FLINT HILLS RESOURCES®

North Pole Refinery
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North Pole, Alaska 99705
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CO- 174-10 Certified Return Receipt # 7009 1410 0002 2821 6900

December 8, 2010

Mr. Brian Jackson
Alaska Department of Environmental Conservation
Spill Prevention and Response
610 University Avenue
Fairbanks, AK 99709-3643

RE: Sump Investigation Report and Investigation Closure Request

Dear Mr. Jackson,

Flint Hills Resources Alaska, LLC ("FHRA") is pleased to provide you with this summary of its investigation of the sump and drain systems at the North Pole Refinery (NPR). FHRA performed this comprehensive sump investigation to identify and repair any sump and drain systems that may have integrity issues. A total of 42 sump systems were inspected beginning in 2009 and continuing until all inspections were completed in 2010.

This report summarizes the inspection procedures and results for the inspection of each sump system. Four sump systems were found to have potentially contributed to a release of material to the subsurface. The findings and corrective actions taken for those four sump systems are specifically addressed in Section III of this report. This report also describes the changes to FHRA's Mechanical Integrity Program that are being implemented as a result of information learned in the course of this inspection program.

I. Investigation Procedures

FHRA used Acuren USA, Inc., a third party inspection contractor, to conduct most of the inspections. A separate investigation of the drain lines associated with the laboratory sump was performed in 2010 by Industrial Engineering LLC.

Generally, for each sump, the inspection procedure began with cleaning of the sump, followed by a visual inspection. If any anomalies were observed, further investigation was conducted, which could include die or ultrasonic testing to determine whether excessive corrosion or thinning of sump walls had occurred. Sump piping was tested by filling with water and observing for any water loss over a 4-hour or longer period. Because drain lines were tested in a full condition, which is not representative of normal operating conditions, the tests reflect a worst-case evaluation of drain line integrity.

II. Summary of Results

FHRA evaluated the integrity of 42 refinery sumps and the piping associated with those sumps. Eighteen sumps were evaluated under the comprehensive inspection program in 2009. Sump 901 and an associated catch basin, which had already been scheduled for examination, were also evaluated in 2009. The remaining 23 sumps were inspected in 2010.

The attached Table 1 provides a summary of results for each of the sump system inspections. As the information in Table 1 indicates, a majority of the sump and drain systems were found to be fully intact, requiring few if any repairs. FHRA made all repairs or other corrective action necessary to assure the integrity of each sump and drain system before returning them to service.

Of the 42 sump systems tested, five were identified and reported to ADEC as having been a potential source of a release to the subsurface. Those five systems are discussed in greater detail below.

III. Results, Corrective Actions and Closure Request for Specific Sumps

FHRA identified five sump systems that have integrity issues that may have resulted in the release of material to the subsurface. Those sump systems are identified as 03-6 (Asphalt Sump), 05-7 (Blend Building Sump), 922 (Tank Farm Truck Kero Sump), 02/04-2 (Naphtha 2 Sump), and 923 (Laboratory Sump). Test results for the Laboratory Sump system were previously reported to ADEC on July 21, 2010, and those findings are not reiterated here. The following summary addresses the investigation findings and corrective actions for the remaining four sump systems.

A. Asphalt Sump (03-6)

The Asphalt Sump had a new cylindrical steel liner installed within the original steel shell in 1997. During the 2010 visual inspection, this inner liner was found to have general corrosion and pitting in the shell and leaks at two of the nozzles. The bottom of the sump was not inspected. One nozzle leak was inside the sump shell so it did not reach the environment. The other nozzle leak is believed to be the result of sandblasting the area to facilitate further inspection. The sandblasting operation perforated the inner steel liner shell so the exact source of the leak could not be determined. An attempt to remove inner steel liner was unsuccessful, so it was decided to replace the entire sump. The replacement sump was installed and is expected to be placed into service in early December.

The gravity drain lines, catch basins, and floor drains influent to the sump were all tightness tested using the static hydro-test method and found to be leak free. The catch basins were lined with an epoxy material to prolong their service life.

One soil sample was collected from the surplus soil following installation of the new sump. The levels of soil contamination in this sample were all below Alaska soil cleanup levels for direct soil exposure, but one analyte, DRO, did exceed the criteria for the soil-to-groundwater pathway.

Because the piping to the sump tested tight, and because the breach in the sump liner was caused by abrasive blasting in the course of its inspection, FHRA does not believe that this sump contributed to a release to the environment during FHRA's ownership. The entire sump has also been replaced. Accordingly, FHRA respectfully requests that ADEC close the investigation of Sump 03-6 and its related piping.

B. Blend Building Sump (05-7)

The Blend Building Sump was found to have corrosion and pitting in the shell in an area between the floor plate and 3-4 inches up the shell. The corrosion had penetrated the shell in various places and was allowing water to seep through the shell and into the sump when it was inspected. One of the three gravity drain lines into the sump was initially unable to pass the static hydro-test for tightness. This line serves the floor drain system in the Blend Building.

A new bottom was installed in the sump by pouring a 6-inch layer of concrete into the sump and welding a new floor plate to the sump shell. To address the corrosion and pitting noted in the initial inspection, a 6-inch high steel band was welded in place around the inner circumference of the shell just above the floor. Following the sump structural repairs, the new welds were acceptance tested and approved for service.

The floor drains and cleanout fittings in the Blend Building were inspected and three floor drain/trap assemblies and two cleanout fittings were excavated and replaced. One of the floor drain/trap assemblies was found to have no bottom in the iron casting which would be an apparent source of leakage to ground for anything that was disposed into that fixture. No leaks were detected in the actual piping in the floor drain system, just at the fixtures at various terminations. Unless the floor drain system became surcharged, it is unlikely that any liquid other than that directly applied to a defective floor drain would have leaked from the drainage system. Following the upgrades to the drainage fixtures, the drain line serving the Blend Building was successfully static hydro-tested and determined to be leak free.

