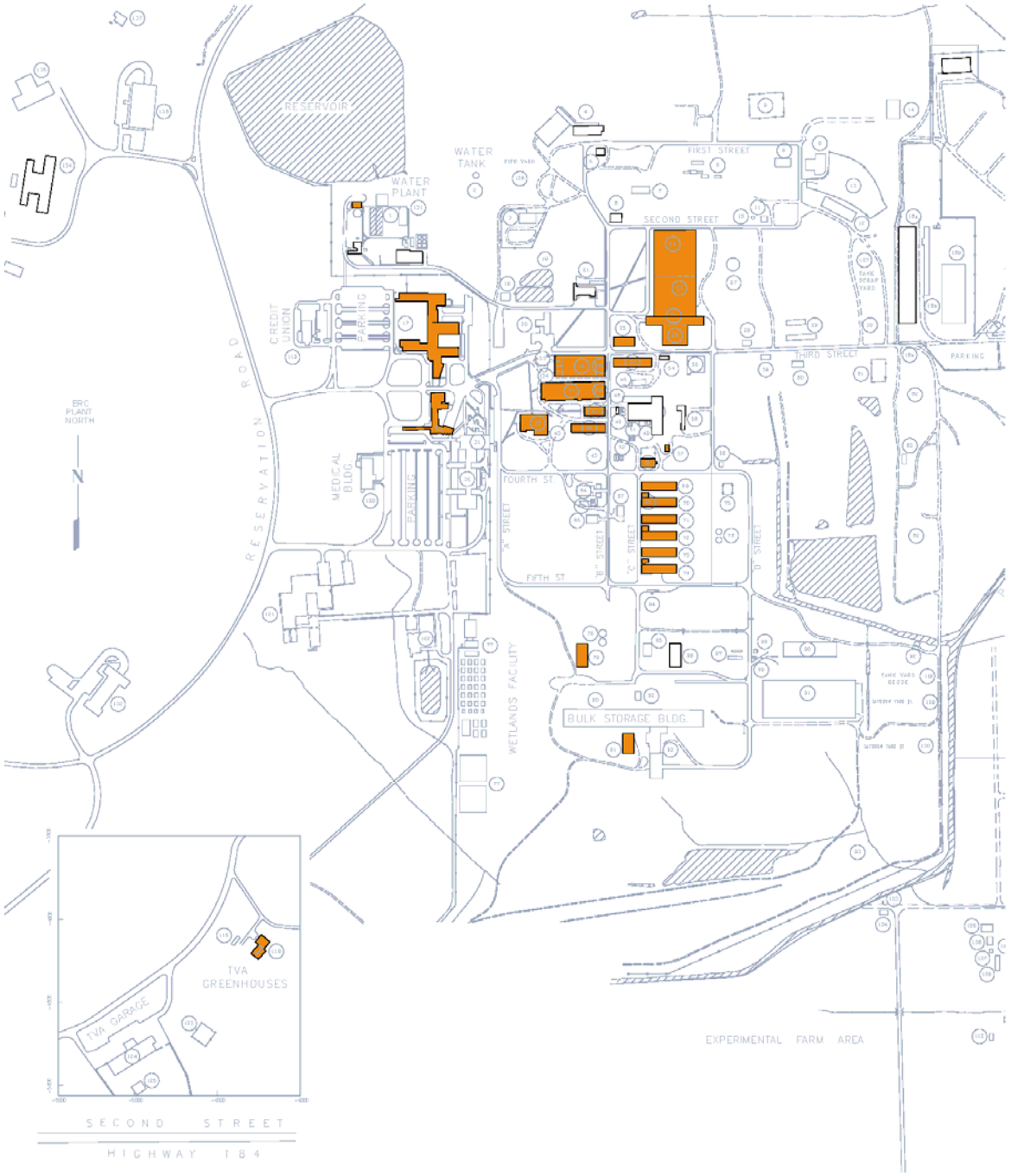
Tennessee Valley Authority



Cyclic Assessment Report
TVA Muscle Shoals, Alabama
September 16, 2013

amec LORD · AECK · SARGENT ARCHITECTURE

Executive Summary

The Tennessee Valley Authority (TVA) engaged Lord Aeck Sargent (LAS) to perform a cyclic condition assessment of historic buildings at the TVA Muscle Shoals Reservation, previously assessed as one component of a more extensive Adaptive Re-Use Study in 2009. LAS engaged AMEC Environmental & Infrastructure, Inc. (AMEC), formerly MACTEC, to perform the structural evaluation of conditions, as they were part of the team that assisted in the development of the 2009 report. While the earlier report assessed the physical condition of 57 industrial, office, and laboratory structures built prior to 1950 and considered historic, the cyclic assessment was condensed to 35 structures, based on a Memorandum of Agreement between TVA and the Alabama State Historic Preservation Office.

A team of LAS and AMEC representatives completed a visual assessment of the designated buildings at the site from July 8 through July 11, 2013. Two teams with two members from each firm visited the buildings together to document visible changes in physical building conditions. Changes in condition based on the 2013 site visit are presented along with the original study findings to allow for comparison. Some inconsistencies in building identification have been addressed in this cyclic assessment report.

An Overall Building Condition rating is provided for each building along with condition ratings for individual features of the building. The Overall Building Condition rating is not determined by the numeric average of various features or structural systems of any given building. Ratings are based on professional judgment regarding physical condition, taking into account characteristic defects of features and/or structural systems as a proportion of the total building.

For the majority of the buildings assessed, the overall physical condition rating of the building remains unchanged. While increased deterioration was visible in some cases, its extent was not sufficient to warrant changes in the overall building condition. It should be noted that, in general, improvements to structures to prevent deterioration have not occurred. For example, buildings that were identified as having roof covering deficiencies in 2009 have not been repaired and water continues to enter the buildings. A notable exception is the Environmental Research Center building (17a). The occupied spaces with operable HVAC systems are still in excellent condition; however, the unoccupied spaces, where the HVAC systems have been deactivated, exhibit significant visible deficiencies, most of which appear to be due to heat gain through windows exposed to direct sunlight. Conversely, in a few instances, TVA (or a building occupant) has performed work, often cosmetic improvements, to actively used buildings. In these cases, the condition ratings for the 2013 cyclic assessment were adjusted to indicate the effects of this work on the feature or features addressed. While this typically improved the condition rating of a particular feature, the impact of these changes was generally not sufficient to affect the Overall Building Condition rating. In several buildings, changes were made that improved the functional condition of the building (for example, window and door replacements) but replacement materials were used that are incompatible with the surrounding materials or the overall character of the building. In these instances, the condition rating of the individual feature was similarly adjusted.

The following chart summarizes the 2013 findings as compared to the 2009 condition, with notable changes described.

Building and Structural Conditions Comparison

TVA Building Number	TVA Building Name	2009 Overall Building Condition	2013 Overall Building Condition	2009 Structural Condition	2013 Structural Condition	Notes
01a	Chemical Feed House	3	3	3	3	A
17a	Environmental Research Center	1	**1, 2**	1	**1, 2**	**B**
17b	Service Building	2	2	2	**3**	C
22-24 & 26	L/N Building	4	4	4	4	A
25	Warehouse Z	1	1	2	2	
33-36	Chemical Plant Warehouse	3	3	3	3	A
37-38	Machine Shop	4	4	3	3	A
39	Engineering Lab	4	**3**	3	3	D
41	Sheet Metal Shop	2	2	3	3	
42	Pipe Shop	3	3	3	3	
44	Project Operation Bath House	3	3	3	3	
53	Tin Shop	3	3	4	4	
57	Substation # 2	2	2	3	3	
68	Substation # 4	2	2	**3**	3	E
68a	Substation # 5	2	2	**3**	3	E
69	Catalyzer # 1	3	3	3	3	
70	Catalyzer # 2	3	3	4	4	
71	Catalyzer # 3	3	3	3	3	
72	Catalyzer # 4	3	3	4	4	
73	Catalyzer # 5	3	3	4	4	
74 with 72a	Catalyzer # 6 w/ Substation # 6	3	3	3	3	
79	3A Building - Nitrate House	3	3	3	3	
81	5A Building - Nitrate House	2	2	3	3	
118a	Greenhouse	1	1	3	3	
118b, c, & d	Greenhouse	1	1	3	3	

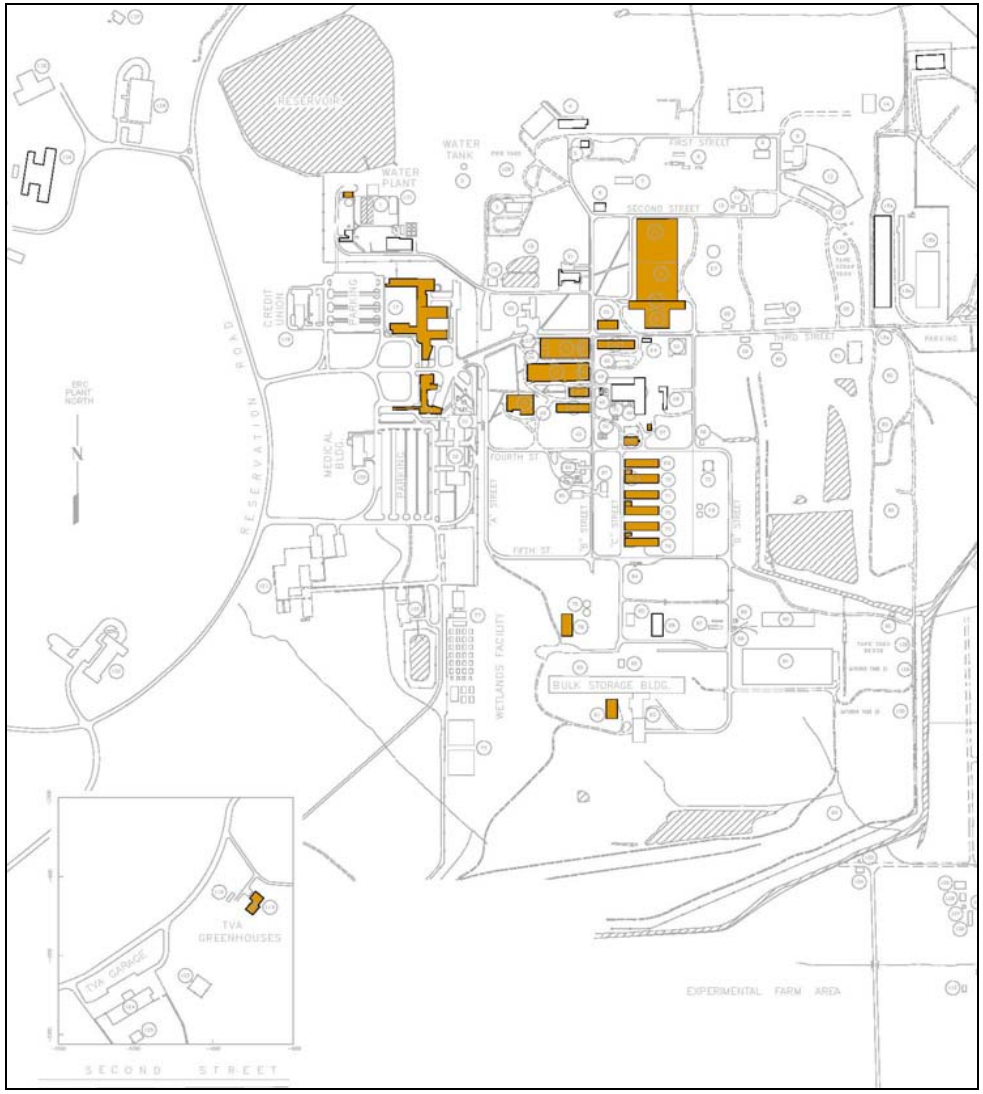
Notes:

Ratings in **bold** indicate a change.

A. Deterioration is progressing at an accelerated rate, but not enough to downgrade the Overall Building Condition rating.
B. Unoccupied portions of the building have been downgraded.
C. Accelerated structural damage due to water intrusion was observed.
D. Assessment in 2009 report was overly severe.
E. Transcription error in 2009 report.

Assessment

The 2013 Cyclic Assessment of buildings at the TVA Muscle Shoals Reservation included the buildings indicated on the map below.



01a	Chemical Feed House
17a	Environmental Research Center
17b	Service Building
22-24 & 26	L / N Building
25	Warehouse Z
33-36	Chemical Plant Warehouse
37-38	Machine Shop
39	Engineering Lab
41	Sheet Metal Shop
42	Pipe Shop
44	Project Operations Bath House
53	Tin Shop
57	Substation # 2
68	Substation # 4
68a	Substation # 5
69	Catalyzer # 1
70	Catalyzer # 2
71	Catalyzer # 3
72	Catalyzer # 4
73	Catalyzer # 5
74	Catalyzer # 6 with 72a – Substation # 6
79	3A Nitrate House
81	5A Nitrate House
118	Greenhouse

The 2013 Cyclic Assessment report has been arranged by building with the architectural assessment first, followed by the structural assessment. The 2009 report for individual buildings has been utilized in its entirety with documentation of visible changes in 2013 easily identifiable. Representative photographs that document conditions are also included to facilitate an understanding of building condition.

The Overall Building Condition rating system from the 2009 Adaptive Re-Use Study has been retained and the ratings are defined as follows:

1 Excellent	Building is currently in use or in move-in condition with minimal remedial work requirements, excluding use change requirements.
2 Good	Building needs some remedial work, which should not impact current occupancy (if any), excluding use change requirements.
3 Fair	Building needs remedial work for continued use or prior to occupancy for a new use.
4 Deteriorated	Building needs substantial work (50%-75%) prior to any form of occupancy.
5 Critical	Building needs extensive work to the majority (over 75%) of its materials to allow any form of occupancy.

Any modification to Overall Building Condition ratings have been bolded on the first page of the architectural cyclic assessment forms. Following the overall building information page are the building component descriptions and condition ratings. These sheets are divided by exterior and interior components. Again, the rating system from the 2009 Adaptive Re-Use Study has been retained and the ratings are defined as follows:

1 Excellent	Visual observation indicates no remedial work required. Estimated less than 10% repair work needed.
2 Good	Visual observation indicates minimal remedial work required. Estimated less than 10% replacement and/or 25% repair work needed.
3 Fair	Visual observation indicates remedial work is required. Estimated up to 25% replacement and/or 50% repair work needed.
4 Deteriorated	Visual observation indicates significant remedial work is required. Estimated up to 50% replacement and/or 75% repair work needed.
5 Critical	Visual observation indicates extensive work is required. Estimated greater than 50% replacement and/or 75% repair work needed.

While the 2009 report presented the assessment information in separate architectural and structural documents, this 2013 report integrates the two, organizing the information by building to paint a more complete picture of each building's condition. In many cases, the structural and architectural comments are related – for example, when structural movement is indicated by shifting or damage to finish material.

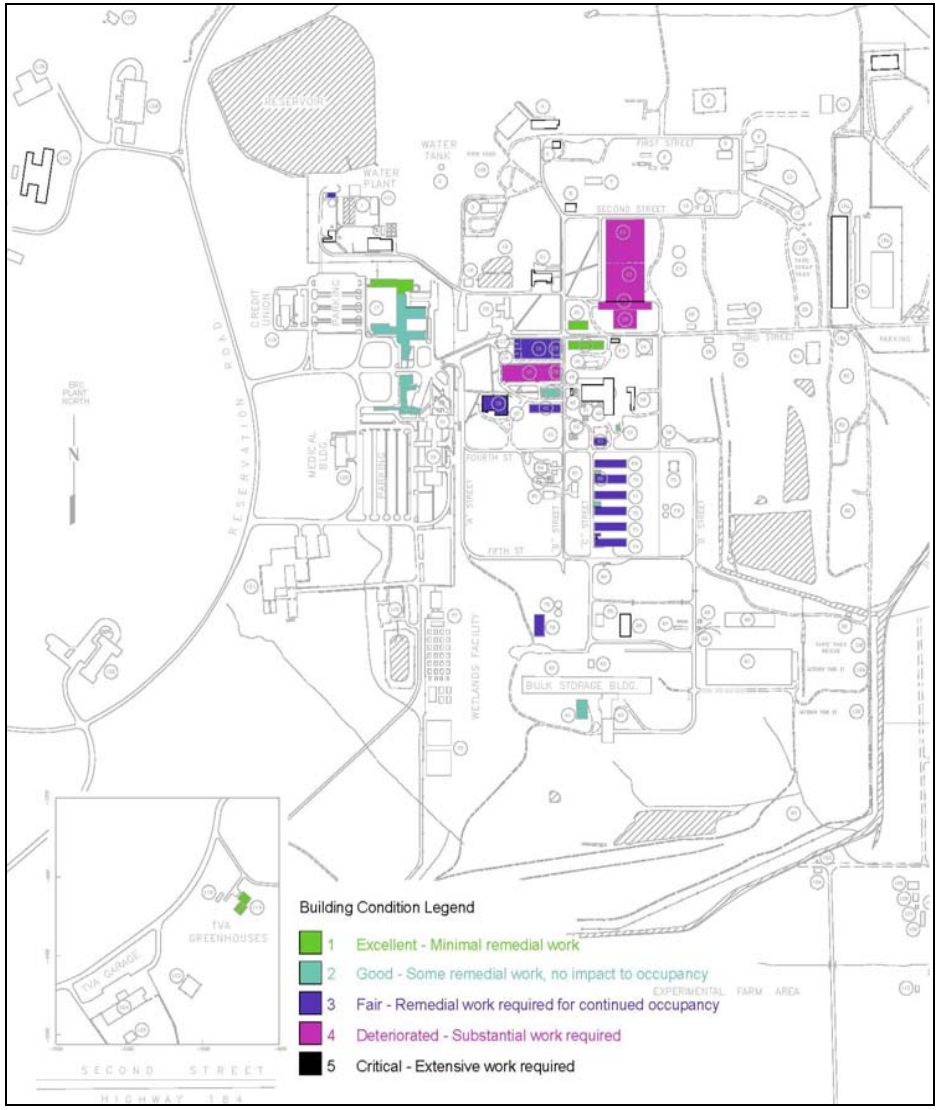
The structural engineering assessment that follows the architectural assessment utilizes the same criteria for assessment of structural systems. Like the Overall Building Condition rating, the General Building Structural System rating is not determined by the numeric average of the various elements of the structural systems of any given building. The Summary ratings are based on professional judgment regarding the overall building condition, taking into account characteristic defects of each structural system as a proportion of the total building structure.

Representative photographs of visible changes were taken for comparison purposes, with the intent of documenting noteworthy differences in the condition of the various structural systems. The deficiencies that were previously documented were observed; however, an evaluation of visible progressive deterioration was the primary focus of the Cyclic Structural Assessment. The body of the structural assessment consists of comprehensive information and associated photographs presented for each building in the 2009 report, with conditions that are noticeably different featured in **bold** text as new information. The 2009 structural photolog for each building is included for reference purposes, with corresponding 2013 photographs added where applicable to support conclusions regarding visible progressive deterioration. The structural assessment consists of four parts:

1. **General Information**, which includes 2009 information such as a general description of the building structure, general description of the building structural condition including an overall condition rating for each building, a summary of recommended structural repairs, and recommendations for additional specific evaluations when applicable. 2013 comments regarding conditions that are noticeably different are featured in **bold** text as new information.
2. **Table 1: Structural Systems Assessment**, which lists the applicable structural components of each building, 2009 and 2013 numeric ratings of the condition of each component, and comments about significant changes in conditions, where applicable. See "Condition Code Description" below regarding criteria for numeric ratings ascribed to each component.
3. **Table 2: Itemized Structural Defects**, which lists specific defects as described in field notes collected as the buildings were visually assessed in 2009. Some entries in Table 2 are general observations; some are descriptions of specific defects. References to corresponding 2009 photographs, when provided, are also listed in Table 2. References to 2013 photographs that document visible changes regarding specific defects have been added to Table 2.
4. **Photolog**, which contains the photographs from the 2009 report that were included to document the general building condition and specific structural defects that were characteristic of observed deficiencies. 2013 photographs that document visible changes regarding specific defects have been added to the photolog. 2013 photographs were chosen to support conclusions regarding visible progressive deterioration of various structural systems, and are not intended to compare the individual instances of previously documented deficiencies.

Building Condition Summary

The following list and map documents the Overall Building Condition rating for each resource in the 2013 Cyclic Assessment.



17a	Environmental Research Center (occupied)
25	Warehouse Z
118	Green House
17a	Environmental Research Center (unoccupied)
17b	Service Building
41	Sheet Metal Shop
57	Substation # 2
68	Substation # 4
68a	Substation # 5
81	5A Nitrate House
01a	Chemical Feed House
33-36	Chemical Plant Warehouse
39	Engineering Lab
42	Pipe Shop
44	Project Operations Bath House
53	Tin Shop
69	Catalyzer # 1
70	Catalyzer # 2
71	Catalyzer # 3
72	Catalyzer # 4
73	Catalyzer # 5
74	Catalyzer # 6 with 72a - Substation # 6
79	3A Nitrate House
22-24 & 26	L / N Building
37-38	Machine Shop

Summary of Overall Structural System Conditions:

Bold text indicates a change in overall structural system condition.

Excellent (1) Structural Condition:	2009: #17A – complete Environmental Research Center (ERC) 2013: **#17A – occupied ERC**
Good (2) Structural Condition:	2009: #17B (Service Building), #25 2013: **#17A – unoccupied ERC**, #25
Fair (3) Structural Condition:	2009: #1A, #33-34-35-36, #37-38, #39, #41, #42, #44, #57 #68, #68A, #69, #71, #74 & 72A, #79, #81, #118 2013: #1A, **#17B (Service Building)**, #33-34-35-36, #37-38, #39, #41, #42, #44, #57, #68, #68A, #69, #71, #74&72A, #79, #81, #118
Deteriorated (4) Structural Condition:	2009: #22-23-24-26, #53, #70, #72, #73 2013: #22-23-24-26, #53, #70, #72, #73
Critical (5) Structural Condition:	2009: None 2013: None

It should be noted that unoccupied buildings or portions of buildings will likely continue to deteriorate more rapidly than occupied buildings. This is due to the absence of active conditioning, which will allow for more extreme temperature swings on both a daily and annual basis, increasing the thermal expansion and contraction of both structural and finish materials, and permit higher levels of moisture to permeate the building materials, causing accelerated deterioration. In addition, when leaking roofs or other issues occur in unused buildings, it is unlikely that they will be noticed and repaired in a timely manner, allowing for far more damage to occur than might otherwise.

The following pages contain the individual building assessment sheets for the 2013 Cyclic Assessment for TVA Muscle Shoals Reservation.

Condition Assessment, April 2009

Building Information | Overall Building Condition 3 | Overall Structural Condition 3

Building Name	01A - Chemical Feed House	
Period of Construction	1941	
National Register Eligibility	Contributing MSHD, TVA Context	
Building Height	2 story	
Building Footprint	1,967 SF	
Historic Use | Current Use	Water Treatment Plant	Water Treatment
Potential Use | Adaptability	CR, CO, LO, RE, ST	3

Character Defining Features

Exterior	Interior
Primary Building Form & Appearance: Linear, Rectangular massing with flat roof and deep concrete overhangs; Elements of International Style Building Structure: Cast In Place Concrete Columns, Floors & Roof Building Walls: Brick Veneer over Glazed CMU Precast Concrete Detailing at Rear Entry Porch Windows: Steel, awning Window Sills: Precast concrete Doors: Flush Steel, vision panel	**Primary** Building Form: Exposure of Concrete Structure & Glazed CMU Equipment: Operating Water Plant Equipment, Piping, Tanks, scales, etc.

Resource Significance

Properties associated with the TVA context are recognized as significant under Criteria A for listing on the National Register of Historic Places. Criteria A emphasizes association with events that have made a significant contribution to the broad patterns of our history. TVA is recognized for its pioneering research and developments in the area of fertilizers, which also had significant contribution to war efforts in the form of munitions. The international role that TVA played in the research and development of fertilizers lasted throughout the mid-to-late twentieth century.

TVA Muscle Shoals Feasibility — Muscle Shoals, Alabama

Lord, Aeck & Sargent Architecture — July 31, 2009

Cyclic Assessment, July 2013

Building Information | Overall Building Condition 3 | Overall Structural Condition 3

Building Name: 01A - Chemical Feed House

Current Use: Vacant

Building 01A → N

General Comments:

When the previous condition assessment was conducted, the water treatment plant was in use. At the time of this assessment, the building was no longer in use and demolition of surrounding buildings was underway. A large, deep hole to the south of the building could potentially affect the building's foundation, as could other earth-moving activity in the vicinity. After work in the area is complete, if the building remains vacant, it is likely that deterioration will accelerate due to the the building's lack of occupancy and discontinuance of HVAC systems. The exterior brick veneer exhibits significant thermal movement-related cracking. This condition has not changed significantly since the previous assessment.

Condition Assessment, April 2009

Building Information

Building Name	01A - Chemical Feed House	
Period of Construction	1941	
National Register Eligibility	Contributing MSHD, TVA Context	
Building Height	2 story	
Building Footprint	1,967 SF	
Historic Use | Current Use	Water Treatment Plant	Water Treatment
Potential Use | Adaptability	CR, CO, LO, RE, ST	3

Exterior Materials and Conditions

Building Component	Building Material	Condition
Roofing | Decking	Flat; Deck: Concrete, cast	3
Exterior Envelope	Brick veneer with Glazed Clay Tile interior	4
Exterior Doors	Metal, flush, vision panel	2
Windows	Steel, awning, double-hung	2
Lintels	Steel, painted	2
Loading Dock	Concrete: 1/4 centered	1
Porch	Brick/Concrete: Centered over entry	2
Additions		

Comments

Chimney: Exterior End; Brick
Efflorescence through deck at overhangs
Seriouse cracking in masonry; significant repointing required
Exterior doors not historic

TVA Muscle Shoals Feasibility
Lord, Aeck & Sargent Architecture

Muscle Shoals, Alabama
July 31, 2009

Cyclic Assessment, July 2013

Exterior Materials and Conditions

Building Component	Building Material	Condition
Roofing / Decking	Flat; Deck: Concrete, cast	**4**
Exterior Envelope	Brick veneer with glazed hollow clay tile interior	4
Exterior Doors	Metal, flush, vision panel	**3**
Windows	Steel, awning, double-hung	**4**
Lintels **& Sills**	Steel, painted	2
Loading Dock	Concrete	1
Porch	Brick / Concrete: Centered over entry on north side	2
Raised Walkway	**Concrete w/ steel pipe rail on south side**	**3**
Additions	N / A	

New Comments

- Significant thermal cracking of brick facade; horizontal cracking on south facade adjacent to large hole in ground
- Vertical cracking at concrete foundation
- Cracking and water staining at concrete overhangs; failed / rusted metal copings
- Moderately rusted steel lintels and steel windows
- Spalling at concrete grillwork at north entrance
- Water draining through light fixture at ceiling
- Chimney cracking at east side
- Partial demolition at raised walkway; mold growth below walkway; rusted pipe rails

TVA Muscle Shoals, Alabama

Condition Assessment, April 2009

Building Information

Building Name	01A - Chemical Feed House	
Period of Construction	1941	
National Register Eligibility	Contributing MSHD, TVA Context	
Building Height	2 story	
Building Footprint	1,967 SF	
Historic Use | Current Use	Water Treatment Plant	Water Treatment
Potential Use | Adaptability	CR, CO, LO, RE, ST	3

Interior Materials and Conditions

Building Component	Building Material	Condition
Corridors	Walls: Glazed Tile, painted; Ceiling: Concrete, painted; ACT	1
Primary Space	Walls: Glazed Tile, painted; Ceiling: Concrete, painted; ACT	1
Secondary Space	Office: Walls: Glazed Tile, painted; Ceiling: Concrete, painted; ACT	1
Secondary Space	Shop/Loading: Walls: Glazed Tile, painted; Brick, painted; Ceiling: Concrete, painted	2
Secondary Space	Basement: Walls: Concrete, painted	2
Flooring	Concrete, unfinished; VCT	1
Walls	Glazed Tile, painted; Brick, painted	2
Ceiling	Concrete, painted; ACT	1

Comments

Tank containment bulkhead in Loading Dock area.

TVA Muscle Shoals Feasibility — Muscle Shoals, Alabama

Lord, Aeck & Sargent Architecture — July 31, 2009

Cyclic Assessment, July 2013

Interior Materials and Conditions

Building Component	Building Material	Condition
Corridors	Walls: Glazed hollow clay tile, painted; Ceiling: Concrete, painted; Floors: VCT	1
Primary Space	Walls: Glazed hollow clay tile, painted; Ceiling: Concrete, painted; Floors: VCT	1
Secondary Space	Office, Locker rooms: Walls: Glazed tile, painted; Ceiling: Concrete, painted; Floors: VCT, unfinished concrete	1
Secondary Space	Shop / Loading: Walls: Glazed hollow clay tile, painted; Brick, painted; Ceiling: Concrete, painted	2
Secondary Space	Basement: Walls: Concrete, painted	2
Secondary Space	**Second floor open to equipment space; Walls: Unglazed hollow clay tile, unpainted; Floor and Ceiling: concrete, unfinished**	**1**
Flooring	Concrete; unfinished; VCT	1
Wallsg	Glazed hollow clay tile, painted; Unglazed hollow clay tile, unpainted	2
Ceiling	Concrete, painted and unpainted	1

New Comments

- Indications of water in basement; termite trails on wall
- Jambs of exterior door at stair badly rusted
- Glazed tile, concrete floors in sound condition
- Crack at ceiling of second floor - roof deck - probably at chimney juncture
- Crack at concrete beam at second floor of stair

Building 01A - Chemical Feed House: There is a large, deep hole in the ground south of the building that could potentially affect the building's foundation.

Building 01A - Chemical Feed House: Horizontal cracking is visible on the south facade adjacent to the large hole in ground.

Building 01A - Chemical Feed House: Horizontal cracking is visible in the concrete at the lower wall.

Building 01A - Chemical Feed House: The metal copings have failed and are rusted. There is cracking and staining at the concrete overhangs.

Building 01A - Chemical Feed House: Localized rusting of the steel lintels and metal windows are present.

Building 01A - Chemical Feed House: Water has stained the concrete adjacent to the light fixture.

Building 01A - Chemical Feed House: A large vertical crack is visible in the concrete screen at the north entry.

Building 01A - Chemical Feed House: Interior view of the building

Building 01A - Chemical Feed House: Interior view of the second floor space

Building 01A - Chemical Feed House: Termites have left a trail along the wall at the pipe penetration.

Building 01A - Chemical Feed House: The jambs of the exterior door are badly rusted.

Building 01A - Chemical Feed House: There is a crack at the concrete beam of the second floor stair.

Building 01A - Chemical Feed House: There is a crack at the concrete beam of the second floor stair.

Structural Assessment – General Information

Building No.: 01A - Chemical Feed House	
Building Name:	01A - Chemical Feed House
Original Function:	Water Treatment Plant
Subsequent Modification:	N/A
General Building Structural Description:	Two story concrete frame building with cast-in-place concrete basement. Exterior walls are masonry supported on concrete foundation walls. The entire first floor is a structural slab above grade with a crawl space under the West side and the basement under the East side. The second floor and roof are concrete slab and beam construction supported by concrete columns. The building has a loading dock and open receiving room at the NW corner, and a steel frame canopy with a concrete roof deck on the West side. The South side of the building has an elevated concrete walkway at the first floor level that is partially constructed above a concrete flume that connects to a circular water treatment tank / pool adjacent to the building. **(2013: This building is now unoccupied and the water treatment pool at the South side of the building is in the process of being demolished.)**
General Building Structural Condition (2009):	Structural General Building Condition Code = 3 "Fair". **(2013: Structural General Building Condition Code = 3 "Fair".)**The overall building is in fair condition with most portions of the concrete frame and upper slabs in generally good condition. Some cracks were observed in the basement walls and exterior foundation walls. A crack and spall were noted in the soffit of the first floor slab, as well as evidence of water intrusion in areas of the basement walls and ceiling. Numerous cracks were noted in the exterior masonry walls. An area of corroded steel framing and flashing was observed at the west canopy. The elevated walkway on the South side of the building is in generally fair condition. Each of the three metal awnings at the South walkway was dented at the corners.
Summary of Observations Regarding Present General Building Structural Condition (2013):	**All 2009 observations still apply and any item that has not been addressed is assumed to have continued to deteriorate. Additionally, there are signs of worsening corrosion in the steel on the exterior of the structure; This is a typical condition. The temperature cracking in the exterior brickwork appears to have continued to progress. The masonry brickwork at the loading dock shows signs of significant additional cracking and movement present.**
Summary of Recommended Structural Repairs (2009):	Cracks and spalls in the basement walls and ceiling must be repaired. Cracks in the exterior foundation walls and masonry walls must be repaired. The corroded portion of the west canopy must be repaired, and the dented metal awnings should be repaired or replaced.
Additional Recommendations (2009):	Not applicable

Table 1: Structural Systems Assessment

Structural Component	Previous (2009) Condition Code	Present (2013) Condition Code	Comments
Basement Walls	3	3	
Lowest Level Floor System	3	3	
Exposed Foundation or Stem Walls	3	3	
Ramps, Stairs, and Landings (At or below first floor)	3	3	
Loading Docks (Walls, supports, and slabs)	3	3	
Exterior Slabs at Canopies	3	3	
First Floor System [Above basement] (Deck and framing)	3	3	
Second Floor System (Deck and framing)	2	3	
Columns	2	2	
Exterior Walls	3	3	
Roof Deck	2	**3**	**Continued deterioration evident. Large crack in Transformer Room at underside of roof slab and spandrel beam with active water intrusion and efflorescence evident.**
Exterior Appurtenances (Fire Escapes, etc)	3	3	
Awnings (Total Assembly)	3	3	

Condition Code Description
(1) Excellent - Visual observation indicates no remedial work required. (less than 10% repair)
(2) Good - Visual observation indicates minimal remedial work required. (less than 10% replacement and/or 25% repair)
(3) Fair - Visual observation indicates remedial work required. (up to 25% replacement and/or 50% repair)
(4) Deteriorated - Visual observation indicates significant remedial work required. (up to 50% replacement and/or 75% repair)
(5) Critical – Visual observation indicates extensive replacement and/or repair. (over 50% replacement and/or 75% repair)

Table 2: Itemized Structural Defects

Defect Item No.	Defect Description (2009)	2013 Assessment of 2009 Itemized Defects (plus description of new defects where noted)	Photo Log Reference Nos.	
			From 2009 Report	2013
1	Minor cracking in exterior concrete slab at canopy	Change in condition was not observed.		
2	Diagonal crack on northeast corner	Change in condition was not observed.		
3	Vertical crack on east side	Change in condition was not observed.	4	
4	Cracks in basement soffit	**Active water intrusion apparent. Continued deterioration assumed.**	8	**8**
5	Vertical crack in foundation stem wall at east side	Change in condition was not observed.	4	
6	Crack in west ext. masonry wall	**Cracking and movement observed. Efflorescence present.**		**10**
7	Spall in basement soffit	Change in condition was not observed.	~~18~~	
8	Vertical crack in masonry in the northeast corner	Change in condition was not observed.		
9	Change in condition was not observed.	Change in condition was not observed.	~~15~~	
10	Corroded steel roof beam	Change in condition was not observed.		
11	Crack in interior load-bearing basement wall	Change in condition was not observed.		
12	Aluminum Sheet Metal awning torn at front corner	Change in condition was not observed.	6	
13	Corroded steel beam of exterior canopy	Change in condition was not observed.	5	
14	Vertical crack in exterior masonry wall	Change in condition was not observed.	1	**1**
15	Vertical crack in exterior masonry wall	**Propagation of cracking evident.**	3	**3, 12**
16	Vertical crack in exterior masonry wall	Change in condition was not observed.	1	**1**
17 (new)	**N/A**	**New Defect: Crack in roof slab inside Transformer Room on level 2**		**11**

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Photo Log:
2009 vs. 2013 Comparison

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PHOTOLOG: Building No. 1A Chemical Feedhouse (2009 vs. 2013 Comparison)

2009 Photo #1: Exterior building looking at Southwest corner

2013 Photo #1: Exterior building looking at Northwest corner

2009 Photo #2: Interior building at 2nd floor

2013 Photo #2: Interior building at 2nd floor

PHOTOLOG: Building No. 1A Chemical Feedhouse (2009 vs. 2013 Comparison)

2009 Photo #3: Cracks in masonry on North side

2013 Photo #3: Cracks in masonry on North side. Corrosion evident to the steel framing around windows and roof edging

2009 Photo #4: Cracks in masonry and foundation wall on East side

No change observed

2013 Photo #4: No change observed.

PHOTOLOG: Building No. 1A Chemical Feedhouse (2009 vs. 2013 Comparison)

2009 Photo #5: Corroded steel framing and flashing at West canopy

2013 Photo #5: No change observed.

2009 Photo #6: Dented metal awning on South side.

2013 Photo #6: No change observed.

PHOTOLOG: Building No. 1A Chemical Feedhouse (2009 vs. 2013 Comparison)

2009 Photo #7: Spall in soffit of floor slab above basement.

No change observed

2013 Photo #7: No change observed.

2009 Photo #8: Evidence of water intrusion at basement wall and ceiling.

2013 Photo #8: Evidence of water intrusion at basement wall and ceiling. Intrusion appears to be worse than previously reported.

Photo Log:
New Observations in 2013

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PHOTOLOG: Building No. 1A Chemical Feedhouse (New Observations in 2013)

2013 Photo #9: South Side – Previous water treatment pool demolished

2013 Photo #10: Cracking and movement in masonry at the loading dock entrance on the West side of the building

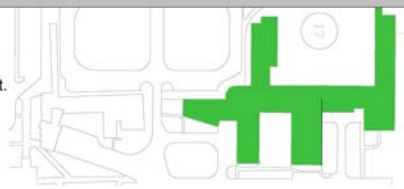
2013 Photo #11: Crack in roof slab runs across entire width of room; Efflorescence present; horizontal beam cracked

2013 Photo #12: Crack in exterior masonry at awnings on South side of building.

Condition Assessment, April 2009

Building Information Overall Building Condition 1 Overall Structural Condition 1

Building Name	17A - Environmental Research Center	
Period of Construction	1947	
National Register Eligibility	Contributing MSHD, TVA & Individual Cont.	
Building Height	3 story	
Building Footprint	69,137 SF	
Historic Use | Current Use	Chemical Engineering/Gatehouse	Office; Lab
Potential Use | Adaptability	CO, RE	3



Character Defining Features

Exterior	Interior
Primary	**Primary**
Building Form: Linear, rectangualr massing with flat roof, curvilinear at lobby. International Style	Entry Lobby - Openings between all floors with circular plaster ceiling medallion and steel light fixture
Building Materials: Brick with Expressed Concrete Structure	Monumental Stairs - Detailing of railings and materials
Concrete Canopy and Eave Extensions	Auditorium - Including lobby and first floor control booth
Windows: Aluminum System - some with pivot operation	Terrazzo Flooring of Entry, Halls and Stairs
Precast concrete window surrounds	Building Walls: Glazed CMU
Doors: Aluminum and Glass	Double Loaded Corridor
Two story glazed curvilinear entrance	Windows: Aluminum Window Wall System
	Doors: Flush Wood with vision panel and ventilation louver
	Lower Level Lobby: Layout and Art on walls Signage on balcony edge "1947 Built for the People of the United States 1950"
	Secondary
	Aluminum Window Wall System: separating some office spaces

Resource Significance

The TVA Environmental Research Building has been recommended eligible for individual listing on the National Register of Historic Places (NHRP) based on its "International" style of architecture, including the distinctive features of curved walls, continuous bands of single-light windows, steel frame construction and flat roofs. The structure housed offices and laboratories that support(ed) TVA's fertilizer research and would be recommended eligible for inclusion on the NRHP under Criterion A for its association with the historically significant National Fertilizer Development Center. The structures are located within the boundaries of the proposed NRHP Muscle Shoals Historic District and recommended as a contributing property to the historic significance of the district.

TVA Muscle Shoals Feasibility Muscle Shoals, Alabama

Lord, Aeck & Sargent Architecture July 31, 2009

Cyclic Assessment, July 2013

Building Information Overall Building Condition 1,**2*** Overall Structural Condition 1,**2***

Building Name: 17A - Environmental Research Center

Current Use: Offices; Vacant

Building 17a → N

General Comments:

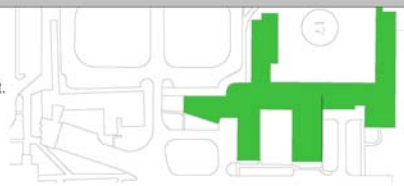
In the previous condition assessment conducted for TVA, most of Building 17A was occupied. At the time of this assessment, Building 17A was only partially occupied in the northernmost wing. The other spaces were vacated about a year prior to the current assessment and HVAC systems have not been in use. The unconditioned areas were very hot and humid despite the fact that portable fans were in active use in some spaces to help move air. The interior climate conditions are causing accelerated deterioration of building materials. The most significant resulting damage was heaving in the window sills and significant cracking and shifting in the walls below the windows in some locations resulting in breakage of the window glazing at the rear ells on all sides. The heaving in the sills and cracks in the window glazing is likely due to expansion and contraction caused by the more extreme changes in temperature. The lack of occupancy has allowed maintenance issues such as leaking of the roof to go undetected and cause significant localized damage.

* Overall Building Condition in Occupied space 1
Overall Building Condition in Unoccupied Space **2**
Overall Structural Condition in Occupied Space 1
Overall Structural Condition in Unoccupied Space **2**

Condition Assessment, April 2009

Building Information

Building Name	17A - Environmental Research Center		
Period of Construction	1947		
National Register Eligibility	Contributing MSHD, TVA & Individual Cont.		
Building Height	3 story		
Building Footprint	69,137 SF		
Historic Use | Current Use	Chemical Engineering/Gatehouse	| Office; Lab	
Potential Use | Adaptability	CO, RE	| 3	



Exterior Materials and Conditions

Building Component	Building Material	Condition
Roofing | Decking	Flat, Cast Concrete; Deck: Metal	2
Exterior Envelope	Brick	2
Exterior Doors	Storefront; Metal, flush	1
Windows	Aluminum, fixed, awning, hopper; Storefront	1
Lintels	Concrete; Steel	1
Loading Dock	Concrete: Corner Rear	2
Porch	Front: Over Entry, Concrete	1
Additions	N/A	

Comments

Punched-opening windows in North and South facades are operable
Major cracking in certain areas of brick, likely resulting from settlement and lack of expansion joints
End walls and building corners represent majority of cracking in brick
Concrete eaves show signs of cracking at most interior corners
Fire stair has significant amount of rust and paint peeling
Moderate water damage to lower window sills on West facade

TVA Muscle Shoals Feasibility — Muscle Shoals, Alabama
Lord, Aeck & Sargent Architecture — July 31, 2009

Cyclic Assessment, July 2013

Exterior Materials and Conditions

Building Component	Building Material	Condition
Roofing / Decking	Flat; Cast concrete; Deck: Metal	2
Exterior Envelope	Brick veneer over concrete frame with clay tile infill and glazed hollow clay tile interior surface	2
Exterior Doors	Storefront; Metal and glass, flush	**2**
Windows	Aluminum, fixed, awning, hopper; Storefront	**2**
Lintels **& Sills**	Concrete; Steel	**2**
Loading Dock	Concrete; Corner rear	2
Porch	Front: Over entry, Concrete	1
Additions	N/A	

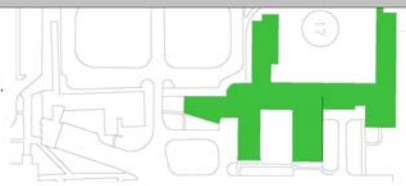
New Comments

- Brick shifting at rear southwest corner
- Failure of insulated windows on east elevation
- Plywood covered windows on east elevation
- Cracking of window and concrete head and lintels on east elevation
- Wall cracking below window at southeast corner of 1962 addition
- Efflorescence and staining of masonry
- Concrete damage at corner by sign and stair exit
- Joint issue and expansion issue at front addition with sloped curtain wall
- Moisture at sills where walkway abuts building on west elevation
- Minor leaking and rusting at edge of coping at canopy at east elevation
- Crack at storefront / canopy juncture at east elevation

Condition Assessment, April 2009

Building Information

Building Name	17A - Environmental Research Center		
Period of Construction	1947		
National Register Eligibility	Contributing MSHD, TVA & Individual Cont.		
Building Height	3 story		
Building Footprint	69,137 SF		
Historic Use | Current Use	Chemical Engineering/Gatehouse	|	Office; Lab
Potential Use | Adaptability	CO, RE	|	3



Interior Materials and Conditions

Building Component	Building Material	Condition
Corridors	Double-Loaded; Walls: Glazed Tile; Doors: Wood	1
Primary Space	Lobby: Walls: Glazed-Tile Panels; Floor: Terrazzo; Rail: Alum., Wood, Lucite	1
Secondary Space	Office: Walls: Glazed-Tile; Floor: Carpet, VCT; Ceiling: ACT	1
Secondary Space	Labratory: Walls: Glazed-Tile; Floor: VCT; Ceiling: ACT	1
Secondary Space	Auditorium: Walls: Wood Panel; Floor: Ceramic Tile; Ceiling: Plaster	1
Flooring	Terrazzo; Ceramic Tile; Carpet; VCT	1
Walls	Glazed Tile; Concrete; CMU; Brick	1
Ceiling	ACT; Plaster	2

Comments

Original wood doors and hardware are historic; Wall lighting in auditorium is historic
Several infill walls appear to be non historic. Toilet rooms have original marble paritions and sills; ceramic floor tiles appear to be non historic Stairway handrails feature curved details in both wood and aluminum. Office area in Southwest wing of building features sloped ceiling and tilted concrete/glass walls

TVA Muscle Shoals Feasibility — Muscle Shoals, Alabama

Lord, Aeck & Sargent Architecture — July 31, 2009

Cyclic Assessment, July 2013

Interior Materials and Conditions

Building Component	Building Material	Condition *	Condition **
Corridors	Double loaded; Walls: Glazed hollow clay tile; Doors: Wood; Floor: VCT, carpet; Ceiling: ACT	1	1
Primary Space	Lobbies: Walls: Glazed hollow clay tile panels; Floor: Terrazzo; Rail: Aluminum, Wood, Lucite; Ceiling: Plaster, ACT	1	1
Secondary Space	Office: Walls: Glazed hollow clay tile; Floor: Carpet, VCT; Ceiling: ACT	1	**2**
Secondary Space	Laboratory: Walls: Glazed hollow clay tile; Floor: VCT; Ceiling: ACT	1	**2**
Secondary Space	Auditorium: Walls: Wood panel; Floor: Composition tile; Ceiling: Plaster	1	1
Flooring	Terrazzo; Ceramic tile; Carpet; VCT	1	**2**
Walls	Glazed hollow clay tile; Concrete; Brick	1	**2**
Ceiling	ACT; Plaster	1	2
Window Sills	**Stone / marble sills**	**1**	**3**

Note: Two columns have been used for the condition of this building due to the significant difference between areas that are currently occupied and climate controlled and those that are not.
* Condition at occupied and conditioned area
** Condition at unoccupied and unconditioned area

New Comments

- Lower level restrooms and storage area in rear of auditorium had burst pipe in the past and water damage is visible in ceiling and plaster walls
- Ground floor has clay tile wall heaving below window sill
- Second and third floors have sills heaving at rear ells on all sides; heat coming through windows is causing heaving of window sills which is in turn cracking the window glass
- Tile floor loss and damage; floor finishes have been damaged from move-out and spillage
- Heat and humidity from lack of climate control in unoccupied areas of the building is causing accelerated deterioration of finishes: cracking at glazed tile, buckling of floor finishes; deterioration of paper in artwork at lower level lobby
- Localized areas of water damage: discolored ceiling tiles; damaged plaster walls and ceilings (severe at mechanical areas by auditorium); plaster damage at significant circular ceiling medallion at lobby - indication of issues at roof

Building 17A - Environmental Research Center: The concrete beam is cracked at the southwest corner of the wing adjacent to the main circular entrance.

Building 17A - Environmental Research Center: The brick is cracked along the interior southwest corner of this wing adjacent to the main circular entrance.

Building 17A - Environmental Research Center : The brick facade has shifted where the awning connects to the building at the southeast corner of this wing.

Building 17A - Environmental Research Center: Moisture has collected at the sills where the walkway abuts the buildings on the west elevation.

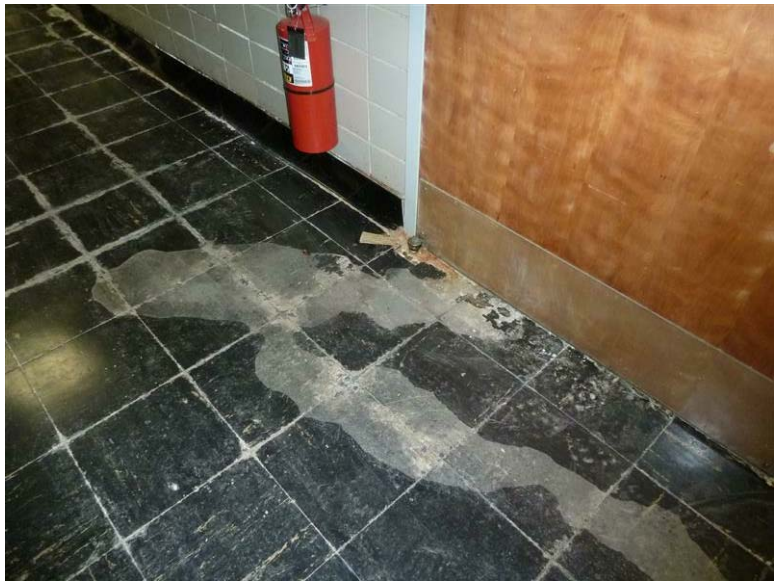
Building 17A - Environmental Research Center: Ladybugs have entered the window cavity indicating the joint/sealant is broken.

Building 17A - Environmental Research Center: Broken panes occur on the east facade of the building where the window sills are heaving.

Building 17A - Environmental Research Center: Plywood covers several of the broken windows on the east facade.

Building 17A - Environmental Research Center: A burst pipe has damaged the plaster wall, ceiling and floor tiles in the room at the rear of the auditorium.

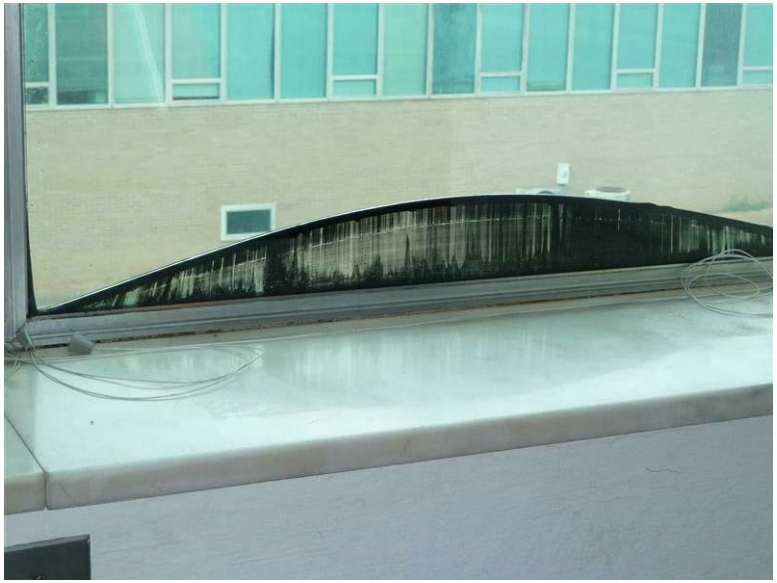
Building 17A - Environmental Research Center: A burst pipe has damaged the plaster ceiling in this lower level restroom.



Building 17A - Environmental Research Center: Water damage is visible on the floor tiles adjacent to this mechanical room.

Building 17A - Environmental Research Center: This window has cracked on the east facade.

Building 17A - Environmental Research Center: Heaving of the sills in the wings on the east facade.



Building 17A - Environmental Research Center: The gasket between the glass panes is expanding indicating heat stress.

Building 17A - Environmental Research Center: Plaster damage is present at the circular ceiling medallion in the main entry.

Structural Assessment – General Information

Building No.: 17A Environmental Research Center (ERC)	
Building Name:	Environmental Research Center
Original Function:	Chemical Engineering Building
Subsequent Modification:	Subsequent Expansions
General Building Structural Description:	The Environmental Research Center (ERC) consists of a multi-wing two story concrete frame structure with exterior masonry walls. It has an extensive partial basement, an auditorium on the second level, and an open two story atrium at the main entrance. The atrium has a circular well at ground level that is open to the basement level below. Most of the interior of the ERC is fully finished and the structure in the finished areas could not be observed. Some areas of the basement ceiling were exposed, revealing a concrete pan joist structure in very good condition. Portions of concrete framing and slabs were visible in other parts of the building through small voids in the finished ceilings. **(2013: Portions of the ERC have been decommissioned. The west wing is the only occupied space within this building. It is AMEC's understanding that in 2012 the environmental control systems were turned off in the unoccupied portions of the building. These areas have been evaluated separately below.)**
General Building Structural Condition (2009):	Structural General Building Condition Code = 1 "Excellent". **(2013: Structural General Building Condition Code = 1 "Excellent" for occupied portions of the building; unoccupied portions of the building have been downgraded to Condition Code 2 "Good").** The Environmental Research Center is in good condition for its age, with the exception of a few isolated cracks in the exterior masonry walls. No other significant structural deficiencies were noted.

Summary of Observations Regarding Present General Building Structural Condition (2013):	**The condition of the occupied North wing section of the building remains unchanged since 2009.** **The unoccupied sections of the building have significant deficiencies that have developed since the environmental control systems were deactivated. Several windows were noted to have large cracks. The glass breakage is concentrated on building elevations with significant exposure to direct sunlight. These windows have marble sills with tight butt joints, and the sills have experienced heave due to thermal expansion. This movement has caused windows to break and cracks in wall finishes below the windows to develop as well. Most of the structural system is concealed by interior finishes and could not be observed. The potential for structural systems in these areas to experience similar patterns of movement and cracking due to thermal expansion is assumed to exist.** **The overall condition of the occupied portion of the ERC is in generally good condition for its age.** **The overall condition of the unoccupied portion is in generally fair condition. However, deterioration appears to have accelerated due to the lack of environmental controls.**
Summary of Recommended Structural Repairs (2009):	Isolated cracks in exterior masonry walls need to be repaired. **(2013: A more detailed structural evaluation should be conducted to document the extent of damage to the structural system within the unoccupied portion of the building.)**
Additional Recommendations (2009):	Not applicable.

