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CP4-ES-0074 **FRev. 1**	**TITLE**: Monitoring Well Inspection and Maintenance	Page 1 of 11

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TABLE OF CONTENTS

1.0 PURPOSE AND SCOPE 3
1.1 Purpose 3
1.2 Scope 3
2.0 REFERENCES 3
2.1 Use References 3
2.2 Source References 3
3.0 COMMITMENTS 3
4.0 PRECAUTIONS AND LIMITATIONS 4
4.1 Precautions 4
4.2 Limitations 4
5.0 PREREQUISITES 4
6.0 INSTRUCTIONS 5
6.1 Annual Inspections 5
6.2 C-404 Annual Inspection and All MWs Triennial Inspection 5
6.3 Well Pad Repair and Maintenance 5
6.4 Well Cap Repair 6
6.5 Well Cap Replacement 7
6.6 Well Vault Seal Repairs 7
6.7 Flush Mount Well Cover Repair 7
6.8 Well Casing and Bollard Repainting 8
7.0 ACCEPTANCE CRITERIA 8
8.0 POST PERFORMANCE WORK ACTIVITIES 9
9.0 RECORDS 10
9.1 Records Generated 10
9.2 Records Disposition 10
APPENDIX A – ACRONYMS/DEFINITIONS 11

1.0 PURPOSE AND SCOPE

1.1 Purpose

This procedure defines the process for groundwater monitoring well (MW) inspection and maintenance. MWs require routine inspection to identify maintenance items that need to be performed to protect and maintain the integrity of the Paducah Gaseous Diffusion Plant (PGDP) MW network. The visual inspection of MWs is also necessary to identify maintenance actions that may be needed to ensure the well provides quality data.

1.2 Scope

This procedure applies to PGDP Deactivation and Remediation employees and subcontractors that inspect and maintain MWs at the Paducah U.S. Department of Energy Site. MW surface components are inspected annually. Inspections for subsurface conditions are performed triennially (occurring once every three years). Inspections for subsurface conditions at C-404 MWs are performed annually.

2.0 REFERENCES

2.1 Use References

- CP2-ES-0024, *Monitoring Well Maintenance Implementation Plan for PGDP*
- CP3-ES-0003, *Environmental Incident Reporting*
- CP3-FP-2005, *Welding, Burning, and Hotwork.*
- CP3-HS-2034, *Lead and Inorganic Arsenic*
- CP3-HS-2035, *Chromium (VI) and Cadmium Protection.*
- CP3-WM-1037, *Generation and Temporary Storage of Waste Materials*
- CP4-ES-0069, *Monitoring Well and Associated Infrastructure Installation.*
- CP4-ES-2700, *Logbooks and Data Forms*
- Drawing C7DCWELLSA002, *Ground Water Monitoring Wells Typical Well Details*
- Job Hazard Analysis (JHA) 10990, *Monitoring Well Inspection, Maintenance, and Well Rehab*
- *PAD-REG-1006, Best Management Practices Plan, Paducah Gaseous Diffusion Plant, Paducah, Kentucky*

2.2 Source References

CP2-ES-0055, *Environmental Monitoring Plan Fiscal Year 2015*

3.0 COMMITMENTS

None

4.0 PRECAUTIONS AND LIMITATIONS

4.1 Precautions

4.1.1 Best Management Practices shall be implemented to prevent spills and releases according to PAD-REG-1006, *Best Management Practices Plan, Paducah Gaseous Diffusion Plant, Paducah, Kentucky*.

4.1.2 Any spills and/or releases shall be reported according to CP3-ES-0003, *Environmental Incident Reporting.*

4.1.3 Do **NOT** introduce contaminants into the well that would compromise the quality of data collection.

4.1.4 Well maintenance activities may produce airborne dust which contains lead and/or chromium.

4.1.5 Requirements of CP3-HS-2034, *Lead and Inorganic Arsenic,* and CP3-HS-2035, *Chromium (VI) and Cadmium Protection,* are followed to prevent exposure.

4.1.6 All hotwork shall be performed according to CP3-FP-2005, *Welding, Burning, and Hotwork.*

4.2 Limitations

4.2.1 Monitoring well inspection and maintenance shall be performed by individuals who are familiar with the design and construction aspects of monitoring wells.

