

PM041099

Revision 4

EXHAUST SHAFT, FAC 351,
QUARTERLY INSPECTION

Maintenance Procedure
Continuous Use
[UH08]

APPROVED FOR USE

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1.0 INTRODUCTION

Specifically, this work will accomplish the following:

- Perform a video inspection of the Exhaust Shaft.

This procedure generates the following Quality records in accordance with WP 13-1, Quality Assurance Program Description (QAPD).

- Attachment 1, Sign-Off Sheet
- Attachment 2, Observation Log
- Video

2.0 REFERENCES

BASELINE (DEVELOPMENTAL)

- WP 12-IS.01, Industrial Safety Program
- Qualification for Fall Protection, PPE-002
- Inuktun Pan-Tilt-Zoom Exhaust Vent Drop Camera System Operator's Manual
- WIPP Hazardous Waste Facility Permit, Attachment D

REFERENCED (REQUIRED ON-HAND)

None.

3.0 MATERIAL LIST

ITEM	MATERIAL DESCRIPTION	QTY	UNIT	PR / WHSE STOCK NO.
1	clean rags			
2	recording media			
3	glass cleaner			X-51-05001
4	paper towels			38-01227
5	lens tissue or cloth			
6	colored electrical tape			

4.0 EQUIPMENT LIST

- Fall Protection Equipment
- 75 foot hand-line (min. ¼")
- 8 foot step ladder
- Camera Van (equip. no. 35-C-001)

- Two-way radios (3 required)
- Crescent wrenches, screwdrivers, and Allen wrenches
- Extension cord with GFI

5.0 PRECAUTIONS

The JOB HAZARDS CHECKLIST indicates types of hazards that may be present during the performance of this work. See the indicated section for precautions and mitigating actions.

JOB HAZARDS CHECKLIST

HAZARD	MITIGATED AT STEP(S)
HEIGHT HAZARD	8.1.11
OVERHEAD HAZARD	8.1.16, 8.1.70
TEMPERATURE HAZARD	8.1.59

- 5.1. Leather gloves should be worn by individuals raising or lowering the hand lines.

6.0 LIMITATIONS

- 6.1. HOLD AND WITNESS POINTS

None.

- 6.2. TAGOUT/LOCKOUT

- 6.3. None.

- 6.4. OTHER LIMITATIONS

- Brackets at the beginning of steps are optional place-keeping aids, and may be checked off as work progresses.
- All personnel affixing initials to this package shall provide the information listed in the PERSONNEL DATA TABLE.
- Troubleshooting or other activities outside the scope of this PM may require the initiation of a work order as directed by the Responsible Engineer or Zone Team Leader.

- The person(s) signing off as the CI (cognizant individual) shall be qualified in accordance with Qualification Card M64, Remote Camera Shaft Inspection.

7.0 PREREQUISITES

7.1. ADMINISTRATIVE

- 7.1.1. Personnel performing this work review these work instructions.

7.2. FUNCTIONAL

- 7.2.1. Conduct maintenance inspection of the Camera Van no earlier than 1 week prior to the Exhaust Shaft inspection. Inspection will verify that all pulleys and sheaves are operable and lubricated. Verify that the camera equipment is clean, and that the camera lights, tilt, pan and zoom are operable. Verify that the video recording equipment is functioning.

SIGN-OFF CI

- 7.2.2. Notify Exhaust Shaft (System UH08) Cognizant Engineer of intent to perform inspection.

SIGN-OFF CI

- 7.2.3. Notify the Facility Shift Manager (FSM) of intent to perform the inspection.

SIGN-OFF CI

- 7.2.4. Obtain materials and equipment shown in Materials and Equipment section.

SIGN-OFF CI

- 7.2.5. Notify Underground Facility Ops of the intent to perform the inspection.

SIGN-OFF CI

- 7.2.6. Notify the Central Monitoring Room (CMR) prior to shaft entry.

SIGN-OFF CI

- 7.2.7. Ensure the Date and Time entries are completed on Attachments 1 and 2.

SIGN-OFF CI

8.0 PERFORMANCE

- 8.1.1. Park van on south side of Exhaust Shaft in line with the top sheave.
- 8.1.2. Chock all four van wheels.
- 8.1.3. Place barrier tape around the work area and display a "DANGER OVERHEAD HAZARD" bifold on each side of the barrier establishing a hard hat area.
- 8.1.4. Connect the van to 120 VAC site power using extension cord with GFCI.
- 8.1.5. Test the GFCI by pressing the test button. If the GFCI does not trip, it's faulty. Replace GFCI.
- 8.1.6. Set power **Selector Switch** to "AC-Main".
- 8.1.7. Ensure that the drum control is in the neutral position and that the drum brake is set before engaging the hydraulics.
- 8.1.8. Activate the drum hydraulic valve on driver side by pulling knob out.
- 8.1.9. Ensure that all guides, rollers and sheaves are functional and operate smoothly.