Table 1: Structural Systems Assessment
Building 17A ERC (OCCUPIED)

Structural Component	Previous (2009) Condition Code	Present (2013) Condition Code	Comments
Basement Walls	2	2	
Lowest Level Floor System	1	1	
First Floor System [Above basement] (Deck and framing)	1	1	
Second Floor System (Deck and framing)	1	1	
Columns	1	1	
Exterior Walls	2	2	
Roof Deck	1	1	
Interior Stairs	1	1	

Condition Code Description
(1) Excellent - Visual observation indicates no remedial work required. (less than 10% repair)
(2) Good - Visual observation indicates minimal remedial work required. (less than 10% replacement and/or 25% repair)
(3) Fair - Visual observation indicates remedial work required. (up to 25% replacement and/or 50% repair)
(4) Deteriorated - Visual observation indicates significant remedial work required. (up to 50% replacement and/or 75% repair)
(5) Critical – Visual observation indicates extensive replacement and/or repair. (over 50% replacement and/or 75% repair)

Table 1: Structural Systems Assessment
Building 17A ERC (UNOCCUPIED)

Structural Component	Previous (2009) Condition Code	Present (2013) Condition Code	Comments
Basement Walls	2	2	
Lowest Level Floor System	1	1	
First Floor System [Above basement] (Deck and framing)	1	1	
Second Floor System (Deck and framing)	1	1	
Columns	1	1	
Exterior Walls	2	**4**	**Movement and cracking was observed in interior finishes below windows and at marble window sills, apparently due to thermal expansion. Related movement and cracking in concealed structural systems at these locations may also exist, but could not be observed.**
Roof Deck	1	1	
Interior Stairs	1	1	

Condition Code Description
(1) Excellent - Visual observation indicates no remedial work required. (less than 10% repair)
(2) Good - Visual observation indicates minimal remedial work required. (less than 10% replacement and/or 25% repair)
(3) Fair - Visual observation indicates remedial work required. (up to 25% replacement and/or 50% repair)
(4) Deteriorated - Visual observation indicates significant remedial work required. (up to 50% replacement and/or 75% repair)
(5) Critical – Visual observation indicates extensive replacement and/or repair. (over 50% replacement and/or 75% repair)

Table 2: Itemized Structural Defects

Defect Item No.	Defect Description (2009)	2013 Assessment of 2009 Itemized Defects (plus description of new defects where noted)	Photo Log Reference Nos.	
			From 2009 Report	2013
1	Isolated cracks in exterior masonry walls	Change in condition was not observed.	5,6,7,8	**5**
2	Minor cracks in interior masonry walls	Change in condition was not observed.	9,10,11,12	
3 (new)	**N/A**	**New Defect/ Unoccupied Space: Heave in window sills**		**16, 17, 20**
4 (new)	**N/A**	**New Defect/ Unoccupied Space: Cracks in exterior walls**		**16, 19**
5 (new)	**N/A**	**New Defect/ Unoccupied space: Stair step crack at Room T19**		**13,14**
6 (new)	**N/A**	**New Defect/ Unoccupied Space: Broken windows**		**15,18**

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Photo Log:
2009 vs. 2013 Comparison

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PHOTOLOG: Building No. 17A ERC (2009 vs. 2013 Comparison)

2009 Photo #1: ERC Building main entrance at Atrium

2013 Photo #1: East side of building. Broken windows observed.

2009 Photo #2: Exterior building looking South

No change observed

2013 Photo #2: No change observed.

PHOTOLOG: Building No. 17A ERC (2009 vs. 2013 Comparison)

2009 Photo #3: Exterior building in good condition

2013 Photo #3: No change observed.

No change observed

2009 Photo #4: Exterior building in good condition

2013 Photo #4: No change observed.

No change observed

PHOTOLOG: Building No. 17A ERC (2009 vs. 2013 Comparison)

2009 Photo #5: Vertical crack in exterior wall

2013 Photo #5:

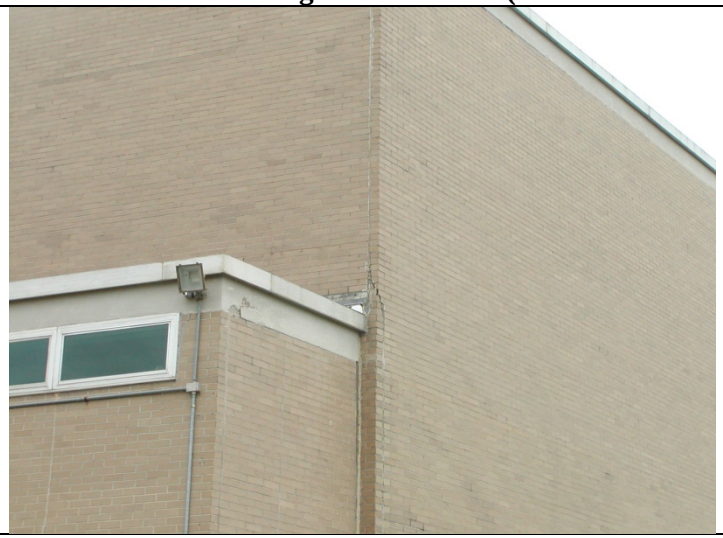
No change observed

2009 Photo #6: Crack in corner at top of auditorium wall

2013 Photo #6: No change observed.

No change observed

PHOTOLOG: Building No. 17A ERC (2009 vs. 2013 Comparison)



2009 Photo #7: Crack at corner of auditorium wall

2013 Photo #7: No change observed.

2009 Photo #8: Crack in wall near building entrance

2013 Photo #8: No change observed.

PHOTOLOG: Building No. 17A ERC (2009 vs. 2013 Comparison)

2009 Photo #9: Minor crack in interior brick wall

2013 Photo #9: No change observed.

No change observed

2009 Photo #10: Minor crack in interior brick wall

2013 Photo #10: No change observed.

No change observed

PHOTOLOG: Building No. 17A ERC (2009 vs. 2013 Comparison)

2009 Photo #11: Minor crack in interior concrete masonry wall

No change observed

2013 Photo #11: No change observed.

2009 Photo #12: Minor crack in interior concrete masonry wall

No change observed

2013 Photo #12: No change observed.

Photo Log:
New Observations in 2013

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PHOTOLOG: Building No. 17A ERC (New Items Observed in 2013)

2013 Photo #13: Outside room T19 (Unoccupied): Stair step crack observed at interior wall.

2013 Photo #14: Unoccupied: Photo #13 from other side.

2013 Photo #15: Unoccupied: Crack and ripple in interior finish. (Left) Broken window.

2013 Photo #16: Unoccupied: Broken marble window sill and large crack in wall finish below window

PHOTOLOG: Building No. 17A ERC (New Items Observed in 2013)

2013 Photo #17: Unoccupied: Inside design center, lateral movement at marble window sill.

2013 Photo #18: Cracked window in unoccupied space.

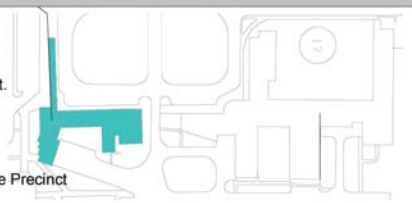
2013 Photo #19: Unoccupied: Stair step cracking in wall finish below marble window sill.

2013 Photo #20: Unoccupied: Broken marble window sill apparently caused by thermal expansion

Condition Assessment, April 2009

Building Information | Overall Building Condition 2 | Overall Structural Condition 2

Building Name	17B - Environmental Research Center		
Period of Construction	1947		
National Register Eligibility	Contributing MSHD, TVA & Individual Cont.		
Building Height	1 story		
Building Footprint	21,269 SF		
Historic Use | Current Use	Chemical Engineering/Gatehouse	Office; Police Precinct	
Potential Use | Adaptability	CO, RE	4	



Character Defining Features

Exterior	Interior
Primary	**Primary**
Building Form: Linear, rectangular massing with flat roof	Building Walls: Glazed CMU
Building Materials: Brick with Expressed Concrete Structure	Double Loaded Corridor and open office space
Concrete Canopy and Eave Extensions	Windows: Aluminum Window Wall System
Windows: Aluminum System - some with operation	Doors: Flush Wood with ventilation louver
Precast concrete window surrounds	
Doors: Aluminum and Glass	

Resource Significance

The TVA Environmental Research Building has been recommended eligible for individual listing on the National Register of Historic Places (NHRP) based on its "International" style of architecture, including the distinctive features of curved walls, continuous bands of single-light windows, steel frame construction and flat roofs. The structures housed offices and laboratories that support(ed) TVA's fertilizer research and would be recommended eligible for inclusion on the NRHP under Criterion A for its association with the historically significant National Fertilizer Development Center. The structures are located within the boundaries of the proposed NRHP Muscle Shoals Historic District and recommended as a contributing property to the historic significance of the district.

TVA Muscle Shoals Feasibility — Muscle Shoals, Alabama

Lord, Aeck & Sargent Architecture — July 31, 2009

Cyclic Assessment, July 2013

Building Information | Overall Building Condition 2 | Overall Structural Condition **3**

Building Name: 17B - Service Building

Current Use: Vacant

Building 17b → N

General Comments:

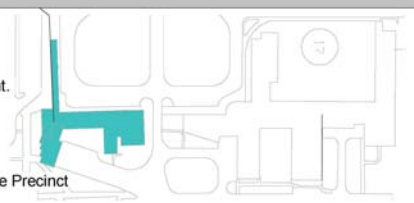
When the previous condition assessment was conducted, this building was occupied and conditioned. At the time of this assessment, the building was no longer in use and systems were inactive. As in 17A, the components of this building have suffered due to the absence of climate control.

Exterior brick veneer exhibits significant thermal movement-related cracking at the sawtooth south wall. In addition, there is significant thermal movement-related cracking at most or all of the T-shaped exterior wall intersections. Localized water damage was observed at the interior.

Condition Assessment, April 2009

Building Information

Building Name	17B - Environmental Research Center		
Period of Construction	1947		
National Register Eligibility	Contributing MSHD, TVA & Individual Cont.		
Building Height	1 story		
Building Footprint	21,269 SF		
Historic Use | Current Use	Chemical Engineering/Gatehouse	Office; Police Precinct	
Potential Use | Adaptability	CO, RE	4	



Exterior Materials and Conditions

Building Component	Building Material	Condition
Roofing | Decking	Flat, Cast Concrete; Deck: Metal	2
Exterior Envelope	Brick; Steel Frame	2
Exterior Doors	Storefront; Metal, flush; Overhead, Metal	1
Windows	Aluminum,awning; Storefront	1
Lintels	Concrete	1
Loading Dock	N/A	
Porch	Concrete Canopy	3
Additions	N/A	

Comments

Roof drains appear to be internal and tie in to sewer below building; visible in garage area
Cracking in brick sawtooth walls in police garage area
Brick infill at Northeast corner not original to building; originally storefront in this area
Metal coping and flashing are in disrepair at interior corners of building
Bottom window panes are operable
Concrete canopy in front of building was originally bus terminal; moderate water damage to concrete

TVA Muscle Shoals Feasibility — Muscle Shoals, Alabama
Lord, Aeck & Sargent Architecture — July 31, 2009

Cyclic Assessment, July 2013

Exterior Materials and Conditions

Building Component	Building Material	Condition
Roofing / Decking	Flat; Cast Concrete; Deck: Metal	**3**
Exterior Envelope	Brick; Steel frame	2
Exterior Doors	Storefront; Metal, flush; Overhead, flush	**2**
Windows	Aluminum, awning; Storefront	**2**
Lintels **& Sills**	**Concrete; steel**	1
Loading Dock	N / A	
Porch	Concrete Canopy	**4**
Additions	N / A	

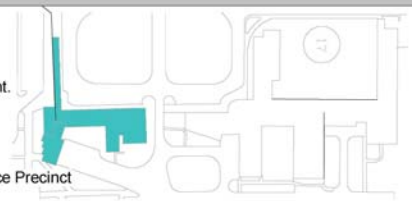
New Comments

- Significant thermal cracking at localized areas: primarily at sawtooth wall and at exterior corners where long walls intersect shorter walls approximately two feet from end of shorter wall
- Deterioration of caulking at windows and storefront; localized broken glazing; rusting at steel lintels
- Water damage at concrete canopy has accelerated since previous assessment
- Rusting of exterior exposed structural steel
- Copings and flashing deteriorated; concrete overhang cracked at interior corner
- Roof deck was not observed; however, significant areas of moisture at the interior and damaged ceilings indicate the presence of leaks

Condition Assessment, April 2009

Building Information

Building Name	17B - Environmental Research Center		
Period of Construction	1947		
National Register Eligibility	Contributing MSHD, TVA & Individual Cont.		
Building Height	1 story		
Building Footprint	21,269 SF		
Historic Use | Current Use	Chemical Engineering/Gatehouse	Office; Police Precinct	
Potential Use | Adaptability	CO, RE	4	



Interior Materials and Conditions

Building Component	Building Material	Condition
Corridors	Double-Loaded	1
Primary Space	Office: Individual Offices, Cubicles	1
Secondary Space	Toilet/Shower Rooms	2
Secondary Space	N/A	
Secondary Space	N/A	
Flooring	Concrete; Carpet; VCT	1
Walls	Glazed Tile	1
Ceiling	Corrugated Metal Deck; ACT; Adhered Cork	1

Comments

Roof leaks visible at several areas, likely caused by clogged roof drains internal to building
Police/Staff offices located off main double-loaded corridor
All original interior walls made of glazed tile in various colors
Locker/Toilet Rooms feature original marble toilet partitions and window sills
Several interior doors appear to be original, most office doors appear to be non-historic

TVA Muscle Shoals Feasibility — Muscle Shoals, Alabama
Lord, Aeck & Sargent Architecture — July 31, 2009

Cyclic Assessment, July 2013

Interior Materials and Conditions

Building Component	Building Material	Condition
Corridors	Double-loaded	**2**
Primary Space	Office: Individual offices, Cubicles, large open office, training / classrooms	**2**
Secondary Space	Toilet / Shower Rooms	2
Secondary Space	**Basement**	**2**
Secondary Space	**Garage**	**2**
Flooring	Concrete; Carpet; VCT	1
Walls	Glazed hollow clay tile, some painted; Concrete; Gypsum board with wallcovering and battens; plaster	**2**
Ceiling	Corrugated metal deck; ACT; Adhered cork; Plaster	**3**

New Comments

- Numerous areas of localized water damage at ceilings
- Deterioration from moisture within concrete and masonry walls
- At garage: Efflorescence at cracking brick of sawtwooth wall; peeling paint at underside of metal roof
- Extensive damage at garage wall / window adjacent to lab hood
- Significant mildew / mold in basement

17B - Service Building: Overall view of the northeast corner of the building

17B - Service Building: Significant thermal cracking and efflorescence is visible on the sawtooth walls.

17B - Service Building: Rusting of exterior exposed structural steel.

17B - Service Building: Water damage at the concrete canopy has accelerated since the previous assessment.

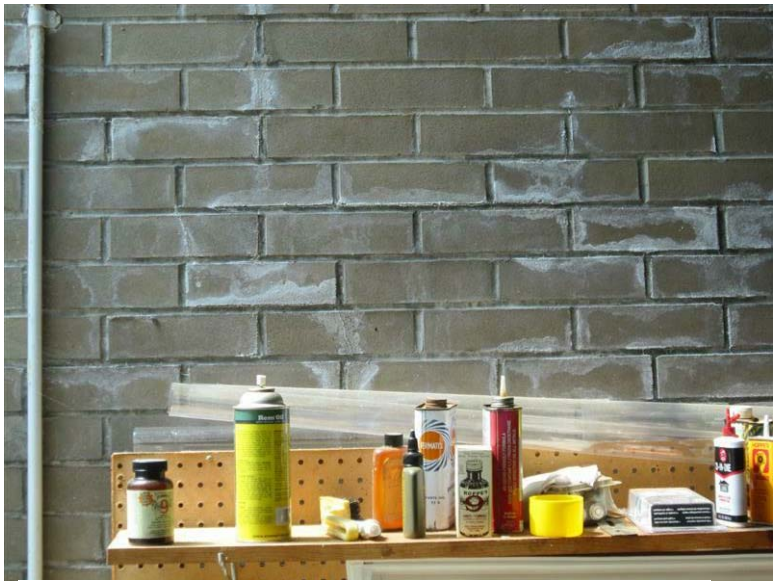
17B - Service Building: The base of the steel columns is rusting adjacent to the concrete.

17B - Service Building: The concrete overhang is cracked at the interior corner.

17B - Service Building: Damage to interior finishes due to moisture in the space.

17B - Service Building: Water damage at the restroom ceiling.

17B - Service Building: The ceiling and wall are damaged from water infiltration adjacent to the water fountain.



17B - Service Building: Efflorescence is visible on the brick wall.

17B - Service Building: Paint is flaking at the metal ceiling.

17B - Service Building: Mold and mildew are prevalent in the basement.

Structural Assessment – General Information

Building No.: 17B Service Building	
Building Name:	Service Building
Original Function:	Gatehouse
Subsequent Modification:	Subsequent Expansions
General Building Structural Description:	The Service Building is a one story steel frame building with a metal deck roof and exterior masonry walls. It has a partial concrete basement with a service tunnel that connects to the Environmental Research Center Building. The first floor level of the Service Building above the basement is a concrete slab on steel beams. Most of the interior of the Service Building is fully finished and the structure in the finished areas could not be observed. The vehicle storage area at the southeast corner has an exposed metal roof deck on steel beams, and portions of metal roof deck were visible in other parts of the Service Building through small voids in the finished ceilings.
General Building Structural Condition (2009):	2009 Structural General Building Condition Code = 2 "Good". **(2013: Due to accelerated damage from water intrusion, the Structural General Building Condition is changed from Condition Code 2 "Good" to Condition Code 3 "Fair".** The Service Building is in generally good condition, with some minor interior deficiencies noted in the vehicle storage area. The exterior concrete overhang near the building entrance has a crack in the soffit, and the adjacent concrete canopy supported on concrete piers has notable surface deterioration due to water intrusion at the roof surface.
Summary of Observations Regarding Present General Building Structural Condition (2013):	**This building is currently unoccupied. Progressive deterioration of interior finishes was observed throughout. Active water intrusion was observed in the women's bathroom where the plaster ceiling has spalled and rusted lath is exposed. Efflorescence not previously documented at the exterior south masonry wall was observed. Some drains inside the concrete piers at the adjacent canopy are leaking, which is causing deterioration of the concrete piers from the inside out.**
Summary of Recommended Structural Repairs (2009):	Water intrusion deficiencies at the exterior concrete canopy and at the vehicle storage area need to be remediated. The crack in the concrete soffit near the building entrance needs to be repaired. **(2013: Water intrusion deficiencies throughout the building need to be remediated.)**
Additional Recommendations (2009):	Not applicable.

Table 1: Structural Systems Assessment
Building 17B Service Building

Structural System Component	Previous (2009) Condition Code	Present (2013) Condition Code	Comments
Basement Walls	2	2	
Lowest Level Floor System	2	2	
Exterior Slabs at Canopies	2	2	
Columns	2	**3**	**Concrete columns at adjacent canopy exhibit progressive deterioration; Delamination of exterior finishes observed at canopy columns.**
Exterior Walls	2	**3**	**Efflorescence not previously documented at the exterior south masonry wall was observed.**
Roof Framing and Subframing	2	**3**	**Effects of water intrusion observed at several locations. It is assumed that corrosion to the roof framing and subframing will continue to deteriorate.**
Roof Deck	3	**4**	**Water intrusion observed at ceiling in Women's bathroom. Smaller areas of water infiltration observed throughout.**
Canopies (Framing and deck)	3	**4**	**Some drains inside the concrete piers at the adjacent canopy are leaking, which is causing deterioration of the concrete piers from the inside out.**

Condition Code Description
(1) Excellent - Visual observation indicates no remedial work required. (less than 10% repair)
(2) Good - Visual observation indicates minimal remedial work required. (less than 10% replacement and/or 25% repair)
(3) Fair - Visual observation indicates remedial work required. (up to 25% replacement and/or 50% repair)
(4) Deteriorated - Visual observation indicates significant remedial work required. (up to 50% replacement and/or 75% repair)
(5) Critical – Visual observation indicates extensive replacement and/or repair. (over 50% replacement and/or 75% repair)

Table 2: Itemized Structural Defects

Defect Item No.	Defect Description (2009)	2013 Assessment of 2009 Itemized Defects (plus description of new defects where noted)	Photo Log Reference Nos.	
			From 2009 Report	2013
1	Crack in concrete soffit near man entrance	No change in condition was observed	~~14~~ **(2)**	
2	Minor roof deck corrosion at vehicle storage area	**More paint flaking and corroded steel decking observed**	~~15,16~~ **(3, 4)**	**3, 4**
3	Water intrusion at exterior masonry wall	No change in condition was observed	~~17,18~~ **(5, 6)**	
4	Minor cracks in slab at vehicle storage area	No change in condition was observed	**(7, 8)**	
5 (new)	**N/A**	**New Defect: Deterioration of columns at adjacent canopy not previously documented**		**11**
6 (new)	**N/A**	**New Defect: Efflorescence at exterior south masonry wall not previously documented**		**12**
7 (new)	**N/A**	**New Defect: Water infiltration at Women's bathroom ceiling not previously documented**		**13**

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Photo Log:
2009 vs. 2013 Comparison

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PHOTOLOG: Building No. 17B Service Building (2009 vs. 2013 Comparison)

2009 Photo #1: General area of Northwest corner of structure

2013 Photo #1: General area of Northwest corner of structure

2009 Photo #2: Crack in concrete soffit near main entrance

No change observed

2013 Photo #2: No change observed.

PHOTOLOG: Building No. 17B Service Building (2009 vs. 2013 Comparison)

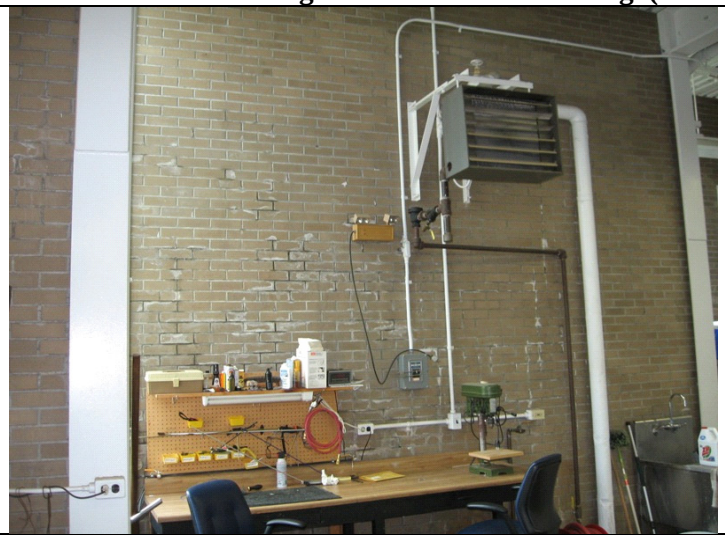
2009 Photo #3: Flaking paint at metal deck in vehicle storage area

2013 Photo #3: Increased amount of flaking paint and corroded steel decking at vehicle storage area.

2009 Photo #4: Flaking paint at metal roof deck in vehicle storage area

2013 Photo #4: Increased amount of flaking paint and corroded steel decking at vehicle storage area.

PHOTOLOG: Building No. 17B Service Building (2009 vs. 2013 Comparison)



2009 Photo #5: Efflorescence at masonry wall of vehicle storage area

No change observed

2013 Photo #5: No change observed.

2009 Photo #6: Efflorescence at masonry wall of vehicle storage area

No change observed

2013 Photo #6: No change observed.

PHOTOLOG: Building No. 17B Service Building (2009 vs. 2013 Comparison)

2009 Photo #7: Cracks in slab at vehicle storage area

2013 Photo #7: No change observed.

2009 Photo #8: Crack in slab at vehicle storage area

2013 Photo #8: No change observed.

PHOTOLOG: Building No. 17B Service Building (2009 vs. 2013 Comparison)

2009 Photo #9: Concrete service tunnel looking toward ERC Building (Building 17a)

2013 Photo #9: No change observed.

2009 Photo #10: Mechanical equipment in basement.

2013 Photo #10: No change observed.

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Photo Log:
New Observations in 2013

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PHOTOLOG: Building No. 17B Service Building (New Items Observed in 2013)

2013 Photo #11: Columns at canopy exhibit mold growth due to leaking interior drains.

2013 Photo #12: Efflorescence not previously documented at the exterior south masonry wall was observed.

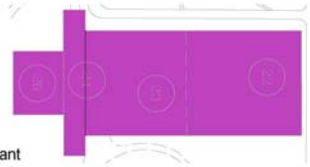
2013 Photo #13: Women's bathroom ceiling. Plaster spalling and rusting steel lath from water infiltration observed.

2013 Photo #14: Deterioration of interior finishes observed at several locations.

Condition Assessment, April 2009

Building Information Overall Building Condition 4 Overall Structural Condition 4

Building Name	22/23 - L&N Building	
Period of Construction	1918	
National Register Eligibility	Contributing MSHD, NFDC Context	
Building Height	1-1/2 story	
Building Footprint	131,749 SF	
Historic Use | Current Use	Cyanamide Oven Bldg.	Storage; Vacant
Potential Use | Adaptability	CR, LI, LO, RE, ST, WH	2



Character Defining Features

Exterior	Interior
Primary Building Form: Two Story Rectangular Massing with Low Slope Roofs and Dual Clerestory Building Walls: Hollow Clay Tile with Brick Quoins Exposed Steel Structure Windows: Remnants of Steel with operable hopper Window Headers and Sills: Precast concrete, sills shaped **Secondary** Exterior Industrial Piping, Ductwork and Supports	**Primary** Spatial Form: Open Plan, 2 story open to dual clerestory **Secondary** Spatial Form: Open Floor Plan between Clerestory and Adjacent Space Exposure of Steel Structure & Precast Concrete Tile Panels Exposure of Hollow Clay Tile with Brick Quoins Equipment: Exposed Industrial Ductwork Exposed Concrete and Brick Floor Sliding Stile and Rail Wood Doors with Glazing and Cross-Bracing

Resource Significance

The National Fertilizer Development Center (fomerly known as Nitrate Plant No. 2) has been recommended eligible to the National Register of Historic Places as a contributing resource in the Muscle Shoals Historic District. The property retains architectural integrity and is historically significant for its' role as a research facility during the World War I and World War II periods and thereafter. The period of significance dates between 1916 and 1970.

TVA Muscle Shoals Feasibility Muscle Shoals, Alabama

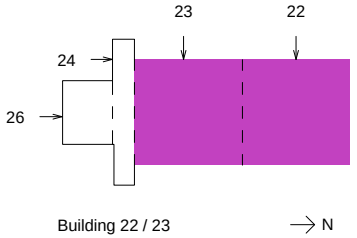
Lord, Aeck & Sargent Architecture July 31, 2009

Cyclic Assessment, July 2013

Building Information Overall Building Condition 4 Overall Structural Condition 4

Building Name: 22 / 23 - L / N Building

Current Use: Vacant



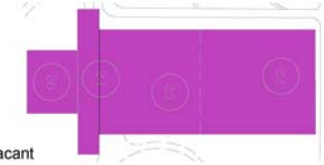
General Comments:

The condition of this building remains similar to its condition when it was assessed in 2009, with the exception of the roof and ceiling. The roof and ceiling exhibit severe deterioration and failure to address water infiltration will result in accelerated damage to the interior of the building.

Condition Assessment, April 2009

Building Information

Building Name	22/23 - L&N Building	
Period of Construction	1918	
National Register Eligibility	Contributing MSHD, NFDC Context	
Building Height	1-1/2 story	
Building Footprint	131,749 SF	
Historic Use | Current Use	Cyanamide Oven Bldg.	Storage; Vacant
Potential Use | Adaptability	CR, LI, LO, RE, ST, WH	2



Exterior Materials and Conditions

Building Component	Building Material	Condition
Roofing | Decking	Gable; Shed; Deck: Concrete, panels; Clerestory	4
Exterior Envelope	Hollow Clay Tile; Brick quoins at openings/corners	3
Exterior Doors	Wood, cast straps, painted,	3
Windows	Steel with Operable Hopper - no longer extant	5
Lintels	Concrete	3
Loading Dock	N/A	
Porch	N/A	
Additions	N/A	

Comments

Hairline cracks throughout concrete lintels
All original doors and windows have been removed and boarded up
Significant rust on exposed steel frame
Significant cracking in some areas of Hollow Clay Tile infill

TVA Muscle Shoals Feasibility — Muscle Shoals, Alabama
Lord, Aeck & Sargent Architecture — July 31, 2009

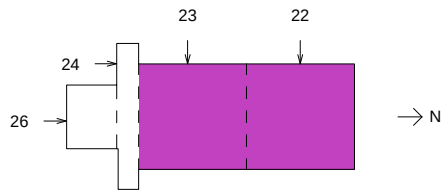
Cyclic Assessment, July 2013

Exterior Materials and Conditions

Building Component	Building Material	Condition
Roofing / Decking	Low-slope gables with clerestories; Deck: Concrete, panels	**5**
Exterior Envelope	Hollow clay tile; Brick quoins at openings / corners	3
Exterior Doors	Wood, cast straps, painted	3
Windows	Steel with operable hopper - no longer extant	5
Lintels **& Sills**	Concrete	3
Loading Dock	N / A	
Porch	N / A	
Additions	N / A	

New Comments

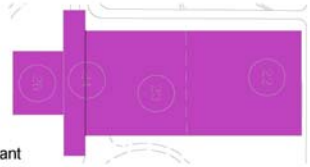
- East side is in significantly worse condition than west side
- Broken and spalled tiles; eroded mortar joints; plant growth on masonry
- Multiple penetrations from utilities; dripping pipes
- Cracking between tile and brick - significant localized cracking
- Significant rust on exposed steel
- Cracks at window sills
- Moisture along base of building on east side
- Significant moisture and plant growth at juncture with corrugated metal



Condition Assessment, April 2009

Building Information

Building Name	22/23 - L&N Building	
Period of Construction	1918	
National Register Eligibility	Contributing MSHD, NFDC Context	
Building Height	1-1/2 story	
Building Footprint	131,749 SF	
Historic Use | Current Use	Cyanamide Oven Bldg.	Storage; Vacant
Potential Use | Adaptability	CR, LI, LO, RE, ST, WH	2



Interior Materials and Conditions

Building Component	Building Material	Condition
Corridors	N/A	
Primary Space	Open	3
Secondary Space	Office: Wood studs, Cement Fiber panels	4
Secondary Space	Toilet Room: Cement Fiber panels	3
Secondary Space	Office: CMU, Steel	3
Flooring	Concrete; Brick	3
Walls	Exposed Hollow Clay Tile	3
Ceiling	Exposed Beams: Steel; Concrete, panels	4
Doors	Sliding Wood Stile and Rail	3

Comments

Concrete panels falling from ceiling
Extension rust/corosion in some areas of steel frame
Brick paving in certain areas
Sliding wood doors and pulley system between main warehouse buildings/spaces.
Lower level inaccessible due to environmental hazards

TVA Muscle Shoals Feasibility — Muscle Shoals, Alabama
Lord, Aeck & Sargent Architecture — July 31, 2009

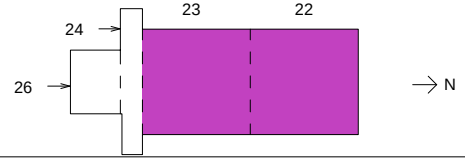
Cyclic Assessment, July 2013

Interior Materials and Conditions

Building Component	Building Material	Condition
Corridors	N / A	
Primary Space	Open	**4**
Secondary Space	Office: Walls, Wood studs, Cement fiber panels	4
Secondary Space	Toilet Room walls: Wood Studs	3
Secondary Space	Office: CMU, Steel	**4**
Flooring	Concrete	3
Walls	Exposed hollow clay tile	3
Ceiling	Exposed beams: Steel; Concrete, panels	**5**
Doors	Sliding wood stile and rail, glazed; wood, flush; storefront; wood, stile and rail, glazed	3

New Comments

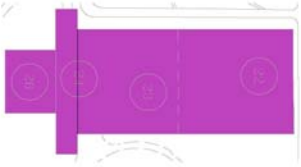
- Space is generally divided into two large open spaces, one on the east side and one on the west side; there is a smaller space on the northwest corner that at one time had a second and third floor - now removed
- East side - issues with moisture on east exterior wall - deteriorated masonry
- Offices along east wall failing from moisture from roof
- Standing water at many locations
- Active leaking from pipe penetrations and roof drains
- Roof drain dumping in water by column is causing severe rusting
- Probable asbestos pipe wrap
- Ceiling panels have advanced deterioration since previous assessment; large sections have fallen into protective nets.



Condition Assessment, April 2009

Building Information | Overall Building Condition 4 | Overall Structural Condition 4

Building Name	24 - L/N Warehouse No. 4	
Period of Construction	1918	
National Register Eligibility	Contributing MSHD, NFDC Context	
Building Height	1 story	
Building Footprint	18,439 SF	
Historic Use | Current Use	Cyanamide Oven Bldg.	Vacant
Potential Use | Adaptability	CR, LI, LO, RE, ST, WH	3



Character Defining Features

Exterior	Interior
Primary	**Secondary**
Building Form: Rectangular massing with low slope roof and clerestory	Spatial Form: Open Floor Plan between Clerestory and Adjacent Space
Exterior walls: Corrigated metal, painted	Exposure of Steel Structure
Steel clerestory windows with operable hopper	Exposed corrugated metal walls
Large corrugated metal doors	Exposed hollow clay tile walls where common with adjacent building
	Central brick demising wall
	Brick floor
	Overhead crane

Resource Significance

The National Fertilizer Development Center (fomerly known as Nitrate Plant No. 2) has been recommended eligible to the National Register of Historic Places as a contributing resource in the Muscle Shoals Historic District. The property retains architectural integrity and is historically significant for its' role as a research facility during the World War I and World War II periods and thereafter. The period of significance dates between 1916 and 1970.

TVA Muscle Shoals Feasibility — Muscle Shoals, Alabama

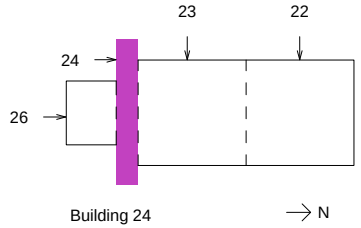
Lord, Aeck & Sargent Architecture — July 31, 2009

Cyclic Assessment, July 2013

Building Information | Overall Building Condition 4 | Overall Structural Condition 4

Building Name: 24 - L / N Warehouse No. 4

Current Use: Vacant



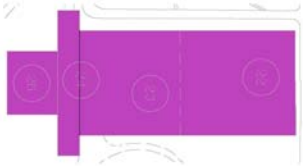
General Comments:

This portion of the building has deteriorated since the previous assessment. Continued water infiltration and accumulation are likely to accelerate damage to the floors and walls.

Condition Assessment, April 2009

Building Information

Building Name	24 - L/N Warehouse No. 4	
Period of Construction	1918	
National Register Eligibility	Contributing MSHD, NFDC Context	
Building Height	1 story	
Building Footprint	18,439 SF	
Historic Use | Current Use	Cyanamide Oven Bldg.	Vacant
Potential Use | Adaptability	CR, LI, LO, RE, ST, WH	3



Exterior Materials and Conditions

Building Component	Building Material	Condition
Roofing | Decking	Shed Roof to Gable Clerestory; Deck: Metal	5
Exterior Envelope	Corrugated Metal Siding; Hollow Clay Tile (Adjacent))	3
Exterior Doors	Corrugated Metal	3
Windows	Steel clerestory windows no longer exist	5
Lintels	N/A	
Loading Dock	N/A	
Porch	N/A	
Additions	N/A	

Comments

No surviving windows; openings covered with corrugated plastic panels.
Louvres at East end of building.
Evidence of rust on exposed steel structure.

TVA Muscle Shoals Feasibility
Lord, Aeck & Sargent Architecture

Muscle Shoals, Alabama
July 31, 2009

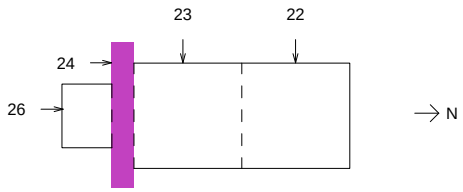
Cyclic Assessment, July 2013

Exterior Materials and Conditions

Building Component	Building Material	Condition
Roofing / Decking	Low-slope gable with clerestory; Deck: concrete panels	5
Exterior Envelope	Corrugated metal siding; Hollow clay tile (Adjacent)	3
Exterior Doors	Corrugated metal	3
Windows	Steel clerestory windows, no longer extant; louvers	5
Lintels **& Sills**	N / A	
Loading Dock	N / A	
Porch	N / A	
Additions	N / A	

New Comments

- Metal wall panels rusting in numerous locations
- Metal fascia and railing at roof severely deteriorated
- Louvers at clerestory significantly deteriorated and missing in locations



Condition Assessment, April 2009

Building Information

Building Name	24 - L/N Warehouse No. 4	
Period of Construction	1918	
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Building Height	1 story	
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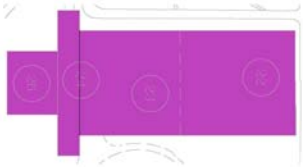
Potential Use | Adaptability	CR, LI, LO, RE, ST, WH	3



Interior Materials and Conditions

Building Component	Building Material	Condition
Corridors	N/A	
Primary Space	Open, low brick will divides space	3
Secondary Space	N/A	
Secondary Space	N/A	
Secondary Space	N/A	
Flooring	Concrete; Brick	2
Walls	Exposed corrugated metal at ends and exposed hollow clay tile where abutting adjacent buildings	3
Ceiling	Exposed Beams: Steel; Concrete, panels	3

Comments

TVA Muscle Shoals Feasibility
Lord, Aeck & Sargent Architecture

Muscle Shoals, Alabama
July 31, 2009

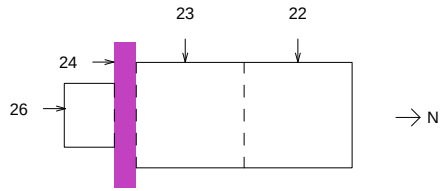
Cyclic Assessment, July 2013

Interior Materials and Conditions

Building Component	Building Material	Condition
Corridors	N / A	
Primary Space	Open, low brick wall divides space	3
Secondary Space	N / A	
Secondary Space	N / A	
Secondary Space	N / A	
Flooring	Concrete; Brick	**4**
Walls	Exposed corrugated metal at ends and exposed hollow clay tile where abutting adjacent buildings	3
Ceiling	Exposed beams: Steel; Concrete, panels	**4**

New Comments

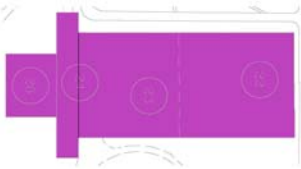
- Brick demising wall has failed; water accumulation near wall; floor is settling in this area
- Ceiling panels have failed in many locations; exposed rebar and active leaking
- Water is dripping down face of north masonry wall
- Floor is cracked and settling



Condition Assessment, April 2009

Building Information Overall Building Condition 4 Overall Structural Condition 4

Building Name	26 - Grounds Maintenance Shop	
Period of Construction	1918	
National Register Eligibility	Contributing MSHD, NFDC Context	
Building Height	1 story	
Building Footprint	18,623 SF	
Historic Use | Current Use	Cyanamide Oven Bldg.	Vacant
Potential Use | Adaptability	CR, LI, LO, RE, ST, WH	3



Character Defining Features

Exterior	Interior
Primary Building Form: Two Story Rectangular Mass with Low Slope Roofs and Triple Clerestory Building Walls: Hollow Clay Tile with Brick Quoins Windows: Steel with operable hopper in Clerestory Window Headers and Sills: Precast concrete, sills shaped Doors: Custom Wood with Cross-Bracing, Unique Steel Hardware and Concrete Lintels Cornerstone stating March 13,1918	**Primary** Spatial Form: Open Plan, 2 story open to triple clerestory **Secondary** Spatial Form: Open Floor Plan between Clerestory and Adjacent Space Exposure of Steel Structure & Precast Concrete Tile Roof Panels Exposure of Hollow Clay Tile Exterior Walls

Resource Significance

The National Fertilizer Development Center (fomerly known as Nitrate Plant No. 2) has been recommended eligible to the National Register of Historic Places as a contributing resource in the Muscle Shoals Historic District. The property retains architectural integrity and is historically significant for its' role as a research facility during the World War I and World War II periods and thereafter. The period of significance dates between 1916 and 1970.

TVA Muscle Shoals Feasibility Muscle Shoals, Alabama

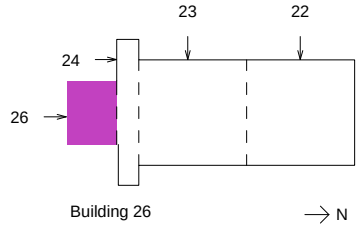
Lord, Aeck & Sargent Architecture July 31, 2009

Cyclic Assessment, July 2013

Building Information Overall Building Condition 4 Overall Structural Condition 4

Building Name: 26 - L / N Building Grounds Maintenance Shop

Current Use: Vacant



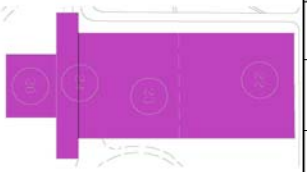
General Comments:

The condition of this building has not changed significantly since the previous assessment; however, if water infiltration is not addressed, moisture and growth of mold and plants will likely accelerate deterioration.

Condition Assessment, April 2009

Building Information

Building Name	26 - Grounds Maintenance Shop	
Period of Construction	1918	
National Register Eligibility	Contributing MSHD, NFDC Context	
Building Height	1 story	
Building Footprint	18,623 SF	
Historic Use | Current Use	Cyanamide Oven Bldg.	Vacant
Potential Use | Adaptability	CR, LI, LO, RE, ST, WH	3



Exterior Materials and Conditions

Building Component	Building Material	Condition
Roofing | Decking	Shed Roof to Gable Clerestory	3
Exterior Envelope	Hollow Clay Tile; Brick quoins at openings/corners	3
Exterior Doors	Entry: Wood, cast straps	3
Windows	Steel, fixed with hopper	5
Lintels	Concrete	3
Loading Dock	N/A	
Porch	N/A	
Additions	N/A	

Comments

Window sashes only at lower level; most sashes and panes intact at Clerestory
Wall ties located at South facade
Steel structure exposed at exterior

TVA Muscle Shoals Feasibility
Lord, Aeck & Sargent Architecture

Muscle Shoals, Alabama
July 31, 2009

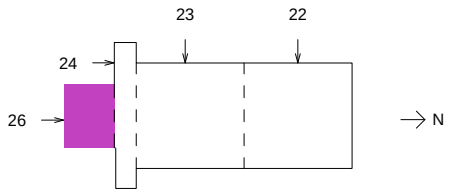
Cyclic Assessment, July 2013

Exterior Materials and Conditions

Building Component	Building Material	Condition
Roofing / Decking	Shed with gabled clerestory; Deck: Concrete panels	3
Exterior Envelope	Hollow clay tile; Brick quoins at openings/corners	3
Exterior Doors	Entry: Wood, cast straps	3
Windows	Steel, fixed with hopper	5
Lintels **& Sills**	Concrete	3
Loading Dock	N / A	
Porch	N / A	
Additions	N / A	

New Comments

- Spalling masonry and eroded mortar joints where water from roof is flowing down face of building
- Nearly all historic windows have been removed and replaced with fiberglass; a few remain on the south and west facades

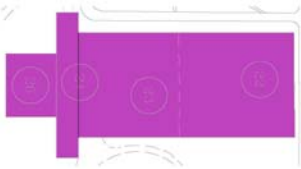


TVA Muscle Shoals, Alabama

Condition Assessment, April 2009

Building Information

Building Name	26 - Grounds Maintenance Shop	
Period of Construction	1918	
National Register Eligibility	Contributing MSHD, NFDC Context	
Building Height	1 story	
Building Footprint	18,623 SF	
Historic Use | Current Use	Cyanamide Oven Bldg.	Vacant
Potential Use | Adaptability	CR, LI, LO, RE, ST, WH	3



Interior Materials and Conditions

Building Component	Building Material	Condition
Corridors	N/A	
Primary Space	Open	3
Secondary Space	N/A	
Secondary Space	N/A	
Secondary Space	N/A	
Flooring	Concrete	4
Walls	Exposed Hollow Clay Tile	3
Ceiling	Exposed Beams: Steel; Concrete, panels	3

Comments

Interior space inaccessible due to environmental hazards
Severe cracking in areas of concrete floor

TVA Muscle Shoals Feasibility
Lord, Aeck & Sargent Architecture

Muscle Shoals, Alabama
July 31, 2009

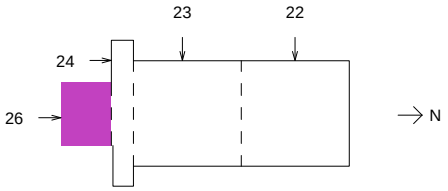
Cyclic Assessment, July 2013

Interior Materials and Conditions

Building Component	Building Material	Condition
Corridors	N / A	
Primary Space	Open	3
Secondary Space	Laboratory	**5**
Secondary Space	N / A	
Secondary Space	N / A	
Flooring	Concrete	4
Walls	Exposed hollow clay tile	3
Ceiling	Exposed beams: Steel; Concrete, panels	3

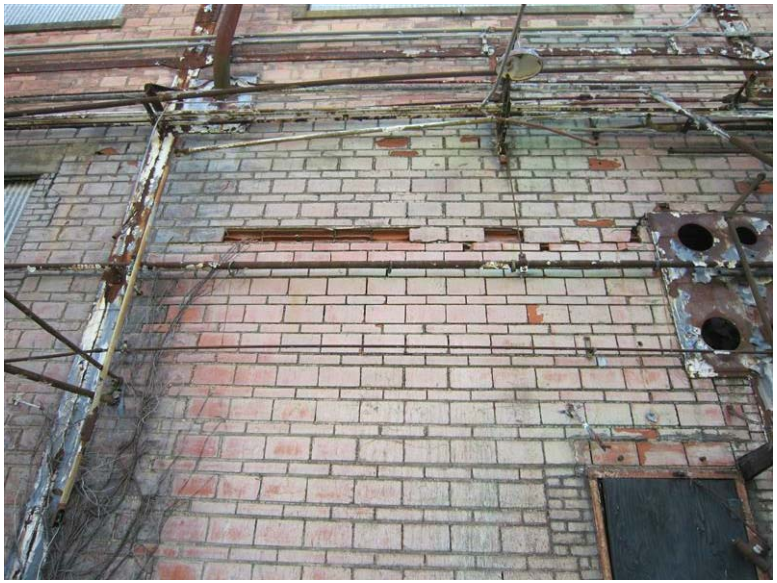
New Comments

- Ceiling panels are deteriorated and rebar is exposed
- Localized cracking of masonry walls
- Secondary space - considerable water damage; mold growth; possible asbestos - containing floor tiles - friable

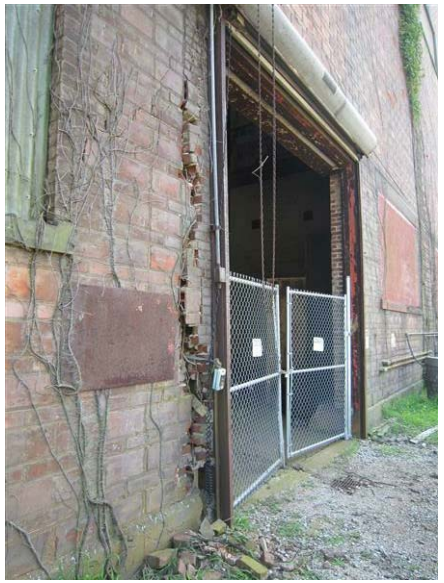


Building 22, 23 – L / N Building: Overall view of the northeast corner of the building

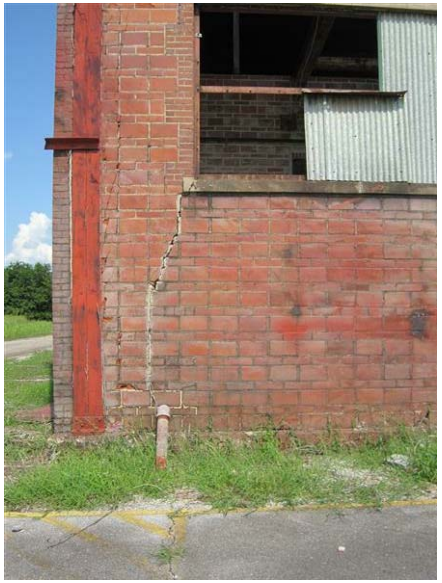
Building 22, 23 – L / N Building: Overall view of the north facade of the building



Building 22, 23 – L / N Building: Localized spalled and broken hollow clay tile and rusted steel are prevalent.



Building 22, 23 – L / N Building: The brick door surround is severely damaged.



Building 22, 23 – L / N Building: Localized cracking is visible at this window sill.

Building 22, 23 – L / N Building: Interior view of the space

Building 22, 23 – L / N Building: Interior view of the space

Building 22, 23 – L / N Building: Severe rusting and deterioration are present at this column.

Building 22, 23 – L / N Building: Standing water is present in the building.

Building 22, 23 – L / N Building: Probable asbestos pipe wrap is present in the building.

Building 22, 23 – L / N Building: Ceiling panels have deteriorated since the previous assessment.

Building 24 – Warehouse No. 4: Overall view of the southeast corner of the building

Building 24 – Warehouse No. 4: Overall view of the south elevation at the east wing

Building 24 – Warehouse No. 4: Overall view of the west wing

Building 24 – Warehouse No. 4: The openings are covered with corrugated metal panels.

Building 24 – Warehouse No. 4: There is a large crack in the concrete foundation.

Building 24 – Warehouse No. 4: Rusting occurs and the paint is flaking from the corrugated metal panels.

Building 24 – Warehouse No. 4: Standing water is visible on the floor.

Building 24 – Warehouse No. 4: Portions of the building were enclosed with fences.

Building 24 – Warehouse No. 4: The brick demising wall has failed and the floor has settled where the water has accumulated.

Building 24 – Warehouse No. 4: Portions of the building were enclosed with fences.

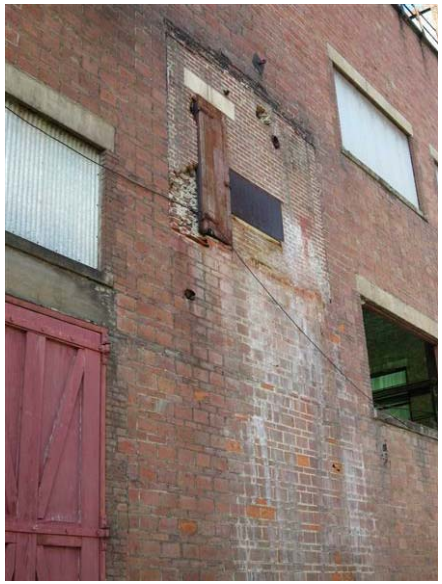
Building 24 – Warehouse No. 4: Water is dripping down the face of the north masonry wall.

Building 24 – Warehouse No. 4: The steel column is severely rusted.

Building 26 – L / N Building Grounds Maintenance Shop: Overall view of the south facade

Building 26 – L / N Building Grounds Maintenance Shop: Overall view of the east facade

Building 26 – L / N Building Grounds Maintenance Shop: Overall view of the west facade



Building 26 – L / N Building Grounds Maintenance Shop: Efflorescence, spalling masonry and eroded mortar joints where water is flowing down the face of the building.

Building 26 – L / N Building Grounds Maintenance Shop: Spalling masonry and eroded mortar joints where water is flowing down the face of the building.

Building 26 – L / N Building Grounds Maintenance Shop: Efflorescence, spalling masonry and eroded mortar joints where water is flowing down the face of the building.

Building 26 – L / N Building Grounds Maintenance Shop: Interior view of the building

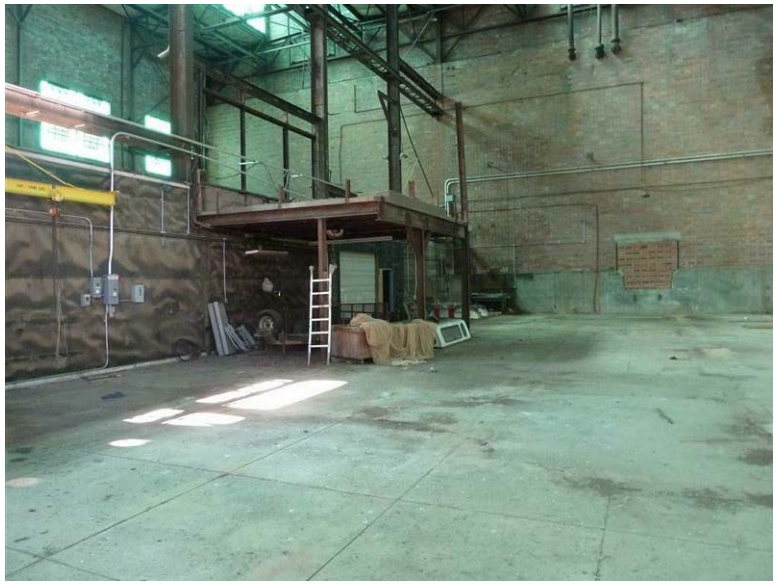
Building 26 – L / N Building Grounds Maintenance Shop: Interior view of the building

Building 26 – L / N Building Grounds Maintenance Shop: Rebar is exposed where spalling has occurred on the concrete ceiling panels.

Building 26 – L / N Building Grounds Maintenance Shop: Considerable water damage, mold growth and possible asbestos containing floor tiles are present in the secondary space.

Building 26 – L / N Building Grounds Maintenance Shop: Several possible asbestos containing floor tiles are missing and deteriorated.

Building 26 – L / N Building Grounds Maintenance Shop: Staining on the north wall adjacent to the pipe.



