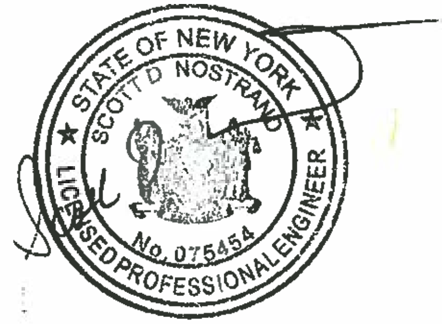
Amphenol Aerospace

Village of Sidney, Delaware County, New York

Plating Operations Wastewater Conveyance System Assessment

November 2013



Barton & Loguidice

Amphenol Aerospace

Village of Sidney, Delaware County, New York

Plating Operations
Wastewater Conveyance System
Assessment

November 2013

Prepared for:

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1.0 Introduction

Barton & Loguidice, PC (B&L) has completed the assessment of the Plating Operations Wastewater Conveyance System in accordance with the approved Scope of Services dated October 4, 2013. This report summarizes the field survey work, the criteria and methodology used in determining the system's hydraulic integrity, and a discussion of the findings. The assessment was conducted over the course of four (4) site visits during the month of October. Assistance from Amphenol personnel was greatly appreciated and contributed to the success of the project.

2.0 Project Background

Amphenol Aerospace (Amphenol) experienced a suspected loss of acidic process wastewater from the wastewater conveyance system serving the Plating Operations Building during the month of August 2013. Routine groundwater monitoring by others indicated that the pH in groundwater samples at select groundwater monitoring wells was below historic values; additional sampling and analysis by others confirmed the atypically low pH values. Amphenol subsequently prepared and submitted a 15 Day Incident Report to the New York State Department of Environmental Conservation (NYSDEC) on August 30, 2013 for the suspected release. Following review of the Incident Report, the NYSDEC requested (by letter dated September 11, 2013) that Amphenol immediately assess the integrity of the wastewater conveyance system (i.e. floor trenches from the plating process to the doubler box). The NYSDEC requested that the conveyance system assessment include the following elements:

- A description, with diagrams if possible, of the entire system itself including materials of construction, size and location within the building.
- The criteria for determining if the conveyance system has integrity.
- How the assessment was conducted.

This report is therefore broken into the applicable sections as requested by the NYSDEC.

3.0 Conveyance System Description

The first task of the assessment was to locate and map out the existing wastewater conveyance system within the Plating Operations Building. With the assistance of Amphenol staff, B&L located and measured the locations of all collection trenches. Following the field survey, B&L updated the existing Plating Operations Building Plan to include the wastewater conveyance trenches and the doubler box. The updated Plating Operations Building plan is included as Figure 1 in Appendix 1.

The wastewater conveyance system is used to convey wastewater containing acid, chromic acid, and cyanide to the wastewater treatment system. The conveyance system components include three (3) collector trenches and a doubler box inside of the Plating Operations Building. The collector trenches generally run in the west to east direction and the doubler box is located at the east end of the building. The north and south collector trenches each contain a 90-degree bend that directs flow to the doubler box. Downstream of the doubler box a conveyance trench extends easterly to the wastewater treatment area.

The typical conveyance system construction consists of an “upper” fiberglass over plastic trench which sits in a separate, “intermediate” fiberglass trench; these two trenches are installed within a concrete trench in the concrete floor of the Plating Operations Building. The upper trench is divided into three (3) sections; each trench section is used to convey the separate wastewater streams (containing acid, chromic acid, cyanide). A photo of a typical upper trench section is included in Appendix 2.

For safety purposes, trench sections not collecting wastewater in a given area are covered to prevent intermingling of the wastewater streams. In addition the remainder of the building floor is covered by 3/8” thick poly sheeting which drains to the wastewater conveyance system. A photo of a typical installed trench section is included in Appendix 2. In this photo the center, chromic acid collection trench is covered and the acid and cyanide trenches are open.

The doubler box is located at the intersection of the three (3) collector trenches at the east end of the Plating Operations Building. The doubler box utilizes a system of subways to combine the separate acid, chromic acid and cyanide trenches from each of the three (3) collector trenches into a single conveyance trench which runs easterly to the wastewater treatment area. For example, the three (3) acid trenches are routed to form a single acid trench; individual acid trenches are routed under the chromic acid and cyanide trenches such that the individual wastewater streams do not come into contact. This is typical for both the chromic acid and cyanide trenches as well.

4.0 Hydraulic Integrity Criteria

Hydrostatic testing was performed to assess the hydraulic integrity of the wastewater conveyance system. The hydrostatic testing was conducted during a weekend following a production run when the facility was not in use. The intent of the hydrostatic testing was to fill the trenches with water and monitor the water level for a period of approximately 24 hours. Following correction for evaporative losses, a liquid level loss would be indicative of a leaking conveyance trench section. If the liquid level stayed constant for the testing period, it could then be assumed that the given trench section has hydraulic integrity and is watertight. Visual inspections were also performed when possible; a large part of the conveyance system runs under plating equipment and tankage and is not visible from the surface.

5.0 Assessment Methodology

The wastewater conveyance system was divided into six discrete sections for the hydrostatic testing. Figure 2 contained in Appendix 1, shows the locations of the test sections which were as follows:

Section 1: North collector trench to 90-degree bend;
Section 2: North collector trench, 90-degree bend to doubler box (acid trench not tested);
Section 3: Middle collector trench to doubler box;
Section 4: South collector trench to 90-degree bend;
Section 5: South collector trench, 90-degree bend to doubler box;
Section 6: Doubler box area, including small sections of the north and south collector trenches and easterly conveyance trench to building wall.

As indicated above, the acid trench was not tested in Section 2 which included the north collector trench section in the vicinity of the 90-degree bend. Upon dewatering the trenches for the hydrostatic testing, a crack was observed in the acid trench at this location; therefore it was apparent a repair is required and this section was not included in the test. With the exception to Section 2 in which only two (2) trenches were tested (chromic acid, cyanide), each of the remaining five (5) test sections contained three (3) trenches (acid, chromic acid, cyanide). Therefore a total of 17 individual sections were hydrostatically tested.

