



**US Army Corps
of Engineers®**
Engineer Research and
Development Center



Houma Navigation Canal Lock Complex (TE-113) Study, Louisiana

Houma Navigation Canal Ship Simulation Results

Mario J. Sánchez, S. Keith Martin, and Morgan M. Johnston

October 2019



The U.S. Army Engineer Research and Development Center (ERDC) solves the nation's toughest engineering and environmental challenges. ERDC develops innovative solutions in civil and military engineering, geospatial sciences, water resources, and environmental sciences for the Army, the Department of Defense, civilian agencies, and our nation's public good. Find out more at www.erdclibrary.usace.army.mil.

To search for other technical reports published by ERDC, visit the ERDC online library at <http://acwc.sdp.sirsi.net/client/default>.

Houma Navigation Canal Lock Complex (TE-113) Study, Louisiana

Houma Navigation Canal Ship Simulation Results

Mario J. Sánchez, S. Keith Martin, and Morgan M. Johnston

*Coastal and Hydraulics Laboratory
U.S. Army Engineer Research and Development Center
3909 Halls Ferry Road
Vicksburg, MS 39180-6199*

Final report

Approved for public release; distribution is unlimited.

Prepared for APTIM Environmental and Infrastructure, LLC
4171 Essen Lane
Baton Rouge, LA 70809

Under MIPR 1YCV3-0J72GJ

Abstract

In 2019, the U.S. Army Engineer Research and Development Center, Coastal and Hydraulics Laboratory (CHL), used its Ship-Tow Simulator (STS) to perform a navigation study to assist APTIM Environmental and Infrastructure, Inc. This project was used to help with the evaluation of a channel modification alternative for barge traffic transiting the Houma Navigation Canal (HNC) Lock Complex (TE-113) near Dulac, Louisiana. The study considered the impacts to navigation associated with the addition of a lock structure adjacent to the existing floodwalls and 250-foot swing gate flood control structure (The Bubba Dove flood gate) on the HNC.

The CHL STS is a real-time simulator, which means there is not a time scale and events on the simulator happen at the same rate as real life. A variety of environmental forces act upon the ship during the simulation transit (e.g., currents, wind, waves, bathymetry, and ship-to-ship interaction).

Ship simulation testing of the project was conducted at CHL over a 2-week period from January through February 2019. The simulations involved a 1,200-horsepower towboat with a 6-pack barge configuration in loaded and ballast conditions.

Results in the form of track plots and pilot questionnaires were reviewed to develop final conclusions and recommendations.

DISCLAIMER: The contents of this report are not to be used for advertising, publication, or promotional purposes. Citation of trade names does not constitute an official endorsement or approval of the use of such commercial products. All product names and trademarks cited are the property of their respective owners. The findings of this report are not to be construed as an official Department of the Army position unless so designated by other authorized documents.

DESTROY THIS REPORT WHEN NO LONGER NEEDED. DO NOT RETURN IT TO THE ORIGINATOR.

Contents

Abstract	ii
Figures and Tables.....	v
Preface.....	vi
1 Introduction.....	1
Project background and existing conditions.....	1
Objective	3
Approach.....	3
2 Data Development	4
Simulator description.....	4
Required data.....	5
Design alternatives	5
Test conditions	7
<i>Wind</i>	7
<i>Currents</i>	7
<i>Design ships (ownership)</i>	8
3 Navigation Study	9
Validation	9
Test scenarios and procedure	10
4 Summary of All Runs Completed	12
5 Results	13
Barge and tow traffic through existing gates.....	14
Barge and tow downbound through existing gates with proposed lock structure in place	15
Barge and tow upbound through existing gates with proposed lock structure in place	16
Barge and tow downbound approaching proposed lock structure with existing gates closed.....	17
Barge and tow upbound departing proposed lock structure with existing gates closed.....	18
6 Conclusions and Recommendations	21
HNC Complex gates open	21
HNC Complex gates closed.....	21
Reference	23
Appendix A: Vessel Track Plots and Run Sheets	24
Appendix B: Final Questionnaires	192

Appendix C: Vessel Pilot Cards	209
Unit Conversion Factors	214
Report Documentation Page	

Figures and Tables

Figures

Figure 1. Project vicinity map.....	2
Figure 2. Proposed Houma Navigation Canal Lock Complex.....	2
Figure 3. Golding Barge Line pilot operating the STS during testing.	4
Figure 4. Proposed lock design alternative for Houma Navigation Canal Lock Complex.....	6
Figure 5. Testing area for all simulated scenarios.....	11

Tables

Table 1. Simulation operator and visitors for the Houma Navigation Canal simulations in 2019.	9
Table 2. Summary of runs completed.	12

Preface

This study was conducted for APTIM Environmental and Infrastructure, Inc., under MIPR 1YCV3-0J72GJ. The technical monitor was Ms. Nicole Cutforth.

The work was performed by the Navigation Branch of the Navigation Division, U.S. Army Engineer Research and Development Center, Coastal and Hydraulics Laboratory (ERDC-CHL). At the time of publication of this report, Mr. Timothy W. Shelton was Branch Chief, and Dr. Jacqueline S. Pettway was Chief. Dr. Charles E. Wiggins was the Technical Director for Navigation Research and Development. The Deputy Director of ERDC-CHL was Mr. Jeffrey R. Eckstein, and the Director was Dr. Ty V. Wamsley.

The Commander of ERDC was COL Teresa A. Schlosser, and the Director was Dr. David W. Pittman.

1 Introduction

Project background and existing conditions

The Houma Navigation Canal (HNC) Lock Complex project is located within Terrebonne Parish, Louisiana, near the city of Houma (Figure 1). The HNC is a man-made channel that provides access from the Gulf Intracoastal Waterway to the Gulf of Mexico at Houma, Louisiana. The proposed HNC Lock Complex is shown in Figure 2. The HNC Lock Complex will be located approximately at mile 20 of the federally authorized channel, 4 miles south of Dulac, Louisiana. At the location of the project, the width of the HNC is approximately 945 feet (ft) at the water surface. The bottom of the HNC is between elevation (EL) -18.0 ft and EL -20.0 ft (North American Vertical Datum of 1988 [NAVD88]) with a width of approximately 200 ft. The authorized channel dimensions are EL -16.0 ft (NAVD88) with a width of 125 ft at that depth.

The Bubba Dove barge gate was constructed with local sales tax revenue and state funds at a total cost of 50 million dollars. The barge gate is 273 ft long, 60 ft wide, and 42 ft tall (extending from a depth of -24 ft to an elevation 18 ft above sea level). The Bubba Dove barge gate was constructed as an interim flood protection measure. Its purpose was to aid in flood protection until the federally sponsored Morganza to the Gulf Hurricane Protection (MGHP) project allowed the construction of the MGHP-designed structure and lock complex.

Figure 1. Project vicinity map.

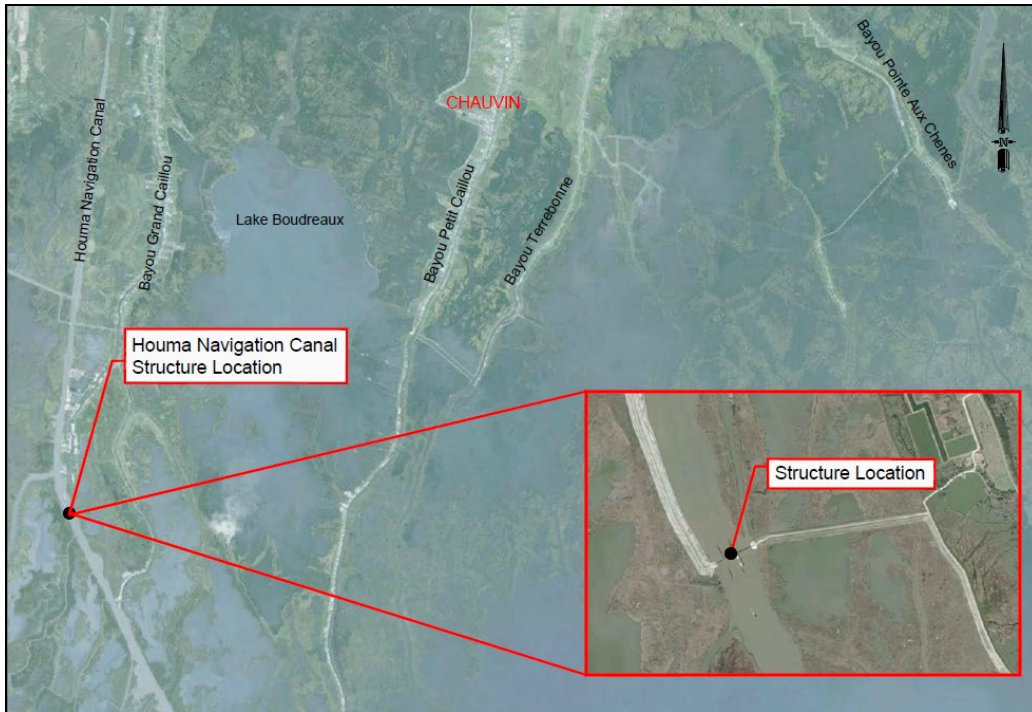
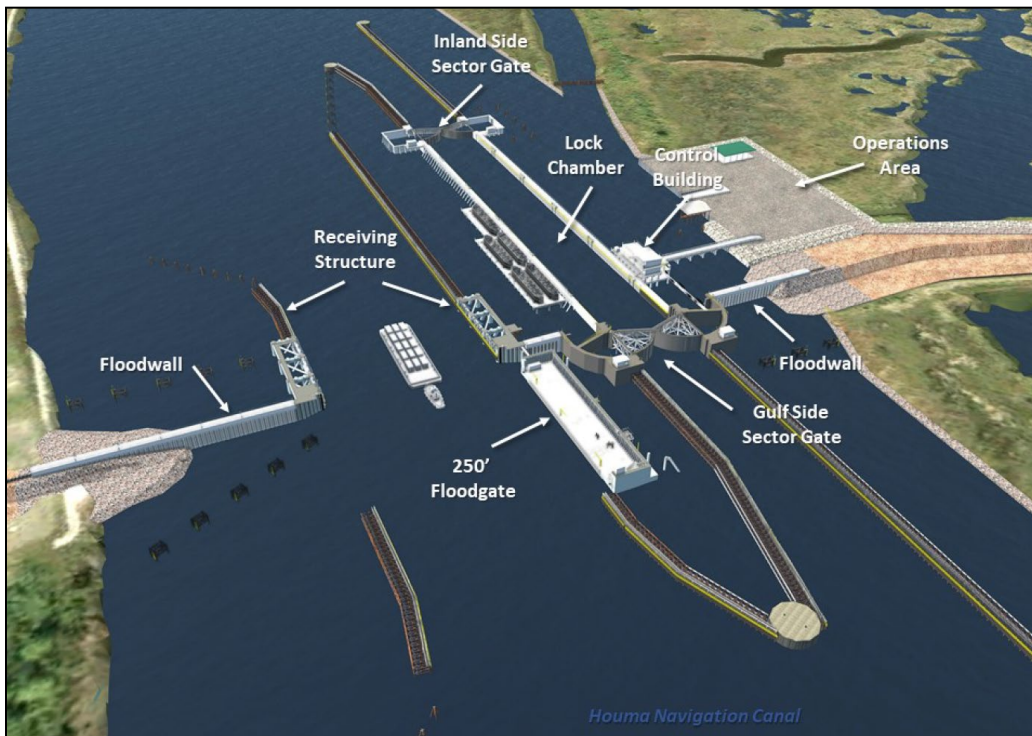


Figure 2. Proposed Houma Navigation Canal Lock Complex.



Objective

To assess the proposed structure, a real-time ship simulation study was performed. The study considered the impacts to navigation associated with the addition of the lock structure adjacent to the existing floodwalls and Bubba Dove flood gate on the HNC.

The structure will provide ecosystem restoration, prevent saltwater intrusion, improve distribution of freshwater within the Terrebonne Basin, and provide storm risk reduction to the 1% annual exceedance event (100-year return period). The structure will also provide benefits to the environment, population, and economy in the Terrebonne Basin and surrounding areas.

Approach

The HNC Lock Complex navigation study was conducted using a series of ship simulation exercises performed at the ERDC Ship-Tow Simulator (STS) Facility. A detailed description of the process is presented in Chapter 2. Results of the simulation tests, performed by locally licensed pilots, and their thoughts and comments were then analyzed to decide on the final recommendations.

2 Data Development

Simulator description

The ERDC STS has been the U.S. Army Corps of Engineers primary modeling tool for deep-draft navigation projects since the early 1980s. STS technology has been applied to over 70 harbor improvement projects on the Atlantic, Gulf of Mexico, and Pacific Coasts as well as Alaska, Hawaii, and Puerto Rico.

The ERDC STS is a real-time simulation model. Real-time simulations do not have a time scale associated with them. Events on the simulator require the same amount of time as they do in real life. A photograph of the ERDC STS is shown in Figure 3.

Figure 3. Golding Barge Line pilot operating the STS during testing.



The mariner controls, or cons, the simulated ship in a similar manner to how they con a ship in real life. Forces operated by the mariner include the rudder, engine, tugs, and thrusters.

A variety of environmental forces act upon the ship during the simulation transit. These include currents, wind, waves, bathymetry,

and ship-to-ship interaction. Initial databases are developed for the area of interest as it exists today. These databases are validated with experienced mariners and then modified to reflect future conditions. A more detailed description of channel design using a ship simulator is available in Webb (1994).

Required data

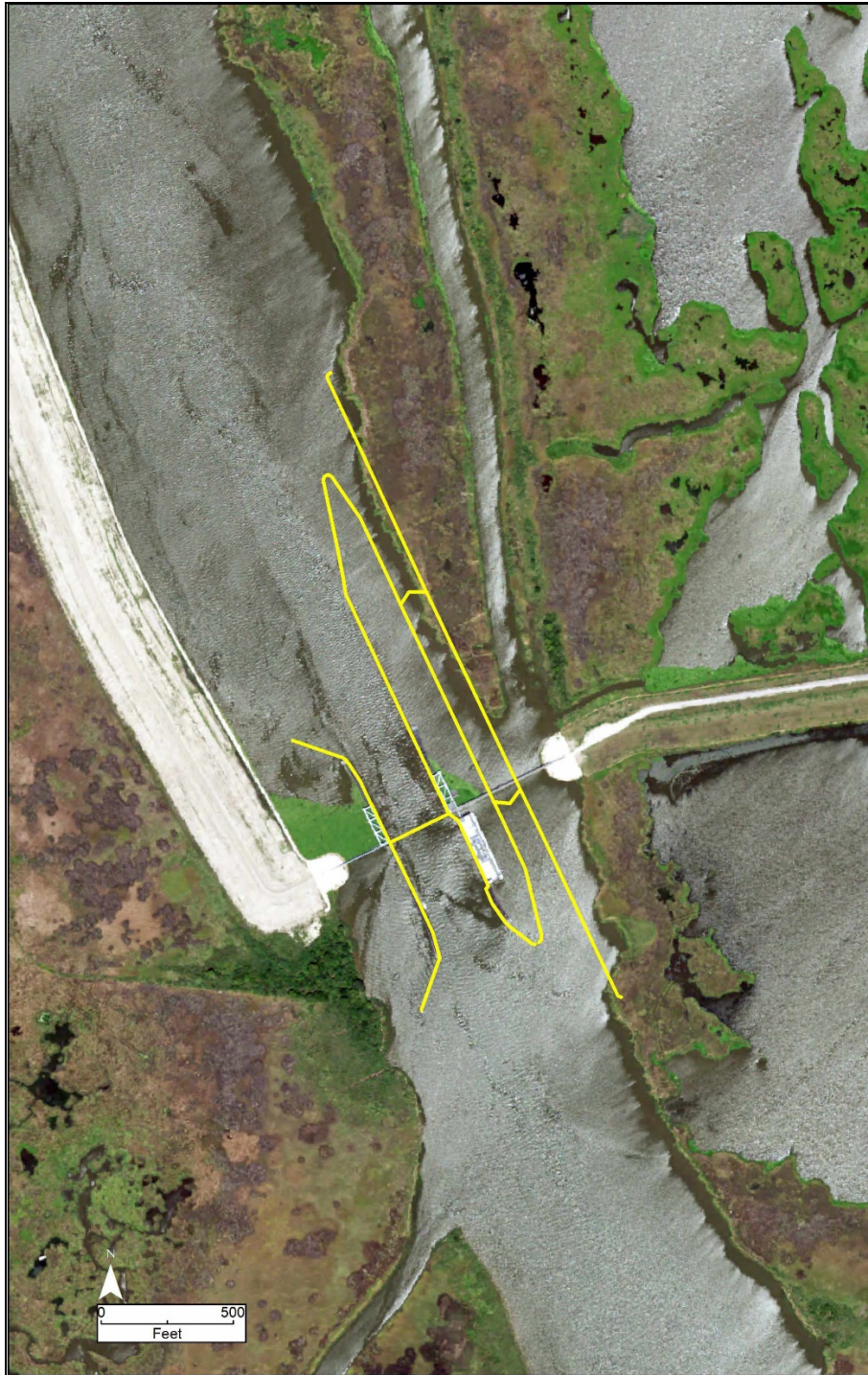
For this study, data required for the area of interest included channel geometry, bathymetry, numerical models for the ships to be evaluated, numerical models of the currents, and visual data of the physical scene. Dredging survey reports provided by APTIM were used to establish channel alignment for all design alternatives. A reconnaissance trip was conducted in November of 2018. On the survey boat during this trip, a discussion was held with representatives from APTIM in regard to navigation in the HNC, and digital photographs were taken that would be used to develop the simulator's visual scene database.

There are two basic types of simulator databases: visual and environmental. The visual databases include the visual scene, radar, and Electronic Chart Display and Information System. The environmental databases include current, bathymetry, and wind. Current databases are developed from the output of a separate hydrodynamic model study. Bathymetry databases use the input from the same hydrodynamic model and are supplemented by additional data sources as necessary. Wind speed and direction are input at run time.

Design alternatives

The design alternative tested was a structural modification to the Bubba Dove structure. This modification consisted of an addition of a lock chamber through the wall on the left descending bank side of the Bubba Dove Barge Gate (Figure 4). The purpose of this lock is to enable Houma Navigation Canal vessel traffic to transit past the structure during events where conditions necessitate the closure of the barge gate. Under normal conditions when the barge gate is open, the lock chamber will remain open and not be transited.

Figure 4. Proposed lock design alternative for Houma Navigation Canal Lock Complex.



Data recorded during these simulations were post-processed into vessel track plots, included in Appendix A. Mariners were given the run sheets at the end of each exercise to record their comments. These are also included in Appendix A directly following each corresponding track plot.

In addition, pilot comments from final questionnaires (Appendix B) and conversations were used for evaluation.

Test conditions

All simulation scenarios including wind (magnitude and direction), current (magnitude and direction), and design vessels were developed in conjunction with the pilots as approved by APTIM. Conditions were chosen as to provide a **maximum credible worst case scenario** (i.e., the worst conditions under which the area of interest would operate on a regular basis).

Wind

The wind module gusts randomly plus or minus 10% of the average wind speed, with a 10% variation on the direction as well. Three wind conditions were selected for this study. For runs with the existing plan and runs through the existing gates with the proposed lock in place, a 15-knot wind speed from the south was used. For runs approaching the proposed lock structure with the existing gates closed, in addition to the 15-knot southern wind, wind conditions of 10 knots from the east and from the west were evaluated as well.

Currents

Three sets of current databases were developed and used for simulation testing: one database for the existing condition and two databases for the proposed project condition. These databases were modeled by FTN Associates, Ltd¹. The current databases encompassed the existing condition upbound and downbound approaches for the Bubba Dove structure, including Bayou Grand Caillou (BGC). Only the downbound approach flow field was modeled and available for the alternative testing as the upbound approach experienced negligible flow with the lock chamber and barge gate closed.

The existing condition current database consisted of the observed flows with the Bubba Dove barge gate open. Current magnitude and direction

¹ FTN. 2018. *Numerical Hydrodynamic Modeling Development of System-Wide and Near-Field Models, Calibration, and Initial Alternatives Evaluations. Houma Navigation Canal Lock Complex (TE-113)*, Terrebonne Parish, Louisiana. FTN Associates, Ltd. April 26, 2018. Baton Rouge, Louisiana. Navigation Technical memo dated September 18, 2017 (Appendix B).

were extracted from a steady state run of the above-mentioned hydrodynamic model run for a 2013 calibration period. The term *observed flows* refers to flows in the Atchafalaya River, as detailed in the FTN report¹. The with-project current databases consisted of (1) observed flows and both flood gates open and the HNC Lock open and (2) average flows with the HNC floodgate closed, the HNC Lock closed, and the BGC floodgate open. Currents for this condition were extracted from the same 2013 calibration period used for existing conditions. The “average flows” database was developed using the average flow condition in the Atchafalaya River.

