14 Lies by Barrick Gold on Glacier Impacts at Pascua Lama

By Jorge Daniel Taillant
jtaillant@cedha.org.ar

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Clandestine photo shows Barrick’s tractors plowing into glacier ice to construct access roads.

Since Barrick Gold unbelievably proposed *dynamiting* glaciers to get at gold deposits underneath perennial ice, a movement has begun along the Central Andes comprising civil society actors, environmental groups, indigenous peoples, common individuals and even governmental agencies, to ensure glacier protection. In Argentina, the world’s first National Glacier Law was adopted in 2010, and in Chile, there is a National Glacier Policy in place to protect these critical water reservoirs captured in perennial ice.

In only a few years, since Barrick’s incredible *glacier management plan* proposing to dynamite and bulldoze glaciers to get at gold, community awareness about the role that glaciers and

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1 The July 2013 version was updated due to a complaint made by BGC Engineering Inc. (an independent consultant) to CEDHA, indicating that we had misrepresented some of the information in their original permafrost studies prepared for Barrick Gold for the Pascua Lama project, particularly in regards to the precise amount of permafrost in the pit and waste dump areas. We had interpreted BGC’s statement suggesting that “all of the pit area is permafrost” to mean that “100% was permafrost”, whereas in fact, BGC corrects our interpretation of their report indicating that the area must be divided into “likely” and “possibly”, permafrost where most of the area is “likely” and some of the area is “possibly” permafrost. BGC also denied that they ever said glaciers do not melt, and indicated that in fact a local press article misquoted their seminar in Argentina and later published a retraction following a BGC complaint. The original misquote led to a CEDHA comment suggesting that BGC was untruthful about rock glacier melt. We retract that statement after now learning that BGC was misquoted. We have corrected our text to indicate that BGC states that *rock glaciers do not contribute a significant amount of water to ecosystems*, a statement with which CEDHA fundamentally disagrees. We apologize to BGC for unintentionally misinterpreting their original report and hope that the corrections made now properly represent their findings. We also reiterate our thanks to BGC for engaging with CEDHA constructively with a view to transmitting precise information about rock glacier and glacier dynamics and vulnerability.
periglacial environments play in the Central Andes is increasing. We are learning more and more about glaciers and periglacial environments so that we can protect these very important hydrological resource, far more valuable to our ecosystems, than the gold extraction that is proposed, that only benefits a few. With this collective learning about glaciers in Argentine and Chilean societies, it is becoming more and more difficult for actors who fail to comply with basic environmental due diligence and even respect for the law, to hide behind systematic public ignorance about the role of glaciers in the Central Andes, and more specifically about the impacts of many extractive activities such as Barrick’s Pascua Lama project, is already visibly having on these sensitive environmental resources. It is becoming harder and harder to distract the public and divert attention of glacier impacts.

This short report was compiled in direct response to Barrick Gold’s new website, posted recently about its glacier impacts. As a response to increasing public outcry over the glacier impact information that is starting to appear in both Chile and Argentina, and as regulatory and legal frameworks develop to protect glacier resources, Barrick Gold is scrambling to cover up damning information about the impacts its activities have on glaciers. Barrick is systematically producing misleading and false information about the glacier resources they are impacting in the Central Andes around their Pascua Lama and Veladero projects in an attempt to downplay the very serious and irreversible impacts they are causing to extremely sensitive high mountain ecosystems.

On this website, which Barrick entitles ironically “Protecting Glaciers”

Barrick Gold makes at least 14 false or misleading statements with regards to their impacts to glaciers and periglacial environments in their zone of influence. In some cases they are outright false, and in others, Barrick employs misleading semantics to distract or divert the real issues that they face in terms of impacts to glaciers and periglacial environments.

We enumerate these false and/or misleading statements one by one in this report and offer a counterpoint with what we argue is the “true” situation in regards to these critical and sensitive hydrological resources affected by Barrick Gold.

[All quotes from Barrick’s site are unofficial translation to English from the original Spanish version of the site]

Questions or comments can be sent to the author of this report at:

Jorge Daniel Taillant
jtaillant@cedha.com
tel: +54 9 351 507 8376

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2 see: [http://pascua-lama.com/medioambiente/cuidado-de-glaciares/](http://pascua-lama.com/medioambiente/cuidado-de-glaciares/)
Lie #1: Barrick Gold says:

In the area where the Pascua Lama project is located there are hydrological resources in solid state (frozen) in the form of glaciers, glaciets, and rock glaciers.

