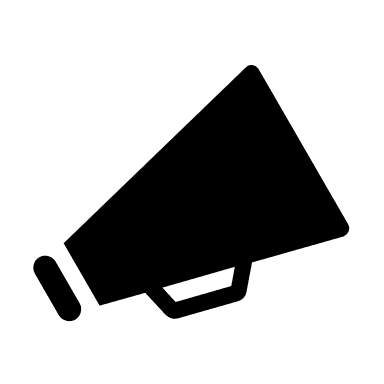
**Formulaire PARE**

# SECTION 1 – INFORMATION AND APPROVAL

 ***Filling this part is MANDATORY.***

|  |  |  |  |
| --- | --- | --- | --- |
| **PARE N° :** | COMITÉ\_SANTÉ\_SÉCURITÉ\_1 | Rév N° : |  |

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| Project : |  |  | Project Manager : |  |
|  | Operator : |  |
|  | Department : |  |
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| **Meeting** | |  |  | **YYYY-MM-DD** |  |  |
| Place : |  | | Date : |  | Time |  |
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|  | **PERSON INVOLVED** |  | **REPLACED BY** | **N/A** | **PRESENT** |  |
| **MANDATORY ATTENDANCE** |  |  |  |  |  |  |
| Project Manager |  |  |  |  |  |  |
| Person in charge (professor etc.) |  |  |  |  |  |  |
| Operator |  |  |  |  |  |  |
| **SPECIALISTS NEEDED ACCORDING TO THE TYPE OF TESTS PERFORMED** | | | | | |  |
| * Chemistry |  |  |  |  |  |  |
| * Electricity |  |  |  |  |  |  |
| * Electrotech |  |  |  |  |  |  |
| * Plumbing |  |  |  |  |  |  |
| * Mechanic |  |  |  |  |  |  |
| * Biology |  |  |  |  |  |  |
| * Other |  |  |  |  |  |  |
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| **OPTIONAL ATTENDANCE** | | | | | |  |
|  |  |  |  |  |  |  |
| SSMTE Representative |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
| Research team |  |  |  |  |  |  |
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| **PARE CLOSING APPROVAL** | |  | | | | |  | | |  | |
| Everyone involved in the manipulation participate in the PARE? | | **YES** |  | | **YYYY/MM/DD** | **NO** | | |  | |
| Were ALL the corrective measures implemented? | | **YES** |  | Date : |  | **N/A** | | |  | |
|  | | | | | | | | | | | |
| Project Manager : |  | | | | | | Date : |  | | | |
|  | Signature | | | | | |  | | |  | |
| Person in charge of the laboratory : |  | | | | | | Date : |  | | | |
|  | Signature | | | | | |  | | |  | |

# Section 2 – EXPERIMENT DESCRIPTION

*If needed, add supplementary documentation to help the reader understand the experiment's procedure.*

|  |  |  |
| --- | --- | --- |
| **Why?**  **(Purpose of the experiment)** |  | |
| **What?**  **(Experiment description)** |  | |
| **Where?**  **(Physical Location)**  *If needed, attach a plan* |  | |
| **When?**  **(tests and overall research’s duration)** |  |  |
| **Who?**  **(People involved in the experiments)** |  | |

**Experimental procedure (how)**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **REQUIRED PERSONAL PROTECTIVE EQUIPMENT** | | | | | | **REQUIRED COLLECTIVE PROTECTIVE EQUIPMENT** | | | |  |
| Gloves: |  | Type : |  | Lab coat: |  | Detector: |  | Type : |  |  |
| Safety shoes: |  | Type : |  | Face Shield: |  | Harness |  |  |  |  |
| Breathing mask : |  | Type : |  | Safety Helmet: |  | Safety shower |  |  |  |  |
| Safety goggles : |  | Type : |  |  |  | Eyewash station: |  |  |  |  |
| Specific lab coat |  | Type : |  | Personal alarm: |  | Chemical hood: |  |  |  |  |
|  |  |  |  |  |  | Biological cabinet: |  | Type : |  |  |
| Others: |  | | |  |  | Others : |  | | |  |
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*If needed, ask the person in charge of OH&S.*

