in August 2004. During 2008, Excellon received permits from Mexican authorities for the construction of a flotation mill and tailings management facility at Platosa. With receipt of these permits, the Platosa operation transitioned from a "test-mine" to a "mine" under the Mexican regulatory system. Mill construction began in September 2008 but was suspended in mid-December 2008 in response to declining metal prices and technical difficulties encountered underground at Platosa. Until the end of January 2009, crushed material was sold to Minera Maple, S.A. de C.V. (Maple), a subsidiary of Industria Peñoles (Peñoles). Since March 2009, Excellon has been shipping all the Platosa crushed ore to the mill at Miguel Auza for processing. Underground development and mining are carried out by Excellon and contractor mining crews using company-owned equipment. Exploration work is managed and carried out by Excellon personnel with ongoing strategic input from Minera Cascabel S.A. de C.V. (Cascabel), with offices in Hermosillo and Chihuahua, Mexico, a subsidiary of IMDEX Inc. (IMDEX) of Tucson, Arizona, USA.



RPA is familiar with the Platosa Property, having previously prepared seven independent NI 43-101 Technical Reports for Excellon. These include a Mineral Resource estimate (Rennie, 2002), a mine plan for underground and surface exploration (Clow et al., 2003), an update to the Mineral Resource estimate (Clow et al., 2006), a report to support Excellon's move from the TSX-Venture Exchange to the TSX in early 2008 (Ross et al., 2007), and three updates to the Mineral Resource estimate, in 2008 (Ross and Rennie, 2008), 2010 (Ross, 2010), and 2011 (Ross, 2011).

The major assets and facilities associated with Platosa include:

- A series of silver-lead-zinc carbonate-replacement type deposits (CRD) in the form of mantos.
- Several excellent exploration targets, including the Rincon del Caido prospect, that may lie on the periphery of a large-tonnage, intrusive-related proximal CRD deposit similar to those found elsewhere in Mexico.
- The surface mine site and associated facilities including a two-stage crushing plant.
- Facilities providing basic infrastructure to the mine, including access roads, site
  offices, electric power distribution, and back-up generators.
- Underground infrastructure including ramps, raises, ventilation/service raise, explosives magazines, dewatering pumps, and underground mobile equipment fleet.
- Access by a short gravel road and paved highway to the company-owned mill at Miguel Auza.
- Flotation mill, assay office, tailings management facility and related facilities at Miguel Auza.

This Technical Report was completed by David Ross, P.Geo., RPA Principal Geologist, and Robert Michaud, P.Eng., RPA Associate Principal Mining Engineer. Mr. Ross and Mr. Michaud are independent Qualified Persons (QP) in accordance with the requirements of NI 43-101.

### **SOURCES OF INFORMATION**

Messrs. Ross and Michaud visited the Platosa Property, project office, underground workings, and drill core handling and storage facility most recently from July 30 to August 1, 2013. Technical documents and reports on the Platosa Property were reviewed at the site



and additional information was obtained as required both prior to and subsequent to the site visit. Messrs. Ross and Michaud held discussions with technical personnel during and/or subsequent to the site visit as follows:

- John R. Sullivan, P.Geo., Vice-President of Exploration for Excellon.
- Robert Moore, Chief Operating Office for Excellon.
- Gerardo Labra C., Senior Exploration Technician, Excellon.
- Ing. Pablo F. Gurrola Q., Mine Manager, Platosa, Excellon.
- Ing. Rene Ramirez L., Senior Geologist, Minera Cascabel S.A. de C.V.
- Robert Banville, Geologist and independent QA/QC Consultant.
- Román Moreno, Mine Engineer, Excellon.
- Angeles Ortiz, Mine Geologist, Excellon.

The documentation reviewed, and other sources of information, are listed at the end of this report in Section 27, References.



### **UNITS AND CURRENCY**

Units of measurement used in this report are largely metric. Some grade and tonnage figures are quoted in Imperial units. For converting grams of silver to troy ounces of silver, a factor of 31.103 grams/troy ounce is used and 1 ounce Ag per ton = 34.29 g/t Ag. Currency is in United States dollars (US\$) unless noted otherwise.

### **LIST OF ABBREVIATIONS**

а	annum	kWh	kilowatt-hour
Α	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	m²	square metre
cfm	cubic feet per minute	$m^3$	cubic metre
cm	centimetre	μ	micron
cm <sup>2</sup>	square centimetre	MASL	metres above sea level
d	day	μg	microgram
dia	diameter	m³/h	cubic metres per hour
dmt	dry metric tonne	mi	mile ·
dwt	dead-weight ton	min	minute
۰F	degree Fahrenheit	μ <b>m</b>	micrometre
ft	foot	mm	millimetre
ft <sup>2</sup>	square foot	mph	miles per hour
ft <sup>3</sup>	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 <sup>3</sup>	grain per cubic foot	psig	pound per square inch gauge
gr/m³	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 <sup>2</sup>	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
km²	square kilometre	W	watt
km/h	kilometre per hour	wmt	wet metric tonne
kPa	kilopascal	wt%	weight percent
kVA	kilovolt-amperes	yd <sup>3</sup>	cubic yard
kW	kilowatt	yr	year



# 3 RELIANCE ON OTHER EXPERTS

This report has been prepared by RPA for Excellon. The information, conclusions, opinions, and estimates contained herein are based on:

- Information available to RPA at the time of preparation of this report,
- · Assumptions, conditions, and qualifications as set forth in this report, and
- Data, reports, and other information supplied by Excellon and other third-party sources.

For the purpose of this report, RPA has relied on ownership information provided by Excellon. Excellon provided a title opinion regarding the validity of its mining concessions prepared by RB Abogados of Mexico City, Mexico and bearing the date of March 14, 2014. This opinion is relied on in Sections 4 and the Summary of this report. RPA has not researched property title or mineral rights for the Platosa Property and expresses no opinion as to the ownership status of the property.

RPA has relied on Excellon for guidance on applicable taxes, royalties, and other government levies or interests, applicable to revenue or income from Platosa Property.

Except for the purposes legislated under provincial securities laws, any use of this report by any third party is at that party's sole risk.



# 4 PROPERTY DESCRIPTION AND LOCATION

The Platosa Property is located in the State of Durango, north-central Mexico, approximately 45 km north of the city of Torreón (Figure 4-1). The property consists of 76 Mining Concessions covering a total area of 40,854.1175 ha (Appendix 1, Table 30-1 and Figure 4-2). These concessions and fractional concessions are 100% owned by Excellon's Mexican subsidiary Minera Excellon de Mexico, S.A. de C.V. A group of 20 of the concessions is subject to a royalty agreement. Excellon reports that the company is current with respect to all applicable taxes and work commitments. Excellon also holds certain surface rights for portions of the property.

Excellon provided a title opinion regarding the validity of its mining concessions prepared by RB Abogados of Mexico City, Mexico and bearing the date of March 14, 2014. In the document RB Abogados concluded that the concessions were in good standing and faced no claims or challenges as to their validity. The opinion does not comment on surface rights.

### MINERAL RIGHTS

The property is divided into two areas nominally named to reflect the mineral rights and underlying agreements, if any:

- Excellon 100%: This area comprises 56 concessions totalling 29,777.7419 ha. It contains the Platosa mantos, current Mineral Resources, and Platosa Mine plus the surrounding area, portions of which were once held in joint venture with Apex Silver Mines Limited (Apex Joint Venture) and its successor Golden Minerals Company (Golden), via their Mexican subsidiary Minera de Cordilleras, S. de R.L. de C.V. (Minera de Cordilleras). In November 2009, Golden sold its interest in the former joint venture concessions to Excellon and its royalty in what was formerly referred to as the Excellon 100%/Apex Royalty Area for US\$2,000,000 and a 1% Net Smelter Return (NSR) royalty on the combined property. In June 2012, Excellon purchased the 1% NSR from Golden for US\$2,400,000 leaving the 56 concessions free of royalties.
- Altiplano Area: This area comprises 20 concessions owned by Excellon totalling 11,076.3756 ha. These 20 concessions are subject to a 3% NSR payable to Exploraciones de Altiplano, S.A. de C.V., a private Mexican company.



### SURFACE RIGHTS

Figure 4-3 illustrates the surface rights owned or leased by Excellon. The 118.84 ha parcel of land was part of a purchase agreement made in 2004 with Villalobos family. The original agreement included surface rights to a 438.1 ha area. Subsequent agreements reduced the area to 118.84 ha. In August 2007, Excellon purchased an additional 622.0 ha of surface rights north of the mine.

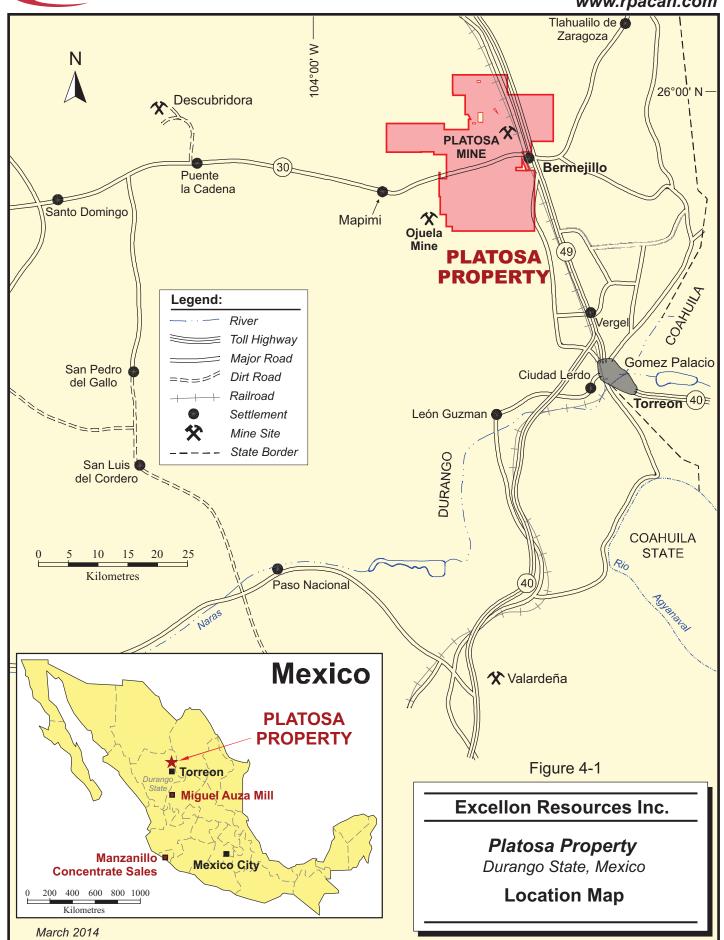
A lease agreement signed in 2008 with the Ejido la Sierrita (a communal surface rights ownership group common in Mexico) granted Excellon access to a 1,100 ha area for exploration, mining and other mining related activities. In the summer of 2012, a dispute developed between Excellon and the Ejido over certain terms in the lease agreement and the Ejido blockaded the property's main entrance on surface rights owned by the Excellon. The blockade lasted for 64 days and mine production was suspended for a total of 99 days. During the blockade, Excellon petitioned the Mexican Agrarian Court to rescind the 2008 agreement. The Ejido subsequently filed a similar suit. Legal proceedings are ongoing as of the effective date of this report.

Should the 2008 lease agreement be completely rescinded, Excellon may be required to move some infrastructure mainly related to pumping. This area of infrastructure is located on 10 ha of land north of the portal and is part of the ongoing legal proceedings with the Ejido before the Mexican Agrarian Court. Excellon does not expect that the dispute will cause a significant disruption of the mining operations.

### **ENVIRONMENTAL LIABILITIES AND WORK PERMITS**

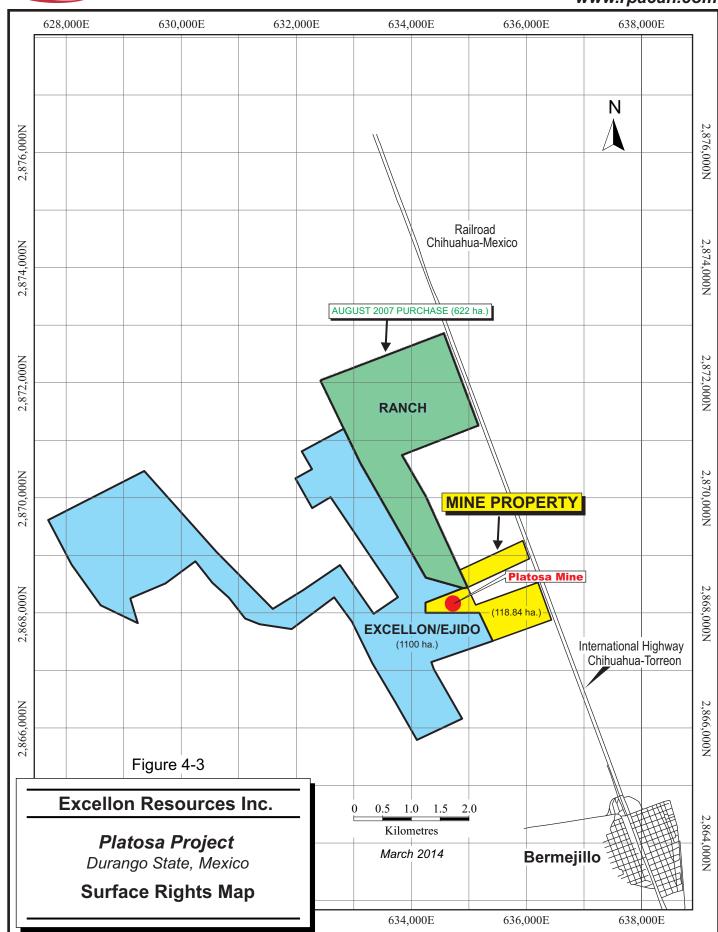
RPA is not aware of any environmental liabilities on the property. Excellon reports that it has all required permits to conduct the proposed work on the property. RPA is not aware of any other significant factors and risks that may affect access, title, or the right or ability to perform the proposed work program on the property.





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# 5 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY

### **ACCESSIBILITY**

The Platosa Property is located in northeastern Durango State, 45 km north of the city of Torreón, an industrial centre of more than one million people when combined with the adjacent cities of Gomez Palacio and Lerdo. The Torreón International Airport is serviced by several daily non-stop flights to and from Mexico City and the United States. The property is approximately a one-hour drive from the airport, via Mexico Highway 49, which is a major north-south trucking route. Rail and power transmission lines run parallel to the highway, and the entire project area is easily accessible (two kilometres from Highway 49) year-round with two-wheel-drive vehicles.

### **CLIMATE**

The climate of the region is warm and dry, and vegetation comprises mesquite trees, desert scrub, and cactus. The mean annual temperature in the area is 22.0°C, and the monthly means range from 14.4°C in January to 28.1°C in July. The average annual rainfall measured at Torreón is 265.9 mm. Mine production and mineral exploration, including drilling, can be carried out 12 months a year.

### **LOCAL RESOURCES**

The town of Bermejillo (pop. 10,000) is five kilometres to the south of Platosa and serves as a source of basic services, supplies, and labour. Excellon maintains several residences and a kitchen in Bermejillo for the use of employees who live in distant centres. Torreón is the major supply centre in the region. A lead smelter and zinc and silver refineries in Torreón are the property of Industrias Peñoles, the second largest mining company in Mexico and the world's largest producer of refined silver.

### **PHYSIOGRAPHY**

The property lies at the southeastern edge of the Sierra Bermejillo, a mountain range extending to the northwest for some 14 km from the mine area. The current Mineral



Resource, mine, and related facilities are located on or beneath the flat land and eastern slope of these mountains. The Sierra Bermejillo rises within 200 m west of the mine portal and the terrain becomes much more rugged. Elevations on the plains are at 1,200 masl, increasing to 1,500 masl in the mountains for local relief of 300 m.

### **INFRASTRUCTURE**

The Platosa Property site and mine facilities include the following:

- The surface mine site and associated facilities, including offices, shops, compressors, fuel storage, electric substations, standby generators, crushing and stockpile facilities, portal, ventilation fan, run-of-mine (ROM) ore storage, underground and surface water settling ponds, diamond drill core logging and storage facilities, and dry facilities.
- Facilities providing basic infrastructure to the mine, including well-maintained gravel roads that access the site as well as a network of roads to service the various ancillary facilities and electric power distribution.
- Underground infrastructure, including ramps, raises, ventilation/service raises, explosives magazines, dewatering pumps, and underground mobile equipment fleet.
- Excellent access by paved highway and gravel roads to the company-owned mill at Miguel Auza.
- Grid electric power supply to the site.



# **6 HISTORY**

Records of the early history of prospecting and mining in the Platosa area are not known to exist, however, it is speculated that the deposits were discovered by Spanish explorers in the 16<sup>th</sup> or 17<sup>th</sup> century. Small-scale mining was carried out at Platosa sporadically from that period up to the 1970s. The Villalobos family mined at Platosa in the early 1970s. Production records from the historic workings are poor, but from the extent of these mine workings, the total historic production from Platosa is estimated to be in the range of 25,000 t to 50,000 t. Smelter sheets from the 1970s quote grades of 0.35 g/t to 1.75 g/t Au, 3,000 g/t to 3,750 g/t Ag, 30% to 40% Pb, and 2% to 12% Zn. Mining at the nearby Saltillera, la Zorra, Socorro, and Refugio properties was reportedly carried out up to the 1960s, but detailed records of this production are not known to exist.

Excellon acquired the historic Platosa Mine property from the Villalobos family in 1996, and staked the surrounding Excelmex and Poeta claims. At approximately the same time, Apex staked the Saltillera property. Both companies conducted reconnaissance mapping and sampling through 1997, after which time, Apex optioned the Platosa Property from Excellon.

Apex carried out mapping and geochemical sampling through 1998, and in 1999 embarked on diamond drilling programs at both Saltillera (842 m) and Platosa (2,604 m). The drilling at Platosa discovered a sulphide body to the east of the old mine workings. In 1999, Apex carried out a Controlled Source Audio-Frequency Magnetotelluric (CSAMT) survey and an orientation soil gas mercury sampling program. In 2000, Apex drilled an additional 1,050 m at Platosa and 188 m at Saltillera.

Excellon participated to some extent in the Apex exploration programs and then assumed control of the project in 2001 and continued the exploration work. Work conducted by Excellon is described in Section 9, Exploration.

Between June 2005 and January 31, 2009, when a sale and purchase contract expired, a total of 153,478 tonnes of ore with average grades of 1,258 g/t Ag, 10.22% Pb, and 10.69% Zn was sold to Maple, a subsidiary of Peñoles. Between March 19, 2009, when Excellon began processing ore at Miguel Auza, and July 31, 2013, the effective date of the current resource estimate, a total of 299,831 tonnes grading 828 g/t Ag, 6.68% Pb, and 8.93% Zn



was processed at the Miguel Auza mill. Total production since start-up to December 31, 2013 was 453,309 tonnes at average grades of 974 Ag, 7.9% Pb, and 9.5% Zn.



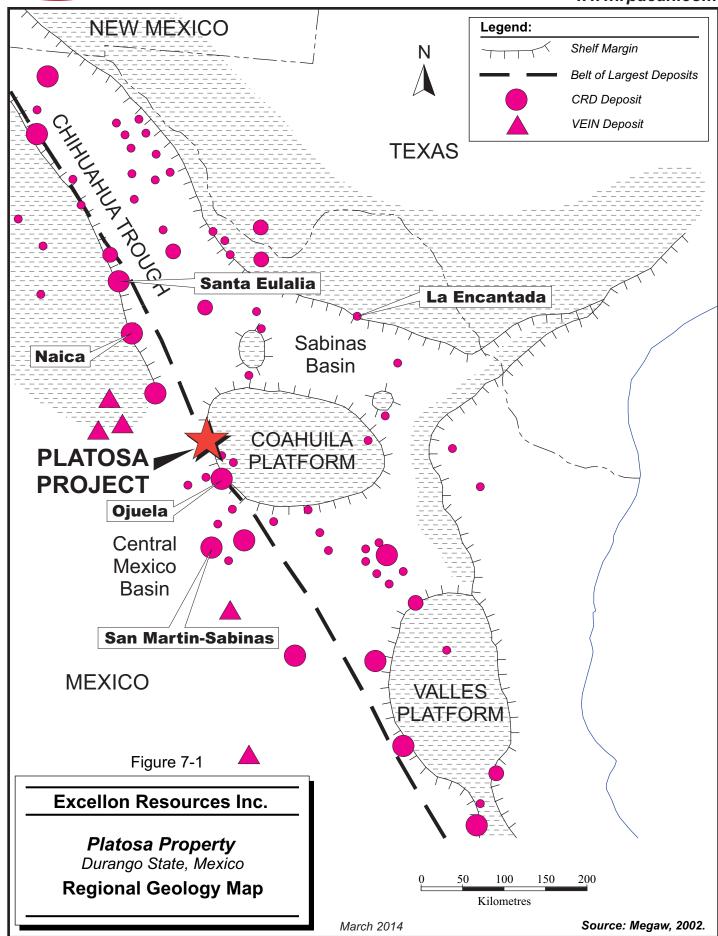
# 7 GEOLOGICAL SETTING AND MINERALIZATION

## **REGIONAL GEOLOGY**

The Platosa area is underlain by Mesozoic shelf and slope facies sedimentary rocks, which lie atop the Coahuila Platform (Figure 7-1). The Coahuila Platform is a fault-bounded uplifted basement block measuring approximately 100 km by 150 km. Surrounding the Coahuila Platform are Jurassic and Cretaceous sedimentary rocks of the Chihuahua Trough and Central Mexican Basin. Basement rocks are part of the Paleozoic Coahuila Terrane.

Northeast-southwest oriented compression during the Cretaceous to early Tertiary Laramide Orogeny deformed the Mesozoic sedimentary rocks into a series of roughly parallel north-northwest trending folds and faults. Extension in the mid- to late Tertiary reactivated and reopened these faults, including the structures bounding the Coahuila Platform, and developed further northwest-southeast oriented ground preparation. The mid-Tertiary extension event was accompanied by widespread magmatism, with the newly reopened faults acting as conduits allowing intrusion emplacement at shallow levels within the structurally prepared Mesozoic carbonate sequence. Most of the CRDs in Mexico were formed at this time, with the largest forming over the deep-seated, large-scale fault zones (Megaw et al., 1988; Megaw, 2002). Platosa lies near a major northwest fault structure on the western margin of the Coahuila Platform, along a northwest-trending line of major CRDs (Figure 7-1).







