CCAT - prime

Occupational Health and Safety Manual

2025, March

Overview
(looking towards mirror M2)

Overview
(looking towards mirror M1)

1st edition (does not contain index until reviewed and authorized by CCAT)

Introduction

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"CCAT - prime: A high-performance, high-sensitivity telescope for studying the formation of stars, galaxies and cosmology."

-Stacey, G.- Second Annual Intensity Mapping Workshop, Baltimore, MD, June 2017

Chile has one of the cleanest skies in the world, especially San Pedro de Atacama, Calama, in the north of this country.

Submillimeter astronomy studies light with wavelengths (I) of about 200 um to 1 millimeter, giving a range between the optimal infrared and radio bands more traditional.

Because water vapor molecules in the earth's atmosphere absorb Submillimeter Cosmic Rays, telescopes must be located at the highest and driest point. For the reasons mentioned above, a magnificent location has been chosen to install the CCAT-prime telescope, positioning it to take full advantage of recent in the Technology Matrix detector.

Doing that is truly the next generation of Submillimeter Telescopes. The source of submillimeter cosmic radiation, the dark molecular cold of clouds and dusty regions where stars and planets are formed, which are invisible.

to the telescopes, because the surrounding dust absorbs the embedded stellar photons and re-radiates their energy in the submillimeter.

At a distance, galaxies of super massive black holes and stars are formed at enormous rates, they are also frequently enveloped in dust and planets, which are impossible for optimal telescopes, because the surrounding dust absorbs the embedded stellar photons and re-radiates their energy in the submillimeter and which are optically dark, but are detestable by the Submillimeter Telescope. The greatest light in the universe, the Cosmic My-Cround-wave Background, is another source of radiation.

An association of Cornell University - Germany and a consortium of institutions of that origin, the Universities of Cologne and Bonn, as well as eight Canadian academic institutions, are working together to create CCAT - prime; Institute Researchers from the United States, Canada, Germany and Chile, have been involved in Science and Development Planning. CCAT - prime operates in Chile under a cooperation agreement with the University of Chile, under the auspices of the Ministry of Foreign Affairs.

1

Description of the location Geographic of the CCAT Project - prime

Exceptional conditions of the Work

Located at 5,600 meters above sea level (masl), the geographic characteristics, location, orientation, and location of the CCAT Observatory requires this project to be designated as one of Extreme Geographic Height. [1]

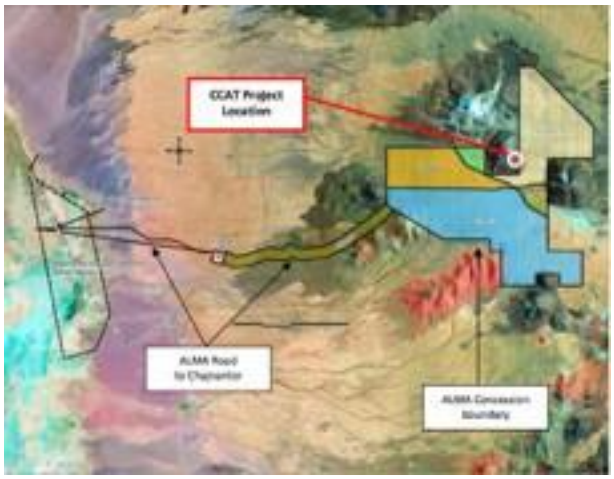
This document describes and defines the conditions, norms and regulations applicable to contractors executing works for the CCAT Project - prime, in the different construction sites and areas located near San Pedro de Atacama, II Region - Chile.

The purpose of this document is to minimize obstructions and obstacles encountered by workers in the various activities and operations of the different companies that participate in the execution of the work and to protect the integrity of the workers and the property of investors.

CCAT through its executive collaborators, as well as the CONTRACTOR, are obliged by Supreme Decree 28 of Supreme Decree 594 of the Ministry of Health to train the entire population of collaborators, sub-contractors, suppliers, advisors and any person close to the project, to inform about the totality of the content ex-presented in this document and its scope of responsibility.

[1] DS 28 for purposes of the Ministry of Health of Chile, DIPOL : 2012

1.1 Project Location



The CCAT Project - prime, is operated in Chile by the University of Colonia - CCAT Observatory, Inc. and is projected at an estimated geographic altitude of 5,600 masl, near the top of Cerro Chajnantor, some 58 km southeast of the town of San Pedro de Atacama, in the II Region of Chile.

The main access to the CCAT site is through public road CH 23 (to the Paso de Jama road) that goes from San Pedro de Atacama to Argentina (~35.5 kms.) To reach Cerro Chajnantor it is necessary to leave the Paso de Jama road at mile 35 and enter the ALMA Observatory through the rear gate of the ALMA Observatory. Gate entry procedures will be provided by the CCAT Authorized Representative. From the rear gate, follow the ALMA road called Pampa La Bola to the platform of Telescope 410 (~ 6 kms.), then turn west and travel through Cerro Chajnantor to the site of CCAT (~8 kms.). Alternatively, ALMA may give permission to access the ALMA road via the ALMA Main Entrance Gate. The main entrance is reached using the public road CH 23 towards Toconao, 18 kms. south of San Pedro de Atacama. The gateway through the Main Entrance to ALMA should be coordinated in advance with the CCAT Authorized Representative, and ALMA permission may not be granted. The total distance, one way, using this access is ~45 kms. Admission procedures and instructions will be provided by the CCAT Authorized Representative.

1.2 Exceptional Construction Site Conditions

The territorial and geographic conditions of the planning of the work, makes that the total of the collaborators (workers) will carry out activity under conditions denominated for the Ministry of Health, to Occupational Exposure to Chronic Intermittent Hypobaria by Extreme Height.

"The Ministry of Health, in its constant task of overseeing the health care of the population, has developed a *Technical Guide*[2] for the protection of the health of all workers who are exposed to chronic intermittent hypobaria, whose work is performed at an altitude of more than 3,000 masl [3] .

[2] Technical Guide on Occupational Exposure to Chronic Intermittent Hypobariate for High Altitude, Occupational Health Division, Division of Healthy Public Policies and Promotion, Ministry of Health, Nov 2013

All measures, actions and procedures established in this document correspond to the basic standards for prevention and health surveillance emanating from Supreme Decree No. 594/1999 [4]

This Technical Guide should be applied to all exposed workers, regardless of the work activity or productive item in which they work. The aim is to establish homogeneous standards of care on the one hand, and to optimize the use of resources on the other, by avoiding or reducing duplication of examinations.

For works from 5.500 masl it will be necessary to have express and founded authorization of the Sanitary Authority, represented by the Occupational Health Units of the Health SEREMI [5], Ministry of Health of Chile."[6]

Considering that the Technical Standard was elaborated by the Department of Occupational Health, under the Undersecretary of Public Health of the Ministry of Health, and with technical and scientific material, prepared by medical professionals, academics and non-medical professionals with vast experience and knowledge in matters of work at geographical altitude and hypobaric hypoxia, and that a technical commission was constituted with the participation of professionals representing the Administrative Bodies of Law 16.7447, it is possible to aspire to control and mitigate the effects that it generates in the human organism, and for this reason this manual is created with that regulatory base for the totality of the population that will be exposed to this project, thus complying with legality and professional ethics.

[3] masl: meters above sea level

[4] No. 594/1999 Approves regulation on basic sanitary and environmental conditions in workplaces, Santiago 15 September 1999, Ministry of Health - Chile

[5] SEREMI: Regional Ministerial Undersecretariat

[6] Technical Guidance on Occupational Exposure to High Altitude Chronic Intermittent Hypobaria, introduction page 3

[7] Law 16.744 Establishes Norms on Occupational Accidents and Diseases, Ministry of Labor and Social Welfare; Subsecretariat of Social Welfare, February 1, 1968 - date of publication in the official newspaper of Chile.

1.3 Exposure to Extreme Geographic Height

The nature of the vast majority of workers who will be exposed to the work of in-engineering, construction, implementation and operation of CCAT - prime are native sea level, such activities over 3,000 meters above sea level. Considering the journey from the bedroom or rest place to the altitude level at which the great antenna will be placed, they will have to be exposed to special environmental conditions, in it the decrease of the atmospheric pressure, will generate to these collaborators physiological expressions of their organs in order to compensate the changes generated by this decrease of this variable, which is changing as we expose the body of a living being, It is considered a matter of Occupational Health and the discipline known as High Altitude or Mountain Medicine, since medical, working and environmental conditions converge as a result of work management.

Extreme Altitude, is the geographic altitude equal or higher than to 5,500 masl[8]

1.3.1 Hypobaric Environmental Factors

The decrease in atmospheric or barometric pressure, between 57 and 86 mmHg c/1000 metres, the drop in the partial pressure of oxygen PO2 , the drop in temperature 6, 5 gra- two c/1000 meters of altitude, the drop in environmental humidity, reaching zero per cent, around 5,000 masl, the increase in solar radiation, 5.6% c/1000 meters of the UV solar risk index, the presence of rain, snow and wind, depending on geographical height,

[8] Technical Guide to Occupational Exposure to High Altitude Chronic Intermittent Hypobaria DS28, 2012

latitude north-south and seasons of the year, climate change and the unusual demands of physical effort, psychosocial isolation, changes in diet, resting places and habitability conditions unprepared for these changes in some cases, will themselves be extreme factors to which these collaborators will be exposed. [9]

What is expressed in the preceding paragraph, allows to take the totality of the measures of prevention in health and the alternatives of the physical activity product of the work, the roles of shift, rest, displacements, and others, that will do that this work is unprecedented in the world.

We must therefore aspire to have at the end of this monumental astronomic scientific work, workers prepared to face these extreme environmental and atmospheric conditions, stable, happy, healthy and cooperative people, to face together this great global challenge.

2.- Occupational Health

It is defined as the promotion and preservation of the highest degree of physical, mental and social well-being of workers in all their occupations, the prevention of health deviations due to working conditions, the protection of workers in their employment, against risks due to factors unfavorable to health, the location and protection of work in an occupational environment adapted to their physiological and psychological capacities, make this clinical discipline a set of objectives set by various international and national organizations on behalf of the worker. [10],[11],[12]

The pillars that sustain this clinical, health care and medical discipline in Chile, by Art. 19 of the Political Constitution of the State, as well as those indicated below:

[9] Current Issues Rev. Chilena de Salud Pública 2015, Vol 12 (2) page 189 Dr. Daniel Jiménez

[10] Occupational Health (OS) 1950 and 1995 by the International Labor Organization (ILO) [11] World Health Organization

[12] International Commission on Occupational Health, NGO for the United Nations.

- Art. 82 - 88 of the Health Code of Chile

- Art. 184 - 211 of the Labor Code

- Standards of Hygiene and Safety of workplaces

- Law 16.744 that establishes Norms on work-related accidents and professional diseases.

- DS 594, which establishes Basic Health and Environmental Conditions in Workplaces and exposure to agents harmful to health.

- DS 109/73 which regulates the Qualification of Occupational Accidents and Professional Diseases.

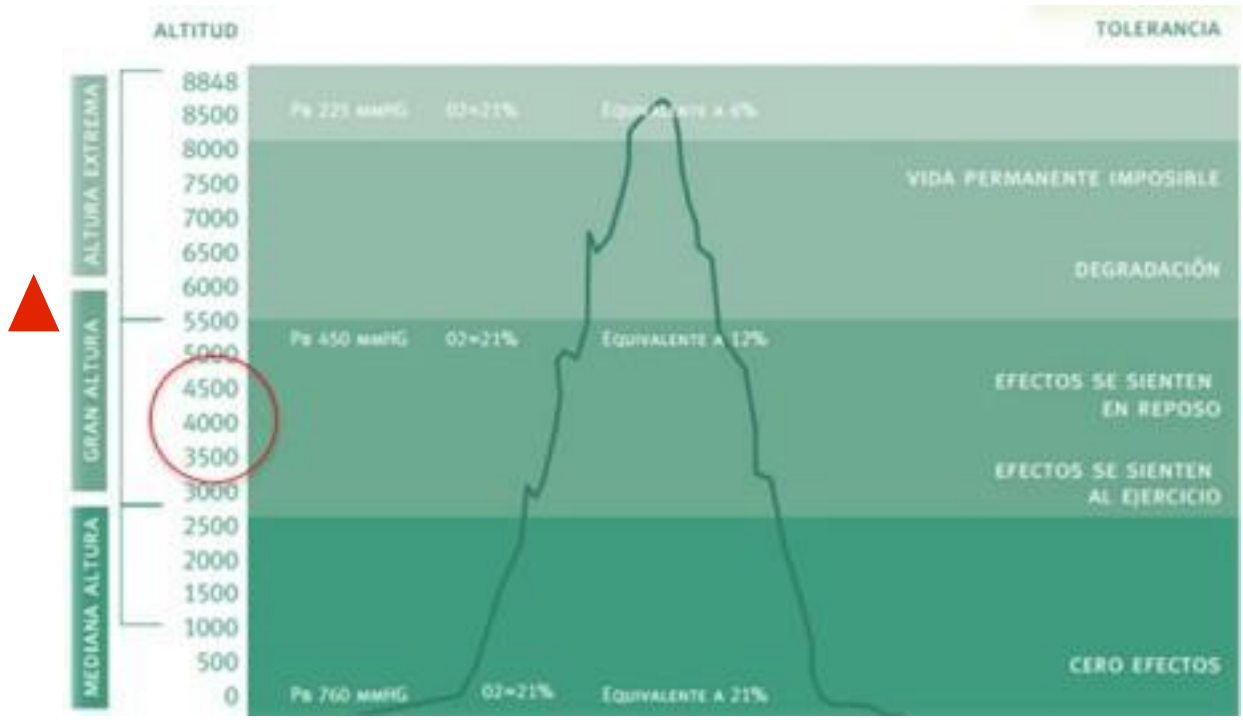
- DS28/2012 Decree amending DS 594, of the Ministry of Health, which approves the Regulation on Basic Health and Environmental Conditions in Workplaces and which adds in paragraph III of title IV of point 9 the following point 10.- ".- Of Chronic Intermittent Hypobaria due to High Altitude".

The latter, in particular, will be the subject of this document to be considered, so that all the normative points will be annexed to it in order to be reviewed and complied with in their entirety.

3.0 Definitions according to Technical Guide - Supreme Decree 28/2012

3.1 Worker Exposed to Chronic Intermittent Hypobaria: Any worker who performs work over 3,000 meters above sea level for more than 6 months, with a minimum stay of 30% of that time in rotating shifts at high altitude and rest at low altitude.

3.2 Sporadic Exhibition: Occupational exposure to hypobaria in less time than what is tabulated for chronic intermittent exposure



CCAT - prime 5,600 masl

3.4 High Altitude: Geographical altitude equal to or greater than 3,000 masl and less than 5,500 masl.

3.5 Extreme Altitude: Geographical altitude equal to or greater than 5,500 meters above sea level.

3.6 Hypobaria: Decrease in barometric pressure with respect to sea level.

3.7 Hypoxia: A decrease in the supply of oxygen to cells, or one that limits energy production to levels below cellular requirements, thereby slowing all cellular metabolic processes.

