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New Equipment Installation, Equipment Modification, or Process Change Procedure

REVISION

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1. INTRODUCTION

- 1.1 This procedure is required for use at the Albany Nanotech Complex (ANC) to assist in installing new or relocated equipment and managing significant changes in process chemistry or physical changes made to tools and/or equipment previously installed and commissioned under this and the **EHS 00017** - Equipment Commissioning Procedure.

2. PURPOSE

- 2.1 To ensure that equipment, tools, and/or significant changes in process chemistry or equipment configuration comply with applicable codes, regulations, and industry standards.
- 2.2 The New Equipment Installation or Equipment Modification or Process Change Checklist, **EHS-00016-F1**, provides a record of each equipment installation and/or significant equipment modification or process chemistry change and the associated review process for Environmental Health and Safety (EHS) and Facility Engineering Group (FEG).

3. SCOPE

- 3.1 This procedure specifies the requirements for the installation of equipment and for the addition of significant new or modified chemistries or a physical modification of existing equipment within the facility and is intended to identify the major EHS and regulatory compliance issues for such activities. The **EHS-00016-F1** Checklist must be completed for the installation of new or relocated equipment and for changes or modification that shall be made to tools and equipment previously installed that meet at least one of the following criteria:
- Uses Hazardous Production Materials (HPMs).
 - Uses Non-HPM solids, liquids, or gases other than CDA and water.
 - Uses or contains ionizing radiation, non-ionizing radiation, or Lasers.
 - Has air pollution abatement equipment installed on it.
 - Generates wastewater requiring treatment.
 - Creates hazardous waste.
 - Has hard-wired or hard-plumbed facility services.
- 3.2 If this installation and/or modification only involves the addition or removal of any toxic gas monitoring system (TGMS) monitoring points, the applicant must follow requirements outlined in TGMS Operations & Maintenance (O&M) Procedure **EHS-00031**.

- 3.3 This procedure does not apply to facility-only modifications. Those proposing to make facility modifications need to comply with the Facility Modification or Alteration Safety Sign-off Process (**EHS-00038**).

4. DEFINITIONS

The definitions included in the **EHS-00017** - Equipment Commissioning Procedure apply to this procedure, as well as the following:

- 4.1 **Changes in process chemistry** - A change in the type of or hazard level of chemicals or gases utilized in an existing equipment that results or may result in a need to increase the level of ambient air monitoring or a change in the method of air pollution control. (An example would be the use of an HPM chemical/gas in a tool which previously only utilized inert gases and had no air pollution control device installed or a tool that used a material at a concentration of 5% now needing to use a concentration of 25%).
- 4.2 **Significant increases in previously approved HPM use** – An increase in use of HPM gases or chemicals in excess of 20% above previously approved and permitted levels would be considered significant. This would require review of the corresponding air pollution control equipment capacity, as well as the exhaust air flow capacity.
- 4.3 **Significant changes in process equipment** – A change in equipment configuration (including addition of process modules beyond what was initially approved), increased input or output potential (resulting in increased power consumption or exhaust flow), addition of an air pollution control device due to a change in process chemistry (resulting in increased energy consumption, exhaust air flow, water utilization, and industrial drain connections), or other physical changes in operation.

5. ASSOCIATED DOCUMENTS

- 5.1 **EHS-00016-F1** – New Equipment Installation or Equipment Modification or Process Change Checklist
- 5.2 **EHS-00017-F1** – Equipment Commissioning Inspection Record
- 5.3 **EHS-00066-F2** – Radiation Device Inventory
- 5.4 **EHS-00066-F3** – Radiation Survey Sheet
- 5.5 **EHS-00066-F4** – Non-Ionizing Radiation Source Equipment Inventory
- 5.6 **EHS-00066-F5** – Laser Inventory Form
- 5.7 **EHS-00066-F6** – Radiation Sealed Source Inventory

5.8 **EHS-00066-F7** – Non-Ionizing Radiation Survey Sheet

6. RESPONSIBILITIES

6.1 The tenant, equipment engineer (EE), or **equipment owner** (EO) requesting permission to install or relocate equipment and/or modify or add new chemicals or gases to existing equipment on the ANC must complete the EHS-00016-F1. The checklist may be completed electronically (SiView or electronic PDF) or by paper hard copy.

