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1.0 INTRODUCTION

1.1 Purpose

The purpose of this procedure is to ensure that health hazards associated with benzene are evaluated, eliminated, or controlled in a consistent manner through sound engineering solutions, operating procedures, hazard awareness, and personal protective equipment.

1.2 Scope

This procedure applies to all Marathon Anacortes Refinery employees and contractors.

Benzene is a hydrocarbon found naturally in crude oil and produced or concentrated in some Marathon Anacortes Refinery processes (Ex: catalytic reforming, catalytic cracking). Any process stream containing more than 0.1% benzene (i.e., by volume) is covered by this procedure. Streams and products that may contain benzene at or above 0.1% include the following: crude oil, slop oil, transmix, naphtha, reformate, mixed pentanes, gasoline blending components and gasoline.

2.0 REFERENCES

2.1 Marathon Standards, Policies & Procedures

- HLT-2013, Benzene Exposure Control Program
- HLT-200,1 Industrial Hygiene Program

2.2 Government Regulations

- OSHA 29 CFR 1910.1028, Benzene
- WAC 296-62-073, Carcinogens
- WAC 296-849, Benzene

3.0 DEFINITIONS

The following definitions are applicable to this procedure.

Table 1 Definitions

Term	Description
Action Level	An airborne concentration of benzene of 0.5 parts per million (ppm) calculated as an 8-hour time-weighted average (TWA-8).
Authorized Personnel	Individuals specifically permitted by the employer to enter the exposure control area to perform necessary duties, or to observe employee exposure evaluations as a designated representative.

Table 1 Definitions

Term	Description
Benzene	A hydrocarbon found naturally in crude oil and produced or concentrated in some refinery processes. Any refinery stream containing more than 0.1% benzene by volume is covered by this procedure. Streams and products that may contain benzene at or above 0.1% include crude oil, slop oil, transmix, naphtha, reformate, mixed pentanes, gasoline blending components and gasoline.
Breathing Zone	The space around and in front of an individual's nose and mouth, forming a hemisphere with a 6 to 9-inch radius.
Exposure	The contact an individual has with benzene, whether or not protection is provided by respirators or other personal protective equipment (PPE). Contact can occur through various routes of entry such as inhalation, ingestion, skin contact, or skin absorption.
Permissible Exposure Limit (PEL)	Limits that must not be exceeded during exposure to toxic substances or harmful physical agents. PELs are also specified in various DOSH rules. The 8-hour PEL for benzene is an eight-hour time-weighted average (TWA) of 1 part per million (ppm). The 15-minute short-term exposure limit (STEL) for benzene is 5 ppm. Marathon has adopted these values.
Short-Term Exposure Limit (STEL)	An exposure limit averaged over a 15-minute period that must not be exceeded during any part of the workday.
Time-Weighted Average (TWA)	An exposure limit averaged over an 8-hour period that must not be exceeded during the workday.

4.0 HEALTH DATA

At room temperature, benzene is a colorless liquid with a sweet odor that can evaporate into the air quickly and dissolve slightly in water. It is highly flammable and is formed from both natural processes and human activities.

Benzene can affect the body by various routes of exposure. These routes include direct liquid contact, inhalation of vapors, absorption through the skin, and ingestion. There can be immediate (i.e., acute) as well as delayed (i.e., chronic) affects associated with benzene exposure. Liquid benzene is irritating to the eyes and skin. Exposure to high airborne concentrations of benzene may cause irritation of the eyes, nose, throat, and respiratory tract. It may also cause drowsiness, lightheadedness, coughing, and blurred vision. At very high concentrations, unconsciousness and death may occur. Benzene has been classified as a known human carcinogen.

5.0 EXPOSURE LIMITS

The action level for benzene is 0.5 ppm calculated as an 8-hour TWA. The Permissible Exposure Limit (PEL) is 1.0 ppm as an 8-hour time weighted average. The Short-Term Exposure Limit (STEL) is 5 ppm as averaged over any fifteen-minute period.

The Marathon Anacortes Refinery anticipates and recognizes potential benzene exposures utilizing the qualitative assessment process outlined in the Marathon Exposure Assessment Methodology (EXAM) HLT-2001, which includes:

- Determination of Similar Exposure Groups for positions with potential exposures.
- Identification of routine and non-routine Similar Exposure Tasks (SET) for each SEG.
- Calculation of a Health Risk Rating for each SEG and SET.
- Periodic re-assessment according to the established schedule.