Two soil samples were collected from two of the open excavations beneath the concrete floor slab for floor drain and cleanout repairs. The levels of soil contamination in these two samples were all below Alaska soil cleanup levels for direct soil exposure, but several analytes did exceed the criteria for the soil-to-groundwater pathway. No soil samples were collected from the sump area since no excavation was performed during the sump repair, and the surface area is paved.

FHRA diligently records spills of any quantity and at any location at the refinery. There are no records of any spills within the Blend Building that entered the floor drains during FHRA's operations. Furthermore, the Blend Building piping fixtures and Sump 05-7 have been repaired, so there should be no further opportunity for a release of material from this sump system. And although sumps were customarily inspected at 10-year intervals, the Mechanical Integrity Department at FHRA has developed a new schedule for sump inspection based, in part, on previous inspection history. Under the revised schedule for re-inspection of this sump, re-inspection will occur on a 2-year interval to verify that its integrity remains.

To the extent that any material may have been released from this sump during FHRA's ownership, that material is not likely to have contained sulfolane. The vast majority of material received by this sump is kerosene from the kerosene filtration system, which does not use sulfolane. And any fuel hydrocarbon release from this sump would be within the capture zone of the current remediation system, which has been designed precisely for the purpose of capturing and treating fuel hydrocarbons in the groundwater.

Because the sump system has been repaired and because there is no reason to believe that FHRA's operation of Sump 05-7 has caused any material release to the environment that would not have been captured by the existing groundwater remediation system, FHRA respectfully requests that ADEC close its investigation of this sump system, including the Blend Building drains.

C. Tank Farm Truck Kero Sump (922)

The Tank Farm Truck Kero Sump was found to have a potential defect during a mechanical integrity inspection. The sump was initially noted to have a possible defective weld due to a gap that was visible on the inside of the sump around a 6-inch line that penetrated the shell. Once the shell was removed, however, the refinery's mechanical integrity inspector confirmed that the 6-inch nozzle was welded to the sump shell with an external reinforcing pad and found no evidence of a leak. The welds connecting the nozzle to the re-pad and sump were tested using contrast magnetic particle testing, which also revealed no indication of a leak.

The 6-inch line did not pass a tightness test when the line was plugged inside the sump, but did pass the same test when the line was cut several feet outside the sump shell and retested. The section of 6-inch line that was removed was inspected and there was little to no wall loss and no indication of pipe failure.

The sump shell was also inspected and found to have no visual defects. Based on the remaining metal thickness measured during the mechanical integrity inspection, and the fact that the interior surface of the sump shell was neither coated nor lined, it was decided to replace the entire sump assembly.

Sulfolane was not detected in the soil sampling. The levels of soil contamination outside the sump were below Alaska soil cleanup levels for direct soil exposure, but several analytes did exceed the criteria for the soil-to-groundwater pathway. Two samples of the excess excavated soil from the sump area were characterized for disposal, and laboratory results indicated that the soil was non-hazardous under RCRA criteria.

FHRA did not identify any leak from this sump or any integrity issues in the two lines that serve this sump. Nonetheless, the sump was replaced due to aging and end-of-service life considerations. The presence of hydrocarbons in the subsurface soil samples taken from the area of this sump is to be expected based on historical releases and does not necessarily indicate any recent release from this sump system. The sump is located in the middle of the refinery tank

farm where numerous petroleum hydrocarbon releases have occurred over a long period of time by FHRA's predecessors. Those releases are being addressed by FHRA in the context of its ongoing work under the Site Characterization Work Plan and Interim Remedial Action Plan. Therefore, FHRA respectfully requests that ADEC close its investigation of Sump 922 and its associated piping.

D. Naphtha 2 Sump (02/04-2)

The Naphtha 2 Sump had no identified leaks from the sump to the environment when it was inspected visually in May 2009. During this visual inspection, a stained area was noted on the inside of the shell wall around the nozzle penetration from the drain line from Crude Unit 2. The source of this staining was not identified, but the nozzle was noted to lack back-welding to the inside steel shell, indicating that the interior shell was improperly installed in 1997. Upon discovering this defective installation, FHRA sealed the nozzle penetration to the inner shell by welding.

There were two gravity drain lines serving various equipment drains and area drains in both Crude Unit 2 and the Extraction Unit. Both lines were tightness tested using the static hydro-test method. The line from the Extraction Unit passed the tightness test. The line from Crude Unit 2 did not pass the tightness test and could not be successfully repaired. As a result, the entire drain line from Crude Unit 2 was abandoned and isolated from the sump by installing a blind flange inside the sump. No soil samples were collected during the sump investigation and repair because the entire area is paved, and no excavation was performed.

The drain system in Crude Unit 2 that failed the tightness test has been permanently removed from service. Any hydrocarbons that may potentially have been released to groundwater through these drains in Crude Unit 2 (which is not a sulfolane process area), would be expected to be captured by the current remediation system. That system has been designed precisely for the purpose of capturing and treating fuel hydrocarbons in the groundwater. Accordingly, FHRA respectfully requests that the ADEC close its investigation of Sump 02/04-2 and its associated piping.

IV. Mechanical Integrity Program

FHRA has a discrete Department at the refinery that is dedicated to assuring that all process equipment is inspected at regular intervals. Equipment is scheduled for inspection based upon several factors, including the type of equipment, the type of operation it performs, its manner of construction, the chemical and physical environment in which it operates, and other considerations.

Whenever an inspection indicates that the frequency and/or procedure for the inspection of any particular piece of equipment or system should be modified, the Mechanical Integrity Department evaluates and implements changes to the applicable inspection protocols. The recent sump and piping inspection project is no exception to this continuous improvement process. The following improvements to the mechanical integrity program are being implemented as a direct result of observations made during the sump and drain inspection project.