Hypobaric hypoxia is the decrease in the supply of oxygen to tissues due to a drop in the partial pressure of that gas, due to exposure to a lower barometric pressure in geographical altitude.

2

General clauses for the collaborators in Works

1.0 Definitions of the Work Site

1.1 Land shall mean the area of the CCAT Project construction site - prime

1.2 The area at the top of the Chajnantor Hill observatory terrain is approximately 5,600 meters above sea level.

1.3 The service area is located near Cerro Chajnantor at approximately 5,000 meters above sea level.

1.4 The road connects to the service area and the top area.

Considerations:

The contractor's operations with respect to the work shall be subject to and confined to the areas mentioned above, and shall be part of the contract entered into by both parties to the official document for these purposes.

2.0 Definitions of the Parties

The parts subject to these conditions, rules and regulations are:

2.1 Contractor: The term means the company, the company's employees who include associated with the remuneration or payment / or unpaid, sub-contractors and sub-contractors, consultants, suppliers, service companies, their employees, contractors and associated companies in one form or another.

2.2 CCAT - prime : The acronym means the organization that is the principal of the project and that has treated a contractor company to execute the works.

3.0 Effects and duration of established conditions, rules and regulations

3.1 These conditions, rules and regulations shall apply no earlier than the order given by CCAT to commence field work activities and work, the scope of these conditions shall extend to the last person hired by the contractor or otherwise related to carry out any activity and who has left the field, after completion of his work and provisional acceptance of the work and which has been granted by CCAT.

3.2 This document and its contents are applicable to all contractors and collaborators who carry out any activity in the field of work described above without any exception, and are an integral part of the contract signed by the parties.

4.0 Interpreting

4.1 Clarifications regarding interpretations of this document and/or consultations shall be answered by CCAT to the Contractor in writing. All consultation to CCAT by the contractor must be addressed formally and in writing via e-mail to the address of the representative in Chile for these purposes, who must respond in writing to the contractor under this same modality.

Both documents shall be physically stored in the contractor's folder at the principal's central offices, which shall be stored by the principal for at least 10 years following the completion of these communications and under the principal's supervision and control, CCAT.

5.0 Modifications

5.1CCAT may modify this document whenever necessary, according to its own needs and/or as appropriate, due to changes in standards and/or legal regulations, during the period of construction, operation and maintenance of the facilities known as OBRA.

5.2 The contractor must notify CCAT in advance and in writing, via formal mail or email, of any consequence in the contract price or in the termination date of the contracted WORK in the event that these modifications generate an increase in the construction and/or operation costs of the original prices and conditions of the presentation of the economic and/or technical offer.

6.0 Administrative Organization and Staff Matters

6.1 Hours of work, working day - role of shifts and rest times

Given the conditions of exposure to extreme geographic heights and as indicated by the rules of DS28 and Law 16.744, it will not be allowed to carry out activities in the field outside the lapse of sunlight time, unless by express indication for an exceptional reason and authorized by CCAT for such case.

In view of the foregoing, this exception must be in writing as the response given to the contractor or sub-contractor, as the case may be.

The contractor shall provide CCAT with a schedule of the work and activities of the execution of the work, described in terms of the definition of the task to be executed by role of tur- nos and by work, as well as the location in which such activity will be carried out.

It is the contractor's responsibility to demonstrate the time allotted to each activity, the travel time of his collaborators to and from the field, worker travel, rest time and extension hours of the work and its definition.

The contractor must ensure the integrity of the collaborator totally and absolutely, which is registered in this way, with the signature of the supervisor, whenever CCAT considers it convenient and pertinent, always safeguarding the absolute integrity of the collaborator, this being a condition of "absolute exception" and subtracting score in the evaluation for effect of Quality and Safety used by the contractor company for the purposes of this work.

6.2 Prior to commencing fieldwork, the contractor must provide the CCAT authorized representative with the following information for approval and will be evaluated at the time of submission of the financial, technical, and administrative bid for approval

It is subject to modifications in case the principal so defines for reasons of force majeure and/or security and integrity of the entire population of workers in the field and in times of rest.

a.- The daily working hours, which must be complied with according to Supreme Decree 28 Supreme Decree 594, respectively.

b.- Time and place of rest / Conditions of habitability of the enclosure

c.- Effective hours of sleep per worker, the contractor must show vigilance and drowsiness of each employee.

d.- Description of the position and routine of work of each collaborator.

e.- You must identify the type of work and the weight load that must be carried out by the worker versus the geographical area in which the activity will be carried out.

f.- Shift Role Sheets

g.- Estimated number of shifts / Number of workers / according to the area to be used for the activities.

6.3 The contractor is fully responsible for the observations and application of Chilean labor laws relevant to the DS28 shift systems in the field. CCAT will evaluate the system and role of shifts, rest time and place for it, as well as the time allocated for food and hygiene, in order to ensure total integrity in the health and welfare of employees.

6.4 The working hours of the contractor's employees in the field shall be adjusted to the altitude conditions of the area of the work activity or the terrain on which each work is located, according to DS28 and DS594, the respective Labour and Health Code.

7.0 Subcontractors, Consultants, and others (suppliers - services)

7.1 The contractor has full responsibility for all sub-contractors and sub-subcontractors, consultants and service providers - suppliers, and/or any other person and/or members or parties directly or indirectly related and/or linked to the work under the contract, as well as all information that may be applicable to their obligations and responsibilities under the economic, technical and administrative terms of the contract, the conditions, rules and regulations, which it is by Law to comply with.

The particular conditions of extreme geographic height to which the tailors will be exposed makes it necessary that at the moment of being hired, each one of them will have to sign an "Informed Consent" on the extreme conditions of work to which they will be exposed, likewise it is of rigor to have the totality of the documentation by each collaborator, on the requirements to participate of these tasks, which will be integral part as preoccupational examinations, occupational controls, and other records, that will have to take in writing and signed, each supervisor of crew. The totality of documents approved by the health authority must be part of the contract before the start of activities on site, these sections and / or documents must be delivered to CCAT for safekeeping and stored for at least 10 years.

The nature of the work obliges the contractor to have on site professionals trained according to DS28 to perform both on the site of the work, as well as in rest areas, services and dormitories, monitoring and registration signed by the collaborator, of the vital signs described in Technical Guide chapter 12 page 17.

The registration documents generated are considered part of the Good Work Practices and risk prevention at extreme altitude, which must be carried out as the PROTOCOL FOR FOLLOW-UP OF ACLIMATATION ON ARRIVAL and at 24 - 48 and 76 hours after arrival at the site by the employee. The monitoring and detection of deviations from normality shall be ipso facto delivered and informed to CCAT, and the contractor shall take palliative and preventive measures according to DS28 or other regulations relating to Occupational Health described in preceding paragraphs.

The contractor must have an ad hoc professional to define behaviors to follow in the face of

the condition of abnormality in the health and integrity of the employee, as well as submit a report of the evolution of the conduct to take and actions as the case may be: suspend transitory activity - permanent suspension - withdrawal of the work - inter consultation to polyclinic - evaluation in ALMA - transfer to rest area in San Pedro and / or transfer to its place of origin as indicated by the consultant doctor. This report will be evaluated by CCAT to evaluate decisions taken by the contractor and may suggest and/or decide on conduct to be followed in order to control the risk and minimize the harmful effects of the signs and symptoms expressed by the employee.

8.0 Instructions for field operations

8.1 Sub Contracts and Contractor Third Parties (Sub Sub Contractors)

In order to eliminate field operations and informal activities, the authorized CCAT representative may intervene for optimal coordination among the various contractors directly involved in the field, without prejudice to the foregoing, the contractor must have the approval of these changes, always with the desire not to over-expose the population in the field to reduce risks of over-exposure to extreme heights.

Whenever necessary CCAT may intervene without prior consultation to these actions, and may also evaluate the contractor for such reasons, calling these actions as faults, inefficiencies in productivity, thus obtaining the contractor a negative evaluation for Occupational Health and Industrial Safety.

8.2 If the need arises to organize meetings in the field, these will be analyzed by the representative of CCAT and rigorously such instances should ideally be carried out at 3,000 masl or by Internet communication at a distance.

Whenever there are meeting activities where engineering, operation and/or maintenance decisions have to be made, a record of objectives, date - start time and end - place - agreements and signatures of the attendees will be kept, all of them at a distance or in San Pedro de Atacama. CCAT, in conjunction with the contractor, shall carry a guide of agreed actions and/or pertinent modifications as needed. All these minutes will be filed and in charge of the representative of CCAT and copy for contractor, with the respective signatures of the parties as agreement to the actions at sea.

It will be considered a serious fault on the part of the contractor, as long as the agreements are not carried out by both parties, which could lead to the absolute termination of the contract, depending on the scope of what has not been carried out, which will be evaluated by CCAT.

9.0 Vehicle traffic - driving - transfers

9.1 General requirements

Every vehicle should make permanent use of lights on during the day and night for road safety and to drive with greater visibility along the way.

The measures required by CCAT for driving any type of vehicle:

- Every driver must be accompanied by a co-pilot and both make permanent use of oxygen therapy in the cabin and outside it.
- Both must have the requirements of the traffic laws depending on the type of vehicle.
- The contractor must exhibit and provide to CCAT the records of documents and identification of each driver, co-pilot, type of vehicle and movement to be performed in the field.
- The contractor must avoid as much as possible the driving of vehicles and their respective displacement.

- CCAT shall deliver written authorization to the contractor for travel and driving purposes.
- All vehicles must carry still drinking water for consumption by their drivers and co-pilots.
- The contractor must have a sufficient and redundant supply of medical oxygen cylinders for the permanent use of drivers and co-pilots.
- Any vehicle transiting on CCAT terrain - between ALMA and CCAT - CCAT and TAO, or another territory, must have written authorization signed by CCAT representative, except in case of emergencies, in the latter case must also be informed to the CCAT representative to evaluate such action.
- Every vehicle must remain with the engine running, whenever it needs the lathe in a short time. Every vehicle must also be able to operate at extreme heights and thus be demonstrated with documents before CCAT.
- All types of accidents and/or incidents shall be ipso facto reported to the CCAT representative and thereafter submit a report of the accident and/or incident, leaving CCAT with the responsibility of evaluating the actions taken and notifying the contractor for the actions taken, relevance - irrelevance of such conduct performed.
- In case of transfer of collaborators to land or return, the driver must make use of oxygen therapy throughout the journey, otherwise both the driver and the contractor will be notified as a serious fault.
- All vehicles must have medical oxygen cylinders for all passengers, sufficient equipment in case of use in an emergency situation to provide assistance while the emergency brigade provided by the contractor arrives.
- In the event of an accident along the way, the driver must provide assistance and at the time notify the contractor via radio communication system and the contractor to the CCAT manager.

- Every vehicle must be checked daily and fill out a check list of each and every one of the critical points for its proper functioning and operation.
- These checklists must be signed by the internal auditor and signed by the driver who will use this vehicle, as well as a copy with the identification of the driver, vehicle and signature of the contractor, driver and co-pilot.
- No vehicle may carry alcoholic beverages or other energy elements.
- All drivers and co-pilots must have the knowledge certified by a mutual entity, for maneuvers of resuscitation, transfer and stabilization of a wounded or injured.
- Smoking is absolutely forbidden in and during the driving route, as well as in the entire construction site.
- All vehicles must have an emergency case, equipped according to current regulations for this purpose, with current products and automatic replacement in case of using any of them.
- The vehicles that go up to CCAT terrain have the preference of passage over the vehicles that go down.
- Drivers must report via radio communication at each of the points designated as the hypoxia route, which will be duly marked by the contractor.
- The contractor has the obligation to enforce all instructions given by CCAT concerning road signs, speed limits, rest breaks or others.
- The permitted speed is up to 40 km/hr, except for high-risk road conditions, this must be reduced to 30 km/hr.
- Any time a driver is caught making use of disabled routes, he will be suspended from his activities and with possible causes of dismissal for serious misconduct.

- Vehicles may only use previously established parking areas.
- It is forbidden to circulate without the proper authorization of CCAT, all vehicles with heavy load.
- It is absolutely forbidden to transport people on open-platform vehicles, except those that are suitable for such purposes.

4

Environment - Good Practices and Regulations

CCAT will preserve autochthonous flora and fauna

4.1 Flora and Fauna

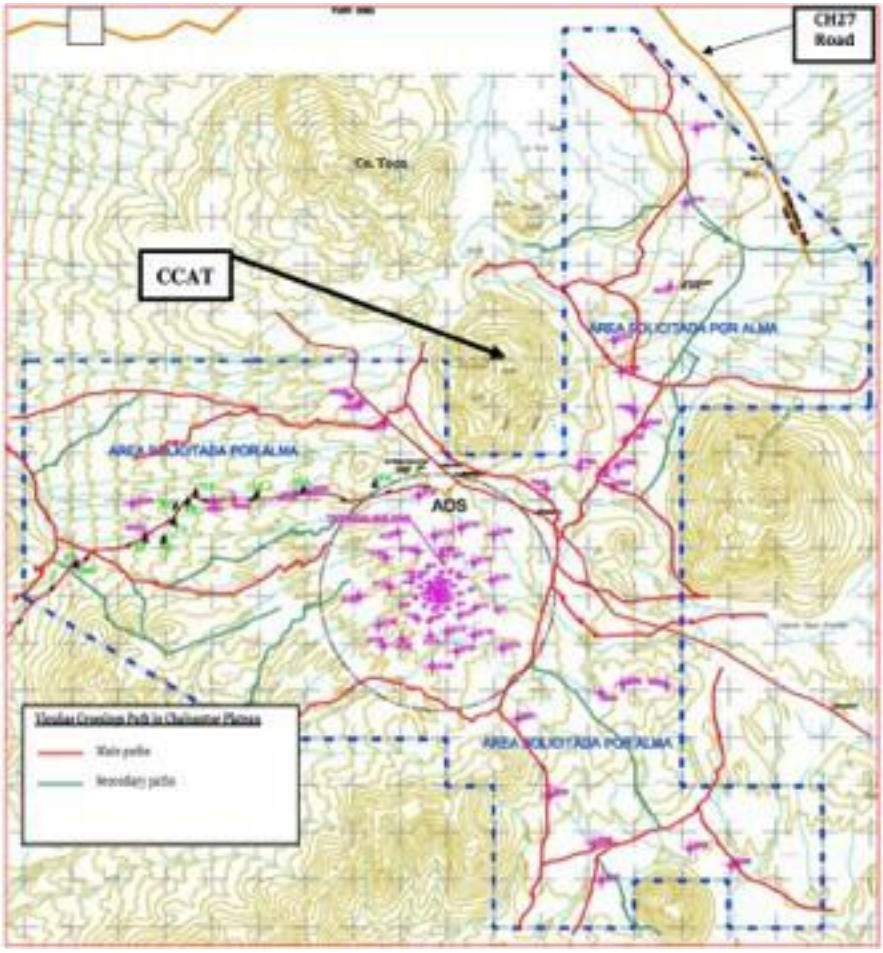
The contractor must ensure the absolute integrity of the environment and land of the work, for this CCAT indicates as prohibition:

- Disturbing or assaulting flora and fauna while doing field and work activity.
- To feed the food and to make a correct disposition of food and orcanic wastes.
- Obstructing or interrupting the paths (see image in annex) of vicuña passage.
- In case there are animals on the road that obstruct the journey, do NOT honk.