The truth is:
This description of the area of the project is partial and leaves out the majority of the “hydrological resource in solid state” which is the periglacial environment of the area of the project. Consultants that work for Barrick Gold Corporation, the consulting group BGC, and the glacier expert Lydia Espizua have published reports detailing frozen grounds of the periglacial environment of the Veladero and Pascua Lama projects. Periglacial environments can contain enormous amounts of water in frozen state. BGC in fact reveals that the pit and the waste pile sites at Pascua Lama are mostly permafrost (frozen grounds) (see table below; we’ve modified the text from Spanish to English where necessary).

![Table from BGC Report on Permafrost (2009) prepared for Barrick Gold citing permafrost presence in Pit and Waste Pile](image)

The following image shows frozen grounds of the periglacial environment. The map was generated by the global permafrost mapping carried out by the University of Zurich.

Lie # 2: Barrick Gold says:

Glaciers - ice reservoirs are located outside the project limits and correspond to glacierets named Estrecho, Amarillo, Los Amarillos, Guanaco and Canito.

The truth is:
Barrick wants us to think that there are only 5 glaciers affected by the Pascua Lama and Veladero projects and that these are outside the limits of the projects. The truth is that there are more than 300 Barrick-affected glaciers INSIDE the project zone, since the limits of the project, in terms of glacier impacts is not only the pit or waste pile area which is what Barrick wants us to believe. The limits of the project area also include areas along the hundreds of kilometers of access roads that are used by Barrick, which begin in Tucum and end at Veladero (on the Argentine side of the project) and from Alto del Carmen to Pascua Lama (on the Chilean side). The use of these access roads generates contamination and dust in suspension, which in turn impacts glaciers.

Lie # 3: Barrick Gold says

More than 300 kilometers of roads on the Chilean and Argentine sides of the project generate impact on more than 300 glaciers due to activities of both of Barrick Gold’s projects, Veladero (Argentina) and Pascua Lama (Chile).
Glacierets - ice masses of smaller dimension, compared to the other glaciers, with little or no movement - are located along the southern portion of the Pascua Lama project, at the head of the Toro River (Chilean site). There are three glacierets in this zone, Toro 1, Toro 2 and Esperanza.

The truth is:
Glacierets is a term conveniently employed by Barrick in the diminutive form, “semantically” reducing the category of these glaciers impacted by Barrick. This terminology, is only significant when we need to categorize glaciers, but has no relevance or value whatsoever, in terms of discussing impacts. According to Argentine law, a glacier is a glacier independent of size. The protection of glacier ice applies both for small glacierets or larger glaciers. Both are hydrological reserves, both regulate water basins, both are of the public good and both are protected by law. There are many uncovered glaciers of all types and sizes affected by Barrick Gold at the Pascua Lama and Veladero projects. CEDHA has carried out an inventory of the glaciers in Barrick’s zone of influence. We’ve registered more than 300 glaciers. These glaciers are easily visible on Google Earth, simply by downloading a KMZ file that we offer online. If we consult the image offered to us on Barrick Gold’s website, we quickly note that it only includes a few glaciers near the Pascua Lama pit. But even if we limited our analysis to this small portion of the greater project area, we realize that Barrick is leaving out significant information. Compare the following two images, the first by Barrick Gold and the second taken from Google Earth. Barrick omits several glaciers in the project area. CEDHA’s inventory shows glaciers as blue polygons.

Image comparison between Barrick picture and Google Earth Picture shows that Barrick omits information.

To see the glaciers in Barrick Gold’s zone of influence at Veladero and Pascua Lama, download the following file and open it in Google Earth: http://wp.cedha.net/wp-content/uploads/2012/12/Glaciares-Barrick-ARGENTINA-poligonos-only.rar
Lie #4: Barrick Gold says

In the rivers that originate in the Central Andes, the principal source of water is from snow precipitation that normally covers the high basin areas each winter.