6.2 The person completing **EHS-00016-F1** is responsible to ensure all questions have been answered completely and to take additional actions based on the checklist instructions (i.e., completion of additional forms, attaching additional information as requested). The designated NY CREATES personnel will review the checklist and required documentation. When approval has been granted to begin the installation and/or modification or process change NY CREATES EHS will inform the applicant.

6.3 The groups to be represented on the Equipment Installation Approval Sign-off are as follows:

- EO
- EE
- EO or EE Supervisor or Manager
- Process Engineer's Supervisor or Manager
- NY CREATES System Owner: Bulk Gases/Chemicals (chemical/gas change)
- NY CREATES Wastewater Engineer (chemicals go to drains or there are changes to the drain connections)
- NY CREATES Tool Hook-up Project Manager (for any change other than a chemical add)
- NY CREATES EHS Environmental Engineer
- NY CREATES EHS Safety Equipment Engineer

Approval signatures indicate that each individual has reviewed **EHS-00016-F1**.

7. PROCEDURE

- 7.1 This procedure guides the involved EO and assigned personnel through a review of the equipment installation and/or proposed installation design or chemical change prior to the change and allows for periodic reviews prior to and during the installation/change. These reviews provide an opportunity for involved personnel to verify that required elements are in place prior to the start of the new equipment installation or equipment modification or process change and prior to starting or re-starting the equipment.
- 7.2 The **EHS-00016-F1** Checklist informs the applicable groups of the proposed installation or change. This allows for aid in identifying deficiencies in the design pre-installation phase.
- 7.3 The **EHS-00016-F1** must be approved by NY CREATES EHS prior to any changes taking place. NY CREATES EHS will inform the applicant when the **EHS-00016-F1** Checklist is approved and will assign a Safety Equipment Engineer to oversee the installation or change.
- 7.4 **General Information**
- 7.4.1 The first page of the **EHS-00016-F1** Checklist requires General Information. This information is intended to provide a *quick* reference to the information regarding the equipment being installed:
- 7.5 **General Safety**
- 7.5.1 Documentation is required to ensure that the equipment has been evaluated to operate in a safe manner. In general, the equipment shall either be listed or labeled by a nationally recognized testing laboratory (NRTL) or a SEMI S2 review has been performed by a third party. If neither of these has been done for the equipment, a meeting with a NY CREATES Safety Equipment Engineer must be scheduled to determine if the equipment will be allowed to be installed.
- 7.5.2 Peripheral equipment must also have either SEMI S2 review or NRTL label or listing. Any installations, modifications, or process changes that result in additions or changes to TGMS monitoring will require that a new TGMS matrix is submitted for approval.

7.6 Equipment Design Requirements

7.6.1 Equipment must meet all relevant federal (e.g., OSHA Title 29 CFR Part 1910), state (e.g., building, fire codes), and local codes and regulations.

7.6.1.1 One of the following methods shall be used to meet site acceptance:

- 1) Semiconductor equipment and equipment components must be compliant with applicable SEMI standards (e.g., SEMI S2, S8, S14, S22) and proven with documentation. This includes but is not limited to VMBs, GIB assemblies, gas cabinets, chemical distribution units, safety interlocks, and emergency shutdown capability.

NOTE: A complete copy of the SEMI S2 and S8 report of the equipment's compliance and or non-compliance with the applicable SEMI standards must be submitted to EHS. Any non-compliance issues must be addressed and closed in writing by the third party providing the report prior to the equipment being turned on.