Each test section was isolated with a “double dam”. A single dam consisted of two (2) one (1)-gallon spring water containers sealed in the upper trench with expanding foam sealant. To properly isolate each test section, two (2) single dams were installed adjacent to each other with an air gap in between, forming a “double dam”. By leaving the air gap it would be apparent if one (1) of the dams failed during the test. It is noted that single dams were installed in the acid trench of the north collector. Single dams were installed as it was believed that the acid trench in Section 2 would remain dry during the test. As is discussed later in the report, water began entering this portion of the trench through the visible crack in the floor as the adjacent test section was filled. A photo of a typical dam setup is included in Appendix 2. It is noted that these double dams were installed in the north collector trench; two (2) double dams were installed in the chromic acid and cyanide trenches and a single dam was installed acid trench.

Following installation of the dams, level sensors and data loggers were placed in each trench test section. The level sensors were attached to the side of the trench utilizing spring clamps; a photo of a typical installation is contained in Appendix 2. The data loggers were programmed to continuously log water levels during the test. The level sensor and data logger locations are indicated on Figure 2 in Appendix 1. Once the dams and level sensors were in place, the test sections were flooded with water and left to sit for approximately 24 hours.

Following the 24-hour test period, the level sensors, data loggers and dams were removed and the Plating Operations Building resumed operations. Manual water level measurements were taken at the beginning and end of the hydrostatic test to check against the data logger readings. The data from each data logger was downloaded and summary graphs were prepared to assess the liquid level in each test trench section over the 24-hour test period. The summary graphs are contained in Appendix 3 and are discussed in further detail in the following section.

6.0 Summary of Assessment Findings

As discussed in the previous section, the trench level data recorded by the data loggers was plotted for each test section. The results of each test section are discussed in detail below.

Section 1: North collector trench to 90-degree bend (P-15, P-16, P-17)

The recorded data for this test section gave varying results. The fractional water level drop in the chromic acid trench (P-16) is attributed to evaporative losses. The recorded liquid level in the cyanide trench (P-17) was irregular and varied from 5- to 12-inches during the test. Manual water level measurements confirmed that only a fractional change in water level occurred in the cyanide trench section over the length of the test and that level sensor P-17 malfunctioned. Therefore, it is concluded that both the chromic acid and cyanide trenches in this test section have hydraulic integrity.

The recorded data for the acid trench (P-15) indicates a water level drop of approximately 5-inches during the course of the test. It is noted that B&L staff observed a 3- to 4-inch drop in this trench within the first 45 minutes of the test. The dam isolating the east end of the test section was observed to be watertight so it is assumed that the water drop was due to a leak in the test section. B&L staff observed water entering the acid trench of the dry, untested Section 2 between P-15 and P-7 through a visible crack in the floor of the trench. It is therefore concluded that the acid trench in Section 1 is leaking and is in need of repair.

Section 2: North collector trench, 90-degree bend to doubler box (P-13, P-14)

The recorded data for this test section indicates a minimal liquid level drop in the chromic acid and cyanide trenches (P-13, P-14). Any fractional water level drop is attributed to evaporative losses; therefore, it is concluded that the chromic acid and cyanide trenches in this test section have hydraulic integrity. As discussed previously, the acid trench in this section is in need of repair. A visible crack was observed in the floor of the trench. Water was observed flowing up through this trench as the upstream section was filled.

Section 3: Middle collector trench to doubler box (P-10, P-11, P-12)

The recorded data for this test section gave varying results. The fractional water level drops in the acid and chromic acid trenches (P-10, P-11) are attributed to evaporative losses. The recorded liquid level in the cyanide trench (P-12) was somewhat irregular and varied about an inch during the test. Manual water level measurements confirmed that only a fractional change occurred in the water level in this trench section and that level sensor P-12 malfunctioned. Therefore, it is concluded that all three (3) trenches in this test section have hydraulic integrity.

Section 4: South collector trench to 90-degree bend (P-1, P-2, P-3)

The recorded data indicates a minimal liquid level drop in each of the three (3) trenches in this test section. Any fractional water level drop is attributed to evaporative losses; therefore it is concluded that all three trenches in this test system have hydraulic integrity.

Section 5: South collector trench, 90-degree bend to doubler box (P-4, P-5, P-6)

The recorded data for this test section indicates a minimal liquid level drop in each of the three (3) trenches. It is noted that the starting water levels varied between the three (3) trenches; however, each water level remained constant throughout the test. Any fractional water level drop is attributed to evaporative losses; therefore it is concluded that all three (3) trenches in this test system have hydraulic integrity.

Section 6: Doubler box area, including small sections of the north and south collector trenches and easterly conveyance trench to building wall (P-7, P-8, P-9)

The recorded data for the doubler box area indicates a steady drop in each of the three (3) trenches, with the greatest decline in the acid trench which contained probe P-7. Both the chromic acid and cyanide trenches (P-8, P-9) dropped approximately 2-inches while the acid trench (P-7) dropped approximately 3-inches.

Due to the plating process, the building atmosphere is maintained under a negative pressure and there is a large quantity of air drawn in for ventilation at the east of the building near the conveyance trench. It is assumed that this section exhibits higher rates of evaporative losses due to the air flow into the building. Because the chromic acid and cyanide trenches exhibited a similar water level drop, it is assumed this is due to evaporative losses. The acid trench dropped approximately one-inch greater than these two trenches. It is therefore assumed that the acid trench in the vicinity of the doubler box is compromised and a leak caused the additional one-inch of water loss.