Building 26 – L / N Building Grounds Maintenance Shop: Interior view of the mezzanine

Structural Assessment – General Information

Building No.: 22 L/N Building, 23 Power Service Shop Storage Area, 24 Warehouse No. 4 & 26 Grounds Maintenance Shop	
Building Name:	L/N Building (#22) Power Service Shop Storage Area (#23) Warehouse No 4 (#24) Grounds Maintenance Shop (#26)
Original Function:	Cyanamide Oven Building
Subsequent Modification:	N/A
General Building Structural Description:	Buildings 22, 23, 24, and 26 comprise one very large structurally contiguous building separated by interior masonry walls. Buildings 22 and 23 are parallel structures that together are five 50 ft. bays wide and twenty six 20 ft. bays long. The main roof at the north end is approximately 50 ft. high with 10 ft. high clerestory monitors at the center of each 50 ft. bay. The main roof at the remainder of Buildings 22 and 23 is approximately 35 ft. high with 10 ft. high clerestory monitors at the center of each 50 ft. bay. The main roof and monitors are supported by steel trusses, and the roof deck is concrete planks supported by steel beams. The north exterior wall of Buildings 22 and 23 is load bearing masonry, and the east and west walls are masonry infill panels with exposed steel framing. The ground floor level of both buildings in an elevated concrete slab above a concrete frame basement. The roof structure of both buildings is supported by steel columns that bear on the top of the elevated slab. Building 24 consists of a single 50 ft. structural bay that spans north and south, perpendicular to the large bay spans of Buildings 22 and 23. The east and west ends of Building 24 extend approximately 50 ft. beyond the east and west walls of Buildings 22 and 23, and these extended areas are clad with metal panels. The roof height and structural framing of Building 24 is similar to the adjacent perpendicular roof of Buildings 22 and 23. Building 24 has an interior steel frame mezzanine and an interior wood frame mezzanine. Building 26 is located adjacent to Building 24 on the south side. The roof height, structural framing and structural orientation of Building 26 is identical to the north end of Buildings 22 and 23, however, Building 26 is only three 50 ft. bays wide. The south exterior wall is load bearing masonry, and the east and west walls are masonry infill panels with exposed steel framing. Building 26 has an interior enclosure with a wood frame roof on the west side. **(2013: For the purpose of clarity, the site maps provided indicate the split between buildings 22 and 23 are more of a north/south split. Based on the assessments, the natural division of the buildings is more of an east/west split. For the purposes of this reporting, L/N Building (#22) is the west side of the north end of the building and Power Service Shop Storage Area (#23) is the east side of the north end of the building.)**

General Building Structural Condition (2009):	Structural General Building Condition Code = 4 "Deteriorated". **(2013: Structural General Building Condition Code = 4 "Deteriorated".)**The entire building which consists of Buildings 22, 23, 24 and 26 is in poor condition with significant portions of each building that are structurally unsound. Severely corroded steel framing is found throughout each building. The concrete plank roof decking in Building 22 and 23 has collapsed in some locations. The roof deck in Buildings 24 and 26 is generally deteriorated and structurally unsound in some locations. Spalled concrete with exposed corroded reinforcing steel was observed in numerous locations in the basement areas of Buildings 22 and 23. The exterior walls of each building vary between fair and poor condition.
Summary of Observations Regarding Present General Building Structural Condition (2013):	**All observations for 2009 still apply. Continued deterioration of concrete roof planks observed. This deterioration will accelerate as more concrete planks are to environmental conditions. Building 23 structural steel columns have disconnected roof drains above them that easily allow water intrusion into the building. This will accelerate the deterioration of the structural steel systems.**
Summary of Recommended Structural Repairs (2009):	The roof deck of each building must be replaced. The structural steel framing must be sandblasted and painted, with extensive remediation required to restore the structural integrity of the overall building. Deteriorated concrete at the elevated slabs and support structure must be repaired. Deteriorated masonry and exposed steel framing, primarily on the east side of Building 23, must be repaired.
Additional Recommendations (2009):	An extensive, detailed evaluation of the structural framing at each building must be performed to determine the extent of remediation, repair and replacement required to restore the structural integrity of the overall building.

Table 1: Structural Systems Assessment
Building 22 L/N Building

Structural Component	Previous (2009) Condition Code	Present (2013) Condition Code	Comments
Basement Walls	3	3	
Lowest Level Floor System	3	3	
First Floor System [Above basement] (Deck and Framing)	4	4	
Columns	4	4	
Exterior Walls	3	3	
Exterior Wall Framing and Subframing	3	**4**	**Complete failure of connection observed at Northwest corner of structure. Continued deterioration of structural steel while water intrusion persists.**
Roof Framing and Subframing	4	4	
Roof Deck	4	**5**	**Roof deck continues to deteriorate. This deterioration appears to be accelerating as more roof panels become exposed to water intrusion.**
Monitor/Clerestory Structure (Framing, walls, and roof deck)	4	**5**	**Roof deck continues to deteriorate. Active water intrusion continues to corrode structural steel.**

Condition Code Description
(1) Excellent - Visual observation indicates no remedial work required. (less than 10% repair)
(2) Good - Visual observation indicates minimal remedial work required. (less than 10% replacement and/or 25% repair)
(3) Fair - Visual observation indicates remedial work required. (up to 25% replacement and/or 50% repair)
(4) Deteriorated - Visual observation indicates significant remedial work required. (up to 50% replacement and/or 75% repair)
(5) Critical – Visual observation indicates extensive replacement and/or repair. (over 50% replacement and/or 75% repair)

Table 1: Structural Systems Assessment
Building 23 Power Service Shop Storage Area

Structural Component	Previous (2009) Condition Code	Present (2013) Condition Code	Comments
Basement Walls	3	3	
Lowest Level Floor System	3	3	
First Floor System [Above basement] (Deck and Framing)	4	4	
Columns	4	**5**	**Disconnected roof drains are emptying rain water inside the building onto structural steel members.**
Exterior Walls	3	3	
Exterior Wall Framing and Subframing	2	2	
Roof Framing and Subframing	4	4	
Roof Deck	4	4	
Monitor/Clerestory Structure (Framing, walls, and roof deck)	4	4	

Condition Code Description
(1) Excellent - Visual observation indicates no remedial work required. (less than 10% repair)
(2) Good - Visual observation indicates minimal remedial work required. (less than 10% replacement and/or 25% repair)
(3) Fair - Visual observation indicates remedial work required. (up to 25% replacement and/or 50% repair)
(4) Deteriorated - Visual observation indicates significant remedial work required. (up to 50% replacement and/or 75% repair)
(5) Critical – Visual observation indicates extensive replacement and/or repair. (over 50% replacement and/or 75% repair)

Table 1: Structural Systems Assessment
Building 24 Warehouse No. 4

Structural Component	Previous (2009) Condition Code	Present (2013) Condition Code	Comments
Lowest Level Floor System	3	3	
Mezzanine Floor System (Deck and framing)	4	4	
Columns	4	4	
Exterior Walls	3	3	
Exterior Wall Framing and Subframing	3	3	
Roof Framing and Subframing	3	3	
Roof Deck	4	4	
Monitor/Clerestory Structure (Framing, walls, and roof deck)	4	4	

Condition Code Description
(1) Excellent - Visual observation indicates no remedial work required. (less than 10% repair)
(2) Good - Visual observation indicates minimal remedial work required. (less than 10% replacement and/or 25% repair)
(3) Fair - Visual observation indicates remedial work required. (up to 25% replacement and/or 50% repair)
(4) Deteriorated - Visual observation indicates significant remedial work required. (up to 50% replacement and/or 75% repair)
(5) Critical – Visual observation indicates extensive replacement and/or repair. (over 50% replacement and/or 75% repair)

Table 1: Structural Systems Assessment
Building 26 Ground Maintenance Shop

Structural Component	Previous (2009) Condition Code	Present (2013) Condition Code	Comments
Lowest Level Floor System	3	3	
Columns	4	4	
Interior Load Bearing Walls	3	3	
Exterior Walls	3	3	
Exterior Wall Framing and Subframing	3	3	
Roof Framing and Subframing	4	4	
Roof Deck	4	4	
Monitor/Clerestory Structure (Framing, walls, and roof deck)	4	4	
Interior Stairs	4	4	

Condition Code Description
(1) Excellent - Visual observation indicates no remedial work required. (less than 10% repair)
(2) Good - Visual observation indicates minimal remedial work required. (less than 10% replacement and/or 25% repair)
(3) Fair - Visual observation indicates remedial work required. (up to 25% replacement and/or 50% repair)
(4) Deteriorated - Visual observation indicates significant remedial work required. (up to 50% replacement and/or 75% repair)
(5) Critical – Visual observation indicates extensive replacement and/or repair. (over 50% replacement and/or 75% repair)

Table 2: Itemized Structural Defects
Building 22 L/N Building

Defect Item No.	Defect Description (2009)	2013 Assessment of 2009 Itemized Defects	Photo Log Reference Nos.	
			From 2009 Report	2013
1	Significant corrosion to columns G-25 (0.3" thickness compromised)	**Additional corrosion observed.**	13,14	**13,14**
2	Deteriorated soffit of 1st level concrete slab - spalling, exposed corroded rebar, efflorescence	Change in condition was not observed	17,18	
3	Cracking in the exterior brick masonry wall on the west side of the building	Change in condition was not observed		
4	Damaged interior load bearing wall at the northwest corner	**Failed connection observed.**		**19**
5	Roof/clerestory framing is moderately to severely corroded throughout the entire area of the building	Change in condition was not observed	11,12,13,14	
6	Roof concrete planks are deteriorated due to spalling of concrete, cracking in the panels and exposed corroded rebar. Nets have been installed to retain the spalling debris from the concrete planks	**Defect has continued to worsen. Deterioration accelerated as more concrete is exposed to water damage.**	4,5,6,7,8	**5,6**

Table 2: Itemized Structural Defects
Building 23 Power Service Shop Storage Area

Defect Item No.	Defect Description (2009)	2013 Assessment of 2009 Itemized Defects	Photo Log Reference Nos.	
			From 2009 Report	2013
1	Significant corrosion to columns throughout the entire building (0.1" to 0.5" thickness compromised)	**Disconnected roof drains are spilling water into building onto structural steel systems.**	5,6	**5**
2	Moderate corrosion to mezzanine framing	Change in condition was not observed		
3	Damage and cracking in the exterior brick masonry wall on the east side of the building	Change in condition was not observed	3,4	
4	Roof/clerestory framing is moderately to severely corroded throughout the entire area of the building	Change in condition was not observed	7,8,9	
5	Roof concrete planks are deteriorated due to spalling of concrete, cracking in the panels and exposed corroded rebar. Plastic nets installed to catch the spalling concrete debris	Change in condition was not observed	11,12	

Table 2: Itemized Structural Defects
Building 24 Warehouse No. 4

Defect Item No.	Defect Description (2009)	2013 Assessment of 2009 Itemized Defects	Photo Log Reference Nos.	
			From 2009 Report	2013
1	Significant corrosion of steel columns (0.1" to 0.3" thickness compromised)	**Additional corrosion to structural steel evident.**	9,10	**10**
2	Significantly damaged and deteriorated wood framed mezzanine	Change in condition was not observed	4	**4**
3	Deteriorated metal siding/wall system on the west side of building	Change in condition was not observed		
4	Damaged brick partition wall	Change in condition was not observed	8	
5	Roof framing is moderately corroded throughout the entire area of the building	Change in condition was not observed		
6	Roof concrete planks are deteriorated due to cracking and exposed corroded rebar	Change in condition was not observed	5,6,7	

Table 2: Itemized Structural Defects
Building 26 Grounds Maintenance Shop

Defect Item No.	Defect Description (2009)	2013 Assessment of 2009 Itemized Defects	Photo Log Reference Nos.	
			From 2009 Report	2013
1	Significant corrosion of steel columns (0.1" to 0.3" thickness compromised	Change in condition was not observed	8	
2	Damaged flange of column E-33	Change in condition was not observed	9	
3	Deteriorated interior wood frame enclosure	Change in condition was not observed	17,18,19	
4	Spalled masonry at west wall	Change in condition was not observed	4	
5	Roof framing is moderately to severely corroded throughout the entire area of the building	Change in condition was not observed	5,6,7	
6	Roof concrete planks are deteriorated due to cracking, spalling and exposed corroded rebar	Change in condition was not observed	11,12,13,14,15,16	

Photo Log:
2009 vs. 2013 Comparison

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PHOTOLOG: Building No. 22 L/N Building (2009 vs. 2013 Comparison)

2009 Photo #1: Exterior building – west side

2013 Photo #1: No change observed.

No change observed

2009 Photo #2: Exterior building – west side

2013 Photo #2: No changed observed.

No change observed

PHOTOLOG: Building No. 22 L/N Building (2009 vs. 2013 Comparison)

2009 Photo #3: Interior building looking South

2013 Photo #3: Interior building looking South. Continued concrete roof plank deterioration evident.

2009 Photo #4: Deteriorated concrete plank roof deck

No change observed

2013 Photo #4: No change observed.

PHOTOLOG: Building No. 22 L/N Building (2009 vs. 2013 Comparison)

2009 Photo #5: Holes in deteriorated concrete plank roof deck

2013 Photo #5: Holes in deteriorated concrete plank roof deck. Condition has continued to decline and may be accelerating.

2009 Photo #6: Areas of ruined concrete plank roof deck

2013 Photo #6: Areas of ruined concrete plank roof deck. Continued deterioration evident.

PHOTOLOG: Building No. 22 L/N Building (2009 vs. 2013 Comparison)

2009 Photo #7: Ruined concrete roof planks

2013 Photo #7: No change observed.

2009 Photo #8: Ruined concrete roof planks

2013 Photo #8: No change observed.

PHOTOLOG: Building No. 22 L/N Building (2009 vs. 2013 Comparison)

2009 Photo #9: Deteriorated concrete roof planks

2013 Photo #9: No change observed.

2009 Photo #10: Deteriorated concrete roof planks

2013 Photo #10: No change observed.

PHOTOLOG: Building No. 22 L/N Building (2009 vs. 2013 Comparison)

2009 Photo #11: Severely corroded structural steel

2013 Photo #11: No change observed.

2009 Photo #12: Severely corroded structural steel

2013 Photo #12: No change observed.

PHOTOLOG: Building No. 22 L/N Building (2009 vs. 2013 Comparison)

2009 Photo #13: Severely corroded structural steel

No change observed

2013 Photo #13: No change observed.

2009 Photo #14: Severely corroded structural steel

2013 Photo #14: Corroded steel column. Paint flakes have fallen from above as corrosion has worsened. Different location than 2009.

PHOTOLOG: Building No. 22 L/N Building (2009 vs. 2013 Comparison)

2009 Photo #15: View of basement

2013 Photo #15: View of basement

2009 Photo #16: Defective concrete at basement ceiling

No change observed

2013 Photo #16: No change observed.

PHOTOLOG: Building No. 22 L/N Building (2009 vs. 2013 Comparison)

2009 Photo #17: Severely spalled concrete at basement ceiling

No change observed

2013 Photo #17: No change observed.

2009 Photo #18: Severely spalled concrete at basement ceiling

No change observed

2013 Photo #18: No change observed.

PHOTOLOG: Building No. 22 L/N Building (New Items Observed in 2013)

2013 Photo #19: Severely corroded steel and failed connection at Northwest corner of building.

PHOTOLOG: Building No. 23 Power Service Shop Storage Area (2009 vs. 2013 Comparison)

2009 Photo #1: Exterior of buildings 22 and 23 on the North side

2013 Photo #1: Exterior of buildings 22 and 23 on North side

2009 Photo #2: Exterior building – East side

2013 Photo #2: Exterior building – East side

PHOTOLOG: Building No. 23 Power Service Shop Storage Area (2009 vs. 2013 Comparison)

2009 Photo #3: Exterior building – East side

No change observed

2013 Photo #3: No change observed.

2009 Photo #4: Deteriorated steel and masonry at exterior building – East side

No change observed

2013 Photo #4: No change observed.

PHOTOLOG: Building No. 23 Power Service Shop Storage Area (2009 vs. 2013 Comparison)

2009 Photo #5: Severely corroded steel column

2013 Photo #5: Severely corroded steel column. Above is disconnected roof drain that empties water into the building.

2009 Photo #6: Severely corroded steel column

No change observed

2013 Photo #6: No change observed.

PHOTOLOG: Building No. 23 Power Service Shop Storage Area (2009 vs. 2013 Comparison)

2009 Photo #7: Severely corroded steel framing

2013 Photo #7: No change observed.

2009 Photo #8: Severely corroded steel framing

2013 Photo #8: No change observed.

PHOTOLOG: Building No. 23 Power Service Shop Storage Area (2009 vs. 2013 Comparison)

2009 Photo #9: Severely corroded steel framing

2013 Photo #9: No change observed.

2009 Photo #10: Defective area of elevated slab above basement

2013 Photo #10: No change observed.

PHOTOLOG: Building No. 23 Power Service Shop Storage Area (2009 vs. 2013 Comparison)

2009 Photo #11: Large holes in deteriorated concrete plank roof deck

2013 Photo #11: No change observed

2009 Photo #12: Holes in deteriorated concrete plank roof deck

2013 Photo #12: No change observed.

PHOTOLOG: Building No. 23 Power Service Shop Storage Area (2009 vs. 2013 Comparison)

2009 Photo #13: Interior view of building looking North

2013 Photo #13: Interior view of building looking North.

2009 Photo #14: Interior view of building looking North at East wall

2013 Photo #14: Interior view of building looking at East wall.

PHOTOLOG: Building No. 23 Power Service Shop Storage Area (2009 vs. 2013 Comparison)

2009 Photo #15: Interior view of building looking North

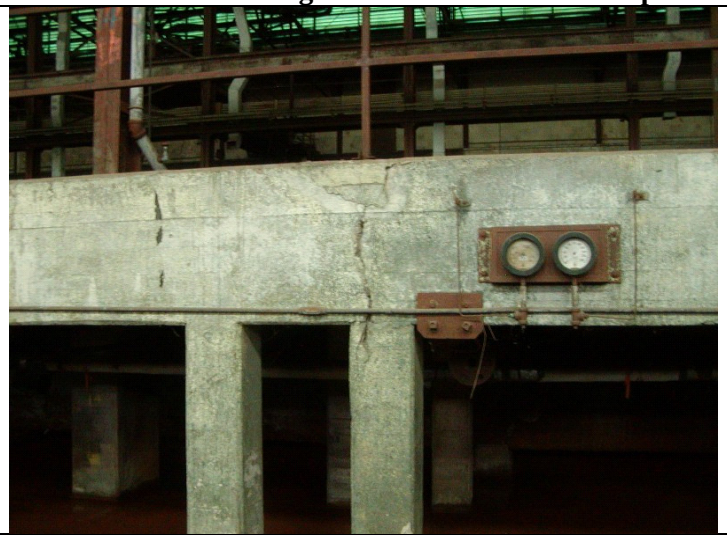
2013 Photo #15: Interior view of building looking North.

2009 Photo #16: View of open area at basement level

No change observed

2013 Photo #16: No change observed.

PHOTOLOG: Building No. 23 Power Service Shop Storage Area (2009 vs. 2013 Comparison)



2009 Photo #17: Cracks at edge of elevated slab above basement

No change observed

2013 Photo #17: No change observed.

2009 Photo #18: Spalled concrete at basement structure

No change observed

2013 Photo #18: No change observed.

PHOTOLOG: Building No. 23 Power Service Shop Storage Area (2009 vs. 2013 Comparison)

2009 Photo #19: Spalled concrete at basement structure

No change observed

2013 Photo #19: No change observed.

2009 Photo #20: Spalled concrete at basement structure

No change observed

2013 Photo #20: No change observed.

PHOTOLOG: Building No. 24 Warehouse No. 4 (2009 vs. 2013 Comparison)

2009 Photo #1: Exterior building – West end

No change observed

2013 Photo #1: No change observed.

2009 Photo #2: Exterior building – East end

2013 Photo #2: Exterior building – East end

PHOTOLOG: Building No. 24 Warehouse No. 4 (2009 vs. 2013 Comparison)

2009 Photo #3: Interior building looking West

2013 Photo #3: Interior building looking West

2009 Photo #4: Steel and wood mezzanines at building interior

2013 Photo #4: Steel and wood mezzanines at building interior

PHOTOLOG: Building No. 24 Warehouse No. 4 (2009 vs. 2013 Comparison)

2009 Photo #5: Deteriorated concrete plank roof deck

No change observed

2013 Photo #5: No change observed.

2009 Photo #6: Deteriorated concrete plank roof deck

No change observed

2013 Photo #6: No change observed.

PHOTOLOG: Building No. 24 Warehouse No. 4 (2009 vs. 2013 Comparison)

2009 Photo #7: Structurally deficient concrete roof plank

No change observed

2013 Photo #7: No change observed.

2009 Photo #8: Partially collapsed interior masonry partition

No change observed

2013 Photo #8: No change observed.

PHOTOLOG: Building No. 24 Warehouse No. 4 (2009 vs. 2013 Comparison)

2009 Photo #9: Severe corrosion at column base plate attachment

No change observed

2013 Photo #9: No change observed.

2009 Photo #10: Severely corroded steel column

2013 Photo #10: Severely corroded steel column. Continued corrosion evident.

PHOTOLOG: Building No. 26 Grounds Maintenance Shop (2009 vs. 2013 Comparison)

2009 Photo #1: Exterior building – South end

2013 Photo #1: Exterior building – South end

2009 Photo #2: Exterior building East side at intersection with Building 24

2013 Photo #2: Exterior building East side at intersection with Building 24

PHOTOLOG: Building No. 26 Grounds Maintenance Shop (2009 vs. 2013 Comparison)

2009 Photo #3: Exterior building – West side

2013 Photo #3: No change observed.

2009 Photo #4: Spalled masonry on West side at intersection with Building 24

2013 Photo #4: No change observed

PHOTOLOG: Building No. 26 Grounds Maintenance Shop (2009 vs. 2013 Comparison)

2009 Photo #5: Severely corroded steel framing

2013 Photo #5: No change observed.

2009 Photo #6: Severely deteriorated steel framing

2013 Photo #6: No change observed.

PHOTOLOG: Building No. 26 Grounds Maintenance Shop (2009 vs. 2013 Comparison)

2009 Photo #7: Severely corroded steel framing

2013 Photo #7: No change observed.

2009 Photo #8: Severely corroded steel framing

2013 Photo #8: No change observed.

PHOTOLOG: Building No. 26 Grounds Maintenance Shop (2009 vs. 2013 Comparison)

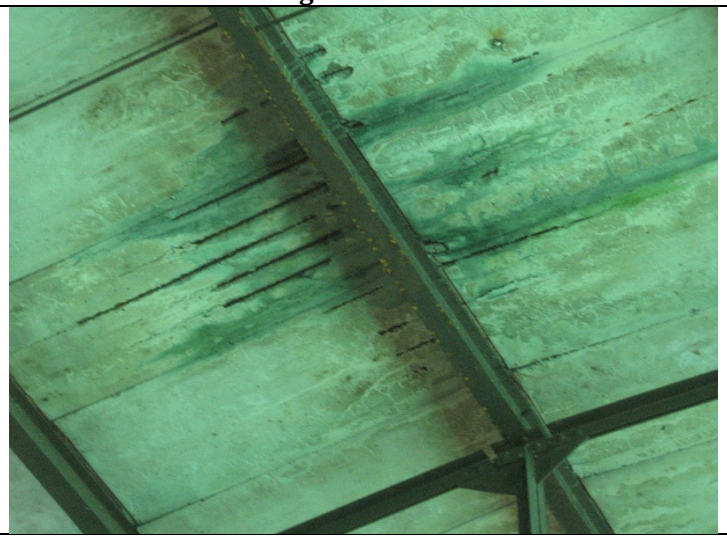
2009 Photo #9: Moderately corroded steel column with impact damage

2013 Photo #9: No change observed.

2009 Photo #10: Moderately corroded steel column with impact damage

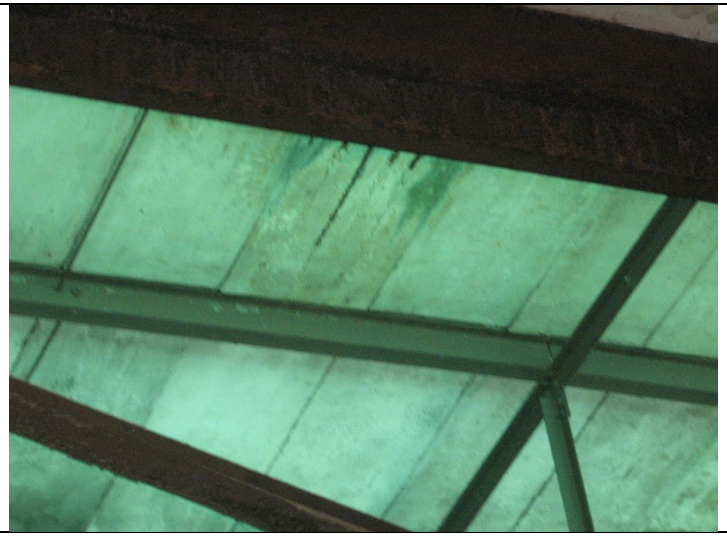
2013 Photo #10: No change observed.

PHOTOLOG: Building No. 26 Grounds Maintenance Shop (2009 vs. 2013 Comparison)



2009 Photo #11: Structurally deficient concrete roof planks

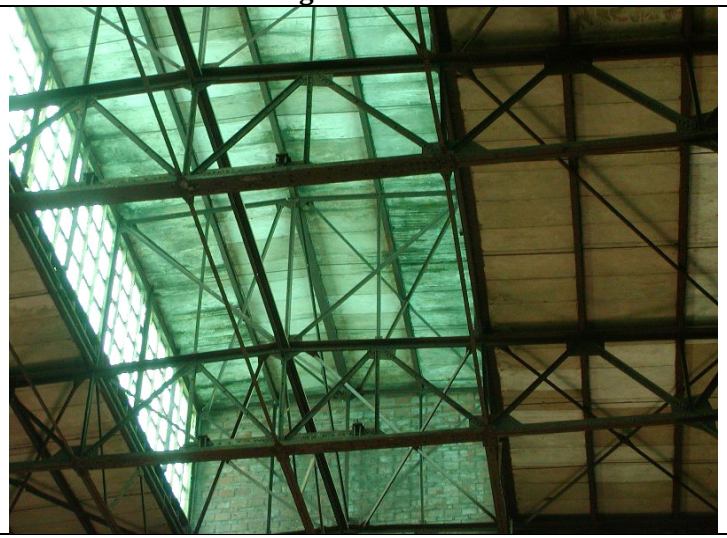
2013 Photo #11: No change observed.



2009 Photo #12: Structurally deficient concrete roof planks

2013 Photo #12: No change observed.

PHOTOLOG: Building No. 26 Grounds Maintenance Shop (2009 vs. 2013 Comparison)



2009 Photo #13: Deteriorated concrete roof planks

2013 Photo #13: No change observed.

2009 Photo #14: Deteriorated concrete roof planks

2013 Photo #14: No change observed.

PHOTOLOG: Building No. 26 Grounds Maintenance Shop (2009 vs. 2013 Comparison)

2009 Photo #15: Deteriorated concrete roof planks

2013 Photo #15: No change observed.

2009 Photo #16: Deteriorated concrete roof planks

2013 Photo #16: No change observed.

PHOTOLOG: Building No. 26 Grounds Maintenance Shop (2009 vs. 2013 Comparison)

2009 Photo #17: View of interior wood frame enclosure from above

2013 Photo #17: No change observed.

2009 Photo #18: View of interior wood frame enclosure from above

2013 Photo #18: No change observed.

PHOTOLOG: Building No. 26 Grounds Maintenance Shop (2009 vs. 2013 Comparison)

2009 Photo #19: Ruined roof deck of interior enclosure

2013 Photo #19: No change observed.

2009 Photo #20: Spalled concrete/corroded reinforcing steel at lintel

2013 Photo #20: No change observed.

PHOTOLOG: Building No. 26 Grounds Maintenance Shop (2009 vs. 2013 Comparison)

2009 Photo #21: Cracked masonry at outside wall

No change observed

2013 Photo #21: No change observed.

2009 Photo #22: Deteriorated steel stair going up to Building 24

No change observed

2013 Photo #22: No change observed.

Condition Assessment, April 2009

Building Information	Overall Building Condition 1	Overall Structural Condition 2

Building Name	25 - Warehouse Z	
Period of Construction	1918	
National Register Eligibility	Contributing MSHD, NFDC Context	
Building Height	1 story	
Building Footprint	7,029 SF	
Historic Use | Current Use	Wash / Locker House Z	Office
Potential Use | Adaptability	CO	3

Character Defining Features

Exterior	Interior
Primary Building Walls: Hollow Clay Tile with Brick Quoins Window Headers and Sills: Precast concrete, sills shaped Building Form: Pattern of Openings for Windows and Doors Pedestrian Entry Door Canopies with Corbelled Brick Supports	Interior alterations obscure all historic features

Resource Significance

The National Fertilizer Development Center (fomerly known as Nitrate Plant No. 2) has been recommended eligible to the National Register of Historic Places as a contributing resource in the Muscle Shoals Historic District. The property retains architectural integrity and is historically significant for its' role as a research facility during the World War I and World War II periods and thereafter. The period of significance dates between 1916 and 1970.

TVA Muscle Shoals Feasibility — Muscle Shoals, Alabama

Lord, Aeck & Sargent Architecture — July 31, 2009

Cyclic Assessment, July 2013

Building Information	Overall Building Condition 1	Overall Structural Condition 2

Building Name: 25 - Warehouse Z

Current Use: Offices

Building 25

N

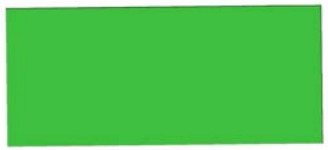
General Comments:

The building is occupied and maintained in good condition. No significant changes were noted since the previous assessment.

Condition Assessment, April 2009

Building Information

Building Name	25 - Warehouse Z	
Period of Construction	1918	
National Register Eligibility	Contributing MSHD, NFDC Context	
Building Height	1 story	
Building Footprint	7,029 SF	
Historic Use | Current Use	Wash / Locker House Z	Office
Potential Use | Adaptability	CO	3



Exterior Materials and Conditions

Building Component	Building Material	Condition
Roofing | Decking	Gable; Deck: Wood	1
Exterior Envelope	Hollow Clay Tile; Brick quoins at openings/corners	2
Exterior Doors	Aluminum glass storefront system, non-historic	1
Windows	Aluminum, fixed, non-historic	1
Lintels	Concrete	1
Loading Dock	N/A	
Porch	Wood: Over entry	2
Additions	N/A	

Comments

Wood eaves with metal drip edge observed at roof
Continuous concrete curb/foundation visible around perimeter of building
Windows and doors replaced during recent renovation of building
Wood-framed awnings over entry doors appear to be historic

TVA Muscle Shoals Feasibility — Muscle Shoals, Alabama
Lord, Aeck & Sargent Architecture — July 31, 2009

Cyclic Assessment, July 2013

Exterior Materials and Conditions

Building Component	Building Material	Condition
Roofing / Decking	Low-slope gable; Deck: Wood	1
Exterior Envelope	Hollow clay tile; Brick quoins at opening / corners	2
Exterior Doors	Aluminum glass storefront system; non-historic	1
Windows	Aluminum, fixed, non-historic	1
Lintels **& Sills**	Concrete	1
Loading Dock	N / A	
Porch	Wood: Over entry	2
Additions	N / A	

New Comments

- Minor localized cracking at clay tile walls
- Evidence of water ponding by HVAC units on north wall; mold growing at base of building
- Some localized masonry repair with incompatible brick
- Spalling concrete at foundation - southwest corner
- Condensation at some windows
- Joint at head of infilled door on north facade - mortar is failing
- East canopy needs painting; south canopy is sagging

Condition Assessment, April 2009

Building Information

Building Name	25 - Warehouse Z		
Period of Construction	1918		
National Register Eligibility	Contributing MSHD, NFDC Context		
Building Height	1 story		
Building Footprint	7,029 SF		
Historic Use | Current Use	Wash / Locker House Z	|	Office
Potential Use | Adaptability	CO	|	3

Interior Materials and Conditions

Building Component	Building Material	Condition
Corridors	Double-Loaded	1
Primary Space	Office	1
Secondary Space	N/A	
Secondary Space	N/A	
Secondary Space	N/A	
Flooring	Carpet	1
Walls	Gyp. Board on Studs	
Ceiling	ACT	1

Comments

Interior recently renovated for office use, no historic features remain visible

TVA Muscle Shoals Feasibility
Lord, Aeck & Sargent Architecture

Muscle Shoals, Alabama
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Interior Materials and Conditions

Building Component	Building Material	Condition
Corridors	Double loaded	1
Primary Space	Office	1
Secondary Space	Toilets	**1**
Secondary Space	N / A	
Secondary Space	N / A	
Flooring	Carpet	1
Walls	Gypsum board on studs	**1**
Ceiling	ACT	1

New Comments

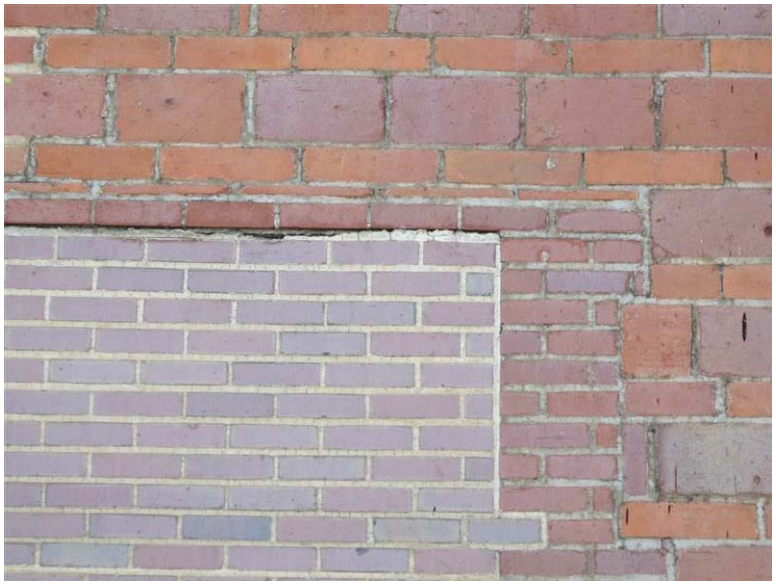
- Crack in drywall at west end of south room - exterior walls south and west
- Minor staining of ceiling tile
- Slight soiling of carpet

Building 25 – L / N Warehouse Z: Overall view of the main entrance

Building 25 – L / N Warehouse Z: Localized staining and efflorescence are visible on the wall.

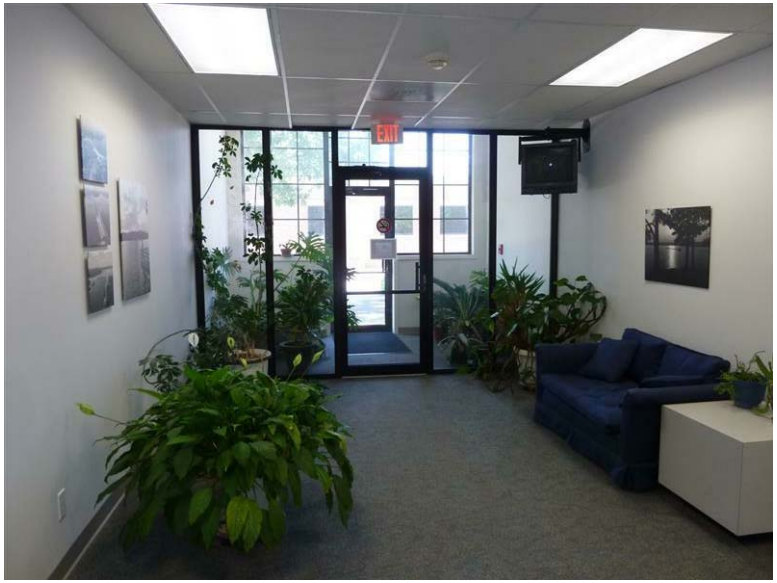
Building 25 – L / N Warehouse Z: There is evidence of water ponding by the HVAC units on the north wall.

Building 25 – L / N Warehouse Z: There is some localized masonry repair with incompatible brick.



Building 25 – L / N Warehouse Z: There is some localized masonry repair with incompatible brick.

Building 25 – L / N Warehouse Z: The east canopy needs painting.



Building 25 – L / N Warehouse Z: Interior view of the lobby

Building 25 – L / N Warehouse Z: Interior view of the hallway

Building 25 – L / N Warehouse Z: Interior view of the office space

Building 25 – L / N Warehouse Z: Horizontal cracking is visible in the gypsum wallboard at the west end of the south room.

Building 25 – L / N Warehouse Z: Interior view of the breakroom

Building 25 – L / N Warehouse Z: Evidence of water infiltration is visible on the acoustical ceiling tiles.

Structural Assessment – General Information

Building No.: 25 Project Operations Office Building	
Building Name:	Project Operations Office Building
Original Function:	Wash and Locker House 2
Subsequent Modification:	Roof appears to be reconstructed
General Building Structural Description:	One story building with exterior load bearing masonry walls. Original drawings indicate interior timber columns on concrete piers. The building has a completely finished interior and structural framing could not be observed. The original drawings also indicate a central clerestory monitor which does not exist.
General Building Structural Condition (2009):	Structural General Building Condition Code = 2 "Good". **(2013: Structural General Building Condition Code = 2 "Good".)**The building appears to be in generally good structural condition. Minor cracks in exterior masonry and in the foundation wall were observed. Minor surface deterioration of metal awnings was noted.
Summary of Observations Regarding Present General Building Structural Condition (2013):	**2009 observations still apply. Cracks in sheetrock have formed at the exterior walls on the North and South sides toward the West end of the building. These cracks appear to be directly across from one another with the cracking on the South side perpetuating to the ceiling.**
Summary of Recommended Structural Repairs (2009):	Minor defects at the exterior walls and awnings need to be repaired.
Additional Recommendations (2009):	Not applicable

Table 1: Structural Systems Assessment

Structural Component	Previous (2009) Condition Code	Present (2013) Condition Code	Comments
Lowest Level Floor System	2	2	
Exposed Foundations/Stem Walls	2	2	
Columns	2	2	
Exterior Walls	3	3	
Roof Framing and Subframing	2	2	
Roof Deck	2	2	
Awnings (Total Assembly)	3	3	

Condition Code Description
(1) Excellent - Visual observation indicates no remedial work required. (less than 10% repair)
(2) Good - Visual observation indicates minimal remedial work required. (less than 10% replacement and/or 25% repair)
(3) Fair - Visual observation indicates remedial work required. (up to 25% replacement and/or 50% repair)
(4) Deteriorated - Visual observation indicates significant remedial work required. (up to 50% replacement and/or 75% repair)
(5) Critical – Visual observation indicates extensive replacement and/or repair. (over 50% replacement and/or 75% repair)

Table 2: Itemized Structural Defects

Defect Item No.	Defect Description (2009)	2013 Assessment of 2009 Itemized Defects (plus description of new defects where noted)	Photo Log Reference Nos.	
			From 2009 Report	2013
1	Cracks in masonry at west wall	Change in condition was not observed	5,6	
2	Crack in foundation wall at southwest corner	Change in condition was not observed		
3 (new)	**N/A**	**New Defect: Crack in sheetrock at North and South interior walls toward West end of building**		**9,10**

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Photo Log:
2009 vs. 2013 Comparison

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PHOTOLOG: Building No. 25 Project Operations Office Building (2009 vs. 2013 Comparison)

2009 Photo #1: Exterior building East end

2013 Photo #1: Exterior building East end

2009 Photo #2: Exterior building South side

2013 Photo #2: Exterior building South side

PHOTOLOG: Building No. 25 Project Operations Office Building (2009 vs. 2013 Comparison)

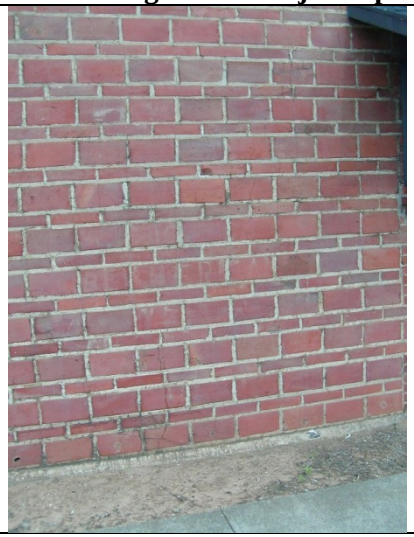
2009 Photo #3: Exterior building West end

2013 Photo #3: Exterior building West end

2009 Photo #4: Exterior building North side

2013 Photo #4: Exterior building North side

PHOTOLOG: Building No. 25 Project Operations Office Building (2009 vs. 2013 Comparison)

	No change observed
2009 Photo #5: Minor crack in masonry at West end	**2013 Photo #5:** No change observed.
	No change observed
2009 Photo #6: Minor crack in masonry at West end	**2013 Photo #6:** No change observed

PHOTOLOG: Building No. 25 Project Operations Office Building (2009 vs. 2013 Comparison)

2009 Photo #7: View of building roof membrane in fair condition

2013 Photo #7: No change observed

2009 Photo #8: View of deteriorated awning roof from above

2013 Photo #8: No change observed

Photo Log:
New Observations in 2013

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PHOTOLOG: Building No. 25 Project Operations Office Building (New Items Observed in 2013)

2013 Photo #9: Crack in interior sheetrock on South side.

2013 Photo #10: Crack in interior sheetrock on North side.

Condition Assessment, April 2009

Building Information | Overall Building Condition 3 | Overall Structural Condition 3

Building Name	35 - Chemical Plant Warehouse	
Period of Construction	1918	
National Register Eligibility	Contributing MSHD, NFDC Context	
Building Height	2 story	
Building Footprint	37,849 SF	
Historic Use | Current Use	Store House	Storage
Potential Use | Adaptability	LI, LO, RE, ST, WH	1

Character Defining Features

Exterior	Interior
Primary	**Primary**
Building Form: Rectangular Form with Low Pitched roof and Central Box Clerestory	Spatial Form: Central Box Clerestory Open to 2nd Floor
Building Walls: Hollow Clay Tile with Brick Quoins	**Secondary**
Building Walls: Exposed Steel Structure	Spatial Form: Open Floor Plan between Clerestory and Adjacent Space
Windows: Steel with operable hopper	Exposure of Steel Structure & Precast Concrete Tile Panels
Window Headers and Sills: Precast concrete, sills shaped	Exposure of Hollow Clay Tile with Brick Quoins
Doors: Rail and Stile, wood	Individual elevators serving sections of building.
Pedestrian Entry Door Canopies with Corbelled Brick Supports	Sliding Steel Industrial Doors
Steel and Precast Concrete Tile Panel Roof	Steel Storage Shelving / Bins
Canopies Extending Length of Building, 2 sides	
Loading Dock - Extending Length of Building, 1 side	

Resource Significance

The National Fertilizer Development Center (fomerly known as Nitrate Plant No. 2) has been recommended eligible to the National Register of Historic Places as a contributing resource in the Muscle Shoals Historic District. The property retains architectural integrity and is historically significant for its' role as a research facility during the World War I and World War II periods and thereafter. The period of significance dates between 1916 and 1970.

TVA Muscle Shoals Feasibility — Muscle Shoals, Alabama

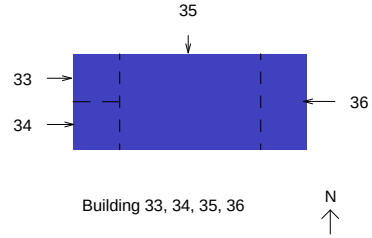
Lord, Aeck & Sargent Architecture — July 31, 2009

Cyclic Assessment, July 2013 - Buildings 33-36

Building Information | Overall Building Condition 3 | Overall Structural Condition 3

Building Name: 33-36 - Chemical Plant Warehouse

Current Use:
Building 33 - Office
Building 34 - Shop
Building 35 - Garage
Building 36 - Warehouse / Garage



General Comments:

Buildings 33, 34, 35 and 36 were constructed as a single building. In the previous condition assessment conducted for TVA, Buildings 33, 34, 35 and 36 were assessed as a single building and labeled Building 35. In the current assessment, the exterior of the buildings was assessed as a single building and the interior divisions of the building were assessed individually to relate as closely as possible to the TVA building numbers.

Some modifications have been made to the building since the previous assessment. Many of the interior spaces have been cleaned and painted. Although in some cases these modifications have improved the condition rating of a component or space, due to the cosmetic nature of this work, these improvements have not affected the overall building condition rating. Continued movement of the exterior corners has opened up previous attempts at crack repair. This condition has worsened since the previous assessment. Since the previous assessment most historic windows have been replaced with new units.

Additional Character Defining Features:

Elevators: Metal fire doors, Wood flooring, Exposed equipment

Condition Assessment, April 2009

Building Information

Building Name	35 - Chemical Plant Warehouse	
Period of Construction	1918	
National Register Eligibility	Contributing MSHD, NFDC Context	
Building Height	2 story	
Building Footprint	37,849 SF	
Historic Use | Current Use	Store House	Storage
Potential Use | Adaptability	LI, LO, RE, ST, WH	1

Exterior Materials and Conditions

Building Component	Building Material	Condition
Roofing | Decking	Gable; Deck:Concrete, panel; Firewalls: Brick	3
Exterior Envelope	Hollow Clay Tile; Brick quoins at openings/corners	3
Exterior Doors	Sliding: Wood; Overhead: Metal; Wood: Flush with lite; Stile and Rail: Wood; Doors: Wood	3
Windows	Steel, operable with hopper	3
Lintels	Concrete	2
Loading Dock	Concrete: full	4
Porch	Steel and Concrete Panel Roof: Over Loading Dock	2
Additions	N/A	





Comments

CMU infill at several dock openings on North facade
Loading Dock on North side of building has been removed
New metal overhead doors have been recently installed in several dock openings
West facade shows signs of cracking/bulging; tie plates installed in areas of end walls
Storm windows applied to exterior of original steel windows on West side of building

TVA Muscle Shoals Feasibility
Lord, Aeck & Sargent Architecture

Muscle Shoals, Alabama
July 31, 2009

Cyclic Assessment, July 2013 - Buildings 33-35

Exterior Materials and Conditions

Building Component	Building Material	Condition
Roofing / Decking	Low-slope gable; Deck: Concrete, panel; Firewalls: Brick	3
Exterior Envelope	Hollow clay tile; Brick quoins at openings/corners	3
Exterior Doors	Sliding: Wood stile and rail; Overhead: Metal; Swinging: Metal with glass lite	3
Windows	Aluminum replacement windows with snap in grids	**1**
Lintels **& Sills**	Concrete	2
Loading Dock	Concrete: full	4
Porch **(South Canopy)**	Steel and concrete panel roof: over loading dock	**4**
Porch (North Canopy)	**Steel and concrete panel roof**	**3**
Additions	N/A	






New Comments

Building 33, 34, 35, 36:

- Severe cracking at all four corners where east and west walls are rotating outward. Cracks commonly occur at juncture of brick quoins and hollow clay tile but also occur throughout tile
- Moisture-related staining on wall above north canopy roof; spalled masonry filled with patching materials; moisture staining on wall below canopy
- Tops of brick buttresses (walls between building segments) missing or failing - possible flashing issue at roof above
- Ceiling panels at north canopy (loading dock) badly deteriorated - rebar exposed
- Concrete at loading dock cracking; spalling or rebar exposed
- Overall some spalling and cracking of wall tile; superficial rust at exposed steel
- Most historic windows have recently been replaced with aluminum units
- Some localized deterioration at window sills

Condition Assessment, April 2009

Building Information

Building Name	35 - Chemical Plant Warehouse	
Period of Construction	1918	
National Register Eligibility	Contributing MSHD, NFDC Context	
Building Height	2 story	
Building Footprint	37,849 SF	
Historic Use | Current Use	Store House	Storage
Potential Use | Adaptability	LI, LO, RE, ST, WH	1

Interior Materials and Conditions

Building Component	Building Material	Condition
Corridors	N/A	
Primary Space	1st: Open	2
Secondary Space	1st: Office	2
Secondary Space	2nd: Storage	2
Secondary Space	N/A	
Flooring	Concrete, unfinished	2
Walls	Hollow Clay Tile and Brick	3
Ceiling	Exposed Beams: Steel; Concrete, panels	2

Comments

Office area off entry doors is wood framed with original bead board
Masonry elevator shaft centrally located
Original copper-wrapped interior sliding doors with pulley system; still operable
Interior of East wall shows severe cracking/bulging; ties in several areas of end walls.





TVA Muscle Shoals Feasibility — Muscle Shoals, Alabama
Lord, Aeck & Sargent Architecture — July 31, 2009

Cyclic Assessment, July 2013 - Building 33

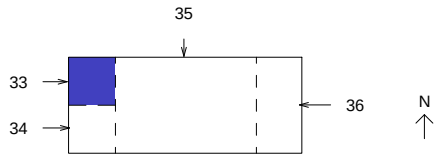
Interior Materials and Conditions

Building Component	Building Material	Condition
Corridors	N / A	
Primary Space	1st Floor: Office	2
Primary Space	2nd Floor: Open Warehouse	2
Secondary Space	N / A	
Secondary Space	N / A	
Flooring	1st Floor: VCT / Carpet; 2nd Floor: Concrete, unfinished	2
Walls	1st Floor: CMU, painted and exposed; Plywood paneling; 2nd Floor: Hollow clay tile and brick	3
Ceiling	1st Floor: ACT; 2nd Floor: Exposed beams: Steel; Concrete panels	2

New Comments

Building 33:

- First floor space divided into small office / conference spaces
- Second floor space extends across Building 33 and 34
- Severe cracking at masonry, especially at exterior corners on second floor
- Water staining and efflorescence at wall adjacent to space 35 on second floor







Condition Assessment, April 2009

Building Information

Building Name	35 - Chemical Plant Warehouse	
Period of Construction	1918	
National Register Eligibility	Contributing MSHD, NFDC Context	
Building Height	2 story	
Building Footprint	37,849 SF	
Historic Use | Current Use	Store House	Storage
Potential Use | Adaptability	LI, LO, RE, ST, WH	1

Interior Materials and Conditions

Building Component	Building Material	Condition
Corridors	N/A	
Primary Space	1st: Open	2
Secondary Space	1st: Office	2
Secondary Space	2nd: Storage	2
Secondary Space	N/A	
Flooring	Concrete, unfinished	2
Walls	Hollow Clay Tile and Brick	3
Ceiling	Exposed Beams: Steel; Concrete, panels	2

Comments

Office area off entry doors is wood framed with original bead board
Masonry elevator shaft centrally located
Original copper-wrapped interior sliding doors with pulley system; still operable
Interior of East wall shows severe cracking/bulging; ties in several areas of end walls.

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Lord, Aeck & Sargent Architecture — July 31, 2009

Cyclic Assessment, July 2013 - Building 34

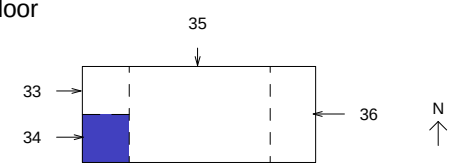
Interior Materials and Conditions

Building Component	Building Material	Condition
Corridors	N / A	
Primary Space	1st Floor: Open workshop	2
Secondary Space	1st Floor: Storage	2
Secondary Space	**Small mezzanine**	**2**
Primary Space	**2nd Floor: Open warehouse**	**2**
Flooring	1st Floor: VCT; 2nd Floor: Concrete, unfinished	2
Walls	1st Floor: Hollow clay tile and brick, painted; CMU, exposed and painted; Plywood; 2nd Floor: Hollow clay tile and brick	**3**
Ceiling	1st Floor: ACT, 2nd Floor: Exposed beams: Steel; Concrete panels	2

New Comments

Building 34:

- Second floor space extends across Building 33 and 34
- Severe cracking of masonry at exterior corners on second floor
- Water staining and efflorescence at wall adjacent to space 35 on second floor



Condition Assessment, April 2009

Building Information

Building Name	35 - Chemical Plant Warehouse	
Period of Construction	1918	
National Register Eligibility	Contributing MSHD, NFDC Context	
Building Height	2 story	
Building Footprint	37,849 SF	
Historic Use | Current Use	Store House	Storage
Potential Use | Adaptability	LI, LO, RE, ST, WH	1

Interior Materials and Conditions

Building Component	Building Material	Condition
Corridors	N/A	
Primary Space	1st: Open	2
Secondary Space	1st: Office	2
Secondary Space	2nd: Storage	2
Secondary Space	N/A	
Flooring	Concrete, unfinished	2
Walls	Hollow Clay Tile and Brick	3
Ceiling	Exposed Beams: Steel; Concrete, panels	2

Comments

Office area off entry doors is wood framed with original bead board
Masonry elevator shaft centrally located
Original copper-wrapped interior sliding doors with pulley system; still operable
Interior of East wall shows severe cracking/bulging; ties in several areas of end walls.

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Lord, Aeck & Sargent Architecture

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Cyclic Assessment, July 2013 - Building 35

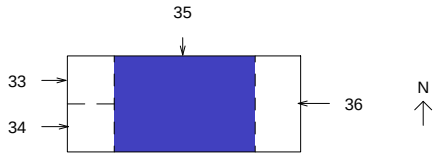
Interior Materials and Conditions

Building Component	Building Material	Condition
Corridors	N / A	
Primary Space	**1st Floor: Open warehouse / garage**	**1**
Primary Space	**1st Floor: Open warehouse**	**1**
Secondary Space	**1st Floor: Storage / Office**	**1**
Primary Space	2nd Floor: Open warehouse	2
Flooring	1st Floor: Concrete; unfinished, some painted; 2nd Floor: Concrete, unfinished	2
Walls	1st Floor: Hollow clay tile and brick, painted; CMU partitions; 2nd Floor: Hollow clay tile and brick, unpainted	3
Ceiling	1st Floor: Exposed beams: Steel; Concrete, panels; 2nd Floor: Exposed beams: Steel; Concrete, panels	2

New Comments

Building 35:

- First floor space has been cleaned and painted and is in use
- Some cracking of exterior walls noticeable beneath new paint
- Water staining and efflorescence on interior face of exterior walls; walls adjacent to other spaces and clerestory walls



Condition Assessment, April 2009

Building Information

Building Name	35 - Chemical Plant Warehouse	
Period of Construction	1918	
National Register Eligibility	Contributing MSHD, NFDC Context	
Building Height	2 story	
Building Footprint	37,849 SF	
Historic Use | Current Use	Store House	Storage
Potential Use | Adaptability	LI, LO, RE, ST, WH	1

Interior Materials and Conditions

Building Component	Building Material	Condition
Corridors	N/A	
Primary Space	1st: Open	2
Secondary Space	1st: Office	2
Secondary Space	2nd: Storage	2
Secondary Space	N/A	
Flooring	Concrete, unfinished	2
Walls	Hollow Clay Tile and Brick	3
Ceiling	Exposed Beams: Steel; Concrete, panels	2

Comments

Office area off entry doors is wood framed with original bead board
Masonry elevator shaft centrally located
Original copper-wrapped interior sliding doors with pulley system; still operable
Interior of East wall shows severe cracking/bulging; ties in several areas of end walls.

