



Reactive Monitoring Mission to the City of Potosí, Plurinational State of Bolivia (C420)

MISSION REPORT



11-14 December 2013 / 23-30 January 2014

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Finally, thanks should go to the individuals met during the mission who contributed their wisdom and helped in understanding the complex reality of City of Potosí.

EXECUTIVE SUMMARY

Main findings of the mission:

The Supreme Decree 27787, issued on October 8, 2004, was not amended to impose a moratorium on all mining activity above 4,400 m. in order to guarantee the preservation of the Cerro Rico. The Ministry of Mining and Metallurgy has intervened a drafts Law *Exploitation and Preservation Law of Cerro Rico* is foreseen to be approved by May 2014.

The State Party has worked on addressing the instability and risk of collapse of the Cerro Rico, however it is urgent to define an updated timeframe that includes work for recent subsidence and the review of options for stabilization measures.

Scientific studies for Cerro Rico have been undertaken and have contributed to defining the *Sinking Stabilization Project at the Peak of Cerro Rico*.

There are currently no adequate management arrangements in place for the property. Several interventions are foreseen although these are not clearly articulated in a management or conservation strategy.

Recommendations to the State Party:

Stabilisation of the collapse at the summit of Cerro Rico

- Re-evaluate the stabilization project that was under implementation and currently halted before the conditions of instability are further modified and exacerbated by on-going rainy season.
- Consider the current situation of high risk of collapse in five areas of the summit of the Cerro Rico, identified in the technical studies that can affect miners working in difficult safety conditions above 4,400 m, as a humanitarian emergency.

Improvement of the characteristics of the Historical City and Ribera de los Ingenios

- Provide visual unity to pavements and sidewalks and recover, where possible, historic materials and construction systems.
- Generate specific projects to improve the urban image based on the traditional architectural style of Potosí, by integrating new and non-harmonious buildings through basic modification actions on facades.
- Promote the removal of overhead wires and cables, replacing them by hidden underground wiring.
- Develop a program for the rearrangement of vehicular traffic and promote the pedestrian use.

Conservation system of the Kari Kari Lagoon

- Identify alternate locations for the relocation of miners so that the Kari Kari – Jayaquila zone is preserved.

Update and enforcement of legislative and regulatory measures

- Formulate and adopt a set of legal and regulatory measures to ensure the protection of the property, especially regarding the implementation of the *Exploitation and Preservation Law of Cerro Rico*.

Integrate the management of the property

- Formulate an Integrated Management Plan that encompasses all attributes that convey the Outstanding Universal Value of the property. Because of its large diversity, it is desirable to establish thematic components that share conservation and development issues for the definition of programmes and actions. The following six components are proposed: architecture, urbanism, archaeology, rural setting, environmental setting, and immaterial elements. Each of these components should have their specific diagnosis, management actions and monitoring.

To be meaningful, the Integrated Management Plan should be developed under a process with active community engagement, considering the role of local inhabitants in the development of the property and practices retained that contribute to the preservation of authenticity and integrity of the property.

The mission concluded that in light of:

- The urgent situation of the Cerro Rico;
- The imminent risk of sinking at Cerro Rico`s summit and the threat that this poses to the Outstanding Universal Value of the property;
- The lack of current effective management mechanisms to ensure the sustained conservation and protection of the property;
- The need to assist and support the efforts of the State Part in the development and implementation of adequate measures;

That the property is faced with considerable ascertained and potential threats and meets the conditions for inscription on the List of World Heritage in Danger. This action will support the development and implementation of adequate management mechanisms to enhance the effective conservation and management of the City of Potosí and its territorial features. It will also garner the necessary support to address the significant risk of collapse of the summit of Cerro Rico.

BACKGROUND TO THE MISSION

The World Heritage property

According to the description of the city of Potosí: "In the 16th century, this area was regarded as the world's largest industrial complex. The extraction of silver ore relied on a series of hydraulic mills. The site consists of the industrial monuments of the Cerro Rico, where water is provided by an intricate system of aqueducts and artificial lakes; the colonial town with the Casa de la Moneda; the Church of San Lorenzo; several patrician houses; and the barrios mitayos, the areas where the workers lived."¹

The nomination file included a territorial scale that includes a group of diverse and varied components interconnected and interdependent as the Cerro Rico and its mines, the artificial lagoons system of Kari Kari, the urban area of the mining settlement, the Ribera de los Ingenios, the indigenous neighbourhoods and the buildings of high architectural value that under the heritage categories recently integrated in the Operational Guidelines for the Implementation of the World Heritage Convention could be considered as a Productive Cultural Landscape.

Inscription of the property on the World Heritage List

The City of Potosí was inscribed on the World Heritage List in 1987 under the criteria (ii) (iv) (vi):

Criterion II. The "imperial city" of Potosí, such as it became following the visit of Francisco de Toledo in 1572, exerted lasting influence on the development of architecture and monumental arts in the central region of the Andes by spreading the forms of a baroque style incorporating Indian influences.

Criterion IV. Potosí is the one example par excellence of a major silver mine in modern times. The industrial infrastructure comprised 22 lagunas or reservoirs, from which a forced flow of water produced the hydraulic power to activate the 140 ingenios or mills to grind silver ore. The ground ore was then amalgamated with mercury in refractory earthen kilns called huayras or guayras. It was then molded into bars and stamped with the mark of the Royal Mint. From the mine to the Royal Mint (reconstructed in 1759), the whole production chain is conserved, along with the dams, aqueducts, milling centres and kilns. The social context is equally well represented: the Spanish zone, with its monuments, and the very poor native zone are separated by an artificial river.

¹ICOMOS evaluation, 1987.

Criterion VI. Potosí is directly and tangibly associated with an event of outstanding universal significance: the economic change brought about in the 16th century by the flood of Spanish currency resulting from the massive import of precious metals in Seville. The decline of the silver mines of Erzgebirge and the monetary crisis and inflation whose causes were analysed by Jean Bodin in 1568, were, insofar as Europe is concerned, the most obvious effects of the mining operation of the Cerro de Potosí. However, the appearance of a new network of trade relations with Lima, and later with Buenos Aires, was of immense consequence for the Andean zone and the whole South American continent. For an inexhaustible market where goods were bought on a cash basis, Potosí, in the 17th and 18th centuries, became one of the invisible pivots of world trade.

Background to the mission

The main objective of the mission was to evaluate the current state of conservation of the City of Potosí, in accordance to Decision 37 COM 7B.91 of the World Heritage Committee (Phnom Penh, 2013). Terms of reference and mission itineraries are included in the annexes.

1. ASSESSMENT OF CONSERVATION ISSUES

The City of Potosí presents diverse levels of conservation according to the social and economic dynamics of each of its components. The property has a territorial scale formed by a wide group of diverse and varied components interconnected and interdependent as the Cerro Rico and its mines, the system of artificial lagoons of Kari Kari, the urban area of the mining settlement, the Ribera de los Ingenios, the indigenous neighbourhoods or the immovable property of architectural value. Each component presents diverse problems of conservation in terms of authenticity and integrity that have not been holistically addressed through management arrangements or a coherent conservation strategy but rather treated in an isolated way.

The reactive monitoring mission assessed the current state of conservation of the Heritage Site City of Potosí according to the following aspects:

1.a Current conditions at the Cerro Rico Mountain

After September 16, 2013 the sinking and settlements caused by the fragmentation and disintegration of stony materials at the summit of the Cerro Rico of Potosí - generated by the permanent extraction of minerals at the summit, became more evident. Unstable conditions were further exacerbated due to the intense rains in the region.

According to the information provided, it is considered that in spite of the continuous extraction of minerals for almost five centuries the upper part of the Cerro Rico is the most rich in silver, zinc, lead and tin, so there is an interest from the mining cooperatives to continue exploiting it.

As of January of 2014 numerous mining cooperatives continue extracting minerals, activities that further weaken the internal structure of the Cerro Rico. Mining even continues at the five areas of high risk of collapse that have been identified in the technical studies developed by the Ministry of Mining and Metallurgy.

A very relevant aspect that should be taken in consideration is the risk loss of human life due to the potential risk of collapse. Since the internal structure of the upper part of the Cerro Rico is severely weakened due to continuous exploitation, there is a significant risk that miners could die from collapses inside the tunnels, as it has already occurred.

Recently, COMIBOL has performed a physical inventory of the Mining Cooperatives that are operating at a height of 4,400 and it identified 38 corporations where approximately 1,500 miners work. More than 15,000 mining workers carry out activities presently Cerro Rico. Given that mining activity at the summit of the Cerro Rico has not been controlled, irregular exploitation is favoured through works in mines and the exit of mineral in "volquetas" or trucks through the roads that provide access to the summit.

According to available information, the authorized mining cooperatives hire external workers in an estimated relation of 30% of cooperative members and 70% of "free" miners, generating labour insecurity, faulty implementation of standards and safety protocols as well as low wages in an outline of economic and social inequity.

The following summary, produced by COMIBOL, represents the cooperatives active at the highest elevations of Cerro Rico:

RESUMEN DE COOPERATIVAS MINERAS QUE EXPLOTAN SOBRE LA COTA 4400 m.s.n.m.	
1 COOPERATIVA MINERA UNIFICADA POTOSÍ LTDA.	9
2 COOPERATIVA MINERA 9 DE ABRIL LTDA.	4
3 COOPERATIVA MINERA 10 DE NOVIEMBRE LTDA.	4
4 COOPERATIVA MINERA VILLA IMPERIAL LTDA,	4
5 COOPERATIVA MINERA 23 DE MARZO LTDA.	1
6 COOPERATIVA MINERA 21 DE DICIEMBRE LTDA.	1
7 COOPERATIVA MINERA SALVADORA LTDA.	2
8 COOPERATIVA MINERA PROGRESO LTDA.	1
9 COOPERATIVA MINERA CKACHAS LTDA.	2
10 COOPERATIVA MINERA CENTRASL MIXTO LTDA.	2
11 COOPERATIVA MINERA ROSARIO LTDA.	1
12 COOPERATIVA MINERA SAN CRISTOBAL LTDA.	1
13 COOPERATIVA MINERA COMPOTOSÍ LTDA.	1
14 COOPERATIVA MINERA ENCARNACIÓN LTDA.	1
15 COOPERATIVA MINERA 1° DE ABRIL LTDA.	1
16 COOPERATIVA MINERA ESPERANZA LTDA.	1
17 CADEMIN - CAMARA DEPARTAMENTAL DE MINERÍA.	2
TOTAL COOPERATIVAS MINERAS.	38

1.a.1 Status of the development of a comprehensive strategy for its stabilization and monitoring

Actions undertaken by the Bolivian State to mitigate the sinking of the summit of the Cerro Rico

As a response to the consecutive recommendations of the World Heritage Committee (Decisions 37 COM 7B.91, 36 COM 7B.96, 35 COM 7B.120, 20 COM VIID.60/61 and 19COM VII.C.2.33/34), in the last years the State Party has been structuring a strategy and implemented actions to mitigate the effects of the continuous exploitation of the Cerro Rico, particularly after the sinking of its summit in the year 2011.