Potential exposures are then evaluated and analyzed quantitatively to ensure statistical validity per the EXAM process.

6.0 EXPOSURE CONTROL REQUIREMENTS

Any employee working on equipment that contains, or had contained, benzene at a level of 0.1% by volume or more shall wear the following protective equipment:

6.1 Respiratory Protection

See R-14-008 for benzene respirator selection requirements.

If supplied-air respirators are used for benzene protection, only the worker(s) needs to wear the mask - there is no need for a back-up worker (buddy system) to be in the same PPE. However, a bottle cart attendant is still required. The exception would be when benzene levels are above 500 ppm. At 500 ppm it is an immediately dangerous to life or health (IDLH) atmosphere, and two persons are required to wear supplied-air equipment with an egress (i.e., escape) bottle.

6.2 Personal Protective Equipment

If liquid or the potential for liquid splash is present, then personnel performing the work shall wear personal protective equipment (PPE) for hydrocarbons with benzene (see R-11-023).

7.0 SPILLS OR LEAKAGE

If a spill or leak of material containing benzene at a level of 0.1% (i.e., by volume) was to occur, individuals cleaning up the area shall adhere to the following procedures.

7.1 Notification

Notify the area Safety Specialist so personnel monitoring can be conducted. The area Safety Specialist shall assess how large of an area to isolate, and what type of PPE is required for personnel entering the area. Only personnel trained on the hazards of benzene shall perform work in the spill or leak area.

7.2 Posting Signs

Warning signs must be posted that denote the regulated area (see Section 8.0). Barricade tags with the same information as described in Section 8.0 is sufficient for spills.

7.3 Protective Clothing

Protective clothing shall be thoroughly washed by the wearer before it is returned to the Safety Equipment Room. The decontaminated protective clothing is to be handled as described in Section 9.0 of this document. For full decontamination procedures, refer to R-11-023 Section 11.0.

7.4 Post Spill or Leak Monitoring

The area Safety Specialist shall conduct post spill or leak monitoring to assure the area is free of benzene.

8.0 REGULATED AREAS AND WARNING SIGNS

Industrial Hygiene Sampling Practices are utilized to monitor all areas of the Marathon Anacortes Refinery for regulated areas. For periodic monitoring data, please contact a member of the Health & Safety Department.

A regulated area must be established if the airborne concentration of benzene exceeds or can reasonably be expected to exceed 1 ppm of benzene. Air sampling may be required to make this determination.

Warning signs shall be posted notifying personnel of potential exposure. Only authorized personnel shall be permitted to enter the area wearing appropriate protective equipment. Warning signs denoting a regulated area shall read as follows:

9.0 BENZENE EXPOSURE

The following steps must be followed if a worker handling a benzene-containing product or material becomes contaminated (i.e., clothing, inhalation without respiratory protection or body):

- Remove all contaminated clothing. Any contaminated Tychem or chemical gear that is designated as single use should be discarded into a sealed bag and labeled as hazardous waste.
- Shower or thoroughly wash body in area of contact. The use of cold water will help prevent the absorption of benzene through the dermal layer.
- Obtain clean clothing from the Safety Equipment Room or Health Clinic.

- Place contaminated clothing in a clear plastic bag and tag as "benzene contaminated clothing." Do not take contaminated clothing home. Contact the area Safety Specialist for questions regarding laundering.
- The Industrial Hygienist or Safety Representative will help determine if a benzene exposure has occurred, thus requiring the collection of a urinary phenol sample. (Use flowchart in Attachment 1 for benzene exposure/urine phenol determinations). Contractors shall adhere to their company's benzene program requirements.
- During normal working hours, exposed employees shall be sent to the Health Clinic for evaluation and potential phenol sampling (as determined necessary by the Industrial Hygienist or Safety Representative). Ideally, urine samples are collected 6-8 hours after benzene exposure. If the employee is scheduled to leave work prior to the 6-8-hour time period, a phenol test kit should be sent home with them for a collection at home. The sample must be analyzed within 72 hours of collection.
- During off hours, request the C Zone Operations Supervisor who will contact the Safety Duty representative to assist with obtaining samples at the Medical Clinic. If it is determined that benzene exposure has occurred and urinary phenol testing is warranted, the Safety Duty Person will also notify Medical. All necessary containers and instructions are located in the storage closet next to the audiometric testing booth and are labeled "Phenol Test Kits" (See Attachment 1- Biological Monitoring Guide for Emergency Exposure to Benzene).