- 2) The equipment is accepted, NRTL-certified, listed, labeled, or otherwise determined to be safe.
- 3) With respect to an installation or equipment of a kind that no NRTL accepts, certifies, lists, labels, or determines to be safe, it must be inspected or tested by another Federal agency, or by a State, municipal, or other local authority responsible for enforcing occupational safety provisions of the National Electrical Code (NEC), and found in compliance with the provisions of the NEC as applied in the OSHA Subpart S.
- 4) For custom-made equipment or related installations that are designed, fabricated for, and intended for use by a particular customer, it must be determined to be safe for its intended use by its manufacturer on the basis of test data which the employer keeps and makes available for inspection to OSHA and OSHA-authorized representatives.

7.6.2 **NOTE:** The 'CE mark' is not accepted by OSHA. Products that bear only non-NRTL certification marks (including the CE mark) do not meet any OSHA standard requiring NRTL approval of the product.

7.7 Radiation

7.7.1 This section is intended to inform the Radiation Safety Officer (RSO) or Laser Safety Officer (LSO) of any equipment that will be installed or modified that contains ionizing radiation producing devices, non-ionizing radiation producing devices, or lasers that are Class 2, 3, or 4.

- 7.7.2 If any equipment that produces ionizing radiation (including X-ray equipment and electron microscopes) is installed or modified, an EHS-00066-F2 must be submitted to the RSO prior to **EHS-00017-F1** approval.
- 7.7.3 If any equipment that produces non-ionizing radiation (including RF, microwave, magnetic, UV, IR) is installed or modified, an EHS-00066-F4 must be submitted to the RSO prior to **EHS-00017-F1** approval.
- 7.7.4 If any equipment that contains Class 2, 3, or 4 lasers is installed or the lasers are modified or replaced, an **EHS-00066-F5** must be submitted to the LSO prior to **EHS-00017-F1** approval. All equipment installed in the cleanrooms and the subfabs must be classified as no higher than a Class 1 laser product.

7.8 Facility Services

- 7.8.1 This section is intended to inform the Tool Hook-up Project Manager of any equipment that will be installed or modified that requires new or upgraded facility services. It states [what facility systems will be utilized or impacted](#). It states [which](#) exhaust systems will be utilized. If the equipment installation or modification does require new or upgraded facility services, then a P&ID will be required to be issued and the tool commissioning process using the **EHS-00017-F1** will be required.

7.9 Chemicals and/or Gases

- 7.9.1 This section is intended to inform EHS, the NY CREATES System Owner: Bulk Gases/Chemicals, and the NY CREATES Wastewater Engineer of any new chemicals/gases to be utilized in the equipment. It will also inform these individuals of the effect of the use of those chemicals/gases on bulk system demands, wastewater, and waste chemical disposal. Addition of or changes to chemicals/gases may require the approval of the NY CREATES System Owner of the Bulk Gases/Chemicals and the NY CREATES Wastewater Engineer. Changes to bulk supplied chemicals or gases will require an **EHS-00017-F1** to be completed and approved and may require a new P&ID and a new TGMS matrix to be approved.
- 7.9.2 For additions or significant changes to chemicals or gases to a piece of equipment, EHS requires submission of the chemical/gas to HAZMIN. The chemical/gas will not be approved until the **EHS-00016-F1** has been approved, a SEMI S2 document of the tool has been submitted to EHS for SEMI equipment, and a request has been placed into HAZMIN.

7.10 **Signature Blocks**

- 7.10.1 After the form has been completed, obtain the Approval Signatures as required prior to submitting the form to EHS. Contact the EHS Safety Equipment Engineer if you are not sure if a signature is required. After NY CREATES EHS has approved the EHS-00016-F1 you will be notified that the form has been approved. If the EHS-00016 is only for chemical or gas change, you will be notified by the HAZMIN system that it has been approved.
- 7.10.2 The **EHS-00016-F1** Checklist serves as documentation of the individual equipment installation project and will be archived for future reference by NY CREATES EHS.