Although there have been no modifications in the legal order contained in the article 6° of the Supreme Decree 27787 dated October of 2004, which establishes a moratorium on all exploitation, extraction and other mining interventions between the heights of 4,400 m. and 4,700 m., these legal provisions have not been enforced and as noted mining has continued. As a result of the collapse of the summit, recent efforts to stabilize the hole left by the haulage of materials toward the interior have been undertaken.

According to the information provided by the Ministry of Mining and Metallurgy and the COMIBOL, the following actions have been developed (See complete document in Annex PDF, c.1):

- Before the collapses and subsidence occurred in the Cerro Rico de Potosí, in 16 September 2010 the National Act for the establishment of the Committee for the preservation of the CERRO RICO, comprising 12 institutions, was adopted.
- In January 17, 2011 the top of the Cerro Rico presented a collapse in an area of 17 x 14 m. with depth of 34 meters.
- Under the recommendation of the Inter-agency Committee, between 2010 and 2011, different studies were carried out to support proposals for stabilization and preservation of the morphology of the Hill. These include:

Geotechnical study - Carried out by the consultant ECOINGENIERIA, which concluded its first phase in September 2010 at a cost of 607.077 Bs. and recommended that topographic details and a geophysical study were carried out.

Topographic survey - for execution by contract with the consultant SGT Ltda. that concluded on January 20 2011 at a cost of 666000 Bs, mapping 623 pitheads and around 130 collapses.

Geophysical Study - Executed by the consulting company GECOH Exploration Bolivia at a cost of 675,000 Bs, concluded on 01 August 2011.

Data integration - Run by SERGEOTECMIN and presented on August 31, 2011.

From May 23 to 27 of 2011, a Reactive Monitoring Mission was carried out and it evaluated the preservation of the Cerro Rico of Potosí with specialists in geology, geophysical engineering, structural geology and mining engineering. The mission outlined the following emergency measures:

- Consolidate and cover the cavity at the top of the Cerro Rico.
- Complete the second phase of the Geotechnical study, including geophysical information in order to have a model of the distribution of cavities in the interior of the Hill.
- Avoid the works and mining activities in the places where subsidence has been detected as a preventive measure.
- Continue the work of mining outside the areas of risk, as it continues with the filling of the cavities.
- Elaborate Topographic studies and monitoring of the movements of the Cerro Rico, at intervals of one month, during the next six months.
- Organize a technical reunion in early 2012 to evaluate the studies and the results of the monitoring and preparation of new measures. ²

Based on these recommendations, technical studies were carried out on behalf of the Ministry of Mining and Metallurgy and of the Corporación Minera de Bolivia (Bolivia Mining Corporation), COMIBOL that allowed for the identification of five areas of high risk of collapse at the upper part of the Cerro Rico (See map d.1 in Annexes). The overall conclusion is that the whole of the summit has a moderate risk of complete collapse.

Following the recommendations of the World Heritage Committee in 2011 (35COM 7B.120) and in 2012 (36COM 7B.96), the Plurinational State of Bolivia began several actions to revert the process of deterioration of the summit of the Cerro Rico. According to the information provided by the Ministry of Mining and Metallurgy, the following activities have been implemented:

- *Rehabilitation of the San Luis mine*; beginning of works on April 17, 2012 by the company VERSA-COVERSUR at a cost of 103.659,90 Bs. Implemented items: 1. Rehabilitation and strengthening of 120 m 2 Gallery-future system of marqueo with pinchotas 7, 60 m.

²*Idem.*

- *First opening of the road*; executed by SEDECA - POTOSÍ, at a cost of 296.056,04 Bs, to open the platform from San Luis to a height of 4730 m, a length of 450 m construction April 17, 2012. Conclusion of work 30 October 2012.
- *Second: Expansion of the road*; executed by the company Q & Q with work order. Length of 450 m. up to 4730 m.
- *Third: Opening of the road*; executed by the Manquiri mining company from the 4730 level until 4768 m/s/n/m at the rim of the sinking, a length of 170 m.
- *Delimitation of the risk areas in the Cerro Rico of Potosí*: Surface delimitation was carried out by the Inter-Agency Committee for the preservation of the Cerro Rico, adopted at the meeting of 02 October 2012.
- *Socialization of areas of risk and the "Stabilization of the sinking in the peak" project*; socialization was developed in coordination between the COMIBOL and the technical office of the Ministry of Mining and Metallurgy with the mining cooperatives, City Council, communication media and others. ³

One of the most significant actions to revert the collapse of the summit is the Project for the stabilization of the sinking of the summit developed by the company Q&Q under the public process promoted by the Inter-institutional Committee for the Preservation of the Cerro Rico of Potosí, on November 5 of 2012.

Taking in consideration the previous technical studies, the project outlined the filling of the hole with Lightweight Concrete Type H60 C/ADI, Reinforced Concrete Type "TO" H=0,35 M. and Lightweight Concrete Type H30; the construction of a "Dome" of reinforced concrete in the shape of arch that allowed for the sealing the sinking. The project had almost been completed until the suspension of the works due to the increase of subsidence detected in December 9 of 2013. According to the project, the dome was to provide support through a grid structure formed by vertical columns and horizontal beams of reinforced concrete to fill the remains of the depression and to replicate the morphology of the summit of the Cerro Rico. (See Map d.2 in Annexes) This part of the project has not still been developed.

The Management Report 2013 - Project of Stabilization of the Sinking of the Peak of the Cerro Rico of Potosí 0306-OTP/2013, elaborated by the Mining Corporation of Bolivia, COMIBOL exposes problems derived from the pumping of lightweight concrete. These include the variation in the conditions of stability at the beginning of the work and the increase of the subsidence and sinking caused by the extraction of minerals, which jeopardised the stabilization works:

³*Op. Cit.*

The pumping of lightweight concrete H-60 began on 01/29/13 with a volume of 6 m³ to the sinking. There were troubles with the capacity of the bomb related to the 68 meters gradient and pipe's slanted length distance of 145 meters. Technically it is impossible to continue from this point of pumping so it was necessary to improve the 450 meters of the road built with embankments to the second platform of pumping. On Monday 25/02/13 a hole in the base of the sinking, with a volume of 450 m³, was detected.

To continue developing the project of stabilization of the sinking of the Peak it is necessary to give a technical solution to this event. [...] From the second pumping station at 4730 m.a.s.l., the pumping is restarted on 20/03/13 with a volume of 9 m³ of lightweight concrete H 60 to the sinking.

On Monday 15/04/13 a collapse in the south perimeter of the sinking, with 1.50 m high escarpment, vertical and slanted displacement of the loose load, occurred. It is impossible to enter to the hole given the high risk to the life of the operators "those wise see the danger and go away, stubborn continue ahead and suffer damages". In spite of this warning, a technical decision was made to strengthen the hole with synthetic material (tires), which were introduced to the hole on the 292 m³ of lightweight concrete stuffed to the base of the hole.

The Manquiri Mining Company, at request of the Regional Management, previous technical-legal justification, on May 12, 13,14 and 15 of 2013 built 180 meters on the road for circulation of high tonnage trucks until the south curb of the sinking. This road solves problems of distance and communication with the casting of the lightweight concrete, transportation of equipment and materials, direct control of the process. [...] After the technical justifications to stabilize the hole, during May 28, 29, 30 and 31 of 2013 this collapse was strengthened with synthetic material (tires). On Wednesday June 5 of 2013, the neck of the hole was blocked with 5 mm iron profiles in U, with a weight of 1300.00 kilos. The Corporación Minera de Bolivia provided the material. Starting from this date the casting of the lightweight concrete H 60, placing the metallic reinforcement in the concrete lightweight with iron meshes of structural reinforcement each 0.30 meters of height, continued. On June 25 and 26 of 2013 the metallic coffer in the base of the crater to reinforce the neck of the sinking was built and in parallel concrete to the supports of this structural arch was poured.

At the beginning of October, cracking of different magnitude occurred in the contours of the structure of lightweight concrete H 60, which control the pumping of concrete to these holes. [...] This situation is due to gravity and the additional casted volume, and risks the stability of the project. [...]

On 11/19/13 the casting with coffer to build the stepped dome that will serve as support for the second structural dome of reinforcement began. In this process, vertical cracking and slanted toward the bank of the loose load in the south side of the sinking occurred. [...] On Monday 12/30/13 the Work Supervisors measured and evaluated the vertical settling and slanted displacement of the loose load through the slanted plane. Entering by the SW side one can arrive to where reinforcements were placed with tires and the structural reinforcement profiles. The casted volume of 292 m³ in vacuum remains stable, but hung as a structural overhanging, the tires move in direction of the slanted plane dragged by the loose load of oxide mineral with silver content. The structural profiles remain stable supported by firm rock. The ¾" steel wires placed on the loose load, on which the lightweight concrete was casted, structurally work, but structural fatigue due to the presence of small fissures is observed. [...] In summary the problem is serious, directly affecting the global investment of the project of Stabilization of the Sinking of the Peak of the Cerro Rico of Potosí.⁴

The structure and the rigid fill of lightweight concrete show structural problems and of stability caused by the effect of "suction" of stony materials and sands toward the core of the mountain, generated by the extraction of minerals by some mining cooperatives with licenses of exploitation at 4,400 height, still operating in the old mines.

The process of disintegration of the materials of the upper cone continues because the chambers and interior tunnels are collapsing since the extraction of materials rich in silver continues on the upper part of the Cerro Rico.

The emergency situation caused by the intense rain season

The deterioration has worsened due to the recent and intense rains of January of 2014 that generated subsidence calculated by the COMIBOL to be 3.5 cm per day. The cumulative sinking has generated a variable hollow close to 2.00 meters under the filling structure, what has generated irregular fractures and settlings in the works performed to the moment (See Map d.3--- in Annexes).

At the time of the mission, stabilization works had been suspended. In the Management Report 2013 - Project of Stabilization of the Sinking of the Peak of the Cerro Rico of Potosí 0306-OTP/2013 elaborated by the Corporación Minera de

⁴COMIBOL, *Informe Gestión 2013- Proyecto de Estabilización del Hundimiento de la Cúspide del Cerro Rico de Potosí 0306-OTP/2013*. Ciudad de Potosí, 2013.

Bolivia, COMIBOL (See complete document in Annex PDF, c.2) the problem is exposed:

These gradual and dynamic settlements are due to the irresponsible extraction of mineral oxide in works located below the sinking and in the whole Area of High Risk of the Peak of the Cerro Rico of Potosí. Structurally they jeopardise the development of the project that had had a positive evolution. Due to these records, the Supervision decides to paralyze the works of the project starting from 09/12/13 while the Technical Office Pailaviri, in charge of solving the underground works of exploitation in the area of High Risk of the Peak of the Cerro Rico of Potosí. [...] structural fatigue is observed by the presence of small fissures. [...] In summary the problem is serious, with direct responsible [The mineral extraction at the height 4,400 masl. by the Mining Cooperatives with concessions in force] of affecting the global investment of the project of Stabilization of the Sinking of the Peak of the Cerro Rico of Potosí.⁵

The current situation of high risk of collapse in the five areas of the summit of the Cerro Rico identified in the technical studies can affect the miners that work under precarious conditions at 4,400 m.a.s.l. This may be considered as an emergency of humanitarian character. In the meetings held with representatives of the Ministry of Mining and Metallurgy and of the Corporación Minera de Bolivia, COMIBOL no tentative date to restart works was mentioned. Structural conditions foreseen in the Project of Stabilization of the Sinking of the Peak of the Cerro Rico of Potosí have been substantially modified due to the recent and intense rains and because the process of transfer and relocation of miners that work at 4,400 m.a.s.l. to other areas has not been formalized.

