

MEDICAL UNIVERSITY OF SOUTH CAROLINA (MUSC)
WORK PRACTICE POLICY FOR PERSONNEL
DEALING WITH CYTOTOXIC (ANTINEOPLASTIC) DRUGS

Revised: 9/2007

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Medical University of South Carolina
Chemotherapy Administration
C-88

Definitions:

Chemotherapy: Drug therapy that may be genotoxic, oncogenic, mutagenic, teratogenic or otherwise hazardous.

Policy:

To ensure safe administration of chemotherapy medications:

A. A registered nurse (RN) who administers chemotherapy must complete the following requirements:

1. Attend a Clinical Services chemotherapy administration course.
2. Successfully pass the course exam with a score of 85 or higher.
3. Perform two chemotherapy administration demonstrations, including one IV vesicant administration.

Note: An RN may be allowed to sit for the exam without completing MUHA chemotherapy course.

B. A registry of all RN staff who are competent to administer chemotherapy must be maintained by the unit manager.

C. There are several studies which have associated exposure to chemotherapy with long-term effects, such as, skin rashes, possibly leukemia or other cancers, and adverse reproductive outcomes (including infertility, spontaneous abortions, and congenital malformations). NIOSH recommends, at a minimum, routine medical surveillance by a personal physician for employees with potential cytotoxic chemotherapy exposure through preparation, administration, waste disposal, or storage. All employees who have an acute exposure to a cytotoxic chemotherapy drug must be seen by employee health services.

D. Topical chemotherapy, oral chemotherapy, and other hazardous medications can be administered by RNs who have reviewed the Medical Center policies and procedures relative to administration and safe handling.

E. Adult inpatients, not on the Oncology service, who have orders to receive various forms of chemotherapy, are admitted/transferred to 10 East or 8 West.

1. If a bed is unavailable on these units, the patient will be admitted to the adjacent units, 10 West or 8 East.
2. Pediatric patients are admitted to 7B.

3. Respiratory isolation patients requiring chemotherapy must be assigned to a negative pressure room.
 - a. If a negative pressure room is not available on 10 East, arrangements will be made by the nurse managers and/or hospital service coordinator for a chemotherapy certified nurse to administer the chemotherapy medications.
 - b. Pediatric patients requiring a negative pressure room will be admitted to 7A and arrangements will be made by the nurse manager and/or hospital service coordinator for a chemotherapy certified nurse to administer the chemotherapy medications.
4. Critical care patients must remain in the ICU during chemotherapy administration.
 - a. Arrangements will be made by the nurse manager and/or hospital service coordinator for a chemotherapy certified nurse to administer the chemotherapy medications.

- F. Written informed consent must be obtained by the physician prior to administration of a course (first cycle) of chemotherapy.
1. The consent will be available to healthcare staff as hard copy in the medical record or on the electronic medical record.

[See: Medical Center Policy & Procedure Manual, Policy C-2, Informed Consent/Refusal (<http://www.musc.edu/medcenter/policy/Med/C02.pdf>)]

- G. A focused history and physical exam will be performed and documented by a physician or nurse practitioner prior to chemotherapy administration.

Required inclusions are:

- a. Pertinent past medical history
- b. Systems review including height and weight
- c. Allergies
- d. Medications
- e. Cancer diagnosis
- f. Cancer treatment
- g. Toxicity to cancer treatment
- h. Complications of cancer treatment
- i. Performance status

- H. Labs and diagnostics specific for chemotherapy drugs and/or protocol must be obtained and reviewed prior to chemotherapy administration.
1. Labs NOT within acceptable parameters must be communicated to the ordering physician, or his certified designee.
 2. Orders to withhold drug or make dose modifications must be written by the attending physician or fellow.

- I. Verbal orders must NOT be accepted for any chemotherapy order including oral and/or topical chemotherapy and chemoprotectants. Chemotherapy prescribing guidelines can be found at: <http://www.musc.edu/pharmacyservices/medusepol/medusepol.html>
- J. Chemotherapy orders, including orders for oral and topical agents and chemoprotectants written by an intern or resident, must be signed by an attending physician prior to administration of the chemotherapy medication.

