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**Addendum 1 of Appendix D, Economics – Attachment 4:
Lock Capacity: Updated NIM Calibration**

**Inner Harbor Navigation Canal (IHNC) Lock – Lock
Replacement, Orleans Parish, Louisiana**

General Reevaluation Report

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Attachment 4 – NIM 2025 Updated Calibration

1. Summary

Calibration is an important step in NIM. It validates that the model is developing least-cost shipping plans that reasonably depict historical (or some other desired) condition before introducing other elements of risk to the calculations (such as changing lock services levels, changing traffic levels, etc.). Calibration in NIM consists of estimating the efficiency of towboats, movement dedication factors (i.e. percent empty backhaul), and the tow-size limits on each waterway sector.

This section describes how the tow-size limits were modified in the current analysis at IHNC Lock's Targets.

As mentioned in Section 8.3 of the Economics Addendum, previous analyses at IHNC Lock assumed that tows would continue to arrive at the project in the same configurations as they had arrived historically in both the With- (WPC) and Without- (WOPC) Project Conditions. This same assumption is maintained in the current analysis for the WOPC. However, in the WPC, tows are expected to reconfigure into more optimized tow packages to make better use of the new 900x110' chamber dimensions. As a result, NIM must be calibrated to new targets that do not match the historical targets. Specifically, NIM must be calibrated to align itself with the lock performance simulation (ARNOLT) to reasonably depict a similar number of tows, barges, and tow-sizes at IHNC Lock. To accomplish this, NIM was loaded with modified targets, derived from the outputs of the ARNOLT model. The outputs used were at a historical tonnage level (about 16 million tons), but using optimized tow configurations and the new chamber dimensions. The new targets are shown in Table 1 below.

Table 1 - Comparison of previous vs. current analysis targets at IHNC Lock

Analysis	Loaded Barges	Empty Barges	Avg Delay Time (mins)	Avg Processing Time (mins)	Tows	Avg Towboat Horsepower
Previous	7,395	5,800	884	52	5,645	1,604
Current	7,314	5,131	40	32	2,831	1,604

2. System considerations

Although processing tows that are “optimized” for the new chambers dimensions in ARNOLT will result in higher lock capacity and generally lower average transit time per tow at any given tonnage level, it does not necessarily mean that tows are “optimized” towards producing a least-cost shipping plan. This is largely due to the potential costs of reconfiguring a tow mid-transit (roughly 20 minutes per tow, 5 minutes per barge). For movements that are close to their waterway destination after traversing IHNC Lock, it might be more cost effective to simply remain in their current/historical configuration than reassembling into something more akin to a “unit tow.” Additional waterway system constraints are also a consideration, such as the chamber dimensions (and thus maximum tow-sizes) at other locks from origin-to-destination. For the

current analysis, the calibrated parameters for the rest of the IHNC network were left unchanged. Only the IHNC Lock waterway sector was recalibrated.

3. Results

Overall, the current analysis calibration improved at IHNC Lock but worsened at other system locks. Comparative metrics can be seen in Table 2 and Table 3. This is likely due to the choice to only calibrate the IHNC Lock waterway sector compared to re-calibrated the entire system.

The distribution of tow-sizes at IHNC Lock also improved, aligning much closer to the desired targets compared to the previous IHNC analysis.

Table 2 - Previous analysis comparison of select target vs. model calibration metrics

lock name	tows			average horsepower			barges per tow		
	target	model	percent difference	target	model	percent difference	target	model	percent difference
Bayou Sorrel Lock	4,588	4,679	2%	1,884	1,629	-14%	3.5	3.4	-2%
Port Allen Lock	5,517	5,515	0%	1,738	1,606	-8%	3.0	3.0	0%
Old River L&D	2,286	2,175	-5%	1,962	1,723	-12%	3.4	3.6	5%
Inner Harbor Lock	5,645	5,733	2%	1,604	1,650	3%	2.3	2.3	-2%
Calcasieu Lock	11,658	11,495	-1%	1,737	1,179	-32%	2.4	2.5	1%
Leland Bowman Lock	11,536	11,216	-3%	1,729	1,359	-21%	2.5	2.6	3%
Bayou Boeuf Lock	11,163	7,872	-29%	1,405	1,498	7%	2.0	2.8	42%
Harvey Lock	2,030	2,032	0%	1,279	1,540	20%	1.3	1.3	0%
Algiers Lock	6,820	7,071	4%	1,698	1,661	-2%	2.7	2.6	-4%