WARNING**Working Height Hazard Exists**

This warning applies to Steps 8.1.12 – 8.1.33 and Steps 8.1.60 – 8.1.62.

- Lanyards three feet long or less can be attached to the breast (front) 'D' ring on the harness. Six-foot lanyards must be attached to the back 'D' ring of the harness.
- Employees standing six feet or higher on a ladder will either secure the ladder to prevent tipping or have a second employee hold the ladder.
- Employees will use both hands for climbing. Tools will be carried in tool belts. Other materials will be raised or lowered using a hand line.
- Personnel installing, cabling or removing the tripod sheave must wear a body harness. Use anchorage points provided on the tripod legs.
- Ensure no personnel are directly under the loads as they are being raised.

8.1.10. Verify all fall protection equipment has in-date certification.

8.1.11. All personnel involved in the performance of this work discuss Working Height hazards, precautions and mitigating actions to be taken.

SIGN-OFF

8.1.12. Transport the sheaves to the roof of Station-A using the hand-line.

8.1.13. Install the sheaves to the boom and tripod.

CAUTION

This caution applies to Step 8.1.14.

DO NOT allow the cable drum to free wheel. Maintain controlled pay out of the cable.

Care must be taken when handling the camera and fiber-optic cable. Maintain a minimum 24-inch bending diameter when handling the cable manually (page 6, Inuktun Operator's Manual).

- [] 8.1.14. Reel out camera cable allowing enough slack to raise the camera to the top of the roof of Station-A.
- [] 8.1.15. Securely attach the hand-line to the eyebolt of the camera assembly.

WARNING

This warning applies to Step 8.1.16.

Ensure no personnel are directly under the loads as they are being raised.

- [] 8.1.16. Raise the camera to the roof of Station-A, while observing no personnel are directly under the load.
- [] 8.1.17. Route the camera cable through the sheave on the Station-A boom and tripod.

CAUTION

This caution applies to Steps 8.1.18 – 8.1.33 and Steps 8.1.56 – 8.1.62.

Station A personnel **SHALL** be in radio contact with the van winch operator when entering or exiting the Exhaust Shaft air lock.

- [] 8.1.18. Raise the camera above the upper hatch.
- [] 8.1.19. Remove protective cap, cap cover and spacers, and securely attach camera weight to the camera assembly.
- [] 8.1.20. Turn on the video system and perform functional test of camera (e.g., lights, pan, etc.).
- [] 8.1.21. Insert recording media into the video recorder.
- [] 8.1.22. Start recording device(s).
- [] 8.1.23. Ensure proper recorder operation.
- [] 8.1.24. Remove the bolts securing the upper hatch cover.
- [] 8.1.25. Open the upper hatch.
- [] 8.1.26. Lower the camera slowly until the upper hatch can be closed.
- [] 8.1.27. Close and secure the upper hatch ensuring cable is positioned into the travel slot bushing.
- [] 8.1.28. Place an easily observed marker (colored tape) on camera cable near the tripod sheave **AND** near the aft-most van sheave for positional reference.
- [] 8.1.29. Loosen the setscrew located at the “T” handle inside Station-A, open the hatch and tighten the setscrew.
- [] 8.1.30. Start recording device(s).
- [] 8.1.31. Lower the camera to the Exhaust Shaft collar.
- [] 8.1.32. Reset the mechanical and digital depth counters to zero.

NOTE

This note applies to Steps 8.1.37 – 8.1.55.

As the features in the shaft are recorded, insert captions onto the video identifying significant features, when available. See Attachment 3 for a caption listing.

Approximate depths, when given, are referenced from the shaft collar. Hence, the depths represent feet below shaft collar (bsc).

The items in Steps 8.1.39 through 8.1.55 can be inspected in any order. Also, **any additional** items may be inspected and recorded as necessary.

[] 8.1.33. Initial each routinely observed item in the performance section of Attachment 1.

[] 8.1.34. Begin lowering the camera and inspect items 8.1.39 through 8.1.55 for the following:

- Cracks
- Corrosion
- Salt buildup
- Dirt
- Debris
- Water entry
- Loosened anchors
- Sagging
- Bending
- Leaks/Spills
- Breaking of equipment (brackets, cables, pipes, etc.)
- Deterioration

Describe any **significant changes** with the inspected items or any newly observed feature(s) on the Observation Log (Attachment 2).

SIGN-OFF CI

[] 8.1.35. 13.8 kV feeder on west wall (spot-check over the inspected area of the shaft).