7.0 Conclusions

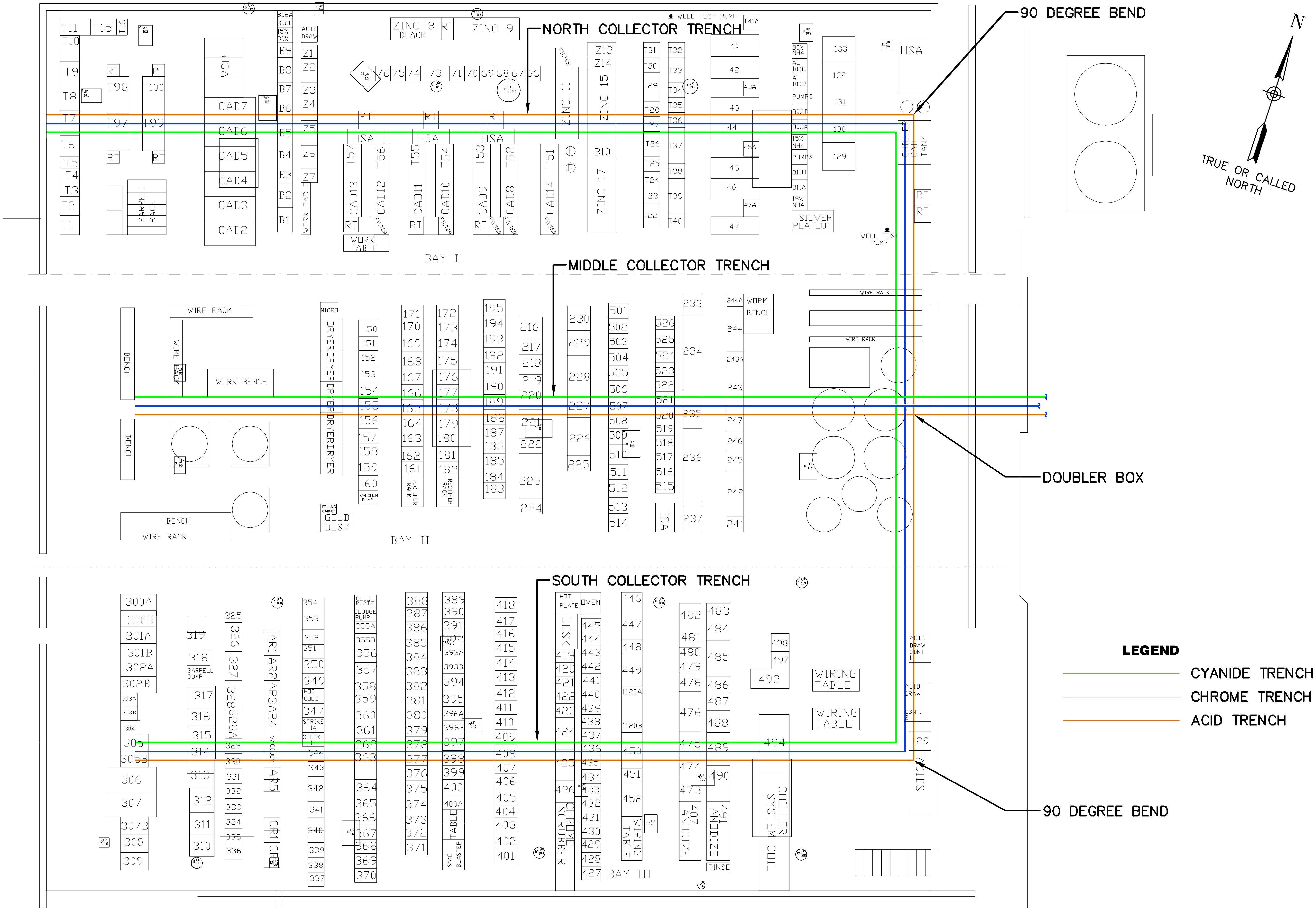
The recorded liquid level data indicates that the Plating Operations Building wastewater conveyance system has hydraulic integrity with the exception to the acid trench section of the north collector trench and within the vicinity of the doubler box. The remainder of the liquid level data indicated small liquid level drops that can be attributed to evaporative losses in the remaining sections. The recorded liquid level data in the cyanide trenches of Test Sections 1 (P-17) and 3 (P-12) were irregular. Manual water level measurements confirmed that only a fractional change in water level occurred in each of these trench sections over the length of the test and that the respective level sensors malfunctioned.

It is known that routine groundwater monitoring by others has indicated that the pH in groundwater samples at select groundwater monitoring wells has been below historic values. The hydrostatic testing performed by B&L has confirmed that the “upper” portion of the acid conveyance trench is compromised and is leaking in the north collector trench and in the vicinity of the doubler box. As the “intermediate” fiberglass and concrete trenches were not visible for observation and testing, it is inferred that these trenches are compromised as well in a manner such that wastewater containing acid is migrating through the concrete trench and into the groundwater. The intermediate fiberglass and concrete trenches should be inspected during repairs to the upper trench.

Appendices

Appendix 1

Figures



AMPHENOL – AEROSPACE OPERATIONS
PLATING WASTE WATER CONVEYANCE ASSESSMENT

WASTEWATER CONVEYANCE SYSTEM LAYOUT

VILLAGE OF SIDNEY
DELAWARE COUNTY, NEW YORK

Barton & Loguidice, P.C.

