

INFORMATION ON GOLD STRIP MINING PROJECT REPORT IN CORCOESTO

CORCOESTO'S STRIP MINING PROJECT REPORT.

The presence of gold in Corcoesto is known from ancient but small golden concentration in the rock (the low law of the deposit (1,6 gr/t)) had made its exploitation difficult. The increase of the price of gold, considered now a guaranteed value, is the item that allows at this moment such working profitable, as long as a very mechanized and large-scale technology is used. The question is to know how long it will continue being profitable a gold of so low law and what would happen if the company does not obtain the foreseen benefits.

Corcoesto's gold is associated to arsenopyrite and pyrite; it is presented in veins or small quartz seams crossing schist and granite. Gold is not used to be visible and it mostly appears on microscopic inclusions.

The project of the company "Minera de Corcoesto S.L." (a subsidiary of Edgewater Exploration) is to exploit the gold in a strip mining which will occupy 392 hectares, using a leaching system with cyanide in agitated tanks.

In order to obtain the gold it is required: ⁽¹⁾

1. **To alter the course** (or to make it disappear according to an expert report dated June, 2013 ⁽²⁸⁾) **of the Lourido River.** The place where such river uses to flow is selected to place the pool of residues of flotation (that will end up by containing more than 8.400 tons of arsenic) and that of leaching residues of cyanidation (smaller but in which will be cyanide compounds). In the project the alteration of its course is formulated by means of the creation of a riverbed "naturalized" of 2730m of length and with a slope of canalization of 3% of average. The problem is that this new canalization would pass by few meters to the pools of cyanidation and to the pool of muds and arsenic facilitating the filtrations and escapes of these pollutants to the underground and superficial waters.
2. Building of two **pools of residues** that would occupy more than 65 hectares.
3. **Mineral extraction.** It would be realized by means of blowing-ups (in two daily rounds of twelve hours and every day of the year) making, with the fragments of rock, an immense dust cloud. Later, the mineral moves to the plant of treatment (the mineral associated with the gold: 17.080.751 tons) or to the dumps (the rock rejected for not having gold: 122.188.570 tons).

4. **Treatment of the mineral.** Once in the plant, the mineral will be ground until less than 100 μm (0.1 millimeters) to go on later to tanks of flotation and later to tanks of leaching with cyanide (10% of the mineral will need this treatment).

5. **Restoration plan.** The impacts caused in the environment by the activities of mega mining industry force to carry out a Restoration Plan as soon as the cessation of the activity has happened. In this case, given the magnitude of the negative impacts (air pollution through particles of arsenic and heavy metals, spillages of lubricants, loss of the stability and compactness of the soil, erosion, accumulation in the land of recalcitrant substances proceeding from the explosives, impacts on the flora and fauna, and a long etc), a good restoration plan would suppose assigning multimillionaire amounts in order to minimize the impacts caused by the activity. Here it is where, because of the evidences and past experiences, we verify that this stage is not carried out in the majority of the projects, especially when it is a question of mining projects of private initiative. As an example, we may mention the void work of reconstruction carried out in Aznalcóllar, after the accident happened in 1998, by the company BOLIDEN which, on the other hand, has had to be paid by the Spanish State.

Some of the problems associated to this mine:

The gold strip mining project of Corcoesto will result in a series of risks and very serious impacts in the health, in the environment and in the socioeconomic level on Bergantiños's region, as a consequence of the pollution caused by arsenic and cyanide.

1. Use of **cyanide**. In spite of the fact that there are alternatives⁽³⁾ (less profitable) than the use of the cyanide, the company would use this highly poisonous compound to a pace of 1'49 daily tons⁽¹⁾. This is alarming, considering that the limit established in the procedure of environmental quality (Spanish Royal Decree 927/1998) for the superficial continental waters is 0,02 mg/l. The company guarantees that it would obtain the chemical total degradation of the cyanide before depositing it in the pool of leaching, but this affirmation contrasts with the information which assure that there is no chemical method which solves the problem of the cyanide compounds of the mining industry⁽⁴⁾⁽⁵⁾ ⁽⁶⁾. It is important to emphasize that there are alternatives to the use of the cyanide for the extraction of gold, alternatives that are recommended in the bibliography consulted and attached to this report. ⁽³⁾