1.a.2 Confirmation of the enforcement of the moratorium on all exploration, extraction and any other interventions under and above ground between altitudes 4400m and 4700m set forth in Article 6 of Supreme Decree 27787 of October 2004

Supreme Decree 27787 of October 2004 legally established a moratorium prohibiting the exploration, extraction and other interventions between the altitudes 4,400 and 4,700 masl. Seemingly this legal instrument was not enforced since, according to the available information, COMIBOL has continued granting licenses for exploitation to mining cooperatives until recent times. It therefore had no

⁵COMIBOL, *Informe Gestión 2013- Proyecto de Estabilización del Hundimiento de la Cúspide del Cerro Rico de Potosí* 0306-OTP/201. Ciudad de Potosí, 2013.

practical effect in preventing collapses and subsidence, which has increased since 2011.

As preliminary part of the relocation process, an inspection to the mines inside the five areas of risk identified is being developed. The Ministry of Mining and Metallurgy, the Departmental Autonomous Government of Potosí, the Corporación Minera de Bolivia, the FEDECOMIN and the Departmental Assembly of Potosí are participating in the assessment.

According to the information provided to the Mission, there is an inspection timeframe in process according to the following schedule:

- Jueves 23 de enero. Mina Esperanza y Mina Copacabana.
- Viernes 24 de enero. Mina Moropoto.
- Sábado 25 de enero. Mina Bolívar.
- Lunes 27 de enero. Mina Santa Barbará.
- Martes 28 de enero. Mina San José.
- Miércoles 29 de enero. Mina Carrasco.
- Jueves 30 de enero. Mina Caracoles.⁶

It was pointed out that the process of mobilization of mining cooperatives toward other areas began with the removal of workers of the Moropoto Mine located at the 4,511 height to work in the Triunfadora Mine located in the height 4,324.

In the medium term, a transfer to the mines Triunfadora located in the Cerro Rico; the mining Concession Don Pablo of Chillcani, Area of Kari Kari - Jayaquila and in the Mining District of Colavi with the mines Fátima, La Esperanza, La Unión, Carnavalito, María Antonieta, Muralla, Demasías Nueva Esperanza, Dolores, Demasías Clarita A., Madre e Hijo, Buena Esperanza, La Negra and Complemento are being considered. All those located in rural areas around the site.⁷

In the long term, relocation is planned through the Project of Rehabilitation and drainage of the Cuadro Bolívar, the Project for treatment of wastewater and the Project of Recorte Pailaviri 2 (See complete document in Annex PDF, c.3).

According to the interviews held on January 27 of 2014 with the Governor of the Regional Autonomous Government of Potosí, Félix Gonzáles Bernal and with the representatives of the mining sector, the program for the relocation of mining cooperatives is recently being implemented and offering as incentive for the transfer of workers to other mining areas in the Cerro Rico or in the suburbs,

⁶Ministerio de Minería y Metalurgia de Bolivia, *Preservación del Cerro Rico del Potosí*, Power Point presentado a la Misión de Monitoreo Reactivo ICOMOS, 26 de enero de 2014.

⁷ COMIBOL, *Posibles áreas para reubicación minas de Cooperativas Mineras sobre la cota 4,400 msnm*, documento sin fecha.

facilities for equipment and arrangement of mines and the improvement of the working conditions.

In the meeting with the mining sector, precise dates were not set for each one of the actions foreseen for the transfer and relocation of miners to other areas. Only actions for the medium and long term have been identified, without a precise timeframe for implementation.

1.b Situation of the road of access to the peak of the Cerro Rico

The road that leads to the peak is part of the project for the stabilization of the summit developed by the Plurinational State of Bolivia through the Ministry of Mining and Metallurgy and the COMIBOL in order to reach the summit and take materials and workers active in the on going works. The road is being used not only for this purpose but also by mining operations that have continued beyond the 4,400m altitude

1.b.1 Works carried out for the construction of the road to the top of Cerro Rico Mountain

The road to the summit was begun in April of 2012 to facilitate the access of materials, equipment and workers to the summit of the Cerro Rico for stabilization works. It has been developed in three working stages:

- *First opening of the road;* executed by SEDECA - POTOSÍ, at a cost of 296.056,04 Bs, by opening the platform from San Luis to a height of 4730 m/s/n/m, a length of 450 m construction April 17, 2012. Conclusion of work 30 October 2012.
- *Second: Expansion of the road;* executed by the company Q & Q with work order. Length of 450 m. up to 4730 m.a.s.l.
- *Third: Opening of the road;* executed by the Manquiri mining company from the 4730 level until 4768 m.a.s.l. at the rim of the sinking, with a length of 170 m.⁸

In the case of the reutilized segments or the road, the rolling platform was widened and materials were consolidated with heavy machinery and building stone contention walls until the area where the upper side of the sinking area is reached.

⁸Ministerio de Minería y Metalurgia de Bolivia, *Preservación del Cerro Rico del Potosí*, Power Point presentado a la Misión de Monitoreo Reactivo ICOMOS, 27 de enero de 2014.

1.b.2 Measures currently in place measures to ensure that access is limited to priority emergency works

To control the access to the peak of the Cerro Rico surveillance tolls were built to restrict the passage of vehicles unaware to the stabilization work. During the mission visits, there were no personnel at the checkpoint.

Given that at present around 38 mining cooperatives continue working at 4,400 under concessions of the COMIBOL in force, the control of the road to the summit for activities exclusive of the stabilization project is not effective. Around 1,500 workers, equipment, transport vehicles carrying mineral to the Manquirí Mining of Canadian origin or toward the multiple complexes established in its skirts to process the load circulate on a daily basis. At night a considerable number of mineral from the upper part of the Cerro Rico are removed without strict controls or quantification of extracted volumes, a situation that has exacerbated the sinking process and structural instability of the summit.

The representatives of COMIBOL indicated in the meeting of January 27, 2014 that the control in the surveillance toll is effective and it would be good in the future to control the access to the peak and the exit of material. On the final destination of the road to the summit, it was mentioned that it could be considered for tourist activities.

1.c Appropriateness of further operations foreseen for interventions at the summit of the Cerro Rico

In the meetings held with the mining sector the need to begin a process of evaluation of the results obtained by the Project of Stabilization, at present suspended and still in process of execution, was outlined. This would be important before intense rains worsened the conditions of stability of the peak. The results from the evaluation could identify an alternative plan or technical solutions to effectively current conditions of disintegration and settling of the intervened area. It was pointed out that it would be opportune to explore other alternatives with less rigid materials than lightweight concrete and more adaptable to the changing conditions of the sinking process that constantly modifies the internal morphology of the hole.

In a preliminary way, the Secretary of Tourism and Culture of the Government of Potosí identified as a possible alternative, the possibility to make a simple and gradual filling with waste material already processed by the mining companies, which could be adapted to the deformations of the internal cavity to recover the historic morphology of the summit. The transfer of the processed material to the

summit could be negotiated as collaboration between mining cooperatives and private mining companies to mitigate the effect of the exploitation of the peak.

1.d Current conditions at the City of Potosí

Although a significant part of the historic city of Potosí is in a good state, at present time there are problems common to the Historic Centres in Latin America, generally marked by the lack of resources to undertake works of conservation, restoration and maintenance of the urban and architectural structure as well as the presence of some actions to adapt to the new urban functions that are not properly integrated to the typological characteristics of the traditional physiognomy of the population of Potosí, with a strong presence of constructions of the Spanish colonial period.

Potosí has a long history of construction of public buildings such as churches, convents, institutional or industrial that through the years for their artistic and historical values have constituted important part of what today is considered heritage. The architecture of Potosí promoted the formation and regional diffusion of the Andean Mestizo Baroque, in which the models contributed by the master builders and religious of European origin were reinterpreted and adapted in a creative way to the sensibility and indigenous manpower producing an urban and architectural identity of a marked mestizo character.

In general, the residence architecture shows a homogeneous urban image with stone foundations, solid walls of adobe or stone, vertical openings following a regular rhythm in doors and windows, thick frames in doors or windows richly ornamented in the most outstanding houses, cornices with different solutions on windows and doors; simple finials on walls; wooden and tile roofs and a rich variety of wooden and glass balconies that act as protection against the climate.

New constructions, with formal functionalist or "modern" codes built since the second decade of the 20th century, affect, although not in an irreversible way, the traditional urban image, and erode the original atmosphere of the historic town.

Another aspect that was noted in the current physiognomy of Potosí is the varied pavement in streets and sidewalks. In general they consist of asphalt pavements on the rolling surface of the streets to facilitate the vehicular traffic that sometimes cover the stone pavement placed previously. Other streets and avenues have hydraulic concrete pavements. In other streets concrete paving with an hexagonal design has been placed. Some sections still maintain stone paving. In the mainly tourist area, pedestrian areas have been proposed with stone pavements and mud brick, seeking to recover the town's historic atmosphere.

The sidewalks in general show a cement finish and in the central part some have coloured pressed cement tiles.

Concerning the urban space, posts and cables affect the visual qualities of the property as they chaotically cross to satisfy the demand of electricity and communication networks for buildings and housings. Another element that affects the urban physiognomy is the graffiti that appears in the facades of historic buildings or housings.

1.d.1 State of conservation of the Ribera de los Ingenios riverside

The Mining complexes established in both riverbanks of the Ribera de Nuestro Señor de la Veracruz inside the urban structure of the City of Potosí show at present time some alterations in their original structure, that while not affecting significantly the heritage value of the group, do not allow for its appropriate perception as fundamental part of the development of the mining cultural landscape of Potosí.

The numerous vestiges of the mining facilities, of high value to understand the evolution of the site, are now immerse, with significant exceptions, among productive constructions recently built as part of the updating process of the very complexes of metal processing or among housings built in recent times without attention to the historic ensemble or the urban physiognomy and traditional typology of the city.

1.d.2 State of other attributes that convey the Outstanding Universal Value of the property

Together with the Cerro Rico and its mines, the historic city, the Ribera de los Ingenios riverside, the well preserved group of Lagoons of Kari Kari, and the estates of architectural value dispersed in the territory comprised, are essential attributes to understand the development and historical evolution of Potosí and to convey the Outstanding Universal Value of the property.