Table 3 - Current analysis comparison of select target vs. model calibration metrics

lock name	tows			average horsepower			barges per tow		
	target	model	percent difference	target	model	percent difference	target	model	percent difference
Bayou Sorrel Lock	4,588	4,151	-10%	1,884	1,371	-27%	3.5	3.8	11%
Port Allen Lock	5,517	4,751	-14%	1,738	1,710	-2%	3.0	3.5	16%
Old River L&D	2,286	2,073	-9%	1,962	1,657	-16%	3.4	3.8	10%
Inner Harbor Lock	2,831	2,831	0%	1,604	1,548	-3%	4.4	4.4	1%
Calcasieu Lock	11,658	7,728	-34%	1,737	1,333	-23%	2.4	3.7	51%
Leland Bowman Lock	11,536	9,874	-14%	1,729	1,299	-25%	2.5	2.9	17%
Bayou Boeuf Lock	11,163	7,729	-31%	1,405	1,304	-7%	2.0	2.9	44%
Harvey Lock	2,030	2,016	-1%	1,279	1,543	21%	1.3	1.3	1%
Algiers Lock	6,820	6,568	-4%	1,698	1,684	-1%	2.7	2.8	4%

Figure 1 - Previous analysis comparison of target vs. NIM tow-sizes at IHNC Lock with a 900'x110' chamber

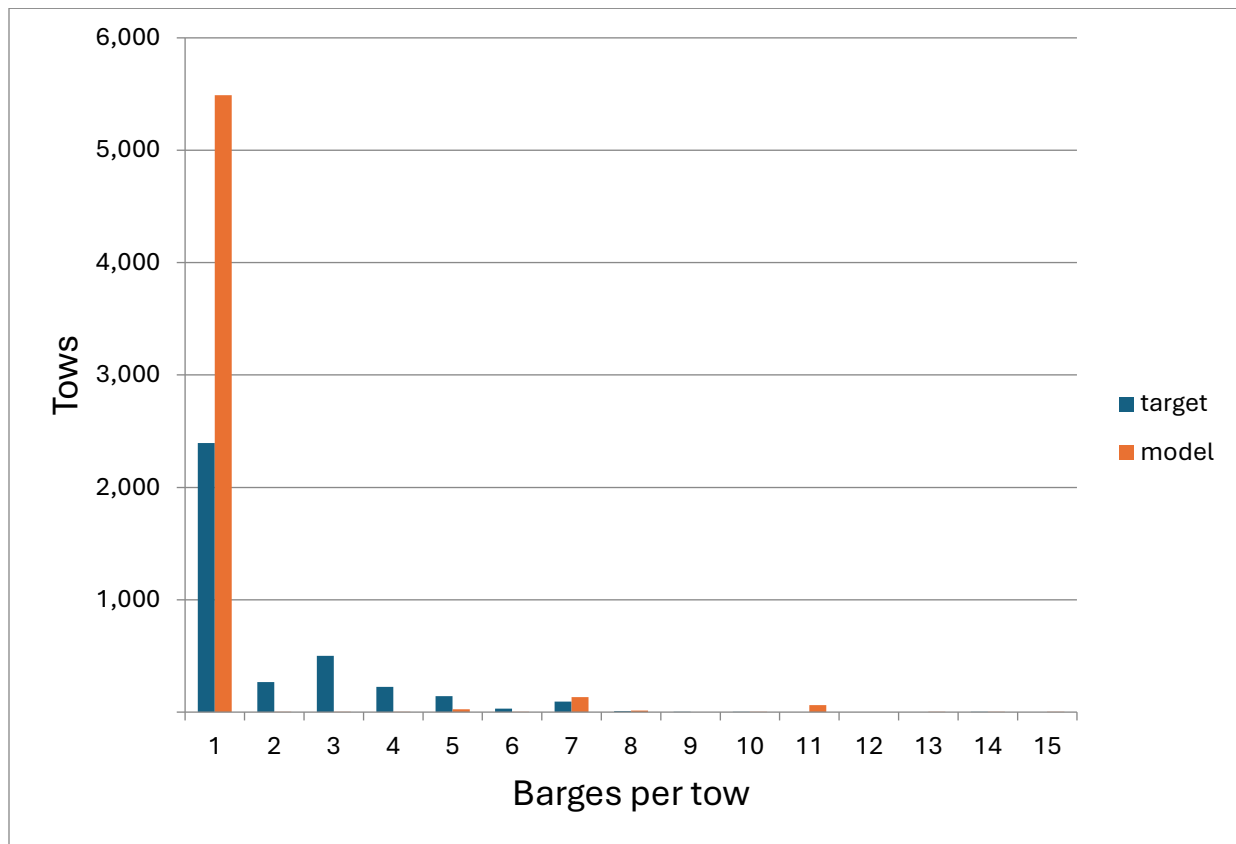


Figure 2 - Current analysis comparison of target vs. NIM tow-sizes at IHNC Lock with a 900'x110' chamber