2. **Blowing-ups**⁽¹⁾. 196 annual blowing-ups of type A would be carried out (each one mobilizes 37.000 m³ of material) and 42 annual blowing-ups of type B (it mobilizes 18.900 m³ in every blowing-up). Taking into account that the mining exploitation would be active day and night, and that some of the particular houses are only 20 meters far away of the mining exploitation,

the levels of noise that the neighbors would support would be the highest. In these blowing-ups there would take place particles that would spread (7) arsenic and mineral particles that can cause pulmonary serious ailments in a radius that will depend on the speed of the wind and on the size of the particles. We should remember that the strong winds are a constant on this cost ("Costa da Morte"). (8)

3. **Arsenic.** Although it is a chemical essential element in small quantities, its toxic effect in major quantity is well-known. We have already commented that in the pool of residues there would have 8.400 tons of this element to which it would have to add the present in the mineral rests that would form the dump that closes the pools of residues and from the filling of the pit. The high toxicity of the arsenic is joined to its less known carcinogenic character and teratogenic (causer of malformations in the embryos and fetuses). There are numerous bibliographies on the high toxicity of the arsenic. (9)(10)(11)

Where this arsenic come from? As we have already mentioned, Corcoesto's gold is associated to arsenopyrites⁽¹⁾. These minerals are composed by arsenic in a 46%, for what so much the rubbles of mine (that will form the dumps) as the sterile ones that would end in the pool of flotation, would have a content in natural arsenic very high.

The presence of arsenopyrite causes that, in a natural way, the rock has 50.000 times more arsenic of the habitual one. The blowing-ups and the later trituration would fragment very much the mineral, increasing enormously its solubility and it would do that the exhibition to the arsenic was 10.000 times superior to the current one. The mine, therefore, would multiply by 10.000 a risk of natural pollution by arsenic.

In this respect we need to consider that the levels of arsenic in the Anllóns River were already evaluated, among others ⁽¹⁴⁾, by a study of the CSIC of the year 2011, in which they detected that the levels of pollution of the waters caused by the arsenic were increasing when passing by the zone of Corcoesto's former auriferous exploitations (exploitations of beginning of the 20th century, which closed in the 40s and which mobilized a minor amount of material that the one claimed by Edgewater). The concentrations of arsenic in 6 of 12 analyzed points in the estuary equalize (1 case) or exceed considerably (5 cases) the value of 70 mg/kg, from which there are always observed harmful effects that can suppose an environmental risk for the nature and for the human and animals health. ⁽¹⁵⁾

The issue of the pollution caused by the arsenic is also provoking a strange lack of coordination between public administrations. In spite of the fact that the Galician Health Department ("Consellería de Sanidade") warned to Cabana de Bergantiños's Council that the water of several of the sources, from which the inhabitants, cattle and crops use to drink, cattle and cultures, were contaminated by arsenic, it took almost a month in publishing

the announcement. Even once published (hung on the tavern and the church) the decree disappeared rapidly according to the neighbors. ⁽²⁹⁾

4. **Pool of residues.** This pool may lead to several problems. It is a pool of great size which is situated only 15 Km from the estuary of the Anllóns River, a zone with high ecological and economic value. The break of Aznalcóllar's pool, with a minor slope than ours, created a wave of 811 m³/s, almost the double of the maximum rise of the Anllóns in the last 200 years (450 m³/s). Considering that the slope average to the sea of Aznalcóllar's pool was 1,3 m/km and that the slope average Corcoesto's pool up to the sea is 15,9 m/km, we are facing a very important risk. ⁽¹⁶⁾

Moreover, the pool would be placed near an active fault that might provoke an accident induced by the blowing-ups or by the pressure of the pools of residues (we include a map of historical seismicity. Source: SISMIGAL). ⁽¹⁷⁾

The potential escapes or overflows of the pools may provoke serious problems, since the pools are less than 1 Km from the Anllóns River (classified under the "Red Natura 2000" like a "Place of Community Interest and Zone of Special Protection for the Birds").