Design ships (ownership)

Ownership is a simulator term defining the ship being driven by a human pilot during the simulation. The pilot cards for all ownerships are included in Appendix C. These design ships were selected through coordination with the Terrebonne Levee and Conservation District (TLCD) and APTIM. The ships are even keel, meaning that the draft is the same along the length of the ship. The following vessels were used as ownerships in this study.

- **6-Pack Loaded Barge and Tow** (1,200 horsepower [hp]) – *Kin King*: 655- × 70- × 9.5 ft. The *Kin King* is an integrated loaded 6-pack barge pushed by a 1,200 hp tow.
- **6-Pack Ballasted Barge and Tow** (1,200 hp) – *Kin King*: 655- × 70- × 6.8 ft. The *Kin King* is an integrated empty 6-pack barge pushed by a 1,200 hp tow.

¹ FTN. 2018. *Numerical Hydrodynamic Modeling Development of System-Wide and Near-Field Models, Calibration, and Initial Alternatives Evaluations. Houma Navigation Canal Lock Complex (TE-113)*, Terrebonne Parish, Louisiana. FTN Associates, Ltd. April 26, 2018. Baton Rouge, Louisiana. Navigation Technical memo dated September 18, 2017 (Appendix B).

3 Navigation Study

Real-time simulations were conducted during January and February of 2019. Table 1 lists the pilots and visitors for the simulation program.

Table 1. Simulation operator and visitors for the Houma Navigation Canal simulations in 2019.

Name	Date	Affiliation	Session	Purpose
Capt. Michael Jeffrey Orr	28JAN-01FEB	Golding Barge Line	Validation/Testing 1	Pilot
Capt. Jason Jones	28JAN-01FEB	Golding Barge Line	Validation/Testing 1	Pilot
Capt. Kevin Keele	04-08 FEB	Golding Barge Line	Testing 2	Pilot
Capt. Mathew Truss	04-08 FEB	Golding Barge Line	Testing 2	Pilot
Jeff Peña	07 FEB	APTIM	Testing 2	Observer
Mitch Marmande	07 FEB	Delta Coast Consultants	Testing 2	Observer
Reggie Dupree	07 FEB	TLCD	Testing 2	Observer

Validation

Tow pilots performed validation for the study from 28 to 29 January. During validation, runs are made with existing conditions, using the existing simulation databases. These databases are adjusted until the existing conditions are as similar to the prototype as possible. These adjustments are then interpreted forward to the databases for the alternative improvements. The following parameters were confirmed during validation:

- Wind effects
- Bank conditions
- Ship engine and rudder response
- Currents
- Visual scene and radar image for the entire study area; Location of all ATONs¹
- Location of buildings visible from the vessel.

¹ Aids to navigation.

Validation began by the pilots transiting through the visual scene to quickly verify building and buoy locations. After this was done, real-time simulations were executed with the ship transiting the entire study area. During these runs, special attention was given by the pilot to the response of the vessel due to external forces. Once the problem areas were isolated, the model was modified and additional runs were conducted through the problem areas. This process was repeated until the pilots were satisfied with the simulated vessel response being similar to that of an actual vessel in the prototype. The same modifications were carried forward to the databases for the alternative improvements.

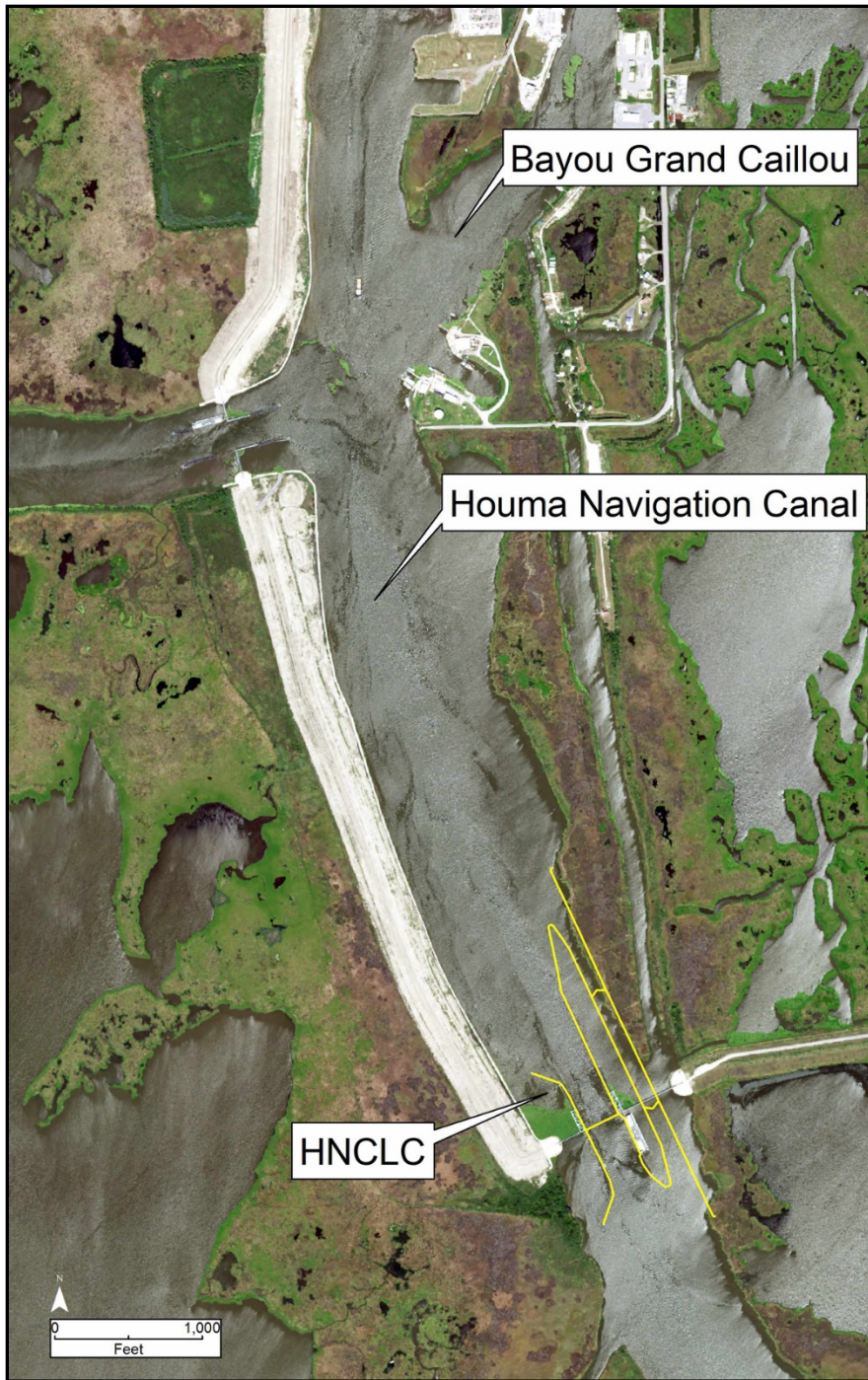
Test scenarios and procedure

To completely analyze the proposed channels, downbound and upbound test runs were simulated using all the design ships. All downbound runs began a half-mile north of the HNC confluence with BGC (Figure 5), continuing to the HNC Lock Complex. Upbound runs transiting the Bubba Dove gate began a half-mile south of the HNC complex continuing past the HNC confluence with BGC. For upbound runs exiting the proposed lock structure, runs began with the vessel lined up with the guide wall of the proposed lock structure continuing past the HNC confluence with BGC.

Simulations were conducted in a random order. This was done to keep the pilots interest and not allow them to “get in a rut”. Pilots were cautioned to “pilot a towboat” not a simulator. Any maneuver that could not be accomplished in real life should not be attempted. This keeps the simulations realistic and allows the study to yield accurate results.

During each simulator run, the characteristic parameters of the ship were recorded automatically every 30 seconds. These parameters included the position of the center of gravity of the ship, speed, engine RPM, heading, drift angle, rate of turn, and rudder angle.

Figure 5. Testing area for all simulated scenarios.



4 Summary of All Runs Completed

The proposed widening alternatives were tested for the different design ship configurations and wind conditions, as economically justified. Table 2 includes a summary of all runs completed over the course of the simulations.

The official scope of work for the Houma Navigation Canal simulation program contained 20 simulation scenarios. During testing, some alternatives were dropped or modified based upon observations during the simulations and discussions immediately afterward. Note that these decisions were based on runtime observations, not the analysis of recorded data. Decisions to eliminate an alternative or scenario from further testing were consensus opinions of the representatives of ERDC, APTIM, and the pilots that observed the simulations in question. These decisions were not necessarily documented or recorded. Also, if a scenario or alternative was dropped or modified, the scenario or alternative could be added back into the simulation program, if observations during additional tests indicated that it would be worthwhile. These means of reducing simulation exercises were necessary to keep simulation time down to a reasonable duration.

Mariners from Golding Barge Line were onsite at ERDC in Vicksburg for 2 weeks of simulation, including validation.

Table 2. Summary of runs completed.

Scenario	Design Ship	Heading	No. Runs
Existing conditions	Kin King (loaded and ballasted)	Downbound/Upbound	10/10
Existing gates with proposed lock	Kin King (loaded and ballasted)	Downbound/Upbound	36/32
Proposed lock with existing gates closed	Kin King (loaded and ballasted)	Downbound/Upbound	20/20

5 Results

Results are presented in the form of track plots, pilot run sheets filled out after each exercise (both presented in Appendix A), and final pilot questionnaires (Appendix B). Results will be presented first for barge traffic transiting downbound or upbound with the existing Bubba Dove Structure at the HNC. Those results will be followed by traffic transiting downbound or upbound with the existing Bubba Dove Structure and the proposed adjacent lock in place. Finally, results for traffic transiting downbound or upbound towards the proposed adjacent lock with the Bubba Dove Structure gates closed will be discussed. When discussing pilot notes in this section, their comments pertaining to plan designs will be summarized. The complete annotations can be found in Appendix A.

Navigation study results are analyzed by several criteria. First, during the run, the operator (at the simulator control station) evaluates the test as it is happening. Any problems with the simulator itself are noted, usually resulting in the run being redone. Also, anything that causes a deviation in the norm of the transit (that does not cause the run to fail, but may look unusual) is recorded on the run sheet. After the run, the pilots fill out a short survey on the test and can add any comments that they feel are needed to interpret their transit. The simulation software records many variables about the ownship during its transit, including the ownship speed, heading, rudder angle, channel clearances, etc. These are saved in a report file and are post-processed into track plots after the testing has been completed. These track plots are for the examination of individual and composite runs and for querying distances between ships and important impedances to free navigation such as the channel edge, other ships, and any other objects present in the environment. Note that an ownship leaving the channel during the simulation does not necessarily abort the exercise at that point. In some cases, there is navigable water outside the channel boundaries that the pilots are aware of; in others, it is helpful to know the distance the ownship goes beyond the channel boundary to analyze if the channel needs to be widened. Therefore, having the ship continue is not necessarily regarded as a problem, and acceptable data can be recorded beyond that point.

Due to time and cost constraints, and the availability of pilots licensed for the project area, ship simulation studies only conduct tests that are considered to be important to the understanding of the project design.

These reasons drive the conditions of the tests and are used to create **maximum credible worst case scenarios**. These scenarios include extreme combinations of wind and current, but under which the area of interest would still be expected to be able to operate. This is the standard of practice for maximum conservative evaluation and how all the scenarios in this study were developed with input from the pilots and APTIM engineers. Therefore, when evaluating the results from this study, it is important to recognize that the conditions used were the limits of navigability for the project area.

The pilots acknowledged that a 1,200 hp tow was undersized for this size barge configuration. While a 2,000 hp tow or more is typical, the simulations presented and discussed in this report are representative of a worst-case situation and yield conservative results.

Barge and tow traffic through existing gates

The composite track plots and the corresponding run sheets with pilot comments for upbound and downbound runs for loaded and empty barge configurations are shown in Plates 1-26. Transits were conducted with wind from the south at 15 knots, with flood and ebb conditions. These existing condition runs were made as a base for comparison with the lock alternative runs. The existing condition runs provide ranges for each transit that can be used to determine if the lock chamber implementation causes a significant shift in the tow transit path.

Overall, the transit path did not change more than a beam width across all existing condition simulations. Any disparity among pilots can be attributed to pilot navigational preferences. Even when comparing the loaded barge configurations with the empty configuration, no significant departure from the main transit line is seen. The one notable exception is the Pilot 3 downbound run with the loaded barge configuration under ebb conditions (Plate 1). Pilot 3 did not comment on any problems with the run. Therefore, his deviation from the sailing line of the other three pilots is attributed to either his personal preference for the approach to the Bubba Dove Structure or the fact that this was one of his first runs and he was still acclimating to the simulator's bridge control layout.

The only notable pilot comments resulted from the downbound empty transits (Plates 6-10). Three of the four pilots indicated a strong set to the

left descending bank, which can be attributed to the effect of the wind on the empty barges.

Barge and tow downbound through existing gates with proposed lock structure in place

Plates 1-5, 27-31, and 40-44 illustrate the simulated transits downbound with loaded barges and an ebb tide condition for the existing structure, the lock alternative with observed flow conditions, and the lock alternative with average conditions, respectively. The transits under observed Atchafalaya River conditions (Plates 27-31) showed a disparity in the transits of all four pilots, right after passing the HNC confluence with BGC. The pilot comments (Plates 28-31) did not indicate any specific reason for these differences. Since the runs were successful, these differences are due to the pilots' preference in their approach to the transit. There were similar differences in the existing conditions. This also applies to the average flow condition transit differences (Plates 40-44).

Downbound transits with empty barges under an ebb tide condition with the same three parameters as the previous paragraph — existing structure, modified structure with observed currents, and modified structure with average currents — are shown in plates 6-10, 35-39, and 45-59. The transit lines do change significantly from the existing conditions to the transits made with the alternative conditions. All four pilots noted a set to the left descending bank as they approached the structure on one or more of the three transits. They attributed this to the flow passing through the new lock structure.

Plates 11-13, 50-54, and 60-64 represent the downbound transits with loaded conditions. The range of transit lines are similar to the previously discussed downbound runs. The existing structure condition was only run by Pilots 3 and 4, but it is not a concern as the transit lines across all downbound runs stayed within a consistent range between the banks. There were no significant deviations between the transit lines of the existing conditions and those of the alternative conditions. The pilots did not note any appreciable set to the left descending bank as they approached the structure. Pilots 2 and 3 even commented that set was not experienced.

The empty barge configuration was run downbound, allowing them to line up with the proposed lock structure, shown in Plates 32-34. This scenario

was run to show how barges might approach the lock in the future and shows transits similar to those discussed in the above paragraphs.

Only one set of downbound runs (Plates 55-59, 65-67, and 68-72) were run for empty barges with the flood tide condition. The average flow condition was the only condition used, as it provided the strongest current. The transit lines do not show significant disparity other than that related to pilot approach. All the pilots did note a set to the left descending bank as they approached the structure in at least one of their runs, but they did not feel this was a significant issue.

Barge and tow upbound through existing gates with proposed lock structure in place

The composite track plots for the existing condition and two alternative flow conditions for upbound, loaded barges with ebb tide are shown in Plates 14-18, 73-77, and 83-87. Transit lines do not differ by more than a beam width between pilots on any of the simulated transits. Differences can again be attributed to pilot's approach (navigational preference) to the run. Pilot 2 noted a set in existing condition transit (Plate 16) that he attributed to the effects of wind. Pilot 2 made a noticeable deviation from the other pilots on the average current condition transit (Plate 83). Verbally, he indicated he intentionally drove close to BGC to determine any effects from the ebb flow out of BGC. His comments (Plate 85) do not indicate any effect.

Plates 19-26, 78-82, and 88-92 represent the upbound runs for empty barges with the lock chamber open and ebb conditions. This situation affords extra steerage control for the pilot, as the additional water passing the rudder (from the towboat going against the current) makes it more efficient. The transit lines are consistent between the existing conditions (Plates 19-26) and the alternative conditions (Plates 78-82 and 88-92). Pilot 2 and 4 did note in separate runs that the wind provided some set (Plates 26 and 90, respectively).

The alternative conditions, observed and average, for loaded, upbound runs are presented in Plates 93-97 and 103-107. The pilots commented the runs represented normal transit conditions and noted no difficulties. The transit lines for each run are very similar with only Pilot 2 showing any noticeable deviation.

The empty, upbound runs for observed and alternative flow conditions are shown in Plates 98-102 and 108-112. All the pilots maintained similar transit lines. Pilot 2 indicated a slight set at the barge gate towards the lock but did not indicate any significant difficulty. No other issues were reported by the pilots.

Barge and tow downbound approaching proposed lock structure with existing gates closed

The composite track plots and subsequent run sheets for transits downbound with the existing Bubba Dove Structure gates closed are shown in Plates 113-138. For all of the downbound transits, runs began a half-mile north of BGC and ended once the vessel was lined up with the proposed lock guide walls. Plates 113-128 show track plots and run sheets completed with average ebb current. Plates 129-138 show track plots and run sheets completed with average flood current.

Plate 113 contains a composite track plot for four downbound runs, each from a different pilot, while Plates 114-117 contain the run sheets for each separate pilot. These runs were completed with an average ebb current, 15 knots of wind from the south, and the loaded 6-pack barge. Plate 113 demonstrates a straightforward transit with little variation in the track plots as the vessels line up for the lock. All pilots agreed that there was little issue with this scenario and believed there was adequate room to make the transit.

Plate 118 contains a composite track plot for four downbound runs from all four pilots. The subsequent run sheets are shown in Plates 119-122. These runs were completed with an average ebb current, 15 knots of wind from the south, and the empty 6-pack barge. The wind had a greater impact on the empty 6-pack barge making for a more difficult transit than with the loaded 6-pack barge. Plate 118 shows track plots of the runs where pilots had difficulty lining up for the lock. Pilots believed the combination of the wind, empty barges, and lining up for the lock made this a difficult transit. Pilots believed this scenario was feasible, but unless the higher horsepower tows were used, it could cause a possible hazard of hitting the lock or flood gate.

Plate 123 contains a composite track plot for two downbound runs and Plates 124-125 show the run sheets for this scenario. These runs were completed with an average ebb current, 10 knots of wind from the east,

and the empty 6-pack barge. The wind condition made the transit difficult for the empty 6-pack barge. Plate 123 shows a large swept path on one of tracks. It highlights the impact from the east wind on the unloaded vessel. One of the pilots stated that this transit was unacceptable for the empty 6-pack barge while the other pilot thought it would be a difficult transit, but could be accomplished.

Plate 126 contains a composite track plot for two downbound runs from two different pilots. The subsequent run sheets are shown in Plates 127-128. These runs were completed with an average ebb current, 10 knots of wind from the west, and the empty 6-pack barge. Plate 126 shows a slight swing out on both vessel tracks for the majority of the transit. This highlights a moderate impact from the west wind. The pilots thought this transit was challenging but achievable.

Plate 129 contains a composite track plot for four downbound runs from all four pilots and Plates 130-133 contain the run sheets. These runs were completed with an average flood current, 15 knots of wind from the south, and the loaded 6-pack barge. Plate 129 highlights a smooth transit only showing small deviations in the vessel track plots. All vessels were able to properly line up for the lock. The pilots agreed that there were no problems completing this scenario.

Plate 134 is a composite of four downbound runs from all four pilots. These runs were completed with an average flood current, 15 knots of wind from the south, and the empty 6-pack barge. Plate 134 show track plots where the pilot had difficulty lining up for the lock under the influence of the wind. One pilot landed his vessel on the east side of the lock guide wall. One pilot stated this scenario was unacceptable for the vessel.

Barge and tow upbound departing proposed lock structure with existing gates closed

The composite track plots and subsequent run sheets for transits upbound with the existing Bubba Dove Structure gates closed are shown in Plates 139-158. For all upbound transits, runs began with the barge and tow lined up with the guide wall of the proposed lock structure, and ended once the vessel completely cleared the HNC confluence with BGC. Plates 139-148 show track plots and run sheets completed with average ebb current. Plates 149-158 show track plots and run sheets completed with average flood current.

Plate 139 contains a composite track plot for four upbound runs each from a different pilot while Plates 140-143 contain the run sheets for this scenario. These runs were completed with an average ebb current, 15 knots of wind from the south, and the loaded 6-pack barge. Plate 139 shows a trouble-free transit with little variation in the vessel track plots, especially approaching the HNC confluence with BGC. Here, the barges are subjected to the strongest currents in the simulated area. Pilot 2 made a noticeable deviation from the other pilots; however, all pilots agreed that there were no significant issues with the scenario. The consensus was that the proposed lock placement was ideal for this transit.

Plate 144 contains a composite track plot of four upbound runs from all pilots. The subsequent run sheets are shown in Plates 145-148. These runs were completed with an average ebb current, 15 knots of wind from the south, and the empty 6-pack barge. In this scenario, wind conditions appeared to have little to no effect on the maneuverability of the empty 6-pack barge. This is indicated on Plate 144 by smooth, fairly consistent transit lines. Pilots commented that this scenario posed no problems, mentioning that the proposed lock configuration allowed for easy access to the channel.