In case that drivers and/or collaborators observe the presence of animals in the route, they will have to give notice to the contractor and this in turn to CCAT.

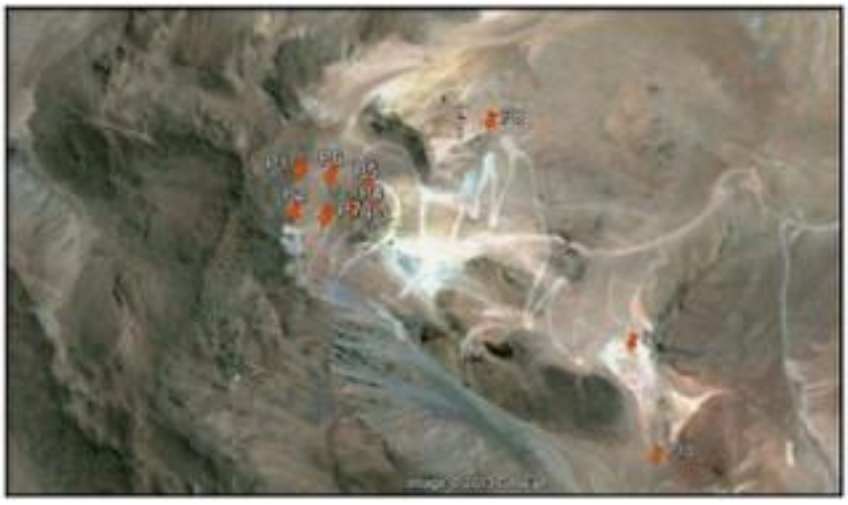
If, due to the presence of flora or fauna on the construction site, this cannot be carried out, the contractor must notify CCAT in order to define the conduct to be followed.

Vicuñas



Paths of vicuña steps in the plateau of Chajnantor

Archaeological and Cultural Sites



4.2 Cultural and archaeological sites

The contractor must respect and give notice to the representative of CCAT whenever, in the course of the work, he finds archaeological vestiges and registers.

It is forbidden to remove, move or extract any element that appears to be of ar- queological origin, in the event of detecting this action, it will be considered a serious fault and CCAT may take measures against the contract in force.

Old stone walls can be found on the construction site, which are located near the road and must be protected in their entirety by the entire working population without exception.

In the CCAT - prime project area, a cultural site was identified (Point 9 in the figure)
Location atPunto 9: 639,638 Este 7,457,871 Sur 4,957 m.a.s.l.

4.3 Hazardous Materials

It is forbidden for workers to transport or carry any material with dangerous characteristics, especially in a vehicle.

- Vehicles for the purpose of transporting dangerous or harmful substances or materials must display signs as described in current traffic and transport regulations, considering specifications for these purposes, universally described by the United Nations (See Annex).
- In the case of fuel storage, the hazard index, type of substance, and under the storage measures dictated by the regulations for hazardous substances and polluting wastes must be marked.

4.4 Cleanliness and hygiene of the workplace

The contractor must comply with the obligation to keep the roads clean, therefore it is expressly prohibited to dispose of any type of garbage, soul-dining organic or inorganic waste in any space on the site of the work.

For this reason, the contractor must take care to maintain the ecology of the land, thus having a place away from the workers for the collection and subsequent removal of waste elements to be transported to the service area and comply with current regulations on disposal of waste elements on site, and cataloguing and separating the types of waste for subsequent recycling.

4.5 Fuel

By definition, combustible material is any element that may eventually participate in the fire triangle. For this reason, transportation, handling, storage and use must be previously informed CCAT and, together with the contractor, determine the area for such disposal, storage and use.

- The contractor must fill out a form that provides information on such material, use and period of use.
- The contractor must exhibit to CCAT the risk mesh associated with said product.
- In the event of requiring the use of diesel oil or other fuel, the contractor is required to submit to CCAT the technical specifications of the dispensers or storage tanks, and with the approval of the principal, the contractor may collect.
- From the previous point, the contractor must provide to the representative of CCAT the technical specifications of the compatibility of the storage tank and of the product that will be reserved in its interior, as well as the technical specifications that demonstrate that said tank and its materiality can be exposed to the altitude of 5600 masl.
- The manipulators of this type of material must have validated knowledge and provide CCAT with a record of the educational content and knowledge that such operator possesses for such purposes.
- Each container should display information on the contents, precautionary measures and, in the event of contact or spillage, the actions to be taken.
- Vehicles used to transport this type of product must be escorted by security and risk containment companies. They must also display information about the content they transport and the distance they must have from it, the vehicles that surround them.

4.5.1 Fuel Storage

- The storage tanks must be in accordance with the Chilean Ministry of Transport.
- In the event that the Contractor for his work, these tanks shall be contained within safe walls with waterproof sheathing.
- Operators must have ad hoc Personal Protection Elements for handling and have the document of registration of work authorization risk and have the necessary knowledge validated through records of attendance at training by competent agencies in Chile.
- While a particular operation is being carried out on the fuel, as an exceptional measure, the operator will be evaluated by the contractor's collaborators - risk prevention. The clinical parameters to be controlled prior to the maneuver: Heart rate = number of beats per minute of the heart, expressed in specific points such as radial, ulnar, carotid artery, etc. / Oxygen saturation = percentage of oxygen available in blood, both will be recorded and you must have been breathing oxygen m-dicinal until the time of manipulation and you are with normal cognitive functions, so that you can perform the maneuver successfully.
- The fuel operator CANNOT count on oxygen therapy while performing the activity, because there can be no contact between the fuel and medical oxygen gas, because it is an oxidizing element and avoid the fire triangle.
- All ignition sources must be maintained a minimum of 15 meters from the fuel storage area(s).
- Such storage must exhibit signs about the risks and distances to be taken by the staff of workers. NO SMOKING information should also be posted and lights should not be lit at a distance of 15 meters in all storage areas and should be visible from all access points.

- It is strictly FORBIDDEN for all types of workers to approach the recin- t with cylinders of compressed oxygen or other oxidizing gas.

Triangle of Fire

4.5.2 Loading of fuel

This activity is considered exceptional and with prior authorization from CCAT.

- Whenever practicable, vehicles and other moving equipment should be taken to the fueling storage area.
- The fuel loading action shall refer to a special annex to the Operations Manual delivered by the Contractor to CCAT, together with a Risk Mesh prepared by them and agreed with CCAT.
- There must be designated areas for loading and unloading fuel into the storage container, as well as the reloading of a vehicle.
- To perform any loading/unloading activity outside the areas designated for such purposes, it must be declared an exceptional and emergency activity, and the contractor's Health and Safety Manager must submit a report to the person in charge of

CCAT that gave rise to this activity and have the authorization to carry out this unplanned activity.

- The Contractor must have an operator responsible for the activity of handling fuel to vehicles in case CCAT authorizes it.
- This type of unplanned activities should be recorded in special documents, with the purpose of generating an analysis of the occurrence and providing a diagnosis of the facts to the client.
- Before starting the loading/unloading activity, it is mandatory to install a ground line connecting the truck and the storage tank, thus avoiding the static generated at great geographical height by the low environmental humidity existing in the ground, since any friction or spark could eventually generate an ignition.
- If there is any type of fuel spill, it must be immediately reported to CCAT's representative in the Works, considering a critical situation and generate cleaning of the place with disposable elements and eliminate them in the places expressly identified and then be moved to sea level to be eliminated as contaminants of the environment.
- All fuel trucks must have permanently connected hoses and self-closing nozzles, preventing dripping when the vehicle is parked.
- All fuel containers must be clearly labeled indicating the contents of the fuel tank, with internationally recognized warning signs that are properly adhered.

The use of petroleum powered construction equipment is restricted, and will only be permitted with the formal approval of the contractor's HS Manager and the CCAT manager.

4.5.3 Fuel Trucks

These types of vehicles must comply with the regulations of the Ministry of Transport and Energy of Chile and are part of the documentation that the contractor must provide to CCAT at the time of the start of work or coordination meeting.

Vehicles carrying out these activities at geographical altitude, and in particular at extreme altitude, must have technical validations in terms of operation and preparation so that their combustion is capable of generating the correct ignition and movement.

Every time the vehicle goes to CCAT, it must have a complete amount of its own fuel tank for use.

Inside the cabins, every driver must go with a co-pilot, who must take the role of driving this vehicle in case of any physical limitation or symptoms of Acute Mountain Sickness13,[14]

These vehicles will be driven by workers who have a valid driver's license for such purposes, have a basic course of resuscitation and first aid, and inside the cabin of the vehicle, have emergency briefcase, water and compressed medical oxygen.

[13] ICD - 10 Considers Acute Mountain Sickness - Disease Database and falls into the category of Emergency Medicine
CIE - 10 is the acronym for International Classification of Diseases, 10 is the tenth edition, is the translation of ICD, acronym for International Statistical Classification of Diseases and Related Health Problems.

[14] Definition: Set of signs and symptoms that occur in the individual as a result of exposure to hypoxia by hypobaria and changes in atmospheric pressure by the decrease in barometric pressure. It is also called colloquially, puna or babiao, pointing, bad pá-bramo, soroche, among others, and is due to the organic manifestation in response to these changes, this disorder may or may not reverse, for it is part of the requirement of the health authority, have methods or systems to mitigate the effects.

The general requirements for drivers of vehicles for work at an altitude ex- trema, is to have been trained with the DS28, sign informed consent of exposure to extreme conditions of temperature, humidity, hypobaria and hypoxia. This document will form part of the worker's file, which must be presented to the CCAT representative for verification, and a copy for the administrative area of the Counter-attack.

All ignition sources must be maintained at a minimum of fifteen (15) meters from the fuel storage area(s), which must display visual signs of the risks, personal protective devices, and the distance the team of workers must take from both the contractor and CCAT.

5

Medicinal Gases - Industrial Tablets

The objective of this chapter is to provide information on the characteristics of compressed gases, their behavior at geographic altitude and the specific characteristics of the gases commonly used by workers, both to mitigate the effects of exposure to Extreme Geographic Altitude, as well as general and habitual industrial gases, which could eventually be used.

5.1.- Definition

Compressed Medicinal Gas, is any type of compound in a gaseous state of matter and which is found at high pressure in a container with a valve to contain that pressure and which is capable of modifying the state of disease or ailment, to a state of well-being.

5.1 Medicinal Oxygen[15]

This gas is obtained fromthe air of the atmosphere, by means of a mechanism called air liquefaction, and that by compression and decompression in followed acts, generates a state of the liquid matter, and that at the moment of expanding it again will be able to separate from the air the Oxygen, Nitrogen and Argon.

The relevance of making use of this gas for the use of workers, comes from multiple studies in Medicine at Height and that by the extreme altitude to which they will be subjected to work day by day, is a requirement of the health authority through Supreme Decree 2816.

[15] According to American-European-Canadian Pharmacopoeia

[16] Art. 110 b.6 DS28 DS 594

5.2.- Presentation of the product

This gas can be supplied in liquid phase (-196 degrees Celsius) or gaseous phase (ambient temperature).

In both cases and given that it comes from an air liquefaction process, its purity is at least 99.0%, which allows a quality control of the product that will be delivered to be breathed by the workers.

In a gaseous state is what is commonly used by a person with difficulty in breathing and in providing the organism with the most important component for human life, so that each cell of the organism can carry out its metabolism and generate the energy required for any activity, walking, sleeping, thinking, eating, etc. The lack of this gas in our organism will make it impossible for workers to carry out these activities, because their cell will NOT be performing the function of gas exchange nor its internal metabolism. The latter will cause the vital organs to be affected and the chain of signs and symptoms of Acute Mountain Sickness to begin to occur, for these effects of Geographical Altitude.

Each person is different, which will make their response is individual, so many times these manifestations are described as normal and workers and companies do not generate changes or are supplemented with medical oxygen, which can be a reason for serious accidents because the changes in the body can be silent (without manifestations) and only come a great effect, may trigger, Pulmonary Edema, Brain Edema, Acute Myocardial Infarction, among others, and generate the occurrence with fatal results and death.

5.3.- Oxygen Production

5.3.1 Air Liquefaction[17]

The only source of medical oxygen of certified purity is that which comes from the process of liquefying the air, which can be traced and determine critical points of control for the quality and safety of the user. This gas obtained is free of impurities or very few, free of moisture which prevents corroding the containers to compress them.

5.3.2 PSA [18]

Oscillating Pressure Adsorption[19] (PSA) Technology

Oxygen-enriched air from this technology must be controlled in line and impurities must be controlled. This technology requires on-site electric power, on-site purity and impurity control, moisture control, and maintenance according to hours of use. It has anti-pollution filters, which do not have the technology to trap suspended dust at geographical height scales.

Between the air inlet process, the passage through molecular sieves that con- have zeolite to primarily trap nitrogen, and let oxygen-enriched air pass into the atmosphere or to the user. Since nitrogen is trapped and since it is the most commonly present gas in the air, the sieves are over-saturated, allowing the air to be released to such an extent that it has not been able to retain the nitrogen, hence the importance and rigour of maintenance. On the other hand the state of the art of this technology, indicates that to obtain a purity of approximately 93%, these must be located in ventilated zones, at sea level or until a level of altitude that does not surpass in some the 3,500 masl, delivering an even- tual air very similar to the one that is breathed to great height with a slight pressure that will fluctuate of

[17] American - European and Canadian Pharmacopoeia signal Medical Oxygen 99.0% purity

[18] American and Canadian Pharmacopeia signal Air enriched with pure oxygen 93%

[19] Adsorption is a process by which atoms, ions or molecules of gases, liquids or solids di- are trapped or retained on a surface.

hanging from the liters per minute it delivers to the user. Although there are Industrial type devices, this equipment must be manufactured for operation at geographical altitudes, increasing the fuel consumption for the operation energy.

Also, this type of technology was created for home patients, i.e. to be used in domestic environments, the type of patients are chronically oxygen-dependent.

It is relevant to have the manufacturer's specifications and validate with them the maintenance plan and associated costs.

5.3.3 VSA Vacuum Adsorption Technology [20]
It only varies with respect to obtaining air and enriched with oxygen, that this technology adsorption is by vacuum.

5.4 Safe Handling of Medicinal and Industrial Compressed Gases

5.4.1 General Requirements

- Activities involving the use of compressed gases (including air) will require special consideration for a number of safety aspects. The trans-shipment of cylinders, the place of work, the terrain and the present working environment must be determined prior to the mobilization of the equipment.