The complex of 32 artificial lagoons established among the narrow canyons of the hill of Kari Kari began in the 16th century to supply water to the city of Potosí and to the mining facilities established in the Ribera de los Ingenios riverside. This hydraulic complex continues to be essential for the development and the well being of the city inhabitants since it still supplies water to the population, covering almost 50% of the necessities of the city:

These constituted a group of smaller lagoons that fed other bigger lagoons from which, through canals, a single water course was obtained that, taking

advantage of the stressed slope of the topography, allowed for the location of complexes, installed successively, from the foot of the lagoons to beyond the city.⁹

The most important lagoons are those of San Sebastian, San Ildefonso, and San Pablo, followed by those of San Fernando, Masoni, JatunTio, Juchuy Huacani, Jatun Huacani and San José in the high part of the Kari Kari hill. The two lagoons of San Sebastian and the lagoons of San Ildefonso and San Pablo are included in the boundaries of the property as per the nomination dossier of 1987 and as an ensemble they are incorporated in the proposal of Buffer zone recently submitted for the consideration of the World Heritage Committee. (See Map d.4 in Annexes).

The area where the lagoons are located does not show recent interventions that affect the landscape and the historic setting. The integrity of dams, aqueducts and water troughs is well preserved as well as the authenticity of the natural landscape. According to archaeologists, the area around the lagoons still maintains archaeological vestiges of prehispanic origin like Inca paths.

To preserve the authenticity and integrity of the setting of the artificial lagoons, it is convenient to outline another alternative for the relocation of miners that work at the height 4,400 to other areas since the mining exploitation scheduled in Kari Kari - Jayaquila would affect the natural and cultural landscape of this part of the property. The Heritage Direction of the Ministry of Cultures outlined this proposal in the meeting with the mining sector in Potosí and with the Organ of Emergency in La Paz.

2. EVALUATION OF THE PROGRESS IN SECURING OPERATIONAL MANAGEMENT AGREEMENTS FOR THE PROPERTY

No information or documentation was provided to the mission regarding the integral management of the World Heritage property. However, significant efforts of from different sectors are being made to face the complex issues to address. The responsibility for the management and follow-up of each component of the site relies on different instances of the National, or Municipal Governments that have reached different levels of operative management and achievements.

⁹Querejazu, Pedro, *Potosí. Un campamento minero en torno a un cerro de plata*, en *El oro y la plata de las Indias en la época de los Austrias*. Fundación ICO, Madrid, 1999. P. 168.

2.a Evaluate the progress made in securing operational management arrangements for the property, with clear decision-making mechanisms and adequate resourcing, human, technical and financial.

To address the sinking of the peak, the Bolivian State began the Project of Stabilization of the Sinking of the Peak of the Cerro Rico of Potosí in 2012 with State human and financial resources.

Due to the worsening of the sinking of the summit of the Cerro Rico due to the intense rains, both the Inter-institutional Committee for the Preservation of the Cerro Rico and the Emergency Entity have had multiple meetings to establish agreements between to face the problem. Some of their recent agreements are the suspension of the Project of Stabilization of the Sinking of the Peak of the Cerro Rico of Potosí until the removal of the mining cooperatives that continue operating at 4,400 masl is formalised and the emergent activation of the miners' Relocation Program to other areas is implemented.

The historic city has a Master Plan of Rehabilitation of the Historic Centre of the City of Potosí that developed between 1991 and 2009. For the Ribera de los Ingenios riverside, an Inventory of Mining Complexes of the Ribera de Nuestro Señor de Veracruz of the City of Potosí was undertaken as part of a Master Plan of the Ribera de los Ingenios Mineros of Potosí published in 2010. Both documents constitute important planning tools to control the evolution of these components of high heritage value to the property but unfortunately the preservation of the OUV for which this singular mining complex was inscribed in the World Heritage List is not part of its objectives or strategies.

2.b Assess the existing management tools for the property and the provisions regarding conservation and rehabilitation works, as well as proposals for public use and plans for risk management

The mining exploitation of the Cerro Rico of Potosí is assisted primarily by the Ministry of Mining and Metallurgy through the Corporación Minera de Bolivia, COMIBOL. This entity is in charge of authorizing the mining exploitation to private mining companies and mining cooperatives by means of concessions.

The *Inter-institutional Committee for the Preservation of the Cerro Rico*, created in 2007 and constituted by 12 institutions related with the mining extraction and academic entities, manage the problem of the sinking and subsidence at the summit of the Cerro Rico. The Committee is formed by the following institutions: Ministry of Mining, Ministry of Cultures, Departmental Autonomous Government of Potosí, Municipal Autonomous Government of Potosí, COMIBOL, Tomas Frías Autonomous University, Federation of Mining Cooperatives, COMCIPO and

SERGIOPTECMIN. Its primary objective is the stabilization of the summit of the Cerro Rico and the creation of Inter-institutional agreements for the gradual removal of the miners that work at 4,400 m.

The *Emergency entity* was created at national level to optimize the coordination of institutional efforts to assist the emergency caused by the sinking of the Cerro Rico. The Ministry of Mining, the Ministry of Cultures and the COMIBOL constitute it.

Both entities play an important role in addressing the complex situation of the Cerro Rico but their framework for action does not integrate other components of the property such as the historic city, the Ribera de los Ingenios riverside or the complex of the lagoons of Kari Kari.

The mission notes that the Direction of Heritage of the Ministry of Cultures proposed the possibility to begin a process of *Declaration of Emergency* of humanitarian character on behalf of the Bolivian Government in order to face the challenge of stabilizing the peak, to limit with urgent character the extraction of minerals at 4,400m as well as to speed up the process of miners' relocation to other areas of exploitation.

The management of the lagoons complex of Kari Kari corresponds to the environmental institution and the urban development and the preservation of the historic city of Potosí concerns mainly to the municipal administration. Therefore these important attributes of the property are separately managed.

To promote improvements to the historic city of Potosí, since 1990 programs of international cooperation to recovery the traditional urban image, the rehabilitation of heritage estates or the orderly growth of the site have been carried out. The work developed between 1991 and 2009 with the support and collaboration of different organisms like the Embassy of Spain in Bolivia, the Technical Office of Spanish Cooperation, the Prefecture of the Department of Potosí and the Municipal Government of Potosí, should be underscored. As a result the *Master Plan of Rehabilitation of the Historic Centre of the City of Potosí* was formulated and partially implemented. A Technical Office, that became a Civil Association, was created to follow up on the *Plan of Rehabilitation of the Historic Areas of Potosí AC-PRAHP*. Through the continuous operation of the Technical Office, significant contributions of the Spanish Cooperation were channelled to integrate policies and resources aimed to the preservation of the valuable built heritage of Potosí.

Through the PRAHP, interventions in 18 estates of high urban significance were implemented in Potosí and five more projects were started. The Master Plan integrates regulations and policies for the urban regulation and several projects to develop in five programs: Coordination between institutions for the conservation of

the cultural heritage; Urban integral treatment of service networks, traffic and roadways, public spaces and urban image; Conservation and rehabilitation of the architectural heritage; Rehabilitation of housings in historic areas to improve the conditions of habitability and Awareness raising, socializing and consent of the Master Plan.

A significant effort to identify the elements of heritage value of the city is the inventory of immovable property in the Historic Centre developed in 1993, which establishes the conservation categories. The Royal Embassy of the Netherlands - Governance Fund together with the Spanish Agency of International Cooperation, the Departmental Administration of Potosí and the Municipal Government, financed it. In this inventory the categories of protection of estates and the adequate levels of use and extent for interventions for each of the constructions inside the protection perimeter were established. (See Map d.5 in Annexes).

The aid granted by the Spanish Agency of International Cooperation for the property ended in the year 2009. Since then, resources have significantly decreased for the preservation of the historic city and initiatives to recover gradually the valuable urban heritage - architectural preserved in the city are limited.

In recent years, the Honourable Municipal Government of Potosí through its Architectural Heritage Unit has taken back the process, allocating some resources to continue the restoration of emblematic buildings like the Cathedral and with pilot works of improvement of pavements and urban image in specific areas of the Historic Centre. Due to the comprehensible lack of resources of the municipality, it has not been possible to give permanent continuity to the *Master Plan of Rehabilitation of the Historic Centre of the City of Potosí*.

In addition to the Master Plan of Rehabilitation of the Historic Centre of the City of Potosí, a meticulous *Inventory of Mining Complexes of the riverside Ribera de Nuestro Señor de la Veracruz of the City of Potosí* was developed with support of the Junta de Andalusia as part of a specific Master Plan for that important historic area that attests the industrial mining development in Potosí since the 16th century.¹⁰ In this document, a detailed revision of the vestiges of industrial archaeology that have remained in the two riversides of the river and of the system of aqueducts that comes from the lagoons complex of Kari Kari is made. Architectural and photographic surveys of the remains of mining complexes and an interpretation of their original operation are presented. 55 complexes distributed in

¹⁰AC-PRAHP, *Inventario de Ingenios Mineros de la Ribera de Nuestro Señor de la Veracruz de la Ciudad de Potosí*, Oficina Técnica del Plan de Rehabilitación de las Áreas Históricas de Potosí. 2010.

the riverside Ribera de Nuestro Señor de la Veracruz, at present integrated to the urban area of Potosí, from the lagoons of San Sebastian to the low part of the city, were identified. At the national level, there is a minimal structure for the follow-up of the Bolivian sites inscribed on the World Heritage List, which complicate the institutional management of the site like as an integral ensemble.

3. PROGRESS IN THE ESTABLISHMENT OF THE BUFFER ZONE FOR THE PROPERTY

In the proposal of Buffer zone recently submitted to consideration of the World Heritage Committee the expansion of the limits of the site toward the south part of the Cerro Rico toward the recent growth of the urban area that surrounds the historic city of Potosí and toward the hill and lagoons of Kari Kari integrating the two lagoons of San Sebastian and the lagoons of San Ildefonso and San Pablo are considered.

3.a Assess progress made in the establishment of the property's buffer zone

The mission notes that there are only sector plans and programs without an apparent link or common objective to support the boundaries of the property and the buffer zone in what refers to a zoning and regulation of land use focused to the preservation of the Outstanding *Universal Value* (OUV) of the site as a whole.

In the information presented, no documentation could be found to supports progress to formally define the Buffer zone; there is a unity of common criteria established between the three government levels for the management of the World Heritage site as an unit. A dispersion of objectives, development strategies, and public policies between the different authorities responsible for the management of the different components of the site is perceived. The distinctive elements of the site (mines of the Cerro Rico, System of water collection of the artificial lagoons of Kari Kari, historic city of Potosí and indigenous neighbourhoods, Ribera de los Ingenios riverside, buildings of architectural value or intangible heritage associated to the Cerro Rico) are managed as separated elements with scarce linkages to each other.

In some cases, the dispersion of objectives between instances that act inside the wide territory of the inscribed property and the proposed buffer zone generates some divergences in the performance policies in the diverse components of the property. This is illustrated by the strategy for the relocation and mobility of the miners and mining cooperatives working today at 4,400 of height planned to exploit

some deposits in the area of Kari Kari, where the complex of the artificial lagoons that historically have supplied water to the population of Potosí are located. This area, managed by environmental authorities, is one of the few that maintain entirely its original characteristics and a safe ecosystem. If the necessary miners' relocation program is carried out without modifications, it could potentially affect the heritage value of the area and, therefore the integrity of the site.

3.b Assess progress made in the establishment of related regulatory measures to control and regulate further development

It is necessary to point out that the efforts have been focused in solving the challenge of stabilizing the summit of the Cerro Rico. Therefore no significant progress has been made in the establishment of regulatory measures for the rest of the components of the World Heritage property.