Date: NOVEMBER, 2013

Scale: NOT TO SCALE

Figure Number: 1

Project Number: 824.007

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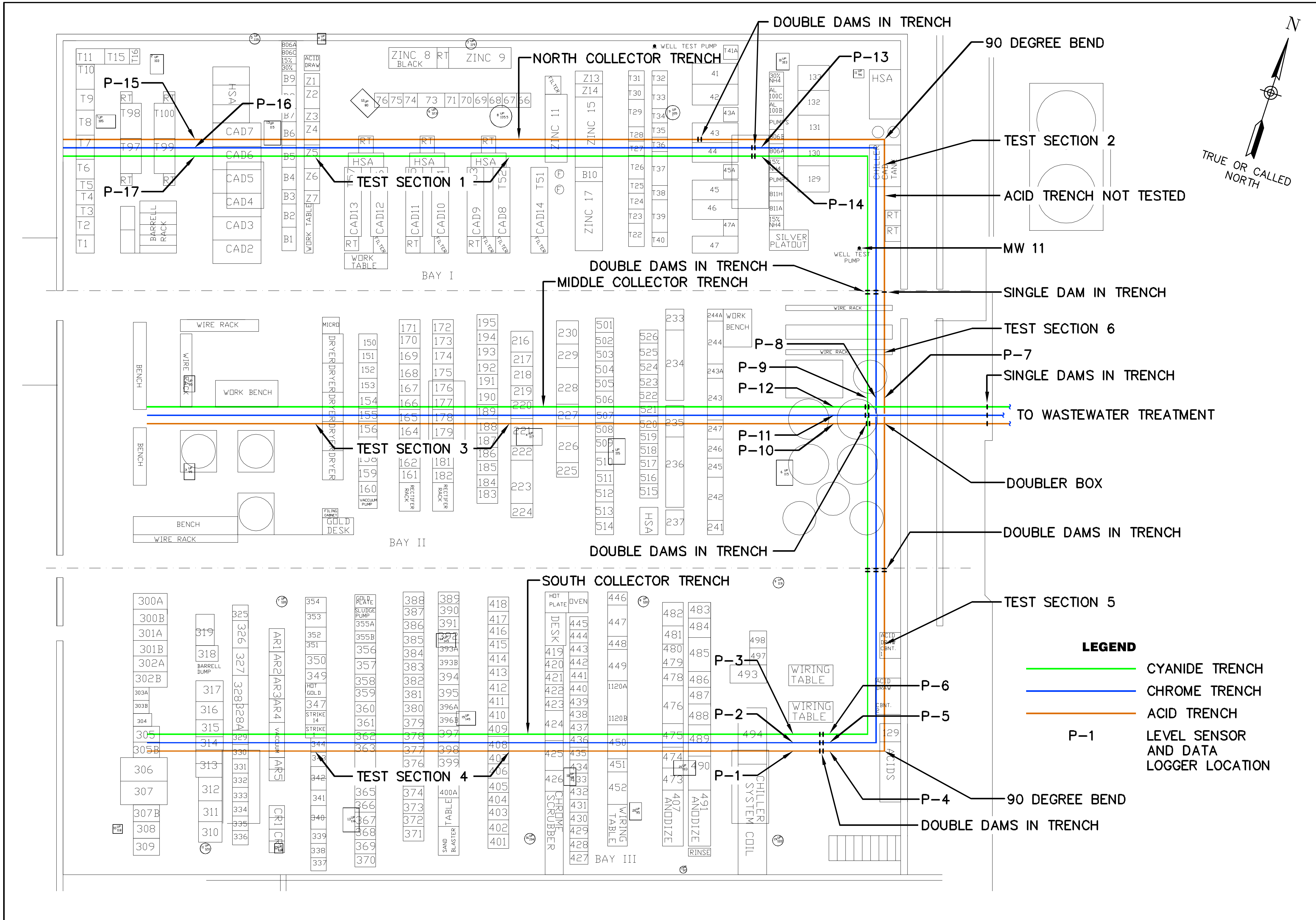


AMPHENOL – AEROSPACE OPERATIONS
PLATING WASTE WATER CONVEYANCE ASSESSMENT

HYDROSTATIC TESTING PLAN

DELAWARE COUNTY, NEW YORK

VILLAGE OF SIDNEY

Barton & Loguidice, P.C.