Chemotherapy prescribing guidelines can be found at:

<http://www.musc.edu/pharmacyservices/medusepol/medusepol.html>

K. Routes of administration

1. RN's may administer chemotherapy via the following routes: intravenous (IV), intramuscular (IM), subcutaneous (SC), topical, and oral.
2. RN's may NOT administer intrathecal, intraommmaya, intravesical, or intraperitoneal chemotherapy.
Note: No other medications are to be at the bedside during intrathecal/intraommmaya administration of chemotherapy.
3. Do NOT crush tablets or open capsules.
4. If a vesicant is to be administered peripherally:
 - a. It must be administered IV push through the side port or via stopcock and a free flowing IV.
 - b. It cannot be infused as a mini-bag infusion or a continuous infusion into a peripheral vein.
 - c. The patient must have constant observation and monitoring by the RN.
 - d. A blood return must be assessed prior to, during and after the administration.

Note: For those medications that are not considered a vesicant but cause prolonged patient discomfort at the infusion site, it is strongly recommended that a central line be placed.

5. If a vesicant is to be administered through a central line it may be administered IV push through the side port or via stopcock and a free flowing IV, mini-bag infusion or continuous infusion controlled by an IV pump.
6. Adult patients receiving IV chemotherapy must have their peripheral site changed at least every 72 hours.

7. A physician's order is required if the site cannot be placed at the most distal portion of a vein or must be started in the hand or a bony prominence.

L. Determination of Drug Dose

1. All doses for adults and children must be calculated and verified according to milligram per kilogram (mg/kg) of body weight or milligrams per meter squared (mg/m²) of body surface area (BSA).
2. BSA must be calculated using a BSA calculator, nomogram scale or by using the following equation:

$$BSA = \sqrt{\frac{\text{height in inches} \times \text{weight in pounds}}{3131}} \quad \text{OR} = \quad \sqrt{\frac{\text{height in cm} \times \text{weight in kg}}{3600}}$$

3. Intrathecal (IT) or intraommay therapy dosing is based on treatment protocol.
4. The *Calvert formula* may be used to determine carboplatin dosing:
 Adult patients: Dose **in mg = AUC (Area Under the Curve) x (GFR + 25)**.
 Pediatric patients: Dose **in mg = AUC x [GFR + (0.36 x body weight (kg))]**.

AUC dose calculator is available online at

http://hcc.musc.edu/hemonc/carboplatin_dose_calculator.htm

5. The *Jellife* Equation must be used to estimate GFR for gynecologic oncology patients. All other oncology disciplines use the *Cockcroft-Gault* Equation to estimate GFR. **GFR should not exceed physiologic maximum, 120 ml/min.**

Procedure:

A. Medication Administration by the RN

1. Prior to Administration
 - a. Review chemotherapeutic agent drug information and
 - b. Ensure date of last chemotherapy course and regimen are documented on order sheet.
 - c. Verify that lab values are within acceptable parameters.
 - d. Check allergy history.
 - e. Verify consent for chemotherapy.
 - f. Verify drug order to determine correct dose, drug, patient, route and time.
 - 1) Two licensed practitioners (RN, MD, Pharmacist) will independently verify calculations to prevent medication errors.
 - 2) One RN verifying calculations will administer drug.
 - 3) Both licensed practitioners verifying calculations will sign MAR.

- g. Have medications available to manage severe side effects, e.g., extravasation or anaphylaxis.
- h. Check pharmacy label for drug filtration requirements.
- i. Assess patient's understanding of cancer and chemotherapy treatment plan prior to administration of chemotherapy.
- j. Review chemotherapy schedule, expected side effects, and self-care preventative strategies with patient and caregivers.
 - 1) Provide written information: NCI booklets, MUSC chemotherapy and cancer patient education materials as appropriate.
- k. Document patient education on the 24-Hour Patient Record.
- l. Document Chemotherapy side effects on Interdisciplinary Plan of Care (POC).
 - 1) Record desired outcomes and appropriate interventions.
 - 2) Provide copy of self-care instructions, including follow up labs, appointments and important phone numbers at time of discharge.
- m. Check patient's identification band against drug label for patient's name, date of birth and medical record number with another chemotherapy certified RN/pharmacist/physician.
- n. Prime IV tubing with 0.9% NaCl or other compatible IV solution in preparation for spiking IV chemotherapy bag.
- o. Assemble and don appropriate protective equipment.