Finally, a quick look to the topographic map ⁽¹⁸⁾ demonstrates that the drift of the Lourido River increases the risk of pollution of the Anllóns River. The channeling that it is proposed as alternative for the Lourido River would make that it stops occupying its valley, with a riverbed that as any other river cuts the level curves, to occupy a position in the middle of the hillside in parallel to the level curves. In this new course the river would be obliged, in a concrete point, to make a curve of almost 90°. The experience demonstrates that in the periods of flood the rivers turned aside artificially use to take again the original riverbed and we cannot forget that in this place there would be two pools of residues with tons of arsenic and cyanide residues. In Galicia, the episodes of strong rainfalls caused by powerful tempests or explosive cyclogenesis are frequent and would increase the risk of the rechanneling of the Lourido River or the pools of residues could spill part or all its content to the Anllóns. In addition, in the scheme in which the aspect of the new course of the Lourido River is described, there are artificial terraces that would be fixed by trees that, from the repopulation, would take time in growing and being able to realize its contain function. ⁽¹⁾

5. **Water.** According to the project (page 31 of the Study on Environmental Impact, hereinafter "EIA") ⁽¹⁾ of the mining company 1.400.000 m³ annual of water would be used, among the caught water of the rain and the water obtained from underground resources. Making a quick calculation, it means that it needs approximately 4.000 m³ every day (432.695 +967.305 =1.400.000 m³ =1.400.000.000 liters per year and 3.835.616 liters/day, which are 3.835 m³/day). The water would come from the rain and from the underground waters that fill the mining hollows. Although the company considers this fact as positive, since it is a question of natural water which is present in the zone, we can only remember that the collected water of the rain would be the water that would stop coming to our rivers, modifying the

hydrological balance of the Anllóns. We cannot forget that the shellfish suffers strongly with the changes of salinity that might cause this modification. Moreover, the indispensable emptying of water of the fellings will also concern the springs, provoking in many cases its disappearance.

6. **Insurances.** We know that every year almost two mining pools, of average, use to break in the world, so it is necessary to contemplate the possibility of accidents. In the conclusions of a study which was seeking to learn about the break of Aznalcóllar's pool⁽²¹⁾ it is commented that in actions which may provoke the release of pollutants to the environment, a study of the maximum possible risk, in this case the break of the pool, shall be included in the evaluation of environmental impact. In spite of this information, the study of environmental impact of Corcoesto's Mining company does not evaluate this possible risk.

In consequence, the aim of the company not to constitute a financial guarantee in order to face the potential damages to people and to the environment caused by accidental situations is not included in the EIA nor in the DIA (in Spanish, Declaration of Environmental Impact), regardless the requirement the governmental estates must have gathered on the basis of the legislation in force. The Galician decree 455/1996 of November 7 related to finance in environmental issues, mentions in its first article: "Article 1º. The administrative competent body for the granting of an authorization of projects, works and activities capable of concerning the environment, according to the Law 1/1995, of January 2, related to environmental protection of Galicia, when in the above mentioned authorization correcting measures are imposed, the constitution of a personal guarantee may be required by means of an endorsement which guarantees, sufficiently, the fulfillment of these and the repair of the possible damages and the cost of the restoration. The constitution of the endorsement, the full satisfaction of the administrative body which requires, will be the prior condition for the exercise of the activity or for the beginning of the works to which the authorization is referred." (22)(23)(24)

7. **Pollution of the soil.** Although the importance of the ground is little known and valued, it is known by everybody that what happens to the soil will concern the vegetables and the whole food chain.

In the annexes attached to this report it can be clearly observed that the pollution of the soils in the nearness of dumps with high level of arsenic provokes problems of pollution that make these ecosystems, and we mention literally, "slightly healthy places so much for the animals as for the man". ⁽¹²⁾

We shouldn't forget that the soils are very fragile structures that are renewed to a very slow pace, so any affection that we provoke in them will remain in a long time.

Based on the monograph "Generic levels of reference (NGR) of heavy metals and other elements trace in soils of Galicia", realized in the Department of Edaphology and Chemical Agriculturalist of the University of Santiago to order of the Council of Environment and Sustainable Development, and focused on the related to the arsenic on the soils, we may mention:

- "The major risks on pollution of soils are in zones where mining and metallurgical activities, processes of combustion, waste management or utilization of pesticides for the preservation of wood or the elimination of recalcitrant plagues were carried out" (p. 58).