#### LOCAL GEOLOGY

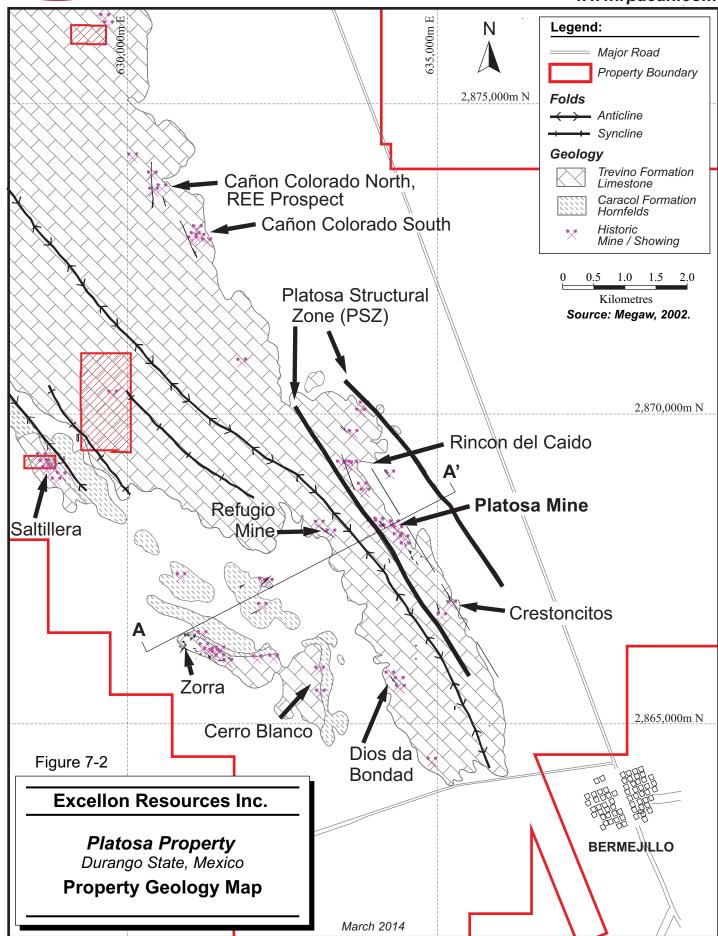
The Platosa Property lies in the Sierra Bermejillo, a northwesterly-trending anticline-syncline pair developed in Mesozoic sedimentary rocks (Figures 7-2 and 7-3). The Sierra Bermejillo Anticline is a relatively open fold plunging southeast. The Saltillera Syncline is a doubly plunging structure located west of the anticline. The folded sequence is cut by a number of north- to northwest-striking, steeply dipping fractures and faults. Tertiary felsic to intermediate dykes and plutons intrude these structures in the western part of the Sierra Bermejillo. The principal fault system in the property area is the Platosa Structural Zone (PSZ), a 250 m to 1,500 m wide zone of fractures and shearing that traverses the eastern margin of the Sierra Bermejillo. The PSZ includes at least five separate fault planes that strike north-northeasterly and dip steeply east and west and has been mapped for five kilometres northwest and southeast of the Platosa Mine (Megaw, 2002). It is characterized by brecciated, crushed, and dolomitized limestones; slickenside fracture surfaces; iron and manganese oxides; travertine-filled breccias; and coarsely-crystalline selenite veins, some up to five metres thick. The faulted rocks are erosionally less resistant and this contributes to formation of topographic depressions along the PSZ.

#### PROPERTY GEOLOGY

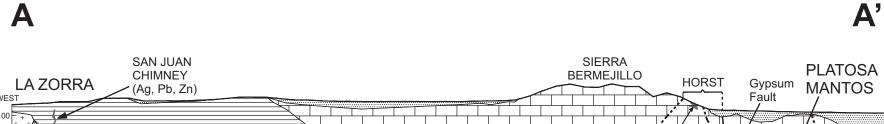
#### STRUCTURE

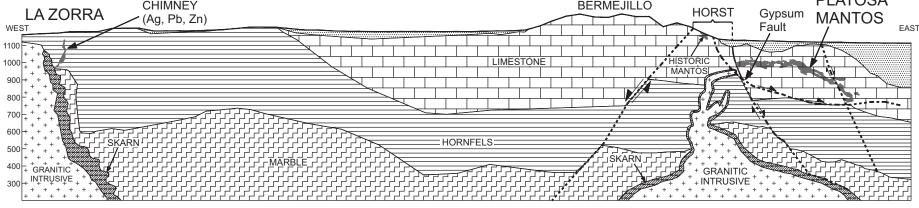
The current Platosa Mineral Resource is located near the intersection of the PSZ with a northeasterly-trending fracture zone that also hosts mineralization further west. The Gypsum Fault, part of the PSZ, traverses the Platosa Property just west of the historical mine workings (Figures 7-2 and 7-3) and consists of a gypsum-filled shear zone that dips at 70° towards the east at surface, flattening to 60° down-dip. It has at least 60 m of normal offset. Other faults with lesser offsets are interpreted from the drilling and appear to have displaced stratigraphic contacts by up to 20 m. Post-mineralization faulting does not appear to be significant.



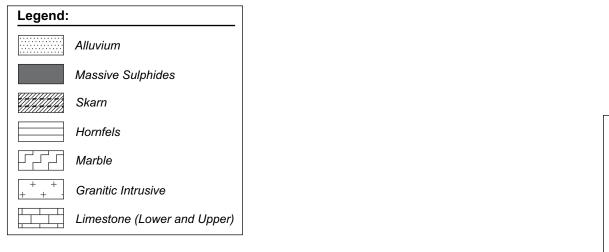


March 2014





Source: Excellon Resources Inc., 2011.



0 200 400 600 800 1000 Metres

Figure 7-3

#### **Excellon Resources Inc.**

Platosa Property Durango State, Mexico

Schematic Cross Section A - A' (Looking North-West)



#### STRATIGRAPHY

The Platosa Property is underlain by folded and faulted Mesozoic sedimentary rocks, locally intruded by dykes and sills of Laramide age (Figure 7-4). The lowermost in the stratigraphic sequence is the Lower Cretaceous Acatita Formation evaporite sequence. It is a gypsum-rich horizon that outcrops eight kilometres north of Platosa, and is thought to be the source for the abundant pore-filling gypsum observed throughout the property.

Overlying the Acatita Formation is the Treviño-Cuesta del Cura Formation, also Lower Cretaceous in age. This formation comprises a variety of platform and deeper marine facies calcareous sedimentary rocks that have been variously hornfelsed, dolomitized, and mineralized. At the top of this sequence is the Lower Limestone, which is strongly metamorphosed to marble.

The Lower Limestone is overlain by the Lower Hornfels, an altered and hornfelsed shale-sandstone of unknown thickness. Drilling has intersected a number of endoskarned dykes along with lead-zinc-molybdenum-bearing veinlets. Overlying the hornfels is a 50 m to 80 m thick sequence of shallow marine, thinly bedded to laminated, calcareous mudstone locally referred to as the Black Limestone. This is followed by a thin, black, organic-rich, pyritic sandstone called the Black Sandstone.

Overlying the Black Sandstone is the 30 m thick Grey Limestone unit, which is in turn overlain by the Fragmental Limestone, often referred to as the Heterolithic Fragmental Limestone, the principal host of mineralization at Platosa. The Fragmental Limestone is a variably dolomitized, sedimentary breccia composed of angular limestone and dolomite fragments, ranging in size from less than one centimetre to more than 50 cm, in a sandy carbonate matrix. In the vicinity of the mine, the unit is 50 m to 120 m thick, with an irregular basal contact and karsted upper contact. Northwest of the mine area, the contact with the overlying Upper Limestone is observed to be gradational over a few metres. Fragmental Limestone has been mapped on surface throughout the PSZ. The Fragmental Limestone was widely affected by post-lithification dolomitization thus creating a highly permeable rock susceptible to dissolution and mineralization.



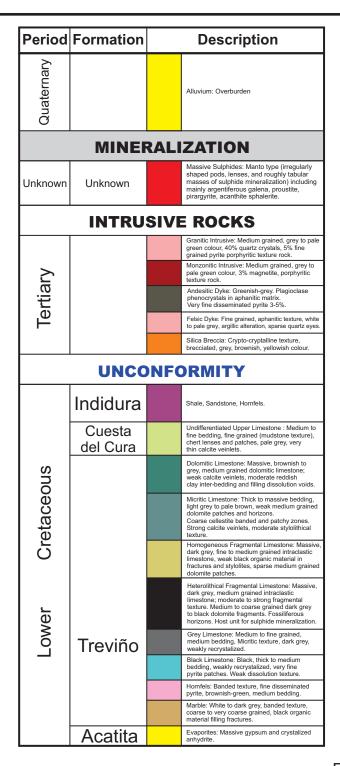


Figure 7-4

#### **Excellon Resources Inc.**

Platosa Property
Durango State, Mexico
Stratigraphic Column

March 2014

Source: Excellon Resources Inc., 2011.



The Fragmental Limestone is overlain by 200 m of thick- to medium-bedded calcareous mudstones called the Upper Limestone. This unit has been locally dolomitized between Refugio and Platosa, and recrystallized to marble between Refugio and la Zorra. Upper Cretaceous shales, limey shales, and sandstones of the Indidura/Caracol Formation overlie the Upper Limestone. These rocks comprise basal shales, calcareous shales, calcarenites, and limestones, which grade upwards into siliceous shales, sandstones, and conglomerates.

#### INTRUSIVE ROCKS

Intrusive rocks are poorly exposed in the project area but have been intersected by drilling in several areas on both the west and east sides of the Sierra Bermejillo. A large magnetic anomaly, visible in both published and Excellon airborne magnetic surveys, and widespread thermal metamorphism of the Mesozoic sedimentary rocks suggest that intrusive rocks are more widespread than currently observed. The largest exposure of intrusive rocks in the western area is the Tertiary Pozo Porphyry, which is seen in a water well located southwest of the property, along the Bermejillo-Mapimi highway. The Pozo Porphyry is a medium-grained feldspar porphyry thought to be a quartz monzonite (Megaw, 2002). One- to three-metre thick felsic dykes occur in the la Zorra Mine and a multi-phase granite porphyry has been cut in drilling to the south.

At the Platosa Mine, one- to ten-metre wide altered and endoskarned felsic dykes with associated sulphide-bearing veinlets were intersected in deep drill holes into the Lower Hornfels. Six kilometres northwest of Platosa at Cañón Colorado, a fine-grained neck or flow-dome of felsic intrusive is exposed. This sub-volcanic intrusive is accompanied by minor gossan and ferruginous jasperoid that are anomalous in arsenic, zinc, silver, and lead. In the spring of 2010, hole LP763 drilled in the Rincon del Caido area 1.2 km northwest of the northwest corner of the Guadalupe Manto intersected anomalous gold, silver, copper, bismuth, and antimony over 3.3 m in a much wider marble unit, a portion of which was skarnified. A felsic intrusive was intersected deep in the hole and the marble/intrusive combination suggested an environment proximal to a large intrusive, which may be favourable for the discovery of a large CRD deposit. Additional drilling carried out in 2012 and 2013 has confirmed the potential of the Rincon del Caido area.



#### **ALTERATION**

Secondary dolomitization of the host carbonate section (not to be confused with regional primary or diagenetic dolomitization of certain carbonate units) is locally well developed, especially along the northeast flank of the range near the Platosa Mine. The secondary dolomitization was a pre-sulphide event caused by the passage of early Mg-rich brines along fractures and bedding planes in many limestone units. The process created secondary dolomite and significantly increased the porosity of the affected beds, many of which were later selectively mineralized by sulphides.

Silicification, occurring as weak to pervasive jasperoid and quartz veining, is found throughout the project area and is associated with both the northwest-southeast and northeast-southwest-trending fault structures. The intensity of the silicification is observed to be highest in zones of intersection of these two fracture trends but is only locally seen in the sulphide mantos.

Gypsum occurs as fairly late stage fracture-fillings and veins throughout the district. Collector-quality gypsum crystals have been extracted from open fractures in the historic Platosa Mine, and are what originally led Excellon to the property. The gypsum commonly cuts across mantos and cements large areas of sulphide breccia. Crystalline gypsum containing extremely fine grained inclusions of galena dust is often found tens of metres from these breccias and is a reliable indicator of proximity to coherent sulphides. Cross-cutting relationships and sulphur isotopic analyses indicate that the gypsum is probably not genetically related to the mineralizing event, but is most likely derived from the solution and reprecipitation of gypsum derived from the underlying Acatita Formation evaporates (Eastoe, 1997).

#### **MINERALIZATION**

#### **MASSIVE SULPHIDES**

Mineralization at Platosa forms a series of mantos and chimneys localized at the intersection of the PSZ with a northeast-striking lineament. As presently known, the bodies are found within an irregularly shaped 800 m by 700 m area. Most mantos dip gently to the east and are often connected by local, small chimney structures forming a stair-step pattern for a collective dip of 18° towards the east. Depth from surface ranges from 60 m in the west to over 315 m in the east. Sulphide mineralization is massive, banded, disseminated and fracture-filling, fine- to coarse-grained galena and sphalerite, with minor accessory pyrite.



The primary silver mineral is acanthite, which occurs as coarse blebs and fine-grained intergrowths with galena. Native silver and proustite occur locally. Silver, lead, and zinc grades are often high, especially in the more massive sections. Silver grades in the thousands of grams per tonne are not uncommon. Lead and zinc sulphides can constitute over 80% of the rock mass in drill core.

Drilling in the known manto area has also occasionally intersected anomalous copper and gold values, the gold occurring with the massive sulphides in several holes in the 6A Manto and in a siliceous zone overlying but some distance above portions of the NE1 Manto massive sulphides. Neither the copper nor gold is of sufficient continuity to be considered part of the Mineral Resource. Gangue minerals include fine-grained calcite, coarse gypsum, quartz, and fluorescent purple fluorite.

Ross et al. (2007), Ross and Rennie (2008), and Ross (2010, 2011) describe zones that have been mostly mined out, including the oxidized surface mineralization and mantos 1, 2, 3, 4, 5, and NE1. Previous reports describe each contiguous sulphide body as a separate manto. Excellon's continued success discovering additional mantos makes a description on an individual basis unpractical. Instead, RPA has grouped several of the sulphide bodies by area named after the primary manto within the area:

- The Manto 6 Area is made up of several northwest-trending elongate sulphide bodies located between mined-out Manto 5 and Guadalupe. The largest is 180 m long in the northwest-southeast direction, up to 40 m wide, and varies between 1.25 m and 6.5 m thick. Excellon accessed both ends of Manto 6 through underground workings developed from the main ramp and from workings at the northwest end of the Guadalupe Manto. Drilling in 2012 discovered a new manto measuring 65 m by 25 m at the northwest end of the area. The new manto dips steeper (50° east) than the other mantos in the immediate area.
- The Guadalupe Area, including the Guadalupe Manto, is located 30 m to 50 m north of Manto 6A/6B. It is elongated in the northwest-southeast direction, along the PSZ, measuring approximately 360 m long by 100 m wide and ranging from 1.25 m to 10 m thick. Lead, zinc, and silver grades are often high, especially in the more massive sections. A significant portion of the Guadalupe Area has been mined out.
- The Guadalupe South Area is located east of Manto 6, ranging from 110 m to 180 m below surface. Similar to Guadalupe, Guadalupe South is elongated along the PSZ. It measures 230 m long, 10 m to 70 m wide, and varies in thickness from 1.6 m to 10.0 m.
- The Rodilla Manto was discovered in late 2007, following the acquisition of additional surface rights immediately north of the mine. The Rodilla massive sulphide (and



sulphide breccia) drill hole intercepts range from 1.0 m to 14 m thickness and consist largely of massive sphalerite with subordinate galena and 10% to 20% barite gangue.

- The NE1 Manto mineralization was discovered in 2005 with three holes that intersected sandy, fine-grained sulphides at 220 m depth. The actual manto was drilled in 2008 when following up on a high-resistivity Natural Source Audio-Frequency Magnetotelluric (NSAMT) anomaly located 120 m northwest from the 2005 holes. The current geometry of the manto is approximately 100 m long by 80 m wide and divided into a shallower (west) part averaging 210 m in depth and a deeper (east) part averaging 310 m in depth. The 100 m displacement is related to a major northwest-trending structure identified in several holes in the area. The thickness of the manto varies from one metre to nine metres with grades somewhat lower than those of the Guadalupe Manto.
- The 623 Manto was discovered in July 2009 during drill testing of a gravity anomaly located 200 m south of the NE1 Manto. It varies in depth from 125 m in the south-southwest near the Guadalupe South Manto to 240 m in the north-northeast, more or less at the same depth as the western portion of the NE1 Manto. As currently defined, the manto is an irregularly shaped north-northeast—south-southwest trending body 200 m long by 45 m wide in the northern portion and 120 m wide in the southern portion. It has a clear northeast-southwest structural control. The estimated true thickness varies from 1.4 m to 7.1 m. Grades are similar to the Guadalupe South Manto.
- The Pierna Manto, located between the Rodilla Manto to the southwest and the NE1 Manto, was discovered during exploration drilling in late 2010. It measures approximately 100 m by 50 m and contains some of the highest zinc grades at Platosa.

#### SULPHIDE-RICH BRECCIAS

Underground development has encountered several areas of lower grade, sulphide-rich breccias beneath and around many of the main sulphide bodies. These breccias are composed of coarse sulphide and wall rock fragments up to one metre in diameter, with interstices filled with loose to partially consolidated fine to coarse sulphide and dolomite sand. In many places, the infill shows the fine laminar bedding characteristic of cavern-fill sediments. These lower-grade zones may have formed through late intra-mineral to post-mineral dissolution of carbonate rocks around and below the mantos, with concurrent collapse of manto fragments and wall rocks into the voids, followed by later "washing" of finer-grained particles into the breccia voids by groundwater flow. Notably, the sand-sized fraction tends to be dominated by galena and/or acanthite and commonly yields high silver grades. In many places, these breccias are cross-cut and cemented by later gypsum deposition. Core recovery is often poor in the unconsolidated, sandier portions of these breccias.



#### MINERALIZATION PROXIMAL TO INTRUSIVE SYSTEMS

A wide range of thermally metamorphosed rocks are found throughout the property. These include hornfels, skarnoid, and marble recrystallization of the carbonate host rocks. The heat source for the metamorphism is thought to be a polyphase intrusive body that may extend for several kilometres beneath the southwest flank of the Sierra Bermejillo. The extent of the body is revealed by regional aeromagnetic surveys flown by the Mexican Geological Survey and Excellon. Monzonite, granodiorite, granite, quartz-eye porphyry, and andesite porphyry have been found in isolated outcrops and drill holes throughout this area. Deeper holes drilled in this area have encountered copper-molybdenum-bearing veinlets and metasomatic skarn zones cutting the hornfels. Megaw (2002) postulated that these metamorphic and metasomatic fluids related to the deeper-seated portions of this intrusion were dammed below the relatively impermeable Lower Hornfels Formation and were only locally able to ascend into the upper carbonate units along faults and fractures.

In August 2007, hole EX07ST-50, drilled in the Saltillera area, intersected 85 m (estimated true thickness) of variably sulphide-mineralized proximal or near-source hornfels and skarns developed around two swarms of fine-grained felsite dykes. Galena, sphalerite, and chalcopyrite were locally visible in the core, with the most strongly mineralized section grading 129 g/t Ag, 2.12% Pb, and 0.92% Zn over 1.1 m. The intercept was the first significant mineralization found in a series of holes designed to test specific zones around a magnetic anomaly revealed in the 2007 airborne electromagnetic (AEM) survey.

In November 2007, hole EX07-LP422, drilled approximately 250 m northwest of the Guadalupe Manto, intersected marble and felsic intrusive rocks starting at a depth of 500 m. This was the first time intrusive rocks had been intersected in drilling on the eastern portion of the property. In the spring of 2010, hole EX10-LP763 drilled in the Rincon del Caido (Rincon) (Figure 7-2) area one kilometre northwest of the northwest corner of the Guadalupe Manto intersected anomalous gold, silver, copper, bismuth, and antimony over 3.3 m in a much wider marble unit, a portion of which was skarnified. A felsic intrusive was intersected at the bottom of the hole. One hole was drilled 200 m to the east in 2011 and intersected no significant mineralization. In early 2012, drilling was again undertaken at Rincon, this time 400 m east of hole EX10-LP763. In a series of holes starting with EX12-LP986, skarn-style sulphide mineralization was intersected between 500 m and 600 m vertical at and immediately below a hornfels-marble contact 200 m to 300 m above an underlying felsic intrusive body, which itself is altered and carries a small amount of disseminated pyrite but



no significant economic sulphides. All the Rincon drill holes bottomed in the intrusive, which may in fact be a sill and part of a larger intrusive complex responsible for the hydrothermal fluids carrying the sulphides found above.

Between March 2012 and April 2013, thirteen holes intersected significant sulphides at Rincon. In addition to silver, lead and zinc, the all intersections carried anomalous gold. Anomalous bismuth and copper values were occasionally encountered within these intersections. Hole EX12-LP1019 had the thickest intersection and encountered 55.46 m at average grades of 132 g/t Ag, 3.13% Pb, 1.74% Zn, and 0.075 g/t Au. Hole EX12-LP1038 had the most significant gold assays returning 13.07 g/t Au, 21.1 g/t Ag, 0.74% Pb, and 3.57% Zn over 7.25 m. These intersections are reported as core widths. Mineralization banding lies at highly variable angles to core axes in all the Rincon holes (as is typical of skarn-related sulphide mineralization) and there are currently insufficient intercepts to estimate the geometry of the mineralization. Additional drilling and 3D modelling are required to estimate true thicknesses. The marble-hosted, intrusive-related skarn-style sulphide mineralization, the presence of aplitic dykes within the marble, the persistent anomalous gold, and the occasional presence of anomalous bismuth and copper suggest that the Rincon prospect could lie on the periphery of a large-tonnage, intrusive-related proximal CRD similar to those found elsewhere in Mexico. A study to determine whether vectors can be found within the existing dataset to suggest the optimal drilling pattern for discovery of additional mineralization has recently been completed and the results are being studied.

#### REFUGIO AND DIOS DA BONDAD PROSPECTS

The Refugio prospect is located 1.4 km southwest from the Platosa Mine on the western flank of the Sierra de Bermejillo (Figure 7-2). Like other areas in and around Platosa, there are several small-scale mine workings present. In the area of mineralized outcrops, there are irregular silica breccias and jasperoid outcrops whose attitude is poorly defined. The silica breccias cut younger beds of the Cuesta del Cura Formation. There has been no evidence found yet that the silica is controlled by a significant structure. There have been several historic and recent samples with gold values up to 7.79 g/t in the silica outcrop area. Lead, zinc, and silver values have been reported in both the jasperoids and silica breccia boulders. Several holes were drilled in the Refugio area in 2002, 2005, and 2010, with no significant results or correlation with the values found in surface samples. In mid-2011, one deep hole tested a Z Axis Tipper Electromagnetic (ZTEM) conductivity anomaly on the west



part of the Refugio area, but no alteration, mineralization, or significant structures were found to explain the ZTEM response.

The Dios da Bondad prospect is located 2.2 km south-southwest of the mine (Figure 7-2). It lies stratigraphically beneath the upper part of the Cuesta del Cura Formation and is overlain by Indidura Formation shales and hornfels units. Historic small-scale mine workings are found in the area and in 2000 a surface sampling program was carried out by Minera de Cordilleras (Apex subsidiary) geologists. They found anomalous silver, lead, and zinc values in historic surface workings and dumps. In 2005, Excellon drilled two holes beneath the old workings. The stratigraphic sequence encountered correlated well with the Platosa upper limestone package including the heterolithic limestone at depth, but no mineralization or significant alteration was found. In mid-2011, one deep hole tested a ZTEM conductivity anomaly at Dios da Bondad, but no alteration, mineralization, or significant structures were intersected to explain the ZTEM response. Nonetheless, well-defined southwest-northeast trending structures and the presence of structurally controlled manganese and silica mineralization are continuing demonstrations of the area's exploration potential.

#### SALTILLERA AND LA ZORRA PROSPECTS

The Saltillera prospect is located within the Altiplano area, on the western flank of the Sierra Bermejillo, four to five kilometres west of the Platosa Mine. The prospect includes the historic workings of the Saltillera Mine. The area is underlain by the typical Sierra Bermejillo sequence: fragmental limestone, micritic limestone, dolomitic limestone, and cherty mudstone capped by hornfels. The sequence is intruded by dykes and sills of variable composition to produce several zones of weakly mineralized to barren skarn. The mineralization at the historic Saltillera Mine is dominantly northwest trending epithermal veins hosting silver, lead, and gold.

Drilling was carried out in the area by Excellon between late 2006 and late 2008. In August 2007, hole EX07ST-50 intersected 85 m (estimated true thickness) of variably sulphide-mineralized proximal or near-source hornfels and skarn developed around two swarms of fine-grained felsite dykes. Galena, sphalerite, and chalcopyrite were locally visible in the core with the most strongly mineralized section grading 129 g/t Ag, 2.12% Pb, and 0.92% Zn over 1.1 m. The intercept was the first significant mineralization to be found in a series of holes designed to test specific zones around a large and complex magnetic anomaly revealed in the AEM survey flown in early 2007. Previous drill holes in the program had



progressively outlined what has emerged as an extensive multi-phase intrusive system with numerous dyke offshoots. This progression led to hole EX07ST-50. Overall, the intrusive system shows numerous features similar to those associated with large lead-zinc-silver-copper-gold carbonate replacement deposits of Mexico. Drilling resumed in the area in October 2009, focusing on the la Zorra area, also the site of historic small-scale mining, some four to five kilometres southeast of Saltillera.