**[See: Medical Center Policy & Procedure Manual, Policy C-88A, Handling of Chemotherapy and Cytotoxic Drugs
(<http://www.musc.edu/medcenter/policy/Med/C88A.pdf>)]**

- p. Assess the type of IV access and site.
- q. Assess the patency of the venous access route by:
 - 1) flushing with 0.9% NaCl to observe for any signs of infiltration and,
 - 2) aspirating for a blood return prior to administration of the chemotherapy.
 - a) A peripheral IV must have a blood return.
 - b) If a central line does not have a blood return:
 - (1) confirm line placement through x-ray, and
 - (2) obtain physician order to use line for administration.

[See: Oncology Nursing Society Guidelines and APON Guidelines for site assessment and blood return check parameters]

- r. Flush between drugs. Assure compatibility with concurrent fluids or medications.
- s. Separate tubing is required for each concurrent bag of chemotherapy, even when the same drug is being hung.
- t. All sharps must be disposed of in a sharps container labeled chemotherapy or cytotoxic drugs.
- u. Monitor for side effects based on chemotherapy drug profile.
- v. Document administration on Medication Administration Record (MAR) with co-signature of person verifying medication.

2. Following Administration
 - a. Document blood return and any adverse effects.
 - b. Dispose of all materials in designated containers.

**[See: Medical Center Policy & Procedure Manual, Policy C-88A, Handling of Chemotherapy and Cytotoxic Drugs
(<http://www.musc.edu/medcenter/policy/Med/C02.pdf>)]**

B. Managing Drug Administration Complications

1. Extravasation

Refer to Clinical Protocol: Extravasation Protocol for Peripheral Administration of IV Push Vesicant Drugs.

2. Hypersensitivity

Refer to Clinical Protocol: Local and Generalized Hypersensitivity Reactions to Chemotherapy and Biotherapy.

C. Performance Improvement Monitoring

1. Chemotherapy is a high alert medication that requires an independent double check by two licensed practitioners authorized to administer medications. An independent double check requires verification of the drug, dose concentration, rate settings, patient and line connections. These double checks are performed at the initiation and replenishment of any chemotherapeutic agent.
2. High alert medications require documentation by two licensed professionals on the MAR.
3. Chemotherapy doses are routinely monitored as part of performance improvement goals set forth by Medication Safety Team.

Appendices:

1. Extravasation Protocol
2. Hypersensitivity Protocol

Appendix 1: Extravasation Protocol

ENDORSED BY:
Attending Oncologist
Clinical Pharmacist
Advance Practice Nurse
CLINICAL PROTOCOL

TITLE: Extravasation Protocol for Peripheral Administration of IV-Push Vesicant Drugs.

PURPOSE: To outline immediate treatment of extravasation of vesicant drugs.

POPULATION SERVICED: Patients receiving vesicant chemotherapy.

ASSESSMENT:

Monitor the IV site of any patient receiving a vesicant drug (Table I) throughout the infusion for erythema, edema, change in sensation, pain, burning, stinging, or inability to obtain a blood return every 2 to 3 mL (*or every 5 minutes*) AND as clinically indicated.

Table I
Vesicant Potential of Chemotherapy

Vesicant	Irritant	Non-Vesicant²
Dactinomycin	Carmustine	Asparaginase
Daunorubicin	Cisplatin*	Bleomycin
Doxorubicin	Dacarbazine	Cyclophosphamide
Idarubicin	Doxorubicin, Liposomal	Cytarabine
Mechlorethamine	Etoposide	Interferons
Mitomycin C	Fluorouracil	Interleukin-2
Vinblastine	Ifosfamide	Methotrexate
Vincristine	Streptozocin	Thiotepa

Weak Vesicants¹

Docetaxel
Mitoxantrone
Paclitaxel
Vinorelbine

¹There have been reports of these agents causing tissue necrosis; true classification may be “weak vesicant”.

²Any agent extravasated in high enough concentration may be an irritant.

Note: For those medications that are not considered a vesicant but cause prolonged patient discomfort at the infusion site, it is strongly recommended that a central line be placed.

SEQUENCE OF INTERVENTIONS:

1. If a physician’s order to initiate the protocol is not included in pre-printed admission orders or has not been written by the physician prior to initiating the protocol, write **verbal order** to “Initiate Extravasation Protocol” Include the date and time of the order and the signature of the RN documenting the order. The physician will need to co-sign the order within 24 hours.
2. Extravasation Protocol” Include the date and time of the order and the signature of the RN documenting the order. The physician will need to co-sign the order within 24 hours.
3. With ANY sign of vesicant chemotherapy extravasation, **stop the infusion**.