TVA Muscle Shoals Feasibility — Muscle Shoals, Alabama
Lord, Aeck & Sargent Architecture — July 31, 2009

Cyclic Assessment, July 2013 - Building 36

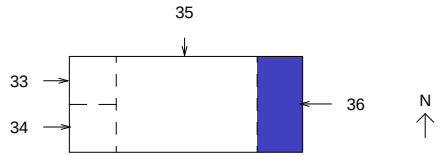
Interior Materials and Conditions

Building Component	Building Material	Condition
Corridors	N / A	
Primary Space	1st Floor: Open warehouse	**1**
Secondary Space	1st Floor: Office	2
Primary Space	2nd Floor: Open warehouse	2
Secondary Space	N / A	
Flooring	1st Floor: Concrete; unfinished; VCT; 2nd Floor: Concrete, unfinished	2
Walls	1st Floor: Hollow clay tile and brick, painted; plywood panels; 2nd Floor: Hollow clay tile and brick, painted	3
Ceiling	1st Floor: Exposed beams: Steel; Concrete, panels, painted; 2nd Floor: Exposed beams: Steel; Concrete, panels	2
Flooring		
Walls		
Ceiling		

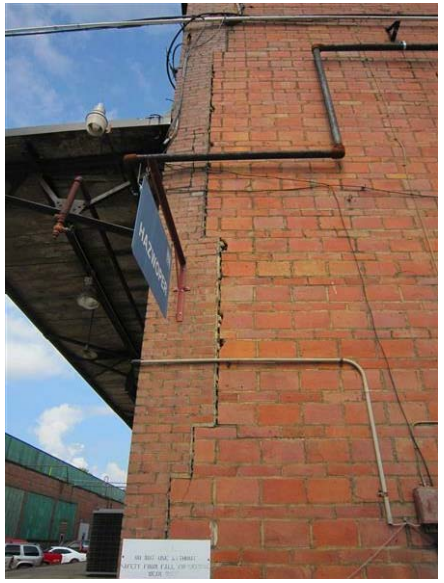
New Comments

Building 36:

- First and second floor spaces have been cleaned and painted
- Severe cracking of masonry at exterior corners and at mid-wall on south side of second floor
- Water staining at clerestory walls on second floor
- Minor water damage at ceiling panels on second floor

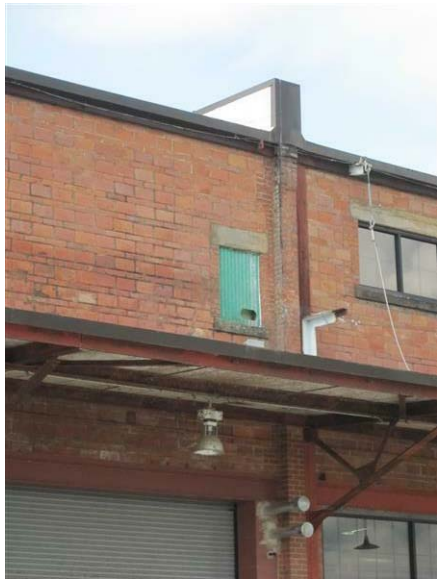


Building 33, 34, 35, 36 – Chemical Plant Warehouse: Overall view of the northeast corner of the building



Building 33, 34 ,35, 36 – Chemical Plant Warehouse: Severe cracking at the brick quoins at the corners of the building.

Building 33, 34, 35, 36 – Chemical Plant Warehouse: Most historic windows have recently been replaced with aluminum units



Building 33, 34, 35, 36 – Chemical Plant Warehouse: Tops of the brick buttresses are failing.

Building 33, 34, 35, 36 – Chemical Plant Warehouse: Concrete panels are spalling exposing the rebar at the north canopy.

Building 33, 34, 35, 36 – Chemical Plant Warehouse: Concrete at the loading dock is cracking.

Building 33 – Chemical Plant Warehouse - Shipping and Receiving Office: One of the historic steel windows remains in this office space, but the walls have been clad in paneling.

Building 33 – Chemical Plant Warehouse - Shipping and Receiving Office: The historic steel windows in this office have been replaced with aluminum windows.

Building 33 – Chemical Plant Warehouse - Shipping and Receiving Office: Some interior modifications have been made to the shipping and recieving space.

Building 33 – Chemical Plant Warehouse - Shipping and Receiving Office: Severe cracking is visble along exterior corners.

Building 33 – Chemical Plant Warehouse - Shipping and Receiving Office: The concrete columns are severely damadged.

Building 34 – Chemical Plant Warehouse - Instrumentation / Electric Shop: Overall view of the interior

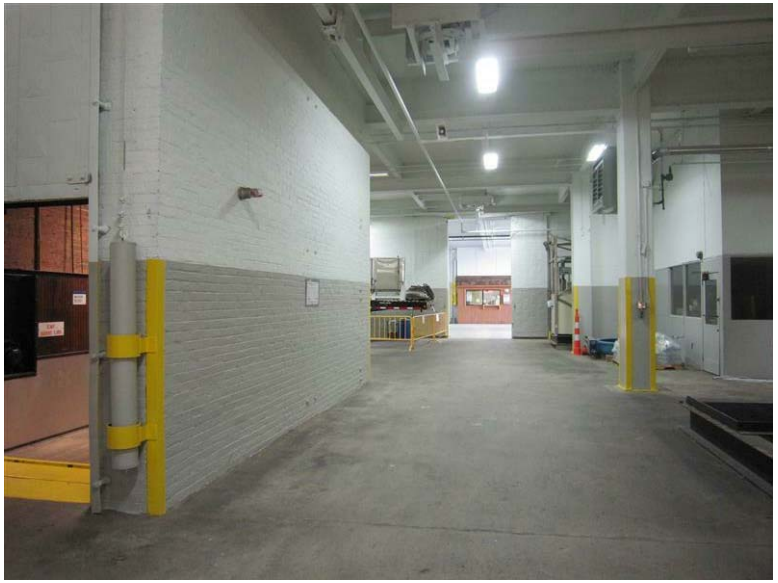
Building 34 – Chemical Plant Warehouse - Instrumentation / Electric Shop: An unfinished wood stud and plywood partition wall was built to enclose the space.

Building 34 – Chemical Plant Warehouse - Instrumentation / Electric Shop: A painted wood stud wall clad in vertical wood boards encloses this space.

Building 34 – Chemical Plant Warehouse - Instrumentation / Electric Shop: New aluminum windows were installed.

Building 34 – Chemical Plant Warehouse - Instrumentation / Electric Shop: The second floor space has a wood floor and partially sloped ceiling.

Building 34 – Chemical Plant Warehouse - Instrumentation / Electric Shop: Acoustical ceiling tiles have installed, lowering the ceiling height.



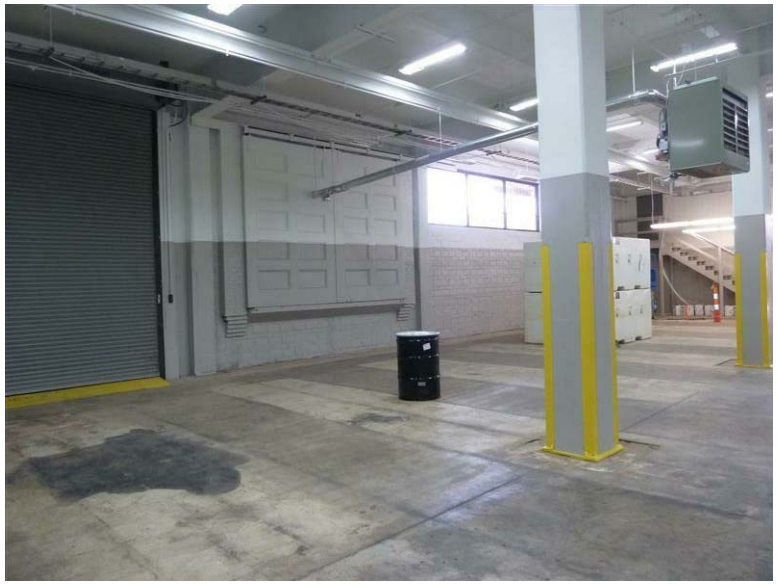
Building 35 – Chemical Plant Warehouse: Recent modifications have been made in this space.

Building 35 – Chemical Plant Warehouse: Although interior cosmetic improvements have been made, the hollow clay tiles remain cracked beneath the paint.

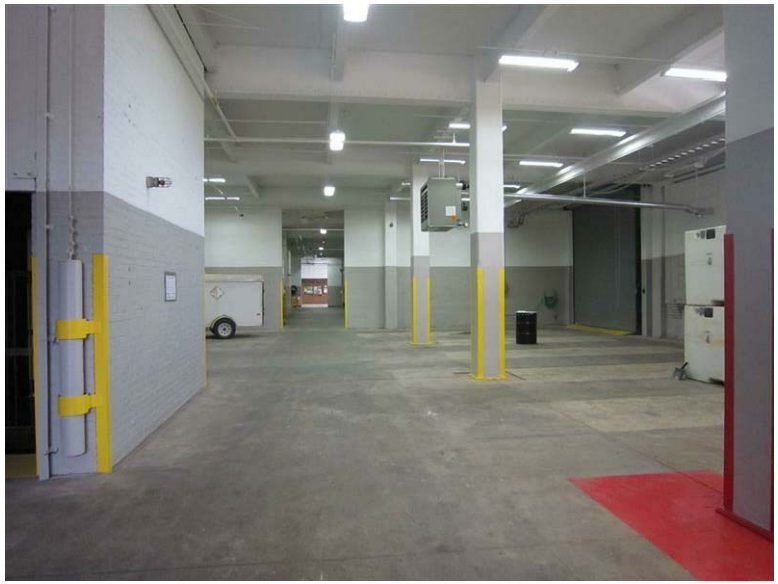
Building 35 – Chemical Plant Warehouse: Although some modifications have been made, portions of this space retain their historic materials.

Building 36 – Chemical Plant Warehouse: The historic sliding doors remain intact.

Building 35 – Chemical Plant Warehouse: Recent modifications have been made to this space.



Building 35 – Chemical Plant Warehouse: Recent modifications have been made to this space. A pipe penetrates the historic door.



Building 36 – Chemical Plant Warehouse - Projects Operations Storage Warehouse: Recent modifications have been made to this space.

Building 36 – Chemical Plant Warehouse - Projects Operations Storage Warehouse: Recent modifications have been made to this space.

Building 36 – Chemical Plant Warehouse - Projects Operations Storage Warehouse: Severe cracking is visible at the exterior corners of the building.

Building 36 – Chemical Plant Warehouse - Projects Operations Storage Warehouse: A large horizontal crack penetrates the hollow clay tile.

Building 36 – Chemical Plant Warehouse - Projects Operations Storage Warehouse: Severe cracking is separating the wall adjacent to this anchor.

Structural Assessment – General Information

Building No.: 33 Shipping and Receiving Office, 34 Instrumentation - Electric Shop, 35 Chemical Plant Warehouse & 36 Projects Operations Storage Warehouse	
Building Name:	(33) Shipping and Receiving Office (34) Instrumentation/Electric Shop (35) Chemical Plant Ware house (36) Projects Operations Storage Warehouse
Original Function:	Store House
Subsequent Modification:	Current Interior build-out lower level west side (identified as building)
General Building Structural Description:	In terms of structure, Buildings 33, 34, 35, and 36 are one 2-story steel frame building 4 bays wide and 15 bays long. Two interior load bearing masonry walls separate the building into 3 sections that are each 5 bays long. Each section has a centrally located clerestory monitor above a centrally located freight elevator. Original drawings show stairs at each end section. The west stair was apparently removed; presently only the east stair remains. **(2013: A fixed ladder has been installed at the West stair.)** The east and west end walls are load bearing masonry; the north and south walls are masonry infill panels with exposed steel framing. Original drawings indicate columns to be steel encased in concrete throughout the building interior. The second floor slab and concrete plank roof deck are supported on steel beams. The building has a canopy-covered loading dock that extends the full length of the south side. The dock is elevated above finish floor and is accessed by two concrete ramps inside the building. A canopy also extends the full length of the north side, where access is at grade. The exterior pavement on the north side has been recently demolished, and the interface of this area with the building appears to be in the process of reconstruction. **(2013: The exterior paving at the North East corner has been completed.)**
General Building Structural Condition (2009):	Structural General Building Condition Code = 3 “Fair. **(2013: Structural General Building Condition Code = 3 “Fair”.)**The first floor slab is in generally good condition, with some cracks that require repair. The second floor slab is in fair condition, with numerous cracks that require repair. The concrete plank roof deck at the main building is in fair condition, with some surface deterioration and numerous minor spalls that require repair. The building columns and the second floor beams are in generally good condition. The roof beams at the main building are mildly corroded. The load bearing masonry walls are in fair condition with vertical cracks at the exterior corners. The masonry infill panels have cracks and spalls that require repair. The steel framing at the north and south canopies is moderately corroded. The concrete roof planks at the north canopy are in generally fair condition with isolated areas of deterioration. The concrete roof planks at the south canopy are generally deteriorated and a significant portion is beyond repair. The south loading dock has numerous large cracks that require repair.

Summary of Observations Regarding Present General Building Structural Condition (2013):	**All 2009 recommendations still apply. Additional movement of the exterior walls were observed, particularly at the corners. We observed the addition of through bolts in isolated areas above the 2nd level slab on the north end of the building. Areas of Building 35 have been painted in the last 3 years. In the newly painted areas, it appears that the underside of the 2nd level slabs and areas around selected columns are showing signs of additional movement and cracking.**
Summary of Recommended Structural Repairs (2009):	Route and seal cracks in first and second floor slabs. Repair spalls in concrete roof planks at the main building and replace a small number of defective planks. Sandblast and paint steel roof beams. Seal cracks and repair spalls in exterior masonry walls. Sandblast and paint steel framing at north and south canopies. Repair and/or replace deteriorated concrete roof planks at north canopy. Replace roof deck at south canopy. Repair cracks in south loading dock.
Additional Recommendations (2009):	Not applicable

Table 1: Structural Systems Assessment

Structural Component	Previous (2009) Condition Code	Present (2013) Condition Code	Comments
Lowest Level Floor System	3	3	
Ramps, Stairs, and Landings (At or below first floor)	2	2	
Loading Docks (Walls, supports, and slabs)	4	**5**	**Continued deterioration of the system.**
Second Floor System (Deck and framing)	3	**4**	**Additional large cracks have formed at the second level.**
Columns	2	2	
Interior Load Bearing Walls	3	3	
Exterior Walls	3	**4**	**Despite the addition of through bolts at isolated locations, the East and West masonry walls have continued to shift. Daylight can be seen through cracks in the masonry that were in the 2009 report.**
Roof Framing and Subframing	3	3	
Roof Deck	3	3	
Monitor/Clerestory Structure (Framing, walls, and roof deck)	3	3	
Canopies (Framing and deck)	4	4	
Interior Stairs	2	2	

Condition Code Description
(1) Excellent - Visual observation indicates no remedial work required. (less than 10% repair)
(2) Good - Visual observation indicates minimal remedial work required. (less than 10% replacement and/or 25% repair)
(3) Fair - Visual observation indicates remedial work required. (up to 25% replacement and/or 50% repair)
(4) Deteriorated - Visual observation indicates significant remedial work required. (up to 50% replacement and/or 75% repair)
(5) Critical – Visual observation indicates extensive replacement and/or repair. (over 50% replacement and/or 75% repair)

Table 2: Itemized Structural Defects

Defect Item No.	Defect Description (2009)	2013 Assessment of 2009 Itemized Defects (plus description of new defects where noted)	Photo Log Reference Nos.	
			From 2009 Report	2013
1	Voids in interior wall east end of Bldg 36, Upper Level	Change in condition was not observed.		
2	Vertical cracks in interior wall at concrete column northeast corner of Bldg 36, Upper Level	Change in condition was not observed.		
3	Vertical crack in masonry interior wall on south side of Bldg 36, Upper Level	**This item appears to have continued to deteriorate. Daylight can be seen through this crack.**	35	**35**
4	Crack in concrete sill on south side of Bldg 36, Upper Level (misc.)	**This item was repaired, but cracking of repair is evident and daylight can be seen through wall.**	36	**36**
5	Vertical/diagonal crack in east wall of Bldg 36, Upper Level (misc.)	**This item appears to have continued to worsen. Additional movement evident.**	37	**37**
6	Voids in east wall (adjacent to 1) of Bldg 36, Upper Level (misc.)	Change in condition was not observed.		
7	Cracks in floor (+ !/8") of Bldg 36, Upper Level (misc.)	Change in condition was not observed.		
8	Cracks in floor (< 1/8") of Bldg 36, Upper Level (misc.)	Change in condition was not observed.		
9	More cracks in floor of Bldg 36, Upper Level (misc.)	**Additional large cracks have formed.**	31	**31**
10	Cracks in roof plank with rust below on Bldg 36, Upper Level (roof)	Change in condition was not observed.		
11	General condition roof diaphragm with minor spalls on Bldg 36, Upper Level (roof)	Change in condition was not observed.		
12	Misc. plank damage/mild to moderate corrosion on steel frame at interior wall (condition similar full length of wall) of Bldgs. 36 & 35 Upper Level (roof)	Change in condition was not observed.	40	
13	Spalls in planks below monitor walls (west side) of Bldg 36, Upper Level (roof)	Change in condition was not observed.		

Defect Item No.	Defect Description (2009)	2013 Assessment of 2009 Itemized Defects (plus description of new defects where noted)	Photo Log Reference Nos.	
			From 2009 Report	2013
14	Mild & moderate corrosion at steel frame, roof planks fair condition on Bldg 36, Upper Level (roof)	Change in condition was not observed.	46	
15	Interior walls,- outside and inside - good condition for age on Bldg 35, Upper Level (misc.)	Change in condition was not observed.		
16	Cracks in floor similar to Bldg 36 (somewhat better condition than Bldg. 36) in Bldg 35, Upper Level (misc)	Change in condition was not observed.		
17	Spalls in concrete roof planks at interior wall between Bldg 35 & Bldg 36	Change in condition was not observed.	42	
18	Spalls in concrete roof planks at pit wall between center & west Bldg 35 (close-up)	Change in condition was not observed.		
19	General deterioration of roof planks & beams at monitor on north side of Bldg 35, Upper Level (misc)	Change in condition was not observed.	41	**41**
20	Spalls in planks below monitor walls on west side of Bldg 35, Upper Level (misc)	Change in condition was not observed.	43	
21	Monitor roof - good condition for age on center portion of composite bldg.	Change in condition was not observed.	45	**45**
22	Cracks in north wall at infilled opening on west portion of composite bldg.	Change in condition was not observed.		
23	Vertical crack in wall adjacent to concrete column in northwest corner of west portion of composite bldg.	**There appears to have been additional movement. The exterior wall of the building is deflecting outward away from the superstructure.**	38	
24	Vertical spall in concrete column in southwest corner of Bldg. 35, Upper Level (misc)	**No repairs have been completed in this area. Additional damage due to wall movement may be evident.**		
25	Cracks in floor similar to center and east end in Bldg 35, Upper Level (misc)	Change in condition was not observed.		

Defect Item No.	Defect Description (2009)	2013 Assessment of 2009 Itemized Defects (plus description of new defects where noted)	Photo Log Reference Nos.	
			From 2009 Report	2013
26	Cracks in floor at column by elevator, worse than center and east end in Bldg 35, Upper Level (misc)	Change in condition was not observed.	32	
27	Close-up of each side of column (see plan) in Bldg 35, Upper Level (misc)	Change in condition was not observed.	33,34	
28	North stair at elevator on west end of Bldg 35, Upper Level (misc)	Change in condition was not observed.		
29	Typical spalling in roof planks above beam at interior wall of Bldg 35, Upper Level (misc) west end	Change in condition was not observed.		
30	General condition of roof planks north side of monitor of Bldg 35, Upper Level (misc) west end	Change in condition was not observed.		
31	Spalls in planks below monitor wall west side of Bldg 35, Upper Level (misc) west end	No change.		
32	Spalls in planks below monitor wall east side of Bldg 35, Upper Level (misc) west end	Change in condition was not observed.		
33	Monitor roof of Bldg 35, Upper Level (misc) west end	Change in condition was not observed.	47	
34	No Stair at west end of building	**A fixed ladder has been installed where the missing stair was located**.		
35	Ramps to south dock okay on lower level of Bldgs 33 – 36	Change in condition was not observed.		
36	Flaking paint on concrete soffit on lower level of Bldgs 33 – 36	Change in condition was not observed.		
37	Steel floor beams on 2nd floor slab general good condition for age on lower level of Bldgs 33 - 36	Change in condition was not observed.		
38	Voids in south wall - east end on lower level of Bldgs 33 - 36	Change in condition was not observed.	27	
39	General condition South wall, east end on lower level of Bldgs 33 - 36	Change in condition was not observed.	29	**29**

40	Crack in floor +/- 1/8" Door, east end on lower level of Bldgs 33 - 36	**Concrete has been refinished in this area.**	28	

Defect Item No.	Defect Description (2009)	2013 Assessment of 2009 Itemized Defects (plus description of new defects where noted)	Photo Log Reference Nos.	
			From 2009 Report	2013
41	General condition looking south, east end on lower level of Bldgs 33 - 36	Change in condition was not observed.	30	
42	Vertical crack at southeast corner & context of exterior walls	**No repairs have been completed in this area. Additional movement may have occurred.**	21,22	**22**
43	Wood awnings (2) - fair condition for age	Change in condition was not observed.		
44	Context photo northeast corner	Change in condition was not observed.	1	**1**
45	Wall above cantilevered canopy, north side - rusted steel columns. Stained clay masonry	Change in condition was not observed.	2,3	
46	North canopy steel mildly corroded/heavily stained. Concrete planks are in fair to poor condition	Change in condition was not observed.	4,5,7,8	**4**
47	Cracks in masonry north wall, east end	Change in condition was not observed.	6	
48 (new)	**N/A**	**New Defect: Cracks in masonry, tieback installed, movement in exterior finish observed**		**49, 50**

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Photo Log:
2009 vs. 2013 Comparison

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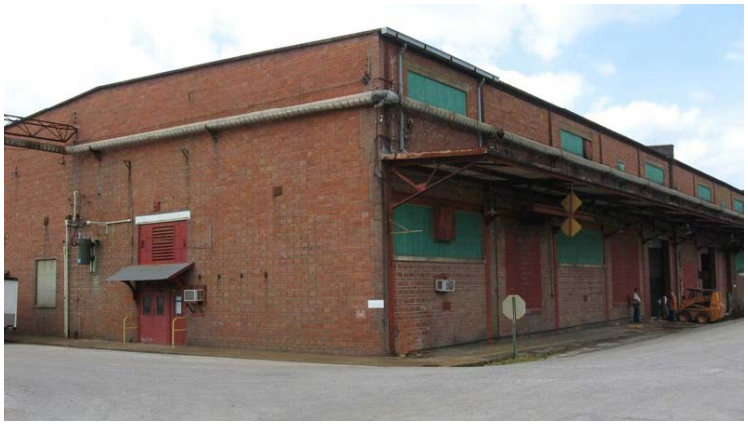
PHOTOLOG: Building No. 33, 34, 35, 36 Chemical Warehouse (2009 vs. 2013 Comparison)



2009 Photo #1: Exterior building looking at Northeast corner.

2013 Photo #1: Exterior building looking at Northeast corner.

2009 Photo #2: Exterior building looking at North side.

No change observed

2013 Photo #2: No change observed.

PHOTOLOG: Building No. 33, 34, 35, 36 Chemical Warehouse (2009 vs. 2013 Comparison)

2009 Photo #3: Exterior building looking at North side toward West end.

No change observed

2013 Photo #3: No change observed.

2009 Photo #4: Underside of North canopy.

2013 Photo #4: Underside of North canopy.

PHOTOLOG: Building No. 33, 34, 35, 36 Chemical Warehouse (2009 vs. 2013 Comparison)

2009 Photo #5: Deteriorated concrete roof planks at North canopy.

No change observed

2013 Photo #5: No change observed.

2009 Photo #6: Crack in exterior masonry below North canopy.

No change observed

2013 Photo #6: No change observed.

PHOTOLOG: Building No. 33, 34, 35, 36 Chemical Warehouse (2009 vs. 2013 Comparison)

2009 Photo #7: Deteriorated concrete roof planks at North canopy.

No change observed

2013 Photo #7: No change observed.

2009 Photo #8: Deteriorated concrete roof plants at North canopy.

No change observed

2013 Photo #8: No change observed.

PHOTOLOG: Building No. 33, 34, 35, 36 Chemical Warehouse (2009 vs. 2013 Comparison)

2009 Photo #9: Cracks in exterior masonry below North canopy.

No change observed

2013 Photo #9: No change observed.

2009 Photo #10: Voids and spalls in exterior masonry at North wall.

No change observed

2013 Photo #10: No change observed.

PHOTOLOG: Building No. 33, 34, 35, 36 Chemical Warehouse (2009 vs. 2013 Comparison)

2009 Photo #11: Exterior building looking at Northwest corner.

2013 Photo #11: Exterior building looking at Northwest corner.

2009 Photo #12: Exterior building looking at Southwest corner.

No change observed

2013 Photo #12: No change observed.

PHOTOLOG: Building No. 33, 34, 35, 36 Chemical Warehouse (2009 vs. 2013 Comparison)

2009 Photo #13: Exterior building looking at Southwest corner.

No change observed

2013 Photo #13: No changed observed.

2009 Photo #14: Cracks in exterior masonry on South side Southwest corner.

No change observed

2013 Photo #14: No change observed.

PHOTOLOG: Building No. 33, 34, 35, 36 Chemical Warehouse (2009 vs. 2013 Comparison)

2009 Photo #15: Deteriorated concrete roof planks at West end of South canopy.

No change observed

2013 Photo #15: No change observed.

2009 Photo #16: Ruined concrete roof planks at South canopy.

No change observed

2013 Photo #16: No change observed.

PHOTOLOG: Building No. 33, 34, 35, 36 Chemical Warehouse (2009 vs. 2013 Comparison)

2009 Photo #17: Deteriorated concrete roof planks at South canopy.

No change observed

2013 Photo #17: No change observed.

2009 Photo #18: Crack in exterior masonry below South canopy.

No change observed

2013 Photo #18: No change observed.

PHOTOLOG: Building No. 33, 34, 35, 36 Chemical Warehouse (2009 vs. 2013 Comparison)

2009 Photo #19: Ruined concrete roof planks at South canopy.

No change observed

2013 Photo #19: No change observed.

2009 Photo #20: Deteriorated and ruined concrete roof planks at South canopy.

No change observed

2013 Photo #20: No change observed.

PHOTOLOG: Building No. 33, 34, 35, 36 Chemical Warehouse (2009 vs. 2013 Comparison)

2009 Photo #21: Exterior building looking at Southeast corner.

No change observed

2013 Photo #21: No change observed.

2009 Photo #22: Vertical crack in masonry on East side of Southeast corner.

2013 Photo #22: Vertical crack in masonry on East side of Southeast corner. Additional movement observed.

PHOTOLOG: Building No. 33, 34, 35, 36 Chemical Warehouse (2009 vs. 2013 Comparison)

2009 Photo #23: Deteriorated concrete steps and support at East and South loading dock.

2013 Photo #23: Deteriorated concrete steps and support at East and South loading dock. Elevated slab deterioration evident.

2009 Photo #24: Deteriorated concrete steps and support at West and South loading dock.

No change observed

2013 Photo #24: No change observed.

PHOTOLOG: Building No. 33, 34, 35, 36 Chemical Warehouse (2009 vs. 2013 Comparison)

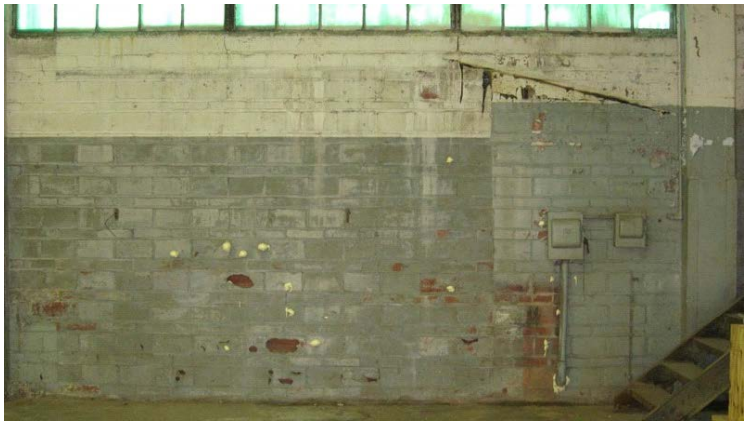
2009 Photo #25: Cracks in South loading deck slab.

2013 Photo #25: Cracks in South loading deck slab. Different location than 2009 photo.

2009 Photo #26: Crack in South loading dock slab.

2013 Photo #26: Crack in South loading dock slab. Different location than 2009 photo.

PHOTOLOG: Building No. 33, 34, 35, 36 Chemical Warehouse (2009 vs. 2013 Comparison)



2009 Photo #27: Spalls and voids in interior masonry wall on North side.

No change observed

2013 Photo #27: No change observed.

2009 Photo #28: Crack in floor in Northwest area of first level.

No change observed

2013 Photo #28: No change observed.

PHOTOLOG: Building No. 33, 34, 35, 36 Chemical Warehouse (2009 vs. 2013 Comparison)

2009 Photo #29: Interior view of central building at first level.

2013 Photo #29: Interior view of refinished central building at first level looking South. Different photo than 2009 photo.

2009 Photo #30: Interior building at first level looking North.

No change observed

2013 Photo #30: No change observed.

PHOTOLOG: Building No. 33, 34, 35, 36 Chemical Warehouse (2009 vs. 2013 Comparison)

2009 Photo #31: Cracks in East area of second floor slab.

2013 Photo #31: Cracks in second floor slab at Northeast corner of East elevator. Different location than 2009 photo.

2009 Photo #32: Cracks in West area of second floor slab.

No change observed

2013 Photo #32: No change observed.

PHOTOLOG: Building No. 33, 34, 35, 36 Chemical Warehouse (2009 vs. 2013 Comparison)

2009 Photo #33: Cracks in West area of second floor slab.

2013 Photo #33: No change observed.

2009 Photo #34: Cracks in West area of second floor slab.

2013 Photo #34: No change observed.

PHOTOLOG: Building No. 33, 34, 35, 36 Chemical Warehouse (2009 vs. 2013 Comparison)

2009 Photo #35: Interior crack in South masonry wall near East end.

2013 Photo #35: Interior crack in South masonry wall near East end. Daylight seen through crack due to continued settlement.

2009 Photo #36: Interior crack/void at window sill on South side near East end.

2013 Photo #36: Interior crack/void at window sill on South side near East end has been infilled with grout.

PHOTOLOG: Building No. 33, 34, 35, 36 Chemical Warehouse (2009 vs. 2013 Comparison)

2009 Photo #37: Interior crack in East wall.

2013 Photo #37: Interior crack in East wall. Crack continues to perpetuate since 2009.

2009 Photo #38: Interior crack/void at column and wall at Northwest corner.

No change observed

2013 Photo #38: No change observed.

PHOTOLOG: Building No. 33, 34, 35, 36 Chemical Warehouse (2009 vs. 2013 Comparison)

2009 Photo #39: Spalls and surface deterioration at concrete roof planks at interior wall.

No change observed

2013 Photo #39: No change observed.

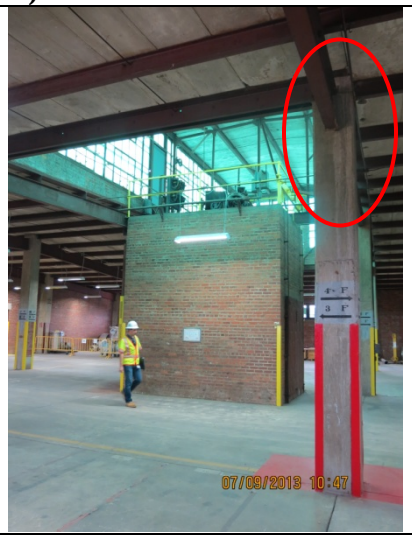
2009 Photo #40: Spalls at concrete roof planks adjacent to clerestory monitor.

No change observed

2013 Photo #40: No change observed.

PHOTOLOG: Building No. 33, 34, 35, 36 Chemical Warehouse (2009 vs. 2013 Comparison)

2009 Photo #41: Water intrusion damage at concrete roof planks, steel beams, and concrete column.



2013 Photo #41: Water intrusion damage at concrete column. Different location than 2009 photo.

2009 Photo #42: Spalls and surface deterioration at concrete roof planks at interior wall.

No change observed

2013 Photo #42: No change observed.

PHOTOLOG: Building No. 33, 34, 35, 36 Chemical Warehouse (2009 vs. 2013 Comparison)

2009 Photo #43: Spalls and surface deterioration at concrete roof planks at interior walls.

No change observed

2013 Photo #43: No change observed.

2009 Photo #44: Deteriorated concrete roof plank at interior wall.

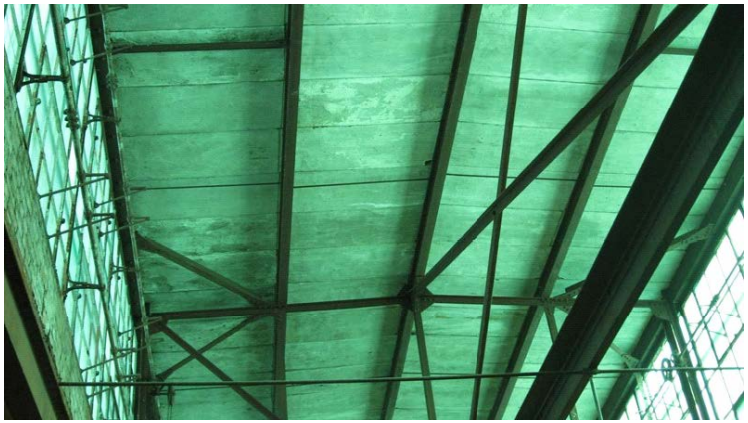
No change observed

2013 Photo #44: No change observed.

PHOTOLOG: Building No. 33, 34, 35, 36 Chemical Warehouse (2009 vs. 2013 Comparison)

2009 Photo #45: Concrete roof planks at clerestory monitor.

2013 Photo #45: Concrete roof planks at clerestory monitor. Different location than 2009 photo.



2009 Photo #46: Concrete roof planks with surface deterioration at clerestory monitor.

No change observed

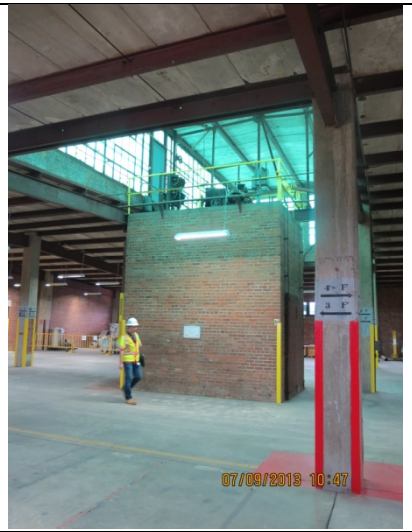
2013 Photo #46: No change observed.

PHOTOLOG: Building No. 33, 34, 35, 36 Chemical Warehouse (2009 vs. 2013 Comparison)

2009 Photo #47: Concrete roof planks with surface deterioration at clerestory monitor.

2013 Photo #47: No change observed.

2009 Photo #48: Interior freight elevator at second floor – West end.



2013 Photo #48: Interior freight elevator at second floor – West end. Opposite side of 2009 photo.

Photo Log:
New Observations in 2013

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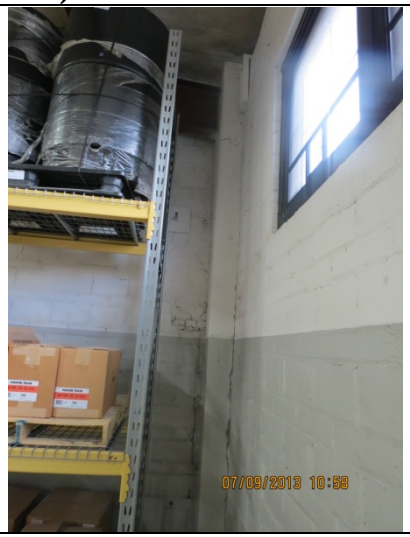
PHOTOLOG: Building No. 33, 34, 35, 36 Chemical Warehouse (New Items Observed in 2013)

2013 Photo #49: Northeast corner column, Severe cracking of brick finishes observed. Post installed tie back installed.



2013 Photo #50: Southeast corner column. Severe cracking of brick observed. Post installed tie back installed.

Condition Assessment, April 2009

Building Information | Overall Building Condition 4 | Overall Structural Condition 3

Building Name	37-Machine Shop	
Period of Construction	1918	
National Register Eligibility	Contributing MSHD, NFDC Context	
Building Height	1-1/2 story	
Building Footprint	42,554 SF	
Historic Use | Current Use	Machine Shop	Shop
Potential Use | Adaptability	LI, LO, RE, ST, WH	2

Character Defining Features

Exterior	Interior
Primary Building Form: Rectangular massing with low slope roofs and dual clerestory Building Walls: Hollow Clay Tile with Brick Quoins Windows: Steel with operable hopper Window Headers and Sills: Precast concrete, sills shaped Secondary Doors: Custom Wood Doors with Strap Hardware	**Primary** Spatial Form: Open Central Clerestory, 2 story open **Secondary** Spatial Form: Open Floor Plan between Clerestory and Adjacent Space Exposure of Steel Structure Exposure of Hollow Clay Tile with Brick Quoins Sliding Steel Fire Doors

Resource Significance

The National Fertilizer Development Center (fomerly known as Nitrate Plant No. 2) has been recommended eligible to the National Register of Historic Places as a contributing resource in the Muscle Shoals Historic District. The property retains architectural integrity and is historically significant for its' role as a research facility during the World War I and World War II periods and thereafter. The period of significance dates between 1916 and 1970.

TVA Muscle Shoals Feasibility — Muscle Shoals, Alabama

Lord, Aeck & Sargent Architecture — July 31, 2009

Cyclic Assessment, July 2013

Building Information | Overall Building Condition 4 | Overall Structural Condition 3

Building Name: 37 - Machine Shop

Current Use: Shop

Building 37 , 38 N

General Comments:

Buildings 37 and 38 were constructed as a single building. In the previous assessment for TVA, Buildings 37 and 38 were assessed as a single building and labeled as Building 37. In the current assessment, the exterior of these buildings was assessed as a single building and the interior divisions of the building were assessed individually to relate as closely as possible to the TVA building numbers.

Some modifications have been made to the building since the previous assessment. Portions of the interior have been cleaned and painted. Due to the cosmetic nature of this work, these improvements have not affected the condition rating assigned to the affected building components.

Continued cracking of the exterior wall and deterioration of the concrete roof panels have negatively affected the condition rating of these components, however this change was not sufficient to affect the overall building condition rating. Since the previous assessment, most historic exterior doors and canopies have been replaced with new units.

Condition Assessment, April 2009

Building Information

Building Name	37-Machine Shop	
Period of Construction	1918	
National Register Eligibility	Contributing MSHD, NFDC Context	
Building Height	1-1/2 story	
Building Footprint	42,554 SF	
Historic Use | Current Use	Machine Shop	Shop
Potential Use | Adaptability	LI, LO, RE, ST, WH	2

Exterior Materials and Conditions

Building Component	Building Material	Condition
Roofing | Decking	Gable; Shed; Deck: Concrete, panels; Clerestory	2
Exterior Envelope	Hollow Clay Tile; Brick quoins at openings/corners	4
Exterior Doors	Entry: Wood, cast straps; Overhead: Metal	2
Windows	Steel, hopper	3
Lintels	Concrete	4
Loading Dock	N/A	
Porch	N/A	
Additions	N/A	

Comments

Significant cracking in masonry at West facade
Several original openings infilled with hollow clay tile and CMU
Erosion of hollow clay tile in areas on East facade
Significant cracking and exposed rebar at concrete sills
Wood doors on East facade have old cast straps, but don't appear to be original to building
New metal overhead doors on East facade at Gas/Diesel Repair Shop

TVA Muscle Shoals Feasibility — Muscle Shoals, Alabama

Lord, Aeck & Sargent Architecture — July 31, 2009

Cyclic Assessment, July 2013

Exterior Materials and Conditions

Building Component	Building Material	Condition
Roofing / Decking	Low-slope dual gable with clerestories; Deck: Concrete, panels	**3**
Exterior Envelope	Hollow clay tile; Brick quoins at openings / corners,	4
Exterior Doors	Overhead: Metal; Metal flush with glass lite	2
Windows	Steel, hopper	3
Lintels **& Sills**	Concrete / steel	4
Loading Dock	N / A	
Porch	N / A	
Additions	N / A	

New Comments

Building 37, 38:

- Severe vertical cracking at corners, lower walls and clerestories - often occurs between brick quoins and hollow clay tile. Displacement at some locations. Cracks have been filled, but have re-opened, indicating continued movement.
- Severe horizontal cracking above windows on north and south walls - often occurs at juncture of brick and tile. Displacement at some locations. Cracks have been filled but have re-opened, indicating continued movement. Also, moderate cracking around, other openings and at other locations along walls.
- Small holes and spalling tile prevalent
- Gutters and fascia deteriorated; plant growth
- Staining from moisture and mold growth at building base
- Some spalling of window sills
- Historic doors and canopies have been removed and replaced with new units
- Rusting door frames and wall vents
- New metal door opening has been added to east facade

Condition Assessment, April 2009

Building Information

Building Name	37-Machine Shop	
Period of Construction	1918	
National Register Eligibility	Contributing MSHD, NFDC Context	
Building Height	1-1/2 story	
Building Footprint	42,554 SF	
Historic Use | Current Use	Machine Shop	Shop
Potential Use | Adaptability	LI, LO, RE, ST, WH	2

Interior Materials and Conditions

Building Component	Building Material	Condition
Corridors	N/A	
Primary Space	Open: Shop equipment	2
Secondary Space	Gas/Diesel Repair Shop	3
Secondary Space	N/A	
Secondary Space	N/A	
Flooring	Concrete	2
Walls	Hollow Clay Tile, painted	2
Ceiling	Exposed Beams: Steel; Concrete, panels	2

Comments

Interior wall between Machine Shop and Gas/Diesel Rpair Shop: Clay Tile with original copper-clad sliding door and pulley system
Areas of walls and floors in Gas/Diesel Repair Shop covered in soot

TVA Muscle Shoals Feasibility — Muscle Shoals, Alabama
Lord, Aeck & Sargent Architecture — July 31, 2009

Cyclic Assessment, July 2013 - Building 37

Interior Materials and Conditions

Building Component	Building Material	Condition
Corridors	N / A	
Primary Space	Open:Shop equipment	**3**
Secondary Space	**Offices**	**1**
Secondary Space	**Toilets**	**1**
Secondary Space	N / A	
Flooring	Concrete	2
Walls	Hollow clay tile, painted	**4**
Ceiling	Exposed beams: Steel; Concrete, panels, painted	**3**

New Comments

Building 37:

- At west end, space has been cleaned and painted, but deterioration and rust have not been addressed
- Severe cracking at exterior walls
- Ceiling panels exhibit peeling paint, probable moisture deterioration beneath

TVA Muscle Shoals, Alabama

Condition Assessment, April 2009

Building Information

Building Name	37-Machine Shop	
Period of Construction	1918	
National Register Eligibility	Contributing MSHD, NFDC Context	
Building Height	1-1/2 story	
Building Footprint	42,554 SF	
Historic Use | Current Use	Machine Shop	Shop
Potential Use | Adaptability	LI, LO, RE, ST, WH	2

Interior Materials and Conditions

Building Component	Building Material	Condition
Corridors	N/A	
Primary Space	Open: Shop equipment	2
Secondary Space	Gas/Diesel Repair Shop	3
Secondary Space	N/A	
Secondary Space	N/A	
Flooring	Concrete	2
Walls	Hollow Clay Tile, painted	2
Ceiling	Exposed Beams: Steel; Concrete, panels	2

Comments

Interior wall between Machine Shop and Gas/Diesel Rpair Shop: Clay Tile with original copper-clad sliding door and pulley system
Areas of walls and floors in Gas/Diesel Repair Shop covered in soot

TVA Muscle Shoals Feasibility — Muscle Shoals, Alabama
Lord, Aeck & Sargent Architecture — July 31, 2009

Cyclic Assessment, July 2013 - Building 38

Interior Materials and Conditions

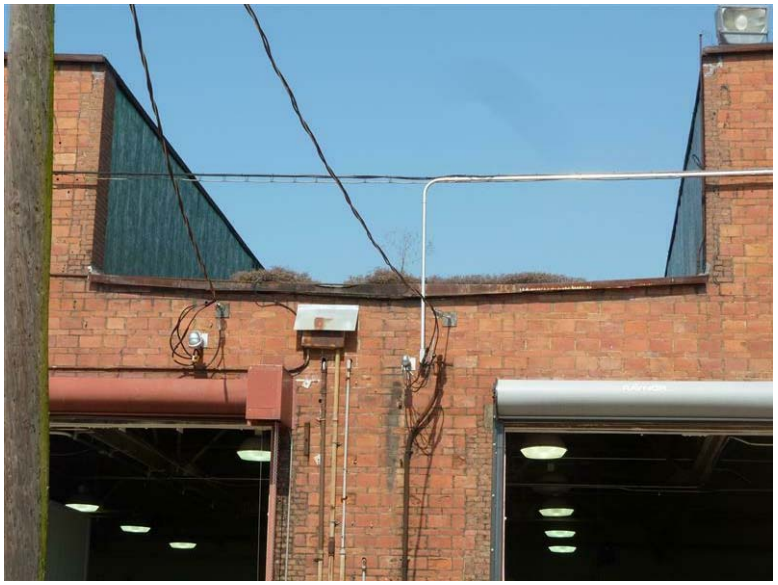
Building Component	Building Material	Condition
Corridors	N / A	
Primary Space	Open: Shop equipment	**3**
Secondary Space	**Partitioned Offices**	**1**
Secondary Space	N / A	
Secondary Space	N / A	
Flooring	Concrete	2
Walls	Hollow clay tile, painted; CMU partition	**4**
Ceiling	Exposed beams: Steel; Concrete, panels, painted	**3**

New Comments

Building 38:

- Space has been cleaned and painted, but deterioration and rust have not been addressed
- Staining from moisture at clerestory walls
- Ceiling panels deteriorated and rebar exposed

Building 37, 38 – Machine Shop: Overall view of the east facade



Building 37, 38 – Machine Shop: Plant growth is visible on the roof.

Building 37, 38 – Machine Shop: Cracking in the brick quoins the corners of the building.

Building 37, 38 – Machine Shop: Although this crack was patched previously, it has continued to separate.

Building 37, 38 – Machine Shop: Several cracks occur in the brick surround, which has begun to shift above the window.

Building 37, 38 – Machine Shop: The concrete sill is deteriorating from water damage. Efflorescence and mold growth has collected on and beneath the window sill.

Building 37 – Machine Shop: Interior view of the building

Building 37 – Machine Shop: Secondary office spaces have been built within the primary space.

Building 37 – Machine Shop: Diagonal cracking along the upper portion of the wall above the window.

Building 37 – Machine Shop: Severe cracking between the door and window openings.

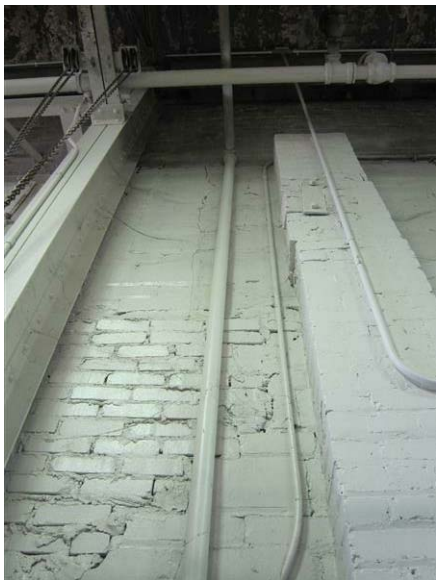
Building 37 – Machine Shop: The glass pane is broken on the wood door leading to the office space.

Building 37 – Machine Shop: A secondary office space has been built within the primary space.

Building 38 – Machine Shop - Gas and Diesel Repair Shop: A metal swinging door provides access between the two building spaces.

Building 38 – Machine Shop - Gas and Diesel Repair Shop: Although the glazing is painted, many of the steel windows remain intact.

Building 38 – Machine Shop - Gas and Diesel Repair Shop: A secondary office space has been built within the primary space.



Building 38 – Machine Shop - Gas and Diesel Repair Shop: Although covered with paint, cracking is visible along the hollow clay tile wall.

Building 38 – Machine Shop - Gas and Diesel Repair Shop: The hollow clay tile walls leading to the clerestory are stained.

Building 38 – Machine Shop - Gas and Diesel Repair Shop: Several concrete ceiling panels are stained by moisture, which has damaged the concrete, exposing the rebar.

Building 38 – Machine Shop - Gas and Diesel Repair Shop: A majority of the concrete ceiling panels are damaged.

Structural Assessment – General Information

Building No.: 37 Machine Shop & 38 Gas and Diesel Repair Shop	
Building Name:	Machine Shop & Gas and Diesel Repair Shop
Original Function:	Machine Shop
Subsequent Modification:	N/A
General Building Structural Description:	One story steel frame building with perimeter steel columns inside self- supporting exterior masonry walls. The building is divided into two interior spaces, with the west space designated as Building No. 37 and the east space designated as Building No. 38. The building has two structural bays with central clerestory monitors that extend the full length of the building. The main roof and monitors are supported by steel trusses that span approximately 50 ft. in the north-south direction. The roof deck is concrete planks supported on steel beams.
General Building Structural Condition (2009):	Structural General Building Condition Code = 3 "Fair" **(2013: Structural General Building Condition Code = 3 "Fair".)**The overall building is in generally fair condition, with the exception of extensive cracking in the exterior masonry walls. The steel framing is mildly to moderately corroded, and surface deterioration of the concrete plank roof deck can be observed throughout the building. Structurally defective roof planks were noted in some locations.
Summary of Observations Regarding Present General Building Structural Condition (2013):	**2009 observations still apply. Some of the previous cracks have been in-filled with red grout. At two locations, cross-bracing has been noted as being removed or damaged to a point of failure. The west end of the building has undergone a renovation. All entrances have been replaced with overhead roll-up doors. The overall condition of the building is in generally fair condition.**
Summary of Recommended Structural Repairs (2009):	See additional recommendations below regarding the repair of cracks in the exterior masonry walls. The interior steel framing, which has been painted, should be sand-blasted and repainted. Structurally deficient concrete roof planks must be replaced.
Additional Recommendations (2009):	Previous repairs of cracks in the exterior masonry walls have deteriorated to some extent. A detailed evaluation of the entire masonry envelope will be required to determine the extent of repair and remediation that will be required. A detailed evaluation of the concrete plank roof deck will be required to verify the amount of structurally deficient roof planks that must be replaced, as well as the extent of remediation required for the surface deterioration of the roof deck.

Table 1: Structural Systems Assessment

Structural Component	Previous (2009) Condition Code	Present (2013) Condition Code	Comments
Lowest Level Floor System	2	2	
Columns	3	3	
Exterior Walls	4	4	
Roof Framing and Subframing	3	3	**Cross-bracing has been damaged to the point of failure at one location and one set of cross-bracing has been removed completely.**
Roof Deck	3	3	
Monitor/Clerestory Structure (Framing, walls, and roof deck)	3	3	

Condition Code Description
(1) Excellent - Visual observation indicates no remedial work required. (less than 10% repair)
(2) Good - Visual observation indicates minimal remedial work required. (less than 10% replacement and/or 25% repair)
(3) Fair - Visual observation indicates remedial work required. (up to 25% replacement and/or 50% repair)
(4) Deteriorated - Visual observation indicates significant remedial work required. (up to 50% replacement and/or 75% repair)
(5) Critical – Visual observation indicates extensive replacement and/or repair. (over 50% replacement and/or 75% repair)

Table 2: Itemized Structural Defects

Defect Item No.	Defect Description (2009)	2013 Assessment of 2009 Itemized Defects (plus description of new defects where noted)	Photo Log Reference Nos.	
			From 2009 Report	2013
1	Crack northeast corner in interior of Bldg. 38	Change in condition was not observed.		
2	Deterioration in High Bay southeast corner ceiling panel in interior of Bldg. 38	Change in condition was not observed.	19	
3	Crack southeast corner in interior of Bldg. 38	Change in condition was not observed.		
4	Corrosion south corner in interior of Bldg. 38	Change in condition was not observed.		
5	Truss corrosion in interior of Bldg. 38	Change in condition was not observed.	20	
6	Cracking south wall in interior of Bldg. 38	Change in condition was not observed.	23	
7	Ceiling panel deterioration in interior of Bldg. 38	Change in condition was not observed.		
8	Partition between Bldg 37/38 crack	Change in condition was not observed.		
9	Cracking on northeast corner of partition stucco in interior of Bldg.37	Change in condition was not observed.		
10	Cracking on center of partition stucco in interior of Bldg. 37	Change in condition was not observed.		
11	Cracking in masonry south wall in interior of Bldg. 37	Change in condition was not observed.	24	
12	Cracking in masonry south wall in interior of Bldg. 37	Change in condition was not observed.	25	
13	Roof panel deterioration in interior of Bldg. 37	Change in condition was not observed.	17	
14	Cracking south wall in interior of Bldg. 37	Change in condition was not observed.		
15	Interior cracking southwest corner of Bldg. 37	Change in condition was not observed.		
16	Masonry cracking southwest corner of Bldg. 37	Change in condition was not observed.		
17	Corrosion of column southwest of Bldg. 37	Change in condition was not observed.		