- "It was opted to establish a reference generic level of arsenic (NGR (As)) of 50 mg/kg, for all the materials, only surmountable in zones of demonstrated presence of arsenopyrite (which should be considered for studies of natural risk). In any case, the high dangerousness of the arsenic (As) shall be considered and the pollution caused by this element strongly controlled and, as possible, minimized" (p. 60).

- As it is literally indicated in the Declaration of Environmental Impact of the mine Corcoesto (Annex III, p. 47): "On the high content in arsenic in the residues generated in the mine; the promoter provides analytics of the natural values of the soils in As ranged between 26 and 4090 ppm, with an average of 494 ppm which are higher than the reference generic levels for the industrial soils of Galicia".

- In consequence, with an average concentration of 494 mg/kg of arsenic, the soils of Corcoesto's zone with presence of arsenopyrites exceed 10 times the reference generic levels established by the Galician Government for the protection of human health and of ecosystems, so they shall be included in the category for which Macías Vázquez and Calvo de Anta (2009) recommend "that it should be considered for studies of natural risk".

http://www.sghn.org/Actuacions_Xeral/Mineria/Ayala_Carcedo_2004_Rotura_balsa_Aznalcollar.pdf

8. **Social consequences.** The Mining exploitation would last a maximum of 11 years and there would put at risk the shellfishing, fishing, agricultural and rancher sectors of the affected town halls (Cabana de Bergantiños, Ponteceso, Coristanco, Carballo, Malpica and Laxe, as minimum), as well as other activities of the primary sector that support the region. It is not only the possibility that the pools of residues break or the possible overflows and escapes with toxic spillages, but also the confirmed pollution caused by arsenic and other heavy metals as zinc, coming from the dump which closes the pool

of residues and from the filling of the pit. The attached bibliography demonstrates that the dairy sector and the mining industry of the gold are incompatible⁽²⁵⁾, and that the pastures would also be affected. Obviously the tourism would also be harmed and, finally, we shouldn't forget the real danger on the health that these toxic substances provoke.

We have in the region the base for a long-term development sustained by means of agriculture⁽²⁶⁾, ranching and fishing, with tourist applications of great value. All that resources should not be in danger due to a similar exploitation, which in addition would not last more than 11 years. The company Edgewater promises 138 direct jobs and 133 by means of subcontracts (271 in total), without specifying the duration and the specialization. The agriculture and the ranching already have created in Bergantiños's region more than 3.000 direct jobs.

Among the most extended recommendations for a sustainable exploitation of the mineral resources, the importance of acting according to the Principle of Precaution is repeated, trying that the provoked damage is not bigger than the obtained benefit, to prove the innocuousness of the actions, to propose alternatives and to inform the people, allowing a democratic decision.

Bibliography and references:

- (1) Estudio de Impacto Ambiental para la mina de oro de Corcoesto. ([pdf](#))
- (2) Declaración de Impacto Ambiental para a mina de oro de Corcoesto. ([pdf](#))
- (3) Referencias sobre alternativas a la cianuración:
 - Castroviejo, R. *Gold ores related to shear zones*, West Santa Comba- Fervenza area (Galicia/Spain): A mineralogical study. 1990 ([pdf](#))
 - <http://www.agenciasinc.es/Noticias/Desarrollan-un-metodo-para-extraer-oro-menos-toxico-que-el-cianuro>
 - <http://madreongpoo.blogspot.com.es/2008/09/extraccion-de-oro-sin-cianuro.html>
- (4) Artículo de la Dra en Química Carmen Varela: “Cianuro e minería, verdades demostradas”. <http://nonaminadecorcoesto.blogspot.com.es/2013/02/cianuro-e-mineria-verdades-demostradas.html>
- (5) Documento audiovisual de la Dra en Química Carmen Varela: “Cianuro e outros tóxicos de mina”. [Conferencia](#)
- (6) Artículo de la Dra. en Química Carmen Varela “Cianuro e minería: Moitas medias verdades interesadas”. [Artigo](#)
- (7) Colegio de Ingenieros Civiles de Baja California Sur, AC. “Estudio relativo al movimiento del polvo (residuo de mina) debido a la acción del viento”. ([pdf](#))
- (8) Sistema de información meteorológica de [meteogalicia](#).
- (9) Agencia para Sustancias Tóxicas y el Registro de Enfermedades (ATSDR). Estudios de caso en medicina ambiental. La toxicidad del arsénico ([pdf](#))
- (10) US Department of Health and Human Services. Toxicological Profile for Arsenic. 2007. ([pdf](#))
- (11) Mateo, L.M. *El Arsénico, ese conocido tan desconocido*. Ambiociencias- Revista de divulgación científica. Universidad de León. ([pdf](#))
- (12) [Pastor,J; García-Salgado,S; Hernández, A. J. ; Quuano, MªA.; ; Bonilla, Má M. 2008. Arsénico y otros metales pesados en plantas de comunidades de pastos del cerro de la plata \(Bustarviejo, Madrid\) \(pdf\)](#)
- (13) Macías Vázquez, F.; Calvo de Anta, R. 2009. *Niveles genéricos de referencia de metales pesados y otros elementos traza en suelos de Galicia*. Consellería de Medio Ambiente e Desenvolvemento Sostible. Xunta de Galicia ([pdf](#))
- (14) Devesa-Rey, R., Díaz-Fierros, F., Barral, M.T. (2011). *Assessment of enrichment factors and grain size influence on the metal distribution in riverbed sediments (Anllóns River, NW Spain)*. Environmental Monitoring and Assessment 179, 371–388.