Date	NOVEMBER, 2013
Scale	NOT TO SCALE
Figure Number	2
Project Number	824.007

Appendix 2

Conveyance System and Assessment Photos

Photo 1 – Typical fiberglass conveyance trench construction

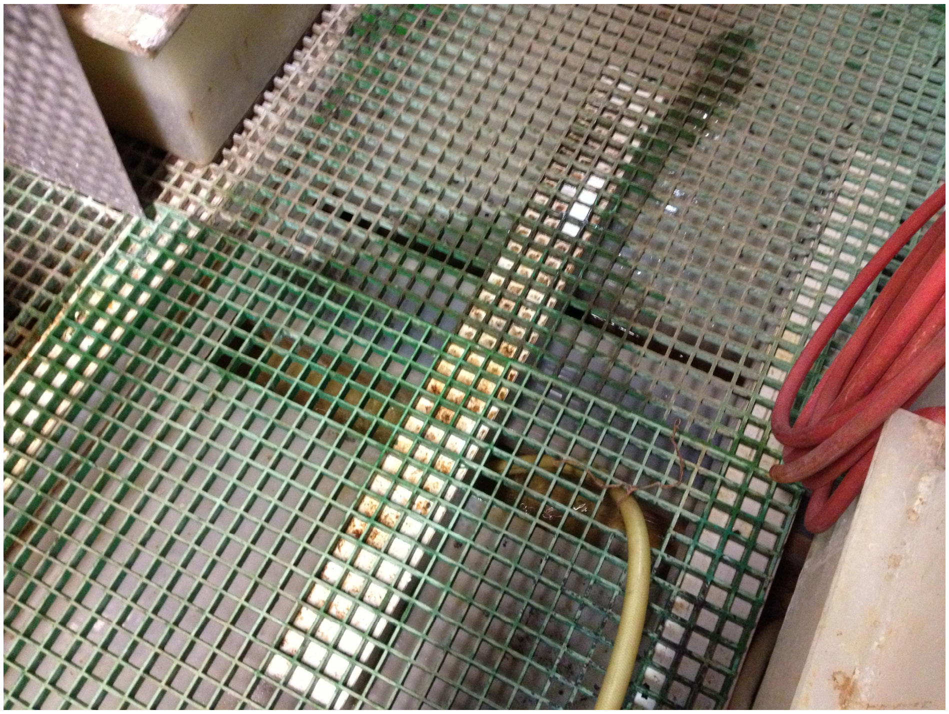


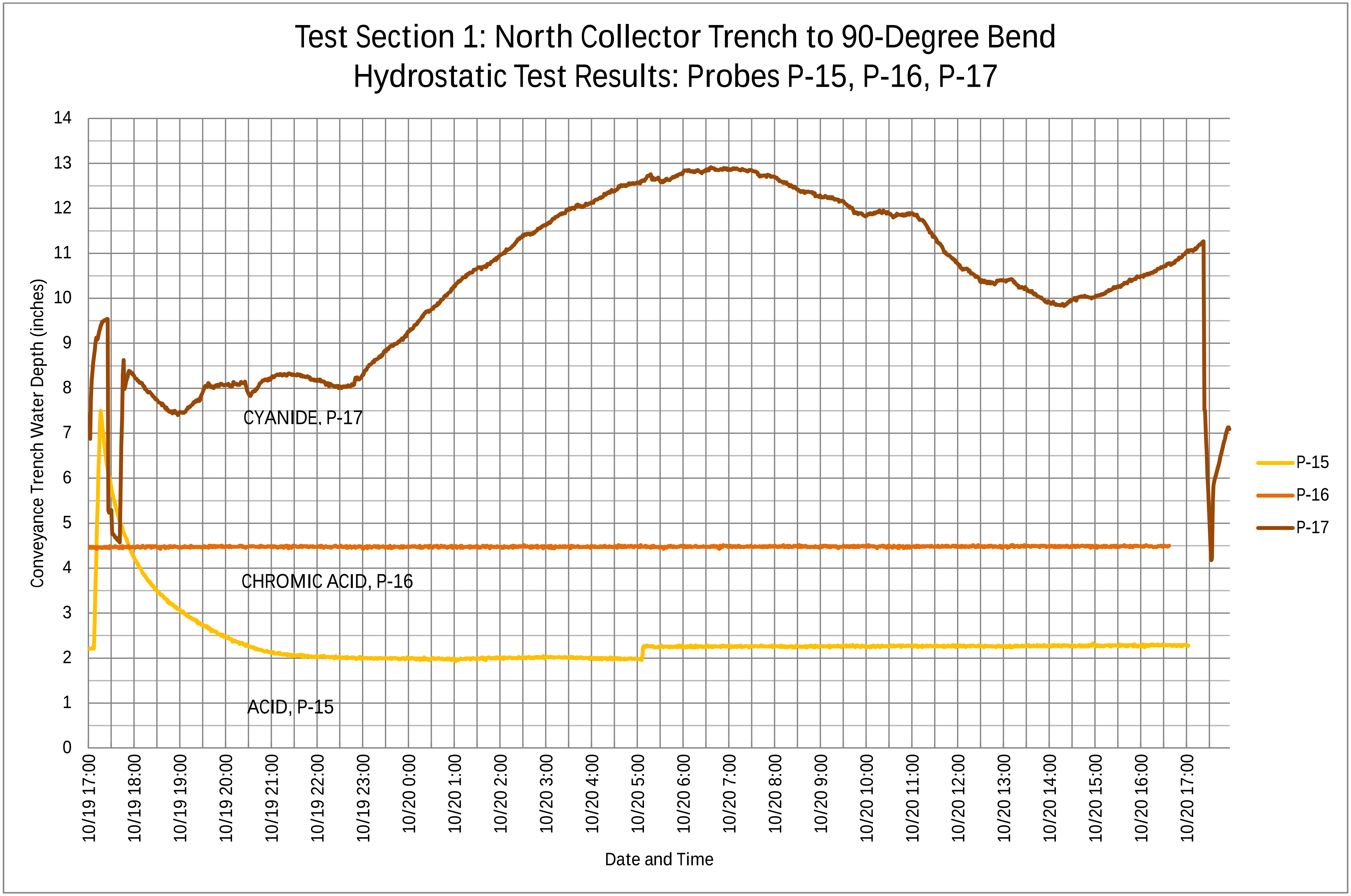
Photo 2 – Typical installed trench with poly floor covering (center chromic acid trench covered, acid and cyanide trenches open)

Photo 3 – Typical trench dams installed for hydrostatic testing

Photo 4 – Typical level sensor installation

Appendix 3

Hydrostatic Test Sections – Liquid Level Plots


Test Section 1: North Collector Trench to 90-Degree Bend
Hydrostatic Test Results: Probes P-15, P-16, P-17
Conveyance Trench Water Depth (inches)
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
CYANIDE, P-17
CHROMIC ACID, P-16
ACID, P-15
10/19 17:00
10/19 18:00
10/19 19:00
10/19 20:00
10/19 21:00
10/19 22:00
10/19 23:00
10/20 0:00
10/20 1:00
10/20 2:00
10/20 3:00
10/20 4:00
10/20 5:00
10/20 6:00
10/20 7:00
10/20 8:00
10/20 9:00
10/20 10:00
10/20 11:00
10/20 12:00
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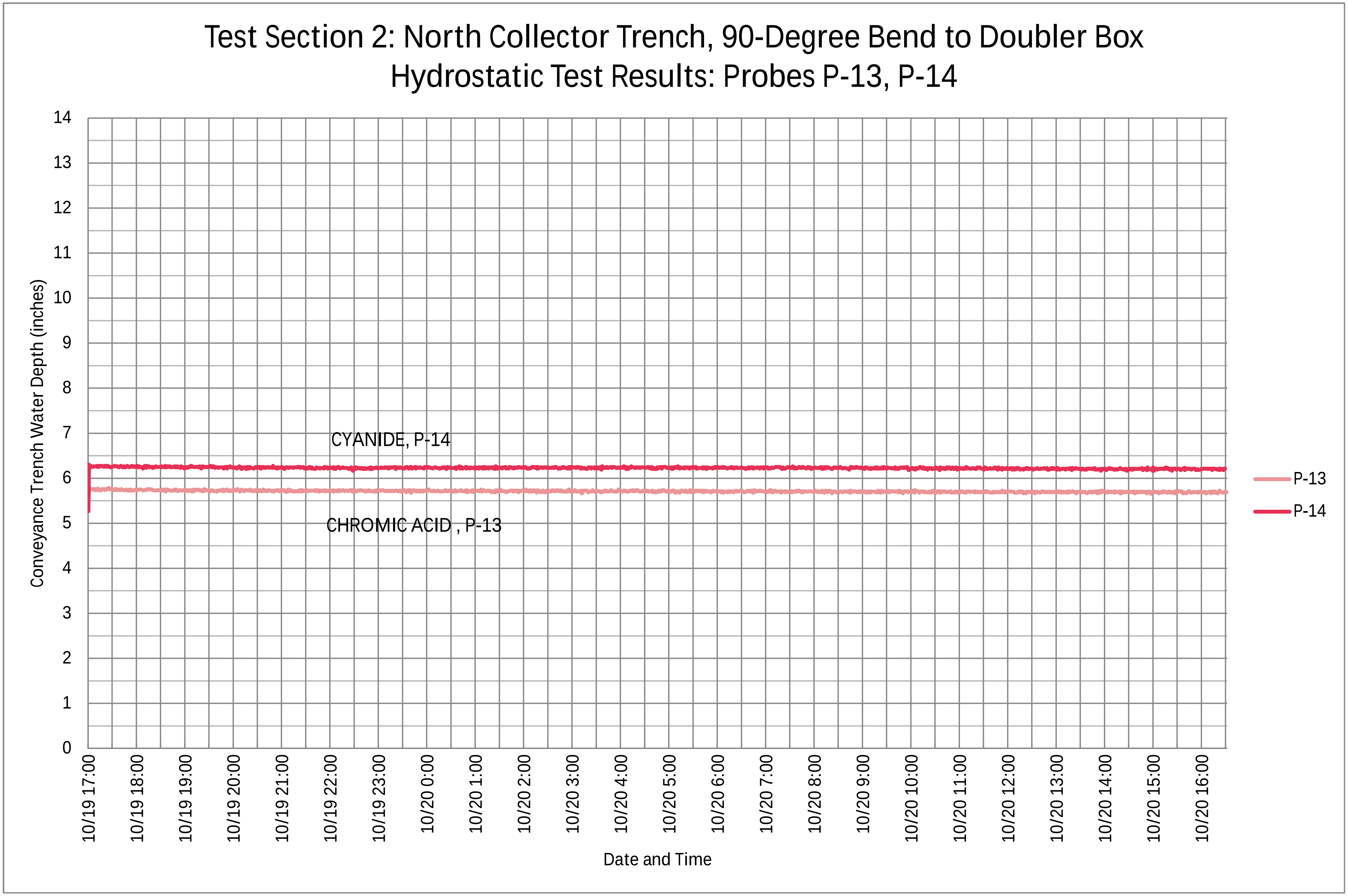
10/20 17:00
Date and Time
P-15
P-16
P-17