Defect Item No.	Defect Description (2009)	2013 Assessment of 2009 Itemized Defects (plus description of new defects where noted)	Photo Log Reference Nos.	
			From 2009 Report	2013
18	Cracking southwest corner of Bldg. 37	Change in condition was not observed.	22	
19	Cracking south side of north high bay, west end of Bldg. 37	Change in condition was not observed.		
20	Cracking in northwest corner in interior of Bldg. 37	Change in condition was not observed.		
21	Masonry crack north wall of Bldg. 37	Change in condition was not observed.		
22	Cracking in north wall of Bldg. 37	Change in condition was not observed.	21	**21**
23	Corrosion north wall of Bldg. 37	Change in condition was not observed.		
24	Cracking northwest corner	Change in condition was not observed.		
25	Cracking southwest corner	**Cracking has been in-filled with grout.**	4	**4**
26	Cracking north high bay, west end	Change in condition was not observed.		
27	Cracking south high bay, west end	Change in condition was not observed.		
28	Cracking southwest corner	Change in condition was not observed.		
29	Cracking southwest corner	**Cracking has been in-filled with grout**	6	**6**
30	Cracking south side	Change in condition was not observed.		
31	Cracking south side	Change in condition was not observed.	9	
32	Cracking south side	Change in condition was not observed.		
33	Cracking southeast corner	Change in condition was not observed.	7,8	
34	Cracking southeast corner	Change in condition was not observed.		
35	Cracking east end	Change in condition was not observed.	5	

Defect Item No.	Defect Description (2009)	2013 Assessment of 2009 Itemized Defects (plus description of new defects where noted)	Photo Log Reference Nos.	
			From 2009 Report	2013
36	Cracking south high bay east end	Change in condition was not observed.		
37	Cracking northeast corner	Change in condition was not observed.	10	
38	Cracking north wall	Change in condition was not observed.	11	
39	Cracking north wall	Change in condition was not observed.	12	
40	Cracking north wall	**Gap across gap has increased.**	13	**13**
41	Cracking northwest corner	**Crack has been patched, but large displacement is visible.**	14	**14**
42 (new)	**N/A**	**New Defect: Failed cross-bracing at interior of Southeast corner**		**27**
43 (new)	**N/A**	**New Defect: Cut steel framing**		**28**
44 (new)	**N/A**	**New Defect: Removed cross-bracing at interior of Southwest corner**		**29**

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Photo Log:
2009 vs. 2013 Comparison

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PHOTOLOG: Building No. 37 Machine Shop & 38 Gas and Diesel Repair Shop (2009 vs. 2013 Comparison)

2009 Photo #1: Exterior building East end

2013 Photo #1: Exterior building East end

2009 Photo #2: Exterior building South side

2013 Photo #2: Exterior building South side

PHOTOLOG: Building No. 37 Machine Shop & 38 Gas and Diesel Repair Shop (2009 vs. 2013 Comparison)

2009 Photo #3: Exterior building West end

2013 Photo #3: Exterior building West end

2009 Photo #4: Cracks in masonry South end of West wall

2013 Photo #4: Repairs to cracks in masonry South end of West wall observed.

PHOTOLOG: Building No. 37 Machine Shop & 38 Gas and Diesel Repair Shop (2009 vs. 2013 Comparison)

2009 Photo #5: Cracks in masonry at Southeast corner

No change observed

2013 Photo #5: No change observed.

2009 Photo #6: Cracks in masonry at Southwest corner

2013 Photo #6: Repaired cracks in masonry at Southwest corner

PHOTOLOG: Building No. 37 Machine Shop & 38 Gas and Diesel Repair Shop (2009 vs. 2013 Comparison)

2009 Photo #7: Cracks in masonry in South wall

2013 Photo #7: No change observed.

2009 Photo #8: Cracks in masonry (Same locations as Photo No. 7)

2013 Photo #8: No change observed.

PHOTOLOG: Building No. 37 Machine Shop & 38 Gas and Diesel Repair Shop (2009 vs. 2013 Comparison)

2009 Photo #9: Cracks in masonry lintels at South wall

No change observed

2013 Photo #9: No change observed.

2009 Photo #10: Cracks in masonry North end of East wall

No change observed

2013 Photo #10: No change observed.

PHOTOLOG: Building No. 37 Machine Shop & 38 Gas and Diesel Repair Shop (2009 vs. 2013 Comparison)

2009 Photo #11: Cracks in masonry at North wall

2013 Photo #11: No change observed.

No change observed

2009 Photo #12: Cracks in masonry at North wall

2013 Photo #12: No change observed.

No change observed

PHOTOLOG: Building No. 37 Machine Shop & 38 Gas and Diesel Repair Shop (2009 vs. 2013 Comparison)

2009 Photo #13: Cracks in masonry at North wall

2013 Photo #13: Cracks in masonry at North wall. Additional movement observed.

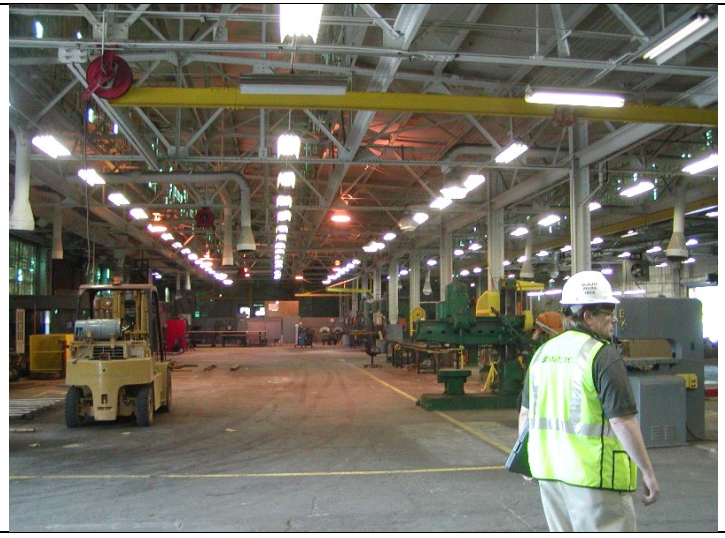
2009 Photo #14: Cracks in masonry at Northwest corner

2013 Photo #14: Repaired cracks in masonry at Northwest corner.

PHOTOLOG: Building No. 37 Machine Shop & 38 Gas and Diesel Repair Shop (2009 vs. 2013 Comparison)

2009 Photo #15: Interior building

2013 Photo #15: Interior building at the West end has been refinished.



2009 Photo #16: Interior building

No change observed

2013 Photo #16: No change observed.

PHOTOLOG: Building No. 37 Machine Shop & 38 Gas and Diesel Repair Shop (2009 vs. 2013 Comparison)

2009 Photo #17: Surface deterioration at concrete plank deck

No change observed

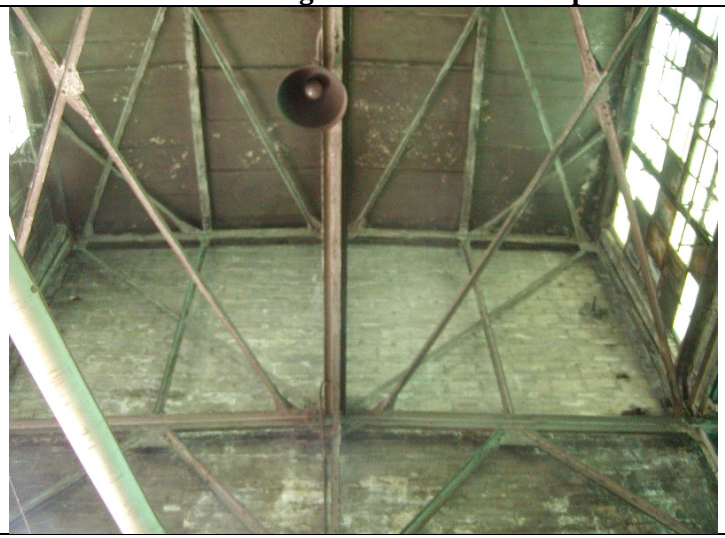
2013 Photo #17: No change observed.

2009 Photo #18: Crack and spall in concrete plank roof deck

No change observed

2013 Photo #18: No change observed.

PHOTOLOG: Building No. 37 Machine Shop & 38 Gas and Diesel Repair Shop (2009 vs. 2013 Comparison)



2009 Photo #19: General moderate deterioration of monitor framing, wall, and roof deck

2013 Photo #19: No change observed.

2009 Photo #20: Deteriorated concrete plank roof deck at monitor

2013 Photo #20: No change observed.

PHOTOLOG: Building No. 37 Machine Shop & 38 Gas and Diesel Repair Shop (2009 vs. 2013 Comparison)

2009 Photo #21: Diagonal crack in masonry at North wall

2013 Photo #21: Diagonal crack in masonry at North wall

2009 Photo #22: Diagonal crack in masonry at West wall

No change observed

2013 Photo #22: No change observed

PHOTOLOG: Building No. 37 Machine Shop & 38 Gas and Diesel Repair Shop (2009 vs. 2013 Comparison)

2009 Photo #23: Vertical crack in masonry at South wall

2013 Photo #23: No change observed

2009 Photo #24: Diagonal crack in masonry at South wall

2013 Photo #24: No change observed

PHOTOLOG: Building No. 37 Machine Shop & 38 Gas and Diesel Repair Shop (2009 vs. 2013 Comparison)

2009 Photo #25: Horizontal crack in masonry at South wall

2013 Photo #25: No change observed.

2009 Photo #26: Cracked and partially dislodged masonry at Northeast corner

2013 Photo #26: No change observed.

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Photo Log:
New Observations in 2013

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PHOTOLOG: Building No. 37 Machine Shop & 38 Gas and Diesel Repair Shop (New Items Observed in 2013)

2013 Photo #27: Failed cross-bracing at the South face at the East end of the building.

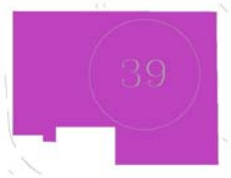
2009 Photo #29: Cross-bracing removed at Southwest corner.

2013 Photo #28: Brace cut to facilitate installation of roll-up door.

Condition Assessment, April 2009

Building Information | Overall Building Condition 4 | Overall Structural Condition 3

Building Name	39 - Engineering Lab	
Period of Construction	1918	
National Register Eligibility	Contributing MSHD, NFDC Context	
Building Height	1 story	
Building Footprint	18,007 SF	
Historic Use | Current Use	Iron and Brass Foundry	Vacant
Potential Use | Adaptability	LI, LO, RE, ST, WH	2



Character Defining Features

Exterior	Interior
Primary Building Form: Rectangular Form with Low Slope Roofs and Clerestory Building Walls: Hollow Clay Tile with Brick Quoins Windows: Steel with operable hopper Window Headers and Sills: Precast concrete, sills shaped **Secondary** Building Form: Additions	**Primary** Spatial Form: Open Central Clerestory, 2 story open **Secondary** Spatial Form: Open Floor Plan between Clerestory and Adjacent Space Exposure of Steel Structure Exposure of Hollow Clay Tile with Brick Quoins

Resource Significance

The National Fertilizer Development Center (fomerly known as Nitrate Plant No. 2) has been recommended eligible to the National Register of Historic Places as a contributing resource in the Muscle Shoals Historic District. The property retains architectural integrity and is historically significant for its' role as a research facility during the World War I and World War II periods and thereafter. The period of significance dates between 1916 and 1970.

TVA Muscle Shoals Feasibility — Muscle Shoals, Alabama

Lord, Aeck & Sargent Architecture — July 31, 2009

Cyclic Assessment, July 2013

Building Information | Overall Building Condition **3** | Overall Structural Condition 3

Building Name: 39 - Engineering Lab

Current Use: Vacant

Building 39 N

General Comments:

The previous condition assessment resulted in an Overall Building Condition rating and ratings of some components that were too severe when compared to similar buildings. The current assessment has addressed this discrepancy.

Ongoing moisture infiltration through deteriorated roof panels and uncovered window openings threatens the building if not corrected.

Condition Assessment, April 2009

Building Information

Building Name	39 - Engineering Lab	
Period of Construction	1918	
National Register Eligibility	Contributing MSHD, NFDC Context	
Building Height	1 story	
Building Footprint	18,007 SF	
Historic Use | Current Use	Iron and Brass Foundry	Vacant
Potential Use | Adaptability	LI, LO, RE, ST, WH	2

Exterior Materials and Conditions

Building Component	Building Material	Condition
Roofing | Decking	Shed Roof to Gable Clerestory; Deck: Concrete, panels	4
Exterior Envelope	Hollow Clay Tile, painted; Brick quoins at openings/corners;	3
Exterior Doors	Metal or Wood, Flush; Overhead: Metal	3
Windows	All sashes removed	5
Lintels	Concrete, painted	2
Loading Dock	N/A	
Porch	N/A	
Additions	North: Shed, hollow clay tile; South:Shed, hollow clay tile, Metal Siding	4

Comments

One addition on North side constructed of hollow clay tile and glass block
Three additions on South side constructed of metal siding/framing
All windows removed from original building, now covered with transulcent panels
Entire exterior painted, including hollow clay tile/brick, lintels, and sills
Large portion of additions on South side in disrepair, both framing and skin
Substation located on South side of building

TVA Muscle Shoals Feasibility — Muscle Shoals, Alabama
Lord, Aeck & Sargent Architecture — July 31, 2009

Cyclic Assessment, July 2013

Exterior Materials and Conditions

Building Component	Building Material	Condition
Roofing / Decking	Low-slope gable with clerestory; Deck: Concrete	4
Exterior Envelope	Hollow clay tile, painted; Brick quoins at openings/corners	3
Exterior Doors	Metal or wood, Flush and wood stile and rail with glass lites; Overhead, Metal	**4**
Windows	All sashes removed; glass block infill at single story of north facade	5
Lintels **& Sills**	Concrete, painted	2
Loading Dock	N / A	
Porch	N / A	
Additions	South: Shed, hollow clay tile, Metal siding	4

New Comments

- Gutters and fascia are severely deteriorated; plant growth in several locations; gutters full of debris
- Wider cracking at quoins / exterior corners of building and clerestory. Cracks commonly occur at juncture of brick and hollow clay tile
- Localized spalling of hollow clay tile
- Localized cracks at window sills
- Rusting of exposed exterior steel
- Exterior stair is rusted and in critical condition
- Many windows are not secure; interior finishes are exposed to the elements
- Deteriorated wood at door frames
- Foundation plants close to north wall will hold moisture against building

Condition Assessment, April 2009

Building Information

Building Name	39 - Engineering Lab	
Period of Construction	1918	
National Register Eligibility	Contributing MSHD, NFDC Context	
Building Height	1 story	
Building Footprint	18,007 SF	
Historic Use | Current Use	Iron and Brass Foundry	Vacant
Potential Use | Adaptability	LI, LO, RE, ST, WH	2

Interior Materials and Conditions

Building Component	Building Material	Condition
Corridors	N/A	
Primary Space	Open	4
Secondary Space	Open: Trailer storage	4
Secondary Space	N/A	3
Secondary Space	N/A	
Flooring	Concrete, unfinished	3
Walls	Hollow Clay Tile, painted	3
Ceiling	Exposed Beams: Steel; Concrete, panels	4





Comments

Severe water damage to majority of concrete ceiling panels; metal deck used for repair in areas
Interior wall of hollow clay tile dividing building into two areas
Entire interior painted, including steel strucutre, concrete ceiling panels, and hollow clay tile
Concrete floor has trench drains in several areas
Steel showing signs of rust from extensive water intrusion
Large wood doors and original steel windows in hollow clay tile wall between spaces intact

TVA Muscle Shoals Feasibility — Muscle Shoals, Alabama
Lord, Aeck & Sargent Architecture — July 31, 2009

Cyclic Assessment, July 2013

Interior Materials and Conditions

Building Component	Building Material	Condition
Corridors	N / A	
Primary Space	Open	**3**
Primary Space	Open: Storage	**3**
Secondary Space	**Laboratories / Office**	**3**
Secondary Space	**South Shed**	**4**
Flooring	**Concrete: unfinished ; VCT, carpet at north wing**	3
Walls	**Hollow Clay Tile: painted; Plaster at north wing**	3
Ceiling	**Exposed beams: Steel; Concrete, panels; Exposed painted concrete, ACT at north wing**	**3**
Additions		

New Comments

- Overall condition of primary and secondary spaces was too severe in the previous assessment and has been revised in this assessment
- Staining from water near steel columns in primary space
- Standing water at north wing. Mold growth is prevalent. Severe water damage at plaster wall below north windows
- Ceiling panels deteriorated - several missing areas have been patched






Building 39 – Engineering Lab: Overall view of the west facade of the building

Building 39 – Engineering Lab: Rusted metal outside shed addition.

Building 39 – Engineering Lab: Many of the windows are missing or covered and the doors are in poor condition.

Building 39 – Engineering Lab: This exterior metal stair is severely rusted.

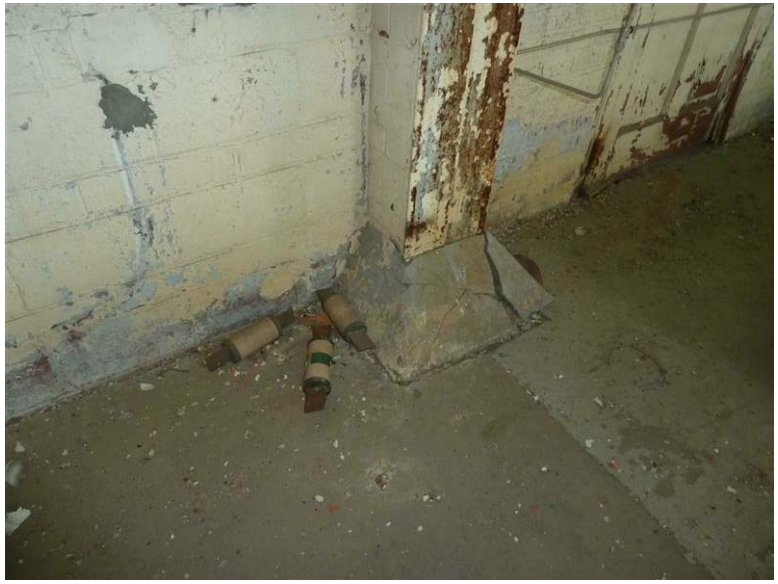
Building 39 – Engineering Lab: Cracking is visible at the hollow clay tile and brick quoins on the upper wall.

Building 39 – Engineering Lab: The fiberglass panels covering the windows are torn and missing in some areas, exposing the interior to moisture.

Building 39 – Engineering Lab: This portion of the building is a double height space. Several concrete ceiling panels have been replaced with metal panels.

Building 39 – Engineering Lab: The lintel is missing where an opening was made in the hollow clay tile wall adjacent to the south addition.

Building 39 – Engineering Lab: Severe water damage has rusted the steel column and stained the wall.



Building 39 – Engineering Lab: The concrete footing at this column is cracked.

Building 39 – Engineering Lab: Water infiltration has severely damaged this plaster wall on the north facade.

Building 39 – Engineering Lab: Portions of the wood decking have been replaced with plywood.

Structural Assessment – General Information

Building No.: 39 Engineering Lab	
Building Name:	Engineering Lab
Original Function:	Iron and Brass Foundry
Subsequent Modification:	Extension on north side
General Building Structural Description:	Structural General Building Condition Code = 3 "Fair". **(2013: Structural General Building Condition Code = 3 "Fair".)**One story steel frame building approximately 35 ft. tall with a central 10 ft. high clerestory monitor above the main roof. The main roof and monitor are supported by steel trusses on perimeter steel columns inside self-supporting exterior masonry walls. The roof deck is concrete planks supported by steel beams. The building has a partial second floor on the south side and a low one-story office addition on the north side. A steel frame building with shed roofs (Building 40) has been constructed on the south side of Building 39.**(2013: The steel frame extension to the south was mistakenly labeled as building 40 and is, instead, a part of building 39; which is now part of the 2013 evaluation.)** **(2013: The extension is a one story building, approximately 20 ft tall, with a three story pop-up, approximately 35ft tall. The main roof is supported by wood purlins, steel beams, and perimeter steel columns. The exterior walls are a mix of masonry infill and fiberglass siding.)**
General Building Structural Condition (2009):	The building roof deck and exterior masonry walls are in generally fair condition. The steel framing, which was painted, is moderately corroded with heavy corrosion in some locations. Numerous minor cracks were noted in the exterior masonry walls. The steel framing and metal deck at the partial second floor are moderately to heavily corroded.
Summary of Observations Regarding Present General Building Structural Condition (2013):	**All observations from 2009 still apply.** **The roof of the extension of Building 39 is in generally fair condition. The steel framing is moderately to severely corroded; Several members had been removed to facilitate removal of storage devices inside of the main structure. Impact damage was noted at some locations throughout the structure. A crack in the slab on grade appeared to have recently perpetuated. The upper levels of the structure were not accessed due to safety concerns. The fiberglass siding has been removed at many locations. The masonry infill is generally in fair condition, some shifted blocks were noted in areas where fiberglass siding was being supported.**
Summary of Recommended Structural Repairs (2009):	The steel framing must be sandblasted and painted. Cracks on the masonry walls must be repaired. The second floor structure must be repaired.
Additional Recommendations (2009):	A detailed evaluation of the second floor deck will be required to determine the extent of repairs and/or replacement required.

Table 1: Structural Systems Assessment
(Previously reported)

Structural Component	Previous (2009) Condition Code	Present (2013) Condition Code	Comments
Lowest Level Floor System	3	3	
Pits and Trenches	4	4	
Second Floor System (Deck and framing)	4	4	
Columns	3	3	
Exterior Walls	3	3	
Roof Framing and Subframing	3	3	
Roof Deck	3	3	
Monitor/Clerestory Structure (Framing, walls, and roof deck)	3	3	
Exterior Stairs	3	3	

Condition Code Description
(1) Excellent - Visual observation indicates no remedial work required. (less than 10% repair)
(2) Good - Visual observation indicates minimal remedial work required. (less than 10% replacement and/or 25% repair)
(3) Fair - Visual observation indicates remedial work required. (up to 25% replacement and/or 50% repair)
(4) Deteriorated - Visual observation indicates significant remedial work required. (up to 50% replacement and/or 75% repair)
(5) Critical – Visual observation indicates extensive replacement and/or repair. (over 50% replacement and/or 75% repair)

Table 1: Structural Systems Assessment
(Steel Framed Extension – New Report)

Structural Component	Previous (2009) Condition Code	Present (2013) Condition Code	Comments
Lowest Level Floor System	-	**3**	**The concrete slab on grade is in generally good condition with some cracking noticed.**
Second Floor System (Deck and framing)	-	**5**	**Due to safety concerns these areas were not accessed. The steel in these areas are severely corroded.**
Columns	-	**3**	**Moderate to severe corrosion of steel noted throughout.**
Exterior Walls	-	**4**	**Fiberglass siding has been removed at several locations. Masonry infill movement noted at some locations.**
Roof Framing and Subframing	-	**2**	
Roof Deck	-	**2**	

Condition Code Description
(1) Excellent - Visual observation indicates no remedial work required. (less than 10% repair)
(2) Good - Visual observation indicates minimal remedial work required. (less than 10% replacement and/or 25% repair)
(3) Fair - Visual observation indicates remedial work required. (up to 25% replacement and/or 50% repair)
(4) Deteriorated - Visual observation indicates significant remedial work required. (up to 50% replacement and/or 75% repair)
(5) Critical – Visual observation indicates extensive replacement and/or repair. (over 50% replacement and/or 75% repair)

Table 2: Itemized Structural Defects

Defect Item No.	Defect Description (2009)	2013 Assessment of 2009 Itemized Defects (plus description of new defects where noted)	Photo Log Reference Nos.	
			From 2009 Report	2013
1	Thermal cracks in slab-on-grade	No change observed.		
2	Severe corrosion in steel columns on north wall	No change observed.	13	
3	Moderate corrosion to steel framing in southwest corner	No change observed.		
4	Moderate corrosion to painted steel roof throughout the entire building, steel paint is peeling off	No change observed.	15,16,17,18, 19,20	
5	Cracks in exterior masonry wall at the southwest corner high bay on both sides	No change observed.		
6	Cracks in masonry wall at southeast corner	No change observed.		
7	Cracks in exterior masonry wall at the east elevation	No change observed.		
8	Cracking in masonry wall at southwest corner	No change observed.		
9	Foundation settlement and localized distortion of steel column at base at southwest corner	No change observed.		
10	Crack in clay tile wall at the annex on south side	No change observed.		
11	Exterior steel staircase on south side is significantly corroded	No change observed.		
12	**N/A**	**Crack in slab on grade at east end of extension new cracking observed.**		**21**
13	**N/A**	**Damaged steel members due to impact or other unintended uses of members.**		**22**
14	**N/A**	**Severely corroded steel members.**		**22, 23, 25, 26**
15	**N/A**	**Hole in masonry wall**		**24**
16	**N/A**	**Cut and removed steel members.**		**25**

Photo Log:
2009 vs. 2013 Comparison

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PHOTOLOG: Building No. 39 Engineering Lab (2009 vs. 2013 Comparison)

2009 Photo #1: Exterior building East elevation

2013 Photo #1: Exterior building East elevation.

2009 Photo #2: Exterior building looking at Northeast corner

No change observed

2013 Photo #2: No change observed.

PHOTOLOG: Building No. 39 Engineering Lab (2009 vs. 2013 Comparison)

2009 Photo #3: Exterior building South side – Building No. 40 (N.I.C.) is in foreground

2013 Photo #3: Exterior building South side

2009 Photo #4: View of roof on South side – Building 40 (N.I.C.) is on right hand side of photograph

No change observed

2013 Photo #4: No change observed.

PHOTOLOG: Building No. 39 Engineering Lab (2009 vs. 2013 Comparison)

2009 Photo #5: Crack in masonry at end wall East side

2013 Photo #5: Crack in masonry at end wall West side. Movement of exterior wall observed.

2009 Photo #6: Crack in wall by door opening West end

No change observed

2013 Photo #6: No change observed.

PHOTOLOG: Building No. 39 Engineering Lab (2009 vs. 2013 Comparison)

2009 Photo #7: Deteriorated exterior steel stair

No change observed

2013 Photo #7: No change observed.

2009 Photo #8: Interior building looking East

2013 Photo #8: Interior building looking West. Other side of doorway in 2009 photo.

PHOTOLOG: Building No. 39 Engineering Lab (2009 vs. 2013 Comparison)

2009 Photo #9: Interior building looking East at monitor roof

2013 Photo #9: No change observed.

2009 Photo #10: Interior building looking at main roof North side

2013 Photo #10: No change observed.

PHOTOLOG: Building No. 39 Engineering Lab (2009 vs. 2013 Comparison)

2009 Photo #11: Deteriorated wall construction North side of main building

2013 Photo #11: No change observed.

2009 Photo #12: Corroded steel below second floor at Southwest corner

2013 Photo #12: No change observed.

PHOTOLOG: Building No. 39 Engineering Lab (2009 vs. 2013 Comparison)

2009 Photo #13: Corroded steel column North side of main building

2013 Photo #13: No change observed.

No change observed

2009 Photo #14: Corroded steel column and deteriorated steel trench grates at South side of main building

2013 Photo #14: No change observed.

No change observed

PHOTOLOG: Building No. 39 Engineering Lab (2009 vs. 2013 Comparison)

2009 Photo #15: View of monitor framing and roof deck

2013 Photo #15: No change observed.

2009 Photo #16: View of steel roof trusses

2013 Photo #16: No change observed.

PHOTOLOG: Building No. 39 Engineering Lab (2009 vs. 2013 Comparison)

2009 Photo #17: View of main roof framing and roof deck

No change observed

2013 Photo #17: No change observed.

2009 Photo #18: Wood frame interior wall at second floor

No change observed

2013 Photo #18: No change observed.

PHOTOLOG: Building No. 39 Engineering Lab (2009 vs. 2013 Comparison)

2009 Photo #19: Flaking paint at corroded steel roof framing

2013 Photo #19: No change observed.

No change observed

2009 Photo #20: Flaking pain at corroded steel roof framing

2013 Photo #20: No change observed.

No change observed

Photo Log:
New Observations in 2013

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PHOTOLOG: Building No. 39 Engineering Lab (New Items Observed in 2013)

2013 Photo #21: East end of extension, crack in slab on grade perpetuates across entire width of structure.

2013 Photo #22: Damaged steel beam due to impact or other unforeseen use of member.

2013 Photo #23: Severely corroded steel framing at west end of structure.

2013 Photo #24: Hole in masonry wall of main section of Building 39. Steel framing has been cut as well.

PHOTOLOG: Building No. 39 Engineering Lab (New Items Observed in 2013)

2013 Photo #25: Same location as Photo #24, steel framing and grating cut and removed.

2013 Photo #26: Severely corroded steel column. Pedestal damaged due to impact damage.

Condition Assessment, April 2009

Building Information | Overall Building Condition 2 | Overall Structural Condition 3

Building Name	41 - Sheet Metal Shop	
Period of Construction	1918	
National Register Eligibility	Contributing MSHD, NFDC Context	
Building Height	1 story	
Building Footprint	6,622 SF	
Historic Use | Current Use	Wood Working Shop	Shop
Potential Use | Adaptability	CR, LI, LO, RE, ST, WH	2

Character Defining Features

Exterior	Interior
Primary Building Form: Rectangular Form with Low Slope Roofs and Clerestory Building Walls: Hollow Clay Tile with Brick Quoins Windows: Steel with operable hopper Window Headers and Sills: Precast concrete, sills shaped	**Primary** Spatial Form: Open Central Clerestory, 2 story open **Secondary** Spatial Form: Open Floor Plan between Clerestory and Adjacent Space Exposure of Steel Structure Exposure of Hollow Clay Tile with Brick Quoins

Resource Significance

The National Fertilizer Development Center (fomerly known as Nitrate Plant No. 2) has been recommended eligible to the National Register of Historic Places as a contributing resource in the Muscle Shoals Historic District. The property retains architectural integrity and is historically significant for its' role as a research facility during the World War I and World War II periods and thereafter. The period of significance dates between 1916 and 1970.

TVA Muscle Shoals Feasibility — Muscle Shoals, Alabama

Lord, Aeck & Sargent Architecture — July 31, 2009

Cyclic Assessment, July 2013

Building Information | Overall Building Condition 2 | Overall Structural Condition 3

Building Name: 41 - Sheet Metal Shop

Current Use: Shop

Building 41

N

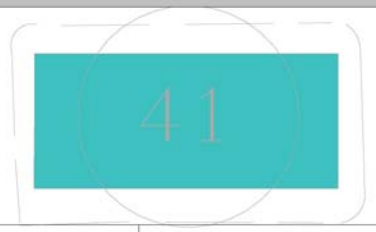
General Comments:

The building is occupied and has received a certain level of maintenance due to occupancy. No significant changes in architectural features were noted since the previous assessment. There was no evidence of significant improvement in building condition.

Condition Assessment, April 2009

Building Information

Building Name	41 - Sheet Metal Shop	
Period of Construction	1918	
National Register Eligibility	Contributing MSHD, NFDC Context	
Building Height	1 story	
Building Footprint	6,622 SF	
Historic Use | Current Use	Wood Working Shop	Shop
Potential Use | Adaptability	CR, LI, LO, RE, ST, WH	2



Exterior Materials and Conditions

Building Component	Building Material	Condition
Roofing | Decking	Shed Roof to Gable Clerestory; Deck: Concrete, panels	2
Exterior Envelope	Hollow Clay Tile; Brick quoins at openings/corners	3
Exterior Doors	Overhead: Metal	1
Windows	Steel, with operable hopper, painted	2
Lintels	Concrete	3
Loading Dock	N/A	
Porch	N/A	
Additions	N/A	

Comments

Brick recently replaced at large door opening header on North side
Severe cracking at brick quoins around openings; major brick replacement at West Facade
Severe spalling and exposed rebar at concrete window sills
North facade of building has severe cracking and bulging

TVA Muscle Shoals Feasibility — Muscle Shoals, Alabama
Lord, Aeck & Sargent Architecture — July 31, 2009

Cyclic Assessment, July 2013

Exterior Materials and Conditions

Building Component	Building Material	Condition
Roofing / Decking	Low-slope gable with clerestory; Deck: Concrete panels	2
Exterior Envelope	Hollow clay tile; Brick quoins at openings / corners,	3
Exterior Doors	Wood, cast straps, painted; Overhead: Metal	1
Windows	Steel, fixed with operable hopper, painted	2
Lintels **& Sills**	Concrete	3
Loading Dock	N / A	
Porch	N / A	
Additions	N / A	

New Comments

- Brick incompatible with existing used to repair door surround on north wall
- Holes patched with substance incompatible with existing mortar on west wall
- Staining visible on west side of lower north wall

Condition Assessment, April 2009

Building Information

Building Name	41 - Sheet Metal Shop	
Period of Construction	1918	
National Register Eligibility	Contributing MSHD, NFDC Context	
Building Height	1 story	
Building Footprint	6,622 SF	
Historic Use | Current Use	Wood Working Shop	Shop
Potential Use | Adaptability	CR, LI, LO, RE, ST, WH	2

Interior Materials and Conditions

Building Component	Building Material	Condition
Corridors	N/A	
Primary Space	Open: Shop Equipment	2
Secondary Space	N/A	
Secondary Space	N/A	
Secondary Space	N/A	
Flooring	Concrete, unfinished	3
Walls	N/A	
Ceiling	Exposed Beams: Steel; Concrete, panels	2

Comments

Water infiltration around some roof openings and flashing
Entire interior painted, included steel framing, steel windows, and HCT walls
Small equipment mezzanine with stair in corner of space

TVA Muscle Shoals Feasibility
Lord, Aeck & Sargent Architecture

Muscle Shoals, Alabama
July 31, 2009

Cyclic Assessment, July 2013

Interior Materials and Conditions

Building Component	Building Material	Condition
Corridors	N / A	
Primary Space	Open:Shop equipment	2
Secondary Space	N / A	
Secondary Space	N / A	
Secondary Space	N / A	
Flooring	Concrete; unfinished	3
Walls	Hollow clay tile	**4**
Ceiling	Exposed beams: Steel; Concrete, panels	2

New Comments

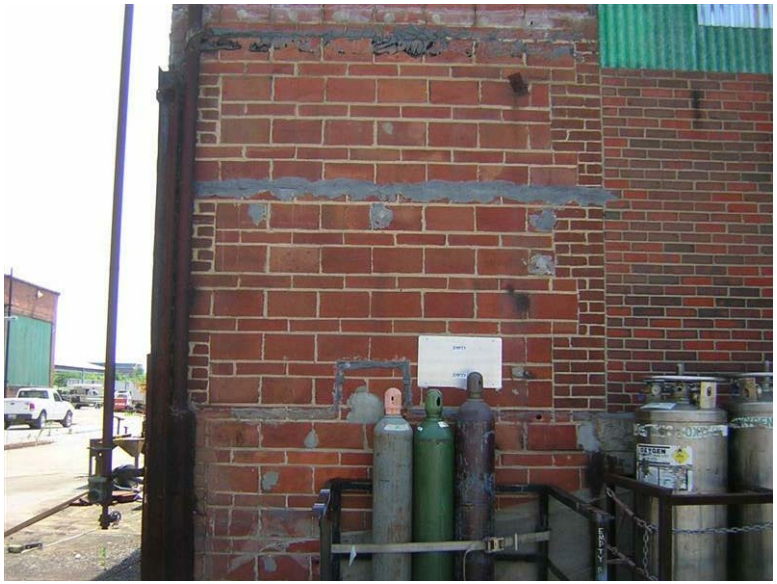
- Glass panes broken in most windows
- Areas of roof replaced with corrugated metal panels
- Ceiling tiles damaged at edge of lower roof, exposing rebar

Building 41 – Sheet Metal Shop: Overall view of the northeast corner of the building

Building 41 – Sheet Metal Shop: Cracking is visible in the hollow clay tile and brick quoins located at the upper corners of the building.

Building 41 – Sheet Metal Shop: The brick door surround has been replaced with incompatible brick in a non-historic pattern.

Building 41 – Sheet Metal Shop: Localized spalling of concrete sills is prevalent.



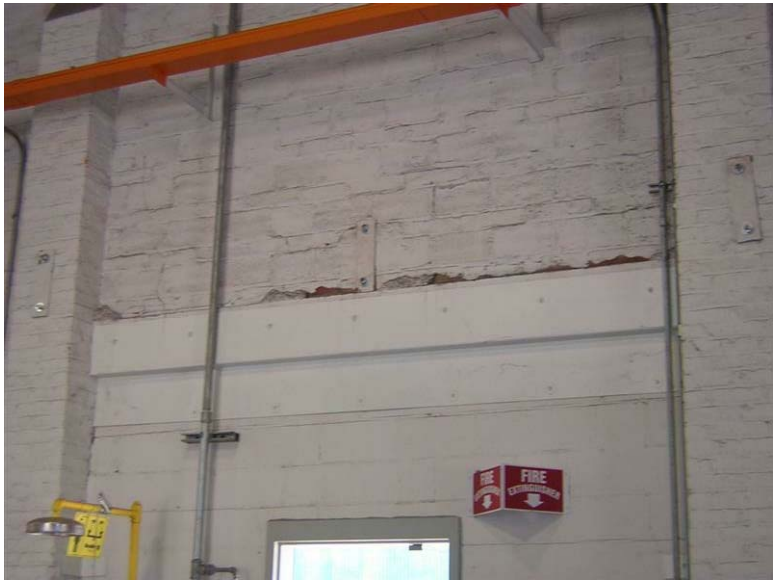
Building 41 – Sheet Metal Shop: Joints and holes have been patched with a substance incompatible with the existing mortar.

Building 41 – Sheet Metal Shop: Water staining and efflorescence are visible on the west side of the north wall.

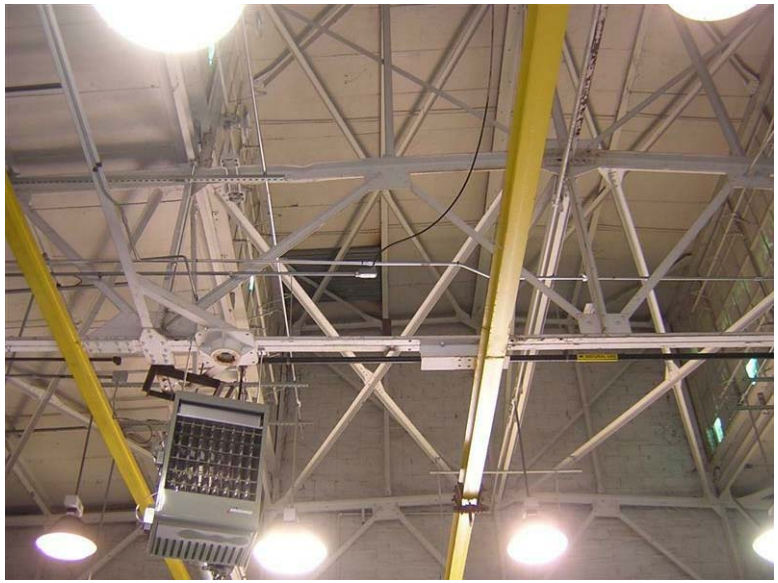
Building 41 – Sheet Metal Shop: Overall view of the building interior

Building 41 – Sheet Metal Shop: Overall view of the building interior

Building 41 – Sheet Metal Shop: Glass panes are missing in many windows. The exterior of the windows are covered with fiberglass panels.



Building 41 – Sheet Metal Shop: The hollow clay tile is cracked where the CMU and lintel have been inserted into existing door opening.



Building 41 – Sheet Metal Shop: Although the steel truss system is painted, rusting occurs and paint is flaking.

Building 41 – Sheet Metal Shop: The concrete ceiling panel has spalled, exposing the rebar.

Building 41 – Sheet Metal Shop: Some of the concrete ceiling panels have been replaced with metal panels.

Structural Assessment – General Information

Building No.: 41 Sheet Metal Shop	
Building Name:	Sheet Metal Shop
Original Function:	Wood Working Shop
Subsequent Modification:	N/A
General Building Structural Description:	One story steel frame building with perimeter steel columns inside self- supporting exterior masonry walls. The building has a central clerestory monitor that extends the length of the building. The roof structure is steel trusses with a concrete plank roof deck supported by steel beams.
General Building Structural Condition (2009):	Structural General Building Condition Code = 3 "Fair". **(2013: Structural General Building Condition Code = 3 "Fair")** The overall building is in generally fair condition. The roof structure is painted and exhibits minimal corrosion. One concrete roof plank is structurally deficient. **(2013: Additional structurally deficient concrete roof planks were noted in 2013. Condition of these planks in 2009 is unknown.)** Numerous cracks were noted in the exterior masonry walls and masonry is partially dislodged at cracks in the northeast and southeast corners. Large cracks were noted in the concrete floor at the east end of the building. **(2013: Cracks in slab were noted throughout the building in 2013, not just at east end. It appears unlikely that additional cracks observed are new.)**
Summary of Observations Regarding Present General Building Structural Condition (2013):	**The overall building remains in generally fair condition. Progressive deterioration of concrete roof planks appears to have occurred in isolated locations. Exterior awnings have been replaced.**
Summary of Recommended Structural Repairs (2009):	Replace defective concrete roof planks. Repair cracks in exterior masonry walls and reconstruct partially dislodged masonry. Repair cracks in concrete floors.
Additional Recommendations (2009):	2009: Not applicable. (**2013: A detailed evaluation of the concrete plank roof deck may be required to determine the type of remediation and the extent of repairs required.)**

Table 1: Structural Systems Assessment

Structural Component	Previous (2009) Condition Code	Present (2013) Condition Code	Comments
Lowest Level Floor System	3	3	**Cracks in slab were noted throughout the building, not just at east end as previously documented. It appears unlikely that additional cracks observed are new.**
Columns	2	2	
Exterior Walls	3	3	
Roof Framing and Subframing	2	2	
Roof Deck	3	3	**Additional structurally deficient concrete roof planks were noted in 2013. Condition of these planks in 2009 is unknown.**
Monitor/Clerestory Structure (Framing, walls, and roof deck)	3	3	
Awnings (Total Assembly)	4	**2**	**Awnings have been replaced**

Condition Code Description
(1) Excellent - Visual observation indicates no remedial work required. (less than 10% repair)
(2) Good - Visual observation indicates minimal remedial work required. (less than 10% replacement and/or 25% repair)
(3) Fair - Visual observation indicates remedial work required. (up to 25% replacement and/or 50% repair)
(4) Deteriorated - Visual observation indicates significant remedial work required. (up to 50% replacement and/or 75% repair)
(5) Critical – Visual observation indicates extensive replacement and/or repair. (over 50% replacement and/or 75% repair)

Table 2: Itemized Structural Defects

Defect Item No.	Defect Description (2009)	2013 Assessment of 2009 Itemized Defects	Photo Log Reference Nos.	
			From 2009 Report	2013
1	Thermal cracks in slab on grade	**Additional cracks in slab that were noted are not considered to be new**	10	
2	Cracks in exterior masonry wall at high bay on east side	Change in condition was not observed	11	
3	Cracks in exterior masonry wall at the southwest corner	Change in condition was not observed		
4	Cracks in masonry wall at southeast corner	Change in condition was not observed	5	
5	Corroded rebar exposed from roof panels, cracks observed in roof panel	**Additional structurally deficient concrete roof planks were noted in 2013. Condition of these planks in 2009 is unknown.**	12	**12**

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Photo Log:
2009 vs. 2013 Comparison

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PHOTOLOG: Building No. 41 Sheet Metal Shop (2009 vs. 2013 Comparison)

2009 Photo #1: Exterior of building – East elevation

2013 Photo #1: Exterior of building – SE corner. Awning has been replaced

2009 Photo #2: Exterior of building – South elevation

No change observed

2013 Photo #2:

PHOTOLOG: Building No. 41 Sheet Metal Shop (2009 vs. 2013 Comparison)

2009 Photo #3: Exterior of building – West elevation

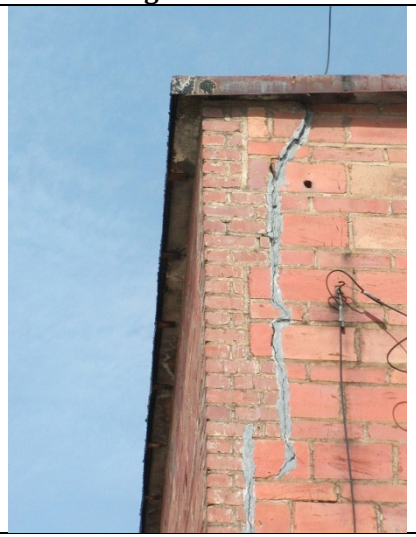
2013 Photo #3: Exterior of building – West elevation. New awnings have been installed

2009 Photo #4: Exterior of building looking at North elevation

No change observed

2013 Photo #4:

PHOTOLOG: Building No. 41 Sheet Metal Shop (2009 vs. 2013 Comparison)



2009 Photo #5: Cracked and partially dislodged masonry at Southeast corner

2013 Photo #5:

No change observed

2009 Photo #6: Cracks in masonry at Northeast corner

2013 Photo #6:

No change observed

PHOTOLOG: Building No. 41 Sheet Metal Shop (2009 vs. 2013 Comparison)

2009 Photo #7: Surface deterioration and cracks in exterior masonry at West wall

2013 Photo #7:

No change observed

2009 Photo #8: Crack above window opening on North side

2013 Photo #8:

No change observed

PHOTOLOG: Building No. 41 Sheet Metal Shop (2009 vs. 2013 Comparison)

2009 Photo #9: Cracks in masonry and exposed slab edge on North side

2013 Photo #9:

No change observed

2009 Photo #10: Large cracks in concrete floor slab

2013 Photo #10:

No change observed

PHOTOLOG: Building No. 41 Sheet Metal Shop (2009 vs. 2013 Comparison)

2009 Photo #11: Roof framing at east end wall

2013 Photo #11:

No change observed

2009 Photo #12: Structurally defective concrete roof deck panel

2013 Photo #12: Additional structurally defective concrete roof deck panels – condition in 2009 was not documented

Condition Assessment, April 2009

Building Information | Overall Building Condition 3 | Overall Structural Condition 3

Building Name	42 - Pipe Shop	
Period of Construction	1918	
National Register Eligibility	Contributing MSHD, NFDC Context	
Building Height	1 story	
Building Footprint	10,933 SF	
Historic Use | Current Use	Blacksmith Shop	Shop
Potential Use | Adaptability	LI, RE, ST, WH	2

Character Defining Features

Exterior	Interior
Primary Building Form: Rectangular Form with Low Slope Roofs and Clerestory Building Walls: Hollow Clay Tile with Brick Quoins Windows: Steel with operable hopper Window Headers and Sills: Precast concrete, sills shaped	**Primary** Spatial Form: Open Central Clerestory, 2 story open **Secondary** Spatial Form: Open Floor Plan between Clerestory and Adjacent Space Exposure of Steel Structure Exposure of Hollow Clay Tile with Brick Quoins

Resource Significance

The National Fertilizer Development Center (fomerly known as Nitrate Plant No. 2) has been recommended eligible to the National Register of Historic Places as a contributing resource in the Muscle Shoals Historic District. The property retains architectural integrity and is historically significant for its' role as a research facility during the World War I and World War II periods and thereafter. The period of significance dates between 1916 and 1970.

TVA Muscle Shoals Feasibility — Muscle Shoals, Alabama

Lord, Aeck & Sargent Architecture — July 31, 2009

Cyclic Assessment, July 2013

Building Information | Overall Building Condition 3 | Overall Structural Condition 3

Building Name: 42 - Pipe Shop

Current Use: Shop

Building 42 N

General Comments:

The building is occupied and has received a certain level of maintenance due to occupancy. No significant changes in architectural features were noted since the previous assessment. There was no evidence of significant improvement in building condition.

Condition Assessment, April 2009

Building Information

Building Name	42 - Pipe Shop	
Period of Construction	1918	
National Register Eligibility	Contributing MSHD, NFDC Context	
Building Height	1 story	
Building Footprint	10,933 SF	
Historic Use | Current Use	Blacksmith Shop	Shop
Potential Use | Adaptability	LI, RE, ST, WH	2

Exterior Materials and Conditions

Building Component	Building Material	Condition
Roofing | Decking	Shed Roof to Gable Clerestory; Deck: Concrete, panels	3
Exterior Envelope	Hollow Clay Tile; Brick quoins at openings/corners	4
Exterior Doors	Wood, cast straps, painted; Overhead: Metal	2
Windows	Steel, with operable hopper, painted	2
Lintels	N/A	
Loading Dock	N//A	
Porch	N/A	
Additions	N/A	

Comments

CMU infill at large openings on all four sides
Major cracking in Hollow Clay Tile at East wall; Wall ties visible at East and West walls
Severe settlement/cracking in foundation on all sides
Spalling and exposed rebar observed at window/opening sills; sealant bad at sills

TVA Muscle Shoals Feasibility — Muscle Shoals, Alabama
Lord, Aeck & Sargent Architecture — July 31, 2009

Cyclic Assessment, July 2013

Exterior Materials and Conditions

Building Component	Building Material	Condition
Roofing / Decking	Low-slope gable with clerestory; Deck: Concrete panels	3
Exterior Envelope	Hollow clay tile; Brick quoins at openings / corners	4
Exterior Doors	Wood, cast straps, painted; Overhead: Metal	2
Windows	Steel, fixed with operable hopper, painted	2
Lintels **& Sills**	**Concrete**	**3**
Loading Dock	N / A	
Porch	N / A	
Additions	N / A	

New Comments

- Visible separation at top corners of brick and clay tile appears to be increasing
- Several cracks on north and south walls, especially at southeast corner
- Efflorescence visible on CMU at drive thru; cracking in adjacent hollow clay tile wall

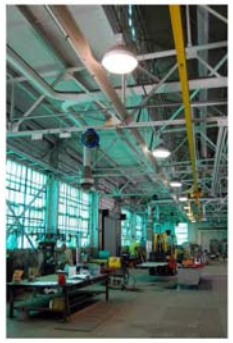
Condition Assessment, April 2009

Building Information

Building Name	42 - Pipe Shop	
Period of Construction	1918	
National Register Eligibility	Contributing MSHD, NFDC Context	
Building Height	1 story	
Building Footprint	10,933 SF	
Historic Use | Current Use	Blacksmith Shop	Shop
Potential Use | Adaptability	LI, RE, ST, WH	2

Interior Materials and Conditions

Building Component	Building Material	Condition
Corridors	N/A	
Primary Space	Open: Shop Equipment	2
Secondary Space	N/A	
Secondary Space	N/A	
Secondary Space	N/A	
Flooring	Concrete, unfinished	3
Walls	Hollow Clay Tile	3
Ceiling	Exposed Beams: Steel; Concrete, panels	2



Comments

Concrete floors show signs of wear from shop equipment
Entire interior painted, including steal frame and steel windows

TVA Muscle Shoals Feasibility — Muscle Shoals, Alabama
Lord, Aeck & Sargent Architecture — July 31, 2009

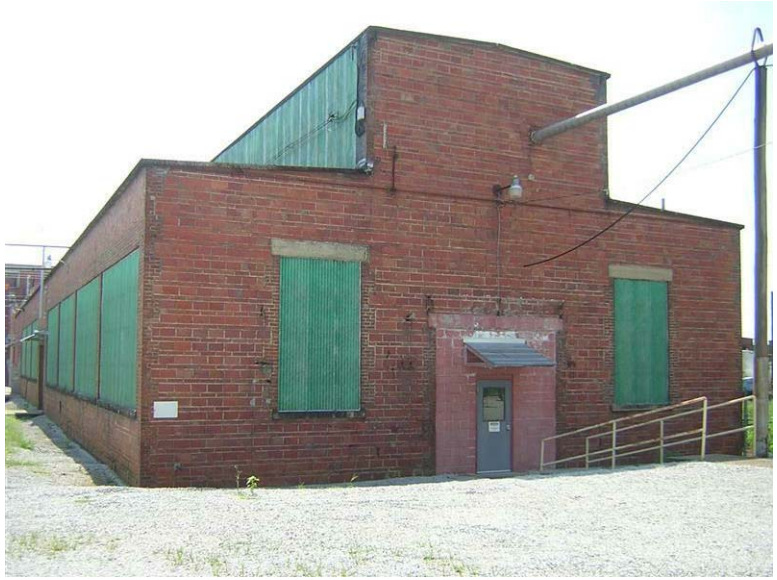
Cyclic Assessment, July 2013

Interior Materials and Conditions

Building Component	Building Material	Condition
Corridors	N / A	
Primary Space	Open:Shop equipment	2
Secondary Space	N / A	
Secondary Space	N / A	
Secondary Space	N / A	
Flooring	Concrete; unfinished	3
Walls	Hollow clay tile	**4**
Ceiling	Exposed beams: Steel; Concrete, panels	2

New Comments

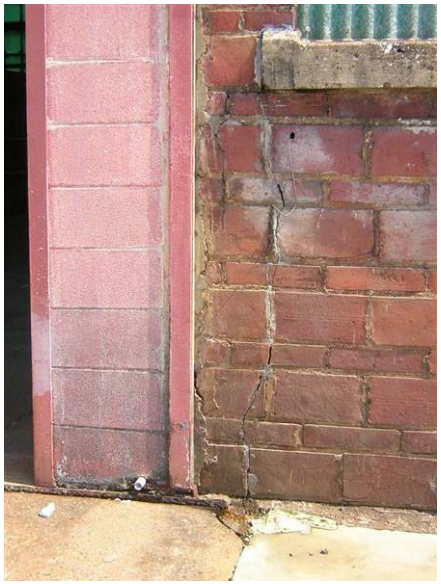
- Cracking visible through walls
- Areas of roof decking have been reinforced with corrugated metal panels



Building 42 – Pipe Shop: Overall view of the southeast corner of the building

Building 42 – Pipe Shop: There is severe cracking of the brick at the southeast corner of the building.

Building 42 – Pipe Shop: Efflorescence is on the CMU infill at this door opening.



Building 42 – Pipe Shop: The wall is cracked adjacent to the door opening on the south wall. Efflorescence is visible along the CMU joints.