- CCAT will request from the contractor the respective safety sheets of both containers and contents and the pressures that such contents are arranged inside the containers. The contractor will deliver these documents each time it renews its charges and the supplier company, expiration of the gases and hydrostatic tests.

[20] American and Canadian Pharmacopoeia idem a PSA

of the containers according to Chilean and international regulations. Containers of berán be exhibited with the color chart of Chile according to NCh 2196:2014 [21]

- Personnel operating compressed gas equipment must have sufficientknowledge and training in its use. These contents must be provided by professionals of the gas industry in Chile and at least have at least 5 years' knowledge of such industries, have a qualified professional title and be independent of such companies in the air gas sector, to avoid conflicts of interest.

- Be aware of the procedures given in this document in order to ensure that the work is carried out in a safe manner.

- All cylinders shall be maintained in good condition and shall be inspected and tested in accordance with an internationally recognized standard.

- The filling of compressed gas cylinders may only be carried out by an authorized supplier; no cylinders may be filled in the enclosure.

- All cylinders shall be identified by the international coding system. The colors must be visible at all times, otherwise the cylinder will be returned to the supplier.

- Cylinders shall be provided with protective caps or valve guards. Suppliers should be instructed to adhere strictly to this requirement.

[21] Chile Standard 2196 : 2014 Compressed gases - Centralized networks and equipment for the distribution of non-flammable gases for medical use - General requirements for construction and operation.

- Cylinders shall not be rolled from vehicles or allowed to fall freely onto rubber tyres or any other similar shock absorber, but shall be lowered to the ground under controlled conditions.

- All cylinders must be manufactured according to national and international standards.

5.4.2 General Operating Guidelines

- Inspect all oxygen hoses or other gases or liquids in high-pressure containers for cuts, splits, burns, and wear and tear and arrange them so that they cannot be cut by contact with sharp edges or edges, falling metal, sparks, or flames from cutting torches.

- Use only red hoses for acetylene and other combustible gases; never interchange with other colors.

- All cylinders of medical and / or industrial oxygen, acetylene and any other combustible gas or oxidizing, must have fireproof devices and safety valves as a seal to release pressure from inside such devices.
  For this purpose, the contractor shall record daily assurance that these pressure-release and fire-retardant seals are properly installed and operating properly.

- Use hoses of equal length and not extremely long hoses wrapped around the valve/regulator assembly.

- All installations must have personnel authorized by the gas supplier company, delivering a certificate from the company that accredits it as such and CCAT will have a copy of said document.

- Do not place or use cylinders near the inlet of an air compressor.

- Storage areas and foundations shall be of fire-resistant construction, designed and located in such a way that in the event of a fire they can be easily removed.

5.4.3 Safety Standards for High Pressure Compressed Gas Cylinders[22]

- Cylinders should be there: In good condition and free of corrosion Colorcoded in line with national standards, individually identified and have the data of its development and respective barcode, have their test certificates in force, have protection system on the pressure valve at all times except when using the cylinder. The external material cannot have cracks, contact samples with welds or others.

- Hoses shall be color coded in accordance with internationally recognized standards for the gas being used, in good condition and installed with hose connectors on permanent clamps, not with worm drive (Jubilee clamps).

- Compressed gas cylinders shall be stored upright and secured to an approved trolley by means of a chain to prevent displacement.

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[22] Chilean Standard 1284 of 1997; 1285/1 of 1997; 1300 Of 1997; 1302 of 1977; 1331 of 1998 ;1331 of 1997; 1300 Of 1997; 1302 of 1977; 1331 of 1998 ;1331 of 1997.
1978; 1358 of. 1979 ; 1582 of 1979 ; 2175 of 1995 ; 1025 of 1990; 1377 of 1990;2164 of 1990 ;2168 of 1991

- No natural or synthetic fiber cord should be used to secure the compressed gas cylinders.

- When cylinders are not to be used for long periods or when being transported or lifted with motorized equipment, the regulators must be removed and the valve caps firmly installed on the cylinders.

- Cylinders should not be lifted by any support system that has not been validated by the supplier, should not be tied or strangled to prevent falls, in case of requiring any kind of fastening, this should be consulted with the supplier of the gas and cylinder to report in writing, the correct and good practices of handling, fastening and / or movement.

- It is forbidden for the contractor to move full or empty containers of gas content at high or low pressure without the prior written consent of CCAT and prior authorization from the gas company to do so and its transfer mechanism.

- Cylinders shall not be placed where there is a possibility of sparks, slag, flame, electric arc or other sources of heat.

- Cylinders should be kept out of enclosed constructions and structures where possible, except in workshops. Cylinders must be removed from the con- tructions at night. Smooth, firm surfaces should be provided when cylinders are placed out of constructions at night.

- Cylinder valves and cutting torches/heating frogs should be closed when not in use. Never knock cylinders together or drop them. Never use cylinders as rollers for heavy equipment. The electrodes must not be hit against a cylinder to produce the arc.

- Do not weld or burn on fuel gas cylinders.

- If it is necessary to dispose of the empty container of the cryogenic compressed gas or liquid, the contractor must contact the provider for this provision, it is forbidden to leave containers as waste material at the CCAT site.

5.4.4 Auxiliary Equipment

It is defined as the equipment located above the cylinders of gases compressed at high pressure for these purposes, which allow the safe containment of internal pressure, and when operated as indicated by the manufacturer, allow the exit of the gas.

These auxiliary equipment should be installed for the effects of medicinal gases, flow regulators or flow meters and / or humidifying vessels in some cases of volume above 2 liters per minute.

Manipulation for compressed gas outlet opening

- Valve operation, must always be opened slowly, cylinder valve spindles have right thread, no matter if they contain oxygen or combustible gas must be closed enough to shut off the gas. Do not apply excessive force to close a cylinder valve.

- Frozen Valve: If regulators or cylinder valves are frozen, they should be warmed with hot water, never use a heat source or direct flame. Strictly speaking, the contractor must contact the supplier, give a written and verbal account to inform the supplier and have the supplier provide written information on the conduct and actions to be taken.

5.4.5 Compressed Gas Cylinder Valve Regulators and Safety Seals

These devices are located on top of the containers, and are inserted separately from the container, since they are separated from the container, it becomes a fragile area.

Never weld or oxycut cylinders.

Pressure regulators aim to release excessive pressure from the gases contained in the containers, so these containers with high-pressure gases should not be exposed to high temperatures or direct heat, as this way the molecules of the gas choke each other, and friction generates increased pressure.

These seals serve to release the gas, a particularly loud sound is heard and in case it occurs, people should move away from this container to prevent any accident from falling from the same container. Then give notice to the supplier company, since the valve must be changed, that cylinder must be quarantined and labeled with the phrase ENVASE INUTILIZADO.

The threads of regulators and other auxiliary equipment must be the same as the threads of the cylinder valve outlets.

Rights for oxygen and other non-combustible gases; left for acetylene, hydrogen, and combustible gases, if the connections are not adjusted, should not be forced for any reason and give notice to the gas supplier for removal and replacement.

The regulator must not be used for gases other than those for which it is intended. Hydrogen and acetylene/propane regulators fit with left hand thread of the same size, but acetylene or propane regulators should not be used on hydrogen cylinders, which are filled at a higher pressure than is appropriate for them.

5.5.5 Specifications of gas pressure gauges.

They have the objective of regulating the pressure of exit of the gas, they are installed direct to the exit of the valve of the cylinder, this one must be always closed, especially in that moment. The operator must be positioned behind the regulator so that when the pressure gauge is inserted, it is facing away from the operator.

Only pressure gauges recommended by suppliers may be used. Oxygen gauges should be marked "Oxygen" and not tested with oil. Manometers used to display oxygen, nitrogen or hydrogen contents must have a minimum dial reading of not less than 3,000 pounds (225 bar).

5.5.6 Cylinder hoses or connections,

- Only the best quality hose should be used, lower quality hoses tend to harden, split, filter and may burn internally when oxygen passes through them.

- The hoses must be firmly connected to the torch and other connections by means of folded clamps (never with Jubilee clamps). Hose lengths are supplied with their ends firmly connected to nipples that have screwed connections suitable for connecting to standard regulator outlets and torch inlets.

5.5.7 Specifications for Compressed Gas Cylinder Storage

Contractors will submit to CCAT's Health and Safety Supervisor for approval a plan outlined with their gas cylinder storage areas. These soul- dining areas will be in the open air, away from drains, other flammable materials and high activity work zones.

Other considerations:

- They must be fenced using wire mesh and located on a firm, level ground. Fences shall be at least two meters high with a roof of zinc plate or other means of permanent protection against direct sunlight, and a locked gate that opens outwards for easy exit in the event of an emergency.

- No source of ignition is permitted within 15 meters of the enclosure line of the storage area, including any first aid facility where medical oxygen may be used.

- EMPTY cylinders should be stored separately from FULL cylinders; empty cylinders should be marked "Empty".

- All cylinders must be stored in a vertical position, with their valve caps installed and individually secured with chains to prevent them from falling, and in a well-ventilated area.

- Oxygen and fuel gas cylinders in storage must be stopped at least 7 meters or by a "firewall" with a 1-hour fire resistance rate.

- When the regulators/pressure gauges are removed, the cylinders are considered as a core and must be separated or fitted with a fire wall.
- Storage areas should be clearly identified with the contents of the cylinders; this includes whether the cylinders are full or empty.

- Compressed gas cylinders should not be stored in areas where other flammable materials are stored; areas around storage areas should be kept free of weeds, debris, and other inflammable materials.

- Compressed gas cylinders should not be stored within 15 meters of any building or structure.

- Warning signs "NO SMOKING IN THIS AREA" and "FLAMMABLE GAS" "COMBURENT GAS" must be posted to warn all travelers of the danger.

- Fire extinguishers shall be located no closer than 5 meters and no further than 25 meters from cylinder storage areas.

- The contractor company's emergency brigade must have training from the industrial safety provider company to control fires and gas leaks, because the extreme conditions of geographical height constitute a different territory due to the decrease in atmospheric pressure to 5,600 masl. Therefore, CCAT requests the contractor to show training certification for this particular point and its validity, in addition to the names of the workers with these educational contents.

5.5.8 Cylinder Transport

All cylinders, when being transported, shall have pro tector covers, also called tulipas, in place on the pressure valve on the cylinder.

They will be transported in a vertical position and secured in the luggage racks for cylinders, ideally these are expected to be placed in baskets especially if they are smaller.

The supplier of these gases must provide a safety certificate so that their gases are transported by the vehicle, this document will be in the hands of CCAT who will grant the respective written permission.

When empty cylinders are returned to the supplier, they must be clearly marked "EMPTY" and with pressure inside, so that no air enters the container, at least 25% of its contents is marked on some regulators, and the valves must be closed and the protective caps placed.

If defects are observed in a cylinder, it must be quarantined and returned to the supplier. This cylinder must not be put into service.

Cylinders shall not:

- Being subjected to undue stress, shock, or mechanical damage.

- Being dropped or having violent contact with other cylinders.

- Be transported with the hoses and regulators installed, unless they are on a tram or luggage trolley.

- When transported on a tram, the valves must be closed before the tram moves.

- Cylinders of different gases should not be transported in the same container.

- Cylinders should not be rolled from the rear of vehicles or dropped on rubber tyres or similar to avoid contact between containers and resistance to falls, but should be lowered to the ground or floor under controlled conditions.

OXYGEN CYLINDERS MUST NOT BE TRANSPORTED WITH ACETYLENE LINDROS OR ANY OTHER INFLAMMABLE OR CHEMICAL MATERIAL/SUBSTANCE.

5.5.9 Cylinder Handling and Use

- Contractors must provide adequate facilities to minimize manual handling of cylinders.

- Lifting cylinders using a crane can only be done using a certified lifting cage. No cylinder shall be lifted using a cylinder body wrapping system or a modified lifting cap.

- All gas cylinders should be handled with caution. Your valves must be properly closed when not in use and the valve caps must be closed when they are to be moved or repositioned.

- When cylinders are located in the place where they will be used, they must be either on carts or secured in permanent structures that allow these containers with high pressure gases to be protected from falls or blows; the keys for closing the valves visible to the operator shall be in the cylinders.

- Only non-sparking material should be used to secure the cylinders.

- All oxygen and acetylene cylinders shall have flame backflow control systems installed in the correct position of the hoses.

- Cylinders must be transported without pressure gauges.

- Hoses on compressed gas cylinders must be raised to avoid tripping hazards and obstructions and to prevent possible damage to the hoses.

- Compressed gas cylinders should never be taken to confined spaces for either use or storage. Whenever compressed gas is used in an enclosed space, as soon as people leave the enclosed space (collation, end of day) all hoses must be removed from the enclosed space.

- All compressed gas equipment must be kept in good working condition.

- Operators should check daily for damaged hoses, pressure gauges or regulators. A soap solution should be used to verify where leakage is suspected. If a leak is found and cannot be restarted, the equipment must be removed from service.

- Caution should be exercised, making sure that neither the regulators nor the cylinder come into contact with any portion of grease or oil that could cause an explosion.

- Make sure the cylinder and regulator threads fit; do not force mismatched connections.

- Open the valve of high or low pressure gas cylinders slowly, always use a pressure reducing regulator or called a regulator, make use of a regulator specified for that particular gas, if you have any doubts consult a gas supplier company, never force over the valve or generate any alteration in it to fit the cylinder valve, it is highly unlikely.

- Never use compressed oxygen as a substitute for compressed air.

- Visually inspect all hoses before use.

- It is absolutely forbidden to make splices, joints and repairs of hoses where high pressure gases circulate, it is highly dangerous. Only qualified employees and/or certified companies will be allowed to carry out these repairs or interventions.

- All equipment and elements associated with the handling, use and control of gases compressed at high or low pressure must be approved by the gas companies, stored and controlled by a technician certified by the gas company.

- There must be an operational fire extinguisher or other protection, placed within 8 meters of all work in progress.

- Cylinders should always be considered full and handled with care.

- Due to their shape, smooth surface, and weight, it is difficult to carry the cylinders by hand. These can be rolled along their bottom edge, but never dragged.

- If a cylinder is exposed to heat, the cylinder may weaken and at the same time the gas content will increase its pressure. This can lead to a slow, vio-y explosion of the cylinder. If the content is combustible, the resulting fire will be immediate.

5.6 Oil, Fat, and other Contaminants:

Oil or grease ignite violently in the presence of high-pressure oxygen and this can lead to an explosion. Cylinders and accessories should be kept away from sources of contamination, such as barrels, overhead transmissions, cranes, or drive belts.

Personnel should not smoke, wear oiled clothing, or have an open light exposed anywhere compressed gases are stored. Personnel should NOT handle oxygen cylinders, valves, or other accessories with greasy hands, gloves, or rags.

Measures must be taken to prevent oil, grease, or water of any kind from entering the cylinder valves, otherwise it will be impossible to prevent the equipment from filtering through the joints. Cylinder valves should be stored well away from all sources of corrosion, such as battery charging areas.