SIGN-OFF CI

[] 8.1.36. 4-inch air line on east wall (spot-check over the inspected area of the shaft).

SIGN-OFF CI

- 8.1.37. 2-inch water line on east wall (spot-check from 0-906' of the inspected area of the shaft).

SIGN-OFF CI

- 8.1.38. Instrumentation cables on north wall (spot-check over the inspected area of the shaft).

SIGN-OFF CI

- 8.1.39. Guide pipe supporting brackets (4) each (depth approx. 5').

SIGN-OFF CI

- 8.1.40. Guide pipe supporting brackets (4) each (depth approx. 9').

SIGN-OFF CI

- 8.1.41. Guide pipe supporting brackets (4) each (depth approx. 19').

SIGN-OFF CI

- 8.1.42. Air velocity tube, north (depth approx. 18').

SIGN-OFF CI

- 8.1.43. Radiation intake probe, east (depth approx. 21').

SIGN-OFF CI

- 8.1.44. Radiation intake probe, south (depth approx. 21').

SIGN-OFF CI

- 8.1.45. Radiation intake probe, west (depth approx. 21').

SIGN-OFF CI

- 8.1.46. Magenta Aquifer water ring (depth approx. 639').

SIGN-OFF CI

- 8.1.47. Culebra aquifer water ring (depth approx. 774').

SIGN-OFF CI

- 8.1.48. Telltale pipes (8) each (depth approx. 905').

SIGN-OFF CI

- 8.1.49. Key and water ring (depth approx. 910').

SIGN-OFF CI

- 8.1.50. Concrete-salt interface (depth approx. 914').

SIGN-OFF CI

- 8.1.51. Shaft wall, salt (spot-check over the inspected area of the shaft).

SIGN-OFF CI

CAUTION

This caution applies to Steps 8.1.56 – 8.1.62.

The video camera should be left on while exiting the shaft to aid in traversing the shaft airlock.

- 8.1.52. Upon completion of the inspection carefully raise camera until clear of the lower hatch as indicated by the depth counters, colored tape marker on the camera cable and the video monitor.

- 8.1.53. Close hatch and tighten the setscrew.

- 8.1.54. Open upper hatch.

WARNING**Possible Temperature Hazard Exists**

This warning applies to Steps 8.1.60 – 8.1.63.

Do not touch hot camera lights, severe burns could result.

- 8.1.55. All personnel involved in the performance of this work discuss temperature hazards, precautions and mitigating actions to be taken, if any.

SIGN-OFF

- 8.1.56. Raise camera enough to allow upper hatch to be closed,
- 8.1.57. Ensure camera is clear of hatch cover.
- 8.1.58. Close the upper hatch and install the retaining bolts (4).
- 8.1.59. Turn off video equipment.

CAUTION

This caution applies to Step 8.1.64.

Use only lens tissue or lens cloth with lens cleaning solution to clean the camera lens.

- 8.1.60. Clean camera lens, lights and housing.
- 8.1.61. Remove camera weight.
- 8.1.62. Install spacers and protective cap.
- 8.1.63. Set the camera on roof of Station-A.
- 8.1.64. Remove camera cable from the tripod and boom sheaves.

- 8.1.65. Secure hand line to the eyebolt of the camera assembly.

WARNING

This warning applies to Step 8.1.70.

Ensure no personnel are directly under the loads as they are being raised.

- 8.1.66. Lower the camera to the ground, observing that no personnel are directly below the descending load.
- 8.1.67. Remove tripod and boom sheaves.
- 8.1.68. Secure and lower each sheave to the ground separately.
- 8.1.69. Reel up loose cable onto the cable drum.
- 8.1.70. Secure camera assembly in protective storage container.
- 8.1.71. Remove and store external 120 VAC extension cord.
- 8.1.72. De-activate van hydraulics by pushing the hydraulic knob below the driver's seat.
- 8.1.73. Remove barrier.
- 8.1.74. Notify CMR operator that the inspection is complete.
- 8.1.75. Notify FSM that the inspection is complete.
- 8.1.76. Notify Underground Facility Ops that the inspection is complete.
- 8.1.77. Submit the video and attachments to the Exhaust Shaft Cognizant Engineer/designee for review.

SIGN-OFF CE

- 8.1.78. Submit video and completed attachments to Work Control for archiving.

SIGN-OFF CI

- 8.2. TASK VERIFICATION

- 8.2.1. None.

[] 8.3. RESTORATION TO OPERATIONAL STATUS

[] 8.3.1. CI conduct post-job review.

