STANDARD OPERATING PROCEDURE FOR NITRIC ACID

I. POTENTIAL HAZARDS:

- Nitric acid is a very strong oxidizer that can ignite on contact or react explosively with many organic and inorganic substances.
- Contact with easily oxidizible substances (including many organic substances such as acetone, acetonitrile, various alcohols, dichloromethane, DMSO, and many others) may result in fires or explosions.
- Nitric acid also reacts violently with many inorganic substances including various bases, reducing agents, ammonia, and alkali metals, among others. Many reactions will yield toxic gases, including nitrogen dioxide (NO2) – see next bullet.
- Concentrated nitric acid can release vapors and toxic gases (including NO2), which can cause moderate to severe health effects, especially irritation to the eyes, skin, respiratory tract, and other mucosal membranes.
- If concentrated nitric acid contacts the skin, it can cause severe burns. Dilute concentrations that contact skin can cause mild irritation.
- Contact with eyes can cause severe burns and permanent eye damage.
- If high concentrations of nitric acid are inhaled, severe respiratory irritation can develop, along with possible delayed effects such as pulmonary edema, which can be fatal.
- Though not likely, ingestion of nitric acid can cause severe corrosion and burning of the mouth, esophagus, and stomach. As little as 10 ml of ingested nitric acid can be fatal.
- The OSHA Permissible Exposure Limit for nitric acid is 2 ppm (8 hours). The American Conference of Governmental Industrial Hygienists recommends a short-term exposure limit (15 minutes) of 4 ppm and an 8-hour limit of 2 ppm.

II. ENGINEERING CONTROLS:

- An eyewash and safety shower must be available in the immediate work area for any work with nitric acid.
- When working with nitric acid, always work in a clean fume hood that contains NO organic materials with the sash closed while reactions are in progress.
- Always use containers/glassware free from organic materials (and other incompatibles) for work with nitric acid.
- If mists are generated either mechanically or from vapor, work must be performed in a chemical fume hood to avoid inhalation.

III. WORK PRACTICE CONTROLS:

- Work should be done in a way that avoids hand/glove contact with nitric acid; it should be noted that nitric acid penetrates standard nitrile gloves in 5 minutes or less.
- If gloves come in contact with nitric acid through a splash (or otherwise), they should be removed and changed immediately.
- Once work with nitric acid is complete, decontaminate the area by wiping it down with a soap and water solution.

IV. PERSONAL PROTECTIVE EQUIPMENT (PPE):

- Chemical splash goggles (over prescription glasses),
- Apron,
- Pants or skirts that extend to below the knee,
- Shoes that completely cover the feet,
- Clothing made of natural fibers.

V. TRANSPORTATION AND STORAGE:

- Nitric acid should be stored in secondary containment in a well-ventilated area that is separated from organics and other combustible materials and incompatibles.
- Ensure primary and secondary containment is free from organic chemicals/solvents.
- Transport corrosives in secondary containment, preferably a polyethylene or other non-reactive acid/solvent bottle carrier.
- Store below eye level.
- Store away from metal (unless the metal has a corrosion-proof coating), and do not store under the sink.
- Avoid storing on the floor.

VI. WASTE DISPOSAL

Handle and store corrosive wastes following the guidelines above while accumulating wastes and awaiting chemical waste pickup. Waste must be disposed of following Columbia State's Hazardous Waste Policy 06-04-00. Contact the director of Facility Services and Safety for assistance for determining appropriate methods for disposal.