Prior to this sump inspection project, all of the sumps were scheduled for a set 10 year interval between inspections. FHRA used the information gathered in this sump investigation to re-evaluate the frequency of sump inspections based on the individual assessment of each sump's corrosion rate, type of service, and material of construction. Through that assessment, FHRA determined that the frequency of inspection for 10 of the refinery sumps should be changed to a 2 year interval (including S 03-6 and S 05-7); 10 sumps were changed to 3 year interval; 8 sumps were changed to 4 year interval; 11 sumps were changed to 5 year interval; 1 sump was changed to 6 year interval; and 1 sump was changed to 7 year interval. Sump 922 was changed to a 4 year interval because the sump thickness was increased from 1/8" to 1/4" during the replacement.

V. Conclusion

FHRA remains committed to assuring that its operations and processes do not result in unauthorized releases to the environment. This comprehensive sump investigation, which required a commitment of substantial resources over a period of nearly two years, is illustrative of that commitment. If you have any questions about the findings of the investigation or would like additional information, please do not hesitate to contact me.

Sincerely,

Daren Knowles
EHS Manager
Flint Hills Resources Alaska, LLC

Attachments (Table 1 & Attachments A through D)

Knowles, Daren

From: Walker, Todd P. [TWalker@faegre.com]
Sent: Wednesday, December 08, 2010 9:24 AM
To: Knowles, Daren
Cc: Kenneth Podpeskar
Subject: RE: S-922 summary
Attachments: Sump Report December 2010 for ADEC.DOC; Sump Report December 2010 for ADEC (redlined).doc

Good call. I think the findings for 922 came out stronger once I re-wrote them. Attached is a clean revised version you can use for sending to ADEC if you agree with the edits that are shown in the attached redline.

From: Knowles, Daren [mailto:Daren.Knowles@fhr.com]
Sent: Tuesday, December 07, 2010 5:21 PM
To: Walker, Todd P.
Cc: Kenneth Podpeskar
Subject: RE: S-922 summary

I believe this does warrant edits. Please make your attempt and resend for review.

Thanks, Daren

From: Walker, Todd P. [mailto:TWalker@faegre.com]
Sent: Tuesday, December 07, 2010 2:23 PM
To: Nelson, Joe
Cc: Knowles, Daren; Kenneth Podpeskar
Subject: RE: S-922 summary

Daren – the final is in your hands. If you think this information warrants a change to the report, let me know and I can edit the report I sent to you earlier today. I have to leave shortly, but I can do that tomorrow if you like.

The detail is helpful, but unfortunately does not explain why the first test failed, so I am not sure it adds a lot to what we already had to say: that there was a failed leak test, but further testing did not identify where any leak would have occurred.

From: Nelson, Joe [mailto:Joe.Nelson@fhr.com]
Sent: Tuesday, December 07, 2010 4:12 PM
To: Walker, Todd P.
Cc: Knowles, Daren; Kenneth Podpeskar
Subject: FW: S-922 summary

I just received the following inspection information from our MI department. It would appear from this information that both the S-922 sump and the influent piping were intact and that neither indicated a confirmed leak source.

Joe Nelson
Joe.Nelson@fhr.com
ofc: 907/488-0054 (x254)

From: Combs, Justin
Sent: Tuesday, December 07, 2010 1:55 PM
To: Nelson, Joe
Subject: S-922 summary

Joe,

Initially we performed a static test on the lines feeding S-922. One line had a liquid level that dropped about 6" during the test. We removed the old sump and about 6' of pipe, then cleaned out and re-tested the remainder of the line. The line held a steady liquid level, thereby passing the static leak test. Visual examination of the removed 6' of pipe revealed little to no wall loss, and no indication of pipe failure. The sump and the nozzle in question were visually examined, and the welds connecting the nozzle to the re-pad and sump were tested via contrast magnetic particle testing. No relevant indications that would point to a leak were found.

I don't know how to explain the first static test's results, but subsequent detailed inspections on all components of the line failed to reveal any failed areas of the sump or underground piping. To the best of my knowledge, based on our inspections, the sump and its associated underground lines were intact.

Sincerely,
Justin Combs
Flint Hills Resources Alaska
Office- (907) 488-5148
Cell- (907) 590-5798

A leader is best when people barely know he exists; when his work is done, his aim fulfilled, they will say: we did it ourselves. - Lao Tzu

Be who you are and say what you feel, because those who mind don't matter and those who matter don't mind.
--Theodor Seuss Geisel, aka Dr. Seuss

TABLE 1

2009-2010 Sump Inspection Summary

#	SUMP ID	LOCATION	SUMMARY
1	S-02-1	CU2	Sump passed the integrity test. A layer of epoxy grout approximately 3 inches thick was applied to the entire floor surface to provide additional protection to the shell-to-floor-weld seam. The piping to the sump did not pass the leak test but this piping is a desalter service water line that is used intermittently. This sump and the related drain lines are in non-sulfolane process areas. All process drains were plugged and tagged, effectively removing them from service. The piping was re-configured and removed from the sump system. Area drains, which are necessary for storm water control, were returned to service.
2	S-02/04-2	CU2 / Extraction	Sump passed the integrity test, as did the underground piping to the sump from the Extraction Unit. The underground piping from Crude Unit 2 did not pass the integrity test. Crude Unit 2 is a non-sulfolane process area. All process drains and area drains to this sump in Crude Unit 2 were plugged and tagged, and the corresponding drain line within the sump was blind-flanged, effectively removing this portion of the drainage system from service. **See Letter Report Section III and Attachment D for further detail**.
3	S-02/04-4	CU2 / Extraction (North)	Sump passed the integrity test. A pipe to the sump did not but the pipe was an area drain pipe that conveys stormwater runoff from the process area. The pipe was plugged and permanently removed from service.
4	S-03-6	Asphalt Unit	Sump liner thinning and breached during abrasive blast / cleaning before inspection. Liner could not be removed or repaired, so the entire sump was replaced. Inlet lines and basins passed static leak testing. **See Letter Report Section III and Attachment A for further detail**.