5.7 Cylinder Care in Use

Compressed gas cylinders shall be maintained either on carriages, designed and manufactured as 'Gas Cylinder Carriage', or secured to a part of a structure such that it cannot be accidentally overturned. Cylinders must be held upright.

Only standard manufacturer's keys may be used to operate cylinder valves. The lever on the keys should not be increased and long or worn lever keys should not be used.

Do not use a cylinder with a broken spindle, otherwise the valves may be damaged and the cylinder may be out of use.

Before using gas cylinders, the user must ensure that they are properly supported and secured. Do not connect a failed appliance to the cylinder or allow it to remain if damaged after connecting.

Personnel must not lubricate any valves or fittings, and must not use any white or red compounds or other union paste.

Cylinders must be kept away from sparks, flames, or slag from welding, hardening, or cutting operations. Cylinder valves should be closed when work is stopped for more than a few minutes or when the cylinder is empty.

5.7.1 Verification of Filtrations:

Caution must be exercised to avoid a gas leak from the cylinder valve or any apparatus connected to it, with the danger associated with the accumulation of gas in an enclosed space.

Liquid indicated by the compressed and certified gas supplier must be used for this purpose. IT IS FORBIDDEN TO USE HEAT SOURCE OR DIRECT FIRE.

5.7.2 Cylinders and Excessive Heat:

Cylinders should not be subjected to excessive heat causing increased pressure and weakening of the cylinder wall.

If a cylinder is accidentally overheated or damaged, the supplier must be notified immediately and the cylinder must be removed from service.

Damaged cylinders should, where possible, be isolated from undamaged cylinders, they should be clearly identified as "Damaged. Do not touch" and return it to the supplier.

If an acetylene or propane cylinder is accidentally heated or by a flame recoil from failed equipment, it should be promptly serviced as follows

- Give notice to isolate the working population.
- Notify CCAT
- Close the valve
- Disconnect regulator and other connections.
- Immediately take the cylinder into the open air and well away from any source of ignition.
- Immerse it in water or apply plenty of water to cool it.
- Open the valve completely and keep it cold with water until the cylinder is empty. As this can take several hours, the provider should be contacted immediately for your service.

5.7.3 Gas Reaction

5.7.3.1 Acetylene

This product comes in a yellow container according to Chilean standards and has a liquid and a gaseous phase. It can form explosive compounds in contact with certain metals or alloys, particularly those of copper and silver.

Never use union fittings or pipes made of copper.

Acetylene must never be allowed to come into contact with copper or any alloy containing more than 70 % copper.
In an enclosed space, a small amount of acetylene, oxygen, or propane can create a dangerous condition, which will cause an explosion or fire from a spark or open light.

5.7.3.2 Medicinal Oxygen

This gas is obtained from the air in the atmosphere by means of a system known as air liquefaction. (See 5.1 page 4)

It's colorless, odorless, and tasteless. The compressed medical oxygen containers in Chile are white.

There are different sizes of containers, all must be labelled for this gas and it is forbidden to transfer, since the traceability of the product is lost and it loses its medial quality.

6

Pre-occupational Health - Occupational - Occupational Hygiene

Drug control - addictions

6.1 Pre-Occupational Health

The contractor must generate a call for candidates to be collaborators in the CCAT - prime project, once the contract has been awarded. For these purposes and considering the extreme conditions of geographical altitude, it is mandatory to evaluate the health conditions of the worker by means of Law 16.744, in the institutions contracted by this contractor company.

Law 16.744 has as occupational health care providers for the total of the population that lives and is considered Chilean or that has chile-na identity card. For these purposes, and with the express indication of the company that has called it, it must attend one of the three mutuals: Mutual de Seguridad, Asociación Chilena de Segurity or, failing that, Instituto de Seguridad del Trabajo.

The work will be located at approximately 5,600 meters above sea level, so the working population must have the authorization and certification of one of these mutuals.

The request to the entity called Organismo Administrador de la Ley 16.744, must indicate that this worker requires evaluations indicated in the Technical Guide of Decree 28 specific for work to "EXTREMA ALTURA GEOGRÁFICA" (GEOGRAPHICAL HEIGHT).

Health assessment performed on all workers who will perform work over 5,500 meters of altitude, regardless of projected time of stay, chronic in-therm or sporadic.

The battery of tests to be applied is the same as that used in pre-occupational evaluations over 3,000 meters above sea level, to which an Effort Test is added, independent of the worker's age.

Objective of Health Assessment for Exposure at Great Geographic Altitude

"To investigate pathological and non-pathological conditions (pregnancy) which, as a result of exposure to hypobaric or special conditions of isolation and difficult accessibility of the worksites, could constitute a risk both to the health of the worker himself and to third parties and the company."[23]

6.1.2 Pre-Occupational Evaluation

CCAT - prime will be built in Chile, therefore all workers and collaborators must comply with local and foreign labor laws in case of sporadic visits to the physical place.

The following is a description of the legalities with which they must comply 100% of the price. Exceptions will be given by diplomatic immunity, if the visits and/or client have at least the examinations to access extreme geographical altitude, as described in annex 1.1 in the technical guide.

The contractor must then present, in a separate folder for each worker, the documentation listed in the following paragraphs, which will form part of the formal contract between the principal and the contractor.

[23] Technical Guide on Occupational Exposure to Chronic High Altitude Intermittent Hypobaria

"The challenge of the Social Security System through the Occupational Health and Safety Policies is to prevent by reducing or eliminating the sources of occupational risks and to provide protection in all those situations that can break the physical, mental and/or social balance of a worker.

Until now, occupational safety has focused on preventing and protecting workers from accidents or illnesses at work. This has led to the creation of various legal mechanisms that are essential for their protection, such as the Regulation on Basic Health and Environmental Conditions in Workplaces, the Quality Certification of personal protection elements against occupational risks and the Compulsory Social Security against Occupational Accidents and Diseases, Law 16,744, which is still in force today.

Initiatives in the area of occupational safety and health are aimed at improving the quality of life and human dignity in the workplace. The adhesion of the State of Chile to various international treaties (more information on contracts), which promote the recognition of fundamental human rights, is of great value.

The work, its conditions, and the type of employment, have repercussions on protection and impact on the pension system.

Work is constituted as an inalienable right of people, together with the right to develop a safe work, today focuses on orientations that eliminate or significantly reduce the sources of risks that are present in all work activity, so it is important to identify where they are.

The risks: They are the assessment of the dangers present in the workplaces, they can be found in the safety conditions, in the environment where the work is carried out, in the presence of chemical, physical, or biological contaminants, in the form of organization or in the form of how the task is carried out day by day, among others.

Once hazards are identified, their risks are assessed, then measures are taken to eliminate or mitigate the risks. Anticipating to make them minimums, that is to say, it is necessary to Prevent.

The rules on worker protection in the field of OSH are contained in:

Law 16,744 on Occupational Accidents and Diseases and its auxiliary decrees.

The Labour Code (Articles 184 et seq.) The Health Code Book III: "On Hygiene and Safety of the Environment and Workplaces" and Other Particular Legal Texts, given that some employing entities are subject to special legislation and supervision on account of their activity. Insurance against Accidents at Work and Illnesses at Work

To perform safe work, it is necessary to consider information, training and measures to ensure that the aspects involved, such as tools used, machines operated, ergonomic conditions and environmental or chemical pollutants, are addressed.

The objective: It is to prevent and protect the occurrence of an occupational accident, trajectory or occupational disease to workers who perform their work, either in a dependent way (with employment contract) or independently (fees or own basin).

Literal font:

Subsecretaría de Prevención Social

https://www.previsionsocial.gob.cl/sps/seguridad-social/sst/

"For the investigation of health contraindications for exposure to chronic intermi- tent hypobaria the following battery of pre-occupational and occupational examinations will be carried out, differentiating only the chest x-ray that will be taken for occupational examinations every 5 years."[24]

i.- Health survey (in annex)

ii.- Battery of clinical and laboratory examinations:

- Weight
- Size.
- Blood Pressure
- Pulse.
- Rest electrocardiogram.
- AP Chest X-ray
- Hemoglobin.
- Glycemia.
- Creatinemia.
- Lipid profile.
- Cardiovascular risk index based on Framingham index (parameters: age, sex, smoking, diabetes, total cholesterol, HDL cholesterol, systolic P. and diastolic P.).
- Lake Louise questionnaire - see attached.

iii.- Medical evaluation: anamnesis, physical examination, background analysis, medical conclusion and counseling.

[24] Technical Guide DS28 page 11

The report must be written on digital and/or paper media, verifying the conclusion of the evaluation, the results of the examinations and the period of validity, identity of the examining physician and the center where it was evaluated. Only a copy of the final report will be delivered, unless, with the express consent of the employee, the company can access the full report presented in other companies.

Contraindications to work over 3000 meters above sea level are described on page 13 of the Technical Guide of Supreme Decree 28 of DS 594, and that the doctor who evaluates the worker will take into account when making the medical consultation.

In addition to the above, and given that the work and the land are located at 5,600 meters above sea level, in addition to the foregoing, the contractor must apply to the Administrative Body to which it is adhered to for Law 16,744, according to the technical guide mentioned above - nothing on page 20, he points out:

"SANITARY AUTHORIZATION TO CARRY OUT WORK OVER 5,500 MASL:[25]

The health authority shall consider compliance with the following requirements for work authorization at extreme altitude.

1.- Health assessment that includes a battery of pre-occupational tests, a force-beam ECG and a hypoxia tolerance test.

2.- Permanent supply of individual oxygen.

3.- Identification of workplaces with high physical and ergonomic loads, with their co-responding risk analysis and risk mitigation and control plans.

[25] Official document Technical Guide Supreme Decree 28 page 20

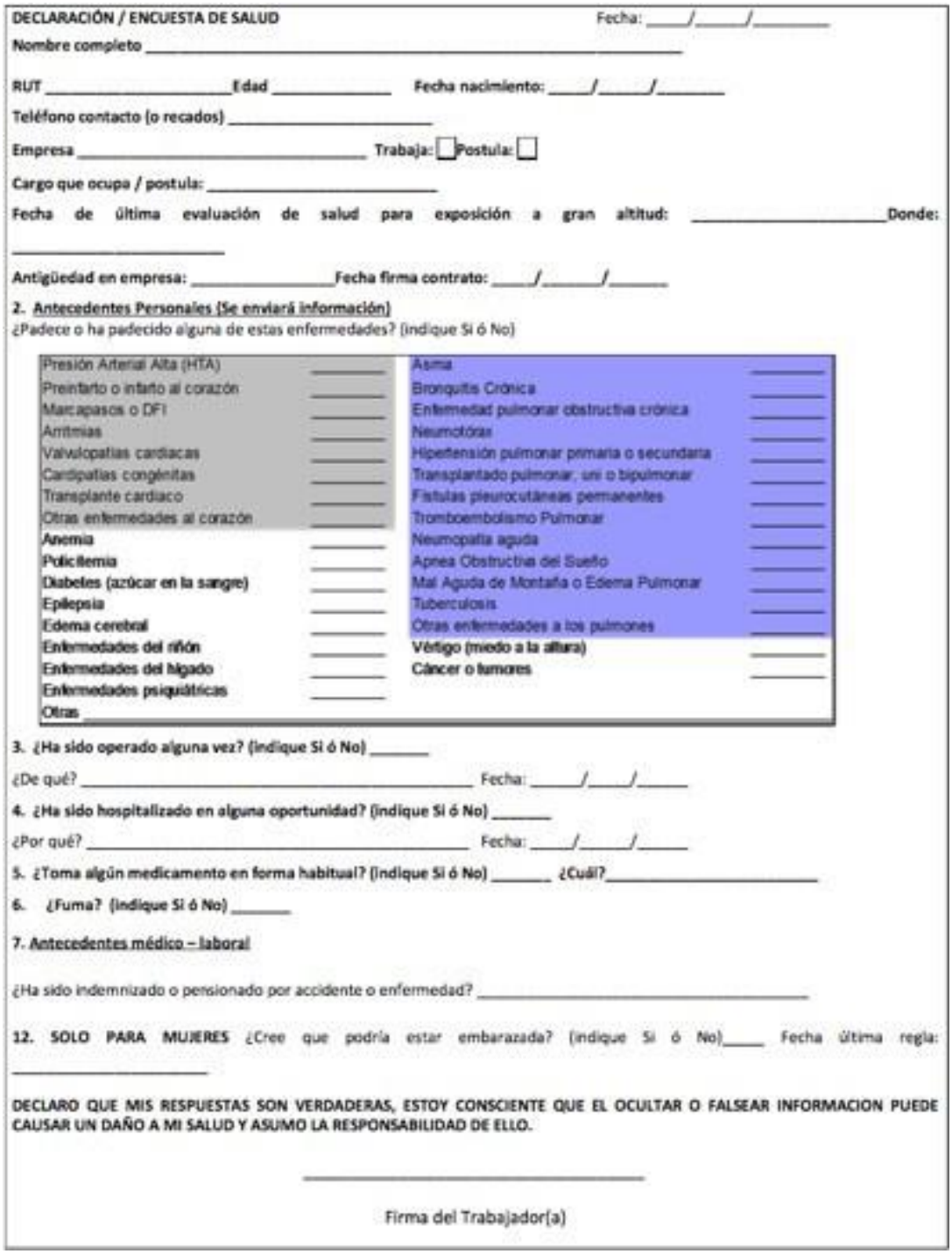
4.- Adequate rest areas for the physiological recovery of the worker who consents to mitigation measures, such as oxygenation and compliance with ha- bitability standards.

Plan, in the first week of work, a progressive exposure from only 4 hours on the first day to 8 or more hours on the third day, to facilitate adequate acclimatization and prevent intolerance.

6.- System of programmed breaks during the working day according to the demands and physiological workload.

CCAT - prime adheres to these points so that the contractor, by delivering the certificates and the folder with all the examinations carried out by the collaborator already hired, can carry out work activities in extreme conditions of geographical altitude and that by means of informed consent, which as an instrument of administrative rigour has informed the worker of the environmental and atmospheric conditions to which he will be subjected.