In 2010, drilling was carried out at both Saltillera and la Zorra, concentrating on Induced Polarization (IP), magnetic, and geological targets. In mid-2011, one deep hole tested a ZTEM conductivity anomaly at Saltillera but no alteration, mineralization, or significant structures were found to explain the ZTEM response.

#### RARE EARTH ELEMENT MINERALIZATION

In September 2011, Excellon announced the discovery of rhyolite breccia-hosted anomalous Rare Earth Element (REE) values in four historic drill holes, drilled during the course of the Apex Joint Venture and located at the Cañón Colorado area, six kilometres northwest of the Platosa Mine. Values of Total Rare Earth Element Oxides (TREEO), the manner in which REE content is normally reported, range from 1,308 ppm (0.131%) TREEO over a 36.25 m core width in hole EX06-JVN03 to 2,136 ppm (0.214%) TREEO over a 281.25 m core width in hole EX06-JVN04. The TREEO amounts consist of cerium, dysprosium, lanthanum, neodymium, praseodymium, samarium, and yttrium oxides. Not enough is known about the occurrence to estimate true widths.

Between October 2011 and February 2012, renewed exploration was undertaken in the Cañón Colorado area. Mapping, prospecting, and rock sampling were carried out over selected portions of a 4.8 km by 0.7 km area in the search for additional rhyolite breccia and associated REE mineralization. A dozen samples were found with anomalous REE values, generally in small areas of altered felsic volcanics within the far larger carbonate package. While interesting, these "showings" were not considered to warrant follow-up. Concurrently a five-hole, 2,325 m drilling program tested NSAMT and ZTEM anomalies similar in nature to anomalies found associated with the known rhyolite breccia. Neither rhyolite nor REE mineralization was intersected in the holes.



## **8 DEPOSIT TYPES**

The principal mineral deposits in the Platosa area are high-temperature epigenetic silverlead-zinc carbonate replacement deposits (CRD). The distal portions of these deposits are characterized by irregularly shaped pods, lenses, and roughly tabular or tubular masses of sulphide mineralization that can either cross-cut or run sub-parallel to the host stratigraphy. The near-vertical bodies are called chimneys, while the more horizontal and elongate masses are called mantos. Mantos and chimneys can extend for thousands of metres from the source of the mineralizing fluids and often follow tortuous paths through the host rocks. The distal massive sulphide bodies commonly grade progressively into mineralized metasomatic skarn deposits as source intrusions are approached. These intrusives are the ultimate source of CRD-type mineralization. This proximal mineralization includes skarns developed along fractures, along dyke and sill contacts, and as large irregular lenses on stock contacts. Locally, mineralized veins cut both the skarns and host intrusions. Metamorphic alteration (marbleization-recrystallization, hornfels, and skarnoid) commonly occurs peripheral to the skarn zone. All aspects of CRD and skarn mineralization are locally and regionally structurally controlled. Important structural controls include faults, fractures, contacts, fold axes, and collapse (paleokarst) zones. Secondarily enhanced host rock permeability (i.e., fractures, breccias, solution cavities, dolomitization) is also an important controlling factor for mineralization (Megaw et al., 1988).

Elsewhere in the Mexican CRD belt, deposits of up to 80 million tonnes have been discovered and exploited. Although the grades of such deposits are typically considerably less than those of the high-grade Platosa mantos, economies-of-scale mining and processing options have made them economically important and attractive exploration targets.



## 9 EXPLORATION

Exploration work on the Platosa Property has included geological mapping, rock and soil geochemical sampling, biogeochemical sampling, soil gas mercury and hydrocarbon surveys, ground and airborne geophysical surveys, fluid inclusion and sulphur isotope studies, and diamond drilling with detailed core logging. Work has been concentrated on the main Platosa deposit area, and regionally at Cañón Colorado, Crestoncitos, Saltillera, Socorro, Cerro Blanco, la Zorra, Refugio, Dios da Bondad, and Rincon del Caido (Figures 7-2 and 10-1). Most of the work has been compiled into a digital database. Ross et al. (2007) summarize all the surface exploration work carried out by Excellon on the Platosa Property to that time. The discussion below is limited to the main methods used for drill hole targeting.

Most exploration work prior to early 2007 was carried out on behalf of Excellon by Cascabel geologists. In early 2007, Excellon began building its own exploration group, while still relying on Cascabel expertise in program planning, analysis of results, and planning of subsequent programs. In late July and early August 2013, during the most recent RPA site visit, the exploration team was engaged in relogging of certain drill holes, data compilation and interpretation, and planning for future drilling programs. The 2013 Platosa diamond drilling program was suspended in mid-May. Excellon expects to restart the program during 2014.

#### GEOLOGICAL MAPPING

Geological mapping has been done at a variety of scales in several areas of the property. Reconnaissance-scale mapping at 1:50,000 over most of the project area was done in 1998 and updated in 2006. More detailed reconnaissance mapping at 1:10,000 scale was completed in 1998 over the corridor from la Zorra to the historic Platosa Mine. In 2000 and 2006, 1:10,000 scale mapping was done over the PSZ as far north as Cañón Colorado. Detailed geological mapping at a scale of 1:5,000 has been carried out over several prospective areas including la Zorra, Saltillera-Socorro, and Platosa. This includes a small program in a 5.2 km by 0.7 km area along the east flank of the Sierra Bermejillo starting behind the main mine office and heading to the northwest from there. This was done in the winter of 2009. In late 2010 and early 2011, targeted mapping, prospecting, and rock sampling were carried out in the Saltillera, la Zorra, and Refugio-Rincon del Caido areas



(Figure 7-2). In late 2011 and early 2012, targeted mapping, prospecting, and rock sampling were carried out in the Cañón Colorado area (Figure 7-2) as discussed briefly in Section 7 of this report.

#### SOIL GAS MERCURY SURVEY

Apex carried out an orientation soil gas mercury survey over the same grid subsequently used by Excellon for a soil gas hydrocarbon survey. Mercury was found to occur in the sulphides intersected in hole LP-05. Consequently, in 1999 the Apex Joint Venture initiated a soil gas mercury geochemistry survey over Platosa to determine if it was capable of detecting blind sulphide bodies at shallow depth. An orientation survey consisting of 100 samples was undertaken along two mutually orthogonal northeast-southwest and northwest-southeast lines that crossed at the collar of LP-05. Sample spacing was five metres over known sulphide bodies and 10 m elsewhere. Soil samples were analyzed by Mineral Exploration Geochemistry (MEG) in Carson City, Nevada. Mercury vapour was extracted from the samples using a low-temperature, low-pressure desorption technique developed by MEG.

Anomalous values were obtained locally over the sulphide bodies, as well as in a number of other locations. The results were sufficiently encouraging to warrant an extended program comprising 800 samples taken over a grid with 10 m by 10 m spacing.

The grid-based survey yielded anomalous values at several localities and holes LP-23, -27, -28, and -29 were drilled to test some of these anomalies. The Manto 6 sulphide body was discovered in hole LP-23. The other three holes did not encounter significant sulphide mineralization.

Drilling of the Guadalupe Manto in 2005 and 2006 resulted in the recognition that the Guadalupe Manto coincided closely with the strongest soil gas mercury anomaly documented in the survey. Re-evaluation of the soil gas data revealed at least six anomalies. None of the five holes drilled in 2006 intersected mineralization.



#### SOIL GAS HYDROCARBON SAMPLING

In 2001, Excellon collected soil gas hydrocarbon samples over the same grid as that previously used by Apex in the soil gas mercury survey. Soil gas hydrocarbon anomalies were found in proximity to both known sulphide bodies and mercury anomalies, however, the results were difficult to interpret since low values were also returned over known mineralization and soil gas hydrocarbon anomalies were obtained in areas with no mercury anomaly or sulphide bodies.

Holes EX-28, -29, -32, -34, and -37 were drilled to test soil gas hydrocarbon anomalies with coincident mercury anomalies. No significant sulphide mineralization was intersected and no further work has been done with soil gas hydrocarbons.

#### MOBILE METAL ION SURVEY

In 2006, Carl A. Kuehn of IMDEX carried out an orientation Mobile Metal Ion (MMI) survey over the immediate deposit area and an area extending approximately two kilometres to the north and one kilometre to the south. Approximately 800 samples were taken and analyzed at the SGS Mineral Services laboratory in Toronto, Ontario. There were obvious concerns that surface disturbance since the commencement of test-mining at Platosa might influence results, however, the possibility of finding another useful exploration technique for the largely covered property outweighed these concerns.

Samples consistently anomalous in silver, lead, and zinc were found above the known mantos and to the limit of the study grid northeast of the Guadalupe Manto. In early 2007, several holes tested the southeastern end of this area, but no positive results were encountered, however, subsequent work in this area suggests that these holes were not drilled deep enough.

#### BIOGEOCHEMISTRY

K.A. Lovstrom, late Consulting Geochemist from Tucson, Arizona, conducted a reconnaissance biogeochemical survey in 2004 with the main objective to identify blind mineralization. Forty-three mesquite samples and four creosote samples were collected along the pediment north and south of the Platosa mantos. Five anomalies were identified



with elevated silver and/or lead and/or zinc values. These anomalies coincided closely with known mineralization, so the survey was expanded to over 250 samples to cover a northwest-southeast elongate area approximately one kilometre wide and three kilometres long. Results for the combined surveys show several prominent spot anomalies and a northwest-elongate anomaly over 1,000 m long. This anomaly parallels a prominent anomaly seen in all five of the NSAMT lines that cross it. The coincident linear biogeochemical and NSAMT anomaly was tested with hole 132, which discovered the Guadalupe Manto, and this work subsequently led to the discovery of the Guadalupe South Manto. The combined anomaly trend continues over 800 m farther to the north and in 2007 several holes were drilled in the general area, however, no significant sulphides were intersected.

#### **GEOPHYSICAL SURVEYS**

Apex carried out small-scale IP and CSAMT surveys at Platosa in 1999. Excellon conducted a combined orientation ground magnetometer and gravity survey over Platosa in 2001. In 2004 and 2005, Excellon carried out NSAMT surveys and in 2012 carried out both CSAMT and NSAMT surveys. The purpose of these surveys was to evaluate the effectiveness of the various techniques in detecting sulphide bodies, geologic contacts, structures, and intrusive bodies in the area. IP is particularly effective in detecting bodies of disseminated sulphide mineralization, especially pyrite, and in defining zones of low or high resistivity. CSAMT and NSAMT are used for detecting conductive bodies or structures, and are useful in searching for massive sulphides and other conductors such as faults. Magnetometer surveys outline bodies containing magnetic minerals, such as pyrrhotite and magnetite, in addition to detecting intrusive bodies and contacts. Magnetometer surveys are especially effective at delineating features where rocks of contrasting magnetic susceptibility are juxtaposed. Gravity surveys can detect bodies of significantly different specific gravity, such as sulphides, in a lower density medium, such as limestone. In February 2007, Excellon carried out an AEM survey over most of the property.

Since 2007, Excellon has employed Mr. Ken Robertson, P.Geo., a consulting geophysicist with Vox Geoscience Ltd., of Delta, British Columbia, to advise on geophysical matters and organize surveys and interpretation of results. Mr. Robertson was employed in this capacity for the 2007 Aeroquest AEM survey, ground geophysical surveys carried out in 2008 and 2010, and the 2010 ZTEM AEM survey. Mr. Robertson has visited the Platosa Mine site to



meet and consult with Excellon geologists several times since 2007, most recently in May 2012. Excellon geologists have also met with Mr. Robertson in Vancouver and Toronto, Canada, as recently as January 2014.

#### INDUCED POLARIZATION

Apex contracted Durango Geophysical Operations of Durango, Colorado, to perform an IP survey, which comprised seven lines totalling 41 line kilometres. The survey was centred on hole LP-05, with one east-west line and six cross-lines oriented north-south and spaced at 75 m. The survey employed a 50 m dipole-dipole array for the east-west line and a 75 m dipole-dipole configuration for the cross-lines. Chargeability and resistivity anomalies were detected, but follow-up was not recommended and Apex chose not to continue the IP surveying.

Excellon reviewed the IP data in late 2007/early 2008 and concluded that the IP survey had been effective, and in early March 2008 engaged Geofisica TMC S.A de C.V., geophysical contractors based in Mazatlan, Mexico, to carry out a line cutting, magnetometer, and IP survey (n:1 to 8 gradient array with pole-dipole follow-up of anomalous areas) over two grids. One grid was centred on the mine area and the other covered a large portion of the corridor linking the Saltillera and la Zorra areas on the western portion of the property. A total of 87.0 line km of gradient and 28.8 line km of pole-dipole surveying were completed. Several resistivity and chargeability anomalies were detected during the course of the survey. IP responses in the Saltillera-la Zorra area were included in the targeting process for four drill holes during 2008 and disseminated pyrite, but no economic sulphides were intersected. Excellon is reviewing the IP results again as part of an ongoing geophysical compilation project.

#### NATURAL AND CONTROLLED SOURCE AUDIO MAGNETOTELLURICS

The NSAMT orientation survey was carried out for Excellon by Zonge Engineering (Zonge) of Tucson, Arizona. NSAMT typically penetrates deeper than CSAMT and does not require a transmitter, which eliminates the need to keep the lines parallel to the transmitter antenna. This gives much greater layout flexibility and allows contouring of topography to minimize or eliminate false anomalies caused by elevation changes. The survey duplicated the CSAMT lines run previously but was expanded to over 40 line-km in several areas within the Sierra Bermejillo–Platosa Mine area (20 km), Dios da Bondad–Refugio area (6 km), la Zorra (4 km),



and Cañón Colorado/Uramex Dome area (10 km). Station spacing was 25 m for the lines in the Platosa Mine area and 50 m for the remaining areas. The equipment used was a Zonge GDP-32 receiver and two Saarloos UO4 ferrite-core magnetic field antennas.

The NSAMT was unsuccessful in detecting the known massive sulphide mineralization but did reveal a number of very high contrast, near-vertical anomalies, several of which correspond with known mineralization. These appear on repeated parallel lines in a northwest-southeast linear array. Several of these are the same anomalies detected by the CSAMT survey, but shown to greater depth and resolution. These were interpreted as reflecting buried structures that acted as mineralization fluid pathways (feeders). One of the strongest of the northwest-trending NSAMT anomalies was drilled in early 2005 (holes 114, 116, and 117) and mineralization was found in all three holes.

Combining the NSAMT linear anomalies with parallel linear biogeochemical anomalies led to the interpretation that the biogeochemical anomalies reflect mineralization emplaced along the parallel structure. This exploration criterion led to the discovery of Guadalupe Manto in hole 132, drilled in December 2005. Drilling along the southeastern extension of the combined anomaly trend led to the discovery of the Guadalupe South Manto in early 2006. The combined anomaly trend continues over 800 m farther to the north of the Guadalupe Manto.

In April and May 2012, Zonge was again engaged to carry out surveying at Platosa. CSAMT surveying was carried out on three lines totalling 3.4 km on the east side of the Sierra Bermejillo. NSAMT surveying was carried out on 14 lines totalling 21.5 km. Five lines were on the east side of the Sierra and nine on the west side. Station spacing was 25 m for all lines. The equipment used was a Zonge GDP-32 receiver and two Saarloos UO4 ferrite-core magnetic field antennas. The surveying did not define any priority targets and no drilling has been carried out based on the survey results.

#### MISE-A-LA-MASSE SURVEY

In the fall of 2012, Geofisica TMC S.A de C.V., a Canadian geophysical contracting company based in Mazatlan, Mexico, was engaged to carry out borehole surveying of two Rincon del Caido drill holes, namely holes EXLP12-1019 and 1023A. A grid totalling 27 line-km consisting of 25 northeast-southwest oriented, 50 m spaced lines centred on the two holes was established.



The survey methodology consists of inserting an electrode into a mineralized area, thus grounding it (mise-à-la-masse in French). The electrical circuit is then completed by positioning a second electrode sufficiently far away from the mineralized zone in such a way that it does not influence the readings. The injection point in the mineralized zone is chosen in such a manner that the maximum current is obtained along the mineralized zone in the borehole, and for each borehole.

A single second electrode was used for the surveys of both holes. For each measurement, the current was alternately injected in each borehole, thus increasing the survey production, by doing both boreholes during the same survey. The potential (Vp) was measured every 25 m at surface along each of the 25 lines, by using an Iris Instruments Elrec Pro receiver. The current was injected by using a Walcer Geophysics Tx-9000 transmitter and a 9.0 kW motor generator.

The mise-à-la-masse surveys carried out in the two holes indicated that the skarn sulphides are probably linked or at least electrically connected. The measured potential suggests a preferential northwest to north-northwest strike, whereas the body is probably more continuous towards the east where a gentle dip is indicated. No drilling has been carried out based on the results of the survey.

#### MAGNETIC SURVEY

In 2001, Excellon contracted Cascabel, in collaboration with geophysicists of the University of Sonora in Hermosillo, Sonora, to carry out an orientation ground magnetometer survey over the la Zorra and Platosa areas. The survey was performed using a Geometrics G816 proton-precession magnetometer over 10 lines ranging in length from 600 m to 7,000 m, at station spacing of 50 m and 100 m. The lines were broadly spaced and run over three geographically disparate target areas: the la Zorra Mine, the Platosa Mine, and the area along the Bermejillo-Mapimi highway. The purpose of the survey was to confirm the presence of a magnetic anomaly discovered in a Mexican Government survey completed in 1997, and to determine if other structures in the Platosa area could be mapped with the magnetometer.

Three lines over the la Zorra Mine returned magnetic lows over the range-bounding fault, and highs over the Upper Hornfels and the limestone-hornfels contact. Four lines at Platosa detected anomalies to the northwest of the Platosa Mine. Drill hole EX-38 intersected



numerous altered dykes in Lower Hornfels through this section, and Megaw (2002) suggested that these dykes could be the source of the anomalies.

Megaw (2002) concluded that the magnetometer survey was successful in detecting intrusive bodies, faults, limestone-hornfels contacts, and other magnetic features, such as magnetite bodies. Additional magnetometer surveying was recommended and a heliborne AEM survey was flown in February 2007.

An additional 93.5 km of ground magnetic surveying was carried out during 2008 in conjunction with the IP surveying discussed above. The results have been useful in the drill hole targeting process.

#### **GRAVITY SURVEY**

In 2001, Excellon contracted Cascabel, in collaboration with geophysicists of the University of Sonora, to carry out an orientation gravimeter survey over known mineralization at the Platosa Mine. The survey was performed along two intersecting lines centred on drill hole LP-05. No significant anomalies were developed over the known massive sulphide mineralization and the exploration technique was temporarily abandoned.

During 2008, Excellon reviewed the 2001 gravity data and determined that additional work was merited. MWH GeoSurveys Inc. of Reno, Nevada, carried out 14 days of surveying (855) unique stations) using LaCoste-Romberg Model G gravimeter (with Aloid upgrade) and Magellan ProMark 500 GPS receivers for geodetic positioning (to ± 2 cm). The surveying broadly followed the grid lines established for the IP surveys in the mine (241 stations) and Saltillera-la Zorra (614 stations) areas. In the vicinity of the mine area, grid readings were taken on several of the historic roads and trails northwest of the grid in order to extend coverage. Inversions, using UBC software, were carried out by SJV Geophysics of Delta, British Columbia, under the supervision of Ken Robertson (VOX Geoscience Ltd.). A second, more detailed interpretation was carried out in the spring of 2009 by Paterson, Grant & Watson Limited, a Toronto-based consulting group, also under the supervision of Mr. Robertson. Several anomalies were outlined in the mine area and one of these, located over the eastern portion of the mantos, was drilled by hole EX09-LP623 in July 2009. This hole intersected 3.20 m of high-grade silver, lead, and zinc massive sulphides and, while it is not clear whether the sulphides were responsible or partially responsible for the anomaly, the results suggested that additional gravity surveying was warranted.



In 2010, Excellon engaged Magee Geophysical Services LLC of Reno, Nevada, to carry out additional gravity surveying, including covering the 5.5 km by 1.0 km to 2.0 km northwest-oriented 3D IP grid centred on the Platosa Mine area (discussed below). The 2010 results have been incorporated into the Platosa database but no drill holes have been spotted based on the gravity results.

#### BOREHOLE PULSE ELECTROMAGNETIC SURVEY

In 2008, Excellon engaged Geofisica TMC S.A de C.V. to carry out downhole surveys in two holes within the immediate mine area. The surveys were executed with the Crone Geophysics Pulse-Electromagnetic (PEM) system using a 16.66 ms time-base, a 1,500 µs ramp-time, and 20 sampling windows (channels). No definite response, which could indicate the presence of a large moderate to strong in-hole conductor or a conductor within a radius of 100 m to 150 m around the holes, was detected. Given the lack of significant pyrite or pyrrhotite in the manto massive sulphides, this result was not surprising.

#### AEROQUEST AIRBORNE ELECTROMAGNETIC SURVEY

In February 2007, Aeroquest International Limited of Milton, Ontario, carried out a 1,530 line-km heliborne AeroTEM II survey over almost all of the original Platosa Property. Flight line orientation was approximately northeast-southwest. Flight line spacing on the southern two-thirds of the 10 km by 16 km survey block was 100 m and for the northern third, 200 m. Tie lines were flown every 1,000 m orthogonal to the flight lines. The nominal electromagnetic (EM) bird height was 50 m.

Because of difficulties incurred during data processing, it was not possible to carry out significant interpretation until late 2007, however, a strong northwest-elongate magnetic high along the southwest flank of the Sierra Bermejillo was immediately evident. The high lies beneath the Saltillera and la Zorra areas (four to five kilometres west of the Platosa manto deposits) where widespread marble, hornfels, silicification, skarn, and local high-grade mineralization occur. Drilling in the Saltillera-la Zorra area after mid-2007 was guided in part by the magnetic survey results.

Further interpretation of the magnetic and EM data has been undertaken for Excellon by Vox Geoscience Ltd., and has highlighted important structures in the immediate mine area. Drill targeting in this area also incorporates the magnetic results.



Weak EM anomalies were also outlined in several areas by the survey. Several holes were drilled to test certain of these targets southeast of the mantos in 2007, however, no sulphide mineralization was intersected. Some of the anomalies are likely related to water-saturated alluvium and/or to sharp drop-offs in overburden thickness in the broad valleys both east and west of the Sierra Bermejillo.

Interpretation of both the magnetic and EM data and incorporation of findings into Excellon's targeting methodology remains an ongoing process.

#### GEOTECH ZTEM AIRBORNE ELECTROMAGNETIC SURVEY

In October 2010, Excellon contracted Geotech Ltd. of Aurora, Ontario, to collect 2,786 line km of ZTEM and magnetic airborne geophysical surveying over a large portion of the original Platosa Property, almost all of the 17,000 ha Excelmex VII concession acquired in April 2010 and located immediately south of the original Platosa concessions, and a portion of the Pluton Property. The survey outlined several previously undetected and untested structural zones or systems of interest and various conductive and resistive features. Line spacing was a nominal 150 m and line direction was approximately northeast-southwest. Six diamond drill holes tested ZTEM targets on various portions of the property between March and July 2011. No significant sulphides or assay results were encountered. Two other holes were abandoned for technical reasons. Interpretation of the results incorporating the 2011 drilling results is an ongoing process.

#### THREE DIMENSIONAL INDUCED POLARIZATION SURVEY

In 2010, Excellon engaged SJ Geophysics Ltd. of Delta, British Columbia, Canada to carry out a 3D IP survey over a 5.5 km by 1.0 km to 2.0 km grid roughly centred on the Platosa Mine. Survey lines were 100 m apart, oriented approximately northeast-southwest, and ranged from one to two kilometres in length. The interpretation indicates correlation between a particular level of chargeability and portions of the known manto massive sulphides. A series of diamond drill holes tested several of the targets and determined that the chargeability was caused by pyritized hornfels and black limestone. Additional data review is planned.