ATTACHMENT 1 – SIGN-OFF SHEET**PREREQUISITES**

Date: _____

Time: _____

Section	Action	Initials
[] 7.2.1	Conduct maintenance inspection of the Camera Van no earlier than one week prior to the Exhaust Shaft inspection. Inspection will verify that all pulleys and sheaves are operable and lubricated. Verify that the camera equipment is clean, and that the camera lights, tilt, pan and zoom are operable. Verify that video recording capability is functioning.	CI_____
[] 7.2.2	Notify Exhaust Shaft (System UH08) Cognizant Engineer of the intent to perform inspection.	CI_____
[] 7.2.3	Notify the Facility Shift Manager (FSM) of the intent to perform the inspection.	CI_____
[] 7.2.4	Obtain materials and equipment shown in Materials and Equipment section.	CI_____
[] 7.2.5	Notify Underground Facility Ops of the intent to perform the inspection.	CI_____
[] 7.2.6	Notify the Central Monitoring Room (CMR) prior to shaft entry.	CI_____
[] 7.2.7	Ensure the Date and Time entries are completed on Attachments 1 and 2.	CI_____

PERFORMANCE

Section	Action	Initials
[] 8.1.11	All personnel involved in the performance of this work discuss Working Height hazards, precautions and mitigating actions to be taken.	CI_____

Section	Action	Initials
[] 8.1.34	Begin lowering the camera and inspect items 8.1.39 through 8.1.55 for the following: Cracks Corrosion Salt buildup Dirt Debris Water entry Loosened anchors Sagging Bending Spills Breaking of equipment (brackets, cables, pipes, etc.) Describe any significant changes with the inspected items or any newly observed feature on the Observation Log (Attachment 2).	CI____
[] 8.1.35	13.8 kV feeder on west wall (spot-check over the inspected area of the shaft).	CI____
[] 8.1.36	4-inch air line on east wall (spot-check over the inspected area of the shaft).	CI____
[] 8.1.37	2-inch water line on east wall (spot-check over 0-906th inspected area of the shaft).	CI____
[] 8.1.38	Instrumentation cables on north wall (spot-check over the inspected area of the shaft).	CI____
[] 8.1.39	Guide pipe supporting brackets (4) each (depth approx. 5').	CI____
[] 8.1.40	Guide pipe supporting brackets (4) each (depth approx. 9').	CI____
[] 8.1.41	Guide pipe supporting brackets (4) each (depth approx. 19').	CI____
[] 8.1.42	Air velocity tube, north (depth approx. 18').	CI____
[] 8.1.43	Radiation intake probe, east (depth approx. 21').	CI____
[] 8.1.44	Radiation intake probe, south (depth approx. 21').	CI____

Section	Action	Initials
[] 8.1.45	Radiation intake probe, west (depth approx. 21').	CI____
[] 8.1.46	Magenta Aquifer water ring (depth approx. 639).	CI____
[] 8.1.47	Culebra aquifer water ring (depth approx. 774).	CI____
[] 8.1.48	Telltale pipes (8) each (depth approx. 905).	CI____
[] 8.1.49	Key and water ring (depth approx. 910).	CI____
[] 8.1.50	Concrete-salt interface (depth approx. 914).	CI____
[] 8.1.51	Shaft wall, salt (spot-check over the inspected area of the shaft).	CI____
[] 8.1.55	All personnel involved in the performance of this work discuss temperature hazards, precautions and mitigating actions to be taken, if any.	CI____
[] 8.1.77	Submit video and attachments to the Exhaust Shaft Cognizant Engineer/designee for review.	CE____
[] 8.1.78	Submit video and completed attachments to Work Control for archiving.	CI____

Comments:

PERSONNEL DATA

PRINTED NAME	SIGNATURE	INITIALS	DATE

ATTACHMENT 3 – CAPTION LISTING

ITEM	DEPTH (feet bsc)	TEXT CODES
WIPP Exhaust Shaft Video Inspection		00
Beginning of Inspection		01
Shaft Collar	0	02
13.8 kV feeder on west wall	0-Brow	03
4-inch air line on east wall	0-Brow	04
2-inch water line on east wall	0-933	05
Instrumentation cables located on the north wall	0-Brow	06
Guide pipe supporting brackets (4) each	5'	07
Guide pipe supporting brackets (4) each	9'	08
Guide pipe supporting brackets (4) each	19'	09
Air velocity tube (north)	18'	10
Radiation intake probe (east)	21'	11
Radiation intake probe (south)	21'	12
Radiation intake probe (west)	21'	13
Magenta Aquifer and water ring	639'	14
Culebra Aquifer and water ring	774	15
Tell-Tale pipes (8 each)	905	16
Key and water ring	910	17
Concrete-salt interface	914	18
Shaft wall to bottom	914-2150	20
Broken support brackets		21
Broken Kellum grips		22
Broken instrumentation cables		23
Cracks - seepage		24
Junction boxes		25
End of Inspection		26