4.2.2 Maintenance requiring re-survey of the well is performed under the supervision of a Kentucky Certified Well Driller.

4.2.3 Only potable or de-ionized water shall be used unless otherwise approved in writing by the Project Manager.

5.0 PREREQUISITES

5.1.1 Review JHA-10990, *Monitoring Well Inspection, Maintenance, and Well Rehab.*

5.1.2 Contact Industrial Hygiene (IH) before drilling, cutting, or pouring dry concrete or sand for personal protective equipment (PPE) requirements including respiratory protection for silica exposure.

5.1.3 Contact Radiological Controls before performing inspections and maintenance in radiological areas.

5.1.4 Contact IH before removing paint from well casings or protective bollards.

5.1.5 Obtain a hotwork permit according to CP3-FP-2005, *Welding, Burning, and Hotwork*, before performing any torch cutting, burning, grinding, or other hotwork.

5.1.6 Before disturbing surfaces that may contain lead based paint, implement requirements of CP3-HS-2034, *Lead and Inorganic Arsenic.*

5.1.7 Before disturbing surfaces and materials that may contain chromium or cadmium, implement requirements of CP3-HS-2035, *Chromium (VI) and Cadmium Protection.*

6.0 INSTRUCTIONS

6.1 Annual Inspections

Environmental Technician

6.1.1 Identify well locations requiring inspection by referring to the current Environmental Monitoring Plan.

6.1.2 Document inspections on CP4-ES-0074-F01, *PGDP Monitoring Well Inspection Checklist,* according to CP4-ES-2700, *Logbooks and Data Forms*.

6.1.3 Complete Part A of CP4-ES-0074-F01 for all monitoring wells.

6.1.4 Complete Part B or C as applicable for each well completion type.

6.2 C-404 Annual Inspection and All MWs Triennial Inspection

6.2.1 Perform all steps listed in Section **6.1 and** complete Part D of CP4-ES-0074-F01.

6.2.2 **If** the reference mark is missing, **then** document where the total depth measurement was made (i.e., north side, west side, etc.) and from top of inner casing, top of outer casing, well wizard rim, well wizard plate, etc.

6.2.3 **If** obstructions are encountered, **then** document the depth to the obstruction if possible **and** note if obstruction prevents sampling/water levels from being completed.

6.2.4 **If** the total depth measurement indicates a significant accumulation of mud or other material, **then** document this information in the Comments section of CP4-ES-0074-F01.

6.3 Well Pad Repair and Maintenance

Field Personnel

WARNING

Well pad repair activities may produce airborne dust which contains silica. Proper PPE must be worn at the direction of IH before any repair activities to prevent silica exposure. IH may also require wet methods of repair to minimize dust.

NOTE:

Concrete well pads that have developed cracks, or are in a deteriorated condition, or do **NOT** slope away from the well, may require repair. These repairs may require the use of hand tools such as chisels, hammers, pick axes, or other similar hand tools to prepare or remove the concrete for repair.

6.3.1 Clean out well pad cracks with a chisel, pick, or other suitable tool to remove loose material.

NOTE:

The Safety Data Sheet for the caulk to be used is sent to IH for approval before use.

6.3.2 Use a brush or broom to clean out the crack before applying the approved concrete caulking into the crack.

6.3.3 Use a caulk gun and approved concrete caulk to fill and seal "hairline" (1/4 inch wide or smaller) cracks as needed.

6.3.4 Use a putty knife to level the caulk with the pad surface.

6.3.5 Repair large cracks greater than ¼ inch wide according to Steps 6.3.6 through 6.3.9.

6.3.6 Remove damaged concrete **and** enlarge the crack slightly along the entire length.

6.3.7 Widen the bottom of the crack to increase the bonding surface between the new concrete and the old.

6.3.8 Use a brush, broom, or other suitable tool to remove loose material from the crack.

6.3.9 Completely fill the prepared crack with cement or other approved filler material.

6.3.10 **If** the well pad is badly deteriorated, **then** remove deteriorated concrete **and** replace the pad according to CP4-ES-0069, *Monitoring Well and Associated Infrastructure Installation*.

6.3.11 Repair incorrect well pad slope by constructing wood forms larger than the existing pad and re-pour the pad according to CP4-ES-0069.