Plate 149 contains a composite track plot for four upbound runs from all pilots; Plates 150-153 contain the run sheets for this scenario. These runs were completed with an average flood current, 15 knots of wind from the south, and the loaded 6-pack barge. Plate 149 shows only small deviations in the track plots. The one clear deviation is due to the pilot's personal approach to the transit. All pilots agreed that there were no "set" issues or other problems with this scenario.

Plate 154 contains a composite track plot of four upbound runs from all pilots. The subsequent run sheets are presented in Plates 155-158. These runs were completed with an average flood current, 15 knots of wind from the south, and the empty 6-pack barge. Plate 154 show the transits, with one pilot's path clearly different from the rest. This pilot experienced a slide effect from his steering maneuver in the turn. All other pilots indicated that this scenario presented no difficulties, and no set.

Additional upbound runs

Plates 159-167 show the composite track plots and subsequent run sheets for upbound transits south of the Bubba Dove Structure, aligning with the

proposed lock structure with the existing gates closed. For all of these transits, runs began a half-mile south of the Bubba Dove structure and ended once the vessel was lined up in the proposed lock guide walls. These scenarios were run more as a “what if” with only two pilots running each condition. Results are discussed below.

Plate 159 contains a composite track plot for two upbound runs and Plates 160-161 are the run sheets for this scenario. These runs were completed with no current, 10 knots of wind from the east, and the empty 6-pack barge. This wind condition is very difficult for the empty 6-pack barge. Plate 160 shows a large sweeping path for one track, indicating the impact the eastern wind can have on a vessel. One pilot stated this transit was unacceptable for the empty 6-pack barge. The other pilot indicated that, while this scenario was feasible, a tow boat with higher horsepower would be better suited for these conditions.

Plate 162 contains a composite track plot for two upbound runs from different pilots. The subsequent run sheets are shown in Plates 163-164. These runs were completed with no current, 10 knots of wind from the west, and the empty 6-pack barge. Plate 126 shows similar transits by both pilots. The pilots were able to use the western wind to their advantage in lining up the vessel with the lock. Both pilots stated conditions were acceptable for this scenario.

Plate 165 contains a composite track plot for two upbound runs; Plates 166-167 show the two run sheets for this scenario. These runs were completed with no current, 15 knots of wind from the south, and the empty 6-pack barge. Plate 165 shows slight differences in the transit lines for each pilot. One pilot indicated that conditions were acceptable for the transit. The other pilot stated that the setup (to line up with the lock guide walls) was a little challenging, but he was able to make the proper adjustments in time for a successful run.

6 Conclusions and Recommendations

Conclusions and recommendations are based upon the vessel track plots, pilot comments on the run sheets, observations during simulations, data collected during the tests, and the pilots' final questionnaires. The final questionnaires are included in Appendix B.

The design alternative being examined in this study is the structural modification of the Bubba Dove structure. This modification consists of the addition of a lock chamber and guidewalls through the wall of the left descending bank side of the Bubba Dove Flood Gate structure (Figure 4). The design was tested with all HNC Complex gates open and with all of the gates closed.

Note again that the pilots specify a 1,200 hp tow is undersized for the 6-pack barge configuration. In practice, a 2,000 hp tow, or more, is typical. The simulations presented and discussed in this report are representative of a worst-case situation.

HNC Complex gates open

The track plots and corresponding pilot comments did not note any significant, navigational issues with all HNC Complex gates in the open position. Transits were made through the Bubba Dove barge gate and past BGC in the upbound and downbound directions with both 6-pack barge configurations: empty and loaded conditions. On a few occasions, pilots noted a set to the left descending bank side as the tows approached the barge gate from the downbound direction. They did not consider this set significant enough to restrict navigation.

HNC Complex gates closed

With the HNC gates in the closed position, pilots had no significant issues with transits made with the loaded barge configuration regardless of wind, tide direction, or transit direction.

The empty barge configuration did, however, present some difficulty under the influence of wind. The east and west wind conditions seemed especially challenging. This is not uncommon, as empty barges present a much larger sail area (area exposed to wind) than loaded barges. In these

cases, pilots will simply wait until wind conditions improve before completing their transits.

The results obtained, with the gates closed, indicate that wind is the factor causing the most difficulty with transits, and then only with empty barges. Loaded barges are most effected by currents. Therefore, since the loaded barge configuration transits experienced negligible difficulty, it is concluded that currents are not adversely affected by the closure of the HNC Complex gates.

Based upon these results and observations, it is recommended the lock chamber modification to the Bubba Dove structure be constructed as designed.

Reference

- Webb, D. W. 1994. "Navigation Channel Design Using Real-Time Marine Simulator." *Proceedings of the American Society of Civil Engineers Second International Conference on Dredging and Dredged Material Placement, 1994.*
<http://www.gbv.de/dms/tib-ub-hannover/190849940.pdf>

Appendix A: Vessel Track Plots and Run Sheets



Existing Conditions
Ebb Tide
Loaded Barge
Downbound
15 Knot S Wind

- Pilot 1
- Pilot 2
- Pilot 3
- Pilot 4

0 1,000
Feet

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 28 JAN 2019

Channel Alternative: (P0) P1 P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 1

Repetition: 1

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood

(Ebb)

Added Tide: 0.5m

Wind Condition:

1 (S15)

Heading: Upbound

(Downbound)

PILOT: Capt. Michael J. Orr (Pilot 1) Capt. Jason Jones (Pilot 2)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P0_A_1_E_S15_D_1_1

End Time: 1102

Log Time: 1040

Transit Time: 15:39

Comments:

Normal Running

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 28 Jan 2019

Channel Alternative: (P0) P1 P2

Area A: Houma Navigation Canal

Test Matrix Run Number: /

Repetition: /

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood

(Ebb)

Added Tide:

Wind Condition:

1/S15

Heading: Upbound

(Downbound)

PILOT: Capt. Michael J. Orr (Pilot 1)

Capt. Jason Jones (Pilot 2)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P0-A1-E-S15-D-2-1

End Time: 1109

Log Time: 1047

Transit Time: 15:45

Comments:

Real Smooth ~~STARW~~ NO adverse effects from wind
OR current.

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 5 Feb 2019

Channel Alternative: P0 P1 P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 1

Repetition: 1

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood Ebb Average Observed

Added Tide:

Wind Condition: 1/S15

Heading: Upbound Downbound

PILOT: ^{Kevin Keele} Capt. Wilson Hundley (Pilot 3) Capt. Matthew Truss (Pilot 4)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P0-A-1-E-S15-D-3-1

End Time: 1037

Log Time: 1009

Transit Time: 18:31

Comments: Condition were acceptable, vessel handled realistic.

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 2/5/19

Channel Alternative: P0 P1 P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 1

Repetition: 1

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood Ebb Average Observed

Added Tide:

Wind Condition: 1 S15

Heading: Upbound Downbound

PILOT: Capt. Kevin Keele (Pilot 3) Capt. Matthew Truss (Pilot 4)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P0-A-LE-S15-D-4-1

End Time: 10:30

Log Time: 1002

Transit Time: 17:56

Comments:

To begin with, the transit was smooth before the locks. Once inside the lock wall, I began to feel a set to port but it was easy to correct.



Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 28 JAN 2019

Channel Alternative: (P0) P1 P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 5

Repetition: 1

Design Ship: 1 TUGBA57 (2) TUGBA59 (Empty)

Tide: Flood

(Ebb)

Added Tide: 0.5m

Wind Condition:

1 (S15)

Heading: Upbound

(Downbound)

PILOT: Capt. Michael J. Orr (Pilot 1) Capt. Jason Jones (Pilot 2)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P0-A-2-E-SIS-D-1-1

End Time: 1126

Log Time: 1102

Transit Time: 13:35

Comments:

Normal Runway

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 29 Jan 2019

Channel Alternative: P0 P1 P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 5

Repetition: 1

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood

Ebb

Added Tide:

Wind Condition:

1 S15

Heading: Upbound

Downbound

PILOT: Capt. Michael J. Orr (Pilot 1) Capt. Jason Jones (Pilot 2)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P0-A-2-E-S15-D-2-1

End Time: 1133

Log Time: 1110

Transit Time: 1326

Comments:

0.3 set to the left Decending Bank.
had to keep a point on it to keep it in
good water.

Houma Navigation Complex, LA Lock Addition Simulation Study

Date:

Channel Alternative: P0 P1 P2

Area: A Houma Navigation Canal

Test Matrix Run Number: 5

Repetition: /

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood Ebb Average Observed

Added Tide:

Wind Condition: 1 S15

Heading: Upbound Downbound

PILOT: Capt. Kevin Keele (Pilot 3) Capt. Matthew Truss (Pilot 4)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: PO-A-2-E-S15-D-3-1

End Time: 1529

Log Time: 1509

Transit Time: 13:27

Comments: Strong set to port, but transit was acceptable

Houma Navigation Complex, LA Lock Addition Simulation Study

Date:

Channel Alternative: (P0) P1 P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 5

Repetition: 1

Design Ship: 1 TUGBA57 (2) TUGBA59 (Empty)

Tide: Flood (Ebb) Average (Observed)

Added Tide:

Wind Condition: 1 (S15)

Heading: Upbound (Downbound)

PILOT: Capt. Kevin Keele (Pilot 3) Capt. Matthew Truss (Pilot 4)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P0-A-2-E-S15-D-4-1

End Time: 1522 Log Time: 1500 Transit Time: 13:00

Comments:

Slight set to port w/o structure being there while you're in floodgates.



Existing Conditions
Flood Tide
Loaded Barge
Downbound
15 Knot S Wind

Pilot 3
Pilot 4

0 1,000
Feet

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 5 FEB 2019

Channel Alternative: (P0) P1 P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 2

Repetition: /

Design Ship: (1) TUGBA57 2 TUGBA59 (Empty)

Tide: (Flood) Ebb Average (Observed)

Added Tide:

Wind Condition: (1 S15)

Heading: Upbound (Downbound)

PILOT: Capt. Kevin Keele (Pilot (3)) Capt. Matthew Truss (Pilot 4)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P0-A-1-F-S15-D-3-1

End Time: 1109

Log Time: 1042

Transit Time: 22:30

Comments: Tow handled well, conditions were acceptable

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 2/5/19

Channel Alternative: P0 P1 P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 2

Repetition: 1

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood Ebb Average Observed

Added Tide: 0.5

Wind Condition: 1 S15

Heading: Upbound Downbound

PILOT: Capt. Kevin Keele (Pilot 3) Capt. Matthew Truss (Pilot 4)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P0-A-L-F-S15-D-4-1

End Time: 1105

Log Time: 1045

Transit Time: 19:56

Comments:

Transit was very ideal. There was no problems what so ever.



Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 28 JAN 2019

Channel Alternative: P0 P1 P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 3

Repetition: 1

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood

Ebb

Added Tide: 0.5m

Wind Condition:

1 S15

Heading: Upbound

Downbound

PILOT: Capt. Michael J. Orr (Pilot 1) Capt. Jason Jones (Pilot 2)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P0_A_1_E_S15_U_1_1

End Time: 1040

Log Time: 1012

Transit Time: 22:52

Comments:

No problems at all. Normal

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 28 Jan 2019

Channel Alternative: P0 P1 P2

Area: A: Houma Navigation Canal

Test Matrix Run Number: 3

Repetition: 1

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood

Ebb

Added Tide: 0.5 m

Wind Condition:

1 S15

Heading: Upbound Downbound

PILOT: Capt. Michael J. Orr (Pilot 1) Capt. Jason Jones (Pilot 2)

Filename = Alternative + Area + Vessel + Tide + Wind + Heading + Pilot + Repetition

Filename: P0-A-1-E-S15-U-2-1

End Time: 1046

Log Time: 1023

Transit Time: 21:33

Comments:

NO Adverse Effects. Concerning Current. A little Delay
in Rate of Turn Due to wind. maybe the other
way around. not much to ~~steer~~ steer hard Down.

Houma Navigation Complex, LA Lock Addition Simulation Study

Date:

Channel Alternative: P0 P1 P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 3

Repetition: /

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood Ebb Average Observed

Added Tide:

Wind Condition: 1 S15

Heading: Upbound Downbound

PILOT: Capt. Kevin Keele (Pilot 3) Capt. Matthew Truss (Pilot 4)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P0-A-1-E-S15-U-3-1

End Time: 1509

Log Time: 1441

Transit Time: 23:07

Comments: Normal transit. Conditions acceptable for transit

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 6 FEB 2019

Channel Alternative: P0 P1 P2

Area A: Houma Navigation Canal

Test Matrix Run Number:

Repetition:

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood Ebb Average Observed

Added Tide:

Wind Condition: 1 S15

Heading: Upbound Downbound

PILOT: Capt. Kevin Keele (Pilot 3) Capt. Matthew Truss (Pilot 4)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P0-A-1-E-S15-U-4-1

End Time: 1500

Log Time: 1435

Transit Time: 21:32

Comments:

Transit was great. No problems.



Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 5 Feb 2019

Channel Alternative: P0 P1 P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 7

Repetition: 1

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood Ebb Average Observed

Added Tide:

Wind Condition: 1 S15

Heading: Upbound Downbound

PILOT: Capt. Kevin Keele (Pilot 3) Capt. Matthew Truss (Pilot 4)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P0_A_2_E_S15_U-3-1

End Time: 1209

Log Time: 1146

Transit Time: 19:12

Comments: vessel handled well, conditions were acceptable

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 2/5/19

Channel Alternative: P0 P1 P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 7

Repetition: /

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood Ebb Average Observed

Added Tide:

Wind Condition: 1 S15

Heading: Upbound Downbound

PILOT: Capt. Kevin Keele (Pilot 3) Capt. Matthew Truss (Pilot 4)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P0-A-2-E-S15-U-4-1

End Time: 1200

Log Time: 1135

Transit Time: 15:57

Comments:

Transit was pretty normal. There was winds but the wind didn't create any problems.



Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 28 JAN 2019

Channel Alternative: (P0) P1 P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 8

Repetition: 1

Design Ship: 1 TUGBA57 (2) TUGBA59 (Empty)

Tide: (Flood) Ebb

Added Tide: 0.5m

Wind Condition: (1 S15)

Heading: (Upbound) Downbound

PILOT: Capt. Michael J. Orr (Pilot 1) Capt. Jason Jones (Pilot 2)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P0-A-2-F-S15-U-1-1

End Time: 1153

Log Time: 1131

Transit Time: 14:24

Comments:

Normal Runway

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 28 Jan 2019

Channel Alternative: (P0) P1 P2

Area (A): Houma Navigation Canal

Test Matrix Run Number: 8

Repetition: 1

Design Ship: 1 TUGBA57 (2) TUGBA59 (Empty)

Tide: (Flood) Ebb

Added Tide:

Wind Condition: 1 (S15)

Heading: (Upbound) Downbound

PILOT: Capt. Michael J. Orr (Pilot 1) Capt. Jason Jones (Pilot 2)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: PD-A-2-F-S15-U-2-1

End Time: 11:59

Log Time: 1138

Transit Time: 13:43

Comments:

0.1 Set Left Decindius Bank. with
a 0.1 slide to the cut Right Decindius Bank

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 5 FEB 2019

Channel Alternative: P0 P1 P2

Area A Houma Navigation Canal

Test Matrix Run Number: 8

Repetition: 1

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood Ebb Average Observed

Added Tide:

Wind Condition: 1 S15

Heading: Upbound Downbound

PILOT: Capt. Kevin Keele (Pilot 3) Capt. Matthew Truss (Pilot 4)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P0-A-2-F-S15-U-3-1

End Time: 1146

Log Time: 1116

Transit Time: 20:07

Comments: TAW Handled well, Conditions were acceptable

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 2/5/19

Channel Alternative: P0 P1 P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 8

Repetition: 1

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood Ebb Average Observed

Added Tide:

Wind Condition: 1 S15

Heading: Upbound Downbound

PILOT: Capt. Kevin Keele (Pilot 3) Capt. Matthew Truss (Pilot 4)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P0-A-2-F-S15-U-4-1

End Time: 1135

Log Time: 1120

Transit Time: 13:56

Comments:

During the transit, the wind played a factor in making the lock but it wasn't a huge concern. Once set up for the wind, the lock was easily made.



Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 29 Jan 2019

Channel Alternative: P0 **P1** P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 90

Repetition: 1

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood **Ebb** Average **Observed**

Added Tide: 0.5m

Wind Condition: 1 **S15**

Heading: Upbound **Downbound**

PILOT: Capt. Michael J. Orr (Pilot 1) Capt. Jason Jones (Pilot 2)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: **PLA-1-EB-S15-D-1-1**

End Time: 1710

Log Time: 1649

Transit Time: 1623

Comments:

Howard Ramsey

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 29 Jan 2019

Channel Alternative: P0 (P1) P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 1900

Repetition: 1

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood (Ebb) Average (Observed) Added Tide:

Wind Condition: 1 S15

Heading: Upbound (Downbound)

PILOT: Capt. Michael J. Orr (Pilot 1) Capt. Jason Jones (Pilot 2)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: PLA-LED-S15-D-2-1

End Time: 1711

Log Time: 1654

Transit Time: 1214

Comments:

ON approach held up high for wind set
to Flood gates.

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 5 FEB 2019

Channel Alternative: P0 P1 P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 9

Repetition: 1

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood Ebb Average Observed

Added Tide:

Wind Condition: 1 S15

Heading: Upbound Downbound

PILOT: Capt. Kevin Keele (Pilot 3) Capt. Matthew Truss (Pilot 4)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P1_A_1_E0_S15-D_3_1

End Time: 1240 Log Time: 1223 Transit Time: 19:34

Comments: Conditions were acceptable with minimal set due to lock being in place, vessel handled well.

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 2/5/19

Channel Alternative: P0 P1 P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 9

Repetition: 1

Design Ship: ① TUGBA57 2 TUGBA59 (Empty)

Tide: Flood ② Ebb Average ③ Observed

Added Tide: 2.5m

Wind Condition: 1 S15

Heading: Upbound ④ Downbound

PILOT: Capt. Kevin Keele (Pilot 3) Capt. Matthew Truss (Pilot 4)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P1_A_1_E0_S15_D_4_1

End Time: 1239

Log Time: 1216

Transit Time: 1720

Comments:

Conditions was very calm during the floodgates entrance and exit. No problems



Alternative 1: Lock Gates Open
Observed Ebb Tide
Loaded Barge, Approach Setup
Downbound
15 Knot S Wind

— Pilot 1
— Pilot 2

0 1,000
Feet

Houma Navigation Complex, LA Lock Addition Simulation Study

Date:

Channel Alternative: P0 P1 P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 9 0 L

Repetition: 1

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood Ebb Average Observed

Added Tide:

Wind Condition: 1/S15

Heading: Upbound Downbound Lock

PILOT: Capt. Michael J. Orr (Pilot 1) Capt. Jason Jones (Pilot 2)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P1-A-1-EO-S15-DL-1-1

End Time: 1058

Log Time: 1040

Transit Time: 11min 48s

Comments:

Approved Run; no problem

Houma Navigation Complex, LA Lock Addition Simulation Study

Date:

Channel Alternative: P0 **P1** P2

Area **A**: Houma Navigation Canal

Test Matrix Run Number: 9 0 Lock Repetition: 1

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood **Ebb** Average **Observed** Added Tide: 0.5

Wind Condition: **1 S15**

Heading: Upbound Downbound **Lock**

PILOT: Capt. Michael J. Orr (Pilot 1) Capt. Jason Jones (Pilot 2)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P1-A-1-E0-S15-DL-2-1

End Time: 11:05 Log Time: 1044 Transit Time: 11:16

Comments:

Maneuver through lock
Lined up for approach



Alternative 1: Lock Gates Open
 Observed Ebb Tide
 Empty Barge
 Downbound
 15 Knot S Wind

- Pilot 1
- Pilot 2
- Pilot 3
- Pilot 4

0 1,000
 Feet

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 30 Jan 2019

Channel Alternative: P0 (P1) P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 13

Repetition: 1

Design Ship: 1 TUGBA57 (2 TUGBA59 (Empty))

Tide: Flood (Ebb) Average (Observed)

Added Tide: 0.5m

Wind Condition: 1 S15

Heading: Upbound (Downbound)

PILOT: Capt. Michael J. Orr (Pilot 1) Capt. Jason Jones (Pilot 2)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P1-A-2-E0-S15-D-1-1

End Time: 15:29

Log Time: 15:15

Transit Time: 12:13

Comments:

Normal Running no problems

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 30 Jan 2019

Channel Alternative: P0 P1 P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 13 0

Repetition: 1

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood Ebb Average Observed Added Tide:

Wind Condition: 1 S15

Heading: Upbound Downbound

PILOT: Capt. Michael J. Orr (Pilot 1) Capt. Jason Jones (Pilot 2)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P1-A-2_E0_S15_D-2-1

End Time: 1534

Log Time: 1518

Transit Time: 13:29

Comments:

Normal Running Conditions

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 5 FEB 2019

Channel Alternative: P0 (P1) P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 13

Repetition: 1

Design Ship: 1 TUGBA57 (2) TUGBA59 (Empty)

Tide: Flood (Ebb) Average (Observed)

Added Tide:

Wind Condition: 1 S15

Heading: Upbound (Downbound)

PILOT: Capt. Kevin Keele (Pilot 3) Capt. Matthew Truss (Pilot 4)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P1_A_2_EO_S15_D-3-1

End Time: 1537

Log Time: 1515

Transit Time: 14:04

Comments: Strong set to East bank when lining up on Flood gate. Once inside Flood gate it still had a strong East bank set.