Building 42 – Pipe Shop: Severe cracking is visible on the south wall especially above windows and between openings. Some cracks have been sealed with a material incompatible with the mortar.

Building 42 – Pipe Shop: This horizontal crack continues across much of the south facade.

Building 42 – Pipe Shop: Interior view of the building

Building 42 – Pipe Shop: Interior view of the building

Building 42 – Pipe Shop: The upper hollow clay tile wall is cracked.

Building 42 – Pipe Shop: Diagonal cracking in the hollow clay tile is prevalent between window and door openings.

Building 42 – Pipe Shop: Interior view of the platform

Building 42 – Pipe Shop: Interior view of the ceiling

Building 42 – Pipe Shop: Some concrete ceiling panels have been replaced with metal panels.

Structural Assessment – General Information

Building No.: 42 Pipe Shop	
Building Name:	Pipe Shop
Original Function:	Blacksmith Shop
Subsequent Modification:	N/A
General Building Structural Description:	One story steel frame building with perimeter steel columns inside self supporting exterior masonry walls. The building has a central clerestory monitor that extends the length of the building. The roof structure is steel trusses with a concrete plank roof deck supported by steel beams. The building has an interior steel frame mechanical mezzanine.
General Building Structural Condition (2009):	Structural General Building Condition Code = 3 "Fair". **(2013: Structural General Building Condition Code = 3 "Fair")** The overall building is in generally fair condition. The roof structure is painted and exhibits minimal corrosion. Numerous cracks were noted in the exterior masonry walls and masonry is partially dislodged at a crack in the southeast corner.
Summary of Observations Regarding Present General Building Structural Condition (2013):	**The overall building remains in generally fair condition. Minor progressive deterioration of exterior masonry walls was observed. Some exterior awnings have been replaced.**
Summary of Recommended Structural Repairs (2009):	Repair cracks in exterior masonry walls and reconstruct partially dislodged masonry.
Additional Recommendations (2009):	Not applicable

Table 1: Structural Systems Assessment

Structural Component	Previous (2009) Condition Code	Present (2013) Condition Code	Comments
Lowest Level Floor System	2	2	
Mezzanine Floor System (Deck and framing)	2	2	
Columns	2	2	
Exterior Walls	3	3	**Minor progressive deterioration of exterior masonry walls was observed.**
Roof Framing and Subframing	2	2	
Roof Deck	3	3	
Monitor/Clerestory Structure (Framing, walls, and roof deck)	3	3	

Condition Code Description
(1) Excellent - Visual observation indicates no remedial work required. (less than 10% repair)
(2) Good - Visual observation indicates minimal remedial work required. (less than 10% replacement and/or 25% repair)
(3) Fair - Visual observation indicates remedial work required. (up to 25% replacement and/or 50% repair)
(4) Deteriorated - Visual observation indicates significant remedial work required. (up to 50% replacement and/or 75% repair)
(5) Critical – Visual observation indicates extensive replacement and/or repair. (over 50% replacement and/or 75% repair)

Table 2: Itemized Structural Defects

Defect Item No.	Defect Description (2009)	2013 Assessment of 2009 Itemized Defects	Photo Log Reference Nos.	
			From 2009 Report	2013
1	Settlement cracks in the masonry wall in southwest corner	Change in condition was not observed	5	
2	Cracks in exterior masonry wall at the southeast corner	**Minor progressive deterioration of exterior masonry was observed this location.**	4	**4**
3	Cracks in exterior masonry wall at the south doorway	Change in condition was not observed		
4	Cracks in masonry wall on the interior at north doorway	Change in condition was not observed	9	
5	Cracks in masonry wall on the interior at the southwest corner	Change in condition was not observed	12	
6	Crack in masonry wall on south side	**Minor progressive deterioration of exterior masonry walls was observed.**	7,10	**7**

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Photo Log:
2009 vs. 2013 Comparison

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PHOTOLOG: Building No. 42 Pipe Shop (2009 vs. 2013 Comparison)

2009 Photo #1: Exterior of building at West end

2013 Photo #1: Exterior of building at West end

2009 Photo #2: Exterior of building on North side

No change observed

2013 Photo #2:

PHOTOLOG: Building No. 42 Pipe Shop (2009 vs. 2013 Comparison)

2009 Photo #3: Exterior of building on South side

2013 Photo #3:

No change observed

2009 Photo #4: Crack and partially dislodged masonry at Southeast corner

2013 Photo #4: Crack and partially dislodged masonry at Southeast corner exhibits minor progressive deterioration

PHOTOLOG: Building No. 42 Pipe Shop (2009 vs. 2013 Comparison)

2009 Photo #5: Horizontal crack in masonry at Southwest corner

2013 Photo #5:

No change observed

2009 Photo #6: Cracks in masonry on South side

2013 Photo #6:

No change observed

PHOTOLOG: Building No. 42 Pipe Shop (2009 vs. 2013 Comparison)

2009 Photo #7: Interior wall and roof construction

2013 Photo #7: Minor progressive deterioration of masonry above windows was observed

2009 Photo #8: Interior building looking East

No change observed

2013 Photo #8:

PHOTOLOG: Building No. 42 Pipe Shop (2009 vs. 2013 Comparison)

2009 Photo #9: Example of diagonal crack in masonry at overhead doors

2013 Photo #9:

No change observed

2009 Photo #10: Horizontal crack in brick pier

2013 Photo #10:

No change observed

PHOTOLOG: Building No. 42 Pipe Shop (2009 vs. 2013 Comparison)

2009 Photo #11: Crack in masonry at end wall

2013 Photo #11:

No change observed

2009 Photo #12: Diagonal crack in masonry at corner of building below window

2013 Photo #12:

No change observed

Condition Assessment, April 2009

Building Information	Overall Building Condition 3	Overall Structural Condition 3
Building Name	44 - Project Operations Bath House	
Period of Construction	1918	
National Register Eligibility	Contributing MSHD, NFDC Context	
Building Height	1 story	
Building Footprint	12,370 SF	
Historic Use | Current Use	Wash/Locker House 3	Storage; Locker Room; Vacant
Potential Use | Adaptability	CO, ST	3

Character Defining Features

Exterior	Interior
Primary	**Secondary**
Building Form: Rectangular Form with Low Sloped Pitched Roof	Spatial Form: Open Floor Plan
Building Walls: Hollow Clay Tile with Brick Quoins	Exposure of Wood Structure
Pedestrian Entry Door Canopies with Corbelled Brick Supports	
Windows: Steel with operable hopper	
Window Headers and Sills: Precast concrete sills, shaped	
Doors:Rail and Stile, wood	

Resource Significance

The National Fertilizer Development Center (fomerly known as Nitrate Plant No. 2) has been recommended eligible to the National Register of Historic Places as a contributing resource in the Muscle Shoals Historic District. The property retains architectural integrity and is historically significant for its' role as a research facility during the World War I and World War II periods and thereafter. The period of significance dates between 1916 and 1970.

TVA Muscle Shoals Feasibility — Muscle Shoals, Alabama

Lord, Aeck & Sargent Architecture — July 31, 2009

Cyclic Assessment, July 2013

Building Information	Overall Building Condition **3**	Overall Structural Condition 3

Building Name: 44 - Project Operations Bath House

Current Use: Offices and Storage

Building 44 N

General Comments:

This building has undergone partial renovation since the previous condition assessment. The historic steel windows have been removed and replaced with aluminum windows, and the single remaining historic wood stile and rail door was replaced with a new metal door.

Condition Assessment, April 2009

Building Information

Building Name	44 - Project Operations Bath House		
Period of Construction	1918		
National Register Eligibility	Contributing MSHD, NFDC Context		
Building Height	1 story		
Building Footprint	12,370 SF		
Historic Use | Current Use	Wash/Locker House 3	Storage; Locker Room; Vacant	
Potential Use | Adaptability	CO, ST	3	

Exterior Materials and Conditions

Building Component	Building Material	Condition
Roofing | Decking	Gable; Deck: Wood	5
Exterior Envelope	Hollow Clay Tile; Brick quoins at openings/corners	3
Exterior Doors	Metal, flush	1
Windows	Steel, with operable hopper	4
Lintels	Concrete	2
Loading Dock	N/A	
Porch	Wood framed canopy over entry with brick supports	5
Additions	N/A	

Comments

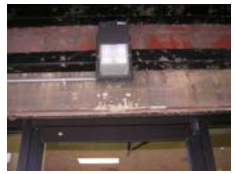
Wood fascia peeling and rotten in certain areas
Significant cracking in concrete foundation around building perimter
Steel winodws showing rust on exterior
Lintels show signs of spalling and pocking

TVA Muscle Shoals Feasibility — Muscle Shoals, Alabama
Lord, Aeck & Sargent Architecture — July 31, 2009

Cyclic Assessment, July 2013

Exterior Materials and Conditions

Building Component	Building Material	Condition
Roofing / Decking	Low-slope gable; Deck: Wood	5
Exterior Envelope	Hollow clay tile; Brick quoins at openings / corners	3
Exterior Doors	Metal, flush	1
Windows	Aluminum with snap-in grids	**1**
Lintels **& Sills**	Concrete	2
Loading Dock	N / A	
Porch	Wood framed canopy over entry with brick supports	**1**
Additions	N / A	



New Comments

- Historic steel windows replaced with new aluminum windows with snap-in grids and historic wood stile and rail door on east facade replaced with a metal door
- Replaced canopies at building entries
- Cracking at foundation
- Repointing at joints between brick and tile
- Wood fascia repaired and painted

Condition Assessment, April 2009

Building Information

Building Name	44 - Project Operations Bath House	
Period of Construction	1918	
National Register Eligibility	Contributing MSHD, NFDC Context	
Building Height	1 story	
Building Footprint	12,370 SF	
Historic Use | Current Use	Wash/Locker House 3	Storage; Locker Room; Vacant
Potential Use | Adaptability	CO, ST	3

Interior Materials and Conditions

Building Component	Building Material	Condition
Corridors	N/A	
Primary Space	Open	3
Secondary Space	Locker Rooms	4
Secondary Space	Storage	4
Secondary Space	N/A	
Flooring	Concrete; VCT	2
Walls	Wood Stud	2
Ceiling	Exposed Beams:Wood; ACT	3

Comments

Major roof leak in Locker Room has resulted in standing water for large portion of floor
East end of building not accessible due to environmental hazard

TVA Muscle Shoals Feasibility — Muscle Shoals, Alabama
Lord, Aeck & Sargent Architecture — July 31, 2009

Cyclic Assessment, July 2013

Interior Materials and Conditions

Building Component	Building Material	Condition
Corridors	N / A	
Primary Space	**Meeting room**	**1**
Secondary Space	**Offices / Restrooms**	**1**
Secondary Space	Storage	**1**
Secondary Space	N / A	
Flooring	Concrete; unfinished	**1**
Walls	Hollow clay tile	**1**
Ceiling	Exposed beams: Steel; Concrete, panels	**1**

New Comments

- Crack in concrete floor at building entry
- Lay-in ceiling in front portion of building and exposed decking visible in rear of building
- Areas of roof wood decking replaced with plywood; wood members sistered to original wood structure; localized wood roof decking damaged from moisture; all new roofing is assumed to have been installed
- Cracks in south plaster wall in rear of building

Building 44 – Project Operations Bath House: Overall view of the north facade

Building 44 – Project Operations Bath House: Overall view of the south facade

Building 44 – Project Operations Bath House: This window opening has been infilled with brick and made into a door opening, which is filled with T-111 siding.

Building 44 – Project Operations Bath House: The concrete lintel is chipped at the main entrance on the west facade.

Building 44 – Project Operations Bath House: The cracks along the quoins have been infilled with red mortar.

Building 44 – Project Operations Bath House: The concrete foundation is cracked in several areas.

Building 44 – Project Operations Bath House: Interior view of the breakroom

Building 44 – Project Operations Bath House: Interior view of the meeting space

Building 44 – Project Operations Bath House: Overall view of the office space

Building 44 – Project Operations Bath House: The concrete floor is cracked at the west entrance.

Building 44 – Project Operations Bath House: A horizontal crack is visble on the south wall beneath the sill in the storage area.

Building 44 – Project Operations Bath House: Wood roof decking and plywood is visible above the acoustical ceiling tiles.

Building 44 – Project Operations Bath House: The wood decking has been partially replaced with plywood in the storage area. New wood structural members have been installed in portions of the roof.

Structural Assessment – General Information

Building No.: 44 Project Operations Bath House	
Building Name:	Project Operations Bath House
Original Function:	Wash and Locker House 3
Subsequent Modification:	Interior only
General Building Structural Description:	One story building with interior and exterior load bearing masonry walls, timber frame columns and roof joists, and wood plank roof. The building is partially occupied on the west end, which has a lay-in ceiling, and is used for storage on the east end, where the wood frame roof structure is completely visible.
General Building Structural Condition (2009):	Structural General Building Condition Code = 4 "Fair". **(2013: Structural General Building Condition Code = 4 "Fair".)** Exterior and interior load bearing masonry walls are in good condition with no significant structural defects. Wood roof structure, which is unprotected by roof covering in some areas, has been previously repaired and is in need of additional repair of significant scope. Standing water was observed inside the building, and moisture damage to the wood roof structure is visible throughout the building.
Summary of Observations Regarding Present General Building Structural Condition (2013):	**The building was more fully occupied at the time of the 2013 Cyclic Assessment, and materials that must be protected are now located in the east end storage area. It appears that deficiencies related to roof construction have been addressed, as no evidence of water intrusion was observed. New areas of repaired/ replaced roof deck and framing were observed, and the deteriorated exterior awnings have been replaced. The general building condition appears to be improved.**
Summary of Recommended Structural Repairs (2009):	Repair of minor cracking in foundation stem walls, which is not structurally significant, can be considered optional. **(2013: The following 2009 recommendations had been addressed at the time of the 2013 Cyclic Assessment:** Wood frame exterior awning at east end needs to be replaced. The remaining original wood roof deck (80-90% of roof area) should be replaced and a new roof covering system installed.
Additional Recommendations (2009):	Not applicable.

Table 1: Structural Systems Assessment

Structural Component	Previous (2009) Condition Code	Present (2013) Condition Code	Comments
Lowest Level Floor System	3	3	
Exposed Foundation or Stem Walls	3	3	
Columns	3	3	
Exterior Walls	3	3	
Roof Framing and Subframing	3	**2**	**Deteriorated roof framing has been repaired**
Roof Deck	4	**2**	**Deteriorated roof decking has been replaced**
Awnings (Total Assembly)	4	**2**	**Deteriorated awnings have been replaced**

Condition Code Description
(1) Excellent - Visual observation indicates no remedial work required. (less than 10% repair)
(2) Good - Visual observation indicates minimal remedial work required. (less than 10% replacement and/or 25% repair)
(3) Fair - Visual observation indicates remedial work required. (up to 25% replacement and/or 50% repair)
(4) Deteriorated - Visual observation indicates significant remedial work required. (up to 50% replacement and/or 75% repair)
(5) Critical – Visual observation indicates extensive replacement and/or repair. (over 50% replacement and/or 75% repair)

Table 2: Itemized Structural Defects

Defect Item No.	Defect Description (2009)	2013 Assessment of 2009 Itemized Defects	Photo Log Reference Nos.	
			From 2009 Report	2013
1	Crack in stem wall at southeast corner	Change in condition was not observed		
2	Deteriorated wood frame awning	**Awnings have been replaced**	3	**3**
3	Multiple small cracks in foundation stem wall on south side of building	Change in condition was not observed	4	
4	Deteriorated wooden roof planks on south side (Large area of daylight visible)	**Wood roof framing has been repaired and deteriorated wood roof deck has been replaced.**	6,7	**6,7**
5	Damaged interior CMU partition wall (Non-load bearing)	Change in condition was not observed		

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Photo Log:
2009 vs. 2013 Comparison

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PHOTOLOG: Building No. 44 Project Operations Bath House (2009 vs. 2013 Comparison)

2009 Photo #1: Exterior building looking at Northwest corner

2013 Photo #1: Exterior building looking at Northwest corner

2009 Photo #2: Exterior building looking at Southeast corner

2013 Photo #2: Exterior building looking at Southwest corner

PHOTOLOG: Building No. 44 Project Operations Bath House (2009 vs. 2013 Comparison)

2009 Photo #3: Wood frame exterior awning at East end

2013 Photo #3: Exterior awnings have been replaced

2009 Photo #4: Cracks in foundation stem wall South side

No change observed

2013 Photo #4:

PHOTOLOG: Building No. 44 Project Operations Bath House (2009 vs. 2013 Comparison)

2009 Photo #5: Partially reconstructed wood frame roof structure

2013 Photo #5:

No change observed in this area of building

2009 Photo #6: Existing wood plank roof with no roof covering (Bright spots are daylight visible through roof deck)

2013 Photo #6: Wood roof framing has been repaired and deteriorated portions of wood roof deck have been replaced

PHOTOLOG: Building No. 44 Project Operations Bath House (2009 vs. 2013 Comparison)

2009 Photo #7: Existing wood plank roof deck with no roof covering (Bright spots are daylight visible through roof deck)

2013 Photo #7: Wood roof framing has been repaired and deteriorated portions of wood roof deck have been replaced

2009 Photo #8: Standing water on floor in one area of uncovered roof deck

Condition has been eliminated

2013 Photo #8:

PHOTOLOG: Building No. 44 Project Operations Bath House (2009 vs. 2013 Comparison)

2009 Photo #9: Partially replaced wood roof deck

No change observed in this area of building

2013 Photo #9:

2009 Photo #10: Moisture damage at wood plank roof deck above partially removed lay-in ceiling

2013 Photo #10: Repairs to roof deck visible above partially removed lay-in ceiling

Condition Assessment, April 2009

Building Information	Overall Building Condition 3	Overall Structural Condition 4
Building Name	53 - Tin Shop	
Period of Construction	1918	
National Register Eligibility	Contributing MSHD, NFDC Context	
Building Height	1 story	
Building Footprint	4,718 SF	
Historic Use | Current Use	Washe/Locker House 4	Vacant
Potential Use | Adaptability	LO, ST	4

Character Defining Features

Exterior	Interior
Primary Building Form: Rectangular Form with Low Slope Roof and Continuous Clerestory Building Walls: Hollow Clay Tile w/ Brick Quoins Windows: Steel with operable hopper Window Headers and Sills: Precast concrete, sills shaped Doors: Rail and Stile, wood **Secondary** Addition #1: Hollow Clay Tile w/ Brick Quoins	**Primary** Spatial Form: Open Central Clerestory **Secondary** Spatial Form: Open Floor Plan between Celerestory and Adjacent Space Exposure of Wood and Steel Structure Steel Structure from Manufacturing Operations

Resource Significance

The National Fertilizer Development Center (fomerly known as Nitrate Plant No. 2) has been recommended eligible to the National Register of Historic Places as a contributing resource in the Muscle Shoals Historic District. The property retains architectural integrity and is historically significant for its' role as a research facility during the World War I and World War II periods and thereafter. The period of significance dates between 1916 and 1970.

TVA Muscle Shoals Feasibility — Muscle Shoals, Alabama

Lord, Aeck & Sargent Architecture — July 31, 2009

Cyclic Assessment, July 2013

Building Information Overall Building Condition 3 Overall Structural Condition 4

Building Name: 53 - Tin Shop

Current Use: Vacant

Building 53 N

General Comments:

The condition of this building remains similar to its condition when it was assessed in 2009, with the exception of the roof. The roof continues to deteriorate and allow water to penetrate the building. Moss growth is evident on the floor and overall building deterioration will accelerate if moisture is allowed to continue entering the building.

Condition Assessment, April 2009

Building Information

Building Name	53 - Tin Shop	
Period of Construction	1918	
National Register Eligibility	Contributing MSHD, NFDC Context	
Building Height	1 story	
Building Footprint	4,718 SF	
Historic Use | Current Use	Washe/Locker House 4	Vacant
Potential Use | Adaptability	LO, ST	4

Exterior Materials and Conditions

Building Component	Building Material	Condition
Roofing | Decking	Shed Roof to Gable Clerestory; Deck: Composition roofing; Fascia: wood	4
Exterior Envelope	Hollow Clay Tile, painted; Brick quoins at openings/corners, painted; Clerestory: wood lap-siding	3
Exterior Doors	Wood, v-boards, vision panel, painted,	4
Windows	Steel, fixed with hopper, painted	3
Lintels	Steel, painted	2
Loading Dock	N/A	
Porch	Rear: 1-bay centered, Gable: metal	3
Additions	West: Extension of original building construction; East: Shed and Gable: metal	3





Comments

Four seperate additions on East side of building, various materials including hollow clay tile, metal siding, steel windows matching original, and wood doors
Lap-siding at Clerestory in disrepair
Wood fascia and rafters exposed along building perimeter
Original awnings over windows on West facade
Exterior wall consists of two layers of hollow clay tile

TVA Muscle Shoals Feasibility — Muscle Shoals, Alabama
Lord, Aeck & Sargent Architecture — July 31, 2009

Cyclic Assessment, July 2013

Exterior Materials and Conditions

Building Component	Building Material	Condition
Roofing / Decking	Low-slope gable with clerestory; Deck: Composition roofing; Fascia: wood	4
Exterior Envelope	Hollow clay tile, painted; Brick quoins at openings / corners, painted; Clerestory: wood lap-siding	3
Exterior Doors	Wood, v-boards, vision panel, painted	4
Windows	Steel, fixed with hopper, painted	3
Lintels **& Sills**	Steel, painted; Concrete	2
Loading Dock	N / A	
Porch	Rear: 1-bay centered, Gable: metal	3
Additions	West: Extension of original building construction; CMU East: Shed and gable: metal	3

New Comments

- Spalling clay tile on west wall
- Doors falling off hinges
- Corrugated metal roof and walls rusted at addition
- CMU wall cracked at rear of building on east facade







Condition Assessment, April 2009

Building Information

Building Name	53 - Tin Shop	
Period of Construction	1918	
National Register Eligibility	Contributing MSHD, NFDC Context	
Building Height	1 story	
Building Footprint	4,718 SF	
Historic Use | Current Use	Washe/Locker House 4	Vacant
Potential Use | Adaptability	LO, ST	4

Interior Materials and Conditions

Building Component	Building Material	Condition
Corridors	N/A	
Primary Space	Open	4
Secondary Space	Open	2
Secondary Space	N/A	
Secondary Space	N/A	
Flooring	Concrete, unfinished	3
Walls	Hollow Clay Tile, painted	3
Ceiling	Exposed Framing: Wood/Steel, painted; Exposed Framing: Metal deck	4

Comments

Concrete floor in main interior space in poor condition
Wood decking missing or rotten in several areas, recently repaired in other areas
Wood joists rotten in several areas
Original wood doors between original building and main addition
Standing water covering 30% of floor in original building

TVA Muscle Shoals Feasibility — Muscle Shoals, Alabama
Lord, Aeck & Sargent Architecture — July 31, 2009

Cyclic Assessment, July 2013

Interior Materials and Conditions

Building Component	Building Material	Condition
Corridors	N / A	
Primary Space	Open	4
Secondary Space	Open	2
Secondary Space	N / A	
Secondary Space	N / A	
Flooring	Concrete; unfinished	3
Walls	Hollow clay tile, painted, plastered	3
Ceiling	Exposed framing: Wood / Steel, painted; Exposed framing: Metal deck	4

New Comments

- Standing water in west side of building
- Daylight visible through roof; wood roof decking damaged from water infiltration, partial replacement metal roof decking
- Moss growth on concrete flooring

Building 53 – Tin Shop: Overall view of the building from the southwest corner

Building 53 – Tin Shop: Overall view of the rear additions

Building 53 – Tin Shop: The hollow clay tile is spalling on the west facade.

Building 53 – Tin Shop: Paint is flaking from the wooden doors.

Building 53 – Tin Shop: The wood fascia board is in poor condition and the metal roof is rusted.

Building 53 – Tin Shop: The corrugated metal panels are rusting at the rear addition.

Building 53 – Tin Shop: Diagonal cracking is located beneath this window on the south facade.

Building 53 – Tin Shop: Interior view at the east addition

Building 53 – Tin Shop: Glass is broken in the vision panel of this door leading to the primary space.

Building 53 – Tin Shop: Daylight is shining through holes in the roof decking.

Building 53 – Tin Shop: The roof is stained from water damage.

Building 53 – Tin Shop: Part of the roof at the addition consists of steel trusses and wood decking and the other portion consists of steel beams and metal decking.

Building 53 – Tin Shop: Standing water has collected on the concrete floor in the primary space.

Building 53 – Tin Shop: Moss growth is prevalent on the concrete floor in the primary space.

Structural Assessment – General Information

Building No.: 53 Tin Shop	
Building Name:	Tin Shop
Original Function:	Wash and Locker House 4
Subsequent Modification:	Exterior and Interior modifications
General Building Structural Description:	One story building with exterior load bearing masonry walls. Primary interior framing is steel, secondary roof framing is wood with wood plank decking. The roof structure includes a central clerestory monitor approximately 8 feet high. Original drawings suggest interior partitions have been removed. Additions have been constructed on the east end of the building. One portion of the addition has CMU load-bearing walls with steel roof joists and wood plank roof deck; the other portion of the addition is light steel framing with corrugated metal roof and walls.
General Building Structural Condition (2009):	Structural General Building Condition Code = 4 "Deteriorated". **(2013: Structural General Building Condition Code = 4 "Deteriorated")** The exterior masonry walls are reasonably well preserved, and the primary steel framing appears to be in salvageable condition. The structural integrity of the wood frame monitor roof and deck has been compromised by water intrusion, and the low roof framing and deck is structurally unsound. The original roof has deteriorated to the point that the majority of the building interior is effectively exposed to weather, making the overall building in poor condition. The wood plank roof deck and the metal frame enclosure at the east addition are deteriorated and require significant remedial work.
Summary of Observations Regarding Present General Building Structural Condition (2013):	**Structural components of the building exhibit only minor progressive deterioration, with the exception of the wood frame low roofs on each side of the main building. These wood roofs have become more decayed due to unimpeded water intrusion, and failure of framing members has begun to occur. The condition of the roof in these areas is a potential safety hazard.**
Summary of Recommended Structural Repairs (2009):	One side of the monitor roof deck and the entire low roof structure on both sides of the original building must be replaced. Defective structural framing at the monitor must either be reinforced, replaced, or reconstructed. Defects at structural columns and masonry walls must be repaired.
Additional Recommendations (2009):	A detailed evaluation of the structural integrity of the monitor framing must be performed to determine if the existing central portion of the original building roof system can be salvaged.

Table 1: Structural Systems Assessment

Structural Component	Previous (2009) Condition Code	Present (2013) Condition Code	Comments
Lowest Level Floor System	3	3	
Columns	4	4	
Interior Load Bearing Walls	3	3	
Exterior Walls	3	3	
Roof Framing and Subframing	5	5	**Failure of wood framing members has begun to occur (low roof framing is more "critical" in 2013 than in 2009)**
Roof Deck	5	5	**Wood decking at low roofs of main building exhibits significant progressive decay (low roof deck is more "critical" in 2013 than in 2009)**
Monitor/Clerestory Structure (Framing, walls, and roof deck)	4	4	

Condition Code Description

(1) Excellent - Visual observation indicates no remedial work required. (less than 10% repair)
(2) Good - Visual observation indicates minimal remedial work required. (less than 10% replacement and/or 25% repair)
(3) Fair - Visual observation indicates remedial work required. (up to 25% replacement and/or 50% repair)
(4) Deteriorated - Visual observation indicates significant remedial work required. (up to 50% replacement and/or 75% repair)
(5) Critical – Visual observation indicates extensive replacement and/or repair. (over 50% replacement and/or 75% repair)

Table 2: Itemized Structural Defects

Defect Item No.	Defect Description (2009)	2013 Assessment of 2009 Itemized Defects	Photo Log Reference Nos.	
			From 2009 Report	2013
1	Cracking at northwest corner	Change in condition was not observed		
2	Roof deck rotting and decaying	**Deterioration has become more severe, and condition has become more dangerous**	3,4	**3,4**
3	Columns not attached to pier	Change in condition was not observed		
4	Crack in original east wall	Change in condition was not observed		
5	Crack in CMU east wall	Change in condition was not observed		
6	Ponding water on building floor	Change in condition was not observed	5	

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Photo Log:
2009 vs. 2013 Comparison

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PHOTOLOG: Building No. 53 Tin Shop (2009 vs. 2013 Comparison)

2009 Photo #1: Exterior building, looking at west elevation

2013 Photo #1: Exterior building**,** west and south sides

2009 Photo #2: Exterior building looking at additions on east end

2013 Photo #2: Exterior building looking at additions on east end

PHOTOLOG: Building No. 53 Tin Shop (2009 vs. 2013 Comparison)

2009 Photo #3: Severely decayed wood roof structure with daylight visible through voids in wood plank deck

2013 Photo #3: More severely decayed wood roof structure with more daylight visible through voids in wood plank deck

2009 Photo #4: Severely deteriorated wood roof structure

2013 Photo #4: Failure of framing members has begun to occur.

PHOTOLOG: Building No. 53 Tin Shop (2009 vs. 2013 Comparison)

2009 Photo #5: Standing water on floor inside building; corroded steel columns

2013 Photo #5:

No change observed

2009 Photo #6: Partially repaired roof deck at clerestory monitor

2013 Photo #6:

No change observed

PHOTOLOG: Building No. 53 Tin Shop (2009 vs. 2013 Comparison)

2009 Photo #7: Wood plank roof deck at East addition is damaged by water intrusion

2013 Photo #7:

No change observed

2009 Photo #8: Corroded metal roof deck and steel framing at East addition

2013 Photo #8:

No change observed

Condition Assessment, April 2009

Building Information | Overall Building Condition 2 | Overall Structural Condition 3

Building Name	57 - Substation No. 2	
Period of Construction	1918	
National Register Eligibility	Contributing MSHD, NFDC Context	
Building Height	1 story	
Building Footprint	996 SF	
Historic Use | Current Use	Electrical Distribution House	Electrical Substation
Potential Use | Adaptability	CO, ST	5

Character Defining Features

Exterior	Interior
Primary Building Form: Rectangular Form with Low Sloped Shed Roof Building Walls: Hollow Clay Tile with Brick Quoins Roof Structure: Steel Beams with Precast Concrete Tile Panels Windows : Steel with operable hopper Window Headers and Sills: Precast concrete, sills shaped **Secondary** Windows: Louver Ventilation Openings Below Windows Doors: Steel Fire Door & Open Mesh Doors	**Secondary** Buildings Walls: Exposure of Hollow Clay Tile with Brick Quoins Ceiling: Exposure of Precast Concrete Tile Panels

Resource Significance

The National Fertilizer Development Center (fomerly known as Nitrate Plant No. 2) has been recommended eligible to the National Register of Historic Places as a contributing resource in the Muscle Shoals Historic District. The property retains architectural integrity and is historically significant for its' role as a research facility during the World War I and World War II periods and thereafter. The period of significance dates between 1916 and 1970.

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Cyclic Assessment, July 2013

Building Information | Overall Building Condition 2 | Overall Structural Condition 3

Building Name: 57 - Substation #2

Current Use: Electrical Substation

Building 57 → N

General Comments:

The condition of this building remains similar to its condition when it was assessed in 2009. The building is still an active electrical substation for the TVA Muscle Shoals facility.

Condition Assessment, April 2009

Building Information

Building Name	57 - Substation No. 2	
Period of Construction	1918	
National Register Eligibility	Contributing MSHD, NFDC Context	
Building Height	1 story	
Building Footprint	996 SF	
Historic Use | Current Use	Electrical Distribution House	Electrical Substation
Potential Use | Adaptability	CO, ST	5

Exterior Materials and Conditions

Building Component	Building Material	Condition
Roofing | Decking	Shed; Deck: Concrete, panels	3
Exterior Envelope	Hollow Clay Tile; Brick quoins at openings/corners	3
Exterior Doors	Entry:Steel mesh	4
Windows	Steel, fixed with hopper	2
Lintels	Concrete	2
Loading Dock	N/A	
Porch	Metal: Over entry	2
Additions	N/A	

Comments

Two exhaust vents on roof
Louvres below windows at transformer room
Awning exists only at secondary entry (transformer location)
Exhaust fan over secondary entry appears to be not historic

TVA Muscle Shoals Feasibility — Muscle Shoals, Alabama
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Cyclic Assessment, July 2013

Exterior Materials and Conditions

Building Component	Building Material	Condition
Roofing / Decking	Shed; Deck: Concrete panels	3
Exterior Envelope	Hollow clay tile; Brick quoins at openings / corners	3
Exterior Doors	Entry: Steel mesh	4
Windows	Steel, fixed with hopper	2
Lintels **& Sills**	Concrete	2
Loading Dock	N / A	
Porch	Metal: Over entry	2
Additions	N / A	

New Comments

- Clay tile spalling at east and west elevations
- Concrete sill damaged on south side of west wall

Condition Assessment, April 2009

Building Information

Building Name	57 - Substation No. 2		
Period of Construction	1918		
National Register Eligibility	Contributing MSHD, NFDC Context		
Building Height	1 story		
Building Footprint	996 SF		
Historic Use | Current Use	Electrical Distribution House	|	Electrical Substation
Potential Use | Adaptability	CO, ST	|	5

Interior Materials and Conditions

Building Component	Building Material	Condition
Corridors	N/A	
Primary Space	Open: Electrical Panels	1
Secondary Space	Open: Electrical Panels	1
Secondary Space	N/A	
Secondary Space	N/A	
Flooring	Concrete, unfinished	1
Walls	Hollow Clay Tile and Brick, painted	1
Ceiling	Concrete, panels	1

Comments

Entire interior of building is painted; paint peeling in some areas
Interior fire door scrapes concrete floor

TVA Muscle Shoals Feasibility — Muscle Shoals, Alabama
Lord, Aeck & Sargent Architecture — July 31, 2009

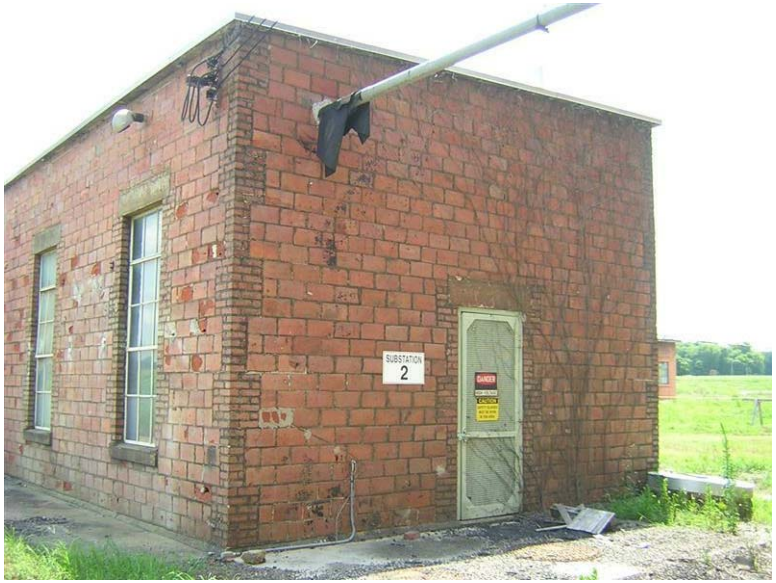
Cyclic Assessment, July 2013

Interior Materials and Conditions

Building Component	Building Material	Condition
Corridors	N / A	
Primary Space	Open: Electrical equipment	1
Secondary Space	Open: Electrical equipment	1
Secondary Space	N / A	
Secondary Space	N / A	
Flooring	Concrete, unfinished	1
Walls	Hollow clay tile and brick, painted	1
Ceiling	Concrete, panels	1

New Comments

- Moisture visible on concrete slab
- Cracking on west wall
- One line of panels at ceiling is broken



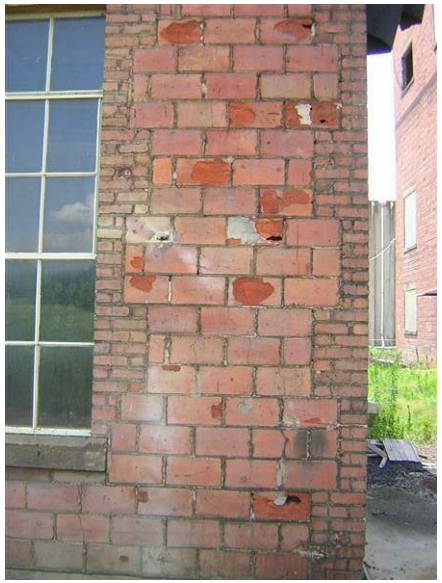
Building 57 – Substation No. 2: Overall view at the northeast corner of the building

Building 57 – Substation No. 2: Overall view of the east facade

Building 57 – Substation No. 2: Open mesh doors are one of the character defining features of this building.

Building 57 – Substation No. 2: The concrete sill is damaged at several of the windows.

Building 57 – Substation No. 2: Some of the holes in the hollow clay tile have been parged with concrete.



Building 57 – Substation No. 2: Hollow clay tile is spalling on the east facade.

Building 57 – Substation No. 2: The wall is cracked adjacent to the window in the background.

Building 57 – Substation No. 2: Moisture is visible on the concrete slab.

Building 57 – Substation No. 2: Interior view of the ceiling and raceways for electrical conduits overhead.

Building 57 – Substation No. 2: Diagonal cracks are visible at the upper walls.

Building 57 – Substation No. 2: Diagonal cracks are visible at the upper walls.

Building 57 – Substation No. 2: A line of concrete ceiling panels is broken.

Building 57 – Substation No. 2: Horizontal cracking was visible in the upper wall.

Structural Assessment – General Information

Building No.: 57 Substation No. 2	
Building Name:	Substation No. 2
Original Function:	Electrical Distribution House
Subsequent Modification:	N/A
General Building Structural Description:	One story building with load-bearing exterior masonry walls. Roof system is concrete plank roof deck supported by steel beams.
General Building Structural Condition (2009):	Structural General Building Condition Code = 3 "Fair". **(2013: Structural General Building Condition Code = 3 "Fair")** Building is in fair condition. Defects include cracks and spalls in exterior masonry walls and minor corrosion at steel roof beams.
Summary of Observations Regarding Present General Building Structural Condition (2013):	**Significant changes were not observed. Minor progressive deterioration of exterior masonry appears to be evident, though obvious change in condition could not be documented.**
Summary of Recommended Structural Repairs (2009):	Repair cracks and spalls in masonry walls, clean and paint corroded steel roof beams.
Additional Recommendations (2009):	Not applicable.

Table 1: Structural Systems Assessment

Structural Component	Previous (2009) Condition Code	Present (2013) Condition Code	Comments
Lowest Level Floor System	2	2	
Exposed Foundation or Stem Walls	2	2	
Exterior Walls	3	3	
Roof Framing and Subframing	3	3	
Roof Deck	3	3	

Condition Code Description
(1) Excellent - Visual observation indicates no remedial work required. (less than 10% repair)
(2) Good - Visual observation indicates minimal remedial work required. (less than 10% replacement and/or 25% repair)
(3) Fair - Visual observation indicates remedial work required. (up to 25% replacement and/or 50% repair)
(4) Deteriorated - Visual observation indicates significant remedial work required. (up to 50% replacement and/or 75% repair)
(5) Critical – Visual observation indicates extensive replacement and/or repair. (over 50% replacement and/or 75% repair)

Table 2: Itemized Structural Defects

Defect Item No.	Defect Description (2009)	2013 Assessment of 2009 Itemized Defects	Photo Log Reference Nos.	
			From 2009 Report	2013
1	Defective roof plank and corroded steel beam	Change in condition was not observed	7	
2	Concrete floor - ok	Change in condition was not o bserved		
3	2 cracks in interior masonry west wall	Change in condition was not observed	5,6	
4	Multiple surface spalls in exterior masonry on east side	**Minor progressive deterioration appears to be evident**	2	**2**
5	Concrete lintels ok	Change in condition was not observed		
6	Vertical cracks in masonry on west side	Change in condition was not observed	3,4	
7	Context photo - southwest corner	Change in condition was not observed	1	**1**

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Photo Log:
2009 vs. 2013 Comparison

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PHOTOLOG: Building No. 57 Substation No. 2 (2009 vs. 2013 Comparison)

2009 Photo #1: Exterior building looking at Southwest corner

2013 Photo #1: Exterior building looking at Southwest corner

2009 Photo #2: Multiple surface spalls in exterior masonry – East side

2013 Photo #2: Minor progressive deterioration of exterior masonry

PHOTOLOG: Building No. 57 Substation No. 2 (2009 vs. 2013 Comparison)

2009 Photo #3: Vertical cracks in masonry – West side

2013 Photo #3:

No change observed

2009 Photo #4: Vertical cracks in masonry – West side

2013 Photo #4:

No change observed

PHOTOLOG: Building No. 57 Substation No. 2 (2009 vs. 2013 Comparison)

2009 Photo #5: Cracks in masonry – West wall

2013 Photo #5:

No change observed

2009 Photo #6: Cracks in masonry – West wall

2013 Photo #6:

No change observed

PHOTOLOG: Building No. 57 Substation No. 2 (2009 vs. 2013 Comparison)

2009 Photo #7: Concrete roof plank appears to have been repaired; note corroded steel beam at left end of irregular surface at roof deck

No change observed

2013 Photo #7:

Condition Assessment, April 2009

Building Information | Overall Building Condition 2 | Overall Structural Condition 4

Building Name	68 - Substation #4	
Period of Construction	1918	
National Register Eligibility	Contributing MSHD, NFDC Context	
Building Height	1 story	
Building Footprint	1,352 SF	
Historic Use | Current Use	Electrical Distribution	Power Substation
Potential Use | Adaptability	ST	5

Character Defining Features

Exterior	Interior
Primary Building Form: Rectangular Form with Low Slope Shed Roof Building Walls: Hollow Clay Tile with Brick Quoins Roof Structure: Steel beams with precast concrete panels Windows: Steel with operable hopper Window Headers and Sills: Precast concrete, sills shaped	**Primary & Secondary** Exposure of Hollow Clay Tile with Brick Quoins Exposure of Precast Concrete Panels

Resource Significance

The National Fertilizer Development Center (fomerly known as Nitrate Plant No. 2) has been recommended eligible to the National Register of Historic Places as a contributing resource in the Muscle Shoals Historic District. The property retains architectural integrity and is historically significant for its' role as a research facility during the World War I and World War II periods and thereafter. The period of significance dates between 1916 and 1970.

TVA Muscle Shoals Feasibility — Muscle Shoals, Alabama

Lord, Aeck & Sargent Architecture — July 31, 2009

Cyclic Assessment, July 2013

Building Information | Overall Building Condition 2 | Overall Structural Condition 3

Building Name: 68 - Substation #4

Current Use: Vacant

General Comments:

The condition of this building remains similar to its condition when it was assessed in 2009.

Additional Character Defining Features:

Well / structure in front of building at west elevation

Condition Assessment, April 2009

Building Information

Building Name	68 - Substation #4	
Period of Construction	1918	
National Register Eligibility	Contributing MSHD, NFDC Context	
Building Height	1 story	
Building Footprint	1,352 SF	
Historic Use | Current Use	Electrical Distribution	Power Substation
Potential Use | Adaptability	ST	5

68

Exterior Materials and Conditions

Building Component	Building Material	Condition
Roofing | Decking	Shed; Concrete panels on steel frame	2
Exterior Envelope	Hollow Clay Tile; Brick quoins at openings/corners	2
Exterior Doors	Wood, plywood over 2x framing	3
Windows	Steel, operable with hopper	3
Lintels	Concrete	2
Loading Dock	N/A	
Porch	N/A	
Additions	N/A	

Comments

80% of window panes replaced with translucent fiberglass
Misc. steel conduit/raceways connected to Buildings 69 & 70
Roof has single large ventilation chimney

TVA Muscle Shoals Feasibility — Muscle Shoals, Alabama
Lord, Aeck & Sargent Architecture — July 31, 2009

Cyclic Assessment, July 2013

Exterior Materials and Conditions

Building Component	Building Material	Condition
Roofing / Decking	Shed; Concrete panels on steel frame	2
Exterior Envelope	Hollow clay tile; Brick quoins at openings/corners	2
Exterior Doors	Wood, plywood over 2x framing	3
Windows	Steel, operable with hopper	3
Lintels **& Sills**	Concrete	2
Loading Dock	N / A	
Porch	N / A	
Additions	N / A	

New Comments

- Clay tile spalling on west elevation, cracked above lintel over door on east, damaged on north wall
- Broken hollow clay tile and missing brick at northeast corner
- Through-wall ties on north, south and west elevations

Condition Assessment, April 2009

Building Information

Building Name	68 - Substation #4	
Period of Construction	1918	
National Register Eligibility	Contributing MSHD, NFDC Context	
Building Height	1 story	
Building Footprint	1,352 SF	
Historic Use | Current Use	Electrical Distribution	Power Substation
Potential Use | Adaptability	ST	5

68

Interior Materials and Conditions

Building Component	Building Material	Condition
Corridors	N/A	
Primary Space	Open: electrical equipment	2
Secondary Space	Open: electrical equipment	2
Secondary Space	N/A	
Secondary Space	N/A	
Flooring	Concrete, unfinished	2
Walls	Brick	2
Ceiling	Concrete, panels	2

Comments

Primary space has floor mounted electrical transformers and equipment
Secondary space has switchgear plus transformers in cast in place concrete housings
Original tin-covered door in brick wall between interior spaces

TVA Muscle Shoals Feasibility — Muscle Shoals, Alabama

Lord, Aeck & Sargent Architecture — July 31, 2009

Cyclic Assessment, July 2013

Interior Materials and Conditions

Building Component	Building Material	Condition
Corridors	N / A	
Primary Space	Open: electrical equipment	2
Secondary Space	Open: electrical equipment	2
Secondary Space	N / A	
Secondary Space	N / A	
Flooring	Concrete, unfinished	2
Walls	Hollow clay tile; brick	2
Ceiling	Concrete, panels	2

New Comments

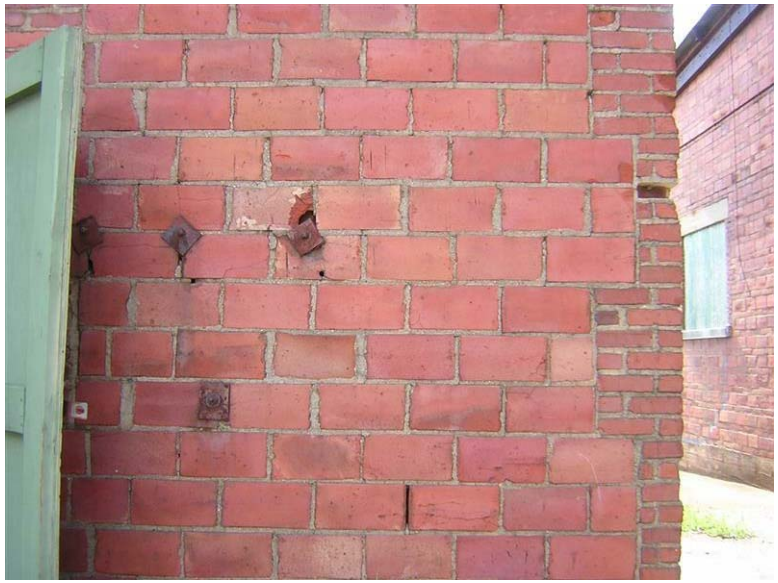
- Moisture visible on the concrete slab; slab damaged at rear entry on the east facade
- Rusting of steel members
- Concrete panels blackened adjacent to west wall

Building 68 – Substation No. 4: Overall view of the south facade

Building 68 – Substation No. 4: Hollow clay tile is spalling on the west facade. Several window panes are broken.

Building 68 – Substation No. 4: Hollow clay tile is spalling on the west facade and the metal coping is damaged.

Building 68 – Substation No. 4: The hollow clay tile and brick is damaged at the northeast corner.

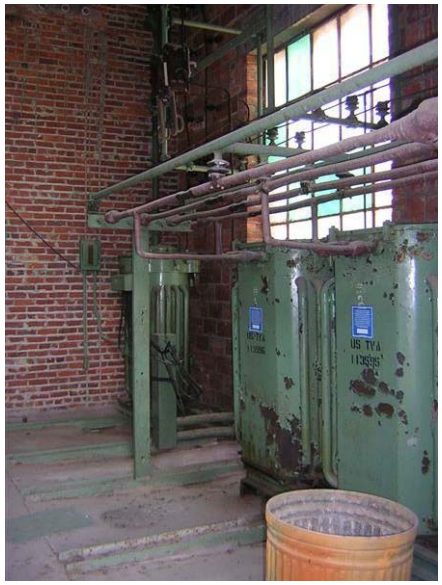


Building 68 – Substation No. 4: Portions of the hollow clay tile are damaged where through-wall ties are located on the east façade.

Building 68 – Substation No. 4: Portions of the hollow clay tile are damaged where through-wall ties are located on the south façade.

Building 68 – Substation No. 4: The wood is warped and damaged on top of this well structure.

Building 68 – Substation No. 4: Interior view of the building



Building 68 – Substation No. 4: Interior view of the building

Building 68 – Substation No. 4: The concrete slab is broken at the door opening.

Building 68 – Substation No. 4: The steel structure is rusted and efflorescence is visible on the wall.

Building 68 – Substation No. 4: A row of concrete panels along the west wall are blackened from moisture

Structural Assessment – General Information

Building No.: 68 Substation No. 4	
Building Name:	Substation No. 4
Original Function:	Electrical Distribution House
Subsequent Modification:	N/A
General Building Structural Description:	One story building with load bearing masonry walls. Roof is concrete planks supported on steel beams.
General Building Structural Condition (2009):	Structural General Building Condition Code = 3 "Fair". **(2013: Structural General Building Condition Code = 3 "Fair")** The building is in generally fair condition. Some cracks were noted in the exterior walls and the roof beams are moderately corroded.
Summary of Observations Regarding Present General Building Structural Condition (2013):	**Significant changes were not observed.**
Summary of Recommended Structural Repairs (2009):	Sand blast and paint steel roof beams. Repair cracks in exterior masonry walls.
Additional Recommendations (2009):	Not applicable.

Table 1: Structural Systems Assessment

Structural Component	Previous (2009) Condition Code	Present (2013) Condition Code	Comments
Lowest Level Floor System	3	3	
Exterior Walls	3	3	
Roof Framing and Subframing	3	3	
Roof Deck	3	3	

Condition Code Description
(1) Excellent - Visual observation indicates no remedial work required. (less than 10% repair)
(2) Good - Visual observation indicates minimal remedial work required. (less than 10% replacement and/or 25% repair)
(3) Fair - Visual observation indicates remedial work required. (up to 25% replacement and/or 50% repair)
(4) Deteriorated - Visual observation indicates significant remedial work required. (up to 50% replacement and/or 75% repair)
(5) Critical – Visual observation indicates extensive replacement and/or repair. (over 50% replacement and/or 75% repair)

Table 2: Itemized Structural Defects

Defect Item No.	Defect Description (2009)	2013 Assessment of 2009 Itemized Defects	Photo Log Reference Nos.	
			From 2009 Report	2013
1	Cracked and spalled masonry at east wall	Change in condition was not observed	3	
2	Cracked masonry at lintel	Change in condition was not observed	4	
3	Roof beams are moderately corroded	Change in condition was not observed	2	

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Photo Log:
2009 vs. 2013 Comparison

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PHOTOLOG: Building No. 68 Substation No. 4 (2009 vs. 2013 Comparison)

2009 Photo #1: East wall of substation

2013 Photo #1: East wall of substation

2009 Photo #2: Roof deck at substation

No change observed

2013 Photo #2:

PHOTOLOG: Building No. 68 Substation No. 4 (2009 vs. 2013 Comparison)

2009 Photo #3: Cracked and spalled masonry at substation

2013 Photo #3:

No change observed

2009 Photo #4: Cracked masonry at substation lintel

2013 Photo #4:

No change observed

Condition Assessment, April 2009

Building Information | Overall Building Condition 2 | Overall Structural Condition 4

Building Name	72a - Substation	
Period of Construction	1918	
National Register Eligibility	Contributing MSHD, NFDC Context	
Building Height	1 story	
Building Footprint	1,446 SF	
Historic Use | Current Use	Electrical Distribution	Power Substation
Potential Use | Adaptability	ST	5

Character Defining Features

Exterior	Interior
Primary Building Form: Rectangular Form with Low Slope Shed Roof Building Walls: Hollow Clay Tile with Brick Quoins Roof Structure: Steel beams with precast concrete panels Windows: Steel with operable hopper Window Headers and Sills: Precast concrete, sills shaped	**Primary & Secondary** Exposure of Hollow Clay Tile with Brick Quoins Exposure of Precast Concrete Panels

Resource Significance

The National Fertilizer Development Center (fomerly known as Nitrate Plant No. 2) has been recommended eligible to the National Register of Historic Places as a contributing resource in the Muscle Shoals Historic District. The property retains architectural integrity and is historically significant for its' role as a research facility during the World War I and World War II periods and thereafter. The period of significance dates between 1916 and 1970.

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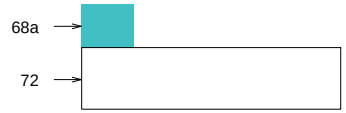
Lord, Aeck & Sargent Architecture — July 31, 2009

Cyclic Assessment, July 2013 - Building 68a

Building Information | Overall Building Condition 2 | Overall Structural Condition 3

Building Name: 68a - Substation #5

Current Use: Vacant



General Comments:

In the previous condition assessment conducted for TVA, Substation #5 was incorrectly listed as Building 72a. In the current cyclic assessment Substation #5 is identified as Building 68a. The condition of this building remains similar to its condition when it was assessed in 2009.