#	SUMP ID	LOCATION	SUMMARY
5	S-04-3	Extraction / Cooling Kero pump row	General surface corrosion but no major pitting. Thickness testing acceptable so the sump passed the integrity test. Sump returned to service. Inlet lines passed static leak testing.
6	S-04-6	West Extraction Unit	Minor pitting on walls at bottom of sump. Welded patch to repair. Thickness testing acceptable so the sump passed the integrity test. Inlet lines passed static leak testing.
7	S-05001	Emergency Rail Rack	Sump coating found intact. Thickness testing acceptable so sump passed the integrity test. Inlet lines passed static leak testing.
8	S-05002	CU3 Flash Drum	Inspection revealed floor pitting. Floor replaced. Thickness testing acceptable so the sump passed the integrity test. Inlet lines passed static leak testing.
9	S-05003	CU3 (East)	Epoxy coated liner failed and was removed. Thickness testing acceptable so the sump passed the integrity test. Inlet lines passed static leak testing.
10	S-05004	CU3	Inspection revealed corrosion at floor to wall seam. New ring welded in to repair. Thickness testing acceptable so the sump passed the integrity test. Inlet lines passed static leak testing.
11	S-05005	CU3 Utility Room	Passed integrity and leak test.
12	S-05006	CU3 Tank Farm	Passed integrity test and inlet lines passed static leak testing.
13	S-05007	CU3	Passed integrity test and inlet lines passed static leak testing.
14	S-05116	Wash Skid Sump	Limited sump corrosion. Thickness testing acceptable so the sump passed the integrity test. Inlet lines passed static leak testing.
15	S-05118	Rail Car Steam Out	Passed integrity test and inlet lines passed static leak testing. Partial coating failure, no corrosion.

#	SUMP ID	LOCATION	SUMMARY
16	S-05-7	Blend Building	Sump found to have pin-hole leaks. New floor and ring installed. Three drains and two cleanouts from inside the Blend Building, which flow to this sump, failed integrity tests and were repaired. The majority of material received by this sump comes from the kero filters, which does not contain sulfolane. Some finished hydrocarbon products piped within the blend building may contain sulfolane. No sulfolane solvent is used in this building. **See Letter Report Section III and Attachment B for further detail**.
17	S-05-8	Asphalt pump skid	Limited pitting repaired. Thickness testing acceptable so the sump passed the integrity test. Inlet lines passed static leak testing.
18	S-05-9	Gasoline Loading Pump Skid	Minor corrosion identified. Thickness testing acceptable so the sump passed the integrity test. Inlet lines passed static leak testing. Sump cleaned and returned to service.
19	S-05-10	Blend Building	Passed integrity test. Inlet line found capped just outside sump penetration. Sump determined to be out of service.
20	S-05-11	Proving Meter Skid	Minor pitting and corrosion identified and repaired. Thickness testing acceptable so the sump passed the integrity test. Inlet lines passed static leak testing.
21	S-05-13	Fire Training	Passed integrity and inlet lines passed static leak testing.
22	S-05-14	Blower Building	East inlet found dead-ended; blind flange installed. Re-pads welded to sump wall on 2 remaining penetrations. Inlet lines passed static leak testing.
23	S-07677	CPS Building	Passed integrity test. Building floor slopes directly to sump without underground lines.
24	S-07730	CPS Building	Passed integrity test. Building floor slopes directly to sump without underground lines.

#	SUMP ID	LOCATION	SUMMARY
25	S-901		Sump passed the integrity test. Integrity issues were identified in the sump inlet piping at the point of penetration but this piping is used as a storm water and equipment cleaning water line that would contain intermittent flows to the sump. Remainder of piping was replaced due to blockage from debris that had entered through area storm drains. This sump is located in Crude Unit 1, which is a non-sulfolane process area.
26	S-902	Rail Rack	Sump passed integrity test. Inlet lines passed static leak testing. Substandard welds repaired.
27	S-903	CU1 Charge Skid	Inlet lines passed static leak testing. Sump corrosion repaired by installing new floor. Thickness testing acceptable so the sump passed the integrity test.
28	S-904	Skid #5	Scale and minor pitting observed. Thickness testing acceptable so the sump passed the integrity test. Sump returned to service.
29	S-905	Effluent Building	Minor mechanical damage to floor identified and repaired. Thickness testing acceptable so the sump passed the integrity test. This sump is fed by an exposed floor trough, which was visually inspected and found to be in good condition.
30	S-907	Effluent Building	Minor mechanical damage to floor identified and repaired. Thickness testing acceptable so the sump passed the integrity test. This sump is fed by an exposed floor trough, which was visually inspected and found to be in good condition.
31	S-908	Salt Drier Skid	Corrosion at lower wall welds identified and patched. Thickness testing acceptable so the sump passed the integrity test. Inlet lines passed static leak testing.
32	S-912A	Wastewater to City (East)	Sump 912A, which receives water from lagoon C and pumps it to the CPS unit for arsenic removal before that water is delivered to the City municipal wastewater treatment system, was found to have significant corrosion. No leak was identified. The sump was relined and put back into service. Sump piping is above ground.

#	SUMP ID	LOCATION	SUMMARY
33	S-912B	Off-site Stormwater (West)	Heavy scaling observed. No pitting. Thickness testing acceptable so the sump passed the integrity test. Minor welding repairs completed. Sump piping is above ground.
34	S-913	Tank Farm Area #4	Corrosion observed; shell bottom replaced. Thickness testing acceptable so the sump passed the integrity test. Inlet lines passed static leak testing.
35	S-914	Utility Building	General corrosion and scale removed by sandblasting. Pits identified and fill welded. Thickness testing acceptable so the sump passed the integrity test. Inlet lines passed static leak testing.
36	S-920	Maintenance Building	Moderate to heavy corrosion and pitting observed. Passed integrity test. Inlet lines passed static leak testing.
37	S-921	Tank Farm #3	Minor scaling and pitting observed. Thickness testing acceptable so the sump passed the integrity test.
38	S-922	Kero Filters	Initial leak test for 6-inch pipe failed; subsequent tests passed and did not locate any leak. Sump was replaced due to age and metal thinning. This sump is in a non-sulfolane process area. **See Letter Report Section III and Attachment C for further detail**.
39	S-923	Laboratory	Drain lines found to lack integrity due to original construction with chemically incompatible connectors. Ongoing drain investigation being conducted under ADEC's direction and oversight.
40	S-924	CU2 Compressor Building	Passed integrity test.
41	S-925	Fire Station	Heavy scale. Welding deficiencies identified and repaired. Thickness testing acceptable so the sump passed the integrity test. Inlet lines passed static leak testing.
42	S-926	Truck Rack	Welding deficiencies identified and repaired. Thickness testing acceptable so the sump passed the integrity test. Inlet lines passed static leak testing.