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 2/5/19

Channel Alternative: P0 P1 P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 13

Repetition:

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood Ebb Average Observed

Added Tide:

Wind Condition: 1 S15

Heading: Upbound Downbound

PILOT: Capt. Kevin Keele (Pilot 3) Capt. Matthew Truss (Pilot 4)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P1-A-2-EO-S15-D-4-1

End Time: 1529

Log Time: 1508

Transit Time: 12:32

Comments:

Moderate set to port while lining up to enter floodgates.



Houma Navigation Complex, LA Lock Addition Simulation Study

Date: Jan 29, 2019

Channel Alternative: P0 (P1) P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 9

Repetition: 1

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood Ebb Average Observed Added Tide:

Wind Condition: 1 S15

Heading: Upbound Downbound

PILOT: Capt. Michael J. Orr (Pilot 1) Capt. Jason Jones (Pilot 2)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P1_A_1_EA_S15_D_1-1

End Time: 1535

Log Time: 1515

Transit Time: 16:57

Comments:

No problems run fine

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 29 Feb 19

Channel Alternative: P0 P1 P2

Area A: Houma Navigation Canal

Test Matrix Run Number: ~~8~~ 9

Repetition: 1

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood Ebb Average Observed Added Tide:

Wind Condition: 1 S15

Heading: Upbound Downbound

PILOT: Capt. Michael J. Orr (Pilot 1) Capt. Jason Jones (Pilot 2)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P1-A-1-EA-S15-D-2-1

End Time: 1535

Log Time: 1539

Transit Time: 1552

Comments:

Normal Running, ~~on simulator~~ on Approach to locks
ran out of water on simulator had to Restart.

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 6 Feb 2019

Channel Alternative: P0 P1 P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 9 A Repetition: 1

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood Ebb Average Observed Added Tide: 0.5

Wind Condition: 1 S15

Heading: Upbound Downbound

PILOT: Capt. Kevin Keele (Pilot 3) Capt. Matthew Truss (Pilot 4)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P1-A-1-EA-S15-D-3-1

End Time: 1026 Log Time: 0955 Transit Time: 17158

Comments: No noticeable set @ Flood gate or Bayou.
Conditions were acceptable for transit

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 6 Feb 2019

Channel Alternative: P0 (P1) P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 9A

Repetition: /

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood (Ebb) (Average) Observed

Added Tide: 0.5

Wind Condition: 1 S15

Heading: Upbound (Downbound)

PILOT: Capt. Kevin Keele (Pilot 3) Capt. Matthew Truss (Pilot 4)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P1-A-1-EA-S15-D-4-1

End Time: 1020

Log Time: 0951

Transit Time: 18:10

Comments:

Transit was very smooth, slight port slide inside floodgates but nothing drastic. No problems.



Alternative 1: Lock Gates Open
Average Ebb Tide
Empty Barge
Downbound
15 Knot S Wind

- Pilot 1
- Pilot 2
- Pilot 3
- Pilot 4

0 1,000
Feet

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 28 JAN 2019

Channel Alternative: P0 **P1** P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 13

Repetition: 1

Design Ship: 1 TUGBA57 **2 TUGBA59 (Empty)**

Tide: Flood

Ebb Avg

Added Tide: 0.5m

Wind Condition:

1 S15

Heading: Upbound

Downbound

PILOT: Capt. Michael J. Orr (**Pilot 1**) Capt. Jason Jones (Pilot 2)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P1-A-2-EA-S15-D-1-1

End Time: 1429

Log Time: 1228

Transit Time: 13:02

Comments:

Had some pull to port vabl on Flood gate where lock is
I think Because lock was open

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 28 Jan 2019

Channel Alternative: P0 (P1) P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 13

Repetition: 1

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood (Ebb)

Added Tide:

Wind Condition: (1 S15)

Heading: Upbound (Downbound)

PILOT: Capt. Michael J. Orr (Pilot 1) (Capt. Jason Jones (Pilot 2))

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P1-A-2-EA-S15-D-2-1

End Time: 14:35

Log Time: 1245

Transit Time: 12:33

Comments:

I had to keep a point on the tow
A little set to the LA Long wall
pass the cut. MAY BE A ISSUE IF wind & current
are increased.

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 6 Feb 2019

Channel Alternative: P0 P1 P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 13 A

Repetition: 1

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood Ebb Average Observed

Added Tide:

Wind Condition: 1 S15

Heading: Upbound Downbound

PILOT: Capt. Kevin Keele (Pilot 3) Capt. Matthew Truss (Pilot 4)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P1-A-2-EA-S15-D-3-1

End Time: 1252

Log Time: 1232

Transit Time: 14:16

Comments: Strong set @ Flood gate. Conditions were rough but able to be done

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 2/6/2019

Channel Alternative: P0 (P1) P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 13A Repetition:

Design Ship: 1 TUGBA57 (2 TUGBA59 (Empty))

Tide: Flood (Ebb) (Average) Observed Added Tide:

Wind Condition: 1-S15

Heading: Upbound (Downbound)

PILOT: Capt. Kevin Keele (Pilot 3) Capt. Matthew Truss (Pilot 4)

Filename = Alternative + Area + Vessel+ Tide +Wind +Heading +Pilot + Repetition

Filename: P1-A-2-EA-S15-D-4-1

End Time: 1243 Log Time: 1224 Transit Time: 12:00

Comments:

Hard set inside floodgates to port. Be cautious during this stage.



Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 29 Jan 2019

Channel Alternative: P0 P1 P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 10

Repetition: /

Design Ship: 1 TUGBA57 2 ~~TUGBA59~~ (Empty)

Tide: Flood Ebb Average Observed Added Tide:

Wind Condition: 1/S15

Heading: Upbound Downbound

PILOT: Capt. Michael J. Orr (Pilot 1) Capt. Jason Jones (Pilot 2)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P1-A-1-E0-S15-D-1-1

End Time: 1736

Log Time: 1716

Transit Time: 18:57

Comments:

Normal Run; see problem

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 30 Jan 2019

Channel Alternative: P0 **P1** P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 10 0

Repetition: 1

Design Ship: 1 **TUGBA57** 2 TUGBA59 (Empty)

Tide: **Flood** Ebb Average **Observed**

Added Tide: 0.5

Wind Condition: 1 **S15**

Heading: Upbound **Downbound**

PILOT: Capt. Michael J. Orr (Pilot 1) **Capt. Jason Jones** (Pilot 2)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: **P1-A-1-FD-S15-D-2-1**

End Time: 10:07

Log Time: 0932

Transit Time: 18:58

Comments:

Normal Running Conditions. no set or slide from
tow.

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 5 FEB 2019

Channel Alternative: P0 P1 P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 10

Repetition: 1

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood Ebb Average Observed

Added Tide:

Wind Condition: 1 S15

Heading: Upbound Downbound

PILOT: Capt. Kevin Keele (Pilot 3) Capt. Matthew Truss (Pilot 4)

Filename = Alternative + Area + Vessel + Tide + Wind + Heading + Pilot + Repetition

Filename: PLA_1_FO_S15_D_3_1

End Time: 1451

Log Time: 1250

Transit Time: 21:01

Comments: with lock in place and open, I have yet to notice much difference in transitting the Flood gate, minimal set. Vessel performed well and was acceptable conditions.

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 2/5/19

Channel Alternative: P0 P1 P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 10

Repetition:

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood Ebb Average Observed

Added Tide:

Wind Condition: 1 S15

Heading: Upbound Downbound

PILOT: Capt. Kevin Keele (Pilot 3) Capt. Matthew Truss (Pilot 4)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P1-A-1-FO-S15-D-4-1

End Time: 1443

Log Time: 1240

Transit Time: 18:16

Comments:

Conditions was very great. No problems with floodgates.



Alternative 1, Lock Gates Open
Observed Flood Tide
Empty Barge
Downbound
15 Knot S Wind

- Pilot 1
- Pilot 2
- Pilot 3
- Pilot 4

0 1,000
Feet

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 30 Jan 2019

Channel Alternative: P0 P1 P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 140

Repetition: 1

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood Ebb Average Observed Added Tide:

Wind Condition: 1 S15

Heading: Upbound Downbound

PILOT: Capt. Michael J. Orr (Pilot 1) Capt. Jason Jones (Pilot 2)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P1-A-2-FO-S15-D-1-1

End Time: 0957 Log Time: 0929 Transit Time: 15:40

Comments:

Normal Runway No problems Had to point up for the wind

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 29 Jan 2019

Channel Alternative: P0 (P1) P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 14

Repetition: /

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood Ebb Average Observed

Added Tide: 0.5m.

Wind Condition: 1 S15

Heading: Upbound Downbound

PILOT: Capt. Michael J. Orr (Pilot 1) Capt. Jason Jones (Pilot 2)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P1_A_2_FO_SIS-D-2-1

End Time: 1728

Log Time: 1712

Transit Time: 1415

Comments:

No new set to Report ~~regular~~ Regular Running conditions
Apply.

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 5 FEB 2019

Channel Alternative: P0 P1 P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 14 Repetition: 1

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood Ebb Average Observed Added Tide:

Wind Condition: 1 S15

Heading: Upbound Downbound

PILOT: Capt. Kevin Keele (Pilot 3) Capt. Matthew Truss (Pilot 4)

Filename = Alternative + Area + Vessel + Tide + Wind + Heading + Pilot + Repetition

Filename: P1-A-2-FO-S15-D-3-1

End Time: 1512 Log Time: 1452 Transit Time: 15:54

Comments: with lock open it had a strong set to the east wall of the Flood gate. Didn't have the same effect with loads just the empties. Vessel responded well - conditions were acceptable.

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 2/5/19

Channel Alternative: P0 P1 P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 14

Repetition:

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood Ebb Average Observed

Added Tide:

Wind Condition: 1 S15

Heading: Upbound Downbound

PILOT: Capt. Kevin Keele (Pilot 3) Capt. Matthew Truss (Pilot 4)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P1_A_2_F0_S15-D_4_1

End Time: 1505

Log Time: 1444

Transit Time: 1455

Comments:

Very hard set toward the locks, once inside the floodgates, there was still a set to port and once clear of the floodgates, set to port increased.



Alternative 1: Lock Gates Open
 Average Flood Tide
 Loaded Barge
 Downbound
 15 Knot S Wind

- Pilot 1
- Pilot 2
- Pilot 3
- Pilot 4

0 1,000
 Feet

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 28 JAN 2019

Channel Alternative: P0 (P1) P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 10

Repetition: 1

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood Avg Ebb

Added Tide: 0.5m

Wind Condition: 1/S15

Heading: Upbound Downbound

PILOT: Capt. Michael J. Orr (Pilot 1) Capt. Jason Jones (Pilot 2)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P1_A_1_FA_S15_D_1_1

End Time: 14:55

Log Time: 1430

Transit Time: 18:33

Comments:

Arrival Runway no set

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 28 Jan 2019

Channel Alternative: P0 (P1) P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 10

Repetition: 1

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood Ebb

Added Tide:

Wind Condition: 1 S15

Heading: Upbound Downbound

PILOT: Capt. Michael J. Orr (Pilot 1) Capt. Jason Jones (Pilot 2)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P1_A-1_FA_S15-D-2-1

End Time: 15:01 Log Time: 14:36 Transit Time: 18:10

Comments: Average Current

VERY little set ~~through~~ A good transit
thru the flood Gates.
winds started out 17.2 @ 0° to 20.2 knots @ 17°

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 6 Feb 2019

Channel Alternative: P0 P1 P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 10A

Repetition: /

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood Ebb Average Observed

Added Tide:

Wind Condition: 1/S15

Heading: Upbound Downbound

PILOT: Capt. Kevin Keagle (Pilot 3) Capt. Matthew Truss (Pilot 4)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P1-A-1-FA-S15-D-3-1

End Time: 1051

Log Time: 1027

Transit Time: 19:37

Comments: NO set @ Lock or Bayou. Conditions acceptable
For transit

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 6 Feb 2019

Channel Alternative: P0 P1 P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 10 A

Repetition: 1

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood Ebb Average Observed

Added Tide: 0.5

Wind Condition: 1 S15

Heading: Upbound Downbound

PILOT: Capt. Kevin Keele (Pilot 3) Capt. Matthew Truss (Pilot 4)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P1-A-FA-S15-D-4-1

End Time: 1044

Log Time: 1025

Transit Time: 1804

Comments:

Conditions was average. No problems



Alternative 1: Lock Gates Open
 Average Flood Tide
 Empty Barge
 Downbound
 No Wind

- Pilot 1
- Pilot 2
- Pilot 3
- Pilot 4

0 1,000
 Feet

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 28 JAN 2019.

Channel Alternative: P0 (P1) P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 14 - B

Repetition: 1

Design Ship: 1 TUGBA57 (2) TUGBA59 (Empty)

Tide: (Flood) Avg Ebb

Added Tide: 0.5M

Wind Condition: 1 S15

(0) None

Heading: Upbound (Downbound)

PILOT: Capt. Michael J. Orr (Pilot 1) Capt. Jason Jones (Pilot 2)

Filename = Alternative + Area + Vessel + Tide + Wind + Heading + Pilot + Repetition

Filename: PLA-2-FA-0-D-1-1

End Time: 11034

Log Time: 11020

Transit Time: 12:54

Comments:

Run right in run problem no set one down

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 28 Jan 2019

Channel Alternative: P0 (P1) P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 146

Repetition: 1

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: (Flood) Ebb Average Observed Added Tide:

Wind Condition: 1 S15 NOWIND

Heading: Upbound (Downbound)

PILOT: Capt. Michael J. Orr (Pilot 1) Capt. Jason Jones (Pilot 2)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P1-A-2-FA-D-D-2-1

End Time: 11:40

Log Time: 11:17

Transit Time: 12:53

Comments:

The wind was the factor of the set-
from the last approach Average flood was not
A factor. only empties with winds use caution.



Alternative 1, Lock Gates Open
Average Flood Tide
Empty Barge
Downbound
15 Knot S Wind

- Pilot 1
- Pilot 2
- Pilot 3
- Pilot 4

0 1,000
Feet

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 28 JAN 2019

Channel Alternative: P0 (P1) P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 14

Repetition: 1

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood (Avg) Ebb

Added Tide: 0.5 m

Wind Condition: 1 S15

Heading: Upbound Downbound

PILOT: Capt. Michael J. Orr (Pilot 1) Capt. Jason Jones (Pilot 2)

Filename = Alternative + Area + Vessel + Tide + Wind + Heading + Pilot + Repetition

Filename: P1-A-2-FA-S15-D-1-1

End Time: 1610

Log Time: 1553

Transit Time: 13:32

Comments:

Felt the wind had to steer up to hold up it is wind and it has a drift to the port not sure which one

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 28 Jan 2019

Channel Alternative: P0 (P1) P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 14 Repetition: 1

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: (Flood) Ebb Average Added Tide:

Wind Condition: (1 S15)

Heading: Upbound (Downbound)

PILOT: Capt. Michael J. Orr (Pilot 1) (Capt. Jason Jones (Pilot 2))

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P1_A_2_FA_S15_D_2_1

End Time: 16:16 Log Time: 1559 Transit Time: 13:34

Comments:

HAD A 1.7 DRAW to the open Chamber of the locks. ~~had~~ HAD 22 Knot wind @ 16°
Not sure how much was each Effect.

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 7 FEB 2019

Channel Alternative: P0 (P1) P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 14 A

Repetition: /

Design Ship: 1 TUGBA57 (2 TUGBA59 (Empty))

Tide: (Flood) Ebb (Average) Observed

Added Tide:

Wind Condition: 1 (S15)

Heading: Upbound (Downbound)

PILOT: Capt. Kevin Keele (Pilot 3) Capt. Matthew Truss (Pilot 4)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P1-A-2-FA-S15-D-3-1

End Time: 1005

Log Time: 0948

Transit Time: 1506

Comments: Strong set @ Flood gate conditions were tough but possible

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 2/6/2019

Channel Alternative: P0 (P1) P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 14 A

Repetition:

Design Ship: 1 TUGBA57 (2) TUGBA59 (Empty)

Tide: (Flood) Ebb (Average) Observed

Added Tide:

Wind Condition: 1S15

Heading: Upbound (Downbound)

PILOT: Capt. Kevin Keele (Pilot 3) Capt. Matthew Truss (Pilot 4)

Filename = Alternative + Area + Vessel + Tide + Wind + Heading + Pilot + Repetition

Filename: P1_A_2_FA_S15_D_4_1

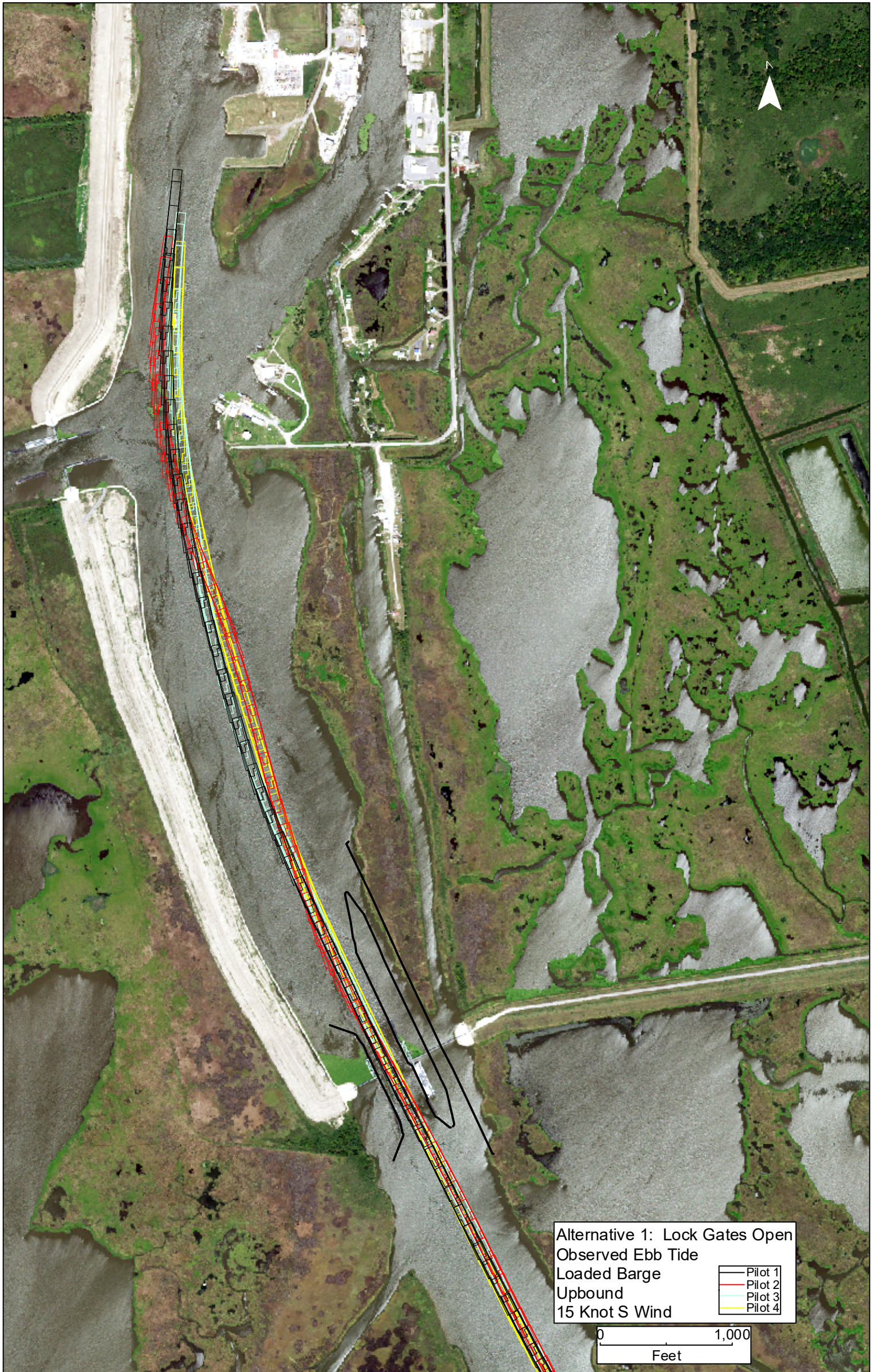
End Time: 1301

Log Time: 1243

Transit Time: 14:17

Comments:

Moderate set to port while making Floodgates.
Be cautious during this stage of conditions w/ empties.



Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 30 Jan 2019

Channel Alternative: P0 (P1) P2

Area A: Houma Navigation Canal

Test Matrix Run Number: ||

Repetition: |

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood (Ebb) Average (Observed)

Added Tide: 0.5m

Wind Condition: 1 S15

Heading: (Upbound) Downbound

PILOT: Capt. Michael J. Orr (Pilot 1) Capt. Jason Jones (Pilot 2)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P1-A-1-E0-S15-U-1-1

End Time: 1512

Log Time: 1447

Transit Time: 20:52

Comments:

Lowest Runway no further

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 30 Jan 2019

Channel Alternative: P0 P1 P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 11 0

Repetition: /

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood Ebb Average Observed

Added Tide:

Wind Condition: 1/515

Heading: Upbound Downbound

PILOT: Capt. Michael J. Orr (Pilot 1) Capt. Jason Jones (Pilot 2)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P1-A-1-ED-515-U-2-1

End Time: 1517

Log Time: 1457

Transit Time: 19:59

Comments:

Current conditions are ideal for transit.

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 5 FEB 2019

Channel Alternative: P0 (P1) P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 11

Repetition: |

Design Ship: (1) TUGBA57 2 TUGBA59 (Empty)

Tide: Flood (Ebb) Average (Observed)

Added Tide:

Wind Condition: 1 S15

Heading: (U) Upbound Downbound

PILOT: Capt. Kevin Keele (Pilot 3) Capt. Matthew Truss (Pilot 4)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P1-A-1-E0-S15-U-3-1

End Time: 1608 Log Time: 1542 Transit Time: 19:31

Comments: with loads w/B there seemed to be little to
No set. Transit conditions were acceptable

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 2/5/19

Channel Alternative: P0 (P1) P2

Area A: Houma Navigation Canal

Test Matrix Run Number: //

Repetition:

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood (Ebb) Average (Observed)

Added Tide:

Wind Condition: 1 S15

Heading: (Upbound) Downbound

PILOT: Capt. Kevin Keele (Pilot 3) Capt. Matthew Truss (Pilot 4)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: PLA-1-EO-S15-U-4-1

End Time: 1601

Log Time: 1532

Transit Time: 19:26

Comments:

Conditions was ideal. No problem w/ loads



Alternative 1: Lock Gates Open
Observed Ebb Tide
Empty Barge
Upbound
15 Knot S Wind

- Pilot 1
- Pilot 2
- Pilot 3
- Pilot 4

0 1,000
Feet

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 30 Jan 2019

Channel Alternative: P0 (P1) P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 15

Repetition:

Design Ship: 1 TUGBA57 (2 TUGBA59 (Empty))

Tide: Flood (Ebb) Average (Observed)

Added Tide: 0.5m

Wind Condition: 1 S15

Heading: (Upbound) Downbound

PILOT: Capt. Michael J. Orr (Pilot 1) Capt. Jason Jones (Pilot 2)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P1-A-2-E0-S15-U-1-1

End Time: 1554

Log Time: 1537

Transit Time: 15:22

Comments:

Normal Runing no problems

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 30 Jan 2019

Channel Alternative: P0 (P1) P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 150

Repetition: 1

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood (Ebb) Average Observed

Added Tide: 0.5

Wind Condition: 1 S15

Heading: Upbound Downbound

PILOT: Capt. Michael J. Orr (Pilot 1) Capt. Jason Jones (Pilot 2)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P1-A-2-ED-S15-U-2-1

End Time: 1555

Log Time: 1539

Transit Time: 14:05

Comments:

Normal Running Conditions.

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 5 FEB 2019

Channel Alternative: P0 P1 P2

Area A: Houma Navigation Canal

Test Matrix Run Number:

Repetition:

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood Ebb Average Observed

Added Tide:

Wind Condition: 1 S15

Heading: Upbound Downbound

PILOT: Capt. Kevin Keele (Pilot 3) Capt. Matthew Truss (Pilot 4)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P1_A_2_EO_S15_U_3_1

End Time: 1718 Log Time: 1652 Transit Time: 14:25

Comments: No noticeable set when N/B w/ empties
Conditions Acceptable

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 5 Feb 2019

Channel Alternative: P0 (P1) P2

Area/A: Houma Navigation Canal

Test Matrix Run Number: 15

Repetition: 1

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood (Ebb) Average (Observed)

Added Tide:

Wind Condition: 1 S15

Heading: (Upbound) Downbound

PILOT: Capt. Kevin Keele (Pilot 3) Capt. Matthew Truss (Pilot 4)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P1-A-2-ED-S15-U-4-1

End Time: 1711

Log Time: 1645

Transit Time: 14:17

Comments:

Conditions was perfect for transit. No problems making floodgates.



Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 29 Jan 2019

Channel Alternative: P0 P1 P2

Area A: Houma Navigation Canal

Test Matrix Run Number: //

Repetition: /

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood Ebb Average Observed

Added Tide: 0.5

Wind Condition: 1 S15

Heading: Upbound Downbound

PILOT: Capt. Michael J. Orr (Pilot 1) Capt. Jason Jones (Pilot 2)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P1-A-1-EA-S15-U-1-1

End Time: 1614

Log Time: 1545

Transit Time: 20:20

Comments:

Sound no problems

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 29 Jan 19

Channel Alternative: P0 P1 P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 11

Repetition: 1

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood (Ebb) (Average) Observed

Added Tide: 0.5

Wind Condition: 1515

Heading: Upbound Downbound

PILOT: Capt. Michael J. Orr (Pilot 1) Capt. Jason Jones (Pilot 2)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P1-A-1-EA-515-U-2-1

End Time: 1620

Log Time: 1557

Transit Time: 2022

Comments:

Normal Running NO Effects noted.

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 6 FEB 2019

Channel Alternative: P0 (P1) P2

Area (A) Houma Navigation Canal

Test Matrix Run Number: 11A

Repetition: 1

Design Ship: (1) TUGBA57 2 TUGBA59 (Empty)

Tide: Flood (Ebb) (Average) Observed

Added Tide:

Wind Condition: (S15)

Heading: (Upbound) Downbound

PILOT: Capt. Kevin Keele (Pilot (3)) Capt. Matthew Truss (Pilot 4)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P1_A_1_EA_S15_U_3_1

End Time: 1229

Log Time: 1203

Transit Time: 20:07

Comments: No set. Transit was acceptable

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 2/6/2019

Channel Alternative: P0 **P1** P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 11 A

Repetition:

Design Ship: **1** TUGBA57 2 TUGBA59 (Empty)

Tide: Flood **Ebb** **Average** Observed

Added Tide:

Wind Condition: 1 S15

Heading: **Upbound** Downbound

PILOT: Capt. Kevin Keele (Pilot 3) Capt. Matthew **Truss** (Pilot 4)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P1_A-1_EA_S15_U-4-1

End Time: 1156

Log Time: 1130

Transit Time: 1945

Comments:

Ideal conditions, no problems making Floodgates.



Alternative 1: Lock Gates Open
Average Ebb Tide
Empty Barge
Upbound
15 Knot S Wind

- Pilot 1
- Pilot 2
- Pilot 3
- Pilot 4

0 1,000
Feet

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 28 JAN 2019

Channel Alternative: P0 (P1) P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 15

Repetition: 1

Design Ship: 1 TUGBA57 (2 TUGBA59 (Empty))

Tide: Flood

(Ebb) Avg

Added Tide: 0.5m

Wind Condition:

(1 S15)

Heading: (Upbound)

Downbound

PILOT: Capt. Michael J. Orr (Pilot 1) Capt. Jason Jones (Pilot 2)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P1_A_2_EA_S15_U_1_1

End Time: 1653

Log Time: 1636

Transit Time: 14:50

Comments:

Normal Runway

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 28 Jan 2019

Channel Alternative: P0 P1 P2

Area/A: Houma Navigation Canal

Test Matrix Run Number: 15

Repetition: 1

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood Ebb Average Observed

Added Tide: 0.5

Wind Condition: 1 S15

Heading: Upbound Downbound

PILOT: Capt. Michael J. Orr (Pilot 1) Capt. Jason Jones (Pilot 2)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P1-A-2-EA-S15-U-2-1

End Time: 1700

Log Time: 1643

Transit Time: 1450

Comments:

No Negative Effects to be noted.
~~Wind~~ wind had little effect on Barges 0.1 set

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 6 Feb 2019

Channel Alternative: P0 P1 P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 15 A

Repetition: 1

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood Ebb Average Observed

Added Tide:

Wind Condition: 1 S15

Heading: Upbound Downbound

PILOT: Capt. Kevin Keele (Pilot 3) Capt. Matthew Truss (Pilot 4)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P1-A-2-EA-S15-U-3-1

End Time: 1114

Log Time: 1052

Transit Time: 14:31

Comments: had a small set @ the bayou and Flood gate
Conditions for transit were acceptable

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 2/6/19

Channel Alternative: P0 P1 P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 15.A

Repetition:

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood Ebb Average Observed

Added Tide:

Wind Condition: 1 S15

Heading: Upbound Downbound

PILOT: Capt. Kevin Keele (Pilot 3) Capt. Matthew Truss (Pilot 4)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P1_A_2_EA_S15_U_4_1

End Time: 1107

Log Time: 1046

Transit Time: 15:26

Comments:

Transit was very smooth w/ no problems in floodgates



Alternative 1: Lock Gates Open
Observed Flood Tide
Loaded Barge
Upbound
15 Knot S Wind

- Pilot 1
- Pilot 2
- Pilot 3
- Pilot 4

0 1,000
Feet

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 30 Jan 2019

Channel Alternative: P0 **P1** P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 120

Repetition: 1

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood Ebb Average **Observed**

Added Tide:

Wind Condition: **S15**

Heading: **Upbound** Downbound

PILOT: Capt. Michael **J. Orr** (Pilot 1) Capt. Jason Jones (Pilot 2)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P1-A-1-FO-S15-U-1-1

End Time: 1028

Log Time: 1006

Transit Time: 19112

Comments:

Howard King

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 30 Jan 2019

Channel Alternative: P0 P1 P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 12 0

Repetition: 1

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood Ebb Average Observed

Added Tide:

Wind Condition: 1 S15

Heading: Upbound Downbound

PILOT: Capt. Michael J. Orr (Pilot 1) Capt. Jason Jones (Pilot 2)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P1-A-L-F0-S15-U-2-1

End Time: 10:35

Log Time: 1011

Transit Time: 18:50

Comments:

NO set noted normal Running for tow:

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 5 FEB 2019

Channel Alternative: P0 (P1) P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 12

Repetition: 1

Design Ship: (1) TUGBA57 2 TUGBA59 (Empty)

Tide: (Flood) Ebb Average (Observed)

Added Tide:

Wind Condition: (1 S15)

Heading: (Upbound) Downbound

PILOT: Capt. Kevin Keele (Pilot 3) Capt. Matthew Truss (Pilot 4)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P1_A_1_FO-S15-W-3-1

End Time: 1633 Log Time: 1609 Transit Time: 17:33

Comments: with Loads N/B There was no set transit was
Very acceptable

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 5 Feb 2019

Channel Alternative: P0 (P1) P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 12

Repetition: 1

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood Ebb Average Observed

Added Tide:

Wind Condition: 1 S15

Heading: Upbound Downbound

PILOT: Capt. Kevin Keele (Pilot 3) Capt. Matthew Truss (Pilot 4)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P1-A-1-FD-S15-U-4-1

End Time: 1626

Log Time: 1602

Transit Time: 1657

Comments:

Transit was smooth and conditions was good. No problems



Alternative 1: Lock Gates Open
Observed Flood Tide
Empty Barge
Upbound
15 Knot S Wind

- Pilot 1
- Pilot 2
- Pilot 3
- Pilot 4

0 1,000
Feet

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 28 JAN 2009

Channel Alternative: P0 (P1) P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 16

Repetition: 1

Design Ship: 1 TUGBA57 (2) TUGBA59 (Empty)

Tide: (Flood) 0.5 Ebb

Added Tide: 0.5m

Wind Condition: (S15)

Heading: (Upbound) Downbound

PILOT: Capt. Michael J. Orr (Pilot 1) Capt. Jason Jones (Pilot 2)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P1-A-2-F0-S15-U-1-1

End Time: 1228

Log Time: 1155

Transit Time: 1408

Comments:

Motor not running

Houma Navigation Complex, LA Lock Addition Simulation Study

Date:

Channel Alternative: P0 (P1) P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 16

Repetition: 1

Design Ship: 1 TUGBA57 2 TUGBA99 (Empty)

Tide: Flood Ebb FLOOD AVG Flood DBS Added Tide:

Wind Condition: 1 S15

Heading: Upbound Downbound

PILOT: Capt. Michael J. Orr (Pilot 1) Capt. Jason Jones (Pilot 2)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P1-A-2-FO-S15-U-2L1

End Time: 12:34

Log Time: 1210

Transit Time: 14:10

Comments:

VERY Smooth + TRANSIT NO Adverse Effects from Wind OR Currents.

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 5 FEB 2019

Channel Alternative: P0 (P1) P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 16

Repetition: 1

Design Ship: 1 TUGBA57 (2) TUGBA59 (Empty)

Tide: (F)lood Ebb Average (O)bserved

Added Tide:

Wind Condition: (S)15

Heading: (U)pbound Downbound

PILOT: Capt. Kevin Keele (Pilot (3)) Capt. Matthew Truss (Pilot 4)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P1_A_2_FO_S15_U_3_1

End Time: 1651 Log Time: 1634 Transit Time: 13:11

Comments: N/B w/ Empties had little to no set
Transit was acceptable

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 5 Feb 2019

Channel Alternative: P0 (P1) P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 16

Repetition: 1

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood Ebb Average Observed

Added Tide:

Wind Condition: 1 S15

Heading: Upbound Downbound

PILOT: Capt. Kevin Keele (Pilot 3) Capt. Matthew Truss (Pilot 4)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P1-A-2-FA-S15-U-4-1

End Time: 1645

Log Time: 1626

Transit Time: 13:06

Comments:

Conditions was good w/ no problems.



Alternative 1: Lock Gates Open
Average Flood Tide
Loaded Barge
Upbound
15 Knot S Wind

- Pilot 1
- Pilot 2
- Pilot 3
- Pilot 4

0 1,000
Feet

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 29 Jan 2019

Channel Alternative: P0 P1 P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 12

Repetition: 1

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood Ebb Average Observed

Added Tide:

Wind Condition: 1/S15

Heading: Upbound Downbound

PILOT: Capt. Michael J. Orr (Pilot 1) Capt. Jason Jones (Pilot 2)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P1-A-1-FA-S15-U-1-1

End Time: 1643

Log Time: 1616

Transit Time: 18:18

Comments:

Normal did not feel any thing

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 29 Jan 19

Channel Alternative: P0 (P1) P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 12

Repetition: 1

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood Ebb Average Observed

Added Tide: 0.5

Wind Condition: 1 S15

Heading: Upbound Downbound

PILOT: Capt. Michael J. Orr (Pilot 1) Capt. Jason Jones (Pilot 2)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P1_A_1_FA_S15-U-2-1

End Time: 16:51

Log Time: 16:25

Transit Time: 18:36

Comments:

NORMAL Running Conditions NO ISSUES Detected.

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 6 FEB 2019

Channel Alternative: P0 (P1) P2

Area (A): Houma Navigation Canal

Test Matrix Run Number: 12 A

Repetition: 1

Design Ship: (1) TUGBA57 2 TUGBA59 (Empty)

Tide: (Flood) Ebb (Average) Observed

Added Tide:

Wind Condition: (1 S15)

Heading: (Upbound) Downbound

PILOT: Capt. Kevin Keele (Pilot (3)) Capt. Matthew Truss (Pilot 4)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P1-A-1-FA-S15-U-3-1

End Time: 1202 Log Time: 1136 Transit Time: 19:00

Comments: No set @ Lock or Bayou. Conditions were acceptable for transit.

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 2/6/2019

Channel Alternative: P0 P1 P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 12 A

Repetition:

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood Ebb Average Observed

Added Tide:

Wind Condition: 1 S15

Heading: Upbound Downbound

PILOT: Capt. Kevin Keele (Pilot 3) Capt. Matthew Truss (Pilot 4)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P1-A-1-FA-S15-U-4-1

End Time: 1220

Log Time: 1156

Transit Time: 18:01

Comments:

Transit was great, no issues making
Floodgates.



Alternative 1: Lock Gates Open
Average Flood Tide
Empty Barge
Upbound
15 Knot S Wind

- Pilot 1
- Pilot 2
- Pilot 3
- Pilot 4

0 1,000
Feet

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 28 JAN 2019

Channel Alternative: P0 (P1) P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 16

Repetition: 1

Design Ship: 1 TUGBA57 (2 TUGBA59 (Empty))

Tide: (Flood) Ebb (Average) Observed

Added Tide: 0.5m

Wind Condition: (1 S15)

Heading: (Upbound) Downbound

PILOT: Capt. Michael J. Orr (Pilot 1) Capt. Jason Jones (Pilot 2)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P1-A-2-FA-S15-U-1-1

End Time: 1751

Log Time: 1734

Transit Time: 14:27

Comments:

Good Run

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 28 Jan 2019

Channel Alternative: P0 (P1) P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 16

Repetition: 1

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: (Flood) Ebb (Average) Observed

Added Tide: 0.5

Wind Condition: (1 S15)

Heading: (Upbound) Downbound

PILOT: Capt. Michael J. Orr (Pilot 1) (Capt. Jason Jones (Pilot 2))

Filename = Alternative + Area + Vessel + Tide + Wind + Heading + Pilot + Repetition

Filename: P1-A-2-FA-S15-U-2-1

End Time: 18:00

Log Time: 17:42

Transit Time: 15:35

Comments:

No noticable set ~~to~~ tow
TRIMS to see if there is a pull
from Grand Cayon.

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 6 FEB 2019

Channel Alternative: P0 (P1) P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 16 A

Repetition: 1

Design Ship: 1 TUGBA57 (2) TUGBA59 (Empty)

Tide: (Flood) Ebb (Average) Observed

Added Tide:

Wind Condition: 1 (S15)

Heading: (Upbound) Downbound

PILOT: Capt. Kevin Keele (Pilot (3)) Capt. Matthew Truss (Pilot 4)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P1_A_2_FA_S15_U_3_1

End Time: 1135 Log Time: 1115 Transit Time: 1306

Comments: Small set @ lock + @ Bayou.

Conditions were acceptable for transit

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 2/6/2019

Channel Alternative: P0 P1 P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 16 A

Repetition:

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood Ebb Average Observed

Added Tide:

Wind Condition: 1 S15

Heading: Upbound Downbound

PILOT: Capt. Kevin Keele (Pilot 3) Capt. Matthew Truss (Pilot 4)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P1_A-2_FA_S15-U_4-1

End Time: 1128

Log Time: 1107

Transit Time: 13:40

Comments:

Conditions was pretty good w/empty barges.
No problems



Alternative 2: Lock Gates Closed
Average Ebb Tide
Loaded Barge
Downbound
15 Knot S Wind

- Pilot 1
- Pilot 2
- Pilot 3
- Pilot 4

0 1,000
Feet

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 29 JAN 2019

Channel Alternative: P0 P1 **P2**

Area A: Houma Navigation Canal

Test Matrix Run Number: 17

Repetition: 1

Design Ship: **1** TUGBA57 2 TUGBA59 (Empty)

Tide: Flood **Ebb** Avg.

Added Tide: 0.5m

Wind Condition: **1 S15**

Heading: Upbound **Downbound**

PILOT: Capt. Michael J. Orr (**Pilot 1**) Capt. Jason Jones (Pilot 2)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P2_A_1_EA_S15_D_1_1

End Time: 1401

Log Time: 1142

Transit Time: 10:55

Comments:

Normal Run by 10:55

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 28 Jan 2019

Channel Alternative: P0 P1 P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 17

Repetition: 1

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood Ebb Average Observed

Added Tide: 0.5

Wind Condition: 1 S15

Heading: Upbound Downbound

PILOT: Capt. Michael J. Orr (Pilot 1) Capt. Jason Jones (Pilot 2)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P2-A-1-EA-S15-D-2-1

End Time: 1411

Log Time: 1300

Transit Time: 1311

Comments:

ONE shallow spot on approach down to 1.7 feet.
the overall lock has a good visual and feel.