Test Section 2: North Collector Trench, 90-Degree Bend to Doubler Box
Hydrostatic Test Results: Probes P-13, P-14
Conveyance Trench Water Depth (inches)
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
CYANIDE, P-14
CHROMIC ACID , P-13
P-13
P-14
10/19 17:00
10/19 18:00
10/19 19:00
10/19 20:00
10/19 21:00
10/19 22:00
10/19 23:00
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10/20 2:00
10/20 3:00
10/20 4:00
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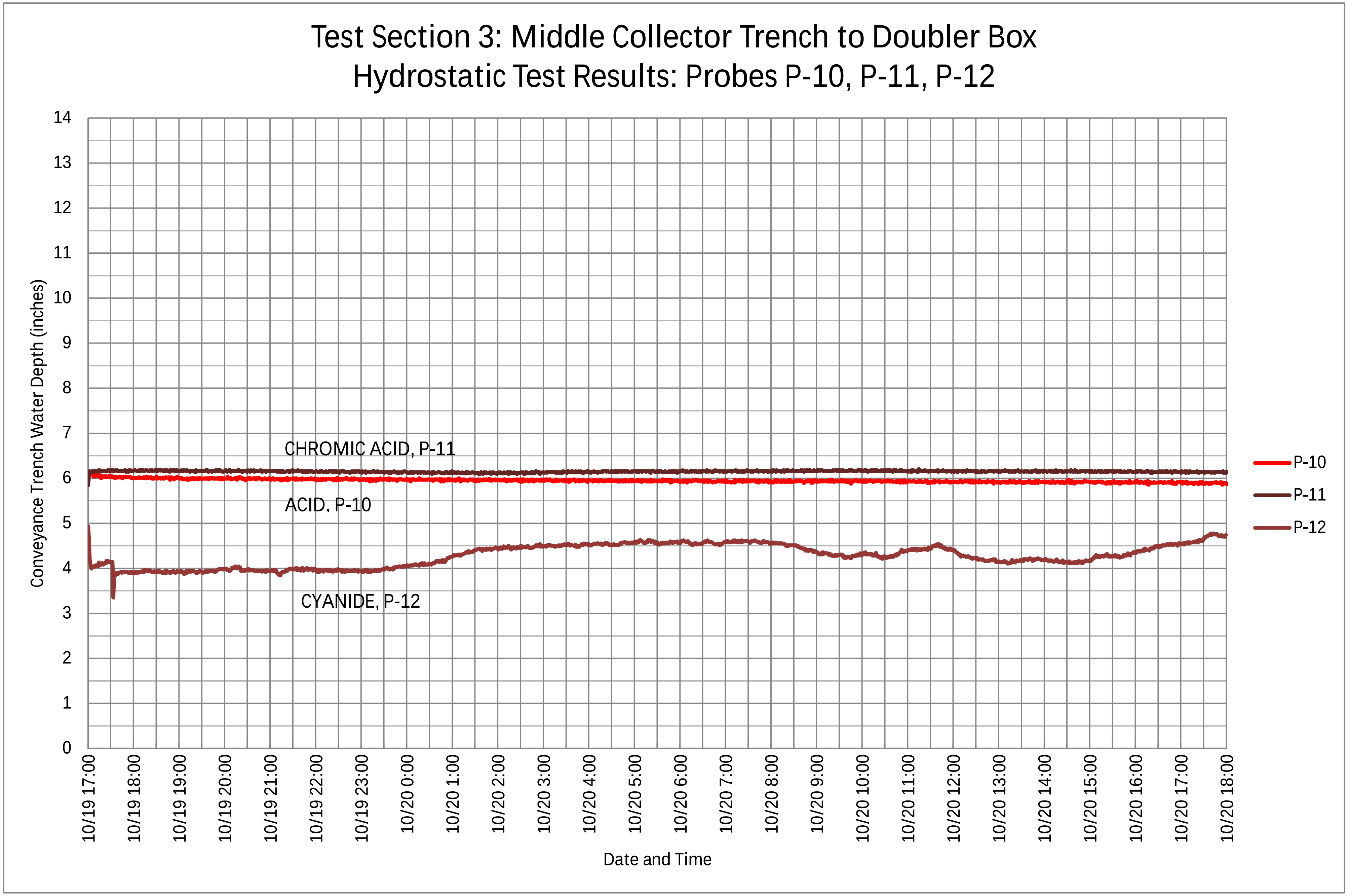
Date and Time