For the Cerro Rico, the project of the Law of Exploitation and Preservation of the Cerro Rico of Potosí considers giving national priority to the preservation of its geomorphologic structure because it constitutes a patriotic symbol of the national shield. The title II intends to establish measures and actions for the preservation of the mountain defining areas of geological risk, prohibitions and permissible activities. It outlines the creation of the Centre of Scientific Investigation "Sumaj Orcko 2; requirements for the elaboration of projects and financing measures; it proposes activities of preservation and restoration of the gradient of the Cerro Rico.¹¹

The title III establishes the rules for the exploration, exploitation both in the surface and underground as well as measures of conservation of the environment in the Cerro Rico of Potosí. The title IV defines the institutional obligations of the official institutions as of the mining operators and the title V gives legal base to the National Committee for the Preservation of the Cerro Rico.

The following stages for the socializing and approval of the Law project are proposed:

1. Delivery of the Law project to all the institutions for its analysis.
2. Meeting of the Inter-institutional Committee to receive suggestions and joint analysis of each article.
3. Implementation of recommendations to the project.
4. Approval of the Law project.

¹¹ Ministerio de Minería y Metalurgia, Proyecto de "*Ley de Explotación y Preservación del Cerro Rico de Potosí*". La Paz, Bolivia, documento sin fecha.

5. Submission to the Ministry of Mining and Metallurgy for enforcement.¹²

The enactment and implementation of this Law project would allow establishing legal bases to control and to regulate the future development of the Cerro Rico. No indication of potential timeframes to finalise the process and adoption of the Law was given.

4. PROGRESS MADE IN THE IMPLEMENTATION OF THE RECOMMENDATIONS OF THE WORLD HERITAGE COMMITTEE

Concerning the exam of the progresses achieved in the implementation of the recommendations made by the World Heritage Committee in its 35th, 36th and 37th sessions (Decisions: 37 COM 7B.91, 36 COM 7B.96, 35 COM 7B.120, 20 COM VIID.60/61) as well as those made by the joint mission of the WHC/ICOMOS 2011, progress has been made to mitigate the effects of the collapse of the Cerro Rico and a strategy is in consideration to stop mining above 4,400m.

The implementation of the *Project of Stabilization of the Sinking of the Peak of the Cerro Rico of Potosí*, the elaboration of the Geotechnical Study, the Topographical Study, the Geophysical study and the Integration of data that the intervention in process or the initiative of Law of Exploitation and Preservation of the Cerro Rico of Potosí illustrate commitment to implement recommendations. However, the complexity of the problem caused by the exploitation of minerals, the unforeseeable effects of the settling of the peak surpasses the on-going stabilization project.

In spite of the interest manifested by the Plurinational State of Bolivia to control the effects of the collapse of the summit of the Cerro Rico the complex situation seriously jeopardises the feasibility of the on-going stabilization project and continue to pose a risk to the lives of miners.

5. ASCERTAINED AND POTENTIAL DANGERS TO THE PROPERTY'S OUTSTANDING UNIVERSAL VALUE

Given the aforementioned aspects, the mission considers that there are ascertained and potential threats to the property and that it meets the conditions for inscribing it on the List of World Heritage in Danger, in accordance with paragraphs 177-182 of the *Operational Guidelines for the Implementation of the World Heritage Convention*. The mission notes that the property is faced with specific and

¹²Ministerio de Minería y Metalurgia de Bolivia, *Preservación del Cerro Rico del Potosí*, Power Point presentado a la Misión de Monitoreo Reactivo ICOMOS, 27 de enero de 2014.

proven imminent danger, due to "i) serious deterioration of materials" and "ii) *serious deterioration of structures*" of the summit of the Cerro Rico as well as a potential danger which could have deleterious effects on its inherent characteristics due to "ii) lack of conservation policy " of integral character that considers all the components of the site or due to "vi) threatening impacts of climatic, geological or other environmental factors."

As it is indicated in the paragraph 181, "... *the threats and/or their detrimental impacts on the integrity of the property may be corrected.*"

6. CONCLUSIONS AND RECOMMENDATIONS

The mission recognises the considerable efforts of the State Party in addressing the collapse and subsidence of the summit of Cerro Rico .

Due to the complexity and current conservation issues at the property, it is recommended that the institutional framework at different levels be strengthened to ensure the adequate protection of the property. This entails increasing technical staff and allocating resources to sustain conservation and protection actions. Augmenting the mandate of the Emergency Entity and of the *Inter-institutional Committee for the Preservation of the Cerro Rico* to address all components of the property would also be desirable. Regarding management arrangements, it is recommended to create a *Management Unit* to coordinate efforts between the institutions that act on the territory and to develop and implement an Integral Management Plan.

6.a On the collapse of the peak of the Cerro Rico and situation of emergency caused by the intense rains

The current high risk situation of collapse in the five areas of the peak of the Cerro Rico identified in the technical studies that, potentially could affect the miners that work under precarious safety conditions at 4,400masl, could indeed be considered as an emergency of humanitarian character. This would allow exploring alternatives that, without affecting the precarious economy of that segment of population of Potosí, could favour the stability of the Cerro Rico and addressing this threat to the property.

The state of emergency of the summit of the Cerro Rico should be an opportunity to stimulate an improvement of the safety labour conditions and the conditions of life of the independent miners that work for the mining cooperatives. The current outline of mining exploitation of the Cerro Rico responds historically to the economic dynamics inherited from the period of the Spanish colony that has

allowed the permanence of inequitable working conditions for a sector of the community.

6.b On the transfer and relocation of miners that work at 4,400

Concerning the relocation process, the mission recommends that alternative locations to the area of Kari Kari be identified. The area maintains a high-level of authenticity and integrity from the historical point of view as a cultural and natural landscape and appropriate measures should be implemented for its protection.

The potential relocating of miners to other rural regions should consider that the miner's narrow and ancestral relationship with the Cerro Rico constitutes a significant feature of the local identity from the social and anthropological point of view. Beyond the economic aspects of daily subsistence, according to the anthropologists and archaeologists consulted during the mission, the work of the miners of Potosí is immersed in a complex ancestral cosmogony with the interior of the Cerro Rico and with the underground deities materialized in the image of the "Uncle" to whom they request permission to work in the mines and make offerings. This situation should be taken in consideration so that the process of transfer to other mines outside the Cerro can have a permanent and successful character. Potential risk of social explosion or resistance to the change needs to be considered and informed by adequate sociological and anthropological studies. Given the predictable resistance to the migration on behalf of the independent workers and mining cooperatives, ready to manifest openly their demands, the offering outlined by the Government and the COMIBOL of facilitating better working conditions, endowment of equipment and personnel safety measures or labour safety should be operative and functional.

6.c On the lagoons of Kari Kari

Due to the quick expansion of the urban area of the city of Potosí in recent years, it is necessary to define urban development strategies to regulate the growth - chaotic to a certain extent- of the new settlements that are being built between the metallurgical plants and the hillsides that give access to the hydraulic complex of Kari Kari.

6.d On the historic city and the Ribera de los Ingenios riverside

To date, the historic city and the Ribera de los Ingenios show some impacts in their urban structure that, without affecting significantly the heritage value of the group, can be addressed through conservation and enhancement actions. It is

recommended to reconsider the guidelines and regulations established in the Master Plan of Rehabilitation of the Historic Centre of the City of Potosí and the documents generated by the Technical Office of the Rehabilitation Plan of the Historic Areas of Potosí AC-PRAHP. These guidelines need to be adapted to the new requirements of the city and methodologies of Management Plans and to the regulation requirements of the Honourable Municipal Government of Potosí and the Government of Potosí so that they become legal instruments that guarantee the protection of the property.

To improve the physiognomy of the historic city it is recommended to implement actions to improve and standardize pavements and sidewalks and recover materials and historic constructive systems as much as possible. Specific projects to improve the urban image based on the traditional architectural typology of Potosí should be developed. New constructions and the discordant constructions need to be better integrated through basic modifications to facades. In addition, overhead power lines and posts should be removed and underground wiring implemented. Finally, a vehicular traffic strategy needs to be developed to gradually reduce vehicular traffic in favour of the pedestrian use.

6.e On the integral management of the site

For the management and preservation of Outstanding Universal Value of property, it is recommended to elaborate, to the short term, an integral Management Plan with objectives, policies, strategies, actions, programs and projects that consider the property in its territorial scale and as a whole. Management provisions need to be made for all components (Cerro Rico and its mines, System of artificial lagoons of Kari Kari, historic urban areas of the mining settlement, Ribera de los Ingenios riverside, indigenous Neighbourhoods, Buildings of high architectural value and new residence and industrial developments), as an interrelated and interdependent group and not -as it happens to date- as isolated elements with independent management outlines. It is suggested that for the formulation of the integral Plan Management, the most recent methodologies and experiences of Management Plans in World Heritage properties are reviewed. Approaches for territorial management and/or productive cultural landscapes could also be considered.

Considering the City of Potosí as a productive cultural landscape that embraces a territorial scale with multiple components of diverse characteristics would allow to better face the challenge of management as a single site and not as the sum of different parts relatively separated and independent as it happens today.

Although this could entail a higher degree of complexity because it involves a large number of components, in the long term the benefits in terms of sustaining the

OUV of the property would be considerable. This approach should necessarily include, not only the physical setting that constitutes it, but also the population that inhabits it dynamically. Therefore it should consider both the tangible as the intangible heritage that support the property and the continuity of its importance. The preservation of architecture, urbanism, historic infrastructure would be as important as the conservation and promotion of social organization forms based on the ancestral tradition.

Since the management plan should establish general preservation policies of general character that assist the diverse problems of each of its punctual elements, it is recommended to identify generic strategies and action lines that articulate and configure actions for each of the six components defined according to the typological groupings identified in territory that comprises the property.

For the management of the site, six sections have been identified that seek to articulate similar components and identify common conservation and management strategies:

- *Management of Architectural heritage*: formed by the group of constitutive elements of the hydraulic complex such as water tanks, cisterns, sources, arcades, springs. In addition, it integrates historic buildings in towns, both vernacular and monumental, as well as haciendas, homesteads or edifications dispersed in the rural area.
- *Management of Urban heritage*: refers to the urban setting and historic layout as entity of social and identity and the architecture manifestations of the different towns.
- *Management of Archaeological heritage*: composed by areas, elements and remains of ancient human settlements.
- *Management of Rural Heritage*: composed by traditional cultivation, historic paths system, territorial infrastructure such as bridges, dams, railroad lines, ditches, etc.
- *Management of Environmental heritage*: refers to geographical enclave, flora, fauna, geomorphology and water resources. Includes natural landscapes or settings.
- *Management of Intangible heritage*: formed by cultural traditions associated to the property as well as their promotion. It integrates customs, traditions, gastronomy, regional identity, etc. celebrations, festivities, legends, etc.

The management plan requires establishing the diagnosis and the proposals for the administration and the management of the property through the detailed analysis of its components or constituent attributes besides defining the management indicators.