The truth is:
This statement by Barrick is misleading, since in the months following the springtime snowmelt, water supply comes from glaciers and periglacial environments since by then there is no winter snow left. The role of glaciers is precisely to feed the ecosystems with water during the hot and dry months, not during springtime snowmelt. Barrick is trying to confuse us by referring to the snowmelt months, when it is obvious to anyone that the major source of water during this period if from seasonal snow precipitation. However, even this statement should be qualified, since much of the winter snowfall is incorporated into glaciers as ice, some of which melts early, and some of which is converted into more dense and deeper ice that is released as water to the ecosystem during later warmer and drier months, sometimes even many years later.

Lie #5: Barrick Gold says

During these drier periods, the ice bodies still contribute water flow to the basin, due to the greater time snow persists on them, and due to the melting of ice of the glaciers, glacierets, or ice bodies.

The truth is:
This is simply false. Glaciers contribute water in warmer months, NOT because they conserve snow on their surface, but rather because their ice is melting. Snow turns to ice in a few weeks. It does not survive for months. As such, the hydrological contribution of glaciers during the warmer months is not due to the melting of snow, but of ice! In fact, mother nature invented glaciers precisely to provide water for longer periods of time. If it weren’t for the ice, all of the snow would melt in early spring leaving no water for summer and fall. Barrick Gold employs a semantic tool, referring to ice as “snow” to deceive. Ice in glaciers goes through cycles, passing vertically and horizontally from surface to core. Some of the surface snow and ice never makes it to the core, but some of it does. Glaciers are dynamic bodies, recycling water, snow and ice in a complex system. Barrick wants us to believe that the ice of a glacier doesn’t melt, but rather stays in the interior. The consulting firm, BGC, which has produced Barrick’s glacier studies are touring Argentina and Chile suggesting that rock glaciers don’t contribute a significant amount of water to ecosystems.

Lie #6: Barrick Gold says

The hydrological contribution of glaciers, glacierets, and other ice bodies is directly proportional to their area, since it is on the surface where melting occurs due to solar radiation and local heat, among other factors.

The truth is:
Studies done on the smaller glaciers in Pascua Lama’s impact area (see Gascoin et.al⁵) indicate that the smaller glaciers in some cases deliver more water than larger glaciers. Gascoin says: (p.1110),

“The observed annual ablation of small glaciers (or “glacierets” Toro 1, Toro 2 and Esperanza) is larger than the ablation of larger glaciers (Guanaco, Estrecho and Ortigas)

Gascoin further refutes Barrick Gold’s statements in regards to the insignificance of glacierets:

“In the Pascua-Lama area, the larger ablation rates affecting smaller glaciers may originate from two factors: ... (ii) a lower albedo, and hence larger net solar radiation input, due to dust influx from the surrounding terrain.”

The “dust influx” of the Pascua Lama zone is no less than the contamination from Barrick’s activities in the preparatory stages of the project due to the movement of grounds. Gascoin is basically telling us that Pascua Lama’s dust is causing small glaciers to melt and that they are contributing more water as a result than larger glaciers! This is completely counterintuitive, and strongly refutes the original arguments by Barrick that we shouldn’t worry about the smaller glaciers like the Toro 1 and Toro 2, or the Esperanza glacier because the really don’t contribute water to the ecosystem.

The truth is that a medium sized uncovered glacier in the Pascua Lama area has enough water in its core to provide the entire Diaguita-Huascoaltino Indigenous peoples (the indigenous peoples living downstream from Barrick Gold’s Pascua Lama project) drinking water for several centuries!

Lie #7: Barrick Gold says:

As a reference, the average melt estimates of ice in the month of February [mid-summer in the southern hemisphere] fluctuate between 0.5 liters/second per hectare (estimate by the General Water Office (DGA)—Chilean governmental agency) and 1.8 liters/second per hectare (conservative estimate by Barrick’s environmental studies).

The truth is:
These are not “conservative estimates”. There are estimates by very well known glacier specialists (Milana, Marangunic, and others) that indicate that glaciers provide much more water than this. Chilean glaciers specialists like Marangunic, have measured rock glaciers that contribute well above 30 liters/second.

Lie #8: Barrick Gold

The total surface area of the three glacierets located at the southern end of the Pascua Lama project was 16.5 hectares in March of 2005, and as such the total flow contributed to the basin is estimated at 8 to 30 liters/second in the warmest period. To put this number in context, the medium flow rate of the Huasco River at Algodones, downstream from the agricultural zone, is above 4 thousand liters/second in the month of February.