#### **WORK ON OTHER PLATOSA AREA PROPERTIES**

Between October 2010 and February 2012, Excellon held an option to earn up to a 75% interest in the Pluton Property located near the town of Mapimi and contiguous with the western boundary of Excellon's Venux concession. The agreement was with Sundance Minerals Limited (Sundance), a private Canadian junior exploration company. During the term of the option, a nine-hole drilling program testing soil geochemical, geophysical, and geological targets was carried out under the direction of Sundance. Results failed to meet Excellon's expectations and the option was terminated in February 2012. Excellon retained no interest in the property.



## 10 DRILLING

To December 31, 2013, a total of 336,127.58 m in 1,307 diamond drill holes had been completed at Platosa. Apex drilled 33 holes, totalling 4,660.05 m, and Excellon has drilled 331,467.53 m in 1,274 holes. A plan showing the areas where drilling has been focused is provided in Figure 10-1. The holes have all been collared with HQ equipment, which produces 63.5 mm diameter core. In cavities or bad ground, the drillers reduced to NQ, which produces 47.6 mm diameter core.

Table 10-1 provides the details of both Apex and Excellon drilling by year and areas of the property as they were known until the transaction referred to in Section 4 of this report whereby Excellon purchased the interest of Golden (successor to Apex) in the Apex Joint Venture property.

Excellon drilling has been carried out by Britton Brothers Drilling S.A. de C.V. of Hermosillo, Sonora (2001-2002), and Major Drilling de Mexico, S.A. de C.V. of Hermosillo, Mexico, a subsidiary of Major Drilling Group International Inc. of Moncton, New Brunswick (2002 to date). When drilling is active, it is carried out using a variety of drills, 24 hours a day, seven days a week. No drills were operating during the RPA site visit in 2013.

In April 2006, February 2007, November 2009, and September 2011, RPA was able to observe the drilling in progress at the Platosa site and noted that the work was being carried out in a competent fashion, using modern equipment that appeared to be in good repair and appropriate for the job.

Collar surveys were made by an Excellon surveyor using a transit. Prior to 2004, downhole orientation surveys were done with a single shot Sperry Sun instrument. Between 2004 and early 2007, detailed downhole orientation survey data were collected by Cascabel personnel for most holes using an Icefield Tools Corporation MI3 survey instrument. This task was assumed by Excellon personnel in early 2007 and is now carried out using a company-owned Icefield MI5 instrument with the MI3 serving as a spare. Measurements are generally collected every six drill rods or 18 m.



## TABLE 10-1 SUMMARY OF DRILLING Excellon Resources Inc. – Platosa Property

Company, Property and Area		Year	No. of Holes	Metres
Apex Silver Mines Limited				
Excellon 100%		1999	21	2,598.35
		2000	6	1,054.40
Subtotal Excellon 100%			27	3,652.75
Apex JV		1999/2000	0	0
Altiplano				
Saltillera		1999	6	1,007.30
Subtotal drilled by Apex			33	4,660.05
Excellon				
Excellon 100% (At one time subject	t to Golden Minerals Royalty)	2001	12	2,350.54
		2002	27	3,898.16
		2004	45	6,495.70
		2005	20	3,349.23
		2006	195	33,794.21
		2007	110	23,774.26
		2008	183	43,082.30
		2009	90	23,306.71
		2010	181	47,256.75
		2011	98	25,207.62
	Mantos	2012	30	7,023.48
	Source	2012	29	19,970.63
	Mantos	2013	31	6,448.29
	Source	2013	14	10,291.79
	Mantos/Source	2013	7	5,801.86
Mine grouting holes drilled from su	rface	2008/2013	60	8,024.32
Subtotal Excellon 100%			1,132	270,075.85
Apex JV (Property now combined with	n Excellon 100%)			
	General Platosa Mine area	2007	3	972.62
	Cañón Colorado	2006	7	2,269.43
	Crestoncitos	2006	5	3,086.40
	Refugio	2007	3	1,956.30
	Saltillera	2007	4	2,524.92
Subtotal Historic Apex JV area			22	10,809.67



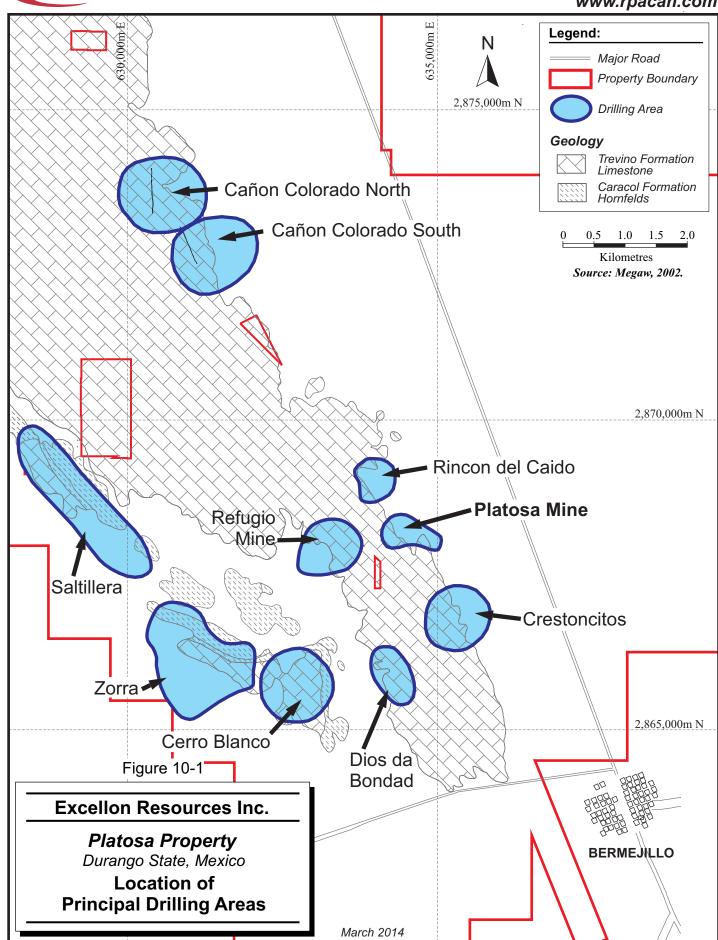
ompany, Property and Ar	ea	Year	No. of Holes	Metres
Itiplano (Property subject to a scovery & production)	Royalty in the eventuality of			
	General Platosa Mine area	2007	4	1,078.6
	Saltillera	2002	4	809.
		2003/2004	0	
		2005	6	2,422.0
		2006	0	
		2007	25	11,505.5
		2008	19	9,102.4
	San Gilberto	2006	2	604.7
	Cerro Blanco	2007	3	1,763.0
	Zorra	2006	13	3,837.9
		2007	5	1,861.8
		2009	5	2,469.5
		2010	16	5,666.0
	Dios da Bondad	2007	1	593.6
	Refugio	2010	4	1,267.3
Subtotal Altiplano			107	42,982.7
Subtotal ZTEM Anomalies	S	2011	8	5,274.2
Subtotal REE		2011/2012	5	2,325.0
Subtotal drilled by Excelle	on (last hole included is LP1086)		1,274	331,467.5
rand Total to December 31, 2	2013		1,307	336,127.5

Since mid-2004, upon completion, holes have been cemented to approximately 10 m above the water table, to prevent inflow into current or future mine workings, and collars have been cemented to approximately a three-metre depth.

RPA notes that core recovery is quite variable, especially in the mineralized zones, and there is a wide range of competence of the rock mass. Core recovery has improved substantially over the history of the project due to the site-specific experience gained by the operating personnel. In some of the earlier holes, recoveries varied from 100% to as low as 15%, but are usually in the range of 90% to 100% in the more recent drilling.

A selection of representative intercepts is listed in Appendix 2, Table 31-1. RPA notes that the sulphide mineralization intersected to date has not been completely closed off by drilling. RPA further notes that the potential for finding additional manto and chimney bodies is very good, and that further exploration at Platosa will likely lead to new discoveries.







# 11 SAMPLE PREPARATION, ANALYSES AND SECURITY

#### SAMPLING METHOD AND APPROACH

Core is moved from the drill site to a covered core handling facility located north of the mine. An Excellon geologist logs the core and marks sample intervals. All drill core is then photographed. The geologist selects sample intervals to reflect lithologic, structural, or mineralization boundaries. Sample identifiers are marked directly on the core and core box. Sample lengths are limited to a maximum of 1.5 m in mineralized sections and 3.0 m in wall rocks. Field assistants split the weakly mineralized core with a standard blade-type core splitter. Intersections with significant sulphides are split with a diamond saw. The diamond saw is cooled and cleaned with a continuous flow of fresh water. Unconsolidated material is split with a spatula. The half-core samples are collected in plastic bags for shipment to the laboratory. The remaining half is retained and stored at the Platosa site warehouse for future reference. Standards and blanks are inserted into each sample batch.

Groups of up to thirty or forty samples are placed in sealed bags for shipping. A list of samples in each sealed bag is submitted to the laboratory along with the sample list in each bag. The samples are ground transported to Durango by Excellon personnel.

No other sample preparation is carried out by Excellon personnel. RPA observes that the sampling protocols in use by Excellon personnel comply with standard industry practice and are appropriate for the deposit type.

Sampling procedures employed by Apex were not recorded, but it is evident from the remaining core and from the logs that their procedures were similar to Excellon's.

### SAMPLE PREPARATION AND ANALYSIS

Prior to April 2005, samples were shipped by bus to ALS Chemex Laboratories in Chihuahua, Mexico. Sample preparation involved drying, crushing, splitting, and pulverization. Splits of the pulverized and homogenized sample material were sent to ALS Chemex in Vancouver, Canada, for analysis. All samples were subjected to 36-element



Inductively Coupled Plasma (ICP) analyses, and Atomic Absorption (AA) for silver and over-limit lead, zinc, and copper. Pulps from high silver-lead-zinc samples were sent to Acme Analytical Labs (Acme), also in Vancouver, for duplicate analysis.

Excellon reports that Apex used Barringer Laboratories for their assays, with some duplicate analysis done at American Assay Laboratories. At that time, Apex discerned that a problem in reproducibility existed between the two laboratories. This was resolved by increasing the degree of homogenization applied to the samples to account for coarse sulphides.

Between April 2005 and June 2008, all samples were sent to SGS Mineral Services (SGS) in Durango for preparation and analysis for silver, gold, lead, zinc, and copper. A portion of the pulps was then sent to the SGS laboratory in Toronto, Ontario, for multi-element ICP analysis. The Durango laboratory was upgraded in the summer of 2008 and since then all Excellon assaying has been carried out in Durango. In the fall of 2009, the Durango laboratory received accreditation to ISO/IEC 17025. SGS is a reputable international laboratory that provides analytical services to the mining and mineral exploration industry worldwide.

Upon reception at SGS Durango, samples are sorted and checked against the sample submission form before entering the preparation laboratory. Samples are dried at 95°C for at least two hours, crushed to 90% passing 2 mm, split to 250 g, and pulverized to 90% passing 75  $\mu$ m (200 mesh). The final pulp is submitted for analysis. A barren wash is used between samples.

A 0.20 g sample is subjected to a four-acid digestion and subsequently analyzed by Inductively Coupled Plasma–Atomic Emission Spectrometry (ICP-AES) (SGS procedure code ICP 40B), for 32 elements, including silver, lead, and zinc. Samples with greater than 10,000 ppm lead or zinc are analyzed by ICP-AES (SGS procedure code ICP 90Q). Almost all analytical results used to estimate the resources were analyzed by ICP90Q. A 0.20 g sample is prepared and added to a sodium peroxide flux prior to being fused in a furnace at 550°C. The resulting melt is cooled and then dissolved in 100 mL of an acid matrix solution. This solution is then analyzed by ICP-AES.

Silver and gold are analyzed by fire assay with an AA finish for gold and a gravimetric finish for silver (SGS procedure code FAG323). A 30 g prepared sample is fused with a mixture of



lead oxide, sodium carbonate, and borax silica and then cupelled to yield a precious metal bead. Beads are weighed by microbalance. The silver in the bead is precipitated by acid forming silver chloride, and the gold is kept in solution for an AAS determination. The silver is then calculated by difference (Au+Ag concentration in bead minus Au concentration).

Before July 2011, SGS's internal Quality Assurance/Quality Control (QA/QC) protocol included a preparation duplicate every 50 samples and pulp duplicates every 12 samples. The laboratory also submitted method blanks, as well as a preparation blank at least once for each work order batch and inserted reference material every 25 samples. The protocol was modified in July 2011 to include QA/QC materials (preparation blanks, method blanks, duplicates, replicates, reference materials) to make up a total of 14% of Excellon's samples. For each laboratory batch, a QC report is produced and submitted on request to Excellon's QA/QC manager for review.

#### DATA MANAGEMENT

Core logging data are entered into Panasonic Toughbook laptops equipped with DHLogger software. The logs record core recovery, Rock Quality Designation (RQD), sample intervals, and descriptive notes on porosity, colour, grain size, sedimentary structures, alteration, and lithology. These data are entered into a customized DHLogger database, which is used along with Downhole Explorer and other Datamine/Century Systems (now CAE Mining) software. Microsoft Excel is used as an intermediate step for some database tables. This is a potential source of database version control errors and should be avoided.

Assay results are received from SGS by email and imported into Excel to parse the QA/QC data and check for analytical failures. If the data are deemed to be acceptable, these data are imported into an official assay table, also in Excel software.

RPA notes that analytical results below the detection limit (BLD) of the analytical method have been treated differently over the years. Depending on the drilling campaign, these values have been entered into the assay table as either zero grade, half the detection limit, or at the full detection limit. RPA recommends that all BLD values be assigned consistently at half the detection limit.



#### SECURITY

Drill core is stored in several covered storage areas within the fenced and access-controlled property perimeter at the Platosa Mine site and in a locked warehouse in Bermejillo. In addition and more recently Excellon has begun cross-piling and palletizing the core and storing it outdoors adjacent to one of the covered areas, which also serves as the core logging location. The core boxes are labelled and depth markers have been placed at appropriate intervals. The drilling, sampling, and logging are carried out under the direct supervision of experienced technical people.

#### ASSAY QUALITY ASSURANCE AND QUALITY CONTROL

In early 2007, Excellon engaged an independent consultant to review and improve the Platosa QA/QC program. In May 2007, as a result of the initial review and recommendations, Excellon began submitting one Certified Reference Material (CRM) sample and one blank with each batch of 30 to 40 samples or less. Since then, Excellon has used its own in-house CRMs named PLA-2, PLA-3, PLA-4, PLA-5, PLA-6, and PLA-7 and continues to insert control materials approximately every 40 samples. Best efforts are made to insert CRMs within or before mineralized intercepts and blanks at the end of the mineralized intercepts. Periodic submission of pulp and reject duplicates is also part of Excellon's QA/QC program.

Excellon closely monitors results of the QA/QC program. Failures are reviewed and action is taken when required. RPA reviewed the QA/QC results from past programs (Ross, 2010, and Ross and Rennie, 2008) and found the protocols and results to be adequate to support Mineral Resource estimation.

From June 2011 until June 2013, there was sufficient control samples inserted in each of the 75 batches submitted and pertinent to this current resource estimation. Thirty-five batches returned CRM values outside the expected range for either silver, lead, or zinc. Among them twenty six were not reanalyzed because they had insignificant mineralization. Nine of the 35 failed batches, or relevant portions of the batches, were resubmitted to SGS and the resource database was updated accordingly.



Results from the 2011, 2012, and 2013 drill programs are summarized in Table 11-1 and described in the following sections. Sample numbering mix-ups are thought to be minimal and are not included in the list of failures. In summary, the QA/QC protocols and results are acceptable to support a Mineral Resource estimate at Platosa.

TABLE 11-1 SUMMARY OF QA/QC RESULTS Excellon Resources Inc. – Platosa Property

	2011	2012	2013
No. Holes	43	27	32
No. Samples	1,387	966	2,373
No. Batches	28	16	31
No. Batches with QA/QC	28	16	31
No. Failed Batches due to CRMs	8	12	15
No. Failed Batches due to Blanks	4	0	2
No. Batches Requiring Reanalysis	4	1	4

#### CERTIFIED REFERENCE MATERIAL PROTOCOL

Results from the regular submission of CRMs identify problems with specific sample batches and long-term biases associated with the regular laboratory. According to Excellon's protocol, failures occur when assays from two consecutive CRMs are greater than plus or minus two standard deviations from the expected value, or if an assay from a single CRM is greater than plus or minus three standard deviations from the expected value.

The five in-house CRMs used since 2011 were prepared from Platosa mineralization. A round robin survey using four laboratories established the accepted values and standard deviations for silver, lead, and zinc. Table 11-2 lists the recommended values and the "between lab" standard deviation. The last line in Table 11-2 lists the number of CRMs used.

TABLE 11-2 EXPECTED CRM VALUES Excellon Resources Inc. – Platosa Property

	PLA-2	PLA-3	PLA-4	PLA-6	PLA-7
Ag (g/t)	982 ± 48	$2,386 \pm 47$	$4,599 \pm 63$	$39 \pm 3$	1,017 ± 17
Pb (%)	11.46 ± 0.24	$20.38 \pm 0.94$	44.76 ± 1.16	$0.30 \pm 0.14$	$9.61 \pm 0.61$
Zn (%)	$21.61 \pm 0.46$	$22.91 \pm 0.88$	16.16 ± 0.31	$0.32 \pm 0.02$	$4.75 \pm 0.28$
No. Batches	4	6	1	34	27



Silver, lead, and zinc results from CRM PLA-7 used during the 2011 to 2013 drill program are presented in a set of control charts in Figures 11-1 to 11-3. Most results show an acceptable level of accuracy. Batches that failed according to Excellon's criteria were reanalyzed if the batch contained samples with mineralization. Batches that contained mineralization are plotted as blue dots while batches with no mineralized samples are plotted as orange dots.

The results from the round robin analyses which underpin the CRM certification process are also shown. On Figure 11-2, the low bias shown for lead appears to have improved over time, however, given that the round robin results from SGS Durango also show a slight negative bias, RPA recommends additional follow-up. In addition, RPA recommends relaxing the PLA-7 CRM failure thresholds for silver, which are too tight and causing an artificially elevated CRM failure rate.

FIGURE 11-1 CRM PLA-7 CONTROL CHART FOR SILVER, 2011 TO 2013



FIGURE 11-2 CRM PLA-7 CONTROL CHART FOR LEAD, 2011 TO 2013

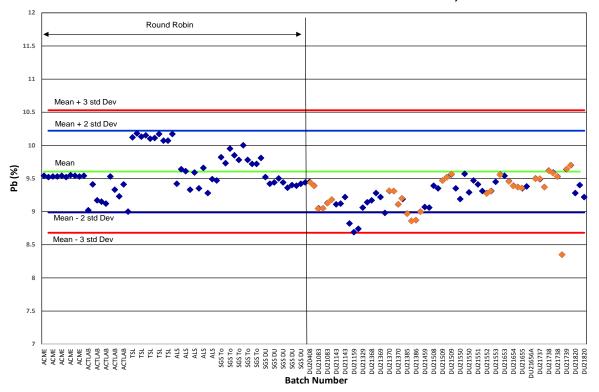
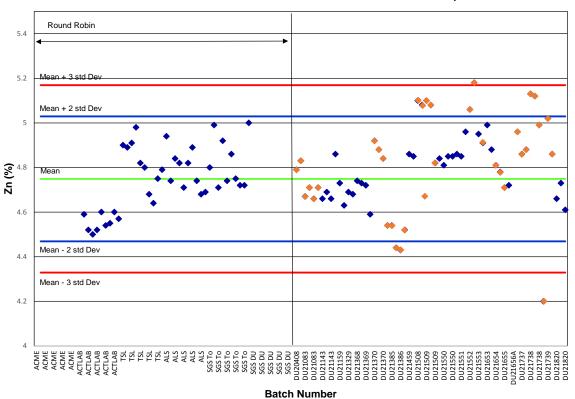


FIGURE 11-3 CRM PLA-7 CONTROL CHART FOR ZINC, 2011 TO 2013





#### **BLANKS**

The regular submission of QA blanks is used to assess contamination during sample preparation and to identify sample numbering mistakes. Blank material is taken from diamond drill core intersections of the barren Upper Micrite unit. For control, ten samples of this barren material were sent in for assay to SGS Toronto to confirm the low metal content.

Silver, lead, and zinc results from blank QA samples submitted during 2011 to 2013 are presented in a set of control charts in Figures 11-4 to 11-6. The tolerance limits are 30 g/t for silver and 0.015% for both lead and zinc. Several batches failed or indicated warnings and were appropriately corrected. Several of the failures are thought to be attributed to sample numbering mix-ups.

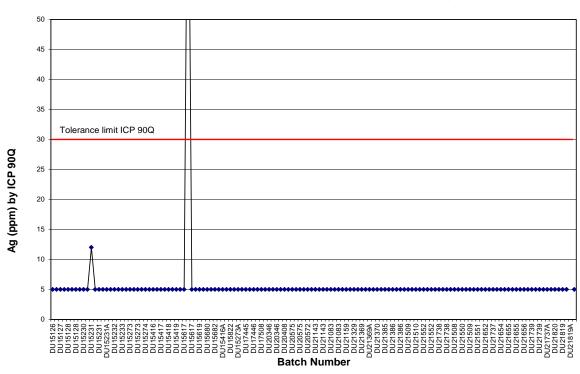


FIGURE 11-4 BLANK CONTROL CHART FOR SILVER, 2011 TO 2013



FIGURE 11-5 BLANK CONTROL CHART FOR LEAD, 2011 TO 2013

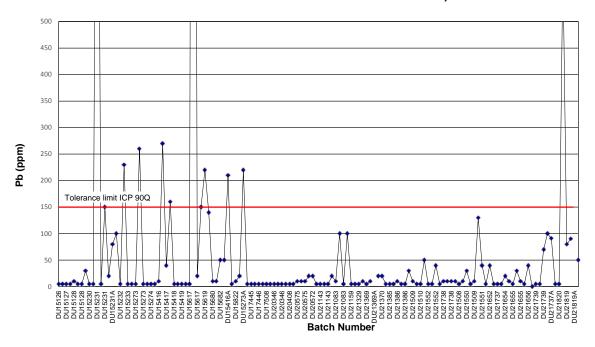
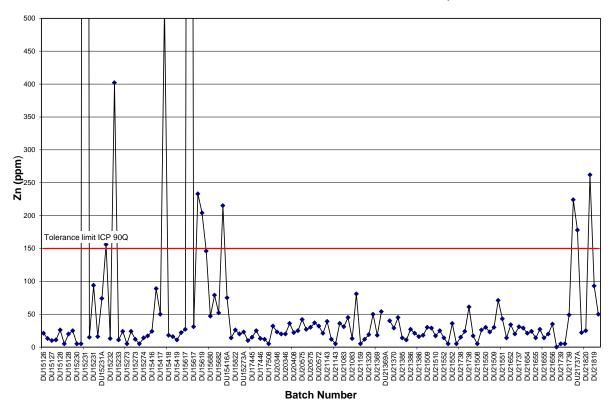


FIGURE 11-6 BLANK CONTROL CHART FOR ZINC, 2011 TO 2013



In RPA's opinion, the sampling, sample preparation, security, and analytical procedures are adequate for estimating Mineral Resources.



# 12 DATA VERIFICATION

Data verification of the drill hole database included manual verification against hardcopy or original digital sources, a series of digital queries, and review of Excellon's QA/QC results. Excellon also compared results from the laboratory against drill hole logs for inconsistencies. The drill hole database was verified by RPA and is suitable for estimating Mineral Resources.

David Ross, P.Geo., Principal Geologist with RPA and an independent QP, visited the property most recently between July 30 and August 1, 2013. He visited the core shack and examined drill core, visited the underground operation and held discussions with Excellon and Cascabel geological and technical staff. On previous visits in 2007, 2009, and 2011, Mr. Ross was able to observe the drilling in progress at the Platosa site and noted that the work was being carried out in a competent fashion, using modern equipment that appeared to be in good repair and appropriate for the job.

#### MANUAL DATABASE VERIFICATION

Drill hole database verification focused on the header and assay tables. Collar locations were verified visually and against a secondary database kept by Excellon staff. Drill hole traces were also checked in cross-section, level plan, and 3D. Several minor discrepancies were found and corrected.