10.0 BENZENE TESTING EQUIPMENT

The work atmosphere shall be tested to determine the benzene concentration. If testing is not feasible, air-supplied respirators are required.

See procedure R-11-017 on confined space sampling, and R-14-004 on Industrial Hygiene and Air Monitoring Equipment.

At the Marathon Anacortes Refinery, an UltraRAE handheld monitor is generally used to collect benzene samples. The UltraRAE monitor has a photo-ionization detector (PID) which detects volatile organic compounds (VOCs) at very low concentrations. When the UltraRAE monitor is used in conjunction with a RAE-Sep filter tube (i.e., filters out most other VOCs), a benzene reading may be provided as low as 0.1 ppm.

The person conducting the sampling should exercise caution and avoid spilling or breathing benzene vapors. Respiratory protection may be required while sampling.

11.0 VENTING TO ATMOSPHERE

The following criteria shall be used to determine when a piece of equipment can be vented to the atmosphere. (Please keep in mind that in addition to the criteria below, EP-08 Maintenance Vent Compliance must also be followed, and equipment must be <10% LEL unless there is less than 72 pounds VOC contained in the equipment after draining.)

11.1 Columns and Vessels

Benzene samples shall be taken from the vessel contents prior to venting to atmosphere. An exclusion zone must be in place to ensure personnel are not in the plume during venting. Additional benzene monitoring shall be conducted to ensure no overexposure occurs. See R-14-004 for additional exposure monitoring information. If the benzene level is less than 1.0 ppm, no additional precautions are required. If readings are above

1.0 ppm, the applicable respiratory protection is required (see R-14-008). If readings are above 10 ppm, venting should be stopped.

11.2 Ground Level Equipment

Benzene readings should be below 10 ppm at ground level equipment. If the benzene level is less than 1.0 ppm, no additional precautions are required. If benzene readings are at or above 1.0 ppm, respiratory protection is required (see R-14-008).

12.0 PRODUCTS CONTAINING BENZENE

Warning signs are posted at the Marathon Anacortes Refinery entrance and at control rooms where benzene may be present above 0.1% by volume in product streams. The SDS Database provides information on all benzene-containing chemicals at the Marathon Anacortes Refinery (see R-11-019).

In some instances, terminology for a product stream differs from the SDS title. This is because all of the SDSs use API definitions, and local terms tend to be utilized instead. The benzene content of intermediate product streams varies and is best determined by reviewing the appropriate SDS for that stream. Expect benzene to be found wherever hydrocarbons containing C6 material is found. The SDS number may be found in the Chemical List Index in the SDS Database.

13.0 TRAINING

Initial training shall be given to all employees for whom benzene is present in their work area. The training should include any product stream that contains 0.1% or greater of benzene. Training shall also be done where exposures could exceed exposure limits. Annual training is required for employees who may be exposed above the action level of 0.5 ppm benzene in air for an 8-hour TWA.

14.0 REVIEW AND REVISION HISTORY

Revision #	Preparer	Date	Description
0	Mark Willand	2/6/2022	Reformatted and Numbered per Document Control Policy, R-63-001
1	Michael Fazio	7/3/2024	Minor edit to Section 10.0. Updated Content Custodian and Approver.

15.0 ATTACHMENT 1 – BIOLOGICAL MONITORING GUIDE FOR EMERGENCY EXPOSURE TO BENZENE

BIOLOGICAL MONITORING GUIDE FOR EMERGENCY EXPOSURE TO BENZENE

Purpose

To assure that appropriate procedures are followed for the collection of urine specimens for phenol analysis where an exposure by inhalation or skin contact to benzene or benzene-containing materials (>0.1% volume) has occurred during an emergency situation. In addition, to ensure that follow-up blood analysis is performed as required by MPC and/or governmental agencies.

Note: The actual personal exposure in this scenario is either unknown or is potentially in excess of the OSHA Permissible Exposure Limits. If measurement(s) is/are made that indicate exposure below the PELs, then no further action is needed.