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| **Step**  **N°** | **Steps’ Description** | **Potential risks** | | | | | | | | | **Control Means** | **Corrective measure number[[1]](#footnote-1)**  **(CM See page 10)** |
| **Collisions and fall of objects and people** | **Chemical risks** | **Biological risks** | **Mechanical risks** | **Electrical risks** | **Burning risks** | **Spill and projection risks** | **Industrial hygiene** | **Specific risks** |
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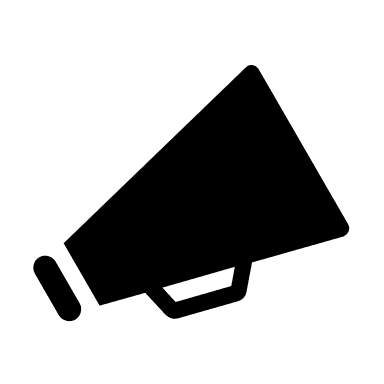
# Section 3 – POTENTIAL CHEMICAL AND BIOLOGICAL REACTIONS

## List of primary and secondary chemical and/or biological products and their expected reactions

Write a comprehensive list of all the chemical products used in the experiment and identify all the expected reactions. When in doubt or using new products, always ask a person in charge.

To consider: - Reagents, products, combustibles, glues, binders, catalysts, dryers, gases, calorific fluids, paints and coatings, cleaners, etc, etc.;

* Reaction possibility with the materials used;
* Reaction possibility in the absence or excess of a chemical product;
* Environmental interactions (air, humidity);
* Infectious materials for humans, terrestrial or aquatic animals, insects and plants.

 *Reaction examples to consider: high temperature, gas emission, energy absorption, volume or pressure increases.*

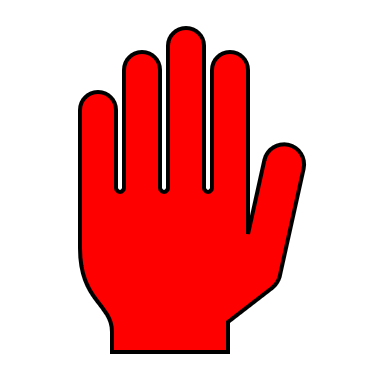
|  |  |  |
| --- | --- | --- |
| **Chemical or biological product list** | | |
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### Main operating parameters (temperature, pressure, mass, flow, size distribution, vibration, etc.)

|  |  |  |
| --- | --- | --- |
| **Parameters** | **Minimum** | **Maximum** |
| **(units)** | |
|  |  |  |
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### Possible reactions

|  |  |  |
| --- | --- | --- |
| **Descriptions** | **Negligible** | **To consider** |
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**If there are any possible hazardous reactions, fill up the following reaction analysis page.**