ATTACHMENT A

FHRA Inspection Report for Sump 03-6

1. System Description

Sump S-03-6, also called the Asphalt Sump, is located outdoors within the asphalt unit section in Crude Unit 2. The sump consists of two steel shells partially embedded in concrete. The inner shell was placed inside the outer shell when thickness levels were below minimum tolerances for operation prior to FHRA ownership of the facility. The sump bottom and the lower portion of the sidewall are not in contact with soil. Three pipe nozzles, two 6-inch and one 4-inch, penetrate the sump and are welded to both the inside and outside of the shell. Each nozzle penetration is fitted with a downward oriented elbow and a short section of pipe within the sump to provide a liquid seal between the inlet lines and low liquid level within the sump. A single centrifugal pump operates off level controls to transfer accumulated liquid automatically to the oily water collection system influent to Tank T-192. T-192 operates as an equalization tank and oil/water separator ahead of the wastewater treatment system. The sump nominal dimensions are 5.0 ft in diameter and 8.0 ft from base to rim. The liquid capacity is 1175 gallons.

The influent lines to the sump are gravity drains that connect to 11 outdoor catch basins, one cleanout, and three indoor floor drains. Besides the rainfall and runoff from the surface drainage, the following materials are also directed to the sump in the ordinary course of refinery operations:

S-03-6 Source and Volume Estimates

Source	Product	Flow/Frequency	Average Daily Volume (gal/day)
Vacuum pump waste gas seal KO pots	Kerosene	15 gal / hr	360 gal per day
Waste gas header	Gasoline	5 gal / 2x per day	10 gal per day
VGO pump prep	VGO	40 gal /mo	2 gal per day
Asphalt bottoms pump prep	Asphalt	40 gal per mo	2 gal per day
CU2 desalter effluent	Water	Continuous	*Continuous

*Continuous stream with the rate being determined by the level in the desalter which fluctuates based on process conditions and incoming water in the crude.

2. System Evaluation

FHRA records indicate that in 1997, the sump was relined with an internal steel shell. The internal liner shell was not welded to the original steel shell at the top of the sump, leaving an opening to the small annular space between the two shells. On July 20, 2010, an independent contractor, Acuren USA, Inc., performed a visual examination of the sump's inner steel shell and nozzles. The inspection indicated that the sump shell had general surface corrosion and pitting.

The depth of pitting was not measured at the time because of a potentially explosive atmosphere inside the sump. A lower explosive limit (LEL) alarm was sounded by the portable monitoring instrument used during the inspection which led to the evacuation of the sump and the cessation of the inspection. Holes were found in the 4-inch nozzle inside the sump. This nozzle enters the sump from the north and connects to one catch basin in the asphalt unit. Leakage into the sump was also reported from the 6-inch nozzle that enters from the southwest and serves six catch basins and three floor drains. The source of the leak on the 6-inch nozzle was not identified due to dirt and grit from sand blasting inside the sump. The floor of the sump was not examined because liquid from the southwest nozzle kept pooling on the bottom of the sump.

The area around the leaking southwest nozzle had been sandblasted to permit a more thorough inspection, but during the sandblasting, the inner steel liner shell was perforated so it was decided to replace the inner liner completely. Various methods were evaluated for removal of the inner liner shell. Removal would be more difficult due to the presence of hydrocarbon in the annular space between the inner and outer shells. The source of this hydrocarbon was not determined. Removal of the inner liner was ultimately unsuccessful, so it was decided to suspend any further attempts to repair the existing sump and replace it entirely.

The Mechanical Integrity department at FHRA performed a static tightness test on the three underground drain lines entering the sump on July 22 and 23, 2010. The static tightness test procedure consists of plugging the line at the point where it enters the sump, and filling the line with water from the open end to the point where the water overflows the piping under test at its lowest point. The static water level is then monitored for any decrease in water level, which would be noted on a test log. A successful test is obtained when there is no decrease in static water level over a 4-hour test period.

All lines and their associated catch basins passed the static hydro-test procedure and actually remained tight over a period of several days. The catch basins had some deterioration present in the walls. Even though all catch basins passed the static hydro-test procedure, it was decided out of an abundance of caution to apply an epoxy coating to the catch basin walls up to the level of the discharge nozzle to provide additional surface protection.

Installation of the new sump was completed in mid-October. The sump is scheduled to be returned to service in early December.

Approximately 10 cubic yards of surplus soil from installing the new sump was stockpiled on a visqueen liner and covered for weather protection. Five soil samples from the surplus soil pile were screened with a volatile organic carbon (VOC) analyzer by geologist from SLR International Corp. One screening sample had a much higher VOC content than the others and a second soil sample was collected from the high VOC area for laboratory analysis. This soil sample was submitted to the SGS North America analytical laboratory in Anchorage, AK. The sample was collected on October 14, 2010, and the analyses were completed on October 26, 2010. The laboratory was requested to analyze the soil samples for the following analyte classes, and to express the results on a dry weight basis: Gasoline Range Organics (GRO); Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX); Diesel Range Organics (DRO); Residual Range Organics (RRO); and Total RCRA Metals. The laboratory found the following positive detections in the soil samples:

Sump 03-6 Soil Sample Detections (dry weight basis)

Analyte	Conc (mg/Kg)
GRO	83.2
Benzene	0.707
Ethylbenzene	1.33
Toluene	10.7
Xylenes	12.3
DRO	2400
RRO	180
Arsenic	2.53

Analyte	Conc (mg/Kg)
Barium	113
Cadmium	0.0676
Chromium	10.4
Lead	4.08
Selenium	0.51
Silver	0.012
Mercury	0.0407

No other analytes were detected above their respective reporting limits.