6.3.12 **If** brass markers are damaged or incorrect, **then** install new markers according to CP4-ES-0069.

6.4 Well Cap Repair

WARNING

Well cap repair activities may produce airborne dust which contains lead and/or chromium. Proper PPE must be worn at the direction of IH before any repair activities. Requirements of CP3-HS-2034, *Lead and Inorganic Arsenic*, and CP3-HS-2035, *Chromium (VI) and Cadmium Protection*, are followed to prevent exposure.

6.4.1 **When** damage or defects to the inner or outer casing affect the security, integrity, or use of the well, repair the inner or outer casing of the monitoring well as required.

6.4.2 **If** rust or paint is removed from the outer well casing or bollards, **then** contain **and** collect the removed material.

6.4.3 Contact Environmental Compliance and Waste Management for direction on disposal requirements.

NOTE:

When the outer lockable cover is loose or has missing hasps, the hasps are repaired to secure the cap to the outer casing.

6.4.4 Remove the faulty hasp/hinge from outer casing or cap as necessary.

6.4.5 Remove rust around area where new hasp will be installed as necessary.

6.4.6 Weld or bolt a new hasp/hinge on the cap or outer casing.

6.4.7 Repaint the entire outer well casing and well identification (ID) numbers, if necessary.

6.4.8 Lock the cap **and** secure site before departing.

6.5 Well Cap Replacement

WARNING

Well cap replacement activities may produce airborne dust which contains lead and/or chromium. Proper PPE must be worn at the direction of IH before any removal activities. Requirements of CP3-HS-2034, *Lead and Inorganic Arsenic*, and CP3-HS-2035, *Chromium (VI) and Cadmium Protection*, are followed to prevent exposure.

6.5.1 Remove old outer casing portions to install new caps, if necessary.

NOTE:

Maintenance requiring re-survey of the well is performed under the supervision of a Certified Well Driller.

6.5.2 **If** sufficient clearance does **NOT** exist with the inner riser and pump assembly to properly close and lock the cap, **then** install a spacer on top of the existing casing to provide the necessary clearance.

6.5.3 Install a new aluminum cap and collar per manufacturer's instructions.

6.5.4 **If** needed, **then** repaint the entire outer well casing and well ID numbers.

6.5.5 Lock the cap **and** secure site before departing.

6.6 Well Vault Seal Repairs

6.6.1 **If** water is present in the vault, **then** pump out water using a submersible pump **or** bail out the water by hand, as needed, to remove as much water as possible.

NOTES:

The Safety Data Sheet for the caulk to be used is sent to IH for approval before use.

A continuous bead of caulk should be present around the inside edge of the vault.

The Frontline Supervisor may choose to allow caulk to cure before closing the vault cover.

6.6.2 Use approved exterior caulk to seal around the inside edge of the vault.

6.6.3 Replace vault gasket, if needed.

6.7 Flush Mount Well Cover Repair

6.7.1 Identify threads that are stripped on bolts and/or holes on well cover.

6.7.2 Re-tap existing thread holes as necessary.

6.7.3 Use a sharp tap on existing threads using the same diameter and thread pattern.

6.7.4 Insert new bolts **and** determine if the well cover is secured.

6.7.5 **If** existing thread cannot be used, **then** use a thread repair kit.

6.7.6 Follow manufacturer's instructions to install new thread inserts.

6.7.7 Install new bolts **and** ensure cover is properly secured.

6.7.8 Install new gasket seal, if needed, to create water tight seal.

6.8 Well Casing and Bollard Repainting

NOTE:

Bollard sleeves are used to refurbish deteriorated bollards whenever possible.

6.8.1 **If** bollard sleeves cannot be used to cover deteriorated paint, **then** request additional IH support **and** follow CP3-HS-2034, *Lead and Inorganic Arsenic,* for lead based paint and CP3-HS-2035, *Chromium (VI) and Cadmium Protection,* for chromium based paint, as necessary.

6.8.2 Cover inner well casing with plastic or other barrier that is secured to the riser pipe to prevent materials from entering the well or pump sampling assembly.