## Reaction analysis

| *Porte-voixIf you select* ***N/A****, continue to the next question. If you select* ***NO****, a corrective measure must be generated (see page 10).* | | | | |
| --- | --- | --- | --- | --- |
|  | **N/A** | **YES** | **NO** | **CM Number(s)** |
| **For every possible reaction to consider, were all the following risks evaluated and the necessary precautions undertaken?** |  |  |  |  |
| 1. Solid, liquid and gaseous products’ toxicity. Have you read the safety data sheet (SDS or supplier documentation)? |  |  |  |  |
| 1. Solid, liquid and gaseous products’ reactivity or explosion risks. |  |  |  |  |
| 1. Combustible sources such as reagents, products, solvents, gaseous byproducts, etc. |  |  |  |  |
| 1. Ignition sources such as engines, etc. |  |  |  |  |
| 1. Presence of residues from previous tests performed with the same equipment. |  |  |  |  |
| 1. UV, IR, X-Ray, laser, microwave and any other radiation. |  |  |  |  |
| 1. Overpressure (Vapor projections due to leaks, fermentation, etc.) |  |  |  |  |
| 1. Pressure and/or temperature variation. |  |  |  |  |
| 1. Volume expansion possibility due to reactions or changes in T or P. |  |  |  |  |
| 1. Polymerization. |  |  |  |  |
| 1. Water reactivity (humidity). |  |  |  |  |
| 1. Biological products contamination risk |  |  |  |  |
|  |  |  |  |  |
| **Have you checked if your setup is adapted for the reactions that will take place? If applicable, attach descriptions)** |  |  |  |  |
| 1. Compatibility of the setup’s construction materials towards: |  |  |  |  |
| * 1. Reagents and products. |  |  |  |  |
| * 1. Corrosion, stress and pitting corrosion, etc. |  |  |  |  |
| * 1. Gaskets. |  |  |  |  |
| * 1. Pressure and temperature. |  |  |  |  |
| 1. Process equipment and instrumentation including: |  |  |  |  |
| * 1. Relief valves, rupture disks (autoclaves, positive displacement pumps blocked lines, obstructed heat exchangers, compressors, etc.), |  |  |  |  |
| * 1. Appropriate discharge system (grounding, rupture disk). |  |  |  |  |
| * 1. Tank spilling possibility. |  |  |  |  |
| * 1. Fail-safe positioning of valve (safest open/shut positioning in an electric or compressed air shutdown). |  |  |  |  |
| * 1. Check valves to prevent material (liquid, solid or gas) flow from entering places where they should not be. |  |  |  |  |
| * 1. Pressure, temperature, level and flow gauges in all critical spots. |  |  |  |  |
| * 1. Critical value alarms (high or low pressure, flow, level, etc.). |  |  |  |  |
| * 1. Automatic, compatible and operational detectors for: |  |  |  |  |
| * + 1. Toxic substances. |  |  |  |  |
| * + 1. Combustible mixtures. |  |  |  |  |
| * + 1. Radiation |  |  |  |  |
| * + 1. Oxygen detector. |  |  |  |  |
| * + 1. Fire. |  |  |  |  |
| * 1. Automatic shutoffs if limits are exceeded. |  |  |  |  |
| * 1. Emergency stop (panic button) of : |  |  |  |  |
| * + 1. Compressed air. |  |  |  |  |
| * + 1. Steam. |  |  |  |  |
| * + 1. Cooling water. |  |  |  |  |
| * + 1. Electricity. |  |  |  |  |
| * + 1. Fuel. |  |  |  |  |
| * + 1. Leaks and spills, etc. |  |  |  |  |
| * + 1. Fire. |  |  |  |  |
| * + 1. Others. |  |  |  |  |
| * 1. Chemical compatibility and materials resistance to bleach or thermal shock (121°C, 15 psi resistance). |  |  |  |  |
| 1. Plumbing (« quick connect »). |  |  |  |  |
| 1. Appropriate identification. |  |  |  |  |
|  |  |  |  |  |
| **Were the following handling elements evaluated?** |  |  |  |  |
| 1. Ventilation (Biological safety cabinet, chemical fume hood…). |  |  |  |  |
| 1. Protective screens (splash, radiation, steam) for operators and equipment. |  |  |  |  |
| 1. Procedure that allows, prior to starting an experiment, to make sure emergency safeguard products are present in sufficient quantities (e.g.: cooling gas). |  |  |  |  |
| 1. Power outage impact (ventilation and biological safety cabinet, alarms, control system failure, burner, …). |  |  |  |  |
|  |  |  |  |  |
| **Was the following safety equipment planned?** |  |  |  |  |
| 1. Emergency shower and eyewash station. |  |  |  |  |
| 1. Appropriate fire extinguishers. |  |  |  |  |
| 1. Self-contained breathing apparatus |  |  |  |  |
| 1. Antidotes or neutralization kits |  |  |  |  |
| 1. Biological safety cabinet : |  |  |  |  |
| * 1. Disinfectants that are appropriate for the biological products. |  |  |  |  |
| * 1. Concentration and lifetime of cleaning products. |  |  |  |  |
| 1. Fire alarms. |  |  |  |  |
|  |  |  |  |  |