A review of Alaska soil cleanup levels found in Tables B1 and B2 of 18 AAC 75.341 (January 2009) indicates that none of the analytes exceeded the listed concentrations for the most restrictive soil exposure route (inhalation, direct contact, or ingestion). One analyte, DRO, did exceed the tabular values for the migration-to-groundwater criteria. Application of the migration-to-groundwater pathway may not produce an appropriate standard, however, because the contamination is beneath a concrete slab and is not subject to percolation from precipitation. The tabular migration-to-groundwater criteria also do not address site-specific information or the existence and proximity of potential receptors.

ATTACHMENT B

FHRA Inspection Report for Sump 05-7

1. System Description

Sump S-05-7, also called the Blend Building Sump, is located outdoors west of the Blend Building. The sump consists of a steel shell embedded in concrete placed between the shell and the surrounding soil. The steel shell is not in contact with soil. Three pipe penetrations enter the sump and are welded to the shell. Each penetration is fitted with a downward oriented elbow and a short section of pipe within the sump to provide a liquid seal between the inlet lines and low liquid level within the sump. A single centrifugal pump operates off level controls to transfer accumulated liquid automatically to the oily water collection system influent to Tank T-192. T-192 operates as an equalization tank and oil/water separator ahead of the wastewater treatment system. The sump nominal dimensions are 5.0 ft in diameter and 10.0 ft from base to rim. The liquid capacity is 1469 gallons.

In addition to the three influent lines, surface drainage at sump skid and from Crude 2 clay filter skid also are routed to this sump. Besides the rainfall and runoff from the surface drainage, the following waste streams are also directed to the sump in the ordinary course of refinery operations:

S-05-7 Source and Volume Estimates

Source	Product	Flow/Frequency	Average Daily Volume (gal/day)
Sample Trough	Gasoline	1 gal / 2x per day	2 gal/day
Kero Filter Drain	Kerosene	1728 gal / 3x per mo	175 gal/day
Blend Bldg. Samples	Kerosene	1 gal / 2x per day	2 gal/day
Air Dryer Condensate	Water	Varies	Not Measured
Vehicle Wash Bay	Water	Varies	Not Measured
Steam Condensate	Water	Varies	Not Measured
ARC Booster Pump Area Drainage	Normally Dry	Varies	Not Measured
Blend Bldg Floor Drainage	Normally Dry	Varies	Not Measured

2. System Evaluation

On August 10, 2010, an independent contractor, Acuren USA, Inc., performed a visual and ultrasonic thickness (UT) examination on the sump's inner steel shell and nozzles. The inspection indicated that the sump shell had general surface corrosion and pitting and that the bottom 3-4 inches had severe corrosion and pitting that penetrated the sump shell and allowed water to seep into the sump. No other breach in the sump shell or piping was noted.

To correct the defects that were identified, a six inch layer of concrete was placed on the floor of the sump and a new floor welded into place. A six inch high ring was also welded to the shell above the new floor to cover the corrosion and pitting. All new welds were magnetic particle tested and found acceptable.

The Mechanical Integrity Department at FHRA performed a static tightness test on the three underground drain lines entering the sump on August 10 and 11, 2010. The static tightness test procedure consists of plugging the line at the point where it enters the sump, and filling the line with water from the open end to the point where the water overflows the piping under test at its lowest point. The static water level is then monitored for any decrease in water level, which would be noted on a test log. A successful test is obtained when there is no decrease in static water level over a 4-hour test period.

All lines passed the 4-hour static hydro-test procedure except the 6-inch line serving the Blend Building floor drains. There are seven floor drains, two floor level clean-out fittings, and one pipe penetration through the floor for a shower drain. The floor drains were originally equipped with Josam 30500-A Series coated cast iron combination floor drain and integral deep drum "P" traps. The shower drain had a 4-inch subfloor P-trap, and the cleanouts had no traps and were sealed with pipe plugs. The original subfloor plumbing was installed in 1985.

An investigation by FHRA personnel indicated that one of the Josam floor drain traps had no bottom remaining, and it was replaced with a fabricated steel pipe P-trap. Additional inspections indicated that two other floor drains in the Blend Building and a cleanout fitting were also in need of closer inspection and possible replacement. These fittings were excavated and replaced between August 16 and September 9, 2010. Static hydro-tests were performed several times during this period to determine if the source of the drain line leakage had been successfully corrected. It was finally discovered that the hydro-test water had been leaking into the sump through a defective plug used for the test procedure. The plug was repositioned and the Blend Building line was successfully hydro-tested on September 9, 2010, indicating that all of the potential leakage sources had been identified and that the drain line was now leak free. The sump has since been returned to service.