Previous studies by RPA included database verification for holes up to EX11LP920 (Ross and Rennie, 2008, Ross, 2010, and Ross, 2011). Holes drilled since the last resource update, up to hole EX13LP1086, were verified for the current Mineral Resource estimate. RPA requested and received nine digital spreadsheets directly from SGS Durango. A total of 506 assay records in nine certificates were compiled and compared to the current drill hole database. Since the comparison was targeted to assays within the wireframe models representing the manto mineralization, more than half the resource assays were checked. In total, the 506 assays records represent approximately 3% of the total number of samples analyzed since the last drill hole database verification. No significant discrepancies were identified.



#### INDEPENDENT CHECK SAMPLES

During the site visit in November 2009, Mr. Ross of RPA selected and marked out two samples of split core for duplicate analysis. The specified intervals were quarter split by Excellon technicians under the supervision of Mr. Ross. The samples were bagged, tagged, and sealed in plastic bags and hand carried back to Toronto. From the RPA offices in Toronto the samples were forwarded by courier to the SGS laboratory in Don Mills, Ontario. SGS is accredited to the ISO 17025 Standard by Certificate number 456. Silver was analyzed by fire assay followed by a gravimetric finish. Lead and zinc were analyzed by ICP-AES following a sodium peroxide fusion.

The independent sampling by RPA confirms that there is significant mineralization in the drill holes sampled. Mineralization at Platosa has also been confirmed by production records, previous check samples, and visual confirmation of sphalerite and galena.

RPA's independent sampling results are shown in Table 12-1.

TABLE 12-1 CHECK SAMPLE RESULTS Excellon Resources Inc. – Platosa Property

			Excellon Values			RPA	Check Sam	ples
Hole	From (m)	To (m)	Ag (g/t)	Pb (%)	Zn (%)	Ag (g/t)	Pb (%)	Zn (%)
EXN-09-654	186.23	187.24	2,900	38.40	11.30	2,470	23.60	16.90
EXN-08-574	289.77	290.78	508	9.13	11.30	628	12.90	12.80

In RPA's opinion, the database is suitable for estimating Mineral Resources.



# 13 MINERAL PROCESSING AND METALLURGICAL TESTING

There is currently no mineral processing carried out at the Platosa site. The ore produced from the mine is crushed to 3/8 inch on site and since mid-March 2009, has been processed at the Excellon-owned flotation mill in the town of Miguel Auza located 220 km south of the mine. Prior to that, crushed ore was sold to a unit of Peñoles at the mine gate. From there it was transported to a Peñoles facility for processing. Between June 2005 and January 31, 2009, when sales of crushed ore to Peñoles terminated, 153,478 tonnes grading 1,258 g/t Ag, 10.22% Pb, and 10.69% Zn were shipped and sold to Peñoles. Ore was stockpiled at the mine between January 31 and mid-March 2009 when crushed-ore shipments began to the Miguel Auza mill.

Between March 19, 2009, when Excellon began processing ore at Miguel Auza, and December 31, 2013, the effective date of the current resource estimate, a total of 299,831 tonnes grading 818 g/t Ag, 6.53% Pb, and 8.91% Zn were processed at the Miguel Auza mill. During the same period, 25,235 tonnes of silver-lead concentrate grading 7,930 g/t Ag and 60.5% Pb and 40,482 tonnes of silver-zinc concentrate grading 575 g/t Ag and 51.7% Zn were produced. The concentrates are shipped to the port of Manzanillo where they are sold under the terms of multi-year off-take agreements to Trafigura Mexico, S.A. de C.V.

In early 2008, Excellon made a decision to construct a 350 tpd flotation mill and tailings disposal area on the Platosa site. In support of this study, a new program of metallurgical testwork on a representative sample from the Guadalupe Manto was started in mid-2007 by SGS Mineral Services in Durango, Mexico. The work was handed off to the SGS facility in Lakefield, Ontario, in late 2007 for completion. Testwork results were incorporated into a flowsheet design and they indicated that the manto metallurgy is relatively straightforward (SGS, 2008). This conclusion was supported by Excellon's study of results from the Naica mill of Peñoles.

After completion of an environmental impact assessment report and meeting other regulatory requirements, the environmental permit required to enable construction of the mill and tailings management area was received in September 2008 and construction was carried out until mid-December 2008 when it was suspended because of falling metal prices. At the time



of suspension, all basic engineering (completed by DRA Americas Inc., then of Peterborough, Ontario), a large portion of the detailed engineering, a large portion of the excavations required for the mill, and the skeletons of two buildings had been completed. The detailed engineering and construction were completed by Renmo Ingenieria, S.A. de C.V., of San Luis Potosi, Mexico.

In addition, a large amount of equipment, much of which was used but in good order, was ordered and/or purchased. Some refurbishing of used equipment was carried out, and some equipment was delivered to site. In the spring of 2009, refurbishing was completed, all purchases were completed, and all equipment was delivered to site where it remains in secure storage. At the time Excellon estimated that 85% of the equipment required for the mill had been acquired and that construction could be completed in six to nine months if there was a decision made to resume the work.

In December 2012 Excellon sold all the mill equipment stored at Platosa to Dundee Corporation of Toronto. As of the time of RPA's site visit in 2013, this equipment was still on site awaiting pick up by the buyer.

To RPA's knowledge, there are no known processing factors or deleterious elements that could have a significant impact on economic extraction.



# 14 MINERAL RESOURCE ESTIMATE

RPA prepared an updated Mineral Resource estimate for the Platosa Property based on production and drill hole data current to December 31, 2013. The latest drill hole used in the current estimate was EX13LP1086. Prior to this update, the last estimate was current to July 31, 2011, having used drill hole information up to drill hole EX11LP920 (Ross, 2011).

RPA employed a block model constrained by wireframes, with an inverse distance method of grade interpolation. Block size was 5 m by 5 m by 2 m, and an initial search ellipsoid was spherical with a radius of 25 m followed by a second search with a radius of 50 m. The influence of high grade composites was restricted to 25 m. The sample database comprised drill hole samples composited to two-metre downhole lengths. The minimum width for the mineralization used in construction of the wireframe models was nominally 1.5 m and the NSR incremental cut-off cost used was US\$189/t. RPA performed a global reconciliation against production and found the results to be acceptable after factoring in mine dilution.

Wireframe models were updated to incorporate mining and drilling information. For the purpose of reporting, the Platosa deposit has been sub-divided into seven areas (Figure 14-1). Each area is made up of several mantos and chimneys. The updated estimate of Mineral Resources is provided in Table 14-1.



TABLE 14-1 MINERAL RESOURCE ESTIMATE AS OF DECEMBER 31, 2013 Excellon Resources Inc. – Platosa Property

	Tonnage	Ag	Pb	Zn	AgEq	Ag	Pb	Zn	
-	(kt)	(g/t)	(%)	(%)	(g/t)	(oz x1,000)	(lbs x1,000)	(lbs x1,000)	
MEASURED RESOURCES									
6A/6B	24	785	8.88	9.02	1,276	612	4,741	4,817	
Guadalupe South	3	747	6.94	5.65	1,100	84	533	435	
Pierna	14	914	8.60	16.67	1,563	413	2,665	5,164	
Total Measured	42	825	8.62	11.31	1,358	1,108	7,939	10,416	
INDICATED RESOUR	CES								
6A/6B	44	735	8.31	11.76	1,267	1,045	8,092	11,458	
Guadalupe	18	857	9.24	12.60	1,438	496	3,673	5,007	
Guadalupe South	22	970	8.24	15.40	1,579	692	4,032	7,538	
Rodilla	83	683	7.03	10.59	1,147	1,830	12,914	19,464	
NE1	158	558	7.95	7.25	980	2,828	27,614	25,200	
623	83	1,232	10.24	9.43	1,777	3,300	18,793	17,315	
Pierna	34	729	9.11	16.10	1,382	794	6,807	12,030	
Total Indicated	443	772	8.40	10.05	1,270	10,985	81,925	98,011	
M+I RESOURCES									
6A/6B	68	753	8.51	10.79	1,271	1,657	12,833	16,275	
Guadalupe	18	857	9.24	12.60	1,438	496	3,673	5,007	
Guadalupe South	26	939	8.06	14.08	1,514	776	4,566	7,973	
Rodilla	83	683	7.03	10.59	1,147	1,830	12,914	19,464	
NE1	158	558	7.95	7.25	980	2,828	27,614	25,200	
623	83	1,232	10.24	9.43	1,777	3,300	18,793	17,315	
Pierna	48	783	8.96	16.27	1,435	1,207	9,472	17,194	
Total M + I	484	777	8.42	10.15	1,277	12,094	89,864	108,427	
INFERRED RESOURCE	ES								
Rodilla	1	505	3.75	1.99	673	18	92	49	
NE1	2	3,199	23.27	1.62	4,005	237	1,183	82	
Total Inferred	3	2,324	16.93	1.74	2,922	255	1,274	131	

#### Notes:

- 1. CIM definitions were followed for the classification of Mineral Resources.
- 2. Mineral Resources are estimated at an incremental NSR cut-off value of US\$189 per tonne.
- 3. NSR metal price assumptions: Ag US\$20.00/oz, Pb US\$1.00/lb, Zn US\$1.00/lb.
- 4. Metal recovery assumptions: 93% Ag, 81% Pb, 83% Zn.
- 5. The silver equivalent (AgEq) is estimated from metallurgical recoveries, metal price assumptions, and smelter terms, which include payable factors, treatment charges, penalties, and refining charges.
- 6. The estimate is of Mineral Resources only and, because these do not constitute Mineral Reserves, they do not have any demonstrated economic viability.
- 7. Totals may not add or multiply accurately due to rounding.

14-3



#### WIREFRAME MODELS

The wireframe models were updated using recent surveys of mined volumes and diamond drilling information. The wireframe models were constructed at a nominal US\$200/t NSR cut-off. RPA notes that this wireframe cut-off is higher than the resource block reporting cut-off of US\$189/t. This inconsistency was due to the re-evaluation of mine costs late in the modelling process and does not affect the results as for all practical purposes the cut-off was not necessary. The mineralization is observed to be quite high grade wherever it occurs, with sharp boundaries. A minimum thickness of 1.5 m was applied. In a few areas, the minimum was reduced to 1.3 m to maintain continuity. Mined volumes were subtracted from the in situ resource models prior to resource reporting.

#### **BLOCK MODEL**

The block model was constructed in GEMS (Gemcom). Block sizes were 5 m x 5 m x 2 m, non-rotated, with the origin at 634200E, 2868100N, and 1,100 m elevation. Total model extents were 180 columns, 130 rows, and 165 levels. Each block contained values for rock code (i.e., zone), density, Ag, Pb, Zn, NSR value, average distance to composites, number of composites, and classification code. In addition, a value was stored for the proportion of each block contained within a wireframe model. This value is used to increase accuracy of volumetric estimates.

#### CAPPING OF HIGH GRADES

Past resource estimates capped silver assays at 10,000 g/t prior to compositing. These high grade values were located in mantos 4 or 5 which have since been mined out and are no longer part of the Mineral Resource. The highest silver grade assay within the current resource wireframes is 65 cm at 9,369 g/t Ag. RPA reviewed distribution of the remaining high grade silver, lead, and zinc assays and concluded that no capping was needed.

Descriptive statistics of the resource assays are listed in Table 14-2 by area.



TABLE 14-2 RESOURCE ASSAY STATISTICS BY AREA Excellon Resources Inc. – Platosa Property

	Ag (g/t)	Pb (%)	Zn (%)	Ag (g/t)	Pb (%)	Zn (%)
		6A			NE1	
No. of Cases	169	169	169	175	175	175
Minimum	5	0.00	0.00	3	0.00	0.00
Maximum	6,480	31.00	40.00	5,101	46.30	40.00
Median	614	7.55	8.65	412	4.61	2.99
Arithmetic Mean	889	8.75	11.08	521	7.31	5.77
Standard Deviation	1,053	7.80	10.46	623	8.24	7.49
Coef. of Var.	1.18	0.89	0.94	1.20	1.13	1.30
	Gua	adalupe So	uth		Pierna	
No. of Cases	110	110	110	89	89	89
Minimum	2	0.00	0.00	10	0.00	0.00
Maximum	6,160	37.80	40.40	9,369	50.00	40.00
Median	755	7.56	8.78	503	5.96	15.90
Arithmetic Mean	1,230	8.86	13.05	766	8.54	15.74
Standard Deviation	1,311	7.82	12.75	1,113	8.35	10.10
Coef. of Var.	1.07	0.88	0.98	1.45	0.98	0.64
		Guadalupe			Rodilla	
No. of Cases	253	253	253	103	103	103
Minimum	2	0.00	0.00	3	0.00	0.00
Maximum	7,800	41.85	38.34	5,100	43.70	40.00
Median	621	6.58	8.84	393	4.75	6.94
Arithmetic Mean	877	8.74	10.70	673	6.87	9.68
Standard Deviation	1,070	8.35	10.12	788	6.97	8.92
Coef. of Var.	1.22	0.96	0.95	1	1.02	0.92
		623			All Areas	
No. of Cases	86	86	86	985	985	985
Minimum	3	0.05	0.01	2	0.00	0.00
Maximum	7,030	44.30	40.00	9,369	50.00	40.40
Median	678	6.70	9.03	560	6.13	7.37
Arithmetic Mean	1,199	9.66	10.19	852	8.37	10.46
Standard Deviation	1,412	10.08	10.03	1,067	8.23	10.31
Coef. of Var.	1.18	1.04	0.99	1	0.98	0.99



#### COMPOSITING

The sampling protocol for most of the project life has been to limit the maximum sample length to 1.5 m in the mineralized sections and 3.0 m in waste. Most samples (approximately 75% of the mineralized zone samples) were taken at one-metre intervals or less. RPA reviewed the sample lengths and noted that more than 95% of the samples are two metres or less in length. Consequently, the composite length was set to two metres.

The compositing was configured to start at the point of entry of a drill hole to the wireframe model, progressing in two-metre intervals to where the drill hole exited the wireframe. The final composite was truncated at the exit point, which resulted in odd-sized composites, termed "orphans." RPA compared the statistics of the orphans with the full-size (two-metre) composites and found that they were lower in grade. The compositing methodology was changed from a "top-down" to a "bottom-up" approach, and the statistical comparison was redone. The orphans generated using a bottom-up strategy were statistically equivalent to the full-size composites. Orphans less than 50 cm in length were removed from the database.

Composites were generated using both length- and density-weighting using an equation relating density and Pb-Zn grades as described below in the section "Bulk Density". Composites were then assigned integer codes depending on the zone they occupied. This was done to discriminate between zones and allow only those composites residing within a particular zone to be used in the grade estimate for that zone. Statistics for those composites within a mineralized zone are provided in Table 14-3.



TABLE 14-3 COMPOSITE STATISTICS BY AREA Excellon Resources Inc. – Platosa Property

	Ag (g/t)	Pb (%)	Zn (%)	Ag (g/t)	Pb (%)	Zn (%)
		6A			NE1	
No. of Cases	89	89	89	91	91	91
Minimum	0	0.00	0.00	0.00	0.00	0.00
Maximum	3,943	29.46	32.85	3,890	39.48	36.55
Median	726	8.13	8.42	442	5.44	3.48
Arithmetic Mean	845	8.78	10.83	548	7.52	6.18
Standard Deviation	781	6.45	8.49	558	7.30	7.36
Coef. of Var.	0.92	0.74	0.78	1.02	0.97	1.19
	Gua	adalupe So	uth		Pierna	
No. of Cases	64	64	64	36	36	36
Minimum	25	0.00	0.00	141	0.85	0.00
Maximum	4,860	27.94	36.80	4,152	23.55	35.59
Median	950	7.88	10.57	740	7.82	16.86
Arithmetic Mean	1,243	8.95	12.82	850	9.43	16.05
Standard Deviation	1,174	6.64	11.17	710	5.92	7.18
Coef. of Var.	0.94	0.74	0.87	0.84	0.63	0.45
		Guadalupe			Rodilla	
No. of Cases	131	131	131	47	47	47
Minimum	5	0.00	0.00	11	0.16	0.04
Maximum	6,431	31.64	36.36	2,529	21.90	25.43
Median	789	8.34	9.67	464	5.62	10.12
Arithmetic Mean	955	9.51	11.48	655	7.03	10.38
Standard Deviation	928	7.01	8.97	546	5.12	6.79
Coef. of Var.	0.97	0.74	0.78	0.83	0.73	0.65
		Manto 623			All	
No. of Cases	44	44	44	502	502	502
Minimum	3	0.19	0.05	0.00	0.00	0.00
Maximum	4,968	33.26	32.59	6,431	39.48	36.80
Median	795	7.10	8.69	660	7.18	8.77
Arithmetic Mean	1,164	9.75	10.09	881	8.73	10.68
Standard Deviation	1,094	8.24	8.61	881	6.84	8.93
Coef. of Var.	0.94	0.84	0.85	1.00	0.78	0.84



## **GRADE INTERPOLATION**

A two-pass approach was used to estimate block grades. The initial pass used a spherical search ellipsoid measuring 25 m in radius. Block estimates were limited to a minimum of two and a maximum of 12 composites, with no more than two composites per drill hole. Most blocks were interpolated during the first pass. The remaining blocks were interpolated using a 50 m isotropic search and similar number of composite constraints. Grades greater than 3,000 g/t Ag, 30% Pb, and 30% Zn were restricted to 25 m during the second pass.

Results from the grade interpolation process, including mined out areas, are illustrated in Figures 14-2 and 14-3.



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#### **BULK DENSITY**

Density estimates are used to convert estimated volume to tonnage. Density estimates can also be used to weight data points during statistical analyses and operations. For most types of mineralization, this means that samples with higher densities have greater influence on the results. At Platosa, where there is a positive correlation between density and grade, the compositing process was both length and density weighted.

RPA compiled 285 density measurements from the Excellon database. Correlation of bulk density values with Pb and Zn grades derived the following relationship:

Bulk Density = 
$$(Pb * 0.045) + (Zn * 0.030) + 2.50$$

The average block densities by manto are listed below in Table 14-4:

TABLE 14-4 AVERAGE BLOCK DENSITIES Excellon Resources Inc. – Platosa Property

Zone	Average Estimated Bulk Density
Manto 6A/6B	3.23
Guadalupe	3.31
Guadalupe South	3.25
Rodilla	3.11
NE1	3.02
623	3.21
Pierna	3.37
Total	3.20

RPA recommends that routine measurements of bulk density on sealed samples be continued.

## **CUT-OFF COST**

The cut-off value used to report Mineral Resources was estimated from operating costs incurred between January 1, 2013 and December 31, 2013, and includes costs incurred at both the Platosa Mine site and the Miguel Auza processing facility (Table 14-5). RPA used a portion of the mining costs to estimate an incremental cut-off NSR value of US\$189/t. The material with an NSR value above the incremental cut-off value, but below the fully-costed



break-even cut-off value, represents mineralization that has a reasonable prospect of economic extraction assuming sunk development costs. This incremental material does not displace higher grade mineralization in the mill feed. It is included largely for purposes of maintaining resource continuity, and does not make up a large proportion of the total Mineral Resource.

The current cut-off NSR value of US\$189/t is lower than the US\$200/t used for the 2011 Mineral Resource estimate. The current cut-off value is based on 2013 costs reported by the Excellon management. The change in cut-off value has no significant effect on the Mineral Resource report as the deposit is insensitive to cut-off value as discussed later in this section.

TABLE 14-5 OPERATING COSTS
Excellon Resources Inc. – Platosa Property

Item	Full Break-Even Cost (US\$/t milled)	Incremental Cost (US\$/t milled)
Mining	189.77	94.89
Milling	51.37	51.37
Mine G&A	31.28	31.28
Mill G&A	11.26	11.26
Total	283.68	188.80

#### **NET SMELTER RETURN VALUE**

The NSR value of the ore is estimated from metallurgical recovery, metal price assumptions, and smelter terms, which include payable factors, transport costs to the smelter, treatment charges, penalties, and refining charges. Revenue assumptions, including metallurgical recovery and metal prices, are outlined in Table 14-6. RPA notes that recoveries are based on actual metallurgical performance data from January 2012 to December 2013.



TABLE 14-6 REVENUE ASSUMPTIONS Excellon Resources Inc. – Platosa Property

Item	Units	Lead Concentrate	Zinc Concentrate
Recovery			
Lead	%	81	-
Zinc	%	-	83
Silver	%	83	10
Metal Prices			
Lead	US\$/lb	1.	00
Zinc	US\$/lb	1.	00
Silver	US\$/oz	20	.00

NSR multipliers representing value per unit grade were developed using the parameters described above. The multipliers were used in combination with drill hole assay grades and block model grades to perform wireframe interpretation and Mineral Resource reporting, respectively.

Excellon currently has concentrate sales contracts in place with Trafigura Mexico, S.A. de C.V. RPA has included the contract terms in its evaluation, but the terms of the contracts are confidential and are not disclosed in this report. The Miguel Auza processing facility produces both lead and zinc concentrates and separate sales contracts describe the treatment terms applicable to each of the concentrates. The current contracts are for 2014 and 2015 inclusive. The treatment terms reflect current prevailing market conditions and have been incorporated into the NSR value calculation algorithm. Modifications to the transportation terms are ongoing and expected to be finalized by mid-2014.

#### **CLASSIFICATION**

The classification of the Mineral Resource estimate was applied in the following way:

- All blocks completely or partially contained within a wireframe model were assigned a minimum classification of Inferred.
- Blocks estimated by a minimum of two composites and for which the average distance to composites was less than or equal to 25 m was upgraded to Indicated. Several adjustments were made manually in areas of unknown grade continuity.



 Areas were assigned Measured where blocks have a minimum distance to drill holes consistently less than ten metres, drill holes have a regular grid pattern, and the mineralization has uniform thickness.

#### **BLOCK MODEL VALIDATION**

RPA validated the block model by visual inspection, volumetric comparison, tonnage grade curves, and scatter plots. Visual comparison on vertical sections and plan views, and a series of scatter plots found good overall correlation between block grades and composite grades.

The estimated volumes of the wireframe and block model at a zero grade, after production, are both 162,700 m<sup>3</sup>. Results are listed by zone in Table 14-7.

TABLE 14-7 VOLUME COMPARISON Excellon Resources Inc. – Platosa Property

	Volume Wireframes (m³ x 1,000)	Volume Block Model (m³ x 1,000)
Manto 6A/6B	22.2	22.1
Guadalupe	7.1	7.2
Guadalupe South	8.0	8.0
Rodilla	27.3	27.3
NE1	57.7	57.7
623	26.2	26.2
Pierna	14.2	14.2
Total	162.7	162.7

The global block grades before production were also compared to the composite grades. This comparison is shown in Table 14-8.

TABLE 14-8 COMPARISON OF BLOCK AND COMPOSITE GRADES Excellon Resources Inc. – Platosa Property

	Ag (g/t)	Pb (%)	Zn (%)
Composites	881	8.73	10.68
Blocks	910	9.08	11.09
Difference	29	0.35	0.41
% Difference	3%	4%	4%



The tonnage grade curve indicates that the project is insensitive to NSR cut-off value (Figure 14-4). RPA also tested the resource model to different silver prices and concludes that the deposit is insensitive. For example, reducing the silver price to US\$18/oz results in less than a two percent reduction in tonnage classified as Measured plus Indicated tonnes.

Tonnage (x1000) NSR Cut-off (US\$/t)

FIGURE 14-4 TONNAGE GRADE CURVE MEASURED PLUS INDICATED

#### CHANGES TO THE MINERAL RESOURCES

Table 14-9 compares the current Mineral Resource estimate to the 2011 estimate. The decrease of 153,000 tonnes from the Measured and Indicated category and 66,000 tonnes from the Inferred category is mostly attributed to mining. The remainder of the decrease is attributed to routine evaluation of remnant resources in mined areas. Production for the



period since the previous estimate, August 2011 to December 2013, is calculated at 167,217 tonnes at a mill feed grade of 766 g/t Ag, 6.13% Pb and 8.81% Zn.