Requirements

1. Determine if exposure to benzene-containing substance (>0.1% volume of benzene) has occurred.

2. Utilize the Biological Monitoring Report, (Form 674, Rev. 07/14) to obtain information following the exposure.

3. Collect urine specimen(s) within 6-8 hours after over-exposure incident. If the employee will leave work prior to the 6-8 hour time period, provide the kit and instructions to the employee for collection at home.
   a) If possible exposure occurs at a refinery/marine location, utilize the on-site clinic
   b) If possible exposure occurs outside of refinery/marine location, utilize the closest occupational health clinic.
   c) If the employee will not be able to provide a sample within the 6-8 hours after possible exposure, send the kit home with the employee.
   d) If the 6-8 hours window is missed, collect the urine sample regardless. Send the sample to Medtox and contact Corporate Health Services for guidance.

4. Send the collected specimen(s) to MedTox for analysis of phenol levels.

5. Have phenol analysis performed within 72 hours after the urine specimen(s) have been collected.

6. Have medical evaluation of all urinary phenol results and perform the appropriate blood analysis for all results equal to or above 75 mg/L.

7. Health care clinician should notify employees of all biological monitoring results within 15 days of the analysis. If the employee is MPL or TT&R, Corporate Health Services will provide the results.

Procedure

1. The On-site Air Monitoring Team Leader, Industrial Hygienist, or Safety Officer should determine if the collection of a urine sample is necessary. The flow chart following this procedure can be used to assist in this determination.

   Note: Depending on the scope of the incident, contractors may have exposure warranting this test. Specimen containers and instructions for use can be provided as long as arrangements are made for results and billing to be sent to contractor management.

2. If urine samples are necessary, the AMTL, IH, or Safety Officer and designated health care professional will complete the Biological Monitoring Report and the MedTox Clinic Test Requisition Form.

3. A urine sample should be collected in the provided specimen containers (available from the local health care professional or other pre-designated location) from the exposed employee.

   If there are any problems contact Health Services at 419-421-3160 or MAPLINE (1-877-627-5463) from 8:00 am - 5:00 pm, Monday-Friday, or MAPLINE after hours and on weekends.

4. If the exposure is not at a refinery or Marine location, the AMTL, IH, Safety Officer will notify Corporate Health Services by email benzene@marathonpetroleum.com **as soon as possible**. Information needed in the email include date and location of exposure, number of employees/contractors tested, and any employees who are waiving their right to be tested.

5. Once the results are in, the AMTL, IH or SO will scan and email the Biological Monitoring Report and lab results to the following email benzene@marathonpetroleum.com . The lab results will be entered into Enterprise Health by each location's Health Services. Any forms or reports will also be scanned to the employee's electronic medical record within in Medgate. Corporate Health Services will be responsible for scanning and entering MPL and TT&R employee information.

6. In the event of an abnormal result, the completed Biological Monitoring Report and the laboratory report will be provided to the Medical Director in Findlay for medical review and appropriate action.