Two soil samples were collected from the soil beneath the concrete floor slab while the excavations to replace one of the floor drains and one of the cleanout fittings were open. The soil sample was collected by an FHRA environmental technician and submitted to the SGS North America analytical laboratory in Anchorage, AK. The sample was collected on August 25, 2010, and the analyses were completed on September 3, 2010. The laboratory was requested to analyze the soil samples for the following analyte classes, and to express the results on a dry weight basis: Gasoline Range Organics (GRO); Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX); Diesel Range Organics (DRO); Residual Range Organics (RRO); Polynuclear Aromatic Hydrocarbons (PAHs); Semivolatile Organic Hydrocarbons (SVOCs); and Sulfolane. The laboratory found the following positive detections in the soil samples:

Sump 05-7 Soil Sample Detections (dry weight basis)

Analyte	Conc (mg/Kg)	
	Drain/ Trap	Cleanout
GRO	3.89	3.06
Toluene	0.0341	ND
Xylenes	0.111	0.0937
DRO	780	9060
RRO	387	2210
bis(2-ethylhexyl)phthalate	[1]2.06	ND
Sulfolane	3.00	ND
Naphthalene	ND	4.86

Analyte	Conc (mg/Kg)	
	Drain/ Trap	Cleanout
Dibenzofuran	ND	3.86
2-methylnaphthalene	ND	38.7
1-Methylnaphthalene	0.111	14.7
Fluorene	0.0584	4.70
Phenanthrene	ND	8.07
Anthracene	ND	0.382
Chrysene	ND	0.196

[1]Bis(2-ethylhexyl)phthalate is a common laboratory contaminant found in certain plastics.

No other analytes were detected above their respective reporting limits.

A review of Alaska soil cleanup levels found in Tables B1 and B2 of 18 AAC 75.341 (January 2009) indicates that none of the detected analytes exceeded the listed concentrations for the most restrictive soil exposure route (inhalation, direct contact, or ingestion). Some analytes, including DRO and methylnaphthalenes, did exceed the tabular values for the migration-to-groundwater criteria. Application of the migration-to-groundwater pathway may not produce an appropriate cleanup standard, however, because the contamination is beneath an indoor floor slab and is not subject to percolation from precipitation. The tabular migration-to-groundwater criteria also do not address site-specific information or the existence and proximity of potential receptors.

ATTACHMENT C

FHRA Inspection Report for Sump 922

1. System Description

The sump basin consists of a steel shell embedded in a base of concrete. A larger corrugated metal pipe surrounds the sump shell, and the annular space between the steel shell and corrugated metal pipe is filled with expandable foam. Two pipe penetrations enter the sump and are welded to the shell. Each penetration is fitted with a downward oriented elbow and a short section of pipe within the sump to provide a liquid seal between the inlet lines and low liquid level within the sump. A single centrifugal pump operates off level controls to transfer accumulated liquid automatically to the oily water collection system influent to Tank T-192. T-192 operates as an equalization tank and oil/water separator ahead of the wastewater treatment system. The sump measures 2.67 ft in diameter and 7.27 ft from base to rim. The nominal liquid capacity is 300 gallons.

There are one 4-inch and one 6-inch gravity drain lines entering the sump. The 4-inch line connects the sump to floor drains in two outdoor equipment skids located west of the sump. The 6-inch line connects drains within an equipment skid east of the sump as well as drains within an asphalt loading pump skid located west of the sump.

2. System Evaluation

On July 20, 2010, an independent contractor, Acuren USA, Inc., performed a visual and ultrasonic thickness (UT) examination on the sump's inner steel shell. Acuren did not identify any visible leaks in the sump shell. When the shell was inspected from the inside, they identified a gap in the shell surrounding the 6-inch nozzle. The inspector surmised that the 6-inch nozzle was attached using an external reinforcing pad welded to the outside surface of the sump shell, but was not back-welded to the inside surface of the sump shell. A visual check by the refinery mechanical integrity (MI) inspector after the sump was removed confirmed that the 6-inch nozzle was welded to the sump shell with an external reinforcing pad and found no evidence of a leak. The welds connecting the nozzle to the re-pad and sump were tested using contrast magnetic particle testing, which revealed no indication of a leak.

The MI Department at FHRA performed a static tightness test on the two underground drain lines entering the sump on July 21, 2010. The static tightness test procedure consists of plugging the line inside the sump at the point where the piping enters the sump, and filling the line with water from the open end to the point where the water overflows the piping under test at its lowest point. The static water level is then monitored for any decrease in water level, which would be noted on a test log. A successful test is obtained when there is no decrease in static water level over a 4-hour test period.

The 4-inch line passed the static tightness test. The 6-inch line did not initially pass the tightness test, so the soil around the exterior perimeter of the corrugated metal pipe serving as a form for the concrete liner was excavated to expose the connecting piping for further inspection and testing. A short section of the 6-inch pipe was removed from the sump by cutting the pipe, and the buried portions of the 6-inch line were retested using the static tightness procedure. The 6-inch buried pipe successfully passed the second tightness test, and no leak was detected. A

subsequent examination of the short section of 6-inch pipe that was removed for the tightness test was also completed by the MI department, and no physical defect was detected. This inspection revealed that there was little to no wall loss, and no indication of pipe failure.

No visible area of leakage was identified in the sump shell or in the section of 6-inch pipe that was removed from the exterior of the sump shell. The UT examination did indicate that the shell material was nearing the end of its service life, so it was determined to replace the entire sump shell. This work was scheduled, and the new sump was subsequently installed.

Following removal of the old sump, a soil sample was collected from beneath its former location. Due to an elevated groundwater condition, there was standing groundwater in the sump excavation at the time the soil sample was collected. Normally, a soil sample is not collected from below the groundwater surface because it is not possible to determine the respective contaminant contributions from groundwater and from contaminated soil. Notwithstanding this difficulty, it was decided to collect the sample at this location due to no better alternate location. The sample was collected using a backhoe bucket to avoid entering the excavation. The backhoe was also able to collect the sample from an area that was less disturbed or exposed to ambient conditions, thus preserving the potential volatile organic compound (VOC) content of the sample.

The soil sample was collected by an FHRA environmental technician and submitted to the SGS North America analytical laboratory in Anchorage, AK. The sample was collected on August 26, 2010, and the analyses were completed on September 9, 2010. The laboratory was requested to analyze the soil samples for the following analyte classes, and to express the results on a dry weight basis: Gasoline Range Organics (GRO); Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX); Diesel Range Organics (DRO); Residual Range Organics (RRO); Polynuclear Aromatic Hydrocarbons (PAHs); Semivolatile Organic Hydrocarbons (SVOCs); and Sulfolane. The laboratory found the following positive detections in the soil sample:

Sump 922 Soil Sample Detections (dry weight basis)

Analyte	Conc (mg/Kg)
GRO	129
Benzene	0.141
Toluene	1.76
Ethylbenzene	2.22
Xylenes	25.0
DRO	4450

Analyte	Conc (mg/Kg)
RRO	30.4
Naphthalene	14.2
2-Methylnaphthalene	33.2
1-Methylnaphthalene	21.7
Fluorene	1.05
Phenanthrene	0.285

No other analytes were detected above their respective reporting limits.