TABLE 14-9 COMPARISON OF 2011 AND 2013 ESTIMATES Excellon Resources Inc. – Platosa Property

Measured plus Indicated	Tonnes	Ag (g/t)	Pb (%)	Zn (%)
2011	637,000	836	8.95	10.58
2013	484,000	777	8.42	10.15
Difference	-153,000	-59	-0.53	-0.43
% Change	-24%	-7%	-6%	-4%
Inferred	Tonnes	Ag (g/t)	Pb (%)	Zn (%)
2011	69,000	1,011	11.35	11.34
2013	3,000	2,324	16.93	1.74
Difference	-66,000	1,313	5.58	-9.60
% Change	-96%	130%	49%	-85%

#### RESOURCE RECONCILIATION

RPA performed several high level reconciliations between the block model and production data from both the mine and the mill. Reconciliations were done by manto for various periods of mining, including the total mined to date. In most cases, the block model grades were 20% to 30% higher than actual production grades. This suggests that either the grades are overestimated or mine dilution is in the order of 20% to 30%, or a combination of the two factors. Considering the irregular geometry of the mantos, it is not unreasonable to sustain high dilution rates given that mine extraction has been maximized owing to the high NSR value of the mineralization. This assumption was partly substantiated by visually comparing the mined openings and the wireframe interpretation of the manto boundaries. RPA therefore did not adjust the block model to better reflect the mined grades, and ascribes the discrepancies primarily to mine dilution until a more detailed reconciliation is completed.

A detailed reconciliation was not prepared for this report because RPA does not have sufficient information to estimate the tonnes and grade produced from each working area of the mine. RPA recommends that the appropriate data be collected and compiled on a routine basis so that accurate reconciliations and dilution studies can be carried out. The necessary data to prepare a detailed reconciliation includes:



- Accurate tonnages (or volumes) for any source contributing to the ore stream (i.e., either stopes or development headings).
- Grade estimates for each development heading and stope for all material shipped as ore.
- The aggregate tonnage and grade shipped for the period, as recorded by the mill.

Ideally, the mined volumes can be estimated from wireframe models of the openings. These wireframes are presently being built by mine personnel and updated on an intermittent basis. RPA recommends that these volume models be continuously updated and organized such that the tonnage mined from any particular period can be easily determined. This would include both stope and development tonnages. To ensure usefulness, the wireframes should be valid solids, and should be free of three dimensional errors such as holes, crossover triangles, shared edges, etc.

The grades at Platosa can vary significantly over relatively short distances, and this variability cannot be predicted solely from the diamond drill hole results. In order to conduct a reconciliation, it is necessary to know, with some accuracy, the grades from each specific work area in the mine. Common industry practice is to take chip or channel samples from the stope walls and development faces, and/or muck samples from individual muck piles or from draw points. Muck samples, by virtue of the difficulty in obtaining a representative sample in a production environment, are generally less accurate than chip/channel samples. Grade control sampling from stope walls and development headings can comprise chip or channel samples taken along profiles oriented perpendicular to the trend of the ore or panel samples, comprising chips taken in a uniform pattern across an exposed area. In cases where the total broken tonnage includes both ore and waste, proper practice is to sample the ore and waste separately and determine the grade of the mined volume by means of a weighted average. RPA recommends that routine grade control sampling be carried out in all stopes and development headings.



# 15 MINERAL RESERVE ESTIMATE

A Mineral Reserve estimate has not been prepared for the Platosa deposit.

Underground mining to date has confirmed that the individual mantos are highly irregular and unpredictable with respect to shape, dip, thickness, extent and grade (Figure 15-1). This variability is as prevalent horizontally as vertically. The design of stope mining shapes, a necessary pre-cursor in the process of estimating of Mineral Reserves, cannot be accurately accomplished from the current drill information. Given the flat nature of the deposit, there is no practical and cost effective method of establishing underground diamond drilling horizons. Alternatively, the cost of increasing the drill density from surface would be prohibitive.

The current underground practice is to excavate a pilot drift into the manto then, based on visual observations and sampling, expand the excavation by breasting, benching, and slashing the pilot drift as required. This is accomplished in multiple phases until all of the ore has been extracted. Pillars are left as required to limit the extent of open spans. Since the mantos are all unique, mining experience (mining recovery and dilution) obtained from the mining of one manto cannot necessarily be projected to a different yet-to-be mined manto.

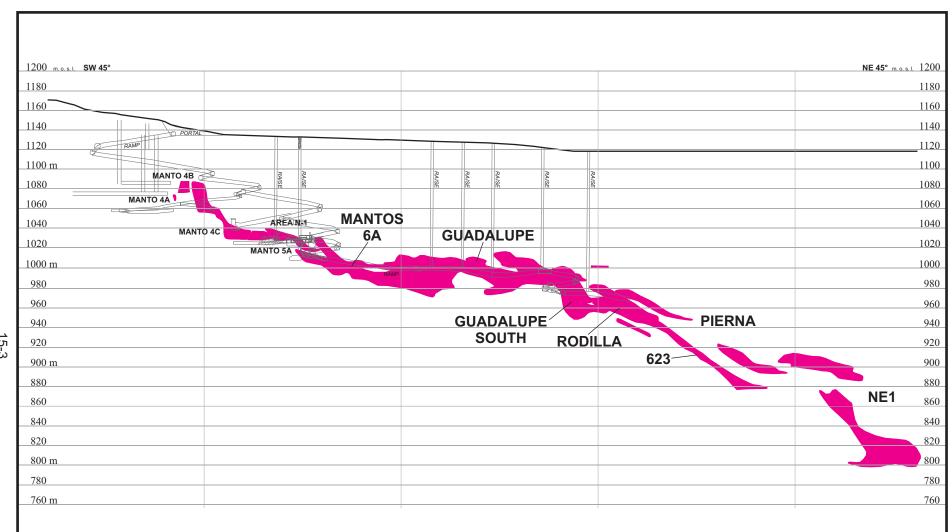
Excellon has prepared annual budgets and associated annual mining plans. It is Excellon's experience that the actual production in any given year is comparable to the budget/mine plan in total only. There were consistently significant variations in the actual material extracted compared to what was planned to be extracted in the annual budget. Even at the current low mining rate averaging 200 tpd, significantly more faces than normal are needed to achieve production targets. The higher than normal flexibility is required as headings can move in and out of ore from one round to the next or become unavailable due to unexpected water inflow requiring grouting. Given that annual production plans cannot be accurately prepared (except in total), preparation of an accurate Life-of-Mine Plan (LOMP), another significant component of the Mineral Reserve estimating process, is not possible.

In summary, mining shapes, mining sequences, and modifying factors cannot be determined with a sufficient level of accuracy to convert Mineral Resources to Mineral Reserves based on the CIM definition standards for reporting reserves. At Platosa, the detailed geological and spatial information required to accurately estimate Mineral Reserves is only available



when mining is underway and the mining parameters are only applicable to the limited volume of material located within close proximity of the mining faces.

For most underground deposits, the inability to define accurate stope shapes and prepare a reasonable mining sequence and accurate LOMP would be a significant production and economic risk. This is not the case at Platosa, however, due to the high operating margin which results from the higher than average grade of the deposit.



## Figure 15-1

## **Excellon Resources Inc.**

## Platosa Property

Durango State, Mexico

Vertical Section of Underground Development and Mantos (Looking NW)



# **16 MINING METHODS**

### PAST PRODUCTION

Excellon accessed the first manto (Manto 4C) by underground trackless ramp and lateral development methods in April 2005. As of December 31, 2013, a total of 452,496 wet tonnes of ore had been mined. A summary by manto is presented in Table 16-1.

TABLE 16-1 MINERAL PRODUCTION TO DECEMBER 31, 2013 Excellon Resources Inc. – Platosa Property

Manto	Wet	Ag	Pb	Zn
	Tonnes	g/t	%	%
4A	1,429	755	6.57	18.50
4B	10,944	1,006	10.14	25.19
4C	16,686	1,386	11.38	10.69
5A	25,364	2,492	16.92	9.37
N-1	12,552	1,147	8.60	7.66
6A/6B	60,998	826	7.00	7.39
Guadalupe Main	246,906	930	9.29	10.68
Guadalupe South	64,400	1,003	7.15	8.71
Rodilla	6,644	679	6.86	10.55
623	6,572	945	7.56	10.63
Total	452,496	1,035	9.11	10.17

The grades shown in Table 16-1 are estimates for chip and channel samples taken from mining faces and obtained using a NITON portable X-ray fluorescence instrument. These results are used by Excellon for grade control purposes only. These therefore differ from the grades obtained from ore samples sent to commercial analytical laboratories for analysis and/or from those obtained from actual processing results.

Of the original December 10, 2003 mine plan, Mantos 4A, 4B, 4C, and 5 have been mined out, and Manto 6 (now referred to as 6A/6B) has been accessed and partially mined. Manto N-1, which is different than NE1, was discovered in 2005 and has also been mined out. The Guadalupe Main, Guadalupe South, Rodilla and 623 mantos, also discovered after the original mine plan was developed, have been accessed and partially mined. The NE1 and Pierna mantos have not yet been accessed.



#### MINE OPERATIONS

Historically, the mine has operated an average 26 days per month, however, recently this has been approaching 30 days. During 2013, Excellon mined approximately 5,820 tonnes per month (tpm), 97% of the budgeted amount. In the past, the main risk to the production rate was excessive groundwater inflow and related flooding. Prior to 2011, the mine suffered several water inflow incidents that disrupted production. The last of these major disruptions occurred in August 2010. Since then, improvements in water management practices, increased pumping capacity, the installation of three water-tight doors, which enable areas of the mine to be isolated if necessary, and installation of an alternative power supply for the pumps have reduced the impact of water inflows into the mine to a manageable level.

Once a manto has been accessed, mineralized material is mined by a "Pilot and Slash" mining method, using jacklegs with some mining carried out using jumbos. Depending on the shape and orientation of the manto, the pilot heading can be inclined, declined or flat, to remain in mineralization. Several phases of back slashing (breasting), wall slashing, or floor slashing (benching) from the pilot heading may be required to extract all mineralized material. When larger openings are developed, rock bolting has been carried out or a pillar left for support until mining of the area has been completed. Mining to date indicates that the mantos are very irregular in shape and orientation, and are in many cases connected.

A significantly higher than normal number of mining faces is required to achieve production targets. This increased flexibility is required as headings can move in and out of ore from one round to the next or become unavailable due to unexpected water inflow requiring grouting.

The ground has been very competent and, in general, very little ground support is required. There has been no problem extracting all the mineralized material (in the mined-out areas). As the mineralized material is high grade, there can be a tendency to over-excavate the mining headings to ensure full extraction. Back calculation of previously mined areas compared to the Mineral Resource estimate suggests that the mining recovery factor is approximately 85% and dilution is in the range of 10% to 25% depending on the size and orientation of the manto.



The underground ventilation system is currently at capacity and this is limiting the number of active work areas available at any one time. Excellon plans to install an additional raise and fresh air fan which, when completed, will double the ventilation system capacity.

Future mine operations will require development to progress deeper and this development is underway. Exploration results suggest that this development will progress to the northeast and to depths in excess of 340 m. The current interpretation of the mine geology, hydrology, and main structural features indicates that the occurrence of open faults, solution channels, and caverns that have delayed and complicated some of the mining to date may decrease as development progresses to the northeast and deeper.

### MINING EQUIPMENT

The Platosa mining equipment fleet totals 17 units as detailed in Table 16-2. The two jumbo drills are used primarily for development. Most mining is completed using jacklegs.

Several of the load-haul-dump (LHD) units have been operating for many years and may be at or near the end of their useful operating lives. The capital cost of replacing some of these units with newer used units has been included in the capital cost estimate. As mining progresses to deeper mantos (particularly the Rodilla, Pierna, 623 and NE1), average mining thicknesses will decrease and stopes will become steeper. RPA recommends that, when making the decision to replace mobile equipment, Excellon consider the purchase of smaller used equipment suitable for the expected narrower excavation dimensions.



TABLE 16-2 MOBILE MINING EQUIPMENT Excellon Resources Inc. – Platosa Property

Item	Manufacturer	Model	Capacity	Operating Hours
LHD 1	Atlas Copco	ST-1030	6 yd <sup>3</sup>	11672
LHD 2	Wagner	ST-3.5	$3.5 \text{ yd}^3$	12913
LHD 3	Atlas Copco	ST-2G	2 yd³	9768
LHD 4	MTI	LT 270	1 yd³	6132
LHD 5	MTI	LT 650	4 yd³	9404
LHD 6	MTI	LT 650	4 yd³	6315
LHD 7	JCI	250M	$3 \text{ yd}^3$	19864
LHD 8	MTI	LT 1050	8 yd <sup>3</sup>	2690
LHD 9	MTI	LT 650	5 yd <sup>3</sup>	298
Truck 1	Wagner		11 yd <sup>3</sup>	7217
Truck 2	MTI	DT 1604	11 yd <sup>3</sup>	8712
Truck 3	MTI	DT 1604	11 yd <sup>3</sup>	5199
Truck 4	MTI	DT 1604	11 yd <sup>3</sup>	9731
Jumbo 1	MTI	VR11	1 boom	
Jumbo 2	Tamrock		2 boom	
Scissor Lift	Getman	A-64		503
Boom Truck	Getman	A-64		108

#### **HYDROLOGY**

On several occasions, the mining operation has experienced groundwater inflows that exceeded pumping capacity and caused production disruptions. To help control these occurrences, Excellon has implemented a program of underground test drilling of all new mine development headings and stope faces where the presence of excessive water ahead of the face is suspected. Grouting is carried out by dedicated crews where groundwater is encountered. In addition, Excellon has constructed three emergency water-tight doors, which in the event of an inflow, can be used to isolate a portion of the mine and allow operations to continue normally elsewhere. Excellon has also added pumping capacity, largely via surface-mounted vertical submersible pumps. During 2013, Excellon pumped an average of approximately 12,500 gpm, or 800 L/s, of water to surface 24 hours per day. In order to maintain pumping in the event of disruptions from the primary provider of electricity (Comision Federal de Electricidad), Excellon has installed a sufficient number of generators to power all of the dewatering pumps. The current capacity of the mine water pumping system is in the order of 26,000 gpm.



Historical records show that pumping requirements are increasing by an average of 2,000 gpm per year. Based on this trend, Excellon are projecting pumping needs to average 16,500 gpm in 2014 and 18,000 gpm in 2015. Although there is sufficient pumping and generating capacity to absorb the projected increases in water inflow as more laterally extensive and deeper ground is opened up for mining, the purchase and installation of additional pumps and the relocation of some of the existing pumps will be required.

In October 2008, Excellon engaged the services of Itasca Denver, Inc. (Itasca) of Lakewood, Colorado, to carry out a hydrology study of the Platosa Mine area.

Between late August and November 2009, under the direction of Itasca, six 5.5 in. (14 cm) diameter vertical monitoring wells were drilled to depths varying from 104 m to 244 m. The holes were equipped with piezometers and water level/pressure data are gathered on a continual basis. These holes were drilled by Layne de Mexico, S.A. de C.V., of Hermosillo, Mexico, under the supervision of Itasca. A seventh such hole measuring 9.5 in. (24 cm) in diameter was completed in December 2009.

In early 2010, Excellon drilled a 9.5 in. (24 cm) diameter vertical test dewatering well to determine whether the water table could be lowered either locally and/or in the entire mine area by such activity. For a variety of technical reasons, it was decided to postpone this portion of the hydrology study. In the fall of 2010, Itasca's involvement with the hydrology program was completed and thereafter, until July 2012, Excellon employed a geologist and technician whose responsibilities were to monitor mine hydrology issues, in particular to measure water flow in several key areas underground and the water levels in the six monitoring wells. Since July 2012, these duties have been carried out by a technician with occasional assistance from mining-industry university students spending their work terms at Platosa.

In the past, Excellon has also employed the services of Buro Hidrolgico Consultoria of Mexico City. In late 2009-early 2010, at the request of CONAGUA, the Mexican national water regulator, this group prepared a summary report on the impact of the Platosa mining activities on neighbouring water users. The report concluded that Excellon's activities had no negative effects.



# 17 RECOVERY METHODS

There is currently no mineral processing carried out at the Platosa site. The ore produced from the mine is crushed to 3/8 inch on site and since mid-March 2009, has been processed at the Excellon-owned flotation mill in the town of Miguel Auza located 220 km south of the mine. The mill was purchased from Silver Eagle in early 2009. The Miguel Auza mill operates a conventional grinding/flotation/filtration circuit producing separate silver-lead and silver-zinc concentrates. It has the capacity to process approximately 350 tpd of the high-grade Platosa ore with size of the flotation circuit being the limiting factor. This capacity exceeds the mine production rate and, as a consequence, the mill operates on a variable schedule of several days on then several days off depending on mine and shipping schedules. Certain maintenance activities are carried out on the days the mill is not operating in order to minimize disruptions.

Mill production metrics for 2011, 2012, and 2013 are detailed in Table 17-1.



TABLE 17-1 MILL PRODUCTION – 2011 TO 2013 Excellon Resources Inc. – Platosa Property

	2011	2012	2013
Production			
Tonnes Milled	59,405	48,199	69,862
Head Grade			
Ag (g/t)	796	846	718
Pb (%)	6.24	6.75	6.14
Zn (%)	9.17	11.81	8.00
<b>Recovery to Zn Concentrate</b>			
Ag (%)	9.6	11.0	9.4
Zn (%)	78.5	84.8	80.2
<b>Recovery to Pb Concentrate</b>			
Ag (%)	79.3	82.5	83.2
Pb (%)	75.6	82.1	79.4
<b>Concentrate Production</b>			
Pb (tonnes)	4,949	4,376	5,559
Zn (tonnes)	8,428	9,393	9,019
<b>Contained Metal</b>			
Ag (oz)	1,383,881	1,223,835	1,492,382
Pb (lbs)	6,337,117	5,885,231	7,559,042
Zn (lbs)	9,501,055	10,678,190	10,037,673

Flotation separation and recovery of lead and zinc concentrates from ores containing galena (PbS) and sphalerite (ZnS) are well established and are achieved quite effectively at Miguel Auza. Silver provides the greatest economic value and is primarily associated with the galena mineralization.

The process of comminution starts with crushing and grinding the ore to a fine size. This fine grinding separates the individual mineral particles from the waste rock and other mineral particles. The grinding is normally done in water with the resultant slurry called the pulp. The pulp is processed in the flotation cells, which agitate the mixture and introduce air as small bubbles.

Froth flotation is considered to be the most widely used method for ore beneficiation. Flotation is a process in which valuable minerals are separated from worthless material or other valuable minerals by inducing them to gather in and on the surface of a froth layer. This process is based on the ability of certain chemicals to modify the surface properties of the mineral(s). Other chemicals are used to generate the froth and still others are used to



adjust the pH. Certain chemicals are capable of depressing the flotation of minerals that are recovered at a later time. When the latter occurs, the process is termed differential flotation.

Differential flotation is the process used effectively at Miguel Auza to produce separate high quality silver/lead and silver/zinc concentrates from the Platosa ore.

## PROCESS DESCRIPTION

A simplified flow sheet of the Miguel Auza Mill is shown in Figure 17-1.

Crushed ore (minus 3/8 in.) is hauled by truck from the Platosa Mine to the various fine ore stockpiles at the Miguel Auza mill. The stockpiles have a total capacity of approximately 1,500 tonnes, equivalent to slightly more than four days of milling. The individual stockpiles are sampled as material is received so that blending can be performed thus providing a consistent mill feed grade. Ore is hauled by front-end loader to the fine ore hopper feeding the ball mill. Sodium cyanide is added to the ball mill feed to depress the zinc in the subsequent flotation circuit. The ball mill reduces the particle size to minus 400 mesh (minus  $35~\mu m$ ) and operates in closed circuit with a pump box feeding a bank of cyclones. Oversize from the cyclone underflow is returned to the mill for further grinding whereas the cyclone overflow product is sent to the flotation circuit.

The cyclone overflow is pumped to a conditioning tank where the pH is adjusted and lead circuit flotation reagents (collector and frother) are added. A silver-lead concentrate is produced from a bank of lead rougher and scavenger flotation cells. The concentrate is upgraded using both primary and secondary cleaning cells. The final silver-lead concentrate is then filtered to reduce the water content. The filtered concentrate is stored in a dedicated covered compartment prior to loading and haulage to the port by truck.

Tailings from the lead scavenger circuit is fed to a series of conditioning tanks where the pH is adjusted and copper sulphate is added to activate the zinc, previously depressed prior to the slurry entering the lead flotation circuit. Other flotation reagents are added as required. A silver-zinc concentrate is produced from a bank of zinc rougher and scavenger flotation cells. The concentrate grade is upgraded using both primary and secondary cleaning cells. The final silver-zinc concentrate is then filtered to reduce the water content. The filtered



concentrate is stored in a dedicated covered compartment prior to loading and haulage by truck to the port.

Tailings from the zinc scavenger circuit are pumped to the tailings pond for final disposal. The tailings pond is located to the northwest of the mill.

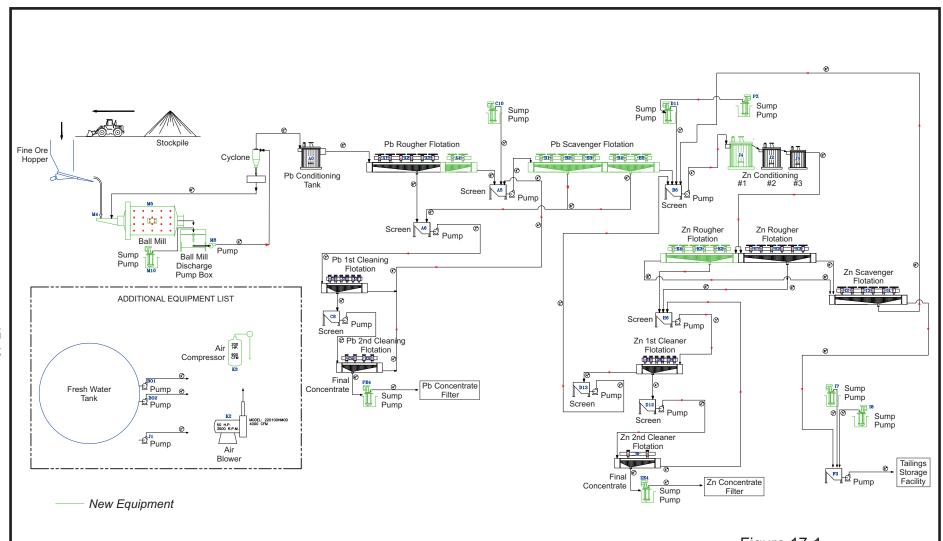


Figure 17-1

## **Excellon Resources Inc.**

Miguel Auza Mill Zacatecas State, Mexico

**Simplified Process Flowsheet** 

March 2014 Source: Excellon Resources Inc., 2011.



#### TAILINGS DISPOSAL

The current tailings pond has a design capacity of 305,800 tonnes. A final 1.8 m high lift of the tailings dam is planned for the summer of 2014. When this is completed, the tailings pond will have a remaining capacity of 95,000 tonnes, sufficient for 21 months of operation (until early 2016). Excellon has identified a site for a new tailings pond near the current facility.

In order to proceed with the design and permitting of a new tailings disposal site, the following items will need to be completed:

- Topographic survey of the proposed site.
- Site geological and geomorphological studies, surface and underground geohydrology determinations as well as soil studies required to support dam design.
- Detailed design of the tailings dam.
- Preparation of a technical study of the change in land usage and authorization from SEMARNAT (Secretaria del Medio Ambiente y Recursos Naturales), Mexico's equivalent of the Ministry of Environment.
- Processing of an environmental impact statement and authorization from SEMARNAT.
- Construction and commissioning of the new tailings disposal site.

Excellon estimates a total time frame of eight months to design the facility and obtain the necessary permits, followed by a six-month construction period. Excellon has initiated the tailings pond permitting and design process.