The truth is:
Here Barrick Gold is comparing the water flow contribution of three small glaciers to the total flow of the Huasco River, which is absurd. Barrick does this to make us think that these three glaciers are irrelevant to the water flow of the Huasco River. Barrick has led us to believe earlier however, that it is only impacting 5 glaciers. This is simply false. Instead, we should consider that the Huasco River receives meltwater from more than 400 glaciers that contribute to the basin, in addition to the contribution of enormous periglacial environment areas. What’s important to consider is not the contribution of these three glaciers to the total flow of the Huasco River, but rather, that many of the 400+ glaciers in the basin system and much of the periglacial environment that also contributes water to the flow of the Huasco River, are in Pascua Lama’s zone of influence. If we take into account the relevance of all of these glaciers and periglacial environment affected by Barrick Gold (there are no studies to show this “total” influence), the relevant percentage to the total flow of the Huasco River would be ENORMOUS!

The reality is that the contamination by Barrick in the area is placing MANY glaciers of the Huasco River Basin at risk. In the following image we show ALL of the glaciers (the blue polygons) in the Diaguita-Huascoaltino territory, their proximity to the Pascua Lama project and
the water flow that is borne from these glaciers. The Huasco River only takes on this name at the lower left edge of the image where the arrow points. It is clear from this image that many of the glaciers affected by Barrick and the periglacial environment in the area, contribute a significant amount to the Huasco River basin.

Lie #9: Barrick Gold says

*The glaciers of the Central Andes, including those located in the project area and in nearby zones, have experimented a natural reduction in size in the last 50 years.*

The truth is:
Glaciers are melting due to climate change. This is a fact. What Barrick Gold doesn’t say however, is that activities at Veladero and Pascua Lama are dramatically accelerating this melting. Many of these glaciers, even with the influence of climate change, should endure for many more years, some even hundreds of years. Barrick mentions only 5 glaciers in the project area, but there are hundreds in Barrick Gold’s area of influence and we see clearly that there are already enormous impacts to these glaciers since Barrick arrived. Some in fact, have already disappeared. In the following image we see Barrick Gold’s contamination at the Estrecho Glacier. This contamination, as Gascoin indicates, could be one of the principal causes of the acceleration of the melting of this glacier.
Lie #10: Barrick Gold says

In October of 2008, the Regional Environmental Commission (COREMA of the Atacama Region of Chile, approved the Glacier Monitoring Plan

Yes, the Chilean government approved a glacier “monitoring” plan, but Barrick’s original intention was not to “monitor” glaciers, but rather to “dynamite” them! Barrick’s infamous [Glacier Management Plan][6] incredibly proposed destroying Toro 1, Toro 2 and Esperanza glaciers with dynamite and bulldozers because according to Barrick, those glaciers were a threat to the environment of its workers! The real reason was that Barrick had already drilled into the ice at the three glaciers and found gold underneath. The Chilean government, fortunately, rejected this plan and has now forbidden Barrick to destroy these glaciers during the Pascua Lama project.

Lie #11: Barrick Gold says

Rock glaciers are formed by intermixed masses of ice with debris or rock and possess a granular material cover that generates a protective effect to block solar radiation. This diminishes the melting of these geoforms compared to a white glacier. Rock glaciers can be near hydrological equilibrium, that is, the long term flow provided by melting is equivalent to the flow that is retained in the accumulation zone, which generates a zero net contribution to the basin in prolonged periods.

The truth is:
For the most part, glaciers around the world are melting. As a result, we can very safely guess that rock glaciers, which are in the warmest areas where glaciers can survive, are probably not in equilibrium. Planetary warming is raising the 0˚C line, the line at which we begin to find rock glaciers and periglacial environments more generally. This means that the lower ends of rock glaciers are melting. In this manner, rock glaciers, for the coming decades and while current

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climate change trends continue, will not be in “equilibrium” and will hence be net positive contributors to water flow.

**Lie #12: Barrick Gold**

[referring to rock glaciers] In the sterile waste pile of Nevada Norte there is one of these geoforms. During the environmental evaluation process, the Chilean authorities expressed concern for the influence that it could have on the stability of the pile. Nevertheless, expert consultants demonstrated that this is a relatively small unit that does not represent stability problems.