Monitoring Results and Employee Notifications

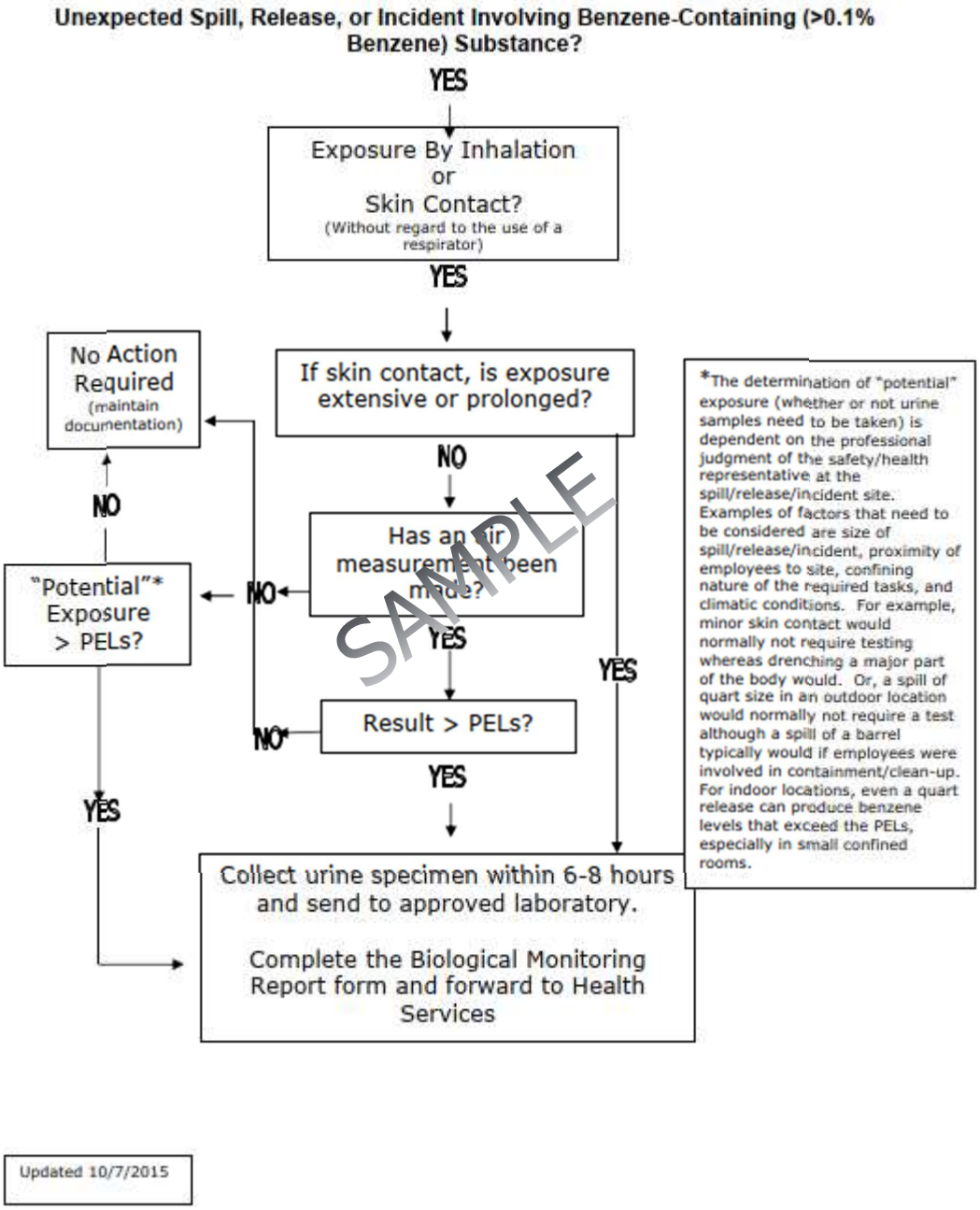
1. When the results have been received from the laboratory, a written notification of the personal results is provided to each employee within 15 days by one of the nursing staff at Corporate Health Services or the employee's Marine and refinery clinic location.

2. If the result is equal to 75 mg/L or greater, the MPC Health Care Professional will consult with the Medical Director. The employee is subsequently provided with a Complete Blood Count (CBC) with differential and platelet count, as well as follow-up blood work of the same kind at monthly intervals for the duration of three months following the exposure. This represents a total of four blood tests consisting of a CBC with differential and platelet counts following an exposure.

3. The results of the blood work for MPC employees are sent to the MPC Health Care Professional for evaluation. The Medical Director determines if additional medical referrals are necessary based on the review of the blood work and notifies the appropriate component location of the decision. Corporate Health Services notifies the employee of the blood work results.

4. In the event a urine sample is not collected/tested within the 72 hour period, the employee(s) may opt for Complete Blood Count (CBC) with differential and platelet count, as well as follow-up blood work of the same kind at monthly intervals for the duration of three months following the exposure. This represents a total of four blood tests consisting of a CBC with differential and platelet counts following an exposure. If the employee(s) select this option, the Health Services nurse will contact the lab with information on the required labs. The nursing staff will also review the results in Medgate GX2, once received and notify employee(s) of any abnormal results. A reminder will be sent out by email to the employee(s) by Health Services for subsequent testing.