Additional Character Defining Feature:

Well / structure located in front of building

Condition Assessment, April 2009

Building Information

Building Name	72a - Substation	
Period of Construction	1918	
National Register Eligibility	Contributing MSHD, NFDC Context	
Building Height	1 story	
Building Footprint	1,446 SF	
Historic Use | Current Use	Electrical Distribution	Power Substation
Potential Use | Adaptability	ST	5

Exterior Materials and Conditions

Building Component	Building Material	Condition
Roofing | Decking	Shed; Concrete panels on steel frame	2
Exterior Envelope	Hollow Clay Tile; Brick quoins at openings/corners	2
Exterior Doors	Wood, plywood over 2x framing	3
Windows	Steel, operable with hopper	3
Lintels	Concrete	2
Loading Dock	N/A	
Porch	N/A	
Additions	N/A	

Comments

50% of window panes replaced with translucent fibergalss
Misc. steel conduit/raceways connected to Buildings 71 & 72
Roof has single large ventilation chimney

TVA Muscle Shoals Feasibility
Lord, Aeck & Sargent Architecture

Muscle Shoals, Alabama
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Cyclic Assessment, July 2013 - Building 68a

Exterior Materials and Conditions

Building Component	Building Material	Condition
Roofing / Decking	Shed; Concrete Panels on Steel Frame	2
Exterior Envelope	Hollow Clay Tile; Brick quoins at openings/corners	**3**
Exterior Doors	Wood, plywood over 2x framing	3
Windows	Steel, operable with hopper	3
Lintels **& Sills**	Concrete	2
Loading Dock	N / A	
Porch	N / A	
Additions	N / A	

New Comments

Building 68a

- Roof steps down at front of building
- Hole in wall at upper west facade
- Crack in clay tiles over door on east wall
- Paint flaking from doors
- Rebar exposed on concrete lintel at southwest corner of building
- Through-wall ties located on south wall

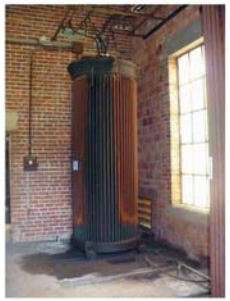
Condition Assessment, April 2009

Building Information

Building Name	72a - Substation	
Period of Construction	1918	
National Register Eligibility	Contributing MSHD, NFDC Context	
Building Height	1 story	
Building Footprint	1,446 SF	
Historic Use | Current Use	Electrical Distribution	Power Substation
Potential Use | Adaptability	ST	5

Interior Materials and Conditions

Building Component	Building Material	Condition
Corridors	N/A	
Primary Space	Open: electrical equipment	2
Secondary Space	Open: electrical equipment	2
Secondary Space	N/A	
Secondary Space	N/A	
Flooring	Concrete, unfinished	2
Walls	Hollow Clay Tile and Brick	2
Ceiling	Concrete, panels	2



Comments

Primary space has floor mounted electrical transformers and equipment
Secondary space has switchgear plus transformers in CIP concrete housings
Original metal-covered door in brick wall between interior spaces

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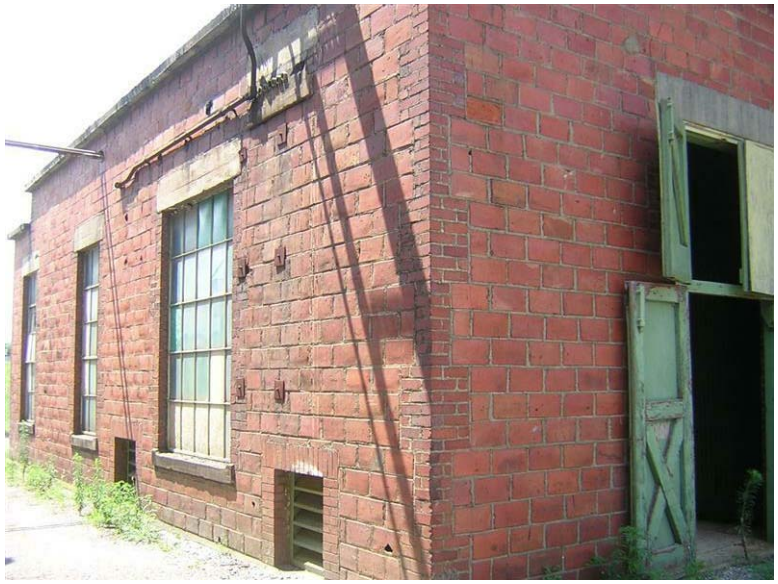
Cyclic Assessment, July 2013 - Building 68a

Interior Materials and Conditions

Building Component	Building Material	Condition
Corridors	N / A	
Primary Space	Open: electrical equipment	2
Secondary Space	Open: electrical equipment	2
Secondary Space	N / A	
Secondary Space	N / A	
Flooring	Concrete, unfinished	2
Walls	Hollow Clay Tile; Brick	2
Ceiling	Concrete, panels	2

New Comments

- Moisture visible on the concrete slab
- Rusting of steel members
- Horizontal crack in upper concrete wall

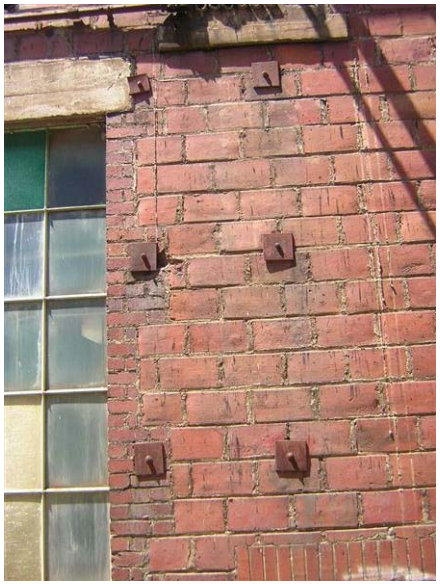


Building 68a – Substation No. 5: Overall view of the south facade

Building 68a – Substation No. 5: Holes penetrate the upper west facade.

Building 68a – Substation No. 5: Paint is flaking from the wood doors on the east facade.

Building 68a – Substation No. 5: Rebar is exposed on the concrete lintel.



Building 68a – Substation No. 5: Several through-wall ties are located on the south facade.

Building 68a – Substation No. 5: Interior view of the building

Building 68a – Substation No. 5: Moisture is visible on the concrete floor.

Building 68a – Substation No. 5: Interior view adjacent to the electrical equipment.

Building 68a – Substation No. 5: The steel structure is rusted.

Building 68a – Substation No. 5: A horizontal crack is visible on the upper concrete wall.

Structural Assessment – General Information

Building No.: 68A Substation #5 ***(incorrectly designated 72A in 2009 Report)***	
Building Name:	Substation
Original Function:	Electrical Distribution House
Subsequent Modification:	N/A
General Building Structural Description:	One story building with load bearing masonry walls. Roof is concrete planks supported on steel beams
General Building Structural Condition (2009):	Structural General Building Condition Code = 3 "Fair". **(2013: Structural General Building Condition Code = 3 "Fair")** The building is in generally fair condition. Some cracks and minor spalls were noted in the exterior walls.
Summary of Observations Regarding Present General Building Structural Condition (2013):	**Significant progressive deterioration was not observed**
Summary of Recommended Structural Repairs (2009):	Repair cracks and spalls in exterior masonry walls.
Additional Recommendations (2009):	Not applicable

Table 1: Structural Systems Assessment

Structural Component	Previous (2009) Condition Code	Present (2013) Condition Code	Comments
Lowest Level Floor System	3	3	
Exterior Walls	3	3	
Roof Framing and Subframing	2	2	
Roof Deck	3	3	

Condition Code Description
(1) Excellent - Visual observation indicates no remedial work required. (less than 10% repair)
(2) Good - Visual observation indicates minimal remedial work required. (less than 10% replacement and/or 25% repair)
(3) Fair - Visual observation indicates remedial work required. (up to 25% replacement and/or 50% repair)
(4) Deteriorated - Visual observation indicates significant remedial work required. (up to 50% replacement and/or 75% repair)
(5) Critical – Visual observation indicates extensive replacement and/or repair. (over 50% replacement and/or 75% repair)

Table 2: Itemized Structural Defects

Defect Item No.	Defect Description (2009)	2013 Assessment of 2009 Itemized Defects	Photo Log Reference Nos.	
			From 2009 Report	2013
1	Cracked masonry at east wall	Change in condition was not observed	2	
2	Spalled masonry at south wall	Change in condition was not observed	3	

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Photo Log:
2009 vs. 2013 Comparison

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PHOTOLOG: Building No. 68A Substation #5 (2009 vs. 2013 Comparison)

2009 Photo #1: West wall of substation in generally good condition

2013 Photo #1: West wall of substation in generally good condition

2009 Photo #2: Minor cracks in masonry at East wall of substation

No change observed

2013 Photo #2:

PHOTOLOG: Building No. 68A Substation #5 (2009 vs. 2013 Comparison)

2009 Photo #3: Minor spalls in exterior masonry

2013 Photo #3:

No change observed

2009 Photo #4: Minor crack on turned down slab

2013 Photo #4:

No change observed

Condition Assessment, April 2009

Building Information	Overall Building Condition 3	Overall Structural Condition 3
Building Name	69 - Catalyzer Building #1	
Period of Construction	1918	
National Register Eligibility	Contributing MSHD, NFDC Context	
Building Height	1-1/2 story	
Building Footprint	10,827 SF	
Historic Use | Current Use	Catalyzer Building	Vacant
Potential Use | Adaptability	LI, LO, RE, ST, WH	3

Character Defining Features

Exterior	Interior
Primary Building Form: Rectangular Form with Low Slope Roofs and Interrupted Clerestory Building Walls: Hollow Clay Tile with Brick Quoins; Expression of Continuous Building Ventilation; Exposed Steel Structure; Brick detailing at pipe penetration Windows: Steel with operable hopper Window Headers and Sills: Precast concrete, sills shaped	**Primary** Spatial Form: Open Central Clerestory, 2 story open **Secondary** Spatial Form: Open Floor Plan at Clerestory and Adjacent Space; Exposure of Steel Structure & Concrete Tile Roof Panels; Exposure of Hollow Clay Tile with Brick Quoins Equipment: Operating & Manufacturing Equipment

Resource Significance

The National Fertilizer Development Center (fomerly known as Nitrate Plant No. 2) has been recommended eligible to the National Register of Historic Places as a contributing resource in the Muscle Shoals Historic District. The property retains architectural integrity and is historically significant for its' role as a research facility during the World War I and World War II periods and thereafter. The period of significance dates between 1916 and 1970.

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Lord, Aeck & Sargent Architecture — July 31, 2009

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Building Information	Overall Building Condition 3	Overall Structural Condition 3

Building Name: 69 - Catalyzer Building #1

Current Use: Vacant

Building 69 N

General Comments:

The condition of the overall building remains similar to its condition when it was assessed in 2009. Interior finishes of infill offices continue to deteriorate due to lack of HVAC systems.

Condition Assessment, April 2009

Building Information

Building Name	69 - Catalyzer Building #1	
Period of Construction	1918	
National Register Eligibility	Contributing MSHD, NFDC Context	
Building Height	1-1/2 story	
Building Footprint	10,827 SF	
Historic Use | Current Use	Catalyzer Building	Vacant
Potential Use | Adaptability	LI, LO, RE, ST, WH	3

Exterior Materials and Conditions

Building Component	Building Material	Condition
Roofing | Decking	Gable; Deck:Concrete, panel; Clerestory	2
Exterior Envelope	Hollow Clay Tile; Brick quoins at openings/corners	3
Exterior Doors	Metal or Wood, Flush	3
Windows	Steel, with operable hopper	3
Lintels	Concrete	3
Loading Dock	None	
Porch	None	
Additions	None	

Comments

Ventilation/mechanical equipment added on shed roof
95% of windows covered by translucent fiberglass
Cracking in hollow clay tile at all exterior corners
New metal awnings over entry doors

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Lord, Aeck & Sargent Architecture — July 31, 2009

Cyclic Assessment, July 2013

Exterior Materials and Conditions

Building Component	Building Material	Condition
Roofing / Decking	Low-slop gable with clerestory; Deck: Concrete panel	2
Exterior Envelope	Hollow clay tile; Brick quoins at openings/corners	3
Exterior Doors	Metal or Wood, flush	**4**
Windows	Steel, with operable hopper	3
Lintels **& Sills**	Concrete	3
Loading Dock	N / A	
Porch	N / A	
Additions	N / A	

New Comments

- Newer metal awning over front door only
- Cracking in quoins at external corners of building
- Localized staining and growth on building from moisture on north wall

Condition Assessment, April 2009

Building Information

Building Name	69 - Catalyzer Building #1	
Period of Construction	1918	
National Register Eligibility	Contributing MSHD, NFDC Context	
Building Height	1-1/2 story	
Building Footprint	10,827 SF	
Historic Use | Current Use	Catalyzer Building	Vacant
Potential Use | Adaptability	LI, LO, RE, ST, WH	3

Interior Materials and Conditions

Building Component	Building Material	Condition
Corridors	Double-Loaded	2
Primary Space	Open: mechanical equipment	3
Secondary Space	Open: mezzanine/loft on side	2
Secondary Space	Office/Laboratory - walls: wood frame	3
Secondary Space	Open	2
Flooring	Concrete, unfinished / vinyl composition tile	2
Walls	Hollow Clay Tile, painted	2
Ceiling	Concrete, painted; acoustical ceiling tile	2

Comments

Surfaces in primary interior space corroded due to chemical exposure
Office / Lab spaces in poor condition - ACT failing due to water infiltration
Original doors remain in entry room(s)

TVA Muscle Shoals Feasibility
Lord, Aeck & Sargent Architecture

Muscle Shoals, Alabama
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Interior Materials and Conditions

Building Component	Building Material	Condition
Corridors	Double loaded	**3**
Primary Space	Open: Mechanical equipment	3
Secondary Space	Open: mezzanine / loft on side	2
Secondary Space	Office / Laboratory - walls: wood frame	**4**
Secondary Space	Open	2
Flooring	Concrete; unfinished / vinyl composition tile	**3**
Walls	Hollow clay tile; painted	2
Ceiling	Concrete, painted; acoustical ceiling tile	**3**

New Comments

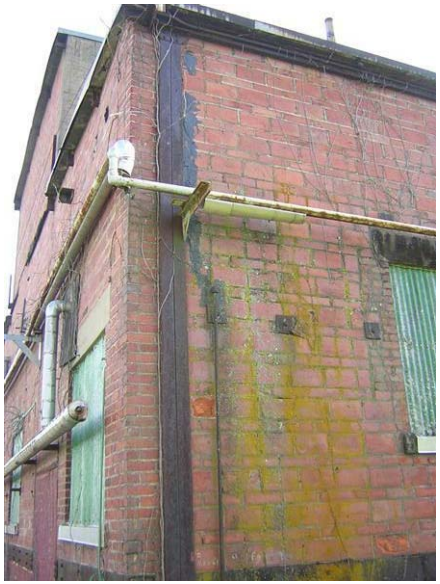
- All infill in poor condition and should be removed for building reuse
- Mezzanine and metal stairs rusted
- Concrete flooring condition has not changed, but vinyl composition tile has deteriorated due to water infiltration
- Concrete ceiling condition has not changed, but acoustical ceiling tiles have deteriorated due to water infiltration

Building 69 – Catalyzer Building No. 1: Overall view of the northwest corner of the building

Building 69 – Catalyzer Building No. 1: The historic awning has been replaced and the flush wood doors are damaged.

Building 69 – Catalyzer Building No. 1: Extant clerestory windows have several broken panes and the lower windows are covered with fiberglass.

Building 69 – Catalyzer Building No. 1: The metal covering this window opening is rusted and the exposed steel structure is rusted.



Building 69 – Catalyzer Building No. 1: Staining and mold growth are visible on the north facade.

Building 69 – Catalyzer Building No. 1: Visual separation of the corner at the east wall.

Building 69 – Catalyzer Building No. 1: Interior view of the stair leading to an enclosed mezzanine.

Building 69 – Catalyzer Building No. 1: Interior view of the hallway leading to offices / laboratories.

Building 69 – Catalyzer Building No. 1: Paint is flaking from the hollow clay tile walls in the laboratory space.

Building 69 – Catalyzer Building No. 1: Acoustical ceiling tiles are missing.

Building 69 – Catalyzer Building No. 1: CMU infill has replaced the wood louvers at the rear of the building.

Building 69 – Catalyzer Building No. 1: The steel supporting the mezzanine is rusted.

Building 69 – Catalyzer Building No. 1: The steel structure is rusted.

Structural Assessment – General Information

Building No.: 69 Catalyzer #1	
Building Name:	Catalyzer #1
Original Function:	Catalyzer Building
Subsequent Modification:	N/A
General Building Structural Description:	One story building with steel frame supporting masonry infill panels at exterior walls. The building has a single high bay with a central clerestory monitor near the west end, and the main building is an eight bay structure with a central monitor that extends from the high bay to the east end of the building. The roof structure is steel trusses with a concrete plank roof deck supported by steel beams.
General Building Structural Condition (2009):	Structural General Building Condition Code = 3 "Fair". **(2013: Structural General Building Condition Code = 3 "Fair")** The building is in generally fair condition. The concrete plank roof deck exhibits surface deterioration throughout the building. The steel roof framing is moderately corroded, and some portions of the exterior wall framing are severely corroded. Substantial settlement cracks were observed at the west end of the building in the masonry and exposed portions of the turned-down slab edge. The masonry wall is cracked and partially dislodged near the roof at the SE corner.
Summary of Observations Regarding Present General Building Structural Condition (2013):	**Significant changes were not observed. Minor progressive deterioration of structural steel frame and concrete plank roof deck appears to be evident, though obvious change in condition could not be documented.**
Summary of Recommended Structural Repairs (2009):	The structural steel framing must be sandblasted and painted. Cracks in the exposed slab edge and masonry walls must be repaired, and partially dislodged portions of the exterior masonry must be repaired or reconstructed.
Additional Recommendations (2009):	A detailed evaluation of the concrete plank roof deck will be required to determine the extent of repairs required.

Table 1: Structural Systems Assessment

Structural Component	Previous (2009) Condition Code	Present (2013) Condition Code	Comments
Lowest Level Floor System	3	3	
Columns	3	3	
Exterior Walls	3	3	
Exterior Wall Framing and Subframing	4	4	
Roof Framing and Subframing	3	3	
Roof Deck	3	3	
Monitor/Clerestory Structure (Framing, walls, and roof deck)	3	3	

Condition Code Description

(1) Excellent - Visual observation indicates no remedial work required. (less than 10% repair)
(2) Good - Visual observation indicates minimal remedial work required. (less than 10% replacement and/or 25% repair)
(3) Fair - Visual observation indicates remedial work required. (up to 25% replacement and/or 50% repair)
(4) Deteriorated - Visual observation indicates significant remedial work required. (up to 50% replacement and/or 75% repair)
(5) Critical – Visual observation indicates extensive replacement and/or repair. (over 50% replacement and/or 75% repair)

Table 2: Itemized Structural Defects

Defect Item No.	Defect Description (2009)	2013 Assessment of 2009 Itemized Defects	Photo Log Reference Nos.	
			From 2009 Report	2013
1	Severe corrosion of masonry support beam on north wall	**Minor progressive deterioration**	11,12	
2	Moderate corrosion of steel column at north wall and column line 5	**Minor progressive deterioration**		
3	Moderate corrosion of steel column at north wall and column line 5	**Minor progressive deterioration**		
4	Moderate corrosion of roof framing in the southeast corner	**Minor progressive deterioration**	7,8	
5	Surface corrosion of concrete planks at roof deck and discoloration of roof deck planks	**Minor progressive deterioration**	9,10	**9**
6	Settlement cracks in the masonry wall in northeast, southeast and southwest corners	Change in condition was not observed	3,14	
7	Thermal crack in masonry wall in high bay at the south wall	Change in condition was not observed		
8	Buckling of wall in the southeast corner	Change in condition was not observed	3	

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Photo Log:
2009 vs. 2013 Comparison

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PHOTOLOG: Building No. 69 Catalyzer #1 (2009 vs. 2013 Comparison)

2009 Photo #1: Exterior building looking at Southwest corner – note multiple cracks in masonry

2013 Photo #1: Exterior building, west elevation

2009 Photo #2: Exterior building looking at South wall – note cracks in masonry above foundation wall

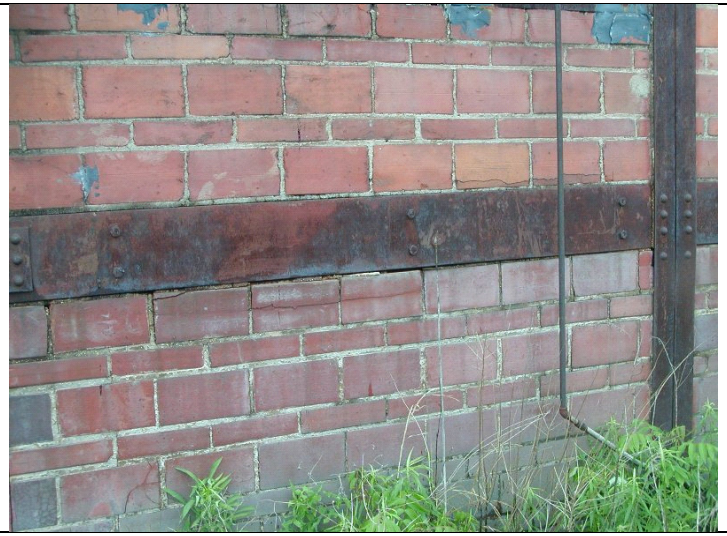
2013 Photo #2: Exterior building, north elevation

PHOTOLOG: Building No. 69 Catalyzer #1 (2009 vs. 2013 Comparison)

2009 Photo #3: Cracked and partially dislodged masonry at Southeast corner

2013 Photo #3:

No change observed



2009 Photo #4: Corroded exterior steel framing at South wall

2013 Photo #4:

No change observed

PHOTOLOG: Building No. 69 Catalyzer #1 (2009 vs. 2013 Comparison)

2009 Photo #5: Interior building looking East

2013 Photo #5:

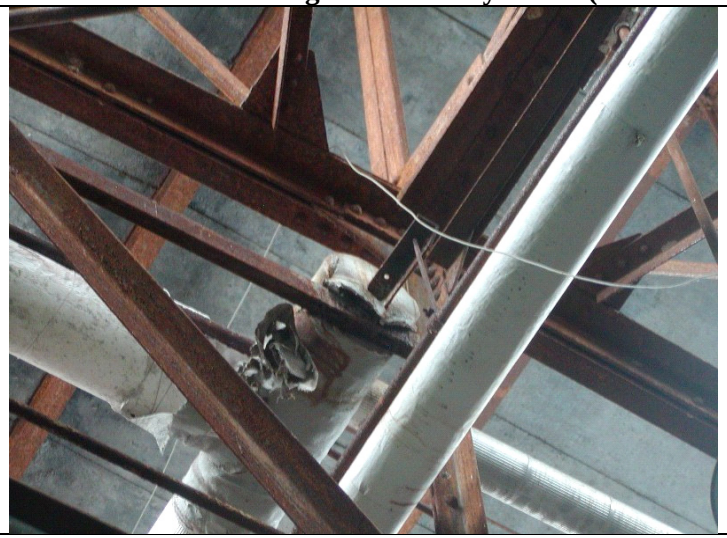
No change observed

2009 Photo #6: Interior building looking West

2013 Photo #6:

No change observed

PHOTOLOG: Building No. 69 Catalyzer #1 (2009 vs. 2013 Comparison)



2009 Photo #7: Moderately corroded steel roof framing

2013 Photo #7:

No change observed

2009 Photo #8: Moderately corroded steel roof framing and surface deterioration on concrete plank roof deck

2013 Photo #8:

No change observed

PHOTOLOG: Building No. 69 Catalyzer #1 (2009 vs. 2013 Comparison)

2009 Photo #9: Monitor roof with corroded steel framing and surface deterioration on concrete plank roof deck

2013 Photo #9: Minor progressive deterioration of steel framing and concrete plank roof deck appears to be evident

2009 Photo #10: Corroded steel framing and deteriorated roof deck at low roof

No change observed

2013 Photo #10:

PHOTOLOG: Building No. 69 Catalyzer #1 (2009 vs. 2013 Comparison)

2009 Photo #11: Heavily corroded steel framing at North wall

2013 Photo #11:

No change observed

2009 Photo #12: Heavily corroded steel framing at North wall

2013 Photo #12:

No change observed

PHOTOLOG: Building No. 69 Catalyzer #1 (2009 vs. 2013 Comparison)

2009 Photo #13: Previously repaired cracks in wall at Northwest corner

2013 Photo #13:

No change observed

2009 Photo #14: Cracks in masonry and foundation wall at Southwest corner

2013 Photo #14:

No change observed

Condition Assessment, April 2009

Building Information | Overall Building Condition 3 | Overall Structural Condition 4

Building Name	70 - Catalyzer Building #2	
Period of Construction	1918	
National Register Eligibility	Contributing MSHD, NFDC Context	
Building Height	1-1/2 story	
Building Footprint	11,546 SF	
Historic Use | Current Use	Catalyzer Building	Vacant
Potential Use | Adaptability	LI, RE, ST, WH	4

Character Defining Features

Exterior	Interior
Primary Building Form: Rectangular Form with Low Slope Roofs and Interrupted Clerestory Building Walls: Hollow Clay Tile with Brick Quoins; Expression of Continuous Building Ventilation; Exposed Steel Structure; Brick detailing at pipe penetration Windows: Steel with operable hopper Window Headers and Sills: Precast concrete, sills shaped	**Primary** Spatial Form: Open Central Clerestory, 2 story open **Secondary** Spatial Form: Open Floor Plan at Clerestory and Adjacent Space; Exposure of Steel Structure & Concrete Tile Roof Panels; Exposure of Hollow Clay Tile with Brick Quoins

Resource Significance

The National Fertilizer Development Center (fomerly known as Nitrate Plant No. 2) has been recommended eligible to the National Register of Historic Places as a contributing resource in the Muscle Shoals Historic District. The property retains architectural integrity and is historically significant for its' role as a research facility during the World War I and World War II periods and thereafter. The period of significance dates between 1916 and 1970.

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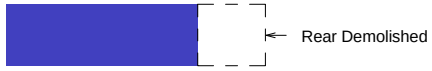
Building Information | Overall Building Condition 3 | Overall Structural Condition 4

Building Name: 70 - Catalyzer Building #2

Current Use: Vacant



Building 70

General Comments:

The condition of the overall building remains similar to its condition when it was assessed in 2009. The rear wall of the building appears to have holes forming and the clay tile is distressed. It is unlikely that interior infill finishes for offices can be retained in a building reuse due to moisture infiltration and lack of HVAC systems.

Condition Assessment, April 2009

Building Information

Building Name	70 - Catalyzer Building #2	
Period of Construction	1918	
National Register Eligibility	Contributing MSHD, NFDC Context	
Building Height	1-1/2 story	
Building Footprint	11,546 SF	
Historic Use | Current Use	Catalyzer Building	Vacant
Potential Use | Adaptability	LI, RE, ST, WH	4

Exterior Materials and Conditions

Building Component	Building Material	Condition
Roofing | Decking	Gable; Deck:Concrete, panel; Clerestory	2
Exterior Envelope	Hollow Clay Tile; Brick quoins at openings/corners	3
Exterior Doors	Wood, flush	3
Windows	Steel, with operable hopper	2
Lintels	Concrete	2
Loading Dock	N/A	
Porch	Wood: Over side entry, not historic	5
Additions	Rear 1/3 of building demolished	5

Comments

Rear 1/3 of building demolished - slab remains
100% of windows covered by translucent fiberglass
Cracking in hollow clay tile at all exterior corners
New metal awnings over entry doors
Ventilation/mechanical equipment added on shed roof

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Lord, Aeck & Sargent Architecture

Muscle Shoals, Alabama
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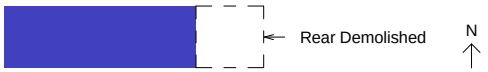
Cyclic Assessment, July 2013

Exterior Materials and Conditions

Building Component	Building Material	Condition
Roofing / Decking	Low-slope gable with clerestory; Deck: Concrete panel	2
Exterior Envelope	Hollow clay tile; Brick quoins at openings / corners	3
Exterior Doors	Wood, flush	**4**
Windows	Steel, fixed with operable hopper	2
Lintels **& Sills**	Concrete	2
Loading Dock	N / A	
Porch	Wood: Over side entry, not historic	5
Additions	Rear 1/3 of building demolished	5

New Comments

- Exposed structural steel on exterior and interior of building is rusting
- Several through-wall ties on north and south elevation
- Exterior doors have worsened in condition
- Clay tile collapsing and has holes in rear



Condition Assessment, April 2009

Building Information

Building Name	70 - Catalyzer Building #2	
Period of Construction	1918	
National Register Eligibility	Contributing MSHD, NFDC Context	
Building Height	1-1/2 story	
Building Footprint	11,546 SF	
Historic Use | Current Use	Catalyzer Building	Vacant
Potential Use | Adaptability	LI, RE, ST, WH	4

Interior Materials and Conditions

Building Component	Building Material	Condition
Corridors	Wood framed	2
Primary Space	Entry Rooms	2
Secondary Space	Open: shop space	2
Secondary Space	Office/Laboratory - walls: wood frame	3
Secondary Space	N/A	
Flooring	Concrete, unfinished / vinyl composition tile	2
Walls	Hollow Clay Tile, painted	3
Ceiling	Concrete, painted; acoustical ceiling tile	3

Comments

Office and Labs in poor condition - ACT failing due to water infiltration

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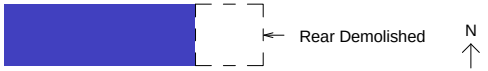
Interior Materials and Conditions

Building Component	Building Material	Condition
Corridors	Wood framed	2
Primary Space	Entry Rooms	2
Secondary Space	Open: shop space	2
Secondary Space	Office / Laboratory - walls: wood frame	**4**
Secondary Space	N / A	
Flooring	Concrete; unfinished / vinyl composition tile	**5**
Walls	Hollow clay tile, painted	3
Ceiling	Concrete, painted; acoustical ceiling tile	**5**

New Comments

- Vinyl composition tiles, acoustical ceiling tiles, and wood framed infill would need to be replaced for building reuse. Water has significantly damaged the infill.
- Doors leading to exterior have worsened in condition



Building 70 – Catalyzer Building No. 2: Overall view of the south facade

Building 70 – Catalyzer Building No. 2: The rear of the building was damaged in a fire and has been demolished.

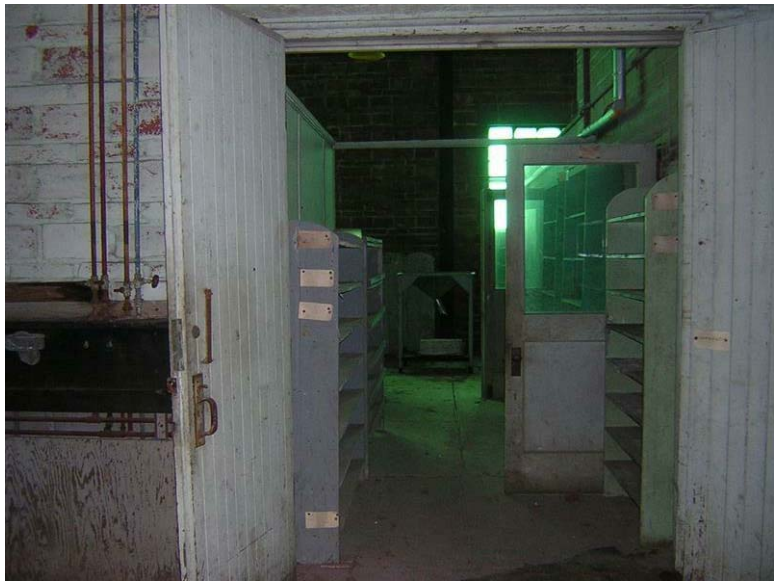
Building 70 – Catalyzer Building No. 2: The wood door and awning are damaged.

Building 70 – Catalyzer Building No. 2: The hollow clay tile is broken at the corner where the adjacent portion of the building has been demolished.

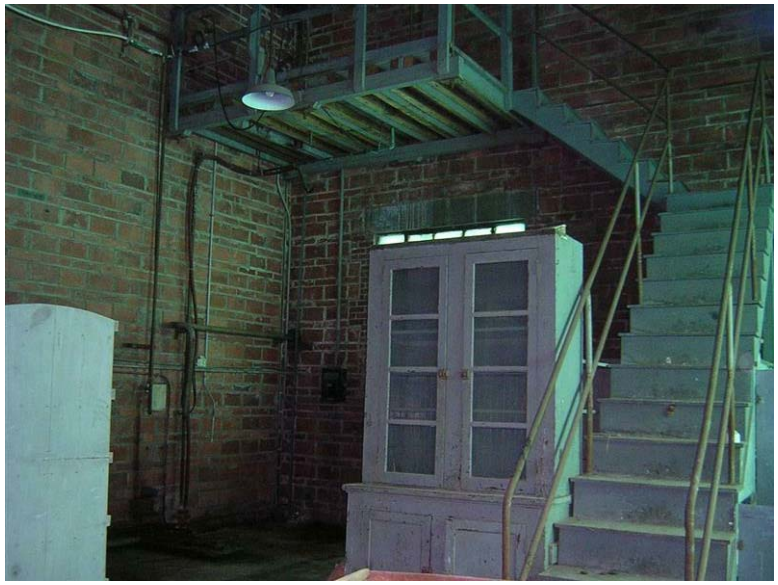
Building 70 – Catalyzer Building No. 2: There is a hole in the wall at the rear of the building.

Building 70 – Catalyzer Building No. 2: The wall is caving in at the rear of the building.

Building 70 – Catalyzer Building No. 2: Interior view of the building



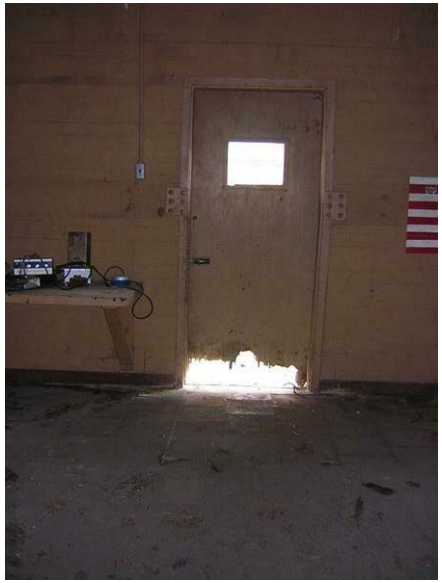
Building 70 – Catalyzer Building No. 2: Interior view of the office / laboratory spaces



Building 70 – Catalyzer Building No. 2: Interior view of the mezzanine

Building 70 – Catalyzer Building No. 2: Water infiltration has stained this interior partition.

Building 70 – Catalyzer Building No. 2: This infill is unfinished with exposed wood members.



Building 70 – Catalyzer Building No. 2: This door leading to the exterior has worsened in condition.

Structural Assessment – General Information

Building No.: 70 Catalyzer #2	
Building Name:	Catalyzer #2
Original Function:	Catalyzer Building
Subsequent Modification:	East End Demolished
General Building Structural Description:	One story building with steel frame supporting masonry infill panels at exterior walls. The building has a single high bay with a central clerestory monitor near the west end, and it appears that five bays of the original building were demolished at the east end. The east end is now a three bay structure with a central monitor that extends from the high bay to a masonry wall that appears to have previously been an interior partition. The roof structure is steel trusses with a concrete plank roof deck supported by steel beams.
General Building Structural Condition (2009):	Structural General Building Condition Code = 4 "Deteriorated". **(2013: Structural General Building Condition Code = 4 "Deteriorated")** The building is in generally poor condition. The steel framing is moderately corroded, and the concrete plank roof deck appears to be significantly deteriorated. Cracks and spalls were noted in the exterior masonry infill panels, and the east wall was not repaired when the end of the building beyond was demolished. At the west end of the building the masonry infill panels extend below grade, and settlement cracks were observed at the northwest corner.
Summary of Observations Regarding Present General Building Structural Condition (2013):	**Significant changes were not observed. General progressive deterioration of exterior masonry, structural steel frame, and concrete plank roof deck appears to be evident, though obvious changes in condition could not be documented.**
Summary of Recommended Structural Repairs (2009):	The structural steel framing must be sandblasted and painted. Remediation or replacement of the concrete plank roof deck will be required. Cracks and spalls in the exterior masonry walls must be repaired. A substantial portion of the east wall requires repair.
Additional Recommendations (2009):	A detailed evaluation of the concrete plank roof deck will be required to determine the type of remediation and the extent of repairs and/or replacement required.

Table 1: Structural Systems Assessment

Structural Component	Previous (2009) Condition Code	Present (2013) Condition Code	Comments
Lowest Level Floor System	3	3	
Columns	3	3	
Exterior Walls	3	3	
Exterior Wall Framing and Subframing	3	3	
Roof Framing and Subframing	3	3	
Roof Deck	4	4	
Monitor/Clerestory Structure (Framing, walls, and roof deck)	4	4	

Condition Code Description
(1) Excellent - Visual observation indicates no remedial work required. (less than 10% repair)
(2) Good - Visual observation indicates minimal remedial work required. (less than 10% replacement and/or 25% repair)
(3) Fair - Visual observation indicates remedial work required. (up to 25% replacement and/or 50% repair)
(4) Deteriorated - Visual observation indicates significant remedial work required. (up to 50% replacement and/or 75% repair)
(5) Critical – Visual observation indicates extensive replacement and/or repair. (over 50% replacement and/or 75% repair)

Table 2: Itemized Structural Defects

Defect Item No.	Defect Description (2009)	2013 Assessment of 2009 Itemized Defects	Photo Log Reference Nos.	
			From 2009 Report	2013
1	Cracking on west face of building	Change in condition was not observed		
2	Cracking at southwest corner	Change in condition was not observed	5	
3	Cracking at northwest corner	Change in condition was not observed	6	

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Photo Log:
2009 vs. 2013 Comparison

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PHOTOLOG: Building No. 70 Catalyzer #2 (2009 vs. 2013 Comparison)

2009 Photo #1: Exterior building – West side

2013 Photo #1: Exterior building – West side

2009 Photo #2: Exterior building – North side

No change observed

2013 Photo #2:

PHOTOLOG: Building No. 70 Catalyzer #2 (2009 vs. 2013 Comparison)

2009 Photo #3: Exterior building – South side

2013 Photo #3:

No change observed

2009 Photo #4: East end of building – end wall is former interior wall

2013 Photo #4: East end of building – end wall is former interior wall – significant changes were not observed

PHOTOLOG: Building No. 70 Catalyzer #2 (2009 vs. 2013 Comparison)

2009 Photo #5: Crack in South exterior wall

2013 Photo #5:

No change observed

2009 Photo #6: Crack in wall at Northwest corner

2013 Photo #6:

No change observed

PHOTOLOG: Building No. 70 Catalyzer #2 (2009 vs. 2013 Comparison)

2009 Photo #7: Interior building at high bay

2013 Photo #7:

No change observed

2009 Photo #8: Interior building at high bay

2013 Photo #8:

No change observed

PHOTOLOG: Building No. 70 Catalyzer #2 (2009 vs. 2013 Comparison)

2009 Photo #9: Interior building

2013 Photo #9:

No change observed

2009 Photo #10: Corroded steel framing and deteriorated roof deck

2013 Photo #10:

No change observed

Condition Assessment, April 2009

Building Information | Overall Building Condition 3 | Overall Structural Condition 3

Building Name	71 - Catalyzer Building #3	
Period of Construction	1918	
National Register Eligibility	Contributing MSHD, NFDC Context	
Building Height	1-1/2 story	
Building Footprint	11,103 SF	
Historic Use | Current Use	Catalyzer Building	Vacant
Potential Use | Adaptability	LI, RE, ST, WH	3

Character Defining Features

Exterior	Interior
Primary Building Form: Rectangular Form with Low SLope Roofs and Interrupted Clerestory Building Walls: Hollow Clay Tile with Brick Quoins; Expression of Continuous Building Ventilation; Exposed Steel Structure; Brick detailing at pipe penetration Windows: Steel with operable hopper Window Headers and Sills: Precast concrete, sills shaped	**Primary** Spatial Form: Open Central Clerestory, 2 story open **Secondary** Spatial Form: Open Floor Plan at Clerestory and Adjacent Space; Exposure of Steel Structure & Concrete Tile Roof Panels; Exposure of Hollow Clay Tile with Brick Quoins

Resource Significance

The National Fertilizer Development Center (fomerly known as Nitrate Plant No. 2) has been recommended eligible to the National Register of Historic Places as a contributing resource in the Muscle Shoals Historic District. The property retains architectural integrity and is historically significant for its' role as a research facility during the World War I and World War II periods and thereafter. The period of significance dates between 1916 and 1970.

TVA Muscle Shoals Feasibility — Muscle Shoals, Alabama

Lord, Aeck & Sargent Architecture — July 31, 2009

Cyclic Assessment, July 2013

Building Information Overall Building Condition 3 Overall Structural Condition 3

Building Name: 71 - Catalyzer Building #3

Current Use: Vacant

Building 71

N

General Comments:

The condition of the overall building remains similar to its condition when it was assessed in 2009. It is unlikely that interior infill finishes such as gypsum board can be retained in a building reuse due to moisture infiltration and a lack of HVAC systems.

Condition Assessment, April 2009

Building Information

Building Name	71 - Catalyzer Building #3	
Period of Construction	1918	
National Register Eligibility	Contributing MSHD, NFDC Context	
Building Height	1-1/2 story	
Building Footprint	11,103 SF	
Historic Use | Current Use	Catalyzer Building	Vacant
Potential Use | Adaptability	LI, RE, ST, WH	3

Exterior Materials and Conditions

Building Component	Building Material	Condition
Roofing | Decking	Gable; Deck:Concrete, panel; Clerestory	2
Exterior Envelope	Hollow Clay Tile; Brick quoins at openings/corners	3
Exterior Doors	Entry: Wood,vertical panel	2
Windows	Steel, fixed with hopper	2
Lintels	Concrete	2
Loading Dock	N/A	
Porch	N/A	
Additions	N/A	

Comments

80% of windows covered by translucent fiberglass
Cracking in hollow clay tile at all exterior corners
Rear windows replaced with double-hung aluminum units

TVA Muscle Shoals Feasibility — Muscle Shoals, Alabama
Lord, Aeck & Sargent Architecture — July 31, 2009

Cyclic Assessment, July 2013

Exterior Materials and Conditions

Building Component	Building Material	Condition
Roofing / Decking	Low-slope gable with clerestory; Deck: Concrete panel	2
Exterior Envelope	Hollow clay tile; Brick quoins at openings/corners	3
Exterior Doors	Entry: Wood, vertical panel	2
Windows	Steel, fixed with hopper; Non-historic aluminum	2
Lintels **& Sills**	Concrete	2
Loading Dock	N / A	
Porch	N / A	
Additions	N / A	

New Comments

- Metal cylindrical structure located adjacent to building rusted
- Cracking in concrete footings
- Localized cracking at lower wall; cracks along quoins at rear of building

Condition Assessment, April 2009

Building Information

Building Name	71 - Catalyzer Building #3	
Period of Construction	1918	
National Register Eligibility	Contributing MSHD, NFDC Context	
Building Height	1-1/2 story	
Building Footprint	11,103 SF	
Historic Use | Current Use	Catalyzer Building	Vacant
Potential Use | Adaptability	LI, RE, ST, WH	3

Interior Materials and Conditions

Building Component	Building Material	Condition
Corridors	N/A	
Primary Space	Open: Shop Equipment	2
Secondary Space	Open: shop space	2
Secondary Space	Vault	2
Secondary Space	N/A	
Flooring	Concrete, unfinished	2
Walls	Hollow Clay Tile, painted	3
Ceiling	Exposed Beams: Steel; Concrete, panels	2

Comments

Secondary (entry) space contains an approx. 15'x20' solid concrete vault
Interior walls and trusses painted

TVA Muscle Shoals Feasibility — Muscle Shoals, Alabama
Lord, Aeck & Sargent Architecture — July 31, 2009

Cyclic Assessment, July 2013

Interior Materials and Conditions

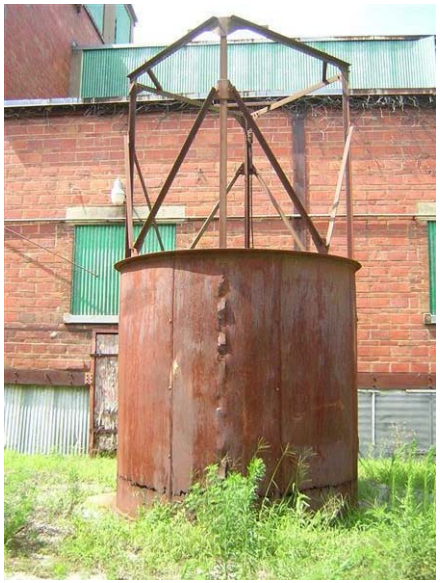
Building Component	Building Material	Condition
Corridors	N / A	
Primary Space	Open: Shop equipment	2
Secondary Space	Open: shop space	2
Secondary Space	Vault	2
Secondary Space	N / A	
Flooring	Concrete; unfinished	2
Walls	Hollow clay tile; Wood stud	3
Ceiling	Exposed beams: Steel; Concrete, panels	2

New Comments

- Vault area inaccessible; fenced on outside and door to vault where ramp is located is inaccessible from inside
- Gypsum wall damaged with holes from water infiltration
- Exposed rebar on several concrete ceiling panels

Building 71 – Catalyzer Building No. 3: Overall view of the north facade

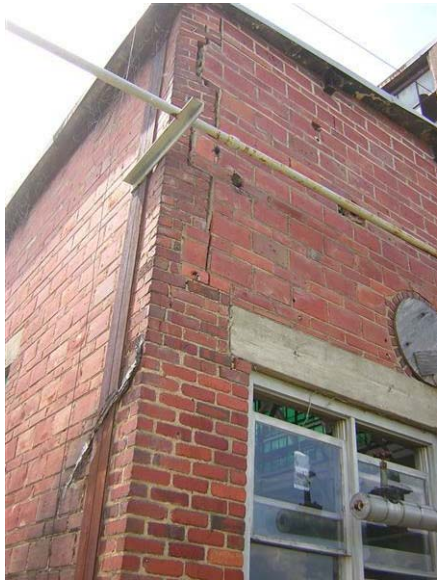
Building 71 – Catalyzer Building No. 3: The original steel windows have been replaced with aluminum windows.



Building 71 – Catalyzer Building No. 3: The cylindrical metal structure adjacent to the building is rusted.

Building 71 – Catalyzer Building No. 3: The concrete footing is broken.

Building 71 – Catalyzer Building No. 3: Several wood louvers are broken and damaged.



Building 71 – Catalyzer Building No. 3: The quoins are cracked at the rear corners.

Building 71 – Catalyzer Building No. 3: Interior view of a metal awning

Building 71 – Catalyzer Building No. 3: Metal decking has been placed over this interior infill.

Building 71 – Catalyzer Building No. 3: The doors leading to the vault were locked and the area was gated from the exterior.

Building 71 – Catalyzer Building No. 3: Paint is flaking from the interior partition wall, which has several holes.

Building 71 – Catalyzer Building No. 3: Water infiltration has severely damaged the wood stud wall.

Building 71 – Catalyzer Building No. 3: Water infiltration has stained the concrete ceiling tiles.

Structural Assessment – General Information

Building No.: 71 Catalyzer #3	
Building Name:	Catalyzer #3
Original Function:	Catalyzer Building
Subsequent Modification:	Interior Vault
General Building Structural Description:	One story building with steel frame supporting masonry infill panels at exterior walls. The building has a single high bay with a central clerestory monitor near the west end, and the main building is an eight bay structure with a central monitor that extends from the high bay to the east end of the building. The roof structure is steel trusses with a concrete plank roof deck supported by steel beams. Shutters are installed between columns at floor level on the long sides of the building. The building floor is a topping slab that covers the original floor construction. An interior vault was constructed at the west end of the building.
General Building Structural Condition (2009):	Structural General Building Condition Code = 3 "Fair". **(2013: Structural General Building Condition Code = 3 "Fair")** The building is in generally fair condition. The steel framing is mildly corroded, and the concrete plank roof deck exhibits surface deterioration throughout much of the main building. The roof deck is heavily deteriorated above the vault area at the west end of the building. Cracked and spalled concrete piers at column attachments were observed, and some cracks were noted in the exterior masonry walls.
Summary of Observations Regarding Present General Building Structural Condition (2013):	**Significant changes were not observed. General progressive deterioration of exterior masonry, structural steel frame, and concrete plank roof deck appears to be evident, though obvious changes in condition could not be documented. The vault area at the west end of the building was not accessible at the time of the Cyclic Structural Assessment and could not be observed.**
Summary of Recommended Structural Repairs (2009):	The structural steel framing must be cleaned and repainted. Remediation of the concrete plank roof deck in the main building will be required, and repair or replacement of the roof deck at the west end will be required. Cracks in the exterior masonry walls must be repaired, and deteriorated concrete piers at column attachments must be repaired.
Additional Recommendations (2009):	A detailed evaluation of the concrete plank roof deck will be required to determine the type of remediation and the extent of repairs and/or replacement required.

Table 1: Structural Systems Assessment

Structural Component	Previous (2009) Condition Code	Present (2013) Condition Code	Comments
Lowest Level Floor System	3	3	
Columns	3	3	
Exterior Walls	3	3	**General progressive deterioration of masonry deficiencies was observed in isolated locations**
Exterior Wall Framing and Subframing	3	3	
Roof Framing and Subframing	3	3	
Roof Deck	4	4	
Monitor/Clerestory Structure (Framing, walls, and roof deck)	3	3	

Condition Code Description
(1) Excellent - Visual observation indicates no remedial work required. (less than 10% repair)
(2) Good - Visual observation indicates minimal remedial work required. (less than 10% replacement and/or 25% repair)
(3) Fair - Visual observation indicates remedial work required. (up to 25% replacement and/or 50% repair)
(4) Deteriorated - Visual observation indicates significant remedial work required. (up to 50% replacement and/or 75% repair)
(5) Critical – Visual observation indicates extensive replacement and/or repair. (over 50% replacement and/or 75% repair)

Table 2: Itemized Structural Defects

Defect Item No.	Defect Description (2009)	2013 Assessment of 2009 Itemized Defects	Photo Log Reference Nos.	
			From 2009 Report	2013
1	Minor infill cracking at northeast corner	Change in condition was not observed		
2	Infill cracking and displacement at southeast corner	**General Progressive deterioration was observed**	12	**12**
3	Minor cracking due sag at door opening	Change in condition was not observed		
4	Step cracking at northeast corner	Change in condition was not observed	11	
5	Northwest corner cracking	Change in condition was not observed		
6	Footing pier cracked and spalled	Change in condition was not observed	5,6	

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Photo Log:
2009 vs. 2013 Comparison

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PHOTOLOG: Building No. 71 Catalyzer #3 (2009 vs. 2013 Comparison)

2009 Photo #1: Exterior building – North side

2013 Photo #1:

No change observed

2009 Photo #2: Exterior building – North side

2013 Photo #2:

No change observed

PHOTOLOG: Building No. 71 Catalyzer #3 (2009 vs. 2013 Comparison)

2009 Photo #3: Exterior building looking at Northwest corner

2013 Photo #3: Exterior building, west elevation

2009 Photo #4: Cracked concrete pier and masonry at Northwest corner

No change observed

2013 Photo #4:

PHOTOLOG: Building No. 71 Catalyzer #3 (2009 vs. 2013 Comparison)

2009 Photo #5: Deteriorated concrete pier at column

2013 Photo #5:

No change observed

2009 Photo #6: Deteriorated concrete pier at column

2013 Photo #6:

No change observed

PHOTOLOG: Building No. 71 Catalyzer #3 (2009 vs. 2013 Comparison)

2009 Photo #7: Interior building looking West

2013 Photo #7:

No change observed

2009 Photo #8: Monitor roof looking West

2013 Photo #8:

No change observed

PHOTOLOG: Building No. 71 Catalyzer #3 (2009 vs. 2013 Comparison)

2009 Photo #9: Interior building looking East

2013 Photo #9:

No change observed

2009 Photo #10: Deteriorated concrete plank at roof deck

2013 Photo #10:

No change observed

PHOTOLOG: Building No. 71 Catalyzer #3 (2009 vs. 2013 Comparison)

2009 Photo #11: Interior crack in masonry at East wall

2013 Photo #11:

No change observed

2009 Photo #12: Infill cracking and displacement at Southeast corner

2013 Photo #12: General progressive deterioration was observed

PHOTOLOG: Building No. 71 Catalyzer #3 (2009 vs. 2013 Comparison)

2009 Photo #13: Interior building at West end

2013 Photo #13:

Space was not accessible

2009 Photo #14: Heavily deteriorated roof deck at West end

2013 Photo #14:

Space was not accessible

Condition Assessment, April 2009

Building Information Overall Building Condition 3 Overall Structural Condition 4

Building Name	72 - Catalyzer Building #4	
Period of Construction	1918	
National Register Eligibility	Contributing MSHD, NFDC Context	
Building Height	1-1/2 story	
Building Footprint	11,099 SF	
Historic Use | Current Use	Catalyzer Building	Vacant
Potential Use | Adaptability	LI, RE, ST, WH	3

Character Defining Features

Exterior	Interior
Primary Building Form: Rectangular Form with Low Sloped Roofs and Interrupted Clerestory Building Walls: Hollow Clay Tile with Brick Quoins; Expression of Continuous Building Ventilation; Exposed Steel Structure; Brick detailing at pipe penetration Windows: Steel with operable hopper Window Headers and Sills: Precast concrete, sills shaped	**Primary** Spatial Form: Open Central Clerestory, 2 story open **Secondary** Spatial Form: Open Floor Plan at Clerestory and Adjacent Space; Exposure of Steel Structure & Concrete Tile and Roof Panels; Exposure of Hollow Clay Tile with Brick Quoins

Resource Significance

The National Fertilizer Development Center (fomerly known as Nitrate Plant No. 2) has been recommended eligible to the National Register of Historic Places as a contributing resource in the Muscle Shoals Historic District. The property retains architectural integrity and is historically significant for its' role as a research facility during the World War I and World War II periods and thereafter. The period of significance dates between 1916 and 1970.

TVA Muscle Shoals Feasibility Muscle Shoals, Alabama

Lord, Aeck & Sargent Architecture July 31, 2009

Cyclic Assessment, July 2013

Building Information Overall Building Condition 3 Overall Structural Condition 4

Building Name: 72 - Catalyzer Building #4

Current Use: Vacant

Building 72 N

General Comments:

The condition of the overall building remains similar to its condition when it was assessed in 2009. It is unlikely that interior infill finishes such as gypsum board can be retained in a building reuse due to moisture infiltration and a lack of HVAC systems.