Houma Navigation Complex, LA Lock Addition Simulation Study

Date:

Channel Alternative: P0 P1 **P2**

Area **A**: Houma Navigation Canal

Test Matrix Run Number: **17**

Repetition: /

Design Ship: 1 **TUGBA57** 2 TUGBA59 (Empty)

Tide: Flood **Ebb** **Average** Observed

Added Tide:

Wind Condition: **1 S15**

Heading: Upbound **Downbound**

PILOT: Capt. Kevin Keele (**Pilot 3**) Capt. Matthew Truss (Pilot 4)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: **P2-A1-EA-S15-D-3-1-1**

End Time: **1553**

Log Time: **1534**

Transit Time: **16:18**

Comments: **making lock was good, plenty of room**

Conditions were acceptable

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 6 FEB 2019

Channel Alternative: P0 P1 (P2)

Area A: Houma Navigation Canal

Test Matrix Run Number: 17

Repetition: 1

Design Ship: (1) TUGBA57 2 TUGBA59 (Empty)

Tide: Flood (Ebb) (Average) Observed

Added Tide:

Wind Condition: (1 S15)

Heading: Upbound (Downbound)

PILOT: Capt. Kevin Keele (Pilot 3) Capt. Matthew Truss (Pilot 4)

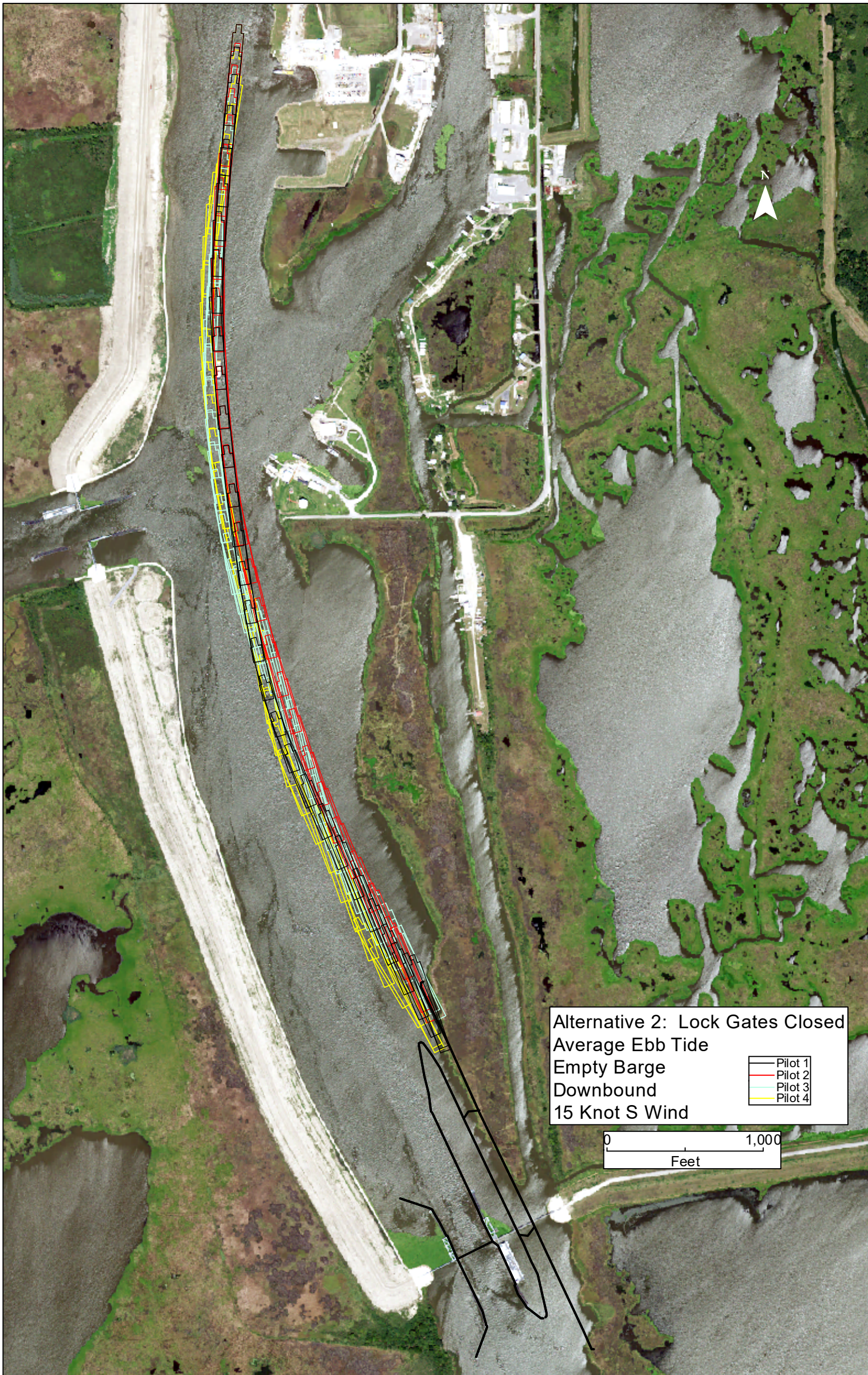
Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P2-A-1-EA-S15-D-4.1

End Time: 1544 Log Time: 1524 Transit Time: 13:17

Comments:

Making Lock itself was perfect. Plenty of room to be comfortable.



Alternative 2: Lock Gates Closed
Average Ebb Tide
Empty Barge
Downbound
15 Knot S Wind

- Pilot 1
- Pilot 2
- Pilot 3
- Pilot 4

0 1,000
Feet

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 29 JAN 2019

Channel Alternative: P0 P1 P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 21

Repetition: 1

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood Ebb Average Observed

Added Tide: 0.5m

Wind Condition: 1 S15

Heading: Upbound Downbound

PILOT: Capt. Michael J. Orr (Pilot 1) Capt. Jason Jones (Pilot 2)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P2_A_2_EA_S15_D_1_1

End Time: 1423

Log Time: 1402

Transit Time: 9:32

Comments:

Normal leaving had to point up for wind.

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 29 Jan 19

Channel Alternative: P0 P1 P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 21

Repetition: 1

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood Ebb Average Observed

Added Tide: 0.5 mi

Wind Condition: 1 S15

Heading: Upbound Downbound

PILOT: Capt. Michael J. Orr (Pilot 1) Capt. Jason Jones (Pilot 2)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P2_A_2_EA_S15_D_2_1

End Time: 1430

Log Time: 1412

Transit Time: 0:47

Comments:

With wind and empties there will be a hazard of striking the lock on Flood gate overall approach was good.

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 7 Feb 2019

Channel Alternative: P0 P1 P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 21

Repetition: /

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood Ebb Average Observed

Added Tide:

Wind Condition: 1 S15

Heading: Upbound Downbound

PILOT: Capt. Kevin Keele (Pilot 3) Capt. Matthew Truss (Pilot 4)

Filename = Alternative + Area + Vessel + Tide + Wind + Heading + Pilot + Repetition

Filename: P2-A-2-EA-S15-D-3-1

End Time: 1035

Log Time: 1011

Transit Time: 1311

Comments: Strong set to the port when entering the lock. Making lock is possible in these conditions

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 7 FEB 2019

Channel Alternative: P0 P1 P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 21

Repetition: 1

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood Ebb Average Observed

Added Tide:

Wind Condition: 1 S15

Heading: Upbound Downbound

PILOT: Capt. Kevin Keele (Pilot 3) Capt. Matthew Truss (Pilot 4)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot+ Repetition

Filename: P2_A_2_EA_S15_D_4_1

End Time: 1026

Log Time: 1004

Transit Time: 10:26

Comments:

Very strong set, to make locks, hold ^{starboard} ~~starboard~~ wall high
and then lay on wall.



Alternative 2: Lock Gates Closed
Average Ebb Tide
Empty Barge
Downbound
10 Knot E Wind

Pilot 3
Pilot 4

0 1,000
Feet

Houma Navigation Complex, LA Lock Addition Simulation Study

Date:

Channel Alternative: P0 P1 P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 28

Repetition: 1

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood Ebb Average Observed

Added Tide:

Wind Condition: 1 S15 2 E10 3 W10

Heading: Upbound Downbound

PILOT: Capt. Kevin Keele (Pilot 3) Capt. Matthew Truss (Pilot 4)

Filename = Alternative + Area + Vessel + Tide + Wind + Heading + Pilot + Repetition

Filename: P2-A-2-EA-E10-D-3-1

End Time: 1245

Log Time: 1224

Transit Time: 1511

Comments: Transit was un-acceptable with conditions.
Under HP vessel for conditions.

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 7 Feb 2019

Channel Alternative: P0 P1 **P2**

Area A: Houma Navigation Canal

Test Matrix Run Number: 28

Repetition:

Design Ship: 1 TUGBA57 **2 TUGBA59 (Empty)**

Tide: Flood **Ebb** Average Observed

Added Tide:

Wind Condition: 1 S15

E10

Heading: Upbound **Downbound**

PILOT: Capt. Kevin Keele (Pilot 3)

Capt. Matthew Truss (Pilot **4**)

Filename = Alternative + Area + Vessel + Tide + Wind + Heading + Pilot + Repetition

Filename: P2_A-2-E10-D-4-1

End Time: 1233

Log Time: 1220

Transit Time: 09:36

Comments:

Given the boat hp & length & the conditions this will be very hard to accomplish but can be done. ~~observed~~



Alternative 2: Lock Gates Closed
Average Ebb Tide
Empty Barge
Downbound
10 Knot W Wind

Pilot 3
Pilot 4

0 1,000
Feet

Houma Navigation Complex, LA Lock Addition Simulation Study

Date:

Channel Alternative: P0 P1 P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 30

Repetition: 1

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood Ebb Average Observed

Added Tide:

Wind Condition: 1 S15 W10

Heading: Upbound Downbound

PILOT: Capt. Kevin Keele (Pilot 3) Capt. Matthew Truss (Pilot 4)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P2-A-2-EA-W10-D-3-1

End Time: 1508

Log Time: 1453

Transit Time: 12:22

Comments: Making lock was a challenge, but under actual conditions I believe it would be possible. Simulator was a little off from what I believe the vessel would've actually handled.

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 7 Feb 19

Channel Alternative: P0 P1 (P2)

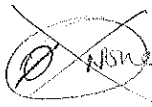
Area A: Houma Navigation Canal

Test Matrix Run Number: 30

Repetition:

Design Ship: 1 TUGBA57 (2 TUGBA59 (Empty))

Tide: Flood (Ebb) (Average) Observed



Added Tide:

Wind Condition: 1 S15 (W10)

Heading: Upbound (Downbound)

PILOT: Capt. Kevin Keele (Pilot 3) Capt. Matthew Truss (Pilot 4)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P2_A-2_EA_W10_D_4_1

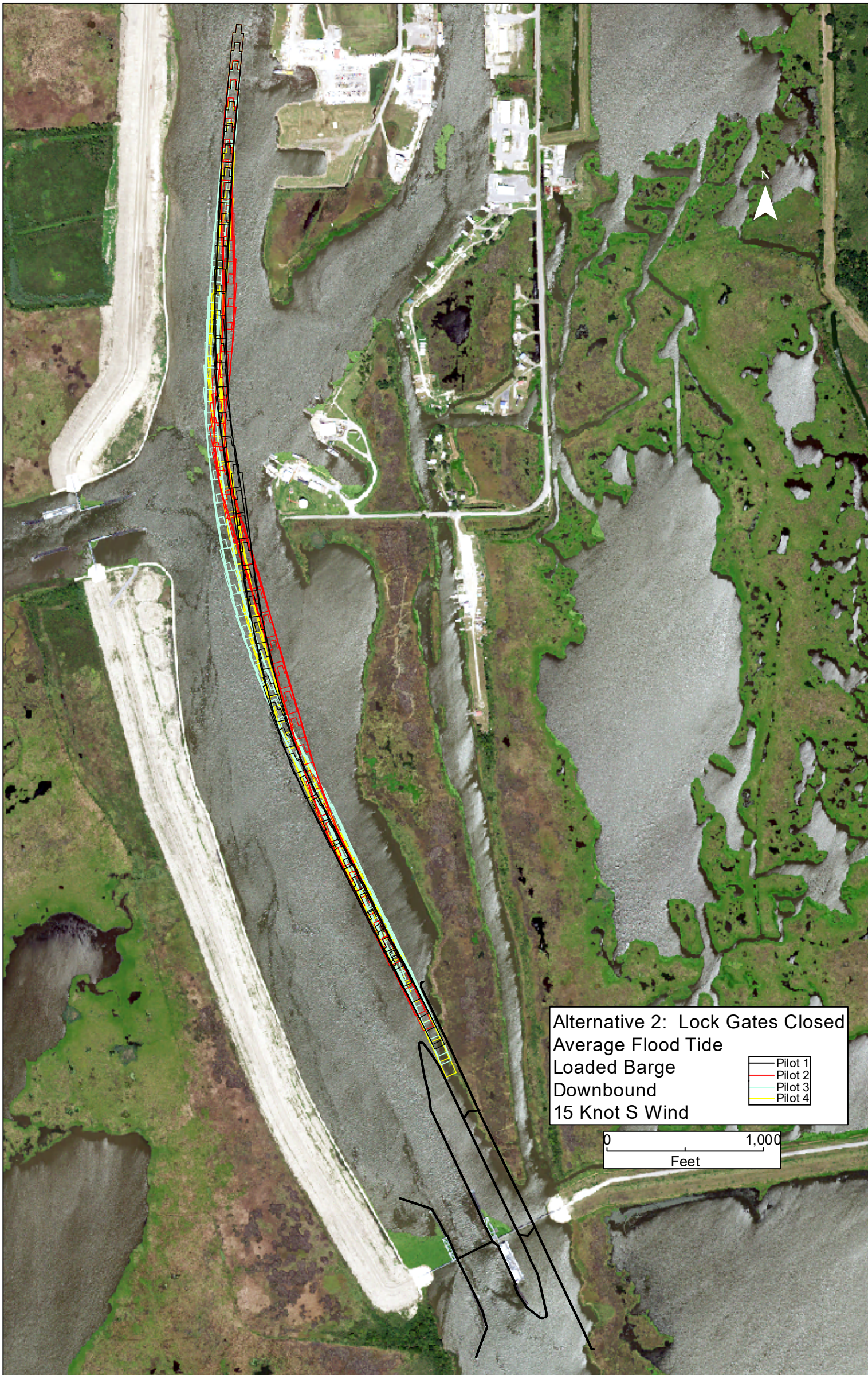
End Time: 1459

Log Time: 1448

Transit Time: 09:21

Comments:

Conditions was ideal, No problems making lock other than a moderate wind.



Alternative 2: Lock Gates Closed
Average Flood Tide
Loaded Barge
Downbound
15 Knot S Wind

- Pilot 1
- Pilot 2
- Pilot 3
- Pilot 4

0 1,000
Feet

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 29 JAN 2019

Channel Alternative: P0 P1 P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 18

Repetition: 1

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood Ebb Average Observed

Added Tide: 0.5m

Wind Condition: 1 S15

Heading: Upbound Downbound

PILOT: Capt. Michael J. Orr (Pilot 1) Capt. Jason Jones (Pilot 2)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P2_A_1-FA_S15-D-1-1

End Time: 1453

Log Time: 1438

Transit Time: 1349

Comments:

Speed Runing No penning

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 29 Jan 19

Channel Alternative: P0 P1 **P2**

Area A: Houma Navigation Canal

Test Matrix Run Number: 18

Repetition: 1

Design Ship: **1** TUGBA57 2 TUGBA59 (Empty)

Tide: **Flood** Ebb **Average** Observed Added Tide: 0.5

Wind Condition: **1 S15'**

Heading: Upbound **Downbound**

PILOT: Capt. Michael J. Orr (Pilot 1) Capt. Jason Jones **(Pilot 2)**

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P2-A-1-FA-S15-D-2-1

End Time: 1459 Log Time: 1439 Transit Time: 1253

Comments:

Good Approach ONE shallow spot @ 1.3 feet
Right past the yachts and the outlet.
trying to cut out square turns for lines up
on the lock.

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 2/6/2019

Channel Alternative: P0 P1 (P2)

Area (A) Houma Navigation Canal

Test Matrix Run Number: 18

Repetition: /

Design Ship: (1) TUGBA57 2 TUGBA59 (Empty)

Tide: (Flood) Ebb Average Observed

Added Tide:

Wind Condition: (S15)

Heading: Upbound (Downbound)

PILOT: Capt. Kevin Keele (Pilot (3)) Capt. Matthew Truss (Pilot 4)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P2_A-1_FA-S15-D-3-1

End Time: 1619

Log Time: 1553

Transit Time: 16:12

Comments: No problems entering lock, plenty of room,
No set, current was acceptable.

Houma Navigation Complex, LA Lock Addition Simulation Study

Date:

Channel Alternative: P0 P1 P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 18

Repetition: 1

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood Ebb Average Observed

Added Tide:

Wind Condition: 1 S15

Heading: Upbound Downbound

PILOT: Capt. Kevin Keele (Pilot 3) Capt. Matthew Truss (Pilot 4)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P2-A-1-FA-S15-D-4-1

End Time: 1609

Log Time: 1545

Transit Time: 13:38

Comments:

Very small set making the locks to the port. Other than that, conditions were ideal.



Alternative 2: Lock Gates Closed
Average Flood Tide
Empty Barge
Downbound
15 Knot S Wind

- Pilot 1
- Pilot 2
- Pilot 3
- Pilot 4

0 1,000
Feet

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 29 JAN 2019

Channel Alternative: P0 P1 **P2**

Area A: Houma Navigation Canal

Test Matrix Run Number: 22

Repetition: 1

Design Ship: 1 TUGBA57 **2 TUGBA59 (Empty)**

Tide: **Flood** Ebb **Average** Observed

Added Tide: 0.5m

Wind Condition: **1 S15**

Heading: Upbound **Downbound**

PILOT: Capt. Michael J. Orr, **(Pilot 1)** Capt. Jason Jones (Pilot 2)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: **P2-A-2-FA-S15-D-1-1**

End Time: 1510

Log Time: 1454

Transit Time: 9:41

Comments:

Normal running just had to point up for wind

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 29 Jan 19

Channel Alternative: P0 P1 **P2**

Area A: Houma Navigation Canal

Test Matrix Run Number: 22

Repetition: 1

Design Ship: 1 TUGBA57 **2 TUGBA59 (Empty)**

Tide: **Flood** Ebb **Average** Observed

Added Tide: 0.5

Wind Condition: **1 S15**

Heading: Upbound **Downbound**

PILOT: Capt. Michael J. Orr (Pilot 1) Capt. Jason Jones (**Pilot 2**)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: **P2-A-2-FA-S15-D-2-1**

End Time: 1514

Log Time: 1459

Transit Time: 8:52

Comments:

With High winds had to hold up high and drop the
tow in the 4-Bay to line up for approach
great simulation.

Houma Navigation Complex, LA Lock Addition Simulation Study

Date:

Channel Alternative: P0 P1 **P2**

Area **A**: Houma Navigation Canal

Test Matrix Run Number: 22

Repetition: /

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: **Flood** Ebb **Average** Observed

Added Tide:

Wind Condition: **1 S15**

Heading: Upbound **Downbound**

PILOT: Capt. Kevin Keele (**Pilot 3**) Capt. Matthew Truss (Pilot 4)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot+ Repetition

Filename: **P2-A-2-FA-S15-D-3-1**

End Time: 1055

Log Time: 1035

Transit Time: 1312

Comments: Strong set to the port. Conditions and hp of the vessel were unacceptable with making lock.

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 7 Feb 2019

Channel Alternative: P0 P1 **P2**

Area A: Houma Navigation Canal

Test Matrix Run Number: ~~27~~

Repetition:

Design Ship: 1 TUGBA57 **2 TUGBA59 (Empty)**

Tide: **Flood** Ebb Average Observed

Added Tide:

Wind Condition: 1 S15

Heading: Upbound **Downbound**

PILOT: Capt. Kevin Keele (Pilot 3) Capt. Matthew Truss (**Pilot 4**)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: **P2_A_2_FA-S15-D_4-1**

End Time: 1045

Log Time: 1027

Transit Time: 1043

Comments:

With conditions, still hold into wind on the side with the wind. Land on wall after entrance.



Alternative 2: Lock Gates Closed
Average Ebb Tide
Loaded Barge
Upbound
15 Knot S Wind

- Pilot 1
- Pilot 2
- Pilot 3
- Pilot 4

0 1,000
Feet

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 30 Jan 2019

Channel Alternative: P0 P1 (P2)

Area A: Houma Navigation Canal

Test Matrix Run Number: 26

Repetition:

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood (Ebb) (Average Observed)

Added Tide: 0.5m

Wind Condition: 1 S15

Heading: (Upbound) Downbound

PILOT: Capt. Michael J. Orr (Pilot 1) Capt. Jason Jones (Pilot 2)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P2-A-1-EA-SIS-U-1-1

End Time: 1223

Log Time: 1158

Transit Time:

Comments:

Normal Running No problems

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 30 Jan 2019

Channel Alternative: P0 P1 (P2)

Area A: Houma Navigation Canal

Test Matrix Run Number: 26

Repetition: 1

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood (Ebb) (Average) Observed

Added Tide: 0.5m

Wind Condition: 1 S15

Heading: (Upbound) Downbound

PILOT: Capt. Michael J. Orr (Pilot 1) Capt. Jason Jones (Pilot 2)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P2-A-1-EA-S15-U-2-1

End Time: 1217

Log Time: 1202

Transit Time: 11:28

Comments:

Current lock placement Ideal for transit.
NORMAL Running.