4. Leave needle in place and withdraw as much of the vesicant as possible.
5. Avoid applying direct manual pressure to suspected extravasation site.
6. Notify the physician on service or his/her designee of the suspected extravasation.
7. **Administer antidote as ordered.** (if applicable) per Table II. (The preferred method is to inject the antidote through the infiltrated IV line. If this is not possible, then the antidote should be given subcutaneously around the area of extravasation.)
8. Remove the administration needle after confirming with the physician or his/her designee that no more antidote is to be given.
9. If the extravasation occurs in an extremity, elevate the affected limb for 48 hours.

REPORTABLE CONDITIONS/Event:

Notify appropriate physician on service or his/her designee of extravasation of any vesicant chemotherapeutic agent, as well as any interventions made.

DOCUMENTATION:

Document the following in the 24-hour Nursing Record and Patient Education Record:

1. Color, size of lesion, patient's complaint of pain, estimated amount of drug infiltrated, time nursing intervention initiated, time physician notified, and exact interventions instituted (Including antidotes given).
2. Follow-up instructions given to patient, including notification to nurse or physician if any changes are noted at the extravasation site (e.g., increased pain, swelling, numbness).
3. Document assessment of extravasation site every 8 hours. Include presence of edema, erythema, stinging, burning, pain, or fluid leakage at insertion site.

**Table II
Antidotes for Extravasations**

Vesicant	Antidote Dosing
Mechlorethamine Cisplatin (large volumes)	Administer sodium thiosulfate solution: -Mix 4 mL 10% sodium thiosulfate solution with 6 mL sterile water -Inject 2 mL into IV for each 1 mg extravasated (mechlorethamine). -Inject 2 mL into IV for each 100 mg extravasated (cisplatin). -Apply cold compresses every 6 hours for 20 minutes at a time.
<u>Vinca Alkaloids:</u> Vinblastine Vincristine Vinorelbine	-Apply warm compresses every 6 hours for 20 minutes at a time.
<u>Anthracyclines¹</u> Daunorubicin	-50% DMSO is applied topically to twice the affected area every 6 hours x7-14 days, depending on the extent and severity of the extravasation.
Doxorubicin Idarubicin Mitoxantrone	-Apply cold compresses every 6 hours for 20 minutes at a time
Taxanes: Docetaxel Paclitaxel	-Apply cold compresses every 6 hours for 20 minutes at a time.

1Topical dimethylsulfoxide (DMSO) may be applied for anthracycline extravasations.

References:

- (1) Olver IN, Aisner J, Hament A, et al. A prospective study of topical dimethyl sulfoxide for treating anthracycline extravasation. *J Clin Oncol* 1988;6:1732-5.
- (2) Bertelli G, Gozza A, Forno GB, et al. Topical dimethylsulfoxide for the prevention of soft tissue injury after extravasation of vesicant cytotoxic drugs: A prospective clinical study. *J Clin Oncol* 1995;13:2851-5.

Appendix 2: Hypersensitivity Protocol

ENDORSED BY:
Attending Oncologist
Clinical Pharmacist
Advance Practice Nurse
CLINICAL PROTOCOL

TITLE: Protocol for Management of Hypersensitivity Reactions to Biotherapeutic and Chemotherapeutic Drugs

PURPOSE: To outline immediate treatment of hypersensitivity reactions.

POPULATION SERVICED: Patients receiving chemotherapy or biotherapy.

A. ASSESSMENT

Monitor all patients receiving chemotherapy for localized hypersensitivity, flare and anaphylaxis. Risk factors for reactions include 1) drugs known to cause reactions (Table 1); 2) drug allergies; 3) no prophylactic medications administered; and 4) exposure to metals.

Review patient's allergy history, obtain baseline vital signs and assess mental status prior to administration.

A scratch test, intradermal skin test or IV test dose may be administered to any patient at high risk for hypersensitivity reaction. Observe patient for one hour. If no signs of local or systemic reactions, proceed with ordered chemotherapy dose.