Test Section 3: Middle Collector Trench to Doubler Box
Hydrostatic Test Results: Probes P-10, P-11, P-12
Conveyance Trench Water Depth (inches)
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
CHROMIC ACID, P-11
ACID. P-10
CYANIDE, P-12
P-10
P-11
P-12
10/19 17:00
10/19 18:00
10/19 19:00
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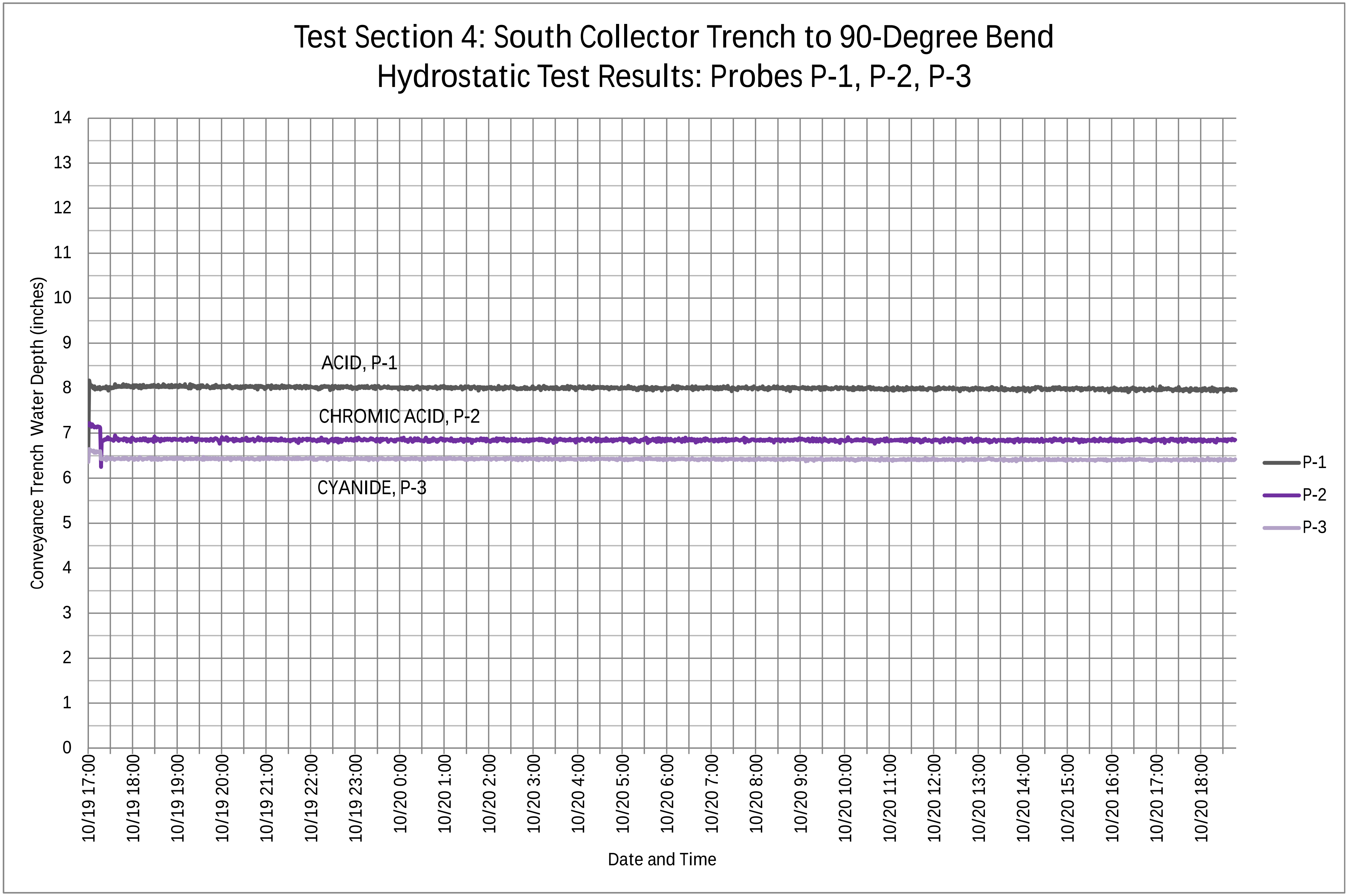
Date and Time



Test Section 4: South Collector Trench to 90-Degree Bend
Hydrostatic Test Results: Probes P-1, P-2, P-3
Conveyance Trench Water Depth (inches)
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
ACID, P-1
CHROMIC ACID, P-2
CYANIDE, P-3
P-1
P-2
P-3
10/19 17:00
10/19 18:00
10/19 19:00
10/19 20:00
10/19 21:00
10/19 22:00
10/19 23:00
10/20 0:00
10/20 1:00
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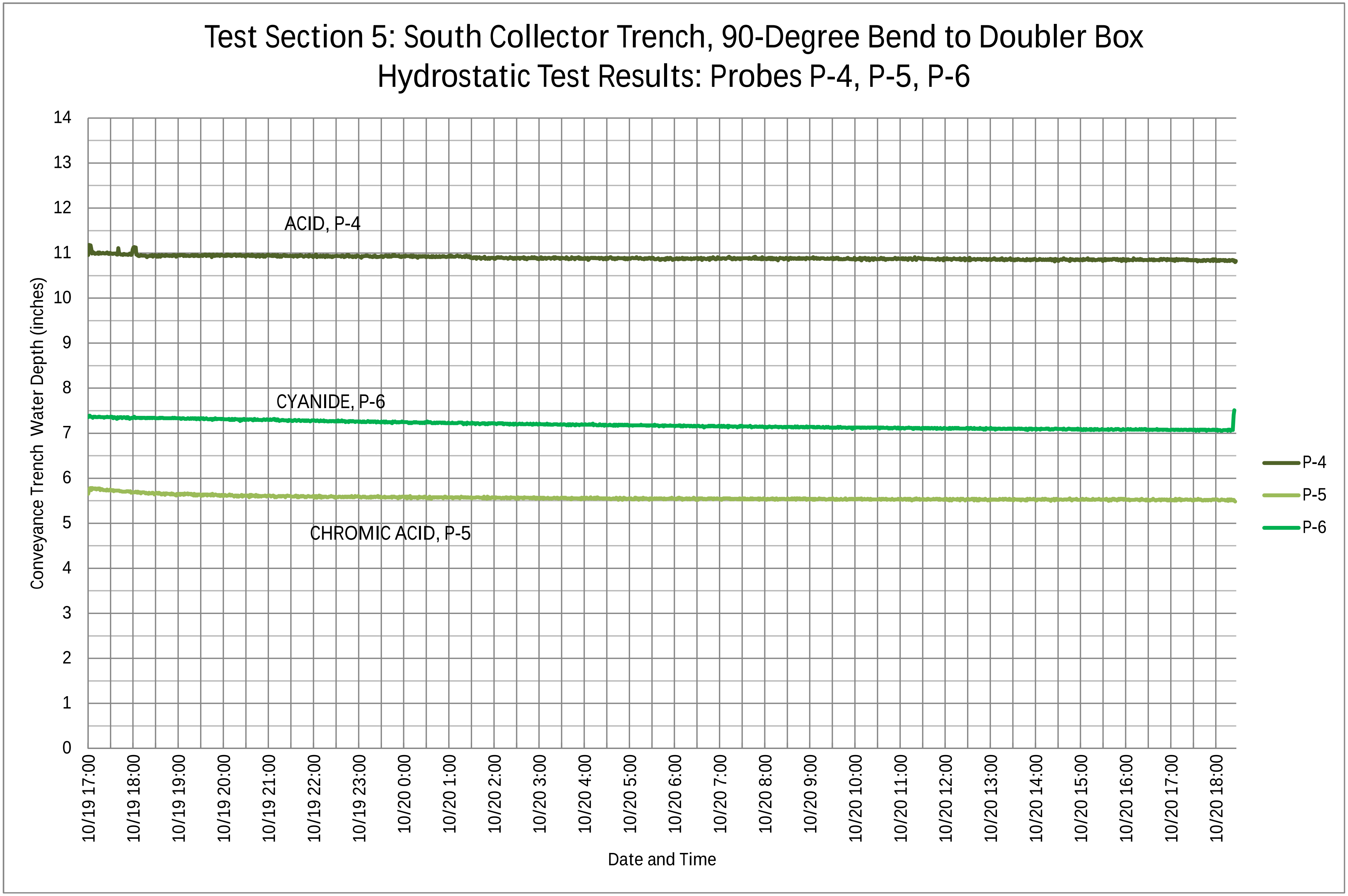
Date and Time