Declaration / Health Survey



DECLARACIÓN / ENCUESTA DE SALUD Fecha: ____/____/_____

Nombre completo _____

RUT _____ **Edad** _____ **Fecha nacimiento:** ____/____/_____

Teléfono contacto (o recados) _____

Empresa _____ **Trabaja:** ☐ **Postula:** ☐

Cargo que ocupa / postula: _____

Fecha de última evaluación de salud para exposición a gran altitud: _____ **Donde:** _____

Antigüedad en empresa: _____ **Fecha firma contrato:** ____/____/_____

2. Antecedentes Personales (Se enviará información)

¿Padece o ha padecido alguna de estas enfermedades? (Indique Si ó No)

Presión Arterial Alta (HTA)	_____	Asma	_____
Preinfarto o infarto al corazón	_____	Bronquitis Crónica	_____
Marcapasos o DFI	_____	Enfermedad pulmonar obstructiva crónica	_____
Arritmias	_____	Neumotórax	_____
Valvulopatías cardiacas	_____	Hipertensión pulmonar primaria o secundaria	_____
Cardiopatías congénitas	_____	Transplantado pulmonar, uni o bipulmonar	_____
Transplante cardiaco	_____	Fistulas pleurocutáneas permanentes	_____
Otras enfermedades al corazón	_____	Tromboembolismo Pulmonar	_____
Anemia	_____	Neumopatía aguda	_____
Policitemia	_____	Apnea Obstructiva del Sueño	_____
Diabetes (azúcar en la sangre)	_____	Mal Aguda de Montaña o Edema Pulmonar	_____
Epilepsia	_____	Tuberculosis	_____
Edema cerebral	_____	Otras enfermedades a los pulmones	_____
Enfermedades del riñón	_____	**Vértigo (miedo a la altura)**	_____
Enfermedades del hígado	_____	**Cáncer o tumores**	_____
Enfermedades psiquiátricas	_____		
Otras _____			

3. ¿Ha sido operado alguna vez? (Indique Si ó No) _____

¿De qué? _____ Fecha: ____/____/_____

4. ¿Ha sido hospitalizado en alguna oportunidad? (Indique Si ó No) _____

¿Por qué? _____ Fecha: ____/____/_____

5. ¿Toma algún medicamento en forma habitual? (Indique Si ó No) _____ **¿Cuál?** _____

6. ¿Fuma? (Indique Si ó No) _____

7. Antecedentes médico – laboral

¿Ha sido indemnizado o pensionado por accidente o enfermedad? _____

12. SOLO PARA MUJERES ¿Cree que podría estar embarazada? (Indique Si ó No)____ Fecha última regla: _____

DECLARO QUE MIS RESPUESTAS SON VERDADERAS, ESTOY CONSCIENTE QUE EL OCULTAR O FALSEAR INFORMACION PUEDE CAUSAR UN DAÑO A MI SALUD Y ASUMO LA RESPONSABILIDAD DE ELLO.

_____

Firma del Trabajador(a)

6.1.3 FOR WORKERS WITH SPORADIC OR PUNCTUAL FUNCTIONS[26]

The battery of tests for medical evaluation will be the same as that applied in pre-occupational and occupational evaluation. If these examinations are in force, they can be used for this purpose.

This annual evaluation is the responsibility of the employer or the company with Legacy Administration, as appropriate.

Hypobaria Mitigation Measures

The contractor must adhere to all the points indicated for this purpose in Supreme Decree 28, as well as in its respective technical guide, and shall be part of the requirements to be met to serve the contract.

CCAT may consider applying, at any time during the period of the work, an audit by an expert professional, in such a way that it is an obligatory condition to comply with the points indicated in Technical Guide DS28.

6.1.4 Protocol for monitoring adaptation on arrival at the slaughterhouse

According to the DS28 Technical Guide, this must be carried out on site on arrival, at 24 hours and 48 hours, notwithstanding the foregoing, CCAT considering that this work is the highest in world history, and aspires to have the entire population of tra- yor in work, route, rest, food and return to their homes, without alterations that generate Poor Quality of Life. For the foregoing, the contract award condition, the majority score will be accumulated by Occupational Health and Industrial Safety.

The contractor must monitor the worker throughout the period of exposure to extreme geographic height with the parameters of:

[26] Official document Technical Guide Supreme Decree 28 page 20

- Oxygen saturation - pulseoximetry

- Heart rate

- Respiratory frequency

- Modified lake louise survey

These data obtained will be recorded on daily record sheets and signed by the operator who controls and by the worker, at the end of the working day these records will be delivered to the person in charge of CCAT.

If changes are found that pose a risk to the worker, the contractor must suspend the workday and refer to the polyclinic with the assistance of a qualified professional to assist the worker and accompany him throughout his care. In the event that the bearer has been attended in the polyclinic, he shall be sent with assistance to the ALMA policy or conduct that has been decided between CCAT and Contractor.

When applying the modified Lake Louise survey, the Occupational Health professional on site will detect a sum equal to or greater than 3 and one of the altered hemodynamic parameters, the accompanied worker must descend to the ALMA polyclinic to be stabilized.

6.1.5 Notifications of Diseases and accidents related to the work to Great and Extreme Geographic Height.

Considering that the worker will daily move to and from the work site during his or her shift role, for the purposes of this manual we refer to Great and Extreme Geographic Height.

At all times, every worker may notify the contractor, who in turn shall immediately notify CCAT of any health situation of any of the workers, or even the observation of any behavior out of the normal to stop the exercise of the task.

Each of the teams of workers that make up a shift role will have the obligation to notify if any of their co-workers and/or supervisor has been detected showing any of the signs and symptoms of Acute Mountain Sickness, the objective is to stop early any evolution that generates a greater deterioration in the worker's organization.

At the same time, in case of illness and accident related to work at great and extreme geographic height as indicated in Law 16.744, it must be notified to the Regional Authority and the Occupational Health Department of the Division of Healthy Public Policies and Promotion of the Ministry of Health, according to the provisions of Art. 110b.10 of DS 28/2012.

All Occupational Health data (medical examinations, equipment inspections, personnel inspections, etc.) shall be correctly documented by the Contractor in the field and shall be available in writing to be arranged and safeguarded by CCAT for possible revisions and updates as national or related international regulations evolve or change.

All contractors must take special measures to mitigate height health problems, as provided in DS28 and DS594, such as water to hydrate the worker according to the protocol indicated by CCAT, individual endowment per worker of compressed medical oxygen, sufficient quantity to perform their shift role. The contractor must also make available for use on demand and by the protocol of pulses of oxygenation by role of shifts, providing training and periodic medical examinations. In addition, the contractor must give employees sufficient time to adapt to high and extreme geographic altitudes (work program adaptation) and provide personal oxygen supplement equipment suitable for work at high and extreme geographic altitudes (e.g., sufficient portable oxygen devices).

The contractor must have medical equipment capable of operating over 5500 masl certified by the manufacturer to obtain heart rate, respiratory and satu- rometry data at least and that the oxygen therapy devices are certified to operate over 5500 masl by the manufacturer. This type of medical element must have a protocol of preventive and reparative maintenance, which comes from the supplier company annually.

In the case of detecting alterations in the ranges of normality and adaptation as a physiological compensation measure, the contractor must inform CCAT and replace or suspend the work of said worker and evacuate him as a preventive measure.

6.2 Drug control - addictions - Alcoholic beverages, drugs and tobacco.

The possession, distribution and consumption of alcoholic beverages and drugs outside of the individual prescription drugs are strictly prohibited, for which each work contracted to execute a contract between CCAT and the Contractor Company must deliver to its employer the information provided to the Mutualidad where the preventive examinations and exposure to High Altitude according to DS28 have been carried out.

It is ABSOLUTELY forbidden to transport, ingest and/or store, alcoholic beverages, energizers, medications not authorized or indicated by a doctor.

In geographic environmental conditions at great and extreme altitudes, the metabolism and physiology of the human body are modified to compensate and condition the organism in the face of a decrease in atmospheric pressure, cold and humidity. estos fines.
Prescription drugs may be used when they do not cause side effects that may affect people's safety. Medical authorization must be provided by the Contractor's physician, who has given authorization to perform work at Great Geographic Altitude and at Extreme Geographic Altitude, respectively.

CCAT precinct contractors must meet their own requirements regarding the respective organizational policy by undergoing medical examinations for extreme geographic height according to DS28 DS594.

All employees of the Contractor and its subcontractors with designated works who re-want access to the CCAT site must sign informed consent with the in-training outlined in DS28 and DS594.

It is a cause for dismissal and considered a serious fault (it is important to consider in the contract concluded with the contractor, that if the case indicated in this point, and for not having avoided this incident, could cause the termination and cessation of the contract, plus may apply fines for such fault as dictated by the contract entered into. Contractor's personnel shall be removed from the site when under the influence of alcohol and/or drugs in any of the CCAT areas.

It is a cause for dismissal and considered a very serious fault (it is important to consider in the contract entered into with the contractor, that if the case indicated in this point, and for not having avoided this incident, could lead to the termination and cessation of the contract, plus may apply fines for that fault as dictated by the contract entered into.

Verification of alcohol by breath control or by any technology may be performed at random by CCAT personnel at any time on the CCAT premises. In accordance with labor laws and regulations and the provisions of the paragraph of the contract, in the case of the worker, he will give his consent for the effects of applying these randomly as a preventive measure. Access to Contractor Facilities and Inspections

All contractors shall provide authorized CCAT representatives with full, unrestricted access to all of their facilities, such as workplaces, sizes, constructions, storage areas, etc., including the facilities that existed at the workers' resting moments during the shift role.

CCAT reserves the right to conduct inspections at the contractor's facilities at regular intervals or as it deems necessary.

In addition, CCAT reserves the right to intervene in the event of circumstances encountered during inspections that are considered detrimental to safety, cleanliness, hygiene, and/or the materials used in the facilities.

CCAT's instructions resulting from inspections and/or interventions shall be executed immediately by the Contractor, for which purpose such finding and photographic evidence shall be written down and stored as a record of the facts.

DAILY CLINICAL FIELD EVALUATION RECORD DOCUMENT

EVALUACIÓN INICIAL Y SEGUIMIENTO

Fecha: _____

Identificación

Nombres y apellidos: _____

Edad: _____años RUT: _____

Ocupación y puesto de trabajo: _____

Sistema de Turno: _____

Altura Geográfica en lugar de trabajo: _____

a) LLEGADA:

Presión Arterial: _____/_____mmhg

Frecuencia Cardiaca: _____ x'

Saturación O_2: _____%,

Resultado Encuesta Lake - Louise: _____

Indicación médica: No_____ Sí_____

b) A las 24 hrs:

Presión Arterial: _____/_____mmhg

Frecuencia Cardiaca: _____ x'

Saturación O_2: _____%

Resultado Encuesta Lake - Louise: _____

Indicación médica: No_____ Sí_____

c) A las 48 hrs:

Presión Arterial: _____/_____mmhg

Frecuencia Cardiaca: _____ x'

Saturación O2: _____%

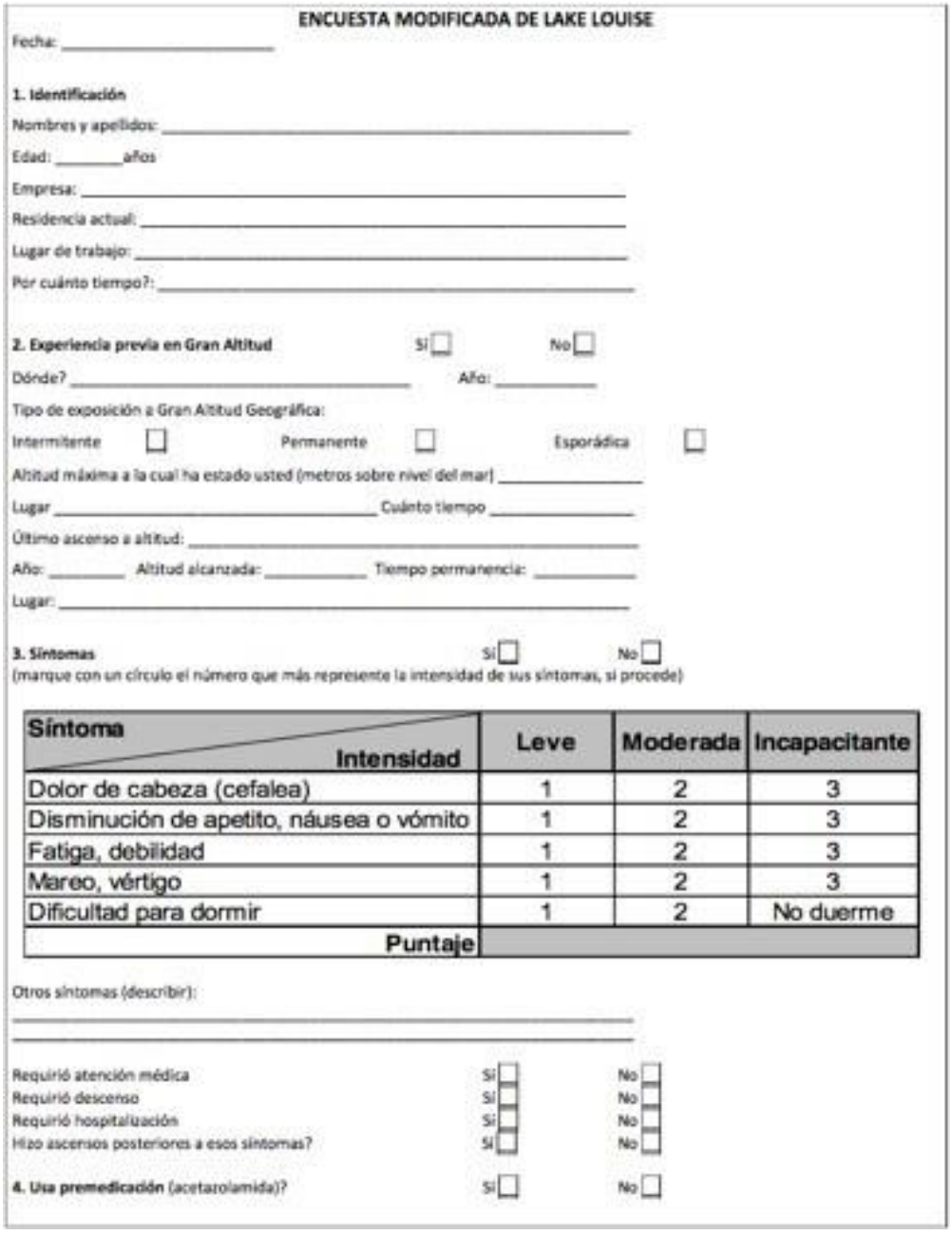
Resultado Encuesta Lake- Louise: _____

Indicación Médica:_____

_____

Occupational Health Log Sheet for Extreme Geographic Height Daily

Control



ENCUESTA MODIFICADA DE LAKE LOUISE

Fecha: _____

1. Identificación

Nombres y apellidos: _____

Edad: _____años

Empresa: _____

Residencia actual: _____

Lugar de trabajo: _____

Por cuánto tiempo?: _____

2. Experiencia previa en Gran Altitud Si ☐ No ☐

Dónde? _____ Año: _____

Tipo de exposición a Gran Altitud Geográfica:

Intermitente ☐ Permanente ☐ Esporádica ☐

Altitud máxima a la cual ha estado usted (metros sobre nivel del mar) _____

Lugar _____ Cuánto tiempo _____

Último ascenso a altitud: _____

Año: _____ Altitud alcanzada: _____ Tiempo permanencia: _____

Lugar: _____

3. Síntomas Si ☐ No ☐

(marque con un círculo el número que más represente la intensidad de sus síntomas, si procede)

Síntoma / Intensidad	Leve	Moderada	Incapacitante
Dolor de cabeza (cefalea)	1	2	3
Disminución de apetito, náusea o vómito	1	2	3
Fatiga, debilidad	1	2	3
Mareo, vértigo	1	2	3
Dificultad para dormir	1	2	No duerme
Puntaje			

Otros síntomas (describir):

_____

_____

Requirió atención médica Si ☐ No ☐

Requirió descenso Si ☐ No ☐

Requirió hospitalización Si ☐ No ☐

Hizo ascensos posteriores a esos síntomas? Si ☐ No ☐

4. Usa premedicación (acetazolamida)? Si ☐ No ☐

PAUTA AUTOEVALUACIÓN

Verificación del Cumplimiento de Exigencias del DS N° 28/2012

Nombre Empresa:
Rut:
Fecha:
Razón Social:
Dirección:

Experto:

OBJETIVO

Verificar el cumplimiento de las exigencias del Decreto Supremo N° 28/2012.