In what refers to address preservation and management issues at the property, the plan should consider the inclusion of elements such as *objectives, policies, intervention criteria, criteria of presentation to the public and interpretation, regulation, inter-institutional agreement, etc.* Given the characteristics clearly differentiated between each component, specific management actions and conservation provisions will need to be identified for each thematic group.

The fundamental objective of the elaboration and implementation of a Management Plan for a site with the characteristics of the City of Potosí, which covers a vast territory, should not only to adequately address heritage conservation but also to contribute to the improvement of the quality of life of those who inhabit the territory.

Management and conservation objectives should strengthen the sense of belonging and identity for its inhabitants and boost the creation of employments and economic growth opportunities based on the preservation of its cultural values.

The Management Plan should also be a tool for organization and intergovernmental coordination to facilitate the sustainable conservation and development of the territory. Provisions made should also harmonise existing legal instruments and competent bodies to ensure that OUV and conditions of authenticity and integrity of each of the attributes of the property are maintained.

7. ANNEXES

Annex 1: Mission Team

Cesar Moreno-Triana, WHC

Luis Ignacio Gómez Arriola, ICOMOS

Annex 2: Terms of reference for the Reactive Monitoring Mission to the City of Potosí, Plurinational State of Bolivia (C420)

In accordance to **Decision 37 COM 7B.91** from the World Heritage Committee (Phnom Penh, 2013), the reactive monitoring mission shall, in collaboration with national authorities, as well as relevant regional and local authorities and other involved stakeholders, undertake the following tasks:

1. Assess the current state of conservation of the World Heritage property with particular focus on:
 - a. Current conditions at the Cerro Rico Mountain, the status of the development of a comprehensive strategy for its stabilization and monitoring, the timeframe necessary for completion of the pending studies and the implementation of recommendations in the four high-risk areas identified, and confirmation of the enforcement of the moratorium on all exploration, extraction and any other interventions under and above ground between altitudes 4400m and 4700m set forth in Article 6 of Supreme Decree 27787 of October 2004;
 - b. Works carried out for the construction of the road to the top of Cerro Rico Mountain and measures currently in place measures to ensure that access is limited to priority emergency works;
 - c. Appropriateness of further operations foreseen for interventions at the summit of the Cerro Rico;
 - d. Current conditions at the City of Potosí and state of other attributes that convey the Outstanding Universal Value of the property.
2. Evaluate the progress made in securing operational management arrangements for the property, with clear decision-making mechanisms and adequate resourcing, human, technical and financial. Assess the existing management tools for the property and the provisions regarding conservation and rehabilitation works, as well as proposals for public use and plans for risk management.
3. Assess progress made in the establishment of the property's buffer zone and related regulatory measures to control and regulate further development,
4. Review progress made in the implementation of the recommendations made by the World Heritage Committee at its 35th, 36th and 37th sessions as well as those made by 2011 joint WHC/ICOMOS Mission,

5. Based on the Statement of Outstanding Universal Value adopted by the 37th session of the World Heritage Committee at its 37th session (Phnom Penh, 2013), and consistent with the Operational Guidelines (paragraph 177-182), the mission shall analyse whether there are ascertained or potential dangers to the property and whether the requirements and criteria for the possible inscription of the property on the List of World Heritage in Danger are met;
6. On the basis of the findings of the mission, prepare practical recommendations and identify appropriate lines of actions related to the property's conservation and development including necessary measures for the implementation of the Management Plan, to be presented to the Government of Bolivia and to the World Heritage Committee;
7. Prepare a joint mission report in English or French, for review by the World Heritage Committee at its 38th session (Qatar, 2014). The report should follow the attached format and should be submitted to the UNESCO World Heritage Centre and ICOMOS Headquarters for review in hard copy and an electronic version

Annex 3. Itinerary and programme of the Mission

The reactive monitoring mission was carried out in two parts and not as it was scheduled originally for reasons unrelated to the participants, a situation that favoured a more thorough assessment of the evolution and instability of the summit of the Cerro Rico de Potosí. The first part of the mission was carried out by Cesar Moreno-Triana, WHC, between 11 to 14 December 2013 and the second part was undertaken from the 23 to 30 January 2014 by Luis Ignacio Gómez Arriola for ICOMOS.

The programme and itinerary for first stage of the mission was:

11 de diciembre de 2013

La Paz

- 10h00 Entrevista de la Misión con el Ministro de Culturas y Turismo
- 14h00 Reunión de trabajo con el Director de Patrimonio Cultural del Ministerio de Culturas y Turismo
- 16h00 Sesión con el Órgano de Emergencia

12 de diciembre de 2013

- 06h10 Salida de la Paz a Potosí
- 09h00 Reunión de recibimiento en la casa de la moneda de Potosí
- 10h00 Visita a la primera zona de riesgo de Cerro Rico
- 14h30 Visita a la segunda y tercera zona de riesgo del Cerro Rico de Potosí
- 16h00 Visita a la cuarta zona de riesgo
- 16:30 Visita a las lagunas de Kari Kari
- 17h30 Encuentro con la Sociedad Civil de Potosí

13 de diciembre de 2013

- 09h00 Reunión con autoridades del entorno de conservación de la Ciudad Histórica, Municipalidad de Potosí.
- 11h00 Recorrido por la Ciudad Histórica
- 14h00 Visita a las obras de restauración de la Catedral de Potosí a cargo de Francisco Poma, Encargado de la Unidad de Patrimonio Arquitectónico del Municipio de la ciudad de Potosí

14 de diciembre de 2013

- 08h00 Retorno a la ciudad de La Paz
- 14h00 Reunión con los Ministros de Culturas y Turismo

The second stage had the following schedule and program of activities:

24 de enero de 2014

- 01h30 Llegada a la ciudad de La Paz, contacto y reunión preliminar con el Director de Patrimonio, Ministerio de Culturas de Bolivia.

25 de enero de 2014

- 06h:00 Salida por avión cancelada a la ciudad de Potosí por mal tiempo (lluvia ininterrumpida)
- 18h00 Salida alternativa por avión a la ciudad de Sucre cancelada por mal tiempo (lluvia ininterrumpida)

26 de enero de 2014

- 9h00 Salida por avión a la ciudad de Sucre para viajar a Potosí por carretera. Traslado interrumpido por bloqueo de Cooperativas Mineras en la población de Betanzos, aproximadamente a la mitad del recorrido.
- 2h00 Llegada a la ciudad de Potosí. Recorrido por la ciudad.

27 de enero de 2014

- 09h00 Visita al Cerro Rico encaminada a observar las condiciones laborales y de seguridad, poniendo énfasis en el sector entre la cima, hasta la cota 4.400. Se visitan y revisa el estado de conservación e intervenciones en el Cerro Rico en las zonas de la cima, sector de relleno, camino y plataformas.
- 12h30 Visita a las Lagunas de represamiento de aguas del Kari Kari
- 13:30 Reunión con el Gobernador del Gobierno Autónomo Regional de Potosí Félix Gonzáles Bernal para revisar la problemática de hundimiento y asentamientos recientes de la cima del Cerro Rico.
- 15h00 Visita a las obras de restauración de la Catedral de Potosí a cargo de Francisco Poma, Encargado de la Unidad de Patrimonio Arquitectónico del Municipio de la ciudad de Potosí
- 16h00 Reunión Informativa sobre el estado general del Cerro Rico y de la Ciudad Histórica. Reunión con autoridades del entorno minero metalúrgico para la evaluación de los estudios científicos del Cerro Rico, documentos técnicos de los proyectos implementados en la cima.
Esta misma visita presentaría la nueva propuesta de reglamentación de la actividad minera.
Participan: Ministerio de Minería y Metalurgia, Ministerio de Trabajo y Previsión Social, Ministerio de Culturas y Turismo, Corporación Minera de Bolivia, Gobierno Autónomo Departamental de Potosí, Gobierno Autónomo Municipal de Potosí y empresa Q&Q.
- 18h00 Recorrido por el Ingenio Minero de Dolores y por la ciudad histórica para evaluar las acciones implementadas para la conservación de la ciudad.

28 de enero de 2014

- 09h00 Retorno emergente a La Paz desde Potosí por posibilidad de cancelación de vuelos por lluvia.
- 16h00 Reunión con Punto Focal boliviano para UNESCO y con el Director de Patrimonio, Ministerio de Culturas de Bolivia.

29 de enero de 2014

15h30 Reunión con el Órgano de Emergencia Participan: Ministerio de Minería y Metalurgia, Ministerio de la Presidencia, Ministerio de Medio Ambiente y Aguas, Ministerio de Relaciones Exteriores y Ministerio de Culturas y Turismo.

Annex 4: Decisions of the World Heritage Committee

Decisión: 37 COM 7B.91

The World Heritage Committee,

1. Having examined Document WHC-13/37.COM/7B.Add,
2. Recalling Decision **36 COM 7B.96**, adopted at its 36th session (Saint-Petersburg, 2012),
3. Takes note of the information submitted by the State Party and regrets that insufficient details were provided to comprehensively assess the current factors affecting the property;
4. Reiterates its requests the State Party to:
 - a) Clarify whether Article 6 of Supreme Decree 27787 of October 2004 has been modified and if the moratorium on all exploration, extraction and any other interventions under and above ground between altitudes 4400m and 4700m is currently enforced,
 - b) Provide further details on the scope and extent of operations foreseen for interventions at the summit of the Cerro Rico,
 - c) Finalise the scientific studies for Cerro Rico and develop a comprehensive strategy for its stabilization and monitoring,
 - d) Provide details on the current arrangements for the management system for the property, including information on provisions and timeframes for conservation and rehabilitation works, proposals for public use and plans for risk management;
5. Requests the State Party to invite an ICOMOS reactive monitoring mission during 2013 to assess the current state of conservation of the property and to evaluate whether there are ascertained or potential dangers to the Outstanding Universal Value of the property would warrant inscription of the property on the List of World Heritage in Danger;
6. Also requests the State Party to submit to the World Heritage Centre, by **1 February 2014**, an updated report on the state of conservation of the property and the implementation of the above, for examination by the World Heritage Committee at its 38th session in 2014.

Annex 5. Participants in the various meetings:

- Dr. Pablo Cesar Groux Canedo, Ministro de Culturas y Turismo
- Dr. Marcos Michel López, Director de Patrimonio, Ministerio de Culturas y Turismo de Bolivia
- Lic. Silvia Saavedra, Punto Focal para Unesco de Bolivia, Ministerio de Culturas y Turismo de Bolivia
- Félix Gonzáles Bernal, Gobernador, Gobierno Autónomo Regional de Potosí
- Lic. Oswaldo Cruz, Secretaría Departamental de Turismo y Cultura, Gobierno Autónomo Regional de Potosí
- Ing. Víctor Hugo Llanos, Ministerio de Minería y Metalurgia de Bolivia
- Ing. Carlos Colque Benítez, Gerente Regional de Corporación Minera de Bolivia, COMIBOL, Bolivia
- Ing. Ángel Quintanilla, Gerente de la Empresa Q y Q, responsable de las obras de consolidación de la cúspide del Cerro Rico
- Francisco Poma, Encargado de la Unidad de Patrimonio Arquitectónico del Municipio de la ciudad de Potosí

Annex 6. Planned and on-going construction projects on the top of Cerro Rico del Potosí

1 Ministerio de Minería y Metalurgia de Bolivia, *Preservación del Cerro Rico del Potosí*, Power Point presentado a la Misión de Monitoreo Reactivo ICOMOS, 26 de enero de 2014.