# Section 4 – PHYSICAL RISKS

| *Porte-voixIf you select* ***N/A****, continue to the next question. If you select* ***NO****, a corrective measure must be generated (see page 10).* | | | | |
| --- | --- | --- | --- | --- |
|  | **N/A** | **YES** | **NO** | **CM Number(s)** |
| **For each manipulation, were the following risks evaluated and the necessary precautions taken?** |  |  |  |  |
| 1. Needle sting. |  |  |  |  |
| 1. Sharp material cut. |  |  |  |  |
| 1. Wheel and gear-related risks. |  |  |  |  |
| 1. Every lentivirus manipulation. |  |  |  |  |
| 1. Noises. |  |  |  |  |
| 1. Cell or micro-organism pathogenicity assessment. |  |  |  |  |
| 1. Burns caused by free flames or high temperature devices. |  |  |  |  |
| 1. Chemical burns. |  |  |  |  |
| 1. Frostbite and cryogen burns (liquid nitrogen, dry ice) |  |  |  |  |
| 1. Heavy weight lifting injuries. |  |  |  |  |
| 1. Wrong posture (work ergonomics). |  |  |  |  |
| 1. Aerosol or dust-generating manipulations. |  |  |  |  |
| 1. Nanoparticle manipulation. |  |  |  |  |
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# Section 5 – ENVIRONMENTAL RISKS

## Waste identification and elimination

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Waste  Chemical / Biological | State | | | Amount | Composition | Toxicity | | Waste control methods[[2]](#footnote-2) | MC  Number(s) | Elimination | | | |
| **Solid** | **Liquid** | **Gas** | **Yes** | **No** | **Bleach** | **Autoclave** | **Incineration** | **Chemical waste** |
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| Porte-voix*If you select* ***N/A****, continue to the next question. If you select* ***NO****, a corrective measure must be generated (see page 10).* | | | | |
| --- | --- | --- | --- | --- |
|  | **N/A** | **YES** | **NO** | **CM Number(s)** |
| **For every test, are the following environmental considerations respected?** |  |  |  |  |
| 1. Law and regulations: |  |  |  |  |
| * 1. Petroleum Products Regulation. |  |  |  |  |
| * 1. Cell uses ethical committee. |  |  |  |  |
| * 1. Transportation of dangerous goods (TDG). |  |  |  |  |
| * 1. Regulation respecting the quality of the atmosphere. |  |  |  |  |
| * 1. Water sanitation and sewage. |  |  |  |  |
| * 1. WHMIS |  |  |  |  |
| * 1. Other regulations (specify). |  |  |  |  |
|  |  |  |  |  |
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|  |  |  |  |  |
| 1. Compatibility between manipulations (cell culture, DNA replication, spores, etc.) |  |  |  |  |
| 1. Environmental impact of a breakage/outage. |  |  |  |  |
| 1. Response plan in case of environmental spill: |  |  |  |  |
| * 1. Accidental spill. |  |  |  |  |
| * 1. Ground contamination. |  |  |  |  |
| * 1. Atmospheric release |  |  |  |  |
| * 1. Sewage contamination. |  |  |  |  |
| * 1. Centrifuge accident (aerosol). |  |  |  |  |
| * 1. Hazardous waste |  |  |  |  |
| * 1. Demolition materials. |  |  |  |  |
| * 1. External noise pollution. |  |  |  |  |
| * 1. Products toxicity. |  |  |  |  |
| * 1. Biological liquid spill of low or high volume. |  |  |  |  |
|  |  |  |  |  |

# Corrective measures’ report (CM) from PARE

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| --- | --- | --- | --- |
| Project manager: |  |  |  |

| **CM number** | **Enviro** | **EH&S** | **Risk to control or eliminate** | **Corrective measure** | **Person in charge** | **Due date**  **YYYY-MM-DD** | **Date performed**  **YYYY-MM-DD** |
| --- | --- | --- | --- | --- | --- | --- | --- |
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1. The corrective measure (CM) number is a number given to a manipulation whose risk must be decreased. [↑](#footnote-ref-1)
2. For all waste generated outside of the UdeS, ask for the proper waste management protocol from the Environment/EH&S person in charge of the site. [↑](#footnote-ref-2)