FLOWCHART FOR BENZENE EXPOSURE/URINE PHENOL DETERMINATIONS



MedTox URINARY PHENOL PROTOCOL FOR EMERGENCY BENZENE EXPOSURE

COLLECT URINE SPECIMEN(S)

* **Use (preservative free) urine specimen container(s), MedTox requisition and FedEx overnight**
  - Collect 50 ml or more of urine per specimen.
  - Clearly label with employee's name. Maintain at room temperature until shipped.

  NOTE: Send to local hospital if no urine kit is available.

MedTox

* **Complete MedTox requisition including:**
  - Employee's name and social security number
  - Benzene Exposure test panel code **(73258)**
  - **The MedTox account numbers for each location:**

61180	Marathon Petroleum
611801	Robinson IL
611802	MPC
611803	Garyville LA
611805	Texas City TX
611806	Canton OH
611807	Detroit MI
611808	Catlettsburg KY
611809	TT&R - G&P
6118010	Marine
6118011	Galveston Bay TX

  - Your name, phone number and where to fax results

If you do not have any pre-printed requisitions, then you will need to contact MedTox:

MedTox Team Sapphire 877-709-7272
Monday – Friday 7 am – 5 pm CST

General Client Response 888-295-9925
Monday – Friday 6 am – 7 pm CST
Saturday – Sunday 8:30 am – 5 pm CST

You may also order supplies through the above numbers or online at www.medtox.com.

WAIVER FORM

The OSHA Benzene Standard (29CFR 1910.1028) requires the employers to collect urine specimens to evaluate employee benzene exposure in emergency situations where exposure is unknown or may exceed the Permissible Exposure Limits. Accordingly, you are being offered a urine phenol analysis, since phenol is a breakdown product of benzene metabolism in the body.

However, as indicated below, you can decline to participate in this test by putting your initials on the statement below and completing the rest of this form.

_____I decline to participate in the urine phenol test used to evaluate exposure to benzene and benzene-containing substances.

Employee _____
(Signature)

_____
(Printed name)

Employee No._____

Social Security No._____

Date_____

BIOLOGICAL MONITORING REPORT

Form 674 Rev. 7/14

CONFIDENTIAL

Parts I & II of this form are to be completed by employee, with assistance of supervisor. Safety personnel will verify/supplement information in Parts I and II.

I. GENERAL INFORMATION

Name _____ Employee # _____

Organization ☐ Production ☐ Pipeline ☐ Marketing ☐ Refining ☐ T&L ☐ Other _____

Component/Facility _____ Incident Location _____ (e.g., tank, pump, tower, valve, etc.)

Department _____ API Job Code _____

II. EXPOSURE INFORMATION

Date ___/___/___ Time Start ___:___ AM/PM End ___:___ AM/PM

Exposure Type ☐ Routine ☐ Emergency ☐ Other _____

Exposure Agent _____ (e.g., benzene, mercury, etc.) Exposure Estimate _____ ☐ ppm ☐ mg/m³

Method to Estimate _____

Route of Exposure ☐ Inhalation ☐ Skin ☐ Eye ☐ Ingestion ☐ Injection

PPE Used ☐ Impermeable Gloves ☐ Goggles ☐ Respirator-Type _____ (SCBA, half/full face piece, chem. cartridge, etc.) ☐ Other _____

Exposure Circumstances (briefly describe incident including process/unit (e.g., cat cracker), product name, estimated quantity of spill/release, task activity) _____

Exposure symptoms associated with this incident (e.g., dizziness, skin irritation)? ☐ Yes ☐ No If yes, describe: _____

III. BIOLOGICAL MONITORING INFORMATION *Part III will be completed by the site health professional and Health Services, Findlay)*

Specimen ☐ Blood ☐ Random Urine ☐ 24-Hour Urine ☐ Other _____

Collection Date ___/___/___ Collection Time ___:___ AM/PM Collected by _____

Analyzed for _____ (phenol, mercury, etc.) Result _____ (include unit of measure, i.e., mg/l, etc.)

Sent to (Lab) _____ Was urine phenol analyzed within 72 hours? ☐ Yes ☐ No Date Reported ___/___/___

Employee Notified ___/___/___ Notified By _____

Further Testing/Follow-up Needed? ☐ Yes ☐ No If so, what? _____

_____ Health Services ___/___/___ Date

I certify that the information in Sections 1 and 2 are correct and that I have received notification of my results.

_____ Employee Signature ___/___/___ Date