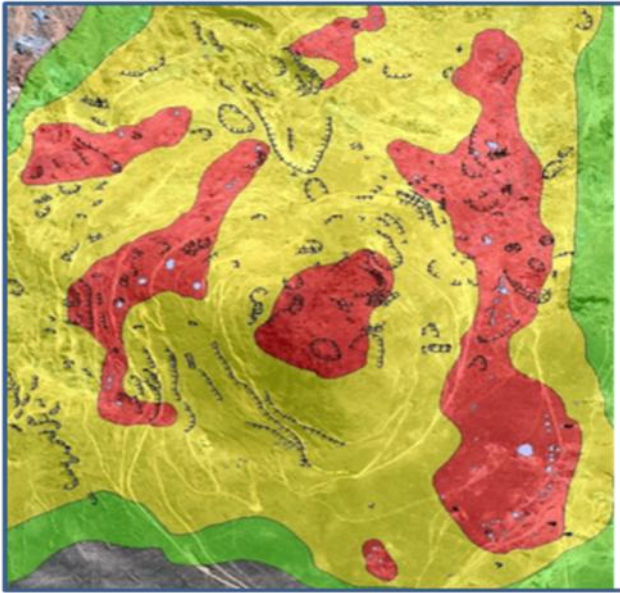
2 COMIBOL, *Proyecto de estabilización del hundimiento de la cúspide del Cerro Rico de Potosí*, 2013.

3 COMIBOL, *Posibles áreas para reubicación minas de Cooperativas Mineras sobre la cota 4,400 msnm*, sin fecha.

4 Ministerio de Minería y Metalurgia de Bolivia, proyecto de *Ley de Explotación y Preservación del Cerro Rico de Potosí*, 2013.

Annex 7. Maps

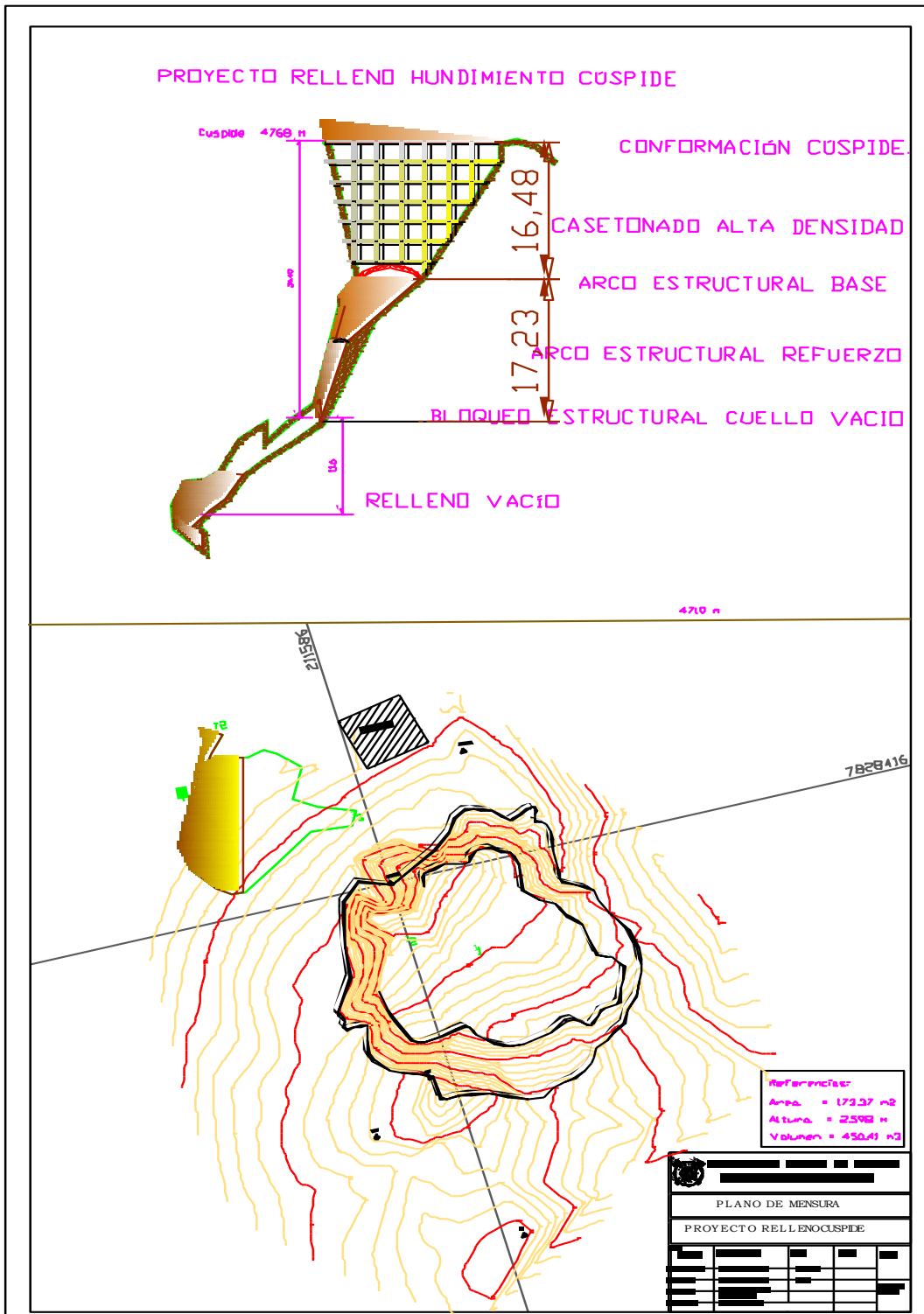
1 COMIBOL, *Zonas de Riesgo*, 2012.



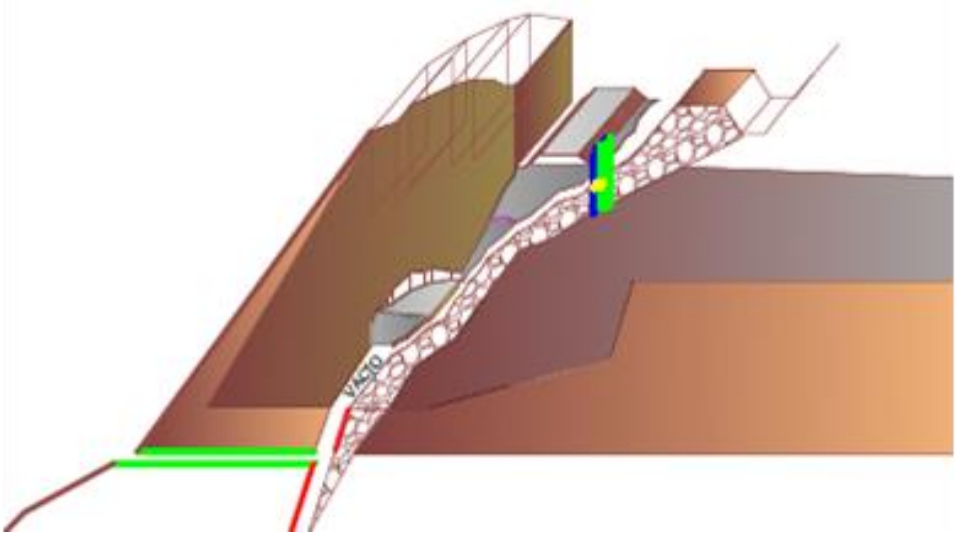
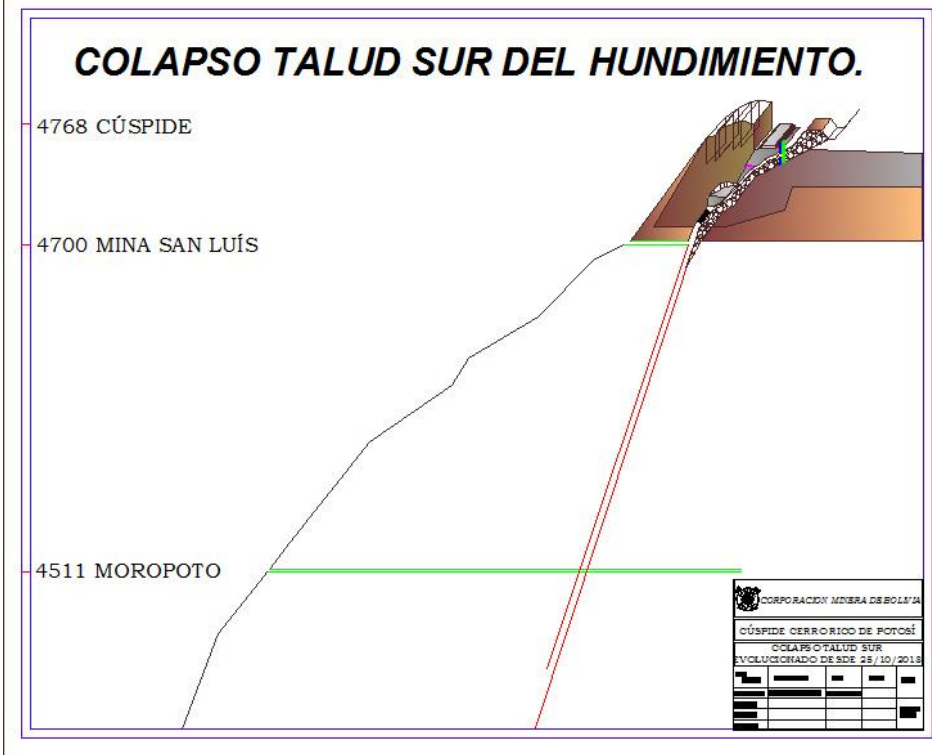
ZONAS DE RIESGO