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 7 Feb 2019

Channel Alternative: P0 P1 P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 23

Repetition: 1

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood Ebb Average Observed

Added Tide:

Wind Condition: 1 S15

Heading: Upbound Downbound

PILOT: Capt. Kevin Keele (Pilot 3) Capt. Matthew Truss (Pilot 4)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P2.A.1-EA.S15.U.3-1

End Time: 1110

Log Time: 1056

Transit Time: 9:57

Comments: conditions were acceptable.

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 7 Feb 2019

Channel Alternative: P0 P1 P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 23

Repetition:

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood Ebb Average Observed

Added Tide:

Wind Condition: 1 S15

Heading: Upbound Downbound

PILOT: Capt. Kevin Keele (Pilot 3) Capt. Matthew Truss (Pilot 4)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P2-A-1-EA-SIS-U-4-1

End Time: 1105

Log Time: 1050

Transit Time: 1057

Comments:

Transit was smooth, No problems exiting locks.



Alternative 2, Lock Gates Closed
Average Ebb Tide
Empty Barge
Upbound
15 Knot S Wind

- Pilot 1
- Pilot 2
- Pilot 3
- Pilot 4

0 1,000
Feet

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 30 JAN 2019

Channel Alternative: P0 P1 P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 25

Repetition:

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood Ebb Average Observed

Added Tide: 0.5m

Wind Condition: 1 S15

Heading: Upbound Downbound

PILOT: Capt. Michael J. Orr (Pilot 1) Capt. Jason Jones (Pilot 2)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P2_A_2_EA_S15_U_1_1

End Time: 1158

Log Time: 1143

Transit Time: 8:16

Comments:

Downbound framing in port

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 30 JAN 2019

Channel Alternative: P0 P1 (P2)

Area A: Houma Navigation Canal

Test Matrix Run Number: 25

Repetition: 1

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood (Ebb) (Average Observed)

Added Tide:

Wind Condition: 1 S15

Heading: (Upbound) Downbound

PILOT: Capt. Michael J. Orr (Pilot 1) Capt. Jason Jones (Pilot 2)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P2 - A - 2 - EA - S15 - u - 2 - 1

End Time: 1202

Log Time: 1149

Transit Time: 8:20

Comments:

EASY Access to Channel Exiting the lock.
great placement of lock → Floodgates.

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 2/6/2019

Channel Alternative: P0 P1 P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 25

Repetition:

Design Ship: 1 TUGBA57 (2) TUGBA59 (Empty)

Tide: Flood Ebb Average Observed

Added Tide:

Wind Condition: 1 S15

Heading: Upbound Downbound

PILOT: Capt. Kevin Keele (Pilot 3) Capt. Matthew Truss (Pilot 4)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P2-A-2-EA-S15-U-3-1

End Time: 1636 Log Time: 1621 Transit Time: 9:28

Comments: No problems exiting the lock. All conditions were acceptable.

Houma Navigation Complex, LA Lock Addition Simulation Study

Date:

Channel Alternative: P0 P1 P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 25

Repetition: 1

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood Ebb Average Observed

Added Tide:

Wind Condition: 1 S15

Heading: Upbound Downbound

PILOT: Capt. Kevin Keele (Pilot 3) Capt. Matthew Truss (Pilot 4)

Filename = Alternative + Area + Vessel + Tide + Wind + Heading + Pilot + Repetition

Filename: P2-A-2-EA-S15-U-4-1

End Time: 1626

Log Time: 1614

Transit Time: 6:33

Comments:

Exiting lock was smooth given the conditions. No problems



Alternative 2: Lock Gates Closed
Average Flood Tide
Loaded Barge
Upbound
15 Knot S Wind

- Pilot 1
- Pilot 2
- Pilot 3
- Pilot 4

0 1,000
Feet

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 30 Jan 2019

Channel Alternative: P0 P1 P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 24

Repetition: 1

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood Ebb Average Observed

Added Tide:

Wind Condition: 1 S15

Heading: Upbound Downbound

PILOT: Capt. Michael J. Orr (Pilot 1) Capt. Jason Jones (Pilot 2)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P2_A_1_FA_S15_U_1_1

End Time: 1142

Log Time: 1124

Transit Time: 12:10

Comments:

Normal Ferry is problem

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 30 Jan 2019

Channel Alternative: P0 P1 P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 24

Repetition: 1

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood Ebb Average Observed

Added Tide: 0.5m

Wind Condition: 1 S15

Heading: Upbound Downbound

PILOT: Capt. Michael J. Orr (Pilot 1) Capt. Jason Jones (Pilot 2)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P2-A-1-FA-S15-U-2-1

End Time: 1148

Log Time: 1132

Transit Time: 11:14

Comments:

Nothing new to Report on set or slide
Normal conditions.

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 7 Feb 2019

Channel Alternative: P0 P1 P2

Area A: Houma Navigation Canal

Test Matrix Run Number:

Repetition:

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood Ebb Average Observed

Added Tide:

Wind Condition: 1 S15

Heading: Upbound Downbound

PILOT: Capt. Kevin Keele (Pilot 3) Capt. Matthew Truss (Pilot 4)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot+ Repetition

Filename: P2 A-1 FA-S15-U-3-1

End Time: 1222

Log Time: 1207

Transit Time:

Comments: Conditions were acceptable

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 7 Feb 2019

Channel Alternative: P0 P1 P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 24

Repetition:

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood Ebb Average Observed

Added Tide:

Wind Condition: 1 S15

Heading: Upbound Downbound

PILOT: Capt. Kevin Keele (Pilot 3) Capt. Matthew Truss (Pilot 4)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P2-A-1-FA-S15-U-4-1

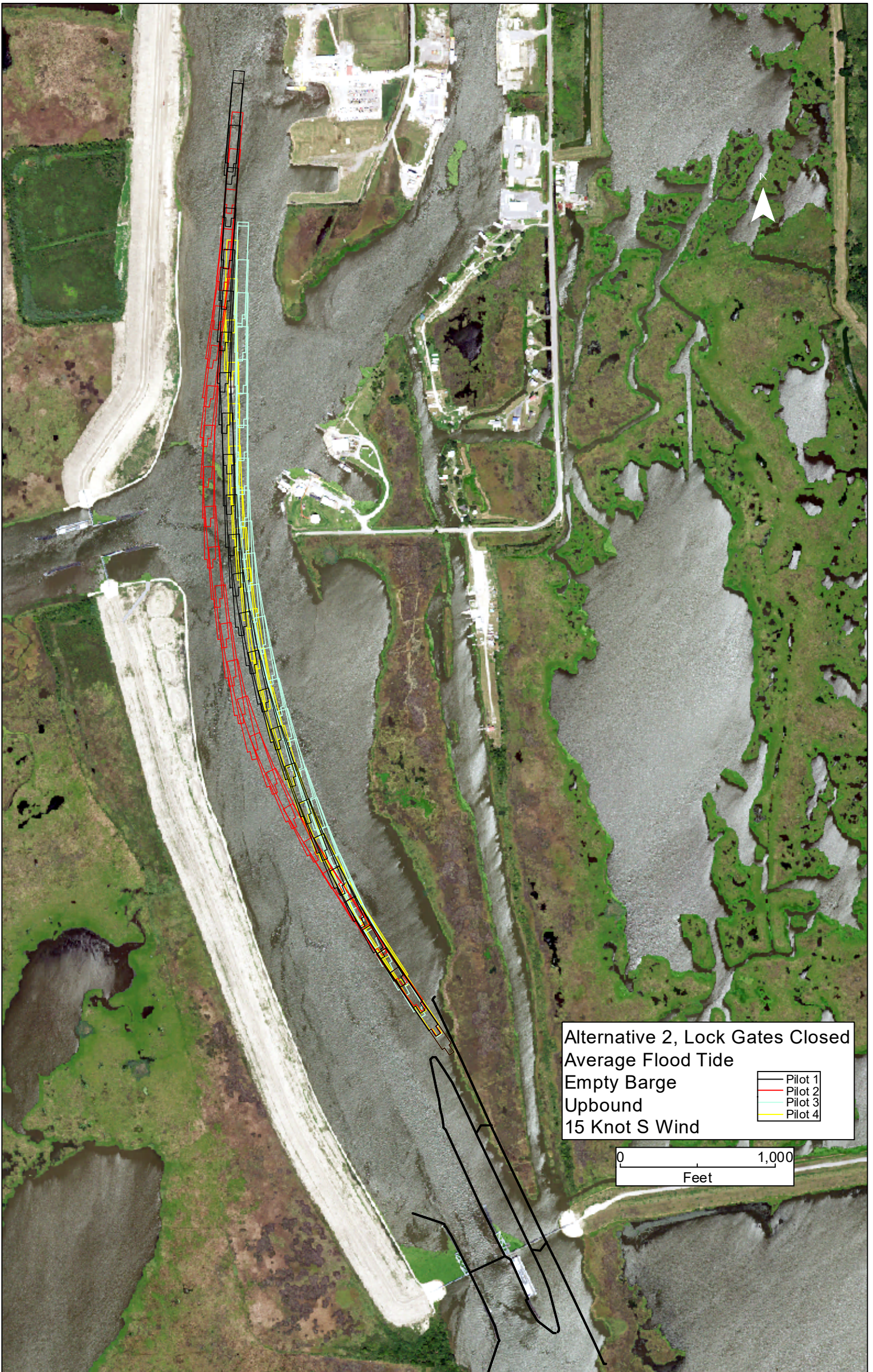
End Time: 1215

Log Time: 1203

Transit Time: 10:16

Comments:

Conditions was perfect. No problems



Alternative 2, Lock Gates Closed
Average Flood Tide
Empty Barge
Upbound
15 Knot S Wind

- Pilot 1
- Pilot 2
- Pilot 3
- Pilot 4

0 1,000
Feet

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 1/30/19

Channel Alternative: P0 P1 (P2)

Area A: Houma Navigation Canal

Test Matrix Run Number: 23

Repetition: 1

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: (Flood) Ebb (Average) Observed

Added Tide: 0.5m

Wind Condition: 1 S15 1

Heading: (Upbound) Downbound

PILOT: Capt. Michael J. Orr (Pilot 1) Capt. Jason Jones (Pilot 2)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P2_A_2_FA_S15_U_1-1

End Time: 1124

Log Time: 1113

Transit Time: 8:08

Comments:

Handwritten signature and notes

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 30 Jan 2019.

Channel Alternative: P0 P1 **P2**

Area A: Houma Navigation Canal

Test Matrix Run Number: **23**

Repetition: 1

Design Ship: 1 TUGBA57 **2 TUGBA59 (Empty)**

Tide: **Flood** Ebb **Average** Observed

Added Tide: 0.5m

Wind Condition: 1 **S15**

Heading: **Upbound** Downbound

PILOT: Capt. Michael J. Orr (Pilot 1) Capt. Jason Jones (**Pilot 2**)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: **P2 - A - 2 - FA - S15 - U - 2 - 1**

End Time: 1130

Log Time: 1120

Transit Time: 08:00

Comments:

A little slide from tow ~~from~~ steering in turn.

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 2/6/2019

Channel Alternative: P0 P1 (P2)

Area A: Houma Navigation Canal

Test Matrix Run Number: 26

Repetition:

Design Ship: 1 TUGBA57 (2 TUGBA59 (Empty))

Tide: (Flood) Ebb Average Observed

Added Tide: 0.5m

Wind Condition: 1 S15

Heading: (Upbound) Downbound

PILOT: Capt. Kevin Keele (Pilot 3) Capt. Matthew Truss (Pilot 4)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P2-A-2-FA-SIS-U-3-1

End Time: 1653 Log Time: 1636 Transit Time: 08:23

Comments: Transiting out of lock, no set, plenty of room

Transit conditions were acceptable.

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 6 Feb 2019

Channel Alternative: P0 P1 (P2)

Area A: Houma Navigation Canal

Test Matrix Run Number: 26

Repetition: 1

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood Ebb Average Observed

Added Tide: 0.5

Wind Condition: 1/S15

Heading: Upbound Downbound

PILOT: Capt. Kevin Keele (Pilot 3) Capt. Matthew Truss (Pilot 4)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot+ Repetition

Filename: P2-A-2-FA-S15-U-4-1

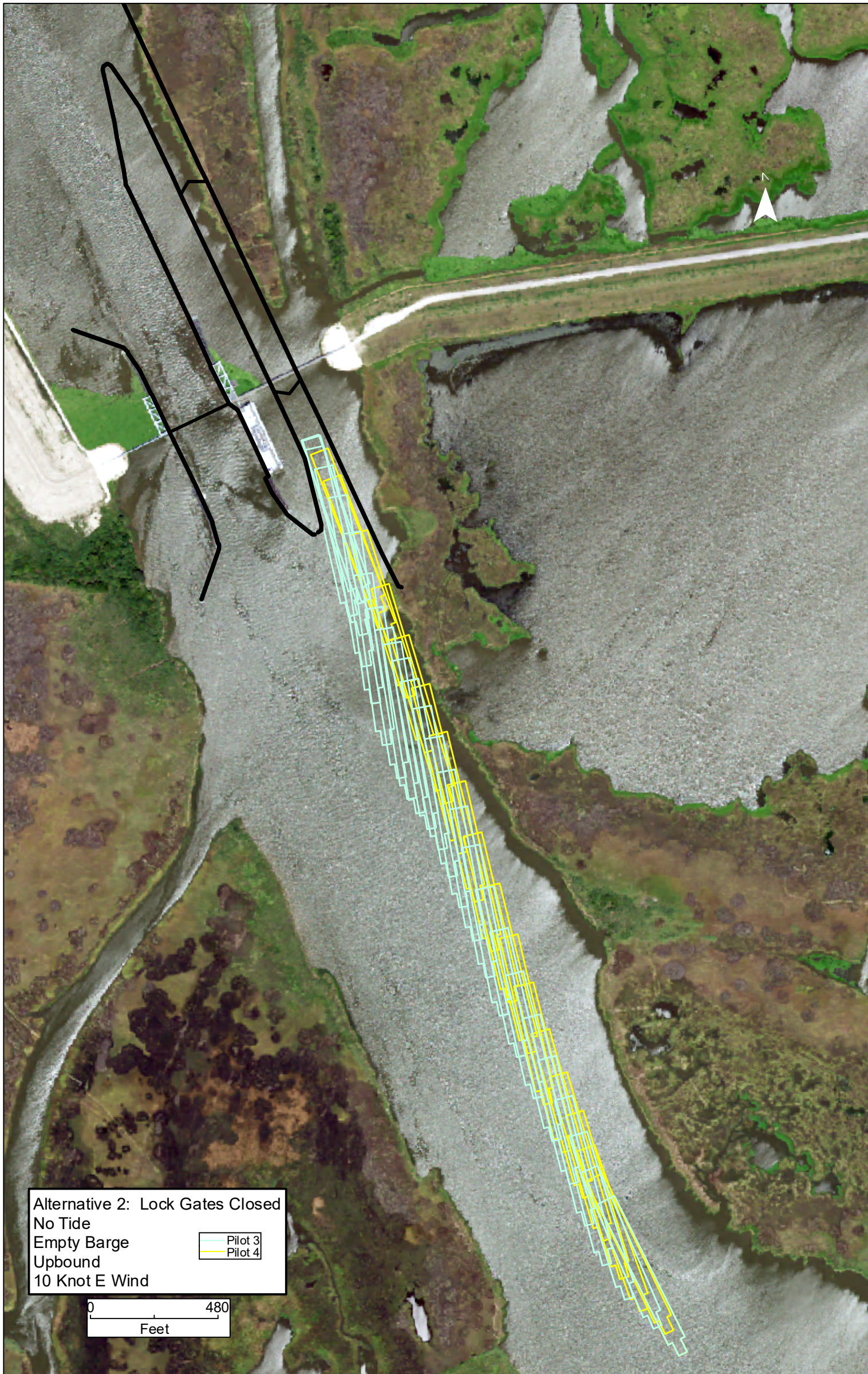
End Time: 1644

Log Time: 1626

Transit Time: 6140

Comments:

Transit was smooth exiting locks. No problems.



Alternative 2: Lock Gates Closed
No Tide
Empty Barge
Upbound
10 Knot E Wind

Pilot 3
Pilot 4

0 480
Feet

Houma Navigation Complex, LA Lock Addition Simulation Study

Date:

Channel Alternative: P0 P1 **P2**

Area A: Houma Navigation Canal

Test Matrix Run Number: 29

Repetition: /

Design Ship: 1 TUGBA57 2 **TUGBA59** (Empty)

Tide: Flood Ebb Average Observed

Added Tide:

Wind Condition: 1 S15 2) **E10**

Heading: **Upbound** Downbound

PILOT: Capt. Kevin Keele (Pilot 3) Capt. Matthew Truss (Pilot 4)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: **P2-A-20-E10-U-3-1**

End Time: 1300

Log Time: 1251

Transit Time: 8:10

Comments: *Conditions were un-acceptable with tow*

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 7 Feb 2019

Channel Alternative: P0 P1 P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 29

Repetition:

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood Ebb Average Observed None Added Tide:

Wind Condition: 1 S15 E10

Heading: Upbound Downbound

PILOT: Capt. Kevin Keele (Pilot 3) Capt. Matthew Truss (Pilot 4)

Filename = Alternative + Area + Vessel + Tide + Wind + Heading + Pilot + Repetition

Filename: P2 - A - 2 - ~~Ø~~ - E10 - U - 4 - 1

End Time: 1247

Log Time: 1233

Transit Time: 5:32

Comments:

50 ft boat, 1200 Hp boat will need to use the wall to enter locks. A bigger boat with more hp will not have and will be able to enter more easily. It can be done safely.



Alternative 2: Lock Gates Closed
No Tide
Empty Barge
Upbound
10 Knot W Wind

Pilot 3
Pilot 4

0 500
Feet

Houma Navigation Complex, LA Lock Addition Simulation Study

Date:

Channel Alternative: P0 P1 P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 31

Repetition: 1

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood Ebb Average Observed 0

Added Tide:

Wind Condition: 1 S15 2 3) W10

Heading: Upbound Downbound

PILOT: Capt. Kevin Keele (Pilot 3) Capt. Matthew Truss (Pilot 4)

Filename = Alternative + Area + Vessel + Tide + Wind + Heading + Pilot + Repetition

Filename: P2-A-2-0-W10-U-3-1

End Time: 1452

Log Time: 1442

Transit Time: 6:20

Comments: Conditions were acceptable, but transit was affected more than I believe it should've been by the wind.

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 7 FEB 19

Channel Alternative: P0 P1 (P2)

Area A: Houma Navigation Canal

Test Matrix Run Number: 31

Repetition: 1

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood Ebb Average Observed 10

Added Tide:

Wind Condition: 1 S15 3) W10

Heading: Upbound Downbound

PILOT: Capt. Kevin Keele (Pilot 3) Capt. Matthew Truss (Pilot 4)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot + Repetition

Filename: P2-A-2-0-W-10-4-1

End Time: 1444

Log Time: 1436

Transit Time: 5:04

Comments:

Transit was ideal for empties, with winds remember to hold up into air and let fall onto opposite wall after entrance. Conditions was moderate but can be done safely.



Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 7 Feb 2019

Channel Alternative: P0 P1 P2

Area A: Houma Navigation Canal

Test Matrix Run Number: 27

Repetition:

Design Ship: 1 TUGBA57 2 TUGBA59 (Empty)

Tide: Flood Ebb Average Observed 0 current Added Tide:

Wind Condition: 1 S15

Heading: Upbound Downbound

PILOT: Capt. Kevin Keele (Pilot 3) Capt. Matthew Truss (Pilot 4)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot+ Repetition

Filename: P2-A-2-0-S15-31

End Time: 1202

Log Time: 1146

Transit Time: 7:43

Comments: conditions were acceptable for lock transit

Houma Navigation Complex, LA Lock Addition Simulation Study

Date: 7 Feb 2019

Channel Alternative: P0 P1 **P2**

Area A: Houma Navigation Canal

Test Matrix Run Number: 27

Repetition:

Design Ship: 1 TUGBA57 **2 TUGBA59 (Empty)**

Tide: Flood Ebb Average Observed **Ø NONE**

Added Tide:

Wind Condition: **1 S15**

Heading: **Upbound** Downbound

PILOT: Capt. Kevin Keele (Pilot 3) Capt. Matthew Truss (**Pilot 4**)

Filename = Alternative + Area + Vessel+ Tide + Wind + Heading +Pilot+ Repetition

Filename: P2 - A - 2 - Ø - S15 - U - 4 - 1

End Time: 1155

Log Time: 1142

Transit Time: 6:48

Comments:

Setting up for lock was a little tricky but corrections could be made in time.