WARNING

Paint removal may produce airborne dust which contains lead and/or chromium. Proper PPE must be worn at the direction of IH prior to any removal activities. Requirements of CP3-HS-2034, *Lead and Inorganic Arsenic,* and CP3-HS-2035, *Chromium (VI) and Cadmium Protection,* are followed to prevent exposure.

6.8.3 Place a drop cloth on the well pad or area where paint is being removed to collect and contain paint chips and flakes.

6.8.4 Remove loose material from the area to be painted by a method approved by IH.

6.8.5 Apply primer according to drawing C7DCWELLSA002, *Ground Water Monitoring Wells Typical Well Details,* to the entire surface.

6.8.6 **When** the primer is dry, paint the surface with two coats of bright yellow paint according to drawing C7DCWELLSA002.

6.8.7 **If** the PGDP Well ID number has been verified, **then** paint ID number on casing in black using proper stenciling.

6.8.8 **If** the Assembled Kentucky Ground Water Database (AKGWA) number is missing from inside cap, **then** paint AKGWA number on inside of cap in black permanent ink marker or stencil stamps.

6.8.9 After paint has dried, close cap and lock well.

7.0 ACCEPTANCE CRITERIA

None

8.0 POST PERFORMANCE WORK ACTIVITIES

Field Personnel

8.1.1 Handle waste according to CP3-WM-1037, *Generation and Temporary Storage of Waste Materials.*

8.1.2 **If** maintenance was performed that requires a survey of the well, **then** notify the Sample Management Office of the survey data.

Environmental Technician

8.1.3 Submit completed monitoring well inspection checklists to the Environmental Monitoring Project Manager.

Environmental Monitoring Project Manager

8.1.4 Ensure monitoring well inspection checklists are reviewed for completeness.

8.1.5 Ensure monitoring well maintenance is prioritized according to CP2-ES-0024, *Monitoring Well Maintenance Implementation Plan for PGDP*.

8.1.6 Submit completed monitoring well checklists to the Facility Manager.

Facility Manager

8.1.7 Review the monitoring well inspection checklists, evaluate, **and** respond to any environmental conditions/concerns.

8.1.8 Identify conditions that need to be corrected and tracked to verify completion.

8.1.9 Consult with Environmental Monitoring Manager, Regulatory Compliance, Safety and Health, Engineering, and Scientist/Geologist for assistance, as needed, to determine appropriate corrective action(s) to eliminate or mitigate the condition.

8.1.10 Enter regulatory or permit related deficiencies into the issues management system.

8.1.11 Evaluate deficiencies that have **NOT** been corrected **and** work with the Environmental Monitoring Project Manager to determine whether the issue should be put into the issues management system or whether one has already been entered.

8.1.12 Develop a statement of work for contacting of needed maintenance to be performed under the supervision of a Kentucky Certified Well Driller.

Environmental Monitoring Project Manager

8.1.13 Provide input to the Facility Manager for deficiencies that have **NOT** been corrected.

9.0 RECORDS

9.1 Records Generated

The following records may be generated by this procedure:

CP4-ES-0074-F01, *PGDP Monitoring Well Inspection Checklist*
Forms are to be completed according to CP3-OP-0024, *Forms Control*.

9.2 Records Disposition

The records are to be maintained according to CP3-RD-0010, *Records Management Process*.

Appendix A – Acronyms/Definitions

ACRONYMS

AKGWA - Assembled Kentucky Ground Water Database

PGDP – Paducah Gaseous Diffusion Plant

ID – Identification

IH – Industrial Hygiene

JHA – Job Hazard Analysis

MW – Monitoring Well

PPE – Personal Protective Equipment

DEFINITIONS

Hotwork - Burning, welding, or similar operations capable of initiating fires or explosions. This includes: welding, allied processes, torch soldering, torch brazing, torch cutting, plasma cutting, grinding, high speed sawing, circular sawing, heat treating, pipe thawing, powder-driven fasteners, hot riveting, and similar applications producing a spark, flame, or heat. Any drilling or cutting (including low speed) into systems that have contained combustible/flammable fluid or dust that has not been cleaned.

Monitoring Well – Any well intended to be used either to collect water samples for purposes of water quality testing, or to measure groundwater levels. A piezometer is a type of monitoring well which measures the pressure (more precisely, the piezometric head) of groundwater at a specific point.