- Alto riesgo**
- Moderado riesgo**
- Bajo riesgo**
- Hundimientos**

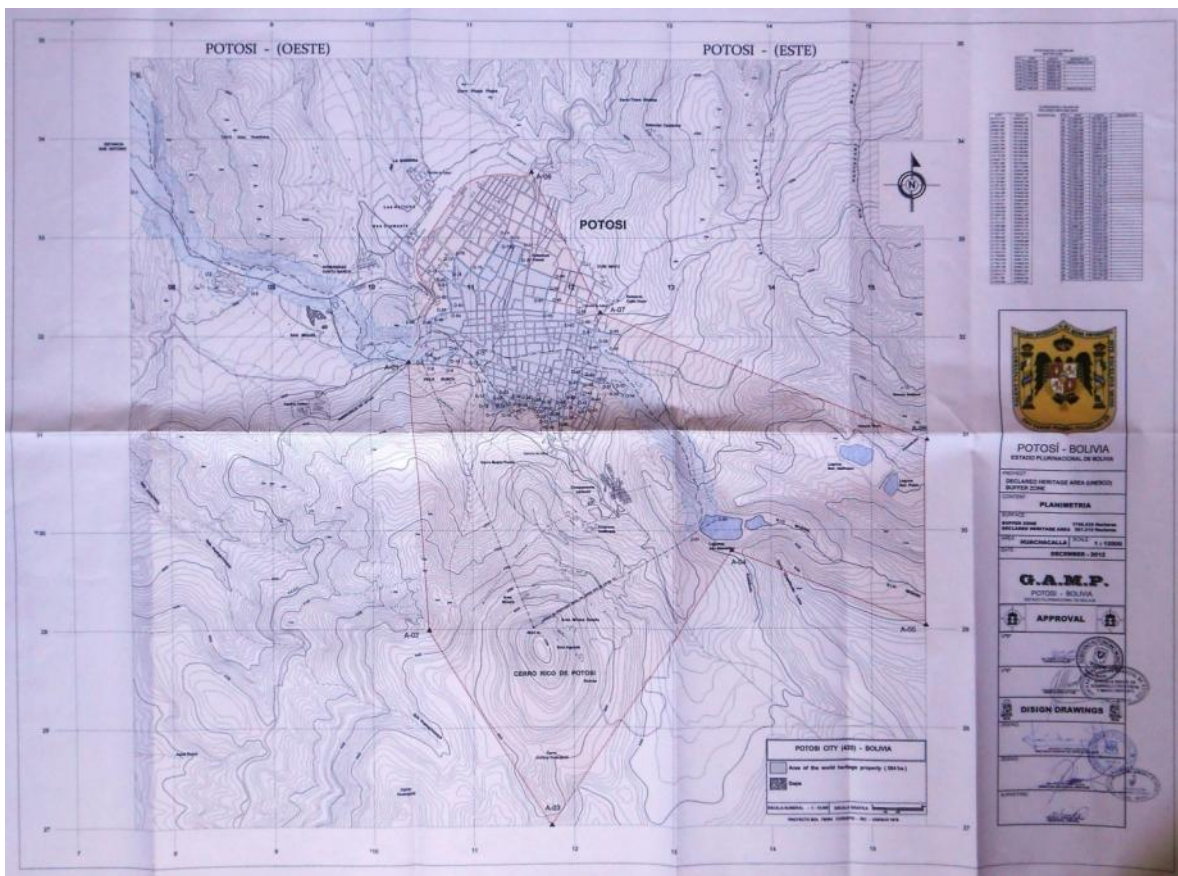
2 COMIBOL. Proyecto relleno de la cúspide del Cerro Rico.



3 COMIBOL, *Mapa esquemático de problemática de relleno de la cúspide del Cerro Rico, 2013.*



4 Estado Plurinacional de Bolivia, *Inscribed Heritage Area (UNESCO) Buffer Zone*, 2012.



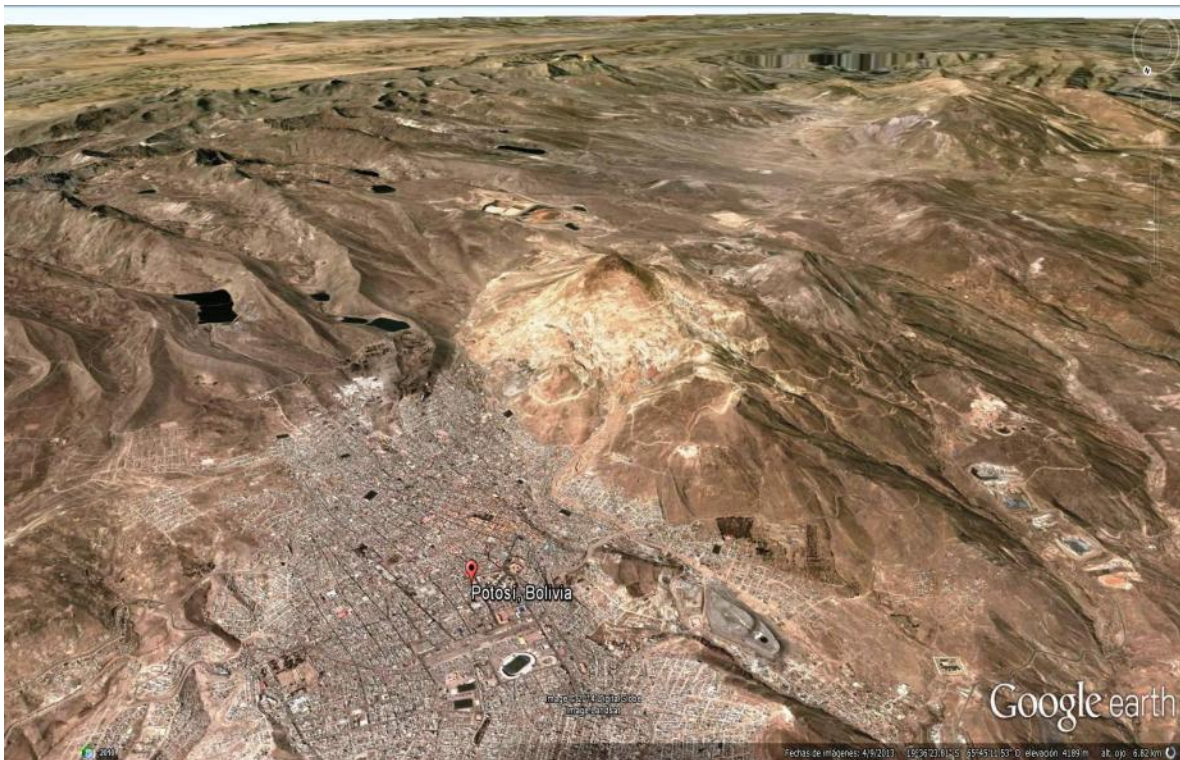
5 PRAHP, *Inventario de inmuebles de valor patrimonial en el Centro Histórico de la ciudad de Potosí, 1993.*



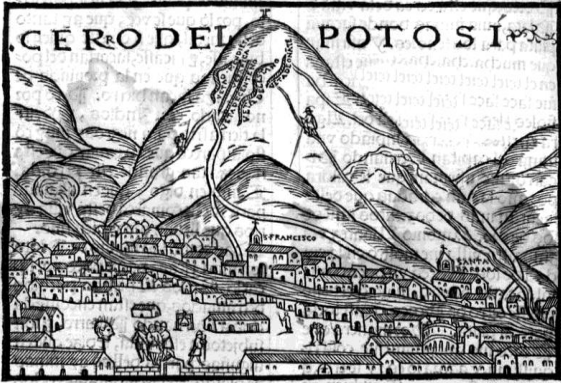
Annex 8. Photographs



General aspect of the World Heritage site of the historic City of Potosí. Google Earth image, 2014.



View of the city of Potosí, Cerro Rico and Kari Kari lagoons complex. Google Earth image, 2014.



Engraving from 16th century that shows the landscape of the site.



The current image of cultural landscape of Potosí is relatively preserved in its overall image.



The city of Potosí from Cerro Rico.



Appearance of the beginning of the collapse of the peak of the Cerro Rico in 2011. Photo Empresa Q & Q.



Inspection of the sinking. Photo Empresa Q & Q.



Revision of the collapse. Photo Empresa Q & Q.



Start of the work for filling gaps. Photo Empresa Q & Q.



Filling works. Photo Empresa Q & Q.



Beginning of the dome of the filler bracket. Photo Empresa Q & Q.



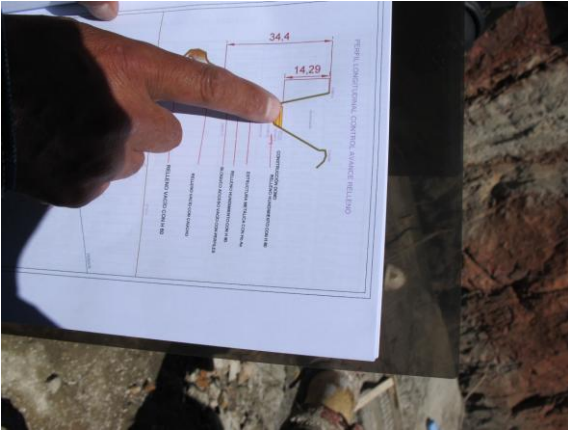
Dome of the filler bracket. Photo Empresa Q & Q.



First visit of reactive monitoring mission to Cerro Rico, December 2013



Works at the summit of Cerro Rico, December 2013



Explanations about the filling during the first visit of reactive monitoring mission to Cerro Rico, December 2013



The lagoon from the summit of Cerro Rico, December 2013



One of the 38 cooperatives operating in Cerro Rico, December 2013



One of the 38 cooperatives operating in Cerro Rico, visited by the mission in December 2013



Second visit of reactive monitoring mission to Cerro Rico, January 2014.



Sample of concrete lightened used for filling of the peak.



Fracture of the filling structure caused by the recent collapses in the Cerro Rico caused by the extraction of mineral and heavy rainfall.



Collapse of the structure of filling.



Inner aspect of the cavity under the filling of concrete lightened.



Separation of the filling of light concrete and the inside of the sinking.



Inspection visit of COMIBOL to site.



Visit of evaluation of the damage at the top of the Cerro Rico.



Miners on route to the mines.



"TIO" ancient God who dwells in the basement of the Cerro Rico.



Mines in exploitation of ore at 4,400 m height.



Appearance of an entrance to the mines located about 4,400 m. that continue operating.



Collapse at inside of a mine.



Recently opened road access to the summit of the Cerro Rico



Panorama of the landscape around Kari Kari lagoons.



One of the colonial dams still in use.



Artificial Kari Kari lagoons complex that maintains its authenticity and integrity.



A water box that controls the flow of the fluid into the city of Potosí.



Water pipe in the Kari Kari hydraulic complex.



Appearance of new buildings without regulation of urban image in the accesses to the complex of lagoons.



Landscape of the site, December 2013



Varied pavement and graffiti in the city center of Potosí, December 2013



Cables affecting the visual qualities of the City of Potosí, December 2013



Traditional residence architecture with stone foundations and solid walls of adobe, December 2013



Properly maintained public space in Potosí, December 2013



Wooden and glass balcony that acts as protection against the climate, December 2013



Mint of Potosí, one of the restored historic buildings.



Water box in Potosí, newly restored but without current use.



One of the alleys intervened to pavements and traditional appearance.



Rehabilitation works at a plaza in Potosí.



Completion of the restoration work of the Potosí Cathedral.



Nocturnal illumination at emblematic buildings of the city.



Current appearance of one of the streets of the city where buildings different from the traditional urban image have been constructed.



Visual contamination by cables and installations at the historic centre.



Road congestion in the narrow streets of the city.



Cables that affect the perception of the monuments of the site.



Pavement of concrete molded forms in one of the Potosí streets.



Carved stone pavement partially covered with asphalt.



Panorama of the Ribera de los Ingenios that retains its historical image.



Historic water channel that still feeds some mining installations from the Kari Kari lagoons.



Historical mining machinery preserved in some mining installations.



Room for the historic benefit of metals still in use.



The uncontrolled inclusion of new architecture without consideration of the traditional building types of Potosí can affect the authenticity and integrity of the site.



New construction without clear regulations for the conservation of the traditional urban image is affecting the Ribera de los Ingenios.