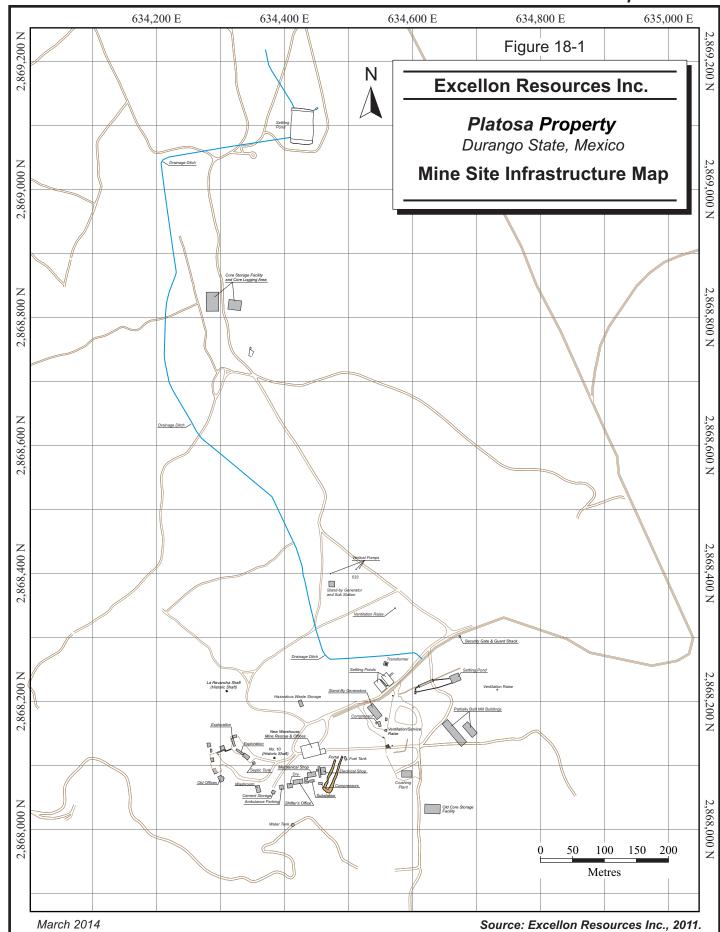
### 18 PROJECT INFRASTRUCTURE

The Platosa Mine and Miguel Auza Mill are active and have developed infrastructure to support both the mining and milling operations. There are well maintained gravel and paved roads that access the sites as well as a network of roads on each site to service the various ancillary facilities. Water sources have been developed for both the mine and mill and electrical power is supplied to both sites from the national grid.

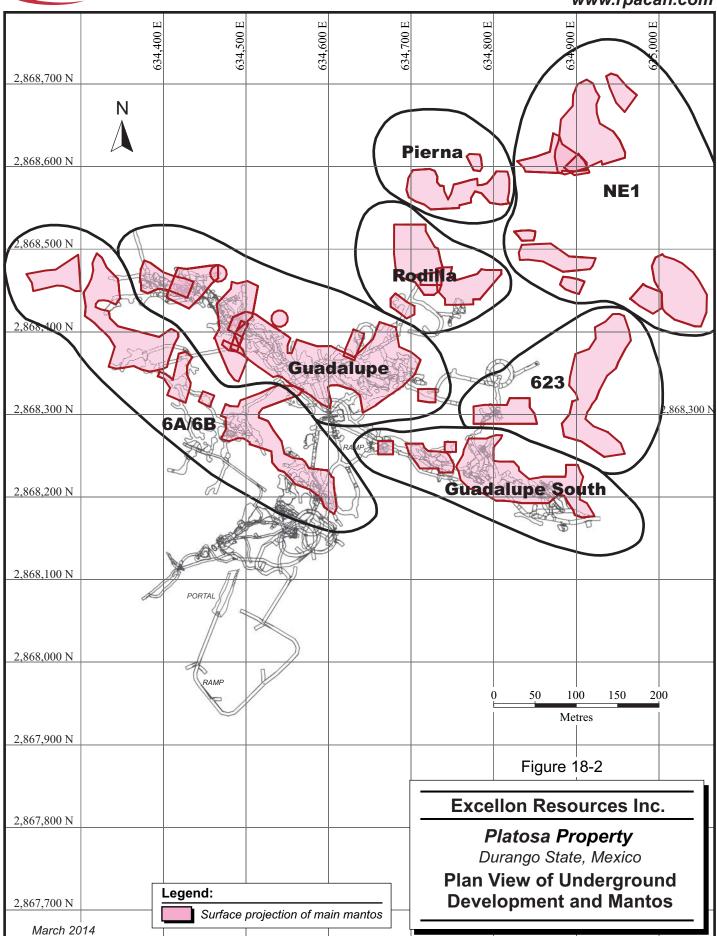
The Platosa Property mine site facilities and underground development and mantos (shown in Figures 18-1 and 18-2, respectively) include the following:

- A two-story administrative building covering an area of 3,000 m<sup>2</sup>, with office space, including a conference room, and a warehouse and first aid/mine rescue facilities.
- A 500 m<sup>2</sup> maintenance shop with facilities and tools needed for the repair of mobile equipment.
- Other smaller buildings including a 150 m<sup>2</sup> mine dry, 100 m<sup>2</sup> shift change office and an electrical shop.
- A 100 tonne per hour surface crushing plant comprising a 3,000-tonne capacity concrete lined coarse ore storage stockpile area, a 4 ft by 16 ft vibrating grizzly, a 40 in. by 26 in. Terex jaw crusher and an electro-magnet. A Nordberg 5 ft by14 ft vibrating horizontal screen, a 40 in. by 26 in. FIMSA secondary impact crusher, a fine ore truck loading system and a 3,000-tonne capacity concrete lined fine ore storage stockpile area.
- A 20,000 litre diesel storage tank and fuelling station.
- Buildings and surface facilities housing compressors, electrical substations, and standby generators,
- Diamond drill core logging and storage facilities.
- A 200,000 cfm ventilation fan, a network of mine dewatering pumps, and underground and surface water settling ponds.
- Underground infrastructure, including ramps, raises, ventilation/service raises, explosives magazines, and material storage facilities.







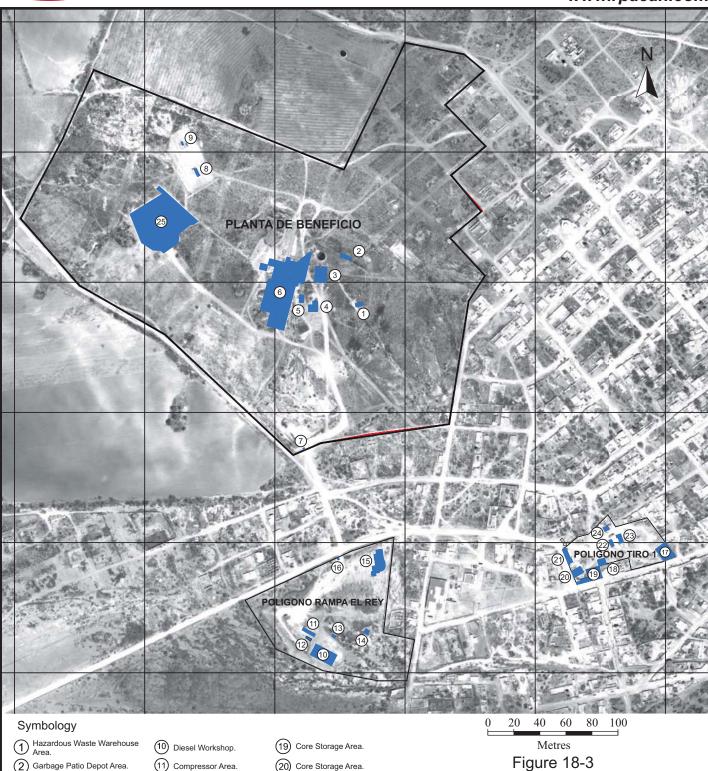




The Miguel Auza Property site and mill facilities include the following (Figure 18-3):

- Two-storey administrative building located in the town of Miguel Auza. The primary warehouse building for the mill and the site security offices are located here as well.
- A nominal 350 tpd mill consisting of circuits for crushing, grinding, flotation, and filtration.
- An assay laboratory consisting of separate areas for sample preparation, sample drying, sample weighing, wet assaying, fire assaying, atomic absorption assaying, and mill process testing.
- An electrical-mechanical workshop.
- Secured hazardous waste areas for the temporary storage of used oil, solids impregnated with petroleum products, batteries, empty cyanide containers, empty acid containers and empty paint containers.
- A 2,400 tonne capacity coarse ore stockpiling area.
- A 300 tonne capacity lead concentrate storage area.
- A 300 tonne capacity zinc concentrate storage area.
- A process water supply pumping and storage system.
- Surface facilities housing compressors and electrical substations.
- A tailings disposal facility.





- (2) Garbage Patio Depot Area.
- Blectrical Repair Shop and Warehouse Area.
- (4) Lab Area.
- Bathroom and Changing Rooms Area.
- 6 Ore Concentration Plant Area.
- (7) Guard house Area.

March 2014

- 8 Explosives Storage Building (inactive).
- 9 Explosives Storage Building (inactive).

- (11) Compressor Area.
- Substation and Warehouse Area.
- (13) Diesel Pump Area.
- Area (No walls/open warehouse).
- 15) Ramp Area Offices.
- (16) Guard House.
- (17) Administrative Offices Area.
- (18) Warehouse Area.

- (20) Core Storage Area.
- (21) Core Storage Area.
- (22) Shaft Structure 1.
- Pump and Substation Warehouse.
- (24) Hoist Room Area.

Source: Excellon Resources Inc., 2013.

(25) Tailings Storage Area.

## **Excellon Resources Inc.**

Miguel Auza Mill Zacatecas State, Mexico

Mill Site Infrastructure Map



## 19 MARKET STUDIES AND CONTRACTS

#### **MARKETS**

The principal commodities at Platosa are freely traded, at prices that are widely known, so that prospects for sale of any production are virtually assured.

The concentrates produced from the Platosa deposit are of marketable grade and do not contain any deleterious elements or contaminants which would limit the number of smelters capable of processing the concentrates.

#### CONTRACTS

The Platosa Mine is in operation and has been in operation for a number of years. There are numerous contracts in place for items including the transportation of ore from the mine to the mill, transportation of concentrates from the mill to the port, as well as other service contracts related to the operation and contracts for energy and supplies. These are usual contracts for an operating mine and mill.

Excellon currently has concentrate sales contracts in place with Trafigura Mexico, S.A. de C.V. RPA has included the contract terms in our evaluation, but the terms of the contracts are confidential and are not disclosed in this report. The Miguel Auza processing facility produces both lead and zinc concentrates and separate sales contracts describe the treatment terms applicable to each of the concentrates.



# 20 ENVIRONMENTAL STUDIES, PERMITTING, AND SOCIAL OR COMMUNITY IMPACT

#### **PERMITTING**

#### PERMITS AT PLATOSA

Most mining activities are carried out under the terms of a permit called *Planta de beneficio y presa de jales de la Unidad La Platosa* (Mill and Tailings Management Area of Platosa), issued by the Mexican *Secretaria de Medio Ambiente y Recursos Naturales y Pesca* (The Secretariat of Environment and Natural Resources, or SEMARNAT). This permit was issued in 2008 to allow for construction of a concentrator and tailings management area on site. A bond was not required. To maintain the permit in good standing, Excellon must report activities on an annual basis, particularly any changes such as an increase in production. The permit expires in 2023 and can be renewed.

The operation holds a second permit, called *Licencia Ambiental Unica* (Environmental Licence), issued by SEMARNAT in 2013. This permit governs particulate emissions from the crushing plant and storage and disposal of hazardous wastes in general. The permit remains valid for as long as there are no significant changes in emissions or use of hazardous materials at the operation. In addition, Excellon must adhere to the plans outlined in its permit application.

Platosa also holds an explosives permit issued by the *Secretaria de la Defensa Nacional* (The Secretariat of National Defence). This permit is valid until December 31, 2014 and must be renewed on an annual basis.

Exploration activities, particularly drilling, are also governed by SEMARNAT regulations. The company is preparing a new drilling plan to accompany a *Manifiesto de Impacto Ambiental*, (an environmental impact statement) and a *Cambio de Uso de Suelo* (change of land use) application for the areas to be affected. The approval of affected surface rights holders is required. Excellon owns the surface rights for most of the affected areas and has ongoing cordial business relations with the owner of the remaining lands and expects that SEMARNAT will issue the required permit without delay.



The operating permits for the Platosa Mine are listed in Table 20-1.

## TABLE 20-1 OPERATING PERMITS AT PLATOSA Excellon Resources Inc. – Platosa Property

Description	Area Included	<b>Effective Date</b>	<b>Expiry Date</b>
Environmental Impact of a Mill & Tailings Area	Mine, mill & tailings area	Sept. 12, 2008	Sept. 11, 2023
Environmental Licence	Crusher and wastes	June 2013	None. See text.
Explosives Permit	Mine	Jan, 1, 2014	Dec. 31, 2014
Approximated Environmental Impact Statement	Exploration	Application	in progress
Change of Land Use	Exploration	Application	in progress

There is no concentrator or tailings area on site. There are small piles of spoils from historic artisanal mining activities in several locations on the property, but Excellon has no responsibility for these. There is no evidence of acid mine drainage at any of these sites and they do not appear to present a hazard. The mine has a waste rock disposal area adjacent to the portal, but since completion of the main ramp, there has been little or no waste transported to surface. There is also a mine water settling pond system located near the mine and a series of ditches/canals and another settling pond, some of which are concrete lined, leading from the mine to the northern portion of the property where the mine water is distributed on the surrounding surface area in accordance with Mexican mining regulations. Excellon reports that regular independent, government-approved sampling and analysis indicates that the discharged mine water is of agricultural quality, similar in character to groundwater found elsewhere in the regional basin.

Excellon reports that the property and mine are inspected regularly by PROFEPA, SEMARNAT's inspection branch, and other governmental authorities, and with occasional minor exceptions, the operation has always been found to comply with Mexican environmental, safety, and general labour law requirements.



#### PERMITS AT MIGUEL AUZA

Operating permits for Miguel Auza are listed in Table 20-2. The "Conditional approval of environmental impact statement" is an umbrella permit that references the other listed permits and has no expiry date provided conditions in the other permits are met.

The registration of Excellon's plan to handle hazardous waste is not a permit per se. Excellon submitted a plan to handle such waste and this document is SEMARNAT's acceptance of the plan. It remains valid for as long as there are no significant changes in the amounts or use of hazardous materials at the operation.

TABLE 20-2 OPERATING PERMITS AT MIGUEL AUZA Excellon Resources Inc. – Miguel Auza Property

Permit Type	Area Included	Effective Date	Expiry Date
Subsurface water use	Mill & general property	August 1994	August 2024
Water discharge	General property	January 2008	January 2018
Conditional approval of environmental impact statement	General property	September 2005	September 2016
Change of land use	Ramp & tailings area construction	September 2005	None
Registration of Excellon's Plan to Handle Hazardous Waste at its Metallurgical Operation	General property	December 2012	None
Conditional approval of environmental impact statement	General property	October 2013	None

#### **BLOCKADE IN 2012**

In early July 2012, three days following a government supervised union election at the mine, the losing union launched a blockade of the mine with the support of an NGO, and the support of a local agrarian community. The blockade closed the mine completely for two months and halted production for three months. Excellon reports that the allegations against the company have since been reviewed and dismissed by the Organization for Economic Cooperation and Development (the "OECD") and the Mexican Federal Environmental Protection Agency ("PROFEPA").

Excellon reports full support of its workers, the local communities and all levels of Mexican government and states that it is in full compliance with all of its commitments and all Mexican laws.



A more chronological summary of blockade is provided below:

- On July 5, 2012, a union vote of the workers at Platosa was held to determine the representative union of the mine. The Sindicato Nacional Minero Metalúrgico Napoleón Gómez Sada (the Sada Union), which represents approximately 5,200 workers in many of Mexico's major mining companies, won the most votes at the election based on initial results.
- Three days later, on July 8, 2012, members of the Sindicato Nacional de Trabajadores Mineros Metalúrgicos, Siderúrgicos y Similares de la República Mexicana (the "Los Mineros"), along with a local communal land ownership group, the Ejido La Sierrita, both under the direction of a non-governmental organization, ProDESC, and with the assistance of certain union members, blockaded the mine.
- On August 29, 2012, a combined group of state and federal officers peacefully reopened access to the mine via a new access located approximately one mile from the main mine site access.
- On September 10, 2012, Excellon announced that it had peacefully regained full access and control of La Platosa through the main mine site access. On October 15, Excellon resumed production at La Platosa.
- On October 23-24, 2012, protesters attempted to blockade a communal access road that was required to transport ore. The protestors dispersed on October 24 and production and shipping has continued uninterrupted since that time.



### 21 CAPITAL AND OPERATING COSTS

#### **CAPITAL COSTS**

Excellon uses the Annual Budget as its planning guide for the operation. As this only covers the current year's production, RPA has estimated the ongoing capital costs required to extract the estimated recoverable portion of the Measured and Indicated Mineral Resources. Future capital cost estimates are based on 2013 actual capital expenditures. Ongoing capital costs are estimated by RPA to total \$27.2 million, summarized in Table 21-1, and include mine development, mine equipment and infrastructure, mill equipment and infrastructure, tailings management and closure costs.

TABLE 21-1 CAPITAL COST ESTIMATE Excellon Resources Inc. – Platosa Property

Year	Mine Development (\$000)	Mine Equipment and Infrastructure (\$000)	Mill Equipment and Infrastructure (\$000)	Mine and Mill Closure (\$000)	Total (\$000)
2014	2,000	1,800	300		4,100
2015	2,000	1,800	800		4,600
2016	2,000	1,800	800		4,600
2017	2,000	1,800	300		4,100
2018	2,000	1,800	300		4,100
2019	2,000	1,800	300		4,100
2020					0
2021				1,600	1,600
Total	12,000	10,800	2,800	1,600	27,200

Capital mine development includes continued excavation of the Rodilla, 725, and NE1 ramps in order to provide access to the Rodilla, Pierna, 623, and NE1 mantos.

The following surface and underground infrastructure additions have been identified and are included in the Mine Equipment and Infrastructure column of Table 21-1:

- The construction of six new 2.4 m diameter ventilation/service raises to be located in the 725 ramp, the Rodilla/Pierna ramp (2), the NE1 ramp, the 6A Manto and another not yet defined location.
- Installation of additional vertical surface pumps in the Robbins R-VI and Rodilla ramps as well as relocation of the 1,000 hp pump (location not yet defined).



- Installation of a second 200,000 cfm ventilation fan in the 6A Manto to increase the system capacity (fan purchased and on site).
- Construction of a 1,000 m<sup>2</sup> underground mobile equipment repair shop.
- Construction of an additional escapeway in Robbins R-V1.
- Installation of a 20-man refuge station. Excellon reports that this work was completed in the winter of 2014.
- Mobile equipment replacement as required.

An allowance of \$1 million has been included for the design, permitting, and construction of a replacement tailings pond.

Mine closure costs are based on a reclamation and closure plan study completed by Servicios Multiples Integrades, S.C. in December 2011. The mill closure costs reflect a reclamation and closure plan study completed by Acro Technologies de la Laguna, S.A. de C.V. in March 2012.

#### **OPERATING COSTS**

Cash operating costs for 2013 were \$19.8 million, with unit costs shown in Table 21-2.

TABLE 21-2 UNIT OPERATING COSTS Excellon Resources Inc. – Platosa Property

Item	2013 Budget (\$)	2013 Actual (\$)
Mining	237.97	189.77
Milling	62.75	51.37
G & A	35.52	42.54
Total	309.49	283.68

RPA considers 2013 actual costs to be representative of the current mining conditions and expected conditions for the remainder of 2014. It is RPA's opinion that operating costs will increase by approximately 5% annually from 2015 onward as mining productivities decrease due to increased depth, distance from the mining areas to the mine portal, and the transition from flat to more steeply dipping and smaller tonnage mantos. Additional manpower and equipment will be required to maintain production targets.



#### **MANPOWER**

The current manpower at the Platosa Mine and Miguel Auza Mill is summarized in Table 21-

3. The table includes both company and contractor employees.

TABLE 21-3 MANPOWER
Excellon Resources Inc. – Platosa Property and Miguel Auza Mill

Department	Com	pany	Contractor	Total	
-	Staff	Hourly			
Mine	8	130	23	161	
Mill	5	15		20	
Maintenance	8	64	12	84	
Technical Services	12	3	6	21	
Administration	30			30	
Security			45	45	
Total	63	212	86	361	



## 22 ECONOMIC ANALYSIS

RPA notes that Excellon is a producing issuer as defined by NI 43-101, the Platosa Mine is currently in production, and a material expansion is not being planned. RPA has performed an economic analysis of the Platosa Mine using the estimates presented in this report and confirms that the outcome is a positive cash flow.

Based on a silver price of \$20.00 per ounce, a lead price of \$1.00 per pound, a zinc price of \$1.00 per pound, and the concentrate smelting contracts currently in place, net revenues are forecasted to average \$481 per tonne of mill feed. Operating costs and capital costs are forecasted to average \$360 per tonne and \$54 per tonne for a total of \$410 per tonne. Although the margin between net revenue and costs is forecast to be lower than it has been in recent years, largely due to more conservative metal prices, RPA notes that economic outcomes remain positive.



## 23 ADJACENT PROPERTIES

The Ojuela property, currently owned by Industrias Peñoles, is a historic CRD producer located adjacent to the south-central portion of the property. Ojuela is reported to host additional, apparently uneconomic, CRD mineralized zones. The Ojuela property has not been in production since the 1930s, however, artisanal miners are known to be mining small amounts of material from and adjacent to the historically mined areas.

Within the Platosa Property, there are five small concessions owned by third-party companies or individuals totalling approximately 400 ha in area. None are located close to the known Platosa mantos. The Mexican Geological Survey (SGM) holds two of these small concessions, both within the southern portion of the property.

Sundance Minerals Limited (Sundance), a private Canadian junior company, holds a property contiguous with the western boundary of Excellon's Venux mineral concession. Excellon held the property under option from Sundance from October 2010 to February 2012.

Both Peñoles and SGM hold other concessions within three kilometres west and southwest of the Platosa Property boundary. Neither RPA nor Excellon is aware of recent or ongoing exploration activity by companies, adjacent to or near the Platosa Property.



# 24 OTHER RELEVANT DATA AND INFORMATION

No additional information or explanation is necessary to make this Technical Report understandable and not misleading.



## 25 INTERPRETATION AND CONCLUSIONS

The Platosa Property is underlain by folded and faulted Mesozoic sedimentary rocks, locally intruded by dykes and sills of Laramide age. The Platosa mineral deposit is thought to represent the distal portion of a high-temperature epigenetic silver-lead-zinc CRD. This distal portion, located at the intersection of the Platosa Structural Zone with a northeast-striking lineament, is characterized by series of mantos and chimneys collectively forming the current Mineral Resource. A regional exploration program is underway to search for proximal-style CRD mineralization. This could be a mineralized intrusive body and/or a mineralized skarn adjacent to such an intrusive and may represent a large-tonnage deposit.

Excellon provided a title opinion regarding the validity of its mining concessions prepared by RB Abogados of Mexico City, Mexico and bearing the date of March 14, 2014. In the document, RB Abogados concluded that the concessions were in good standing and faced no claims or challenges as to their validity. The opinion does not comment on surface rights.

Excellon owns or leases several parcels of land and reports that the combined area is sufficient to carry out the current mining activities. Part of the leased land is currently under dispute with the local Ejido. Depending on the outcome of the dispute and associated legal proceedings, Excellon may be required to move some mining related infrastructure. Although this will add cost and may delay access to some parts of the deposit, RPA does not consider it to be a fatal flaw in the operation.

The exploration work conducted by Excellon on the Platosa Property has been performed in a competent manner according to accepted industry standards. The exploration methods and strategies are appropriate for the geological environment and styles of mineralization present. The drill hole database was verified by RPA and is suitable for Mineral Resource estimation work.