Table 1
Risk of Chemotherapy/Biotherapy Hypersensitivity

High Risk	Moderate Risk	Low Risk	Rarely Reported
Asparaginase #	Bacillus Calmette Guerin (BCG)	Carmustine	Busulfan
IV Immune Globulin (IVIG)	Bleomycin	Daunorubicin	Cytarabine
Lymphocyte Immune Globulin (ATG)	Carboplatin #	Doxorubicin	Cyclophosphamide
Monoclonal Antibodies* (e.g., Rituximab, Trastuzumab)	Cisplatin #	Gemcitabine	Chlorambucil
	Cyclosporine	Idarubicin	Dacarbazine
	Docetaxel	Interferons	Fluorouracil
	Etoposide	Irinotecan	Ifosfamide
Paclitaxel*	Teniposide	Melphalan	Mitoxantrone
		Methotrexate	Vincristine
		Procarbazine	Vinblastine

*Hypersensitivity reactions more common with first dose.

#Hypersensitivity reactions more common after several doses.

B. Management

Implement steps to prevent/minimize hypersensitivity reactions: 1) administer prophylactic medications as ordered; 2) ensure that emergency equipment and medications are readily available; 3) instruct patient to report hypersensitivity symptoms.

1. Management of Localized Hypersensitivity

- a. Observe and evaluate symptoms: urticaria; localized or generalized itching, wheals and localized erythema.
- b. Stop infusion.
- c. Administer medications: diphenhydramine, corticosteroids per MD order.
- d. Monitor vital signs every 15 minutes for 1 hour or as patient condition requires.
- e. Resume medication when symptoms resolved and per MD orders.

2. Management of Flare Reactions

- a. Observe and evaluate symptoms: blotches or streaks along vein, urticaria.
- b. If flare occurs, stop the infusion and flush with 0.9% NaCl and observe for resolution (usually about 30 minutes).
- c. If resolution does not occur, obtain physician order to administer hydrocortisone: Adults 25-50 mg IV x 1, Pediatrics per physician order; followed by 0.9% NaCl flush.
- d. Once flare reaction resolves, resume infusion per MD orders at slower rate.

3. Management of Anaphylaxis

- a. Observe and evaluate for symptoms: Urticaria, localized or generalized itching, shortness of breath, wheezing, agitation, anxiety, periorbital edema, lightheadedness, dizziness, tightness in chest, abdominal cramping, nausea, chills, hypotension (usually occurs within 15 minutes of administration).
- b. Stop chemotherapy immediately.
- c. Stay with patient, request another staff member notify physician.
- d. Maintain IV line with normal saline.
- e. Place patient in supine position.
- f. Monitor vital signs Q5 minutes until patient is stable.
- g. Maintain airway, administer oxygen as needed.
- h. Anticipate need for CPR.
- i. Administer emergency medications as ordered.

Table II
Emergency Medications for Hypersensitivity or Anaphylactic Reactions

Drug	Adult	Pediatric
Epinephrine	0.1-0.5 mg IV every 10 minutes	0.01 mg/kg IV/SC every 10-15 minutes
Diphenhydramine	25-50 mg IV	1 mg/kg (max 50mg)
Aminophylline	5 mg/kg IV over 30 minutes	Not used in pediatrics
Methylprednisolone	30-60 mg IV	0.3-0.5 mg/kg IV
Hydrocortisone	100-500 mg IV	2-5 mg/kg IV
Dexamethasone	10-20 mg IV	0.1-0.2 mg/kg IV

Medical University of South Carolina
Handling of Chemotherapy and other Cytotoxic Drugs
C-88 (A)

Definitions:

Drugs that may be genotoxic, oncogenic, mutagenic, teratogenic, or otherwise hazardous to health. Chemotherapy and cytotoxic drugs are received from pharmacy in a plastic bag labeled with a distinctive warning label “**CHEMOTHERAPY**” or “**CYTOTOXIC**”. See Appendix A.

Policy:

To ensure safe handling of chemotherapy drugs in inpatient and outpatient care areas.

