**Formulaire PARE**

# SECTION 1 – INFORMATION AND APPROVAL

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

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| **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** |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

### 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

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| WasteChemical / Biological | State | Amount | Composition | Toxicity | Waste control methods[[2]](#footnote-2) | MCNumber(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).
 |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| 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.
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# 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)