The sulphide mineralization intersected at and around the mine has not been completely closed off by drilling. There is excellent potential to discover additional manto style mineralization around the current Mineral Resources. In addition, several excellent exploration targets, including the Rincon del Caido prospect, may lie on the periphery of a



large-tonnage, intrusive-related proximal CRD deposit similar to those found elsewhere in Mexico.

Mineral Resources were estimated and classified by RPA following CIM best practices. Using a nominal incremental NSR cut-off value of US\$189/t, Measured plus Indicated Mineral Resources are estimated to total 484,000 tonnes grading 777 g/t Ag, 8.42% Pb, and 10.15% Zn, containing 12.094 million ounces Ag, 89.864 million pounds Pb, and 108.427 million pounds Zn. Inferred Mineral Resources are estimated to total 3,000 tonnes grading 2,324 g/t Ag, 16.93% Pb, and 1.74% Zn, containing 255,000 ounces Ag, 1.274 million pounds Pb, and 131,000 pounds Zn. The Mineral Resources are insensitive to both NSR cut-off value and silver price.

The estimate is of Mineral Resources only and, because these do not constitute Mineral Reserves, they do not have any demonstrated economic viability. There are no Mineral Reserves estimated on the property. Underground mining to date has confirmed that the individual mantos are highly irregular and unpredictable with respect to shape, dip, thickness, extent, and grade. This variability extends both horizontally and vertically. The design of stope mining shapes, a necessary pre-cursor in the process of estimating of Mineral Reserves, cannot be accurately accomplished based on the current drill information. Mining shapes, mining sequences, and modifying factors cannot be determined with a sufficient level of accuracy to convert Mineral Resources to Mineral Reserves based on the CIM definition standards for reporting Mineral Reserves.

For most underground deposits, the inability to define accurate stope shapes and prepare an accurate mining sequence and LOMP would be a significant production and economic risk. This is not the case at Platosa, however, due to the high operating margin which results from the higher than average grade of the deposit.

The ground has been very competent and, in general, very little ground support is required. There has been no problem to date extracting all the mineralized material. As the mineralized material is high grade, there can be a tendency to over-excavate the mining headings to ensure full extraction. Back calculation of previously mined areas compared to the Mineral Resource estimate suggests that the mining recovery factor is approximately 85% and dilution is in the range of 10% to 25% depending on the size and orientation of the manto.



During 2013, Excellon pumped an average of approximately 12,500 gpm, or 800 L/s, of water to surface 24 hours per day. In order to maintain pumping in the event of disruptions from the primary provider of electricity, Excellon has installed a sufficient number of generators to power all of the dewatering pumps. The current capacity of the mine water pumping system is in the order of 26,000 gpm.

Historical records show that pumping requirements are increasing by an average of 2,000 gpm per year. Based on this trend, Excellon are projecting pumping needs to average 16,500 gpm in 2014 and 18,000 gpm in 2015. Although there is sufficient pumping and generating capacity to absorb the projected increases in water inflow as more laterally extensive and deeper ground is opened up for mining, additional pumps and the relocation of some of the current pumps will most likely be required over time.

The Miguel Auza concentrator produces both marketable silver-lead and silver-zinc concentrates with metal recovery rates that meet industry standards for similar ore types.

The current tailings pond had an original capacity of 305,800 tonnes. A final 1.8 m high lift of the tailings dam is planned for the summer of 2014. When this is completed, the tailings pond will have a remaining capacity of 95,000 tonnes, sufficient for 21 months of operation (until early 2016). Excellon estimates a total time frame of eight months to design the facility and obtain the necessary permits followed by a six-month construction period. Excellon has initiated the tailings pond permitting and design process.

Ongoing capital costs have been estimated by RPA to total \$27.2 million and include mine development, mine equipment and infrastructure, mill equipment and infrastructure, tailings management and closure costs.

In RPA's opinion, operating costs will increase by approximately 5% annually from 2015 onward as mining productivities decrease due to increased depth, and the transition from flat to more steeply dipping and smaller tonnage mantos.

RPA is not aware of any environmental liabilities on the property. Excellon reports that it has all required permits to conduct the proposed work on the property. RPA is not aware of any other significant factors and risks that may affect access, title, or the right or ability to perform the proposed work program on the property.



In early July 2012, three days following a government supervised union election at the mine, the losing union launched a blockade of the mine with the support of an NGO, and the support of a local agrarian community. The blockade closed the mine completely for two months and halted production for three months. Excellon reports that the allegations against the company have since been reviewed and dismissed by the OECD and PROFEPA.

Excellon reports full support of its workers, the local communities, and all levels of Mexican government and states that it is in full compliance with all of its commitments and all Mexican laws.



## **26 RECOMMENDATIONS**

Prior to suspending drilling in mid-May 2013 in response to the sudden unanticipated drop in the price of silver, Excellon was in the midst of an aggressive 2013 drilling program. The initial focus was on the Rincon del Caido area, which hosts significant skarn-hosted, proximal style CRD mineralization. Drilling was also carried out near the known mantos in the search for additional high-grade massive sulphides. RPA supports Excellon's intention to resume drilling on a modest scale when market conditions permit. A portion of the proceeds from exploiting the Platosa deposit finances the ongoing compilation and planning work and will fund renewed diamond drilling, as it has done since August 2005.

The proposed 2014 exploration budget for Platosa is \$5,000,000 (Table 26-1). Excluding concession rental payments, approximately 90% of the proposed expenditures are budgeted for diamond drilling. The proposed drilling budget will largely be spent within three kilometres of the mine. Over 90% of the drilling will target additional high-grade manto CRD sulphides similar to those currently being mined at Platosa, and the remaining drilling will be dedicated to the search for a high-tonnage intrusive-related CRD, which may represent the source of the mantos. The initial proximal holes will follow up on the encouraging skarn-sulphide mineralization found at Rincon del Caido in 2012 and early 2013. The split between manto and source drilling will be subject to change depending on results as the program progresses. The remainder of the field budget will be spent on a small amount of geological mapping and small geophysical surveys.



## TABLE 26-1 PROPOSED EXPLORATION WORK PLAN AND BUDGET Excellon Resources Inc. – Platosa Property

Туре	Units	Unit Cost (US\$)	Total Cost (US\$ 000)
Downhole PEM survey, incl. equipment mob/demob cost from Canada & consulting fees	3 holes	8,000	24
Seismic survey, incl. equipment mob/demob cost from the USA & consulting fees			40
Geology	60 man days	400	24
Geochemical & biogeochemical surveying			30
Specific Gravity determinations	200 samples	40	8
Manto diamond drilling – contractor, water, core boxes, other supplies & environmental rehab costs	27,000 m	125	3,375
Source diamond drilling – contractor, water, core boxes, other supplies & environmental rehab. costs	2,000 m	200	400
Local supervisory & core logging labour (geologists)			335
Field technician & draftsman labour			40
Core handling & splitting labour			25
Core assaying	7,000 samples	39	273
Drill hole orientation surveying			16
Software/hardware, technical studies, research & QA/QC consulting fees			50
Property submissions, seminars, Mexican staff travel			30
Government concession rental payments/holding costs			330
Total			5,000



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## 28 DATE AND SIGNATURE PAGE

This report titled "Technical Report on the Platosa Property, Bermejillo, Durango State, North Central Mexico" and dated March 25, 2014, was prepared and signed by the following authors:

(Signed & Sealed) "David Ross"

Dated at Toronto, Ontario March 25, 2014

David Ross, P.Geo. Principal Geologist

(Signed & Sealed) "Robert Michaud"

Dated at Denver, Colorado March 25, 2014

Robert Michaud, P.Eng. Associate Principal Mining Engineer



#### 29 CERTIFICATE OF QUALIFIED PERSON

#### DAVID ROSS

I, David Ross, M.Sc., P.Geo., as an author of this report entitled "Technical Report on the Platosa Property, Bermejillo, Durango State, North Central Mexico", prepared for Excellon Resources Inc., and dated March 25, 2014, do hereby certify that:

- 1. I am a Principal Geologist with Roscoe Postle Associates Inc. of Suite 501, 55 University Ave., Toronto, ON, M5J 2H7.
- 2. I am a graduate of Carleton University, Ottawa, Canada, in 1993 with a Bachelor of Science degree in Geology and Queen's University, Kingston, Ontario, Canada, in 1999 with a Master of Science degree in Mineral Exploration.
- 3. I am registered as a Professional Geoscientist in the Province of Ontario (Reg. #1192). I have worked as a geologist for 20 years since my graduation. My relevant experience for the purpose of the Technical Report is:
  - Review and report as a consultant on numerous mining and exploration projects around the world for due diligence and regulatory requirements
  - Exploration geologist on a variety of gold and base metal projects in Canada, Indonesia, Chile, and Mongolia.
- 4. I have read the definition of "qualified person" set out in National Instrument 43-101 ("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.
- 5. I visited the Platosa Property on April 18 to 20, 2006, on February 13, 2007, from November 9 to 11, 2009, September 14 to 16, 2011, and most recently from July 30 to August 1, 2013.
- 6. I am responsible for the overall preparation of the report and Sections 2 to 12, 14, 20, 23, 24, and parts of Sections 1, 25, and 26 of the Technical Report.
- 7. I am independent of the Issuer applying the test set out in Section 1.5 of NI 43-101.
- 8. I have previously co-authored independent technical reports on the Platosa property.
- 9. I have read NI 43-101, and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.



10. At the effective date of this Technical Report, to the best of my knowledge, information, and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the technical report not misleading.

Dated this 25th day of March, 2014.

(Signed & Sealed) "David Ross"

David Ross, M.Sc., P.Geo.



#### ROBERT MICHAUD

- I, Robert Michaud, P.Eng., as an author of this report entitled "Technical Report on the Platosa Property, Bermejillo, Durango State, North Central Mexico", prepared for Excellon Resources Inc., and dated March 25, 2014, do hereby certify that:
- 1. I am Associate Principal Mining Engineer with Roscoe Postle Associates Inc. of Suite 501, 55 University Ave Toronto, ON M5J 2H7.
- 2. I am a graduate of Queen's University, Kingston, Ontario, Canada, in 1976 with a Bachelor of Science degree in Mining Engineering and Queen's University, Kingston, Ontario, Canada, in 1977 with a Master of Science degree in Mining Engineering.
- 3. I am registered as a Professional Engineer in the Provinces of Ontario (31570013) and Quebec (37287). I have worked as a mining engineer for a total of 32 years since my graduation. My relevant experience for the purpose of the Technical Report is:
  - Operations management of several underground mines;
  - Construction project management and start-up of several underground mines;
  - Management of technical studies and numerous mine designs and feasibility studies;
  - Review and report as a consultant on numerous mining projects around the world for due diligence and regulatory requirements.
- 4. I have read the definition of "qualified person" set out in National Instrument 43-101 (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.
- 5. I visited the Platosa Property from July 30 to August 1, 2013. I visited the Miguel Auza Property from April 13 to 15, 2010.
- 6. I am responsible for Sections 13, 15 to 19, 21, 22, and parts of Sections 1, 25 and 26 of the Technical Report.
- 7. I am independent of the Issuer applying the test set out in Section 1.5 of NI 43-101.
- 8. I have had no prior involvement with the property that is the subject of the Technical Report.
- 9. I have read NI 43-101, and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.
- 10. At the effective date of the Technical Report, to the best of my knowledge, information, and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated this 25<sup>th</sup> day of March, 2014.

(Signed & Sealed) "Robert Michaud"

Robert Michaud, M.Sc., P.Eng.



## **30 APPENDIX 1**

#### **MINERAL CONCESSIONS**



TABLE 30-1 MINERAL CONCESSION LIST (FEBRUARY 2014)
Excellon Resources Inc. – Platosa Project

Concession Name	Appl. No.	Title No.	Date Issued	Date Expires	Size (ha)
PLATOSA PROPERTY					
EXCELLON 100% (No royalty)					
LA PLATOSA		232467	15-Aug-2008	14-Aug-2058	19.7965
AMPL. DE LA PLATOSA		232466	15-Aug-2008	14-Aug-2058	9.9689
2DA. AMPL. DE LA PLATOSA		232465	15-Aug-2008	14-Aug-2008	20.0000
3RA. AMPL. DE LA PLATOSA		232464	15-Aug-2008	14-Aug-2058	55.8726
4TA. AMPL. DE LA PLATOSA		144188	30-Sep-1965	29-Sep-2015	8.6303
5TA. AMPL. DE LA PLATOSA		143509	31-May-1965	30-May-2015	5.6855
6TA. AMPL. DE LA PLATOSA		146350	29-Sep-1966	28-Sep-2016	8.0113
7TA. AMPL. DE LA PLATOSA		149264	16-Mar-1968	15-Mar-2018	10.0000
EL POETA		207685	10-Jul-1998	9-July-2048	659.0722
EL POETA 1		224509	17-May-2005	16-May-2055	63.1679
EL POETA 2		209764	9-Aug-1999	8-Aug-2049	0.7364
EL POETA 3 FRACCION 2		211322	28-Apr-2000	27-Apr-2050	49.8661
EL POETA 3 FRACCION 3		211323	28-Apr-2000	27-Apr-2050	0.1171
EL POETA 3 FRACCION 4		211324	28-Apr-2000	27-Apr-2050	0.1171
EL POETA 3 FRACCION 5		211325	28-Apr-2000	27-Apr-2050	0.1171
EL POETA 3 FRACCION 6		211326	28-Apr-2000	27-Apr-2050	0.1171
EL POETA 3 FRACCION 7		211327	28-Apr-2000	27-Apr-2050	0.1171
EL POETA 3 FRACCION 8		211328	28-Apr-2000	27-Apr-2050	0.1171
EL POETA 3 FRACCION 9		211329	28-Apr-2000	27-Apr-2050	0.1171
EL POETA 3 FRACCION 10		211330	28-Apr-2000	27-Apr-2050	0.1171
EL POETA 7 FRACCION 1		210876	28-Jan-2000	26-Jan-2050	4.3364
EL POETA 7 FRACCION 2		210877	28-Jan-2000	26-Jan-2050	22.7939
EL POETA 7 FRACCION 3		210878	28-Jan-2000	26-Jan-2050	0.3239
EXCELMEX		208313	23-Sep-1998	22-Sep-2048	2,713.1209
FRACCION EXCELMEX		210270	24-Sep-1999	23-Sep-2049	188.3001
EXCELMEX I		208692	11-Dec-1998	10-Dec-2048	58.3563
EXCELMEX II		208773	11-Dec-1998	10-Dec-2048	4,219.0000
EL POETA 3 FRACCION 1		211321	28-Apr-2000	27-Apr-2050	306.4706
EL POETA 3 FRACCION 11		211331	28-Apr-2000	27-Apr-2050	0.6852
EL POETA 3 FRACCION 12		211332	28-Apr-2000	27-Apr-2050	2.6014
EL POETA 3 FRACCION 13		211333	28-Apr-2000	27-Apr-2050	0.2458
EL POETA 3 FRACCION 14		211334	28-Apr-2000	27-Apr-2050	0.2146
EL POETA 4 FRACCION 1		210962	29-Feb-2000	28-Feb-2050	85.0085
EL POETA 4 FRACCION 2		210963	29-Feb-2000	28-Feb-2050	40.1492
EL POETA 4 FRACCION 3		210964	29-Feb-2000	28-Feb-2050	0.0018
EL POETA 4 FRACCION 4		210965	29-Feb-2000	28-Feb-2050	0.0004
EL POETA 4 FRACCION 5		210966	29-Feb-2000	28 Feb 2050	0.0360
EL POETA 5		210989	29-Feb-2000	28-Feb-2050	298.6430



Concession Name	Appl. No.	Title No.	Date Issued	Date Expires	Size (ha)
EL POETA 10		213222	6-Apr-2001	5-Apr-2051	179.3113
EL POETA 11		213224	6-Apr-2001	5-Apr-2051	127.1009
EL POETA 12		213223	6-Apr-2001	5-Apr-2051	234.8843
BERMEJILLO 1		224275	22-Apr-2005	21-Apr-2055	69.5262
BERMEJILLO 2		210967	29-Feb-2000	28-Feb-2050	60.0110
LEO		211193	11-Apr-2000	10-Apr-2050	82.5784
LEONEL		211024	22-Mar-2000	22-Mar-2050	7.4002
NICK		217248	2-Jul- 2002	1-July-2048	505.5065
EXCELMEX III		227589	18-Jul-2006	17-Jul-2056	2,531.8955
EXCELMEX IV FRACC. 1		227595	18-July-2006	17-July-2056	265.9148
EXCELMEX IV FRACC. 2		227596	18-July-2006	17-July-2056	46.5930
EXCELMEX V		229588	22-May-2007	21-May-2057	8.0000
EXCELMEX VI		232200	4-July-2008	3-July-2058	17.7596
EXCELMEX VII FRACCION		240346	22-May-2012	22-May-2062	73.5427
EXCELMEX VII FRACCION II		240345	22-May-2012	22-May-2062	16,607.2349
EXCELMEX VIII		241342	22-Nov-2012	21-Nov-2062	23.1977
EXCELMEX IX		241343	22-Nov-2012	21-Nov-2062	84.0000
EXCELMEX X		241579	30-Jan-2013	29-Jan-2063	1.2524
Sub-total 100% EXN	56 Conce	essions			29,777.7419
ALTIPLANO (100% EXN with 3	% NSR paya	ble in the e	vent of production	on)	
VENUS FRACCION A		221452	13-Feb-2004	12-Feb-2054	240.8268
VENUS 2		222506	20-July-2004	19-July-2054	1,195.1890
VENUS 3		223295	25-Nov-2004	24-Nov-2054	2,307.9703
VENUS 6		224274	22-Apr-2005	21-Apr-2055	25.0000
CORDERO III		223855	25-Feb-2005	24-Feb-2055	188.5619
GALINGA		223777	15-Feb-2005	14-Feb-2055	1.6640
SANTA JULIA		223781	15-Feb-2005	14-Feb-2055	31.8809
VENADO III		226034	15-Nov-2005	14-Nov-2055	11.7189
CORDERO III		211351	28-Apr-2000	27-Apr-2050	239.7574
CORDERO III		211352	28-Apr-2000	27-Apr-2050	88.5970
VENADO III		210900	28-Jan-2000	27-Jan-2050	49.3818
CASUALIDAD		212312	29-Sep-2000	28-Sep-2050	14.8198
VENADO III		212841	31-Jan-2001	30-Jan-2051	20.7093
LA NAVIDAD		204827	13-May-1997	12-May-2047	13.7421
ESPERANZA		214041	7-Aug-2001	6-Aug-2051	25.7548
BONANZA		214175	10-Aug-2001	9-Aug-2051	28.0000
LA ZORRA		226033	15-Nov-2005	14-Nov-2055	10.0000
LA SIERRITA		216552	17-May-2002	16-May-2052	60.0000
VENUX		232186	4-July-2008	3-July-2058	6,514.2306
VENUX FRACCION UNO		232187	4-July-2008	3-July-2058	8.5710
Sub-total Altiplano Royalty	20 Conce	essions			11,076.3756
Total Platosa Property	76 Conce	essions			40,854.1175



## **31 APPENDIX 2**

#### REPRESENTATIVE DRILL HOLE INTERCEPTS



TABLE 31-1 REPRESENTATIVE DRILL HOLE INTERCEPTS Excellon Resources Inc. – Platosa Property

Hole ID	From	То	Length	Silver	Lead	Zinc	Zone
	(m)	(m)	(m)	(g/t)	(%)	(%)	
EX09LP623	238.25	241.45	3.20	1,121	9.83	9.20	623
EX09LP628	240.29	242.02	1.73	812	5.70	0.63	623
EX09LP632	232.56	245.58	13.02	530	4.35	6.18	623
EX09LP641	206.60	208.60	2.00	1,240	13.40	29.55	623
EX09LP650	221.70	226.01	4.31	3,484	28.62	12.23	623
EX09LP654	185.23	192.28	7.05	1,195	14.75	14.95	623
EX09LP657	170.99	174.35	3.36	2,511	11.03	1.92	623
EX09LP662	173.04	175.14	2.10	2,559	12.30	3.86	623
EX09LP663	179.26	181.19	1.93	1,524	6.12	1.66	623
EX08LP483	139.71	142.62	2.91	634	5.38	4.78	Guadalupe
EX08LP486	139.71	142.62	2.91	634	5.38	4.78	Guadalupe
EX08LP489A	131.21	134.85	3.64	615	0.96	0.23	Guadalupe
EX08LP500	136.66	139.60	2.94	470	5.31	3.59	Guadalupe
EX08LP503	140.36	145.92	5.56	413	6.44	12.74	Guadalupe
EX08LP505	137.16	143.89	6.73	922	13.50	20.26	Guadalupe
EX08LP509	130.26	134.46	4.20	271	7.94	11.05	Guadalupe
EX08LP510	130.07	135.01	4.94	640	4.78	3.94	Guadalupe
EX08LP532	99.75	102.37	2.61	1,462	15.77	20.55	Manto 6
EX08LP534	127.27	129.42	2.15	944	14.62	12.39	Manto 6
EX08LP538	128.88	130.19	1.31	407	1.69	0.69	Manto 6
EX08LP542	114.70	121.10	6.40	1,192	13.76	23.79	Manto 6
EX08LP544	120.69	123.19	2.50	1,420	13.67	7.90	Manto 6
EX08LP558	119.38	121.60	2.22	800	8.08	5.15	Manto 6
EX08LP561	112.40	114.95	2.55	1,575	9.37	8.22	Manto 6
EX08LP565	112.56	118.11	5.55	855	9.86	14.81	Manto 6
EX08LP578	127.50	129.22	1.72	418	3.38	4.26	Manto 6
EX08LP447	220.06	225.55	5.49	521	10.39	14.50	NE1
EX08LP463	220.25	223.05	2.80	309	7.33	7.48	NE1
EX08LP468	203.90	212.60	8.70	481	5.86	13.55	NE1
EX08LP484	212.45	213.95	1.50	315	2.37	1.66	NE1
EX08LP533	263.31	265.31	2.00	369	6.74	10.92	NE1
EX08LP533	215.99	218.24	2.25	803	7.22	5.22	NE1
EX08LP543	207.72	211.33	3.61	372	2.94	4.54	NE1
EX08LP545	204.68	207.76	3.08	576	6.99	23.61	NE1
EX08LP574	286.39	291.71	5.32	468	7.61	16.39	NE1
EX08LP583	292.43	297.48	5.05	352	5.04	8.79	NE1
EX08LP587	297.48	299.48	2.00	403	8.88	3.46	NE1
EX08LP592	305.90	312.98	7.08	351	3.17	4.20	NE1
EX08LP597	307.93	311.43	3.50	529	8.65	1.70	NE1



Hole ID	From (m)	To (m)	Length (m)	Silver (g/t)	Lead (%)	Zinc (%)	Zone
EX08LP599	298.62	300.13	1.51	1,342	22.15	0.05	NE1
EX08LP603	262.75	266.62	3.87	432	9.90	4.28	NE1
EX08LP603	216.50	218.60	2.10	801	9.51	15.87	NE1
EX08LP603	248.85	257.95	9.10	1,235	11.40	5.97	NE1
EX08LP614	301.95	309.55	7.60	1,064	14.55	6.15	NE1
EX08LP617	305.04	307.19	2.15	219	4.95	2.14	NE1
EX09LP652	210.62	212.29	1.67	570	2.33	0.09	NE1
EX08LP442	128.10	132.27	4.17	443	5.29	9.40	Rodilla
EX08LP446	155.31	159.71	4.40	425	4.19	1.39	Rodilla
EX08LP449	171.07	172.41	1.33	463	3.47	1.81	Rodilla
EX08LP477	133.72	135.65	1.93	775	6.48	4.14	Rodilla
EX08LP485	151.12	153.20	2.08	974	7.79	10.45	Rodilla
EX08LP491	150.60	153.44	2.84	653	5.16	5.66	Rodilla
EX08LP493	155.36	160.75	5.39	315	4.29	9.47	Rodilla
EX08LP496	144.34	147.31	2.97	818	7.60	11.68	Rodilla

NOTE: Intersections are core lengths. Estimated true thicknesses range from 75% to 100% of core length.