ALCANCE

Esta lista se aplica a todas las empresas que tengan trabajadores expuestos a hipobaria intermitente crónica de gran altitud y extrema altura geográfica

REQUISITO	SELECCIONE SU RESPUESTA EN EL RECUADRO "CUMPLE"			
1. De los Trabajadores Expuestos	CUMPLE (SI/NO)	NORMA LEGAL	ORIENTACIÓN / EVIDENCIA	OBSERVACIONES / ACCIÓN A SEGUIR
1. Se informa a Trabajadores del Riesgo y Medidas Control		Decreto Supremo N° 28/2012	Registro de capacitación	
2. Este Riesgo está incorporado en Sistema Gestión		Decreto Supremo N° 28/2012	Revisar sistema gestión	
3.Tiene programa Prevención actualizado anualmente		Decreto Supremo N° 28/2012	Programa escrito y conocido por el personal.	
4. Se realizan Examenes de Aptitud a los Trabajadores		Decreto Supremo N° 28/2012	Registro de Examen	
5. Están los Trabajadores en Vigilancia Ocupacional		Decreto Supremo N° 28/2012	Confirmar que la totalidad de los trabajadores están en ella	
6. Se realiza chequeo anual preventivo de Salud Compa		Decreto Supremo N° 28/2012	Registro de Examen	
7. - Test de tolerancia a la Hipoxia		Decreto Supremo N° 28/2012	Lugar / Profesional / Aptitud	
2. De las Medidas de Prevención y Mitigación				
7.Dispone de oxígeno para tratar hipobaria		Decreto Supremo N° 28/2012	Se debe confirmar visualmente	
8. Tiene policlínico cerca si tiene más de 50 trabajadores)		Decreto Supremo N° 28/2012	Se debe confirmar visualmente	
9. El número de personas del policlínico cumple el Art 110° b.7.		Decreto Supremo N° 28/2012	Deben existir certificados de cursos	
10. La capacitación del personal está de acuerdo al Art. 110° b.7		Decreto Supremo N° 28/2012	Deben existir certificados de cursos	
11. Dispone de Ambulancia según exigencia del Art. 110° b.7		Decreto Supremo N° 28/2012	Se debe confirmar visualmente	
12.El policlínico cuenta con Autorización Sanitaria		Decreto Supremo N° 28/2012	Debe tener documento	
13. Tiene Brigada de Emergencia entrenada según Art. 110 b.9		Decreto Supremo N° 28/2012	Debe tener registro	

RECOMENDACIONES A SEGUIR	PRIORIDAD	ENCARGADO
	1	
	1	
	2	
	2	
	3	
	3	

7

Personal and Industrial Safety

Occupational Hygiene

7.1 Safety of the person contracted for the work

The security of the person means protecting vital freedoms, that is, protecting people exposed to threats and certain situations, creating a system that provides the worker with the basic elements of survival, dignity, and livelihood.

CCAT will evaluate the presentation delivered by the contractor of a Safety and Emergency Management Plan, this risk mesh associated with the activities involved in carrying out the work.

CCAT will also be able to integrate its own Safety Management Plan and will coordinate it jointly with the Contractor and the Principal. The final purpose is to watch over the life and integrity of all those who are part of the project.

The Personal Protection Elements (PPE) that the Contractor considers to provide to its collaborators, are part of its work contract and by Law 16.744, DS594 and in order to fulfill the tasks in the field, these elements must be evaluated and certified to tolerate extreme temperatures, ultraviolet radiation, hearing protection, eye protection, clothing, footwear, oxygen therapy system, nasal cannulas and drinking water, sufficient and adequate for the permanence in the field.

In addition, the contractor must have a redundant endowment and an arsenal for weather and other insulation for at least 7 days.

It must have at least 1 shelter booth with the characteristics of shelters for at least 2 people, these will serve for the realization of rest breaks as indicated in the regulations.

In addition, there must be a resting place for the entire population in a protected environment that simulates being at 2800 meters above sea level in terms of breathable air conditions, temperature, and relative air humidity.

The technical record and the precautions of use of each material, as well as the personal protection elements that each worker will use, will be correlated with the activity to be carried out and validated by the Public Health Institute of Chile as such. These records and authorizations will be stored and in charge of CCAT, the latter may be the entity that supervises their use and suppress it in case of not complying with the regulations in force by the Ministry of Health of Chile.

All Occupational Health data (medical examinations, equipment inspections, personnel inspections, etc.) shall be correctly documented by the Contractor in the field and shall be available in writing to be arranged and safeguarded by CCAT for possible revisions and updates as national or related international regulations evolve or change.

All contractors must take special measures to mitigate height sa- lud problems, as provided in DS28 DS594, such as water to hydrate the worker according to the protocol indicated by CCAT, individual endowment per worker of compressed medical oxygen, sufficient quantity to perform their shift role. The contractor must also make available for use on demand and by the protocol of pulses of oxygenation by role of shifts, providing training and periodic medical examinations. In addition, the contractor must give employees sufficient time to adapt to the high and extreme geographic altitude (adaptation of the work program) and provide personal oxygen-supplementing equipment suitable for work at great and extreme geographical altitude (e.g., sufficient portable oxygen devices).

The contractor must have medical equipment capable of operating over 5500 masl certified by the manufacturer to obtain heart rate, respiratory and satu- rometry data at least and

that the oxygen therapy devices are certified to operate over 5500 masl by the manufacturer. This type of medical element must have a protocol of preventive and reparative maintenance, which comes from the supplier company annually.

In the case of detecting alterations in the ranges of normality and adaptation as a physiological compensation measure, the contractor must inform CCAT and replace or suspend the work of said worker and evacuate him as a preventive measure.

All Occupational Health data (medical examinations, equipment inspections, personnel inspections, etc.) shall be correctly documented by the Contractor in the field and shall be available in writing to be arranged and safeguarded by CCAT for possible revisions and updates as national or related international regulations evolve or change.

All contractors must take special measures to mitigate height health problems, as provided in DS28 DS594, such as water to hydrate the worker according to the protocol indicated by CCAT, individual endowment per worker of compressed medical oxygen, sufficient quantity to perform their shift role. The contractor must also make available for use on demand and by the protocol of pulses of oxygenation by role of shifts, providing training and periodic medical examinations. In addition, the contractor must give employees sufficient time to adapt to high and extreme geographic altitudes (work program adaptation) and provide personal oxygen supplement equipment suitable for work at high and extreme geographic altitudes (e.g., sufficient portable oxygen devices).

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In the case of detecting alterations in the ranges of normality and adaptation as a physiological compensation measure, the contractor must inform CCAT and replace or suspend the work of said worker and evacuate him as a preventive measure.

The Contractor shall be responsible for the installation, removal, preventive and remedial maintenance, use and reinstallation of guardrails, barricades, temporary covers and similar safety devices where they are to be installed, maintained and/or thrown down for the axis of the work.

The Contractor shall not remove or remove any safety devices under the jurisdiction of another contractor, even if this is necessary for the performance of its contract, without duly informing and coordinating with the other contractor responsible for the safety device(s). In this case, the responsibility for the removal and re-installation of the safety device(s) shall be established and recorded by the contractors involved and immediately informed to CCAT so that CCAT may take the necessary measures to control the risk.

The contractor shall pay special attention to temporary electrical installations, storage and handling of chemicals and flammable products, and shall not use any product containing asbestos, lead, arsenic or formaldehyde and/or its derivatives. All substances and materials should be checked according to Chilean Standard, review annex attached to this document and use a less dangerous substitute material.

It is part of the contract, putting into practice the rules and applying all the concepts and indications of safety and/or safe practices can result in the dismissal of the offending personnel and even put an end to the contract contracted between the CCAT client and the contractor.

The contractor must consider in the management criteria of his work that the behavior of the workers in terms of their levels of intellectual and motor response (movement of the body) may be altered, therefore the supervisors will perform supervisory functions permanently. The disposition of oxygen in the air according to the hypobaria will generate mental disturbances in case of not having medical oxygen.

In the event that the contractor refuses to allow its workers to take rest breaks or sit

down from their activity as a result of general or specific discomfort, this could lead to the contractor's contract being terminated, for CCAT the integrity of the workers is the first priority.

7.2 Emergency Plan - Fires

In any workplace, it is possible to face this type of risk. To do so, the contractor must strictly follow and apply Chilean rules and regulations, as well as those set forth by CCAT.

An emergency plan must be part of the contract that the contractor will deliver as part of its economic and technical offer, which will include rescue equipment, fire control, earthquakes, floods, among others.

All workers must receive training to deal with the risks of emergencies and accidents, on the road, on site, and during the rest period in San Pedro.

The Contractor must install and maintain adequate fire extinguishing devices at the CCAT site in accordance with local Chilean codes and standards.

CCAT may carry out a field verification of all fireproof elements and internal pro- tocolos of the contractors, so that the contractor must exhibit these documents at the time the client requests them.

Fire protection measures shall include welding operations near permanent facilities, all open-flame operations, handling of liquid and gaseous fuels, and inert gas extinguishing system installations.

The contractor shall ensure that readily readable and diagrammed signage is available for reading comprehension. Each product with its proper information in view of all workers.

The contractor must not initiate or process any fire in the enclosure, e.g., that commanded wood, tires, wires, trash and other products.

The finding that these actions have been carried out on the premises shall be grounds for termination of the contract.

7.3 Poisonous or dangerous products:

The Contractor shall not use products that are and/or contain poisonous substances and/or dangerous products and materials without the correct safety measures and safety organization. Therefore, in the event that they are to be used, the contractor must submit to CCAT the manual of procedures for handling, action, transfer, storage and disposal, as well as a risk mesh associated with such products and delivered to CCAT. Each worker, even

when not working with such products, is considered potentially at risk due to being close to them. Therefore, the contractor must provide verbal and written information for the knowledge and experience of the workers.

Where possible, less dangerous subtitles should be used. A poisonous substance is defined as such by its nature, properties or state. Its use may endanger the life and health of human beings, the environment in general and flora and fauna in particular.

The contractor must comply with the regulations in force for the disposal of ligrous substances and inform CCAT in case of requiring a particular substance to perform any activity, this requirement must be delivered to a representative of CCAT for analysis and response.

7.4 Blasting or earthmoving work

Blasting work (destruction of rock by qualified explosives) will be permitted on the CCAT site only if expressly authorized in writing by CCAT and in strict compliance with all Chilean rules and regulations relating to the transport, nipulation, operation and storage of explosives. A specific protocol for blasting plans must be included in the contractor's safety management plan. The contractor must provide a risk mesh, both for the substance to be used as well as for the respective action, this mesh must be delivered and maintained with CCAT.

7.5 Personal Protection Elements (PPE)

All personal protective equipment must be certified in accordance with applicable standards and certified by the manufacturer to be used at extreme geo-graphic heights above 5500 masl by the Institute of Public Health and/or by the manufacturer of the device.

Considering that the work will be done at 5600 masl, from 3000 masl each worker, including drivers of vehicles, must carry with medical oxygen cylinders and be used in and during their work. The contractor will provide a protocol for the replacement of the cylinders and also the rest breaks for each worker depending on the activity to be performed.

7.6 Termination of Work or Work / Slaughterhouse

After completion of the work under contract, a site inspection must be carried out by CCAT. All garbage, contaminated soil, organic and inorganic waste and others, such as remains of materials, screws, nails, cigarette butts, rivets, wooden boards, bottles and the like must be removed from the premises of CCAT and disposed of in a legal manner.

7.7 Climate Observation:

It is strongly recommended that each contractor individually monitor the weather in the area, as well as any news and alerts that may be introduced through the internet, radio or television. Under alerts indicated by nearby observatories and/or emergency brigades, the contractor must carry out the actions to stop the work, locate the workers in a safe place, and ipso facto notify CCAT awaiting special instructions.

Each contractor is responsible for developing its own procedures and specific emergency response actions for emergency events, which must be included in the contractor's safety management plan. However, CCAT may at any time review such procedures and make modifications if appropriate, with technical and scientific support.

If the Contractor becomes aware of any conditions that may impact operations or safety, it shall inform the CCAT safety representative. This information must be formal and in writing, giving an account of the execution pattern of the pending works.

The Contractor shall plan all work activities on the site in a safe manner, which may require postponement or cancellation of activities already planned.

The Contractor must comply with evacuation orders issued by authorized CCAT representatives. Accordingly, the Contractor must present evacuation and/or personnel containment measures at extreme heights in the event of roadblocks, avalanches, high-speed winds, sand or rain storms, snow or hail, true weather and lightning that create danger for the population of workers on site. For the above, the contractor must have physical space to contain the group of workers, sufficient oxygen, water and food to shelter the crew until the rescue is available. There is also an emergency briefcase to cover accidental events.

7.8 Contractor Health and Safety Coordination:

In the context of its responsibilities, the Contractor shall declare under informed consent[27] all measures necessary for the protection of the safety and health of its employees and subcontractors. Taking into account the nature of the traffic, the geographical area, the altitude, environmental conditions, atmospheric pressure, partial pressure of environmental oxygen, temperature and relative humidity of the air, travel time, the Contractor shall take the following behaviors and actions to carry out the scheduling of (a) The Director-General shall submit to the General Conference at its twenty-fourth session a report on his daily activities and shall present a plan of exercise on the work of each of his workers for that purpose:

[27] Informed consent is a formal document signed by the party who reviews, reads, and consents to perform a particular activity and that the party who reads and understands the characteristics and scope of what to do or will avoid doing.
Both the contractor and each worker must sign on the environmental conditions and geographical altitude will be exposed and will limit their actions.

Assess the safety and health risk to workers. The preventive measures and work methods implemented by the Contractor must at least comply with DS28 in force as of April 2019 and attached to this document so that it has the standard and is constantly reviewed, in which the protection of workers in terms of Safety, Rest, Nutrition, fatigue and drowsiness control, Health and Environment (Occupational Safety and Health) must be integrated into all work activities and at all hierarchical levels.