**The truth is:**
The waste pile at Nevada Norte is in periglacial environment territory, and this includes frozen grounds which likely have significant ice content. In the following image, generated by the global permafrost mapping tool of the University of Zurich, the red/blue colors indicate frozen grounds. We see in the upper corner of this area, the rock glacier mentioned by Barrick. Barrick already located a waste pile on frozen grounds at the Veladero project and caused as a consequence, a colossal landslide the size of a small town, that could have been tragic. There is a detailed report of this accident, that Barrick, at the time, hid from authorities. This is not the first time that Barrick commits a mistake in the design of its waste piles. Locating a waste pile on frozen grounds and periglacial environments is irresponsible. This is a decision the company makes based on economic design convenience in absolute disregard for environmental and worker safety. In Argentina, this would be illegal according to the National Glacier Law.

![Rock Glacier at the Nevada Norte Waste Pile](image)

**Lie #13: Barrick Gold says**

[Referring to the rock glacier that Barrick Gold will destroy at the Nevada Norte Waste Pile] The ice, in the event it is present under the active layer, does not melt unless there is a heat event and significant radiation in the environment.

**The truth is:**
It’s true that the ice beneath the active layer is more protected and suffers less melting than the ice that is at the surface. Nonetheless, in a climate change context, as at present, the interior ice is also melting. Further, the active layer is an integral part of the glacier, the most important in terms of water contribution. Barrick speaks of the active layer as if it was not relevant and was not impacted by the Nevada Norte Waste Pile. The truth is that Barrick’s waste pile will DEFINITELY impact the glacier. In fact, this rock glacier will likely die because of the sterile rock deposit that will be placed on it.

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Lie #14: Barrick Gold says

The studies carried out for the environmental evaluation of the project conclude that the effect of the development of the mine on permafrost will not be significant, due to the limited areas with little ice present.

The truth is:
Most of the glaciers in the immediate area surrounding the project site are rock glaciers, which are part of the periglacial environment. Evidence of roads and other activity abound in the area, much of which is affecting glaciers, rock glaciers and periglacial environment. To get a sense of the magnitude of this impact, we need only look at the impacts to Toro 1, due to the deposit of dust coming from soil movement in preparations of Pascua Lama, to confirm that Barrick’s statement is completely false. The glacier that Barrick Gold wanted to dynamite, Toro 1, is now nearly invisible, covered by debris produced by Barrick Gold. See the incredible image of Toro 1 below, a picture taken only a few months ago.

Toro 1 Glacier Totally covered by dust from Barrick’s Pascua Lama
Barrick’s “Glacier Protection” Website, in case they remove it in the future!

http://pascua-lama.com/medioambiente/cuidado-de-glaciares/
En los ríos que nacen en los Andes centrales, el principal aporte de agua lo hace la precipitación de lluvia que normalmente ocurre sobre las cuencas altas de cada río. El agua, que nace en estos mismos depósitos de espejo, se forma por fragmentos de piedra y rocas, y estos depósitos de espejo son necesarios para la formación de los ríos que nacen en los Andes centrales. En estos depósitos, en la parte superior, se forman depósitos de espejo, que son los que alimentan las corrientes de agua de los ríos que nacen en los Andes centrales.

La elevación de las tierras del sur de los glaciares, glaciares y otros cuerpos de hielo se ha efectuado principalmente por la formación de la capa de hielo y del cuerpo de hielo por acumulación de agua sobre ellos. En los ríos que nacen en los Andes centrales, este proceso de formación de la capa de hielo y del cuerpo de hielo se forma por fragmentos de piedra y rocas, y estos depósitos de espejo son necesarios para la formación de los ríos que nacen en los Andes centrales.

Plan de Mantenimiento de Glaciar

En octubre de 2008, la Comisión de Medio Ambiente (COMMA) de la región de Fairbanks en Chico, aprueba el Plan de Mantenimiento de Glaciar, que consta de tres obras para el mejoramiento de las cuencas de los ríos que nacen en el cuerpo de hielo y del cuerpo de hielo por acumulación de agua sobre ellos. En los ríos que nacen en los Andes centrales, este proceso de formación de la capa de hielo y del cuerpo de hielo se forma por fragmentos de piedra y rocas, y estos depósitos de espejo son necesarios para la formación de los ríos que nacen en los Andes centrales.

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