Test Section 5: South Collector Trench, 90-Degree Bend to Doubler Box
Hydrostatic Test Results: Probes P-4, P-5, P-6
Conveyance Trench Water Depth (inches)
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
ACID, P-4
CYANIDE, P-6
CHROMIC ACID, P-5
P-4
P-5
P-6
10/19 17:00
10/19 18:00
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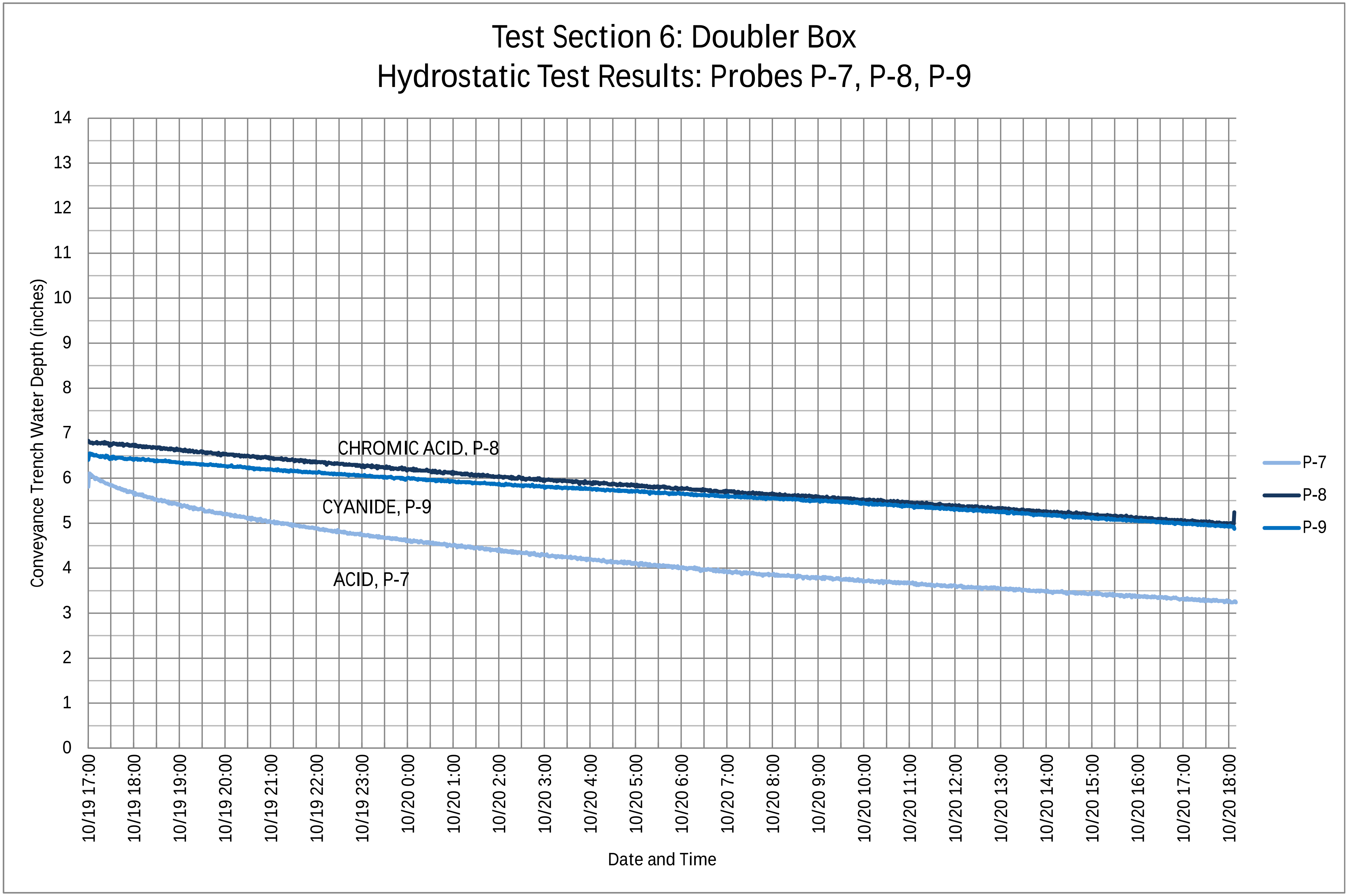

Test Section 6: Doubler Box
Hydrostatic Test Results: Probes P-7, P-8, P-9
Conveyance Trench Water Depth (inches)
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
CHROMIC ACID, P-8
CYANIDE, P-9
ACID, P-7
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Date and Time
P-7
P-8
P-9