Consider the capabilities of the worker in terms of the framework established in DS28 and DS594, in addition to this, have an intervention model in case there are deviations in the standards of normality of laboratory tests, once the labor contract has been initiated and at the time prior to terminating it.

The contractor must have the approval and informed consent of each job and the working conditions in the environment in which it will be carried out, explaining the impact that the extreme geographic height could cause them, and the responsibility of the regulatory use of personal protection elements, effective hours of sleep, food and any organic failure to be declared. Once the contractor has a document signed by both parties, it will be able to elaborate the planning and introduction of new technologies as a result of the choice of equipment, working conditions and the environment for the safety and health of the workers.

The contractor must report in writing and immediately to CCAT on any behavior, signs and symptoms present in each worker and the evolution of this day, these must be registered and informed to CCAT, not notifying them could be cause for termination of the contract.It is important that appropriate training can access areas where there is a serious or specific risk or hazard.

The contractor must provide written evidence of the DS28 training indicated and the exceptional safety measures considered to be work at extreme geographical heights, which are contained and detailed in the annex attached to this manual and form part of the contract

between CCAT and the Contractor.

In the event that CCAT finds any nonconformity in these details, then as a first step will be to inform in writing such finding and after 3 days from the date of notification, the repeated non-compliance will be grounds for sanction and if it is of high impact on the health of workers, may be grounds for termination of contract between CCAT and contractor.

Where several contractors share a workplace, all contractors involved must cooperate with the Safety, Health, Environment and Occupational Hygiene clauses. Contractors must coordinate their actions on SSHE matters, and must inform each other and their respective workers of the risks.

Measures relating to safety, hygiene, occupational health and the environment in the workplace should under no circumstances be passed on to workers at a financial cost to them.

The contractor must have the service of a mutual insurance company which, in the opinion of CCAT, has ad hoc personnel with knowledge of Extreme Geographic Height and control staff trained for this purpose.

Contractors must identify all their equipment on the ground with a sign containing at least the company's name, a contact person and a telephone number. Given the extreme altitude conditions, the Contractor is required to have at least one means similar or equal to a satellite communication system.

This identification must be visible and with signs according to rotation of shifts. It is necessary to have a satellite system for communications. It will be responsible for having the contact telephone numbers and respective names of those in charge of security and rescue in the sector close to its activities.

Informed consent data

Name of the person who reads and understands the document delivered by CCAT and, in turn, the contractor to each worker.

Content: Definition of the work to be performed, place, rest times, rest place, shift role.

Characteristics of the geographical altitude to 5,600 masl and of route

"I declare to have read and understood this document, I have been instructed on safety measures and mitigation of the effects caused by extreme altitude in the body, I assume responsibility for self-care and that of my team.

Signature

7.8 Contractor Health and Safety Management Plan:

A Contractor's Health and Safety Management Plan is required for all Contracted Works. This plan must cover at least the following information:

- Identification of work areas

- Personal identification of each worker to be carried throughout the work period to and from their place of rest.

- General structure of the organization

- Responsibilities and job description of each worker.

- Definition of the work, including signposting, routes, circulation, use and control of the equipment, handling and storage of material, inputs, waste removal, control and access to work areas.

- Identification of the equipment and materials to be used

- Determination of the risk by means of hazard identification and corresponding con- trol measures, by means of risk netting and containment of imminent danger, minimum health and safety requirements according to DS28 - DS594

- Management of information and communication in SSHE matters between all counter-istas.

- Emergency procedures, including evacuation

- Communication system to report accidents

- Accommodation areas, sanitary facilities, etc.

8

Security and Crime Prevention

On Capital Goods

It is defined as any action that provides the containment of theft or robbery on land, road, place of rest or other, as well as any malicious act with premeditation.

8.1 The contractor is responsible for the adequate protection of all its materials, products, devices, equipment, temporary and permanent installations, and all safety aspects of its field operations.

It must provide CCAT with a cadastre that includes the serial number of the industrial equipment, its quantity, storage location and use.

The Contractor shall have records of workers who will use any machinery and/or tools in excess of US$500.

Lost, stolen or damaged tools, materials, products, equipment systems, installations, other works or other items belonging to the Contractor shall be repaired and/or replaced by the Contractor at no cost to CCAT. For the foregoing, the Contractor shall exhibit and deliver a copy of the security policy on its company's capital assets to the principal in order to protect from misuse, theft, damage and/or loss of equipment or industrial elements. The policy shall cover such damages and losses, provided that due to these losses, CCAT delays in having the tasks scheduled for specific dates.

Damages or theft of property belonging to CCAT or third parties that are caused and/or can be attributed to the Contractor or any directly or indirectly employed person shall be repaired and/or replaced by the Contractor at no cost to CCAT.

CCAT shall take legal action for loss in the event of theft, regardless of what is pre-assigned to this paragraph and all that is indicated in this manual.

DANGEROUS WASTE CHILEAN REGULATIONS IN FORCE

Identify hazardous substances used according to NCh 382 of 2004

Classify hazardous waste according to D.S. 148/03 of the Minsal

Store them in suitable and labeled containers, according to D.S 148/03 of the Min-Salt.

Keep a record of the amount of hazardous waste generated.

Storage, transport, and final disposal must be authorized by the health service.

Carry out the hazardous waste declaration according to the hazardous waste declaration and monitoring system (SIDREP).

Applicable Legislation

D.S. 148/03 MINSAL, Sanitary regulation on hazardous waste management
D.F.L. 1/89 MINSAL, Determines matters that require express sanitary authorization.
D.S. 594/99 MINSAL, Regulation on health and environmental conditions in workplaces.

9
Vital Supplies and Sanitation

Sanitary Conditions

9.1 Water

9.1.1 Drinking Water

It is the sole responsibility of the contractor to provide drinking water to its employees at the CCAT site in accordance with the requirements indicated in Decree No. 594/1999 of the Ministry of Health.

The extreme exposure conditions of the work at geographical height, demand constant hi-dratation and therefore it is of utmost importance to have drinking water bottled, CCAT will request certification from the water supplier and redundancy as to the availability of it for consumption on demand.

9.1.2 Industrial Water

The Contractor and its subcontractors must obtain water for contracted works only from authorized sources, such as "Laguna Amarga" or others. Before obtaining water, the contractor must submit that possibility to CCAT for approval of the source of the water under consideration.

CCAT will request from the contractor all documentation that guarantees the use of industrial water and also the validation of the source before the pertinent state and public health authorities.

9.2 Temporary sanitary facilities

The Contractor may provide, relocate, maintain and remove an adequate number of temporary baths during its operations for the employment of all users, complying with all legal requirements. (Decree No. 594/1999 of the Ministry of Health and others). Toilets shall be portable of the independent type, well maintained and hidden from sight. An adequate supply of toilet paper shall always be maintained.

The contractor shall not permit the use of CCAT permanent sanitary devices (if any), unless otherwise agreed. There should be potable water for handwashing outside the toilet, and/or substances authorized by the Public Health Institute of Chile to remove dirt and bacteria from hands.

9.3 Removal of waste, garbage and rubble

All waste, debris and garbage generated by the Contractor during its operations to provide the contracted work at the different work sites shall be re- moved from the CCAT site by the Contractor under its responsibility and expense and disposed of in a legal manner, complying with all local rules and regulations.

The Contractor shall not be permitted to discharge these substances in an uncontrolled manner, including outside the premises of the CCAT.

The Contractor's removal of waste, garbage and debris shall be permanent in order to maintain a hygienic environment free of insects and rodents, thus protecting the environment and preventing accidents and contagious infectious diseases.

In the event of a dispute between contractors regarding the removal of waste, debris and rubble, CCAT may remove them and charge expenses proportionately to the contractors involved, this item must be considered in the contract and conditioned on the payment of fines for failure to take due action.

Hazardous waste (e.g. used oils, solvents, leftover paints, acids, liquids containing chlorine, fuels, contaminated soil, etc.) and other non-hazardous waste must be removed from the premises and disposed of in a legal manner in compliance with local Chilean rules and regulations. CCAT may carry out inspections of the premises used by the contractor without prior notice and generate reports that must then be signed by the Contractor as evidence of the finding, which, if repeated, may result in fines for non-compliance with the provisions of the previous paragraph and for non-compliance with current regulations, as well as for considering such territories under the concept of preservation of natural heritage.

In each case, all final disposal sites and waste disposal methods, including hazardous and non-hazardous waste, must be submitted to the prior approval of the CCAT safety representative or the CCAT authorized representative. For this purpose, CCAT will request the certification of the training received by the workers for the final disposal of the waste and its scope.

Summary of Occupational Health Regulations in Chile [28]

Estándares y Elementos de cumplimiento	MM	Objetivos de SO		
		ST	PT	OC
Art 63. DS 594. En altitud los Límites Permisibles de sustancias químicas respirables se corrigen según la presión barométrica.			PT	
DS 109-73 Las enfermedades de la altura son reconocidas como Enfermedades profesionales del trabajo.		ST		
Guía Técnica sobre Exposición Ocupacional a HIC. Los trabajadores expuestos a HIC están identificados, por permanecer más de 6 meses, y más del 30% del tiempo.	MM			OC
Los trabajadores reciben información de riesgos de exposición a HIC, Obligación de Informar, y Reglamento Interno Orden Higiene y Seguridad.		ST		OC
Existe un Programa Preventivo, PP, escrito, anual para preservar la salud en HIC, elaborado por medico/enfermeros Salud Ocupacional:		ST	PT	OC
el PP tiene Estrategias de Promoción de salud y Calidad de vida, e informa		ST		OC
el PP incorpora los riesgos de la HIC en la Matriz de Riesgos y el Sistema de Gestión de Seguridad y SO.	MM		PT	
el PP tiene medidas de prevención y mitigación de la alteración del sueño.	MM	ST		
el PP incluye información a los portadores de enfermedades crónicas y la importancia de su buen control.		ST		OC
Los trabajadores reciben una Capacitación teórico-práctica, de 3 horas, sobre control de riesgo por exposición laboral a HIC.	MM	ST	PT	
Esta Capacitación de prevención, es dictada por un Profesional de la Salud, y su contenido está de acuerdo a la Guía Técnica				OC
Los expuestos cuentan con Evaluación Preocupacional segun batería definida y listado de contraindicaciones médicas.	MM	ST		
Se procede a Evaluación Ocupacional, según batería establecida y Evaluación Médica Preventiva del Adulto, c/3 años a <40 años, c/2 años 40-55, y anual en >55		ST		OC
Los médicos que efectúan la Evaluación Preocupacional, Ocupacional y Programa de Vigilancia tienen formación en Medicina de Altura, y el Centro cumple requisitos.	MM			OC
Los trabajadores con exposición esporádica suben con Examen de Altura anual.	MM	ST	PT	
Un Programa de Vigilancia Ocupacional de la Salud es efectuado por el Organismo Administrador a todos los expuestos y mide Hemoglobina, Calidad de Sueño.	MM	ST	PT	
Un Examen Pre-egreso se efectúa al terminar la relación contractual, según el formato del Examen Ocupacional. La hemoglobinemia alterada debe ser tratada.	MM	ST		OC
El campamento sobre 3000 metros tiene Medidas de Mitigación: estándares de Habitabilidad para protección del sueño: Humidificación, Temperatura, Ruido, Oscuridad.	MM	ST		OC
Están identificados los trabajadores con apneas centrales por HIC, que requieren medidas, tipo oxigenación u otras.	MM	ST		OC
Al haber más de 50 trabajadores en faena se instala un Policlínico. La dotación de profesionales de la salud del Policlínico, y la presencia de ambulancia está ajustada a 4 criterios de complejidad.				OC
Los Profesionales de la Salud de los Policlínicos cuentan con formación en Medicina de Montaña y Salud Ocupacional.	MM			OC
Existen Protocolos de atención de las Enfermedades de la Altura, de la Aclimatación, y del control de las Enfermedades crónicas.	MM	ST		OC
Los integrantes de la Brigada de Emergencia cuentan con cursos de capacitación de Medicina de montaña, Primer auxilio, manejo de productos sanguíneos, etc.				OC
Un registro de Enfermedades Ocupacionales y Accidentes por altura es entregado c/ año por la mutualidad a la autoridad sanitaria regional.				OC
Para trabajos sobre 5.500 metros se requiere autorización de la SEREMI de Salud.				OC

ST= Salud del Trabajador; PT= Puesto de Trabajo; OC=Organización y Cultura

[28] Rev. Chile Salud Pública 2015 ; page 194 Dr. Daniel Jiménez

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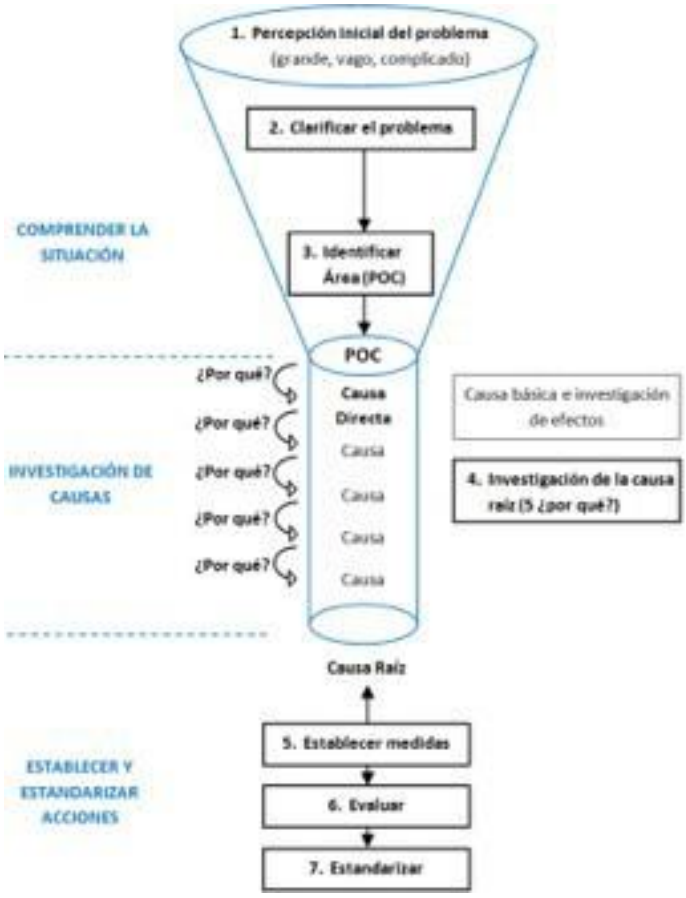
MODELO MATRIZ DE RIESGO



Exploración terreno camino	Traslado Materiales y equipos	Movimiento de tierra	Trazado construcción y montaje	Fin de faena	Indice del Riesgo	Actividad
4	4	4	4	4	Extremo = 4 Alto = 3 Medio = 2 Bajo =1	Exposición a extrema altura geográfica
4	4	4	4	4		Traslado
2	3	3	3	2		Clima
2	3	4	4	4		Fatiga

Diseño para altitud geográfica, ref. Alicia Morales para CCAT