A review of Alaska soil cleanup levels found in Tables B1 and B2 of 18 AAC 75.341 (January 2009) indicates that none of the detected analytes exceeded the listed concentrations for the most restrictive soil exposure route (inhalation, direct contact, or ingestion). Some analytes, including benzene, DRO, and methylnaphthalenes, did exceed the tabular values for the

migration-to-groundwater criteria. Application of the migration-to-groundwater pathway may not produce an appropriate cleanup standard, however, because the contamination is beneath an indoor floor slab and is not subject to percolation from precipitation. The tabular migration-to-groundwater criteria also do not address site-specific information or the existence and proximity of potential receptors.

On October 5, 2010, the replacement sump was commissioned and returned to service. On October 14, 2010, the excess soil remaining from the installation of the new sump was sampled by a geologist from SLR Corporation. Two soil samples (SS-27 and SS-31) were submitted to the SGS North America laboratory for disposal characterization using the following suite of analytes: Gasoline Range Organics (GRO); Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX); Diesel Range Organics (DRO); Residual Range Organics (RRO); and 8 RCRA Metals. On October 26, 2010, the laboratory identified the positive detections in the soil samples submitted for characterization listed in Table 2. The higher of the detected values for the two soil samples is listed. None of the listed analytes exceeded the criteria for the definition of a characteristic hazardous waste by the toxicity characteristic.

Sump 922 Soil Characterization Sample Detections (dry weight basis)

Analyte	Conc (mg/Kg)
GRO	609
Benzene	7.92
Toluene	90.2
Ethylbenzene	5.16
Xylenes	72.6
DRO	6390
RRO	194

Analyte	Conc (mg/Kg)
Arsenic	3.12
Barium	64.1
Cadmium	0.095
Chromium	12
Lead	5
Selenium	0.506
Silver	0.101
Mercury	0.0421

ATTACHMENT D

FHRA Inspection Report for Sump 02/04-2

1. System Description

Sump S-02/04-2, also called the Naphtha 2 Sump, is located outdoors about midway between the Extraction Unit to the east and Crude Unit 2 to the west. Prior to 1997, the sump consisted of a steel shell partially embedded in concrete placed between the shell and the surrounding soil. The upper portion of that outer steel shell is in contact with soil. As a result of a failed inspection in 1997, in November 1997 a steel liner and new floor was installed inside the original sump shell.

Two 6-inch pipe nozzles penetrate the sump and are welded to both the inside and outside of the outer shell. Each nozzle penetration in the inner shell is fitted with a downward oriented elbow and a short section of pipe within the sump to provide a liquid seal between the inlet lines and low liquid level within the sump. A single centrifugal pump operates off level controls to transfer accumulated liquid automatically to the oily water collection system influent to Tank T-192. T-192 operates as an equalization tank and oil/water separator ahead of the wastewater treatment system. The sump nominal dimensions are 5.0 ft in diameter and 8.0 ft from base to rim. The liquid capacity is 1175 gallons.

The influent line to the sump from the Extraction Unit includes 16 equipment drains, 1 area drain, and 3 cleanouts. The other influent line to the sump from Crude Unit 2 includes 10 equipment drains, 2 area drains, and 5 cleanouts. The drain lines and equipment drains are all constructed of carbon steel. The area drains and cleanout fittings are cast iron construction. There is also a separate sample trough line that enters the sump. Expected flows to this sump would include intermittent hydrocarbon discharges from various pieces of equipment in these units on an unscheduled basis.

2. System Evaluation

As a consequence of findings from an inspection in 1997, the sump had been relined with an internal steel shell. On May 19, 2009, an independent contractor, Acuren USA, Inc., performed a visual examination of the sump's inner steel shell and nozzles. The inspection indicated that the interior sump shell had moderate pitting and minor surface corrosion. The internal surface coating also was observed to have generally failed throughout the sump. The inspector also noted that there was staining around the north side nozzle referring to the Crude Unit 2 influent drain line. No perforations or leaks were identified in the sump shell or floor. In addition to the staining around the Crude Unit 2 drain line nozzle, it also appeared to the inspector that the nozzle was not backwelded to the inner steel liner, and that a gasket at the nozzle had potentially failed. Subsequent evaluation indicated that the defective gasket was actually a section of sump liner that had delaminated from the inner shell and was not related to any actual gasketed connection.

The Crude Unit 2 influent drain line nozzle was welded to the inner steel shell, eliminating the opening to the annular space that was not sealed when the liner was installed in 1997. A static hydro-test was also performed on both influent drain lines on May 22, 2009. The static tightness test procedure consists of plugging the line at the point where it enters the sump, and filling the line with liquid from the open end to the point where the liquid overflows the piping under test at its lowest point. The static liquid level is then monitored for any decrease in level, which would be noted on a test log. A successful test is obtained when there is no decrease in static liquid level over a 4-hour test period.

The drain line serving the Extraction Unit was successfully tightness tested. The other drain line serving Crude Unit 2 was unable to successfully pass the tightness test. Subsequent investigation and multiple retesting did not reveal the cause of the failed tightness test. It was decided at that time to eliminate any hydrocarbon sources from the drain piping and to only allow rainfall and runoff sources to flow through the area drains to the sump. Currently, all the Extraction Unit drainage lines to the sump have all been returned to normal service, but all the drainage lines from Crude Unit 2 that flow to the sump have all been removed from service and are no longer functional. Since no excavation was required to investigate and repair the sump, no soil samples were collected.