(15) [Costas M, Prego R, Filgueiras AV, Bendicho C. 2011](#). *Land–ocean contributions of arsenic through a river–estuary–ria system (SW Europe) under the influence of arsenopyrite deposits in the fluvial basin*. Science of the Total Environment 412-413: 304-314.

(16) Artículo de la Sociedad Gallega de Historia Natural sobre la posible rotura de las balsas de residuos:

http://www.sghn.org/Actuacions_Xeral/Mineria/Mina_ouro_Corcoesto.html#Que_Corcoesto_non_sexa_segundo_Aznalcollar

(17) SISMIGAL ([pdf](#))

(18) Mapa representativo del proyecto. Desvío del río Lourido.

(19) Presentación del Dr. Serafín González, Presidente de la Sociedad Gallega de Historia Natural, que incluye la respuesta de la empresa Mineira de Corcoesto S.L. respecto a la exigencia de publicar los datos de calidad de las aguas en tiempo real ([pdf](#))

(20) Réplica razonada del folleto informativo de la empresa en prensa ([pdf](#))

(21) Ayala-Carcedo, F.J. La rotura de la balsa de residuos mineros de Aznalcóllar (España) de 1998 y el desastre ecológico consecuente del río Guadiamar: causas, efectos y lecciones. Boletín Geológico y Minero. 2004 ([pdf](#))

(22) Ley 1/1995 de Protección ambiental de Galicia ([pdf](#))

(23) Ley 26/2007 de Responsabilidad Ambiental ([pdf](#))

(24) Decreto 455/1996 do 7 de novembro, de Finanzas en Materia Ambiental ([pdf](#))

(25) Declaraciones sobre la incompatibilidad del arsénico y el sector lácteo de Miguel A. Álvarez Investigador del Instituto de Productos Lácteos de Asturias (dependiente del CSIC): <http://www.lne.es/occidente/2011/08/06/mineria-oro-sector-lacteo-son-incompatibles-tapia-tendra-decidir/1112458.html>

(26) Auge de la agricultura ecológica en Galicia. <http://www.europapress.es/galicia/agro-00246/noticia-rural-agricultura-ecologica-sigue-auge-galicia-aumento-38-facturacion-22-millones-20130405140728.html>

(27) La mina en cifras. Esquema realizado por la SGHN en el que se resume el proyecto de Corcoesto. Para obtener las 34 toneladas de oro necesitarían usar esas cantidades de productos y movilizar esas cantidades de residuos y escombros.

(28) Eliminación del Río Lourido en el proyecto minero de Corcoesto Luis Manuel Galego García. Ingeniero Técnico Agrícola. Colegiado nº 448 del Coita de Ourense.

(29) http://ccaa.elpais.com/ccaa/2013/06/07/galicia/1370631383_060078.html

Contact: contraminate@gmail.com

<https://www.facebook.com/contraminate>

<http://www.contraminate.org>