Procedure:

- A. Personnel involved in handling of chemotherapy will received orientation/review independently information relative to:
- Known risks of drugs
 - Procedure for handling drugs
 - Proper use of personal protective equipment
 - Procedure for handling exposure or spills
 - Proper disposal of byproducts of administration
- B. Female employees who are pregnant or breast feeding or male or female employees who are actively pursuing conception should be fully informed of potential reproductive hazards from cytotoxic drugs.
- C. It is the responsibility of the employee to notify his/her manager of any of the above conditions. An employee in the above stated circumstances may request to be reassigned to tasks not requiring handling of cytotoxic drugs.
- D. A Chemotherapy Precautions sign must remain on the patient’s door from the time of initiation of the cytotoxic drug until 48 hours after the completion of the therapy.
- E. Inform the patient, family and visitor about the reason for the sign and the use of personal protective equipment.
- F. Advise the patient, family and visitors not to handle body fluids or to use the patient’s bathroom.
- G. Institute standard precautions when handling the blood, vomitus, or excreta of a patient who has received a cytotoxic drug within the past 48 hours. Personal protective equipment includes:
- a. Non-powdered Nitrile Gloves, 2 pairs Change every 30 minutes or if torn, punctured, or contaminated – Do not reuse.
 - b. A lint-free, non-permeable gown with long, cuffed sleeves and back closure. The gown may **not** be reused.

- c. One pair of gloves should be worn under the gown; the second pair of gloves should be worn over the sleeves.
 - d. Wear goggles or face shield if splashing is possible, i.e., blood drawing, tracheostomy suctioning.
- H. To prevent irritation, incontinent patients should be cleaned promptly and frequently.
- I. When disposing of bodily excreta flush the toilet twice.
- J. In the event of exposure, immediately remove any contaminated clothing and wash skin with soap and water. In case of eye exposure, flush the eye with saline or water for 5 minutes.
- Refer to MSDS for agent specific interventions.
 - Report exposure to Employee Health
 - Immediately seek medical treatment.
- K. All contaminated materials, I.e., syringes, tubing, bags, bottles and/or chux must be placed in the leak proof, sealable bag contained in the disposal kit and disposed of in a puncture proof chemotherapy disposal container.
- L. Place needles and sharps in patient room or clinic are biohazards sharps containers, labeled chemotherapy or cytotoxic drugs.
- M. Do not break or recap needles.
- N. Linen used by a patient who has received chemotherapy drugs in the last 48 hours should be placed and secured in a water soluble linen bag and placed in a second impervious Chemotherapy Linen Bag prior to being placed in linen chute.

Chemotherapy Precautions Disposal Kit is available from Central Supply.

Medical University of South Carolina
Handling Spills of Chemotherapy and Other Cytotoxic Drugs
C-88 (B)

Policy:

Appropriately trained MUHA Clinical Services personnel are responsible for the cleanup of spills 5 ccs or less (size of a quarter). MUSC Occupational Safety and Health Division staff are responsible for cleanup of spills greater than 5cc. Call Ext. 2-3604.

MUSC Occupational Safety and Health Division staff must be called for cleanup of any spill that occurs on a carpeted area or involve broken glass. Call EXT. 2-3604.

Equipment:

Spill Kit contains:

Non-permeable gown, mask, chemical splash goggles, two pair of nitrile gloves, 1 dust/mist respirator mask, two (2) sheets of absorbent material, one (1) spill control pad, detergent, and two (2) large cytotoxic drug waste disposal bags.

Procedure:

A. For spills of 5 ccs or less:

- a. Wear non-permeable gown, mask, two pair nitrile gloves, dust/mist respirator and chemical splash goggles.
- b. Wipe liquids with dry absorbent material; wipe solids with wet absorbent material. Avoid generating aerosols.
- c. Clean spill areas three (3) times using the detergent followed by clean water.
- d. Place any used absorbent materials, non-cleanable contaminated items, and used protective equipment in the cytotoxic drug waste disposal bags and then into a cytotoxic drug disposal container.
- e. Wash contaminated items thoroughly with detergent while wearing double nitrile gloves.
- f. Notify University Safety Division (ext. 2-3604) of the spill.
- g. Complete an Occurrence Report.
- h. Obtain a replacement spill kit from Central Supply.

B. For Spills greater than 55 cc's, spills that occur on a carpeted area, or spills involving broken glass:

1. Limit spread by gently covering the are with the spill control pad obtained from the spill kit.
2. Restrict access to the spill area.
3. Post warning sign.
4. Notify:
 - a. Monday through Friday 7:30 A.M. 4:00 P.M. the MUSC Occupational Safety and Health Division (Ext. 2-3604)
 - b. All Other Hours – Dial MUSC Paging Operator (Ext. 2-2123) and ask to have the MUSC Occupational Safety and Health Division staff paged for the appropriate extension or directly page Beeper #17390.

See MUSC Medical Center Occupational Safety and Health Manual MSDS computer disks for further information.