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LAR-16-024: Column Line 7.3 Wall Reinforcement Area Change Pre-Submittal Meeting

September 8, 2016

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Meeting Purpose and Agenda


Meeting Purpose


- Discuss the proposed resolution path for the column line 7.3 wall design nonconformance regarding provided area of reinforcement
- Receive and address Staff feedback

Agenda

- Background
- Problem Statement & Proposed Resolution Path

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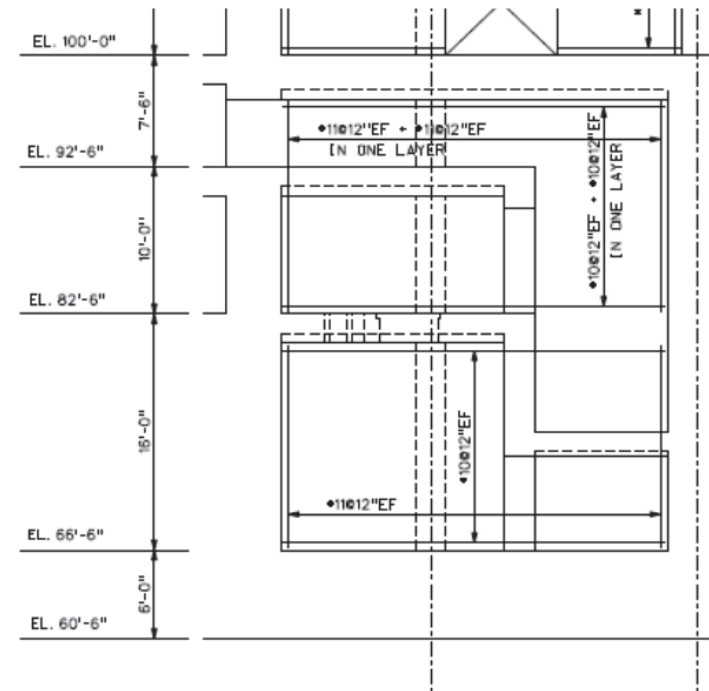
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Background Information

- Tier 2* information in UFSAR Figure 3H.5-4 requires #11 bars at 12" spacing + #11 bars at 12" spacing (equivalent to #11 bars at 6" spacing) on-center for the Auxiliary Building Wall 7.3, between EL. 82'-6" and EL. 100'-0".



UFSAR Figure 3H.5-4
[Typical Reinforcement in Wall 7.3]*

Background Information

- The wall is 27'-3 ¾" long, per design on the south face, resulting in 55 reinforcing bars (#11) provided to meet spacing.
- UFSAR Table 3H.5-5 states that the required reinforcing in this area is 2.08 in²/ft, however; it also states that the provided minimum vertical reinforcement is 3.12 in²/ft (Tier 2* information), which would result in 55 reinforcing bars (#11) provided.

Summary – Problem Statement & Proposed Resolution

Problem Statement

- Contrary to UFSAR Table 3H.5-5, one #11 dowel was omitted due to congestion at the west end of the south face of Wall 7.3, resulting in 54 bars and providing a vertical reinforcement area of steel of 3.08 in²/ft.
- The condition was entered into the corrective action and nonconformance programs. The site-specific design change which caused this omission is applicable to both units.

Proposed Resolution Path

- Tier 2* information in UFSAR Table 3H.5-5 is proposed to be changed via SNC LAR-16-024.

Wall 7.3 Reinforcement at El. 82'-6" (south side)