Appendix B: Final Questionnaires

Houma Navigation Canal Ship Simulation Study – Final Questionnaire

Name: Jeffrey Orr

Terrebonne Parish is proposing the addition of a lock chamber to the existing Houma Navigation Canal Floodgate structure. Testing for this project occurred during two testing weeks: January 28-1 February, 2019 and February 4-8, 2019.

1. Please comment on your experience of using the ERDC ship tow simulator this week for testing.

It was good every thing run great and worked great

2. Do you think any additional testing runs should have been completed that were not tested this week?

No I think that we ran all that we could run

3. Do you feel the environmental conditions (wind, current, etc.) and visuals provided a reasonable representation of the Houma Navigation Canal and its structures?

yes I felt like it was very real and look like it should

4. Did you feel the currents were considerably different based on the closure of the Houma Navigation Canal floodgate and lock?

Did not feel any thing on any run I made

5. Please comment on the behavior of the design vessels (six-pack barge with 1,200 HP pusher tow, loaded and empty). Do you feel the design vessel was adequate as a means of testing the channel?

Seen to do the job and running everything went smooth

6. Do you have any concerns that the addition of the lock chamber and approach will adversely affect navigation past Bayou Grand Caillou, especially with the Houma Navigation floodgate and lock structures in the closed position?

No had no problems with anything

7. With both the lock structure and the floodgate in the open position, do you expect the proposed diversion channel would adversely impact navigation?

No I think it all will run like normal

8. Do you feel that the proposed addition of a lock chamber would be feasible for the following conditions using a loaded six pack barge configuration with a 1200 HP towboat:

- a. All floodgates and lock open and running upbound
- b. All floodgates and lock open and running downbound
- c. Both Houma Navigation Canal structures (floodgate and lock) closed, Bayou Grand Caillou open and running upbound
- d. Both Houma Navigation Canal structures (floodgate and lock) closed, Bayou Grand Caillou open and running downbound

yes you can run with that Tow anyway you set it up

9. Do you feel that the proposed addition of a lock chamber would be feasible for the following conditions using an empty six pack barge configuration with a 1200 HP towboat:

- e. All floodgates and lock open and running upbound
- f. All floodgates and lock open and running downbound
- g. Both Houma Navigation Canal structures (floodgate and lock) closed, Bayou Grand Caillou open and running upbound
- h. Both Houma Navigation Canal structures (floodgate and lock) closed, Bayou Grand Caillou open and running downbound

yes you can run with that Tow just have to watch the wind

10. Overall, do you think the addition of the proposed lock structure would have significant impact on navigation through the Houma Navigation Floodgate? Past Bayou Grand Caillou?

no I think that you would not have any problems locking running on any set up

11. Any additional comments?

I think that This will work and that no one ~~will~~ will have a problem making the lock and the flood gate I seen no problems at any time doing anyone of the trips

Houma Navigation Canal Ship Simulation Study – Final Questionnaire

Name: JASON JONES

Terrebonne Parish is proposing the addition of a lock chamber to the existing Houma Navigation Canal Floodgate structure. Testing for this project occurred during two testing weeks: January 28-1 February, 2019 and February 4-8, 2019.

1. Please comment on your experience of using the ERDC ship tow simulator this week for testing.

The simulator was a correct version of procedures performed all personnel was professional and polite.

2. Do you think any additional testing runs should have been completed that were not tested this week?

only if the towing company need to train their pilots.

3. Do you feel the environmental conditions (wind, current, etc.) and visuals provided a reasonable representation of the Houma Navigation Canal and its structures?

yes very reasonable representation current weather and structures.

4. Did you feel the currents were considerably different based on the closure of the Houma Navigation Canal floodgate and lock?

No difference noted.

5. Please comment on the behavior of the design vessels (six-pack barge with 1,200 HP pusher tow, loaded and empty). Do you feel the design vessel was adequate as a means of testing the channel?

The Boat and Barges were very adequate Both loaded and Empty.

6. Do you have any concerns that the addition of the lock chamber and approach will adversely affect navigation past Bayou Grand Caillou, especially with the Houma Navigation floodgate and lock structures in the closed position?

No concerns that would effect tow or Barges.

7. With both the lock structure and the floodgate in the open position, do you expect the proposed diversion channel would adversely impact navigation?

No Navigation Issues will be Detected with Both Structures open.

8. Do you feel that the proposed addition of a lock chamber would be feasible for the following conditions using a loaded six pack barge configuration with a 1200 HP towboat:
- a. All floodgates and lock open and running upbound
 - b. All floodgates and lock open and running downbound
 - c. Both Houma Navigation Canal structures (floodgate and lock) closed, Bayou Grand Caillou open and running upbound
 - d. Both Houma Navigation Canal structures (floodgate and lock) closed, Bayou Grand Caillou open and running downbound

yes IN CASE of storm surge it will be an accet.
to traffic. APPROACHING lock.

9. Do you feel that the proposed addition of a lock chamber would be feasible for the following conditions using an empty six pack barge configuration with a 1200 HP towboat:
- e. All floodgates and lock open and running upbound
 - f. All floodgates and lock open and running downbound
 - g. Both Houma Navigation Canal structures (floodgate and lock) closed, Bayou Grand Caillou open and running upbound
 - h. Both Houma Navigation Canal structures (floodgate and lock) closed, Bayou Grand Caillou open and running downbound

yes it would be a added security feature.

10. Overall, do you think the addition of the proposed lock structure would have significant impact on navigation through the Houma Navigation Floodgate? Past Bayou Grand Caillou?

NO impact will be A issue.

11. Any additional comments?

The Engineers working the project were very professional and polite A valuable Asset to this project.

Houma Navigation Canal Ship Simulation Study – Final Questionnaire

Name: Kevin Keele

Terrebonne Parish is proposing the addition of a lock chamber to the existing Houma Navigation Canal Floodgate structure. Testing for this project occurred during two testing weeks: January 28-1 February, 2019 and February 4-8, 2019.

1. Please comment on your experience of using the ERDC ship tow simulator this week for testing.

I believe that the simulator is very close to how an actual tow handles, with the exception of empties and wind. I believe that they were accurate enough for this testing to determine whether or not transit is capable.

2. Do you think any additional testing runs should have been completed that were not tested this week?

No.

3. Do you feel the environmental conditions (wind, current, etc,) and visuals provided a reasonable representation of the Houma Navigation Canal and its structures?

Yes.

4. Did you feel the currents were considerably different based on the closure of the Houma Navigation Canal floodgate and lock? *No. I believe that the current wasn't as much of an issue as anticipated*

5. Please comment on the behavior of the design vessels (six-pack barge with 1,200 HP pusher tow, loaded and empty). Do you feel the design vessel was adequate as a means of testing the channel?

Yes. But I believe it would be more of a worse case scenario.

6. Do you have any concerns that the addition of the lock chamber and approach will adversely affect navigation past Bayou Grand Caillou, especially with the Houma Navigation floodgate and lock structures in the closed position?

No. There seems to be plenty of room to make any corrections in the channel.

7. With both the lock structure and the floodgate in the open position, do you expect the proposed diversion channel would adversely impact navigation?

No.

8. Do you feel that the proposed addition of a lock chamber would be feasible for the following conditions using a loaded six pack barge configuration with a 1200 HP towboat:
- a. All floodgates and lock open and running upbound
 - b. All floodgates and lock open and running downbound
 - c. Both Houma Navigation Canal structures (floodgate and lock) closed, Bayou Grand Caillou open and running upbound
 - d. Both Houma Navigation Canal structures (floodgate and lock) closed, Bayou Grand Caillou open and running downbound

yes.

9. Do you feel that the proposed addition of a lock chamber would be feasible for the following conditions using an empty six pack barge configuration with a 1200 HP towboat:
- e. All floodgates and lock open and running upbound
 - f. All floodgates and lock open and running downbound
 - g. Both Houma Navigation Canal structures (floodgate and lock) closed, Bayou Grand Caillou open and running upbound
 - h. Both Houma Navigation Canal structures (floodgate and lock) closed, Bayou Grand Caillou open and running downbound

yes,

10. What difficulties, if any, did you experience with the cross wind conditions? Did the tow package handle realistically for a 10 knot wind magnitude?

It was very difficult. I don't believe the tow would actually handle the way it did.

11. Overall, do you think the addition of the proposed lock structure would have significant impact on navigation through the Houma Navigation Floodgate? Past Bayou Grand Caillou?

No.

12. Any additional comments?

None.

Houma Navigation Canal Ship Simulation Study – Final Questionnaire

Name: Matthew Truss

Terrebonne Parish is proposing the addition of a lock chamber to the existing Houma Navigation Canal Floodgate structure. Testing for this project occurred during two testing weeks: January 28-1 February, 2019 and February 4-8, 2019.

1. Please comment on your experience of using the ERDC ship tow simulator this week for testing.

The simulator is immaculate. Everything is beautiful, well maintained and technology is up to date. Some of the test runs with wind ~~seemed~~ off as with the set from it.

2. Do you think any additional testing runs should have been completed that were not tested this week?

No. Everything was covered.

3. Do you feel the environmental conditions (wind, current, etc.) and visuals provided a reasonable representation of the Houma Navigation Canal and its structures?

Yes except the south wind runs.

4. Did you feel the currents were considerably different based on the closure of the Houma Navigation Canal floodgate and lock?

N/B there wasn't a current which is true +
S/B I felt the current from the upper floodgates.

5. Please comment on the behavior of the design vessels (six-pack barge with 1,200 HP pusher tow, loaded and empty). Do you feel the design vessel was adequate as a means of testing the channel?

Yes speaking from the vessels that transit the area.

6. Do you have any concerns that the addition of the lock chamber and approach will adversely affect navigation past Bayou Grand Caillou, especially with the Houma Navigation floodgate and lock structures in the closed position?

Nope, everything should flow accordingly.

7. With both the lock structure and the floodgate in the open position, do you expect the proposed diversion channel would adversely impact navigation?

There will be a set toward the lock channel
but if picked up in time, its easily corrected.

8. Do you feel that the proposed addition of a lock chamber would be feasible for the following conditions using a loaded six pack barge configuration with a 1200 HP towboat:
- a. All floodgates and lock open and running upbound
 - b. All floodgates and lock open and running downbound
 - c. Both Houma Navigation Canal structures (floodgate and lock) closed, Bayou Grand Caillou open and running upbound
 - d. Both Houma Navigation Canal structures (floodgate and lock) closed, Bayou Grand Caillou open and running downbound

I agree with all options.

9. Do you feel that the proposed addition of a lock chamber would be feasible for the following conditions using an empty six pack barge configuration with a 1200 HP towboat:
- e. All floodgates and lock open and running upbound
 - f. All floodgates and lock open and running downbound
 - g. Both Houma Navigation Canal structures (floodgate and lock) closed, Bayou Grand Caillou open and running upbound
 - h. Both Houma Navigation Canal structures (floodgate and lock) closed, Bayou Grand Caillou open and running downbound

I agree with all options.

10. What difficulties, if any, did you experience with the cross wind conditions? Did the tow package handle realistically for a 10 knot wind magnitude?

I had a great time with the way the tow handles in wind. It's pretty realistic.

11. Overall, do you think the addition of the proposed lock structure would have significant impact on navigation through the Houma Navigation Floodgate? Past Bayou Grand Caillou?

No

12. Any additional comments?

Boats should beware of hp & tow configuration before entering & pay attention to conditions & everything should be fine.

Appendix C: Vessel Pilot Cards

PILOT CARD

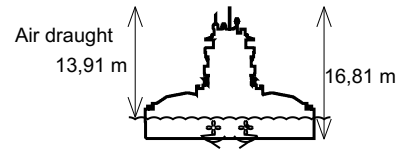
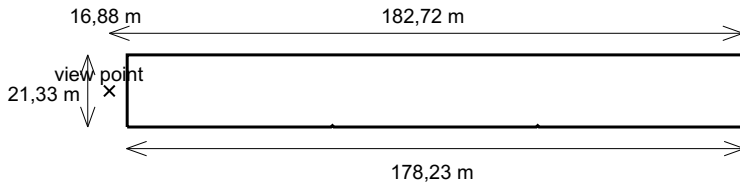
TUGBA57

Version 1

Ship's name Kin King
 Call Sign WDG5328 Deadweight 0 tonnes Year built 2012
 Draught aft 2.895 m / 9 ft 6 in Forward 2.895 m / 9 ft 6 in Displacement 10928 tonnes

SHIP'S PARTICULARS

Length overall 199.6 m Anchor chain: Port _____ shackles Starboard _____ shackles
 Breadth 21.33 m
 Bulbous bow No (1 shackle = 27,432 m = 15 fathoms)



PROPULSION PARTICULARS

Type of engine Diesel Maximum power 883 kW (1200 hp)

Manoeuvring engine order	RPM	Pitch	Speed (knots)	
			Loaded	Ballast
Full sea speed	1	N/A	6.2	N/A
Full Ahead	0.8	N/A	5.6	N/A
Half Ahead	0.5	N/A	4.5	N/A
Slow Ahead	0.25	N/A	2.8	N/A
Dead Slow Ahead	0.125	N/A	1.1	N/A
Dead Slow Astern	-0.125	N/A		
Slow Astern	-0.25	N/A		
Half Astern	-0.5	N/A		
Full Astern	-1	N/A		

STEERING PARTICULARS

Type of rudder _____ Normal/Normal/Flanking/Flanking _____	Maximum angle _____ 45 _____ °
Hard-over to hard-over _____ 5.8 _____ s	
Rudder angle for neutral effect _____ 0 _____ °	
Thruster: Bow _____ N/A _____ kW (_____ N/A _____ hp) Stern _____ N/A _____ kW (_____ N/A _____ hp)	

CHECKED IF ABOARD AND READY

Anchors	<input type="checkbox"/>	Indicators:	<input type="checkbox"/>
Whistle	<input type="checkbox"/>	Rudder	<input type="checkbox"/>
Radar	<input type="checkbox"/> 3 cm <input type="checkbox"/> 10 cm	Rpm/pitch	<input type="checkbox"/>
ARPA	<input type="checkbox"/>	Rate of turn	<input type="checkbox"/>
Speed log	<input type="checkbox"/> Doppler: Yes / No	Compass system	<input type="checkbox"/>
Water speed	<input type="checkbox"/>	Constant gyro error ± _____ °	
Ground speed	<input type="checkbox"/>	VHF	<input type="checkbox"/>
Dual-axis	<input type="checkbox"/>	Elec. pos. fix. system	<input type="checkbox"/>
Engine telegraphs	<input type="checkbox"/>	Type _____	
Steering gear	<input type="checkbox"/>		
Number of power units operating	<input type="checkbox"/>		

OTHER INFORMATION:

PILOT CARD

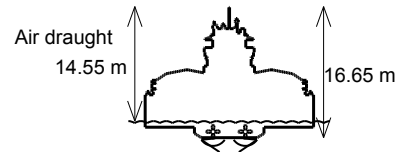
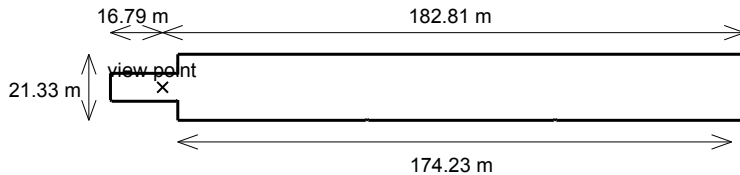
TUGBA59V1

Version 1

Ship's name Kin King
 Call Sign WDG5328 Deadweight 0 tonnes Year built 2012
 Draught aft 2.1 m / 6 ft 11 in Forward 0.457 m / 1 ft 6 in Displacement 1654 tonnes

SHIP'S PARTICULARS

Length overall 199.6 m Anchor chain: Port _____ shackles Starboard _____ shackles
 Breadth 21.33 m
 Bulbous bow No (1 shackle = 27.432 m = 15 fathoms)



PROPULSION PARTICULARS

Type of engine Diesel Maximum power 883 kW (1200 hp)

Manoeuvring engine order		RPM	Pitch	Speed (knots)	
				Loaded	Ballast
Full sea speed	1	279.2	N/A	N/A	7.9
Full Ahead	0.8	248.0	N/A	N/A	6.9
Half Ahead	0.5	200.0	N/A	N/A	5.6
Slow Ahead	0.25	125.0	N/A	N/A	3.4
Dead Slow Ahead	0.125	60.0	N/A	N/A	1.6
Dead Slow Astern	-0.125	-60.0	N/A		
Slow Astern	-0.25	-125.0	N/A		
Half Astern	-0.5	-200.0	N/A		
Full Astern	-1	-279.2	N/A		

STEERING PARTICULARS

Type of rudder	Normal/Normal/Flanking/Flanking	Maximum angle	45	°						
Hard-over to hard-over	5.8	s								
Rudder angle for neutral effect	0	°								
Thruster:	Bow	N/A	kW (N/A	hp)	Stern	N/A	kW (N/A	hp)

CHECKED IF ABOARD AND READY

Anchors	<input type="checkbox"/>		Indicators:	<input type="checkbox"/>
Whistle	<input type="checkbox"/>		Rudder	<input type="checkbox"/>
Radar	<input type="checkbox"/>	3 cm	Rpm/pitch	<input type="checkbox"/>
ARPA	<input type="checkbox"/>		Rate of turn	<input type="checkbox"/>
Speed log	<input type="checkbox"/>	Doppler:	Compass system	<input type="checkbox"/>
		Yes / No	Constant gyro error ±	<input type="text"/>
Water speed	<input type="checkbox"/>		VHF	<input type="checkbox"/>
Ground speed	<input type="checkbox"/>		Elec. pos. fix. system	<input type="checkbox"/>
Dual-axis	<input type="checkbox"/>		Type	<input type="text"/>
Engine telegraphs	<input type="checkbox"/>			
Steering gear	<input type="checkbox"/>			
Number of power units operating	<input type="checkbox"/>			

OTHER INFORMATION:

Unit Conversion Factors

Multiply	By	To Obtain
degrees (angle)	0.01745329	radians
feet	0.3048	meters
horsepower (550 foot-pounds force per second)	745.6999	watts
knots	0.5144444	meters per second
miles (U.S. statute)	1,609.347	meters
square feet	0.09290304	square meters

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

The public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden, to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports (0704-0188), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.

PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.

1. REPORT DATE October 2019		2. REPORT TYPE Final Report		3. DATES COVERED (From - To)	
4. TITLE AND SUBTITLE Houma Navigation Canal Lock Complex (TE-113) Study, Louisiana: Houma Navigation Canal Ship Simulation Results				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S) Mario J. Sánchez, S. Keith Martin, and Morgan M. Johnston				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Coastal and Hydraulics Laboratory U.S. Army Engineer Research and Development Center 3909 Halls Ferry Road Vicksburg, MS 39180-6199				8. PERFORMING ORGANIZATION REPORT NUMBER ERDC/CHL TR-19-18	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) APTIM Environmental and Infrastructure, LLC 4171 Essen Lane Baton Rouge, LA 70809				10. SPONSOR/MONITOR'S ACRONYM(S) N/A	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution is unlimited.					
13. SUPPLEMENTARY NOTES MIPR 1YCV3-0J72GJ					
14. ABSTRACT In 2019, the U.S. Army Engineer Research and Development Center, Coastal and Hydraulics Laboratory (CHL), used its Ship-Tow Simulator (STS) to perform a navigation study to assist APTIM Environmental and Infrastructure, Inc. This project was used to help with the evaluation of a channel modification alternative for barge traffic transiting the Houma Navigation Canal (HNC) Lock Complex (TE-113) near Dulac, Louisiana. The study considered the impacts to navigation associated with the addition of a lock structure adjacent to the existing floodwalls and 250-foot swing gate flood control structure (The Bubba Dove flood gate) on the HNC. The CHL STS is a real-time simulator, which means there is not a time scale and events on the simulator happen at the same rate as real life. A variety of environmental forces act upon the ship during the simulation transit (e.g., currents, wind, waves, bathymetry, and ship-to-ship interaction). Ship simulation testing of the project was conducted at CHL over a 2-week period from January through February 2019. The simulations involved a 1,200-horsepower towboat with a 6-pack barge configuration in loaded and ballast conditions. Results in the form of track plots and pilot questionnaires were reviewed to develop final conclusions and recommendations.					
15. SUBJECT TERMS Gulf Intracoastal Waterway, Houma (La.), Inland navigation—Computer simulation, Locks (Hydraulic engineering, Ships--Maneuverability					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			Mario J. Sánchez
Unclassified	Unclassified	Unclassified	SAR	223	19b. TELEPHONE NUMBER (Include area code) 601-634-4319