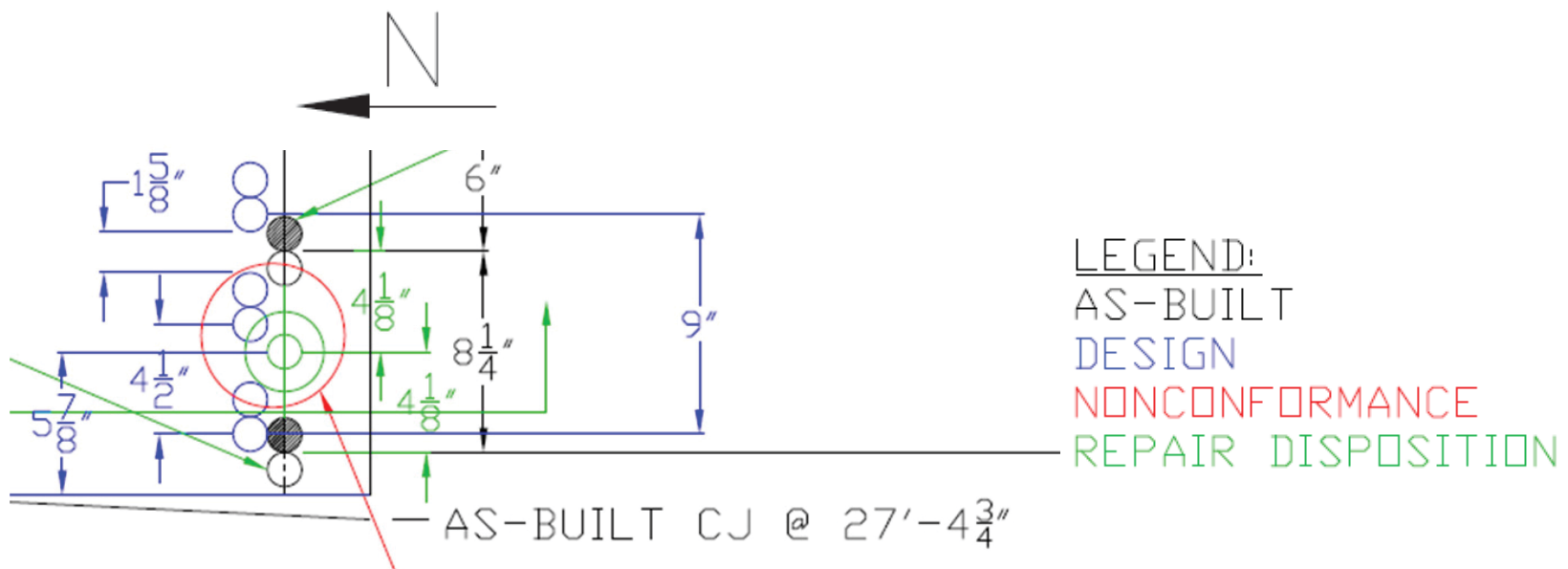


Red line indicates location
where dowel is missing.

Approved Repair

- A dowel was omitted on VEGP 3 because of spacing concerns near the shield building construction joint. The site-specific design change which caused this omission is applicable to both units.
- Demolition and repair were both considered. Repair was chosen due to available margin and satisfactory quality of the existing wall.
- The repair consists of construction activity plus a license amendment request.
- A headed bar was added to replace the omitted dowel.
- The repaired bar acts as the omitted reinforcement above 82'-6" after the development length of the straight bar is achieved.
- The region is well above the required reinforcement for the wall, and continues to meet the reinforcement demands for the design loads.
- The repair was developed in compliance with ACI 349-01. The change maintains conformance to ACI 349-01 code.

Reinforcement Design of South Face Adjacent to SB Construction Joint



Red markup indicates area of repair

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LAR-16-024 Approach

- Licensing Basis Change:
 - LAR-16-024 proposes to reduce the provided minimum reinforcement from 3.12 in²/ft to 3.08 in²/ft for this location.
- The interaction ratio (IR) for wall section 11 is 0.667 where the required reinforcement per UFSAR Table 3H.5-5 is 2.08 in²/ft and provided reinforcement is 3.12 in²/ft. After the addition of a headed reinforcing bar on the south face, the provided reinforcement is reduced to 3.08 in²/ft along the development length of the bar from elevation 82'-6" on the column line 7.3 wall. The new IR for this section of wall is .675, an increase of only .008 in IR.
- Additionally, the detailed analysis found that the local reinforcement required by design in this region is 0.997 in²/ft while the provided reinforcement locally would be 2.08 in²/ft without a developed bar.
- Reinforcement above and below the affected elevation were considered and determined to not be impacted.

Proposed UFSAR Mark-up

Table 3H.5-5
Interior Wall on Column Line 7.3 Details of Wall Reinforcement
(See Figure 3H.5-2 for Locations of Wall Sections.)

Wall Segment (See detail in Subsection 3H.5.1.2.)	Location	Wall Section	Reinforcement on Each Face (in ² /ft)	
			Required ⁽¹⁾	[Provided (Min.)]*
From Roof to Elevation 155'-6"	Horizontal	1	3.96	[4.12
	Vertical	7	3.60	3.72
Elevation 155'-6" to 135'-3"	Horizontal	2	2.80	3.12
	Vertical	8	3.59	3.72
Elevation 135'-3" to 117'-6"	Horizontal	3	2.03	2.54
	Vertical	9	2.63	3.12
Elevation 117'-6" to 100'-0"	Horizontal	4	2.29	2.54
	Vertical	10	2.98	3.12
Elevation 100'-0" to 82'-6"	Horizontal	5	1.69	2.54
	Vertical	11	2.08	3.42 3.08
Elevation 82'-6" to 66'-6"	Horizontal	6	0.85	1.27
	Vertical	12	0.98	1.56
Shear Reinforcement⁽²⁾ (in²/ft²)				
From Roof to Elevation 155'-6"	Standard hook or T headed bar	7	0.38	0.44]*

Notes:

1. Thermal loads have been considered in the design of critical sections. The required reinforcement values shown do not include the load case where seismic and normal thermal loads are numerically combined as the normal thermal loads were assessed to be insignificant. When the seismic and normal thermal loads are numerically combined, the value of required reinforcement may increase; however, in all cases the required reinforcement is less than the provided reinforcement and thus the design of the critical section reinforcement is acceptable.
2. Refer to Subsection 3.8.4.4.1 for the requirements for shear reinforcement.

Summary

- Tier 2* information in UFSAR Table 3H.5-5 is proposed to be changed via LAR-16-024
- The LAR demonstrates that while the provided reinforcement will be reduced locally, the wall still meets design requirements.
- Though this repair is unit specific to VEGP Unit 3, a site specific design change applicable to VEGP Units 3 & 4 caused the omission of the bar on VEGP Unit 3. Therefore, the technical evaluation provided in the proposed amendment is used as the basis for reducing the minimum provided reinforcement for both units.

Questions & Discussion

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