Condition Assessment, April 2009

Building Information

Building Name	72 - Catalyzer Building #4	
Period of Construction	1918	
National Register Eligibility	Contributing MSHD, NFDC Context	
Building Height	1-1/2 story	
Building Footprint	11,099 SF	
Historic Use | Current Use	Catalyzer Building	Vacant
Potential Use | Adaptability	LI, RE, ST, WH	3

Exterior Materials and Conditions

Building Component	Building Material	Condition
Roofing | Decking	Gable; Deck:Concrete, panel; Clerestory	2
Exterior Envelope	Hollow Clay Tile; Brick quoins at openings/corners	3
Exterior Doors	Metal or Wood, Flush	3
Windows	Steel, operable with hopper	2
Lintels	Concrete	2
Loading Dock	N/A	
Porch	N/A	
Additions	N/A	

Comments

TVA Muscle Shoals Feasibility
Lord, Aeck & Sargent Architecture

Muscle Shoals, Alabama
July 31, 2009

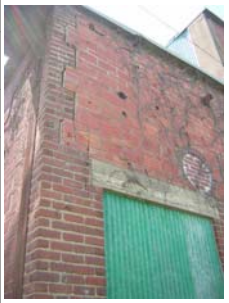
Cyclic Assessment, July 2013

Exterior Materials and Conditions

Building Component	Building Material	Condition
Roofing / Decking	Low-slope gable; Deck: Concrete panel	2
Exterior Envelope	Hollow clay tile; Brick quoins at openings/corners	3
Exterior Doors	Metal or wood, flush	3
Windows	Steel, operable with hopper	2
Lintels **& Sills**	Concrete	2
Loading Dock	N / A	
Porch	N / A	
Additions	N / A	

New Comments

- Windows infilled on west and southwest walls
- Steel stair on south to roof in critical condition
- Wood doors damaged and missing from hinges
- Cracking of hollow clay tile at quoin locations on northeast and southeast corners
- Clay tile spalling on west wall



Condition Assessment, April 2009

Building Information

Building Name	72 - Catalyzer Building #4	
Period of Construction	1918	
National Register Eligibility	Contributing MSHD, NFDC Context	
Building Height	1-1/2 story	
Building Footprint	11,099 SF	
Historic Use | Current Use	Catalyzer Building	Vacant
Potential Use | Adaptability	LI, RE, ST, WH	3

Interior Materials and Conditions

Building Component	Building Material	Condition
Corridors	Wood framed	2
Primary Space	Open: Laboratory Equipment	3
Secondary Space	Offices and laboratories	3
Secondary Space	Open	3
Secondary Space	N/A	
Flooring	Concrete, unfinished	2
Walls	Wood Stud	3
Ceiling	Exposed Beams: Steel; Concrete, ACT	2

Comments

TVA Muscle Shoals Feasibility
Lord, Aeck & Sargent Architecture

Muscle Shoals, Alabama
July 31, 2009

Cyclic Assessment, July 2013

Interior Materials and Conditions

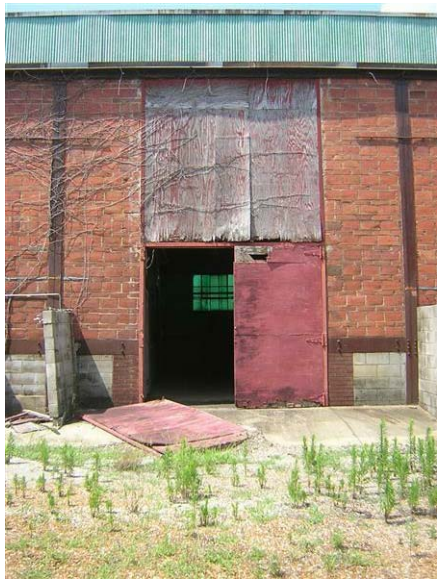
Building Component	Building Material	Condition
Corridors	Wood framed	**3**
Primary Space	Open: Laboratory equipment	3
Secondary Space	Offices and laboratories	3
Secondary Space	Open	3
Secondary Space	N / A	
Flooring	Concrete; unfinished; Wood	2
Walls	Hollow clay tile; Wood stud	3
Ceiling	Exposed beams: Steel; Concrete, ACT	2

New Comments

- Concrete slab is cracking; wood flooring has a hole where water has entered the building
- Infill has continued to deteriorate and would likely need to be removed to reuse the building

Building 72 – Catalyzer Building No. 4: Overall view of the east facade

Building 72 – Catalyzer Building No. 4: The exterior metal stair is rusted and in poor condition.



Building 72 – Catalyzer Building No. 4: The doors at this opening are in poor condition. One door is missing from its hinges.

Building 72 – Catalyzer Building No. 4: Cracking has separated the brick quoins from the hollow clay tile on the east elevation.

Building 72 – Catalyzer Building No. 4: The crack at the south wall has been partially parged with concrete.

Building 72 – Catalyzer Building No. 4: The hollow clay tile is spalling on the west façade.

Building 72 – Catalyzer Building No. 4: Portions of the primary space have been infilled.

Building 72 – Catalyzer Building No. 4: The infill consists of wood stud walls clad in horizontal wood panels and metal panels.

Building 72 – Catalyzer Building No. 4: The floor in the laboratory space is water-stained.

Building 72 – Catalyzer Building No. 4: The floor tiles in the hallway are damaged from moisture.

Building 72 – Catalyzer Building No. 4: The concrete floor is cracked and damaged in several areas.

Building 72 – Catalyzer Building No. 4: Water infiltration has caused a hole in the wood flooring.

Building 72 – Catalyzer Building No. 4: Several of the concrete panels are damaged from water infiltration.

Structural Assessment – General Information

Building No.: 72 Catalyzer #4	
Building Name:	Catalyzer #4
Original Function:	Catalyzer Building
Subsequent Modification:	Interior Offices
General Building Structural Description:	One story building with steel frame supporting masonry infill panels at exterior walls. The building has a single high bay with a central clerestory monitor near the west end, and the main building is an eight bay structure with a central monitor that extends from the high bay to the east end of the building. The roof structure is steel trusses with a concrete plank roof deck supported by steel beams. The building floor is a concrete topping slab that covers the original floor construction. Interior partitions have been added, including those for offices at the west end of the main building.
General Building Structural Condition (2009):	Structural General Building Condition Code = 4 "Deteriorated". **(2013: Structural General Building Condition Code = 4 "Deteriorated")** The building is in generally poor condition. The steel framing is moderately corroded, and some portions of the exterior wall framing including columns are severely corroded. The concrete plank roof deck appears to be significantly deteriorated. Numerous cracks and spalls were noted in the exterior masonry infill panels. At the west end of the building the masonry infill panels extend below grade, and settlement cracks were observed at the northwest corner.
Summary of Observations Regarding Present General Building Structural Condition (2013):	**General progressive deterioration of exterior masonry, structural steel frame, and concrete plank roof deck appears to be evident, though obvious changes in condition could not be documented. Vegetation that previously covered portions of exterior walls is now dead, making masonry defects more visible.**
Summary of Recommended Structural Repairs (2009):	The structural steel framing must be sandblasted and painted. Remediation or replacement of the concrete plank roof deck will be required. Cracks and spalls in the exterior masonry walls must be repaired. Deteriorated concrete piers at column attachments must be repaired.
Additional Recommendations (2009):	A detailed evaluation of the concrete plank roof deck will be required to determine the type of remediation and the extent of repairs and/or replacement required.

Table 1: Structural Systems Assessment

Structural Component	Previous (2009) Condition Code	Present (2013) Condition Code	Comments
Lowest Level Floor System	3	3	
Columns	4	4	
Exterior Walls	3	3	**General progressive deterioration of masonry deficiencies appears to be evident**
Exterior Wall Framing and Subframing	3	3	
Roof Framing and Subframing	3	3	**General progressive deterioration of steel framing appears to be evident**
Roof Deck	4	4	**General progressive deterioration of concrete roof planks appears to be evident**
Monitor/Clerestory Structure (Framing, walls, and roof deck)	4	4	**General progressive deterioration of steel framing and concrete roof planks appears to be evident**

Condition Code Description
(1) Excellent - Visual observation indicates no remedial work required. (less than 10% repair)
(2) Good - Visual observation indicates minimal remedial work required. (less than 10% replacement and/or 25% repair)
(3) Fair - Visual observation indicates remedial work required. (up to 25% replacement and/or 50% repair)
(4) Deteriorated - Visual observation indicates significant remedial work required. (up to 50% replacement and/or 75% repair)
(5) Critical – Visual observation indicates extensive replacement and/or repair. (over 50% replacement and/or 75% repair)

Table 2: Itemized Structural Defects

Defect Item No.	Defect Description (2009)	2013 Assessment of 2009 Itemized Defects	Photo Log Reference Nos.	
			From 2009 Report	2013
1	Cracking in masonry wall on south side	Change in condition was not observed		
2	Cracking at northeast corner	**Vegetation that previously covered portions of exterior walls is now dead, making masonry defects more visible. Change from previous condition was not obvious.**		
3	Crack in slab, slab added at later date	Change in condition was not observed		
4	Crack at southeast corner	**Vegetation that previously covered portions of exterior walls is now dead, making masonry defects more visible. Change from previous condition was not obvious.**		**2**
5	Crack at southeast corner high bay	Change in condition was not observed		
6	Crack at northwest corner	Change in condition was not observed	4	
7	Footing pier cracked and spalled	Change in condition was not observed	10	

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Photo Log:
2009 vs. 2013 Comparison

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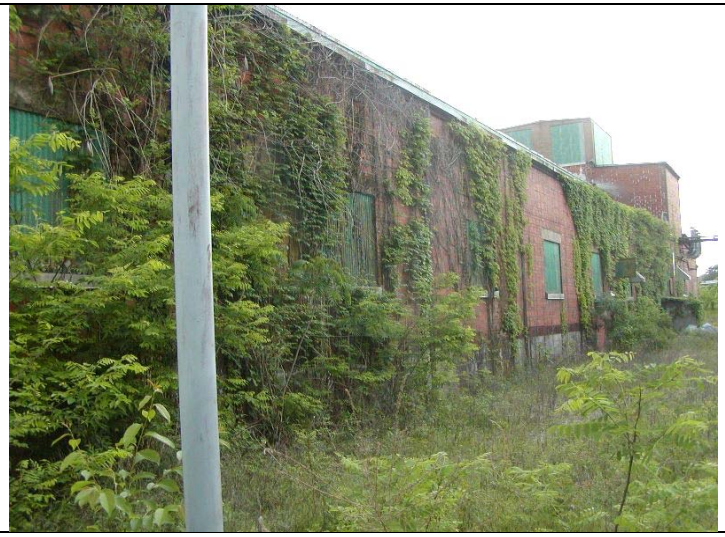
PHOTOLOG: Building No. 72 Catalyzer #4 (2009 vs. 2013 Comparison)

2009 Photo #1: North side of building with substation on left

No change observed

2013 Photo #1:



2009 Photo #2: North side of building

2013 Photo #2: SE corner of building. Vegetation covering portions of exterior walls is now dead, making masonry defects more visible.

PHOTOLOG: Building No. 72 Catalyzer #4 (2009 vs. 2013 Comparison)

2009 Photo #3: Exterior building looking at Northwest corner

2013 Photo #3: Exterior building looking at west elevation

2009 Photo #4: Crack in wall at Northwest corner

No change observed

2013 Photo #4:

PHOTOLOG: Building No. 72 Catalyzer #4 (2009 vs. 2013 Comparison)

2009 Photo #5: General deterioration on North side of building

2013 Photo #5:

No change observed

2009 Photo #6: Detail view of North side

2013 Photo #6:

No change observed

PHOTOLOG: Building No. 72 Catalyzer #4 (2009 vs. 2013 Comparison)

2009 Photo #7: Interior building looking West

2013 Photo #7: Progressive deterioration of roof framing and deck appears to be evident

2009 Photo #8: Corroded steel roof framing and deteriorated concrete roof planks

2013 Photo #8: Progressive deterioration of roof framing and deck appears to be evident

PHOTOLOG: Building No. 72 Catalyzer #4 (2009 vs. 2013 Comparison)

2009 Photo #9: Box-out in topping slab at column

2013 Photo #9:

No change observed

2009 Photo #10: Deteriorated concrete pier at column

2013 Photo #10:

No change observed

Condition Assessment, April 2009

Building Information Overall Building Condition 3 Overall Structural Condition 4

Building Name	73 - Catalyzer Building #5	
Period of Construction	1918	
National Register Eligibility	Contributing MSHD, NFDC Context	
Building Height	1 story	
Building Footprint	11,165 SF	
Historic Use | Current Use	Catalyzer Building	Vacant
Potential Use | Adaptability	LI, RE, ST, WH	3

Character Defining Features

Exterior	Interior
Primary Building Form: Rectangular Form with Low Slope Roofs and Interrupted Clerestory Building Walls: Hollow Clay Tile with Brick Quoins; Expression of Continuous Building Ventilation; Exposed Steel Structure; Brick detailing at pipe penetration Windows: Steel with operable hopper Window Headers and Sills: Precast concrete, sills shaped	**Primary** Spatial Form: Open Central Clerestory, 2 story open **Secondary** Spatial Form: Open Floor Plan at Clerestory and Adjacent Space; Exposure of Steel Structure & Concrete Tile Roof Panels; Exposure of Hollow Clay Tile with Brick Quoins Floor: Exposure of floor track

Resource Significance

The National Fertilizer Development Center (fomerly known as Nitrate Plant No. 2) has been recommended eligible to the National Register of Historic Places as a contributing resource in the Muscle Shoals Historic District. The property retains architectural integrity and is historically significant for its' role as a research facility during the World War I and World War II periods and thereafter. The period of significance dates between 1916 and 1970.

TVA Muscle Shoals Feasibility Muscle Shoals, Alabama

Lord, Aeck & Sargent Architecture July 31, 2009

Cyclic Assessment, July 2013

Building Information Overall Building Condition 3 Overal Structural Condition 4

Building Name: Catalyzer Building #5

Current Use: Vacant

Building 73 N

General Comments:

The condition of the overall building remains similar to its condition when it was assessed in 2009. It is unlikely that interior infill finishes such as gypsum board can be retained in a building reuse due to moisture infiltration and a lack of HVAC systems.

Condition Assessment, April 2009

Building Information

Building Name	73 - Catalyzer Building #5	
Period of Construction	1918	
National Register Eligibility	Contributing MSHD, NFDC Context	
Building Height	1 story	
Building Footprint	11,165 SF	
Historic Use | Current Use	Catalyzer Building	Vacant
Potential Use | Adaptability	LI, RE, ST, WH	3

Exterior Materials and Conditions

Building Component	Building Material	Condition
Roofing | Decking	Gable; Deck:Concrete, panel; Clerestory	3
Exterior Envelope	Hollow Clay Tile; Brick quoins at openings/corners; Louvres: Wood, below sill beam	3
Exterior Doors	Entry: Wood,vertical panel	5
Windows	Steel, operable with hopper	3
Lintels	Concrete	2
Loading Dock	N/A	
Porch	N/A	
Additions	N/A	

Comments

Wood louvres below sill beam - only four or five remain around entire perimeter
Visible rust on steel window frames
Serious cracking and displacement at upper East facade
Metal frame openings at West facade appear to be added - no brick quoining adjacent to openings

TVA Muscle Shoals Feasibility — Muscle Shoals, Alabama
Lord, Aeck & Sargent Architecture — July 31, 2009

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Exterior Materials and Conditions

Building Component	Building Material	Condition
Roofing / Decking	Low-slope gable with clerestory; Deck: Concrete panel	3
Exterior Envelope	Hollow clay tile; Brick quoins at openings/corners	3
Exterior Doors	Metal or wood, flush	5
Windows	Aluminum, fixed; historic steel windows at clerestory	3
Lintels **& Sills**	Concrete	2
Loading Dock	N / A	
Porch	N / A	
Additions	**Substation #6 (See Building 72a)**	

New Comments

- Cracking at quoin locations
- Cracking at corner of east wall, unchanged
- Broken glass panes in windows
- Broken and missing wood louvers

TVA Muscle Shoals, Alabama

Condition Assessment, April 2009

Building Information

Building Name	73 - Catalyzer Building #5	
Period of Construction	1918	
National Register Eligibility	Contributing MSHD, NFDC Context	
Building Height	1 story	
Building Footprint	11,165 SF	
Historic Use | Current Use	Catalyzer Building	Vacant
Potential Use | Adaptability	LI, RE, ST, WH	3

Interior Materials and Conditions

Building Component	Building Material	Condition
Corridors	N/A	
Primary Space	Entry Room	2
Secondary Space	Catalyzer Room	3
Secondary Space	N/A	
Secondary Space	N/A	
Flooring	Concrete, unfinished with brick features	1
Walls	Hollow Clay Tile	2
Ceiling	Exposed Beams: Steel; Concrete, panels	2





Comments

Flues and concrete pad raised about 7" above slab in Catalyzer Room
Building still retains much of its interior historic fabric

TVA Muscle Shoals Feasibility — Muscle Shoals, Alabama
Lord, Aeck & Sargent Architecture — July 31, 2009

Cyclic Assessment, July 2013

Interior Materials and Conditions

Building Component	Building Material	Condition
Corridors	N / A	
Primary Space	Entry	2
Secondary Space	Catalyzer Room	3
Secondary Space	N / A	
Secondary Space	N / A	
Flooring	Concrete; unfinished	1
Walls	Hollow clay tile	2
Ceiling	Exposed beams: Steel; Concrete, panels	**3**

New Comments

- Concrete slab is cracking and separating from brick edge
- Ceiling has holes with daylight coming through






Building 73 – Catalyzer Building No. 5: Overall view of the southeast corner of the building

Building 73 – Catalyzer Building No. 5: There are several broken panes at the clerestory. The crack at the upper corner of the wall has been patched with a substance incompatible with the mortar.

Building 73 – Catalyzer Building No. 5: The wood door is damaged from moisture and the steel windows have several broken panes.

Building 73 – Catalyzer Building No. 5: There is a crack in the hollow clay tile adjacent to the exposed steel structure.

Building 73 – Catalyzer Building No. 5: Several of the wood louvers are broken.

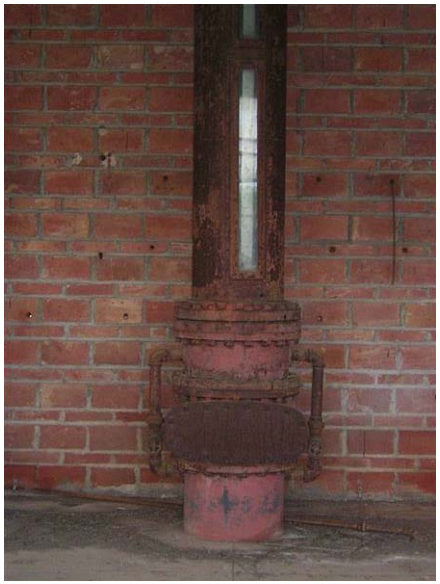
Building 73 – Catalyzer Building No. 5: Visible cracking is located along the quoins at the upper east facade.

Building 73 – Catalyzer Building No. 5: Overall view of the interior space

Building 73 – Catalyzer Building No. 5: A small shed is located in the northeast corner of the building.

Building 73 – Catalyzer Building No. 5: The steel structure is rusted and several concrete panels are stained from water damage.

Building 73 – Catalyzer Building No. 5: The concrete floor is cracked in several areas.



Building 73 – Catalyzer Building No. 5: Some of the equipment used in the catalyzer process is rusted.

Building 73 – Catalyzer Building No. 5: Some of the equipment used in the catalyzer process is rusted.

Structural Assessment – General Information

Building No.: 73 Catalyzer #5	
Building Name:	Catalyzer #5
Original Function:	Catalyzer Building
Subsequent Modification:	N/A
General Building Structural Description:	One story building with steel frame supporting masonry infill panels at exterior walls. The building has a single high bay with a central clerestory monitor near the west end, and the main building is an eight bay structure with a central monitor that extends from the high bay to the east end of the building. Original drawings indicate shutters to be installed between columns at floor level on the long sides of the building; this portion of the exterior walls is now completely open. The roof structure is steel trusses with a concrete plank roof deck supported by steel beams. The building has an irregular concrete floor below the tops of four brick covered trenches that extend the length of the main building.
General Building Structural Condition (2009):	Structural General Building Condition Code = 4 "Deteriorated". **(2013: Structural General Building Condition Code = 4 "Deteriorated")** The building is in generally poor condition. The steel framing is moderately to severely corroded, and the concrete plank roof deck appears to be significantly deteriorated. Portions of the masonry infill panels are structurally unsound due to deteriorated and/or deformed support framing. At the west end of the building the masonry infill panels extend below grade, and substantial settlement cracks were observed at the northwest corner. The irregular floor system of the main building is generally deteriorated, and the condition of the brick covered trenches could not be determined.
Summary of Observations Regarding Present General Building Structural Condition (2013):	**Most structural systems observed in 2009 appear to be stable, with minimal visible changes in condition. Exceptions noted were corroded steel framing, which exhibits minor progressive deterioration, and the more severe deterioration of the concrete plank roof deck.**
Summary of Recommended Structural Repairs (2009):	A substantial portion of the concrete plank roof deck must be repaired or replaced. The structural steel framing must be cleaned and painted, and some steel framing embedded in the masonry walls must be replaced or reinforced. Unstable portions of the masonry walls must be reconstructed, and cracks in the masonry walls must be repaired. Remediation of the existing floor system is not required to stabilize the building, but a new floor system must be constructed to in order to reuse the building.
Additional Recommendations (2009):	A detailed evaluation of the concrete plank roof deck will be required to determine what portion of the original deck can be salvaged and the extent of repairs required. **(2013: It appears unlikely that significant portions of the existing concrete roof deck can be salvaged. Full replacement of the roof deck should be anticipated.)**

Table 1: Structural Systems Assessment

Structural Component	Previous (2009) Condition Code	Present (2013) Condition Code	Comments
Lowest Level Floor System	3	3	
Pits and Trenches	3	3	
Mezzanine Floor System (Deck and framing)	3	3	
Interior Load Bearing Walls	3	3	
Exterior Walls	3	3	
Exterior Wall Framing and Subframing	4	4	
Roof Framing and Subframing	4	4	**Minor progressive deterioration of steel framing appears to be evident**
Roof Deck	4	**5**	**Significant progressive deterioration of the concrete plank roof deck could be observed. More exposed reinforcing steel was visible on the underside of the concrete planks, and holes through the planks not previously documented were noted.**

Condition Code Description
(1) Excellent - Visual observation indicates no remedial work required. (less than 10% repair)
(2) Good - Visual observation indicates minimal remedial work required. (less than 10% replacement and/or 25% repair)
(3) Fair - Visual observation indicates remedial work required. (up to 25% replacement and/or 50% repair)
(4) Deteriorated - Visual observation indicates significant remedial work required. (up to 50% replacement and/or 75% repair)
(5) Critical – Visual observation indicates extensive replacement and/or repair. (over 50% replacement and/or 75% repair)

Table 2: Itemized Structural Defects

Defect Item No.	Defect Description (2009)	2013 Assessment of 2009 Itemized Defects	Photo Log Reference Nos.	
			From 2009 Report	2013
1	Foundation settlement cracks on northwest corner	Change in condition was not observed	13,14	
2	Foundation settlement cracks on southwest corner	Change in condition was not observed		
3	Foundation settlement cracks on north wall	Change in condition was not observed		
4	Sagging support beam for north wall masonry	Change in condition was not observed	12	
5	Deteriorated masonry at southeast corner	Change in condition was not observed	10	
6	Cracking in exterior masonry at southeast corner.	Change in condition was not observed		
7	Cracking in masonry at northeast corner	Change in condition was not observed		
8	Corrosion of steel framing	**Minor progressive deterioration of steel framing appears to be evident**	6,7	
9	Spalling and deteriorated concrete roof deck	**Progressive deterioration was noted, including more exposed reinforcing steel and holes through concrete planks**	6,7,8,9	**5,6,7,8**
10	Cracks in floor slab.	Change in condition was not observed		
11	Door lintel severely deformed on north wall	Change in condition was not observed		

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Photo Log:
2009 vs. 2013 Comparison

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PHOTOLOG: Building No. 73 Catalyzer #5 (2009 vs. 2013 Comparison)

2009 Photo #1: Exterior building looking at Northwest corner

No change observed

2013 Photo #1:

2009 Photo #2: Exterior building looking at North side

2013 Photo #2: Exterior overview of building looking at NW corner

PHOTOLOG: Building No. 73 Catalyzer #5 (2009 vs. 2013 Comparison)

2009 Photo #3: Exterior building looking at Southwest corner

2013 Photo #3:

No change observed

2009 Photo #4: Exterior building looking at South side

2013 Photo #4:

No change observed

PHOTOLOG: Building No. 73 Catalyzer #5 (2009 vs. 2013 Comparison)

2009 Photo #5: Interior building looking East

2013 Photo #5: Progressive deterioration of concrete plank roof deck observed – note holes through deck below clerestory

2009 Photo #6: Corroded steel framing and deteriorated concrete plank roof deck

2013 Photo #6: Progressive deterioration of concrete plank roof deck was observed – note holes through deck below clerestory

PHOTOLOG: Building No. 73 Catalyzer #5 (2009 vs. 2013 Comparison)

2009 Photo #7: Corroded steel framing and deteriorated concrete plank roof deck

2013 Photo #7: Progressive deterioration of the concrete roof deck was observed

2009 Photo #8: Deteriorated concrete plank roof deck at monitor. Exposed reinforcing steel is visible

2013 Photo #8: Progressive deterioration of concrete plank roof deck indicates change in condition from (4) “Deteriorated” to (5) “Critical”

PHOTOLOG: Building No. 73 Catalyzer #5 (2009 vs. 2013 Comparison)

2009 Photo #9: Severely deteriorated roof structure at West end of building

2013 Photo #9:

No change observed

2009 Photo #10: Damaged masonry infill at Southeast corner

2013 Photo #10:

No change observed

PHOTOLOG: Building No. 73 Catalyzer #5 (2009 vs. 2013 Comparison)

2009 Photo #11: Irregular, deteriorated floor system in main building

2013 Photo #11:

No change observed

2009 Photo #12: Structurally unstable masonry infill and supporting steel framing

2013 Photo #12:

No change observed

PHOTOLOG: Building No. 73 Catalyzer #5 (2009 vs. 2013 Comparison)

2009 Photo #13: Settlement cracks in masonry at Northwest corner

2013 Photo #13:

No change observed

2009 Photo #14: Settlement cracks in masonry at Northwest corner

2013 Photo #14:

No change observed

Condition Assessment, April 2009

Building Information	Overall Building Condition 3	Overall Structural Condition 3
Building Name	74 - Catalyzer Building #6	
Period of Construction	1918	
National Register Eligibility	Contributing MSHD, NFDC Context	
Building Height	1-1/2 story	
Building Footprint	10,999 SF	
Historic Use | Current Use	Catalyzer Building	Vacant
Potential Use | Adaptability	LI, RE, ST, WH	3

Character Defining Features

Exterior	Interior
Primary Building Form: Rectangular Form with Low Slope Roofs and Interrupted Clerestory Building Walls: Hollow Clay Tile with Brick Quoins; Expression of Continuous Building Ventilation; Exposed Steel Structure; Brick detailing at pipe penetration Windows: Steel with operable hopper Window Headers and Sills: Precast concrete, sills shaped	**Primary** Spatial Form: Open Central Clerestory, 2 story open **Secondary** Spatial Form: Open Floor Plan at Clerestory and Adjacent Space; Exposure of Steel Structure & Concrete Tile Roof Panels; Exposure of Hollow Clay Tile with Brick Quoins

Resource Significance

The National Fertilizer Development Center (fomerly known as Nitrate Plant No. 2) has been recommended eligible to the National Register of Historic Places as a contributing resource in the Muscle Shoals Historic District. The property retains architectural integrity and is historically significant for its' role as a research facility during the World War I and World War II periods and thereafter. The period of significance dates between 1916 and 1970.

TVA Muscle Shoals Feasibility — Muscle Shoals, Alabama

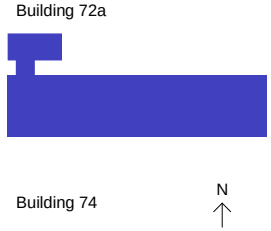
Lord, Aeck & Sargent Architecture — July 31, 2009

Cyclic Assessment, July 2013

Building Information	Overall Building Condition 3	Overall Structural Condition 3

Building Name: 74 - Catalyzer Building #6

Current Use: Vacant



General Comments:

Building 74 includes Substation #6, labeled as Building 72a in the TVA building inventory. Due to the physical connection between 72a and 74 this review treats the buildings as one property.

The condition of the overall building remains similar to its condition when it was assessed in 2009. It is unlikely that interior infill finishes such as gypsum board can be retained in a building reuse due to moisture infiltration and a lack of HVAC systems.

Additional Character Defining Features:

Brick well structure in front of Building 72a, Substation #6

Condition Assessment, April 2009

Building Information

Building Name	74 - Catalyzer Building #6	
Period of Construction	1918	
National Register Eligibility	Contributing MSHD, NFDC Context	
Building Height	1-1/2 story	
Building Footprint	10,999 SF	
Historic Use | Current Use	Catalyzer Building	Vacant
Potential Use | Adaptability	LI, RE, ST, WH	3

Exterior Materials and Conditions

Building Component	Building Material	Condition
Roofing | Decking	Gable; Deck:Concrete, panel; Clerestory	2
Exterior Envelope	Hollow Clay Tile; Brick quoins at openings/corners	3
Exterior Doors	Metal or Wood, Flush	3
Windows	Aluminum, fixed; non-historic steel windows at clerestory	4
Lintels	Concrete	2
Loading Dock	N/A	
Porch	N/A	
Additions	N/A	

Comments

All original ground-level openings infilled with brick, new fixed aluminum windows added
New metal awnings over entry doors
Cracking in hollow clay tile at all exterior corners
40% of clerestory windows covered by translucent fiberglass panels
Some CMU infill at exterior walls and doors

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Exterior Materials and Conditions

Building Component	Building Material	Condition
Roofing / Decking	Low-slope gable with clerestory; Deck: Concrete panel	2
Exterior Envelope	Hollow clay tile; Brick quoins at openings / corners	3
Exterior Doors	Metal or wood, flush	3
Windows	Aluminum, fixed; historic steel windows at clerestory	4
Lintels **& Sills**	Concrete	2
Loading Dock	N / A	
Porch	N / A	
Additions	Substation #6 (See Building 72a)	

New Comments

- Paint and veneer flaking from wood doors
- More broken and missing glass - 15%
- Clay tile failure on south wall below horizontal steel beam
- Concrete sills located at original openings; brick sills located at new openings
- Cracking in hollow clay tile along brick quoins at rear wall
- Entry door at substation has broken vision glazing and paint is flaking; rear wood door damaged and paint is flaking
- Substation windows infilled with brick; one covered with fiberglass; front window replaced with aluminum window
- Moisture is present at the base of the east wall that connects the substation to the adjacent catalyzer building

Condition Assessment, April 2009

Building Information

Building Name	74 - Catalyzer Building #6	
Period of Construction	1918	
National Register Eligibility	Contributing MSHD, NFDC Context	
Building Height	1-1/2 story	
Building Footprint	10,999 SF	
Historic Use | Current Use	Catalyzer Building	Vacant
Potential Use | Adaptability	LI, RE, ST, WH	3

Interior Materials and Conditions

Building Component	Building Material	Condition
Corridors	Wood framed	3
Primary Space	Office: Individual Offices	3
Secondary Space	Open	3
Secondary Space	N/A	
Secondary Space	N/A	
Flooring	Concrete, unfinished / VCT	2
Walls	Wood Stud	3
Ceiling	Exposed Beams: Steel; Concrete, ACT	2

Comments

Primary space built out as office: wood frame walls with paneling, VCT floors and ACT ceilings
Secondary space open and unfinished: concrete floor, steel trusses with concrete panel roof

TVA Muscle Shoals Feasibility
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Interior Materials and Conditions

Building Component	Building Material	Condition
Corridors	Wood framed	3
Primary Space	Open	3
Secondary Space	Individual offices	**5**
Secondary Space	N / A	
Secondary Space	N / A	
Flooring	Concrete; unfinished VAT 9x9	**5**
Walls	Wood studs	3
Ceiling	Exposed beams: Steel; Concrete, ACT	2

New Comments

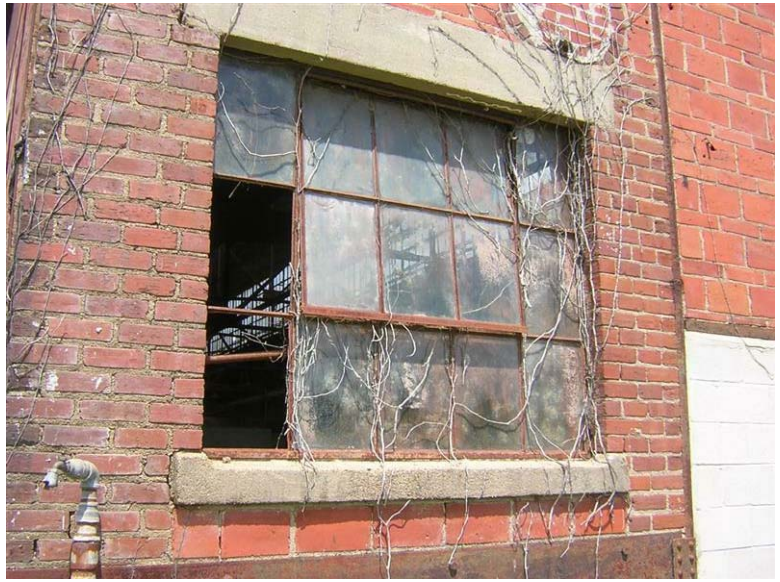
- Cracking in concrete footings
- Infill needs to be removed and rebuilt for the building to be re-purposed; ceilings have holes from water damage; VAT floors damaged, possible asbestos - friable
- Concrete ceiling tiles are blackened from moisture
- Lay-in ceiling in critical condition with falling tiles from water damage
- VCT flooring in critical condition from water damage; may be asbestos tiles
- Paint flaking from doors; missing door panel patched with plywood paneling

TVA Muscle Shoals, Alabama

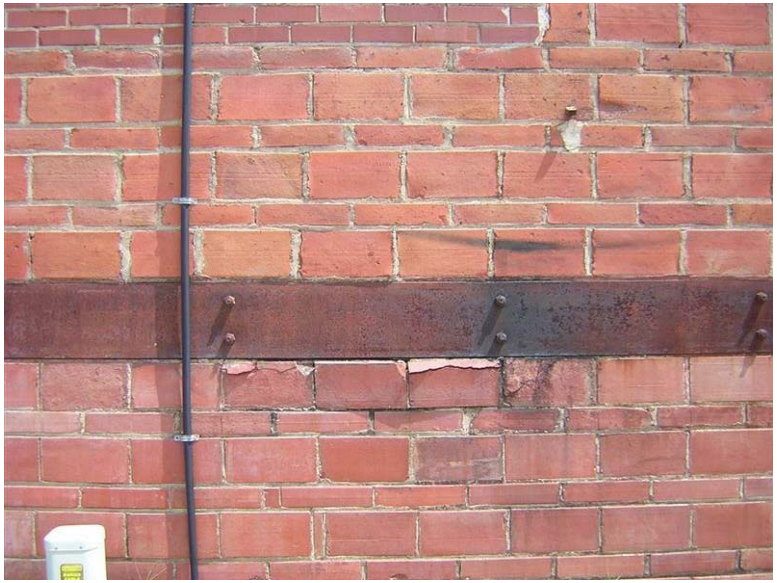
Building 74 – Catalyzer Building No. 6: Overall view of the southeast corner of the building.

Building 74 – Catalyzer Building No. 6: A flush brick facade connects the substation to the adjacent catalyzer building.

Building 74 – Catalyzer Building No. 6: Paint is flaking and the wood door is damaged at the adjoining substation.



Building 74 – Catalyzer Building No. 6: Panes are missing in several of the steel windows.



Building 74 – Catalyzer Building No. 6: The hollow clay tiles are broken below the rusted steel member.

Building 74 – Catalyzer Building No. 6: The wall is cracked along the brick quoins.

Building 74 – Catalyzer Building No. 6: The wood on top of the brick well / structure is warped and damaged.

Building 74 – Catalyzer Building No. 6: The bricks in the raised floor have visible efflorescence.

Building 74 – Catalyzer Building No. 6: The exposed steel is rusted.

Building 74 – Catalyzer Building No. 6: The concrete footing is broken beneath the steel column.

Building 74 – Catalyzer Building No. 6: Water infiltration has damaged the ceiling tiles.

Building 74 – Catalyzer Building No. 6: The floor tiles are damaged from water infiltration.

Building 74 – Catalyzer Building No. 6: The steel structure is rusted.

Building 74 – Catalyzer Building No. 6: The ceiling tiles are stained.

Structural Assessment – General Information

Building No.: 74 Catalyzer #6 *including attached Building 72A Substation #6*	
Building Name:	Catalyzer #6
Original Function:	Catalyzer Building
Subsequent Modification:	Office Addition
General Building Structural Description:	One story building with steel frame supporting masonry infill panels at exterior walls. The building has a single high bay with a central clerestory monitor near the west end, and the main building is an eight bay structure with a central monitor that extends from the high bay to the east end of the building. The roof structure is steel trusses with a concrete plank roof deck supported by steel beams. The open portion of the building at the east end has an irregular concrete floor below the tops of four brick covered trenches that extend the length open portion of the main building. The west portion of the building, including an addition on the north side at the west end **(Building 72A)**, has been fitted up with office space that is inaccessible. In the main building, the office area is constructed with wood frame partitions that terminate below the roof structure.
General Building Structural Condition (2009):	Structural General Building Condition Code = 3 "Fair". **(2013: Structural General Building Condition Code = 3 "Fair")** The building is in generally fair condition. The steel framing is moderately corroded, and some portions of the exterior wall framing including columns are severely corroded. The concrete plank roof deck exhibits surface deterioration throughout the building. Numerous cracks and spalls were noted in the exterior masonry infill panels. At the west end of the building the masonry infill panels extend below grade, and settlement cracks were observed at the northwest corner. The irregular floor system in the open part of the main building appears to be in fair condition, and the condition of the brick covered trenches could not be determined.
Summary of Observations Regarding Present General Building Structural Condition (2013):	**Minor progressive deterioration of exterior masonry, structural steel frame, and concrete plank roof deck appears to be evident, though obvious changes in condition could not be documented. Vegetation that previously covered portions of exterior walls is now dead, making masonry defects more visible. Changes to the attached addition on the north side at the west end (Building 72A) were not observed.**
Summary of Recommended Structural Repairs (2009):	The structural steel framing must be sandblasted and painted. Remediation of the concrete plank roof deck will be required. Cracks and spalls in the exterior masonry walls must be repaired. Remediation of the existing floor system at the east end of he building is not required, but a new floor system in this portion of the building must be constructed in order to reuse this area of the building.
Additional Recommendations (2009):	A detailed evaluation of the concrete plank roof deck will be required to determine the type of remediation and the extent of repairs required.

Table 1: Structural Systems Assessment

Structural Component	Previous (2009) Condition Code	Present (2013) Condition Code	Comments
Lowest Level Floor System	3	3	
Pits and Trenches	3	3	
Columns	4	4	
Exterior Walls	3	3	**Minor progressive deterioration of masonry deficiencies appears to be evident**
Exterior Wall Framing and Subframing	3	3	
Roof Framing and Subframing	3	3	**Minor progressive deterioration of steel framing appears to be evident**
Roof Deck	4	4	**Minor progressive deterioration of concrete roof planks appears to be evident**
Monitor/Clerestory Structure (Framing, walls, and roof deck)	4	4	**Minor progressive deterioration of steel framing and concrete roof planks appears to be evident**

Condition Code Description
(1) Excellent - Visual observation indicates no remedial work required. (less than 10% repair)
(2) Good - Visual observation indicates minimal remedial work required. (less than 10% replacement and/or 25% repair)
(3) Fair - Visual observation indicates remedial work required. (up to 25% replacement and/or 50% repair)
(4) Deteriorated - Visual observation indicates significant remedial work required. (up to 50% replacement and/or 75% repair)
(5) Critical – Visual observation indicates extensive replacement and/or repair. (over 50% replacement and/or 75% repair)

Table 2: Itemized Structural Defects

Defect Item No.	Defect Description (2009)	2013 Assessment of 2009 Itemized Defects	Photo Log Reference Nos.	
			From 2009 Report	2013
1	Minor stair step crack at northeast corner interior	**Vegetation that previously covered portions of exterior walls is now dead, making masonry defects more visible. Change from previous condition was not obvious.**		**1**
2	Footing pier cracking at southeast corner	Change in condition was not observed	7,8	
3	Wall cracking at southeast corner	**Vegetation that previously covered portions of exterior walls is now dead, making masonry defects more visible. Change from previous condition was not obvious.**	9	
4	Cracking at northeast corner of high wall	Change in condition was not observed		
5	Small 1 story building (20' x 30') between Bldg 74 and Bldg 73 **is Building 72A.** No access to interior. No cracking noted in exterior masonry walls	Change in condition was not observed	1	**1,2**
6	Cracking at northwest corner	Change in condition was not observed	4	
7	Cracking at center of west wall	Change in condition was not observed		
8	Cracking at southwest corner	Change in condition was not observed		
9	Crack at south sides of high bay	Change in condition was not observed		
10	Crack under lintel at southwest corner	Change in condition was not observed		
11	Crack at southeast corner	Change in condition was not observed	10	

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Photo Log:
2009 vs. 2013 Comparison

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PHOTOLOG: Building No. 74 Catalyzer #6 & Building 72A Substation #6 (2009 vs. 2013 Comparison)

2009 Photo #1: Exterior view of North side. **Building 72A in background is attached to Building 74 on north side of west end**

2013 Photo #1: NE corner of building. Vegetation covering portions of exterior walls is now dead, making masonry defects more visible.

2009 Photo #2: Exterior view of South side

2013 Photo #2: West view of Buildings 73 (on left) and 74 (on right) Building 72A is small structure in between, visible in Photo #1 above

PHOTOLOG: Building No. 74 Catalyzer #6 & Building 72A Substation #6 (2009 vs. 2013 Comparison)

2009 Photo #3: Exterior building looking at Southwest corner

2013 Photo #3: Exterior building looking at west elevation

2009 Photo #4: Crack in masonry at Northwest corner where North addition adjoins original building

No change observed

2013 Photo #4:

PHOTOLOG: Building No. 74 Catalyzer #6 & Building 72A Substation #6 (2009 vs. 2013 Comparison)

2009 Photo #5: Interior building looking West

2013 Photo #5:

No change observed

2009 Photo #6: Interior building looking East

2013 Photo #6:

No change observed

PHOTOLOG: Building No. 74 Catalyzer #6 & Building 72A Substation #6 (2009 vs. 2013 Comparison)

2009 Photo #7: Deteriorated concrete pier and slab at column

2013 Photo #7:

No change observed

2009 Photo #8: Close-up of deteriorated column attachment at concrete pier

2013 Photo #8:

No change observed

PHOTOLOG: Building No. 74 Catalyzer #6 & Building 72A Substation #6 (2009 vs. 2013 Comparison)

2009 Photo #9: Deteriorated steel column and wall framing

2013 Photo #9:

No change observed

2009 Photo #10: Exterior view of wall and wall framing shown in Photo No. 9

2013 Photo #10:

No change observed

Condition Assessment, April 2009

Building Information	Overall Building Condition 3	Overall Structural Condition 3
Building Name	79 - 3A Nitrate House	
Period of Construction	1918	
National Register Eligibility	Contributing MSHD, NFDC Context	
Building Height	2 story	
Building Footprint	9,397 SF	
Historic Use | Current Use	Ammonium Nitrate Storage | Storage	
Potential Use | Adaptability	LI, LO, RE, ST, WH | 2	

Character Defining Features

Exterior	Interior
Primary	**Primary**
Building Form: Rectangular Form with Moderate Sloped Gable Roof and Interrupted Clerestory	Spatial Form: Open Central Clerestory, 2 story open
Building Walls: Hollow Clay Tile with Brick Quoins; Expressed Concrete Mezzanine Structure	Spatial Form: Mezzanines at sides of 2 story clerestory
Roofing: Corrugated Metal	Mezzanine Visability: to and from 2 story open clerestory
Windows: Steel with operable hopper	**Secondary**
Window Headers and Sills: Precast concrete, sills shaped	Spatial Form: Open Floor Plan between Clerestory and Adjacent Space
Doors: Rail and Stile	Exposure of Steel and Concrete Structure
	Exposure of Hollow Clay Tile with Brick Quoins
	Equipment - Fume Hoods on Mezzanine

Resource Significance

The National Fertilizer Development Center (fomerly known as Nitrate Plant No. 2) has been recommended eligible to the National Register of Historic Places as a contributing resource in the Muscle Shoals Historic District. The property retains architectural integrity and is historically significant for its' role as a research facility during the World War I and World War II periods and thereafter. The period of significance dates between 1916 and 1970.

TVA Muscle Shoals Feasibility — Muscle Shoals, Alabama

Lord, Aeck & Sargent Architecture — July 31, 2009

Cyclic Assessment, July 2013

Building Information	Overall Building Condition 3	Overal Structural Condition 3

Building Name: 79 - 3A Nitrate House

Current Use: Storage

Building 79 → N

General Comments:

The overall condition of the building remains similar to its condition whent it was assessed in 2009.

Condition Assessment, April 2009

Building Information

Building Name	79 - 3A Nitrate House	
Period of Construction	1918	
National Register Eligibility	Contributing MSHD, NFDC Context	
Building Height	2 story	
Building Footprint	9,397 SF	
Historic Use | Current Use	Ammonium Nitrate Storage	| Storage
Potential Use | Adaptability	LI, LO, RE, ST, WH	| 2

Exterior Materials and Conditions

Building Component	Building Material	Condition
Roofing | Decking	Gable; Clerestory Gable	4
Exterior Envelope	Hollow Clay Tile; Brick quoins at openings/corners	3
Exterior Doors	Entry: Wood, rail & stile, painted	4
Windows	Steel wither operable hopper	3
Lintels	Concrete	2
Loading Dock	N/A	
Porch	N/A	
Additions	N/A	

Comments

Cracking, bulge, and separation at building corners
Concrete mezzanine structure expressed on building exterior

TVA Muscle Shoals Feasibility
Lord, Aeck & Sargent Architecture

Muscle Shoals, Alabama
July 31, 2009

Cyclic Assessment, July 2013

Exterior Materials and Conditions

Building Component	Building Material	Condition
Roofing / Decking	Gable; Clerestory gable	4
Exterior Envelope	Hollow clay tile; Brick quoins at openings/corners	3
Exterior Doors	Entry; Wood, rail & stile, painted	4
Windows	Steel with operable hopper	3
Lintels **& Sills**	Concrete; brick	2
Loading Dock	N / A	
Porch	N / A	
Additions	N / A	

New Comments

- All windows are covered by fiberglass, except one on north wall
- Continued rusting of metal roof
- Clay tile has a hole on the east wall; no apparent changes in cracking at corners and across gable end; localized patching of hollow clay tile at base of wall
- Brick lintels are on the upper windows and concrete lintels are on lower windows; cracking is visible in concrete lintels
- Exterior stair to mezzanine is rusted and in critical condition

Condition Assessment, April 2009

Building Information

Building Name	79 - 3A Nitrate House	
Period of Construction	1918	
National Register Eligibility	Contributing MSHD, NFDC Context	
Building Height	2 story	
Building Footprint	9,397 SF	
Historic Use | Current Use	Ammonium Nitrate Storage	Storage
Potential Use | Adaptability	LI, LO, RE, ST, WH	2

Interior Materials and Conditions

Building Component	Building Material	Condition
Corridors	N/A	
Primary Space	Open; Mezzanine level	3
Secondary Space	N/A	
Secondary Space	N/A	
Secondary Space	N/A	
Flooring	Concrete; Brick at Entry	3
Walls	Hollow Clay Tile and Brick	3
Ceiling	Corrugated Metal Panels	3

Comments

Concrete mezzanine has large hoods/equipment

TVA Muscle Shoals Feasibility — Muscle Shoals, Alabama

Lord, Aeck & Sargent Architecture — July 31, 2009

Cyclic Assessment, July 2013

Interior Materials and Conditions

Building Component	Building Material	Condition
Corridors	N / A	
Primary Space	Open; Mezzanine level	3
Secondary Space	N / A	
Secondary Space	N / A	
Secondary Space	N / A	
Flooring	Concrete; Brick at entry	3
Walls	Hollow clay tile, Brick and concrete	3
Ceiling	Corrugated metal panels	4

New Comments

- No apparent changes in cracking at corner and across gable end
- Exposed steel rebar is rusting at columns and in first floor ceiling at mezzanine
- Moisture at the entry could be from the open doors

Building 79 – 3A – Nitrate House: Overall view from the southeast corner of the building

Building 79 – 3A – Nitrate House: Rusting of the metal roof is visible from the exterior.

Building 79 – 3A – Nitrate House: Panes are missing and broken in this uncovered window.

Building 79 – 3A – Nitrate House: There is a hole in the hollow clay tile on the east wall.

Building 79 – 3A – Nitrate House: Hollow clay tile at the base of this wall has been parged.

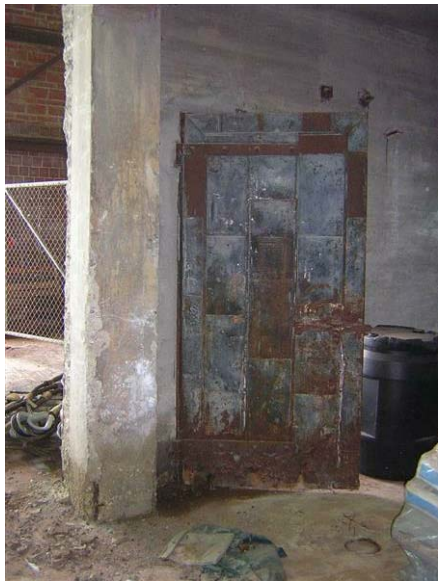
Building 79 – 3A – Nitrate House: Localized cracking and chipping is prevalent in the concrete sills.

Building 79 – 3A – Nitrate House: There is a large horizontal crack across the gable end.

Building 79 – 3A – Nitrate House: Interior view from the first floor

Building 79 – 3A – Nitrate House: Interior view of one of the mezzanines

Building 79 – 3A – Nitrate House: Several tiles have detached from the concrete wall and rebar is exposed at the corner.



Building 79 – 3A – Nitrate House: The metal door is rusted.

Building 79 – 3A – Nitrate House: Rebar is exposed and the concrete is deteriorating at this column.

Building 79 – 3A – Nitrate House: Rebar is exposed at the underside of the mezzanine floor.

Structural Assessment – General Information

Building No.: 79 3A Building	
Building Name:	3A Building
Original Function:	Ammonium Nitrate Storage
Subsequent Modification:	N/A
General Building Structural Description:	Original drawings indicate the building was designed to have a complete second floor consisting of elevated concrete slabs on each side connected by a central floor structure which does not now exist. In its present configuration, the building has mezzanines on each side with concrete columns supporting concrete slab and beam floors with no interior access stairs. The building has a central clerestory monitor supported by steel columns anchored above the inside edge of each mezzanine. The building superstructure is primarily a steel frame constructed on top of the concrete mezzanines. The east, west, and north sides of the building have large window openings within narrow bands of masonry above and below the mezzanines. The south end of the building is load bearing masonry with smaller openings. The original drawings indicate the roof material to be "asbestos protected corrugated iron". The existing roof is corrugated metal that is heavily corroded, however, the roof deck appears to be newer than the original building.
General Building Structural Condition (2009):	Structural General Building Condition Code = 3 "Fair". **(2013: Structural General Building Condition Code = 3 "Fair".)**The overall building is in generally fair condition; however, numerous significant structural deficiencies were noted. The mezzanine concrete columns and beams have suffered substantial spalling from impact damage, and some cracks were noted in the concrete mezzanine structures. The structural steel framing is moderately corroded. The metal roof has significant exterior corrosion and holes in the roof deck can be observed from the underside. Ponded water on the interior floors indicates water intrusion through some portion of the roof system and/or the clerestory windows. Various size cracks were observed in the exterior masonry walls, and a large hole in the wall appears to have been caused by impact damage.
Summary of Observations Regarding Present General Building Structural Condition (2013):	**General progressive deterioration of exterior masonry and structural steel frame appears to be evident, though obvious changes in condition could not be documented. Significant changes were noted regarding deterioration of the metal roof deck, water intrusion at the concrete mezzanine structure, and spalled concrete with exposed reinforcing steel at mezzanine columns.**

Summary of Recommended Structural Repairs (2009):	Interior and exterior cracks and spalls in the concrete mezzanine structures must be repaired. The structural steel framing must be sandblasted and painted. Cracks and holes in the exterior masonry walls must be repaired. Defects in the metal roof system must be repaired, and the deteriorated exterior metal roof panels should either be replaced or cleaned, primed, and coated in order to preserve the existing material.
Additional Recommendations (2009):	N/A

Table 1: Structural Systems Assessment

Structural Component	Previous (2009) Condition Code	Present (2013) Condition Code	Comments
Lowest Level Floor System	3	3	
Mezzanine Floor System (Deck and framing)	4	4	**Additional deterioration from water intrusion was observed (See 2013 Photo #20)**
Columns	4	**5**	**Vertical cracking at damaged corners of columns is significantly expanded, indicating progressive deterioration of reinforcing steel**
Interior Load Bearing Walls	3	3	
Exterior Walls	3	3	
Roof Framing and Subframing	3	3	
Roof Deck	4	4	
Monitor/Clerestory Structure (Framing, walls, and roof deck)	3	**4**	**More and larger holes were observed in clerestory metal roof deck**
Exterior Stairs	5	5	

Condition Code Description
(1) Excellent - Visual observation indicates no remedial work required. (less than 10% repair)
(2) Good - Visual observation indicates minimal remedial work required. (less than 10% replacement and/or 25% repair)
(3) Fair - Visual observation indicates remedial work required. (up to 25% replacement and/or 50% repair)
(4) Deteriorated - Visual observation indicates significant remedial work required. (up to 50% replacement and/or 75% repair)
(5) Critical – Visual observation indicates extensive replacement and/or repair. (over 50% replacement and/or 75% repair)

Table 2: Itemized Structural Defects

Defect Item No.	Defect Description (2009)	2013 Assessment of 2009 Itemized Defects	Photo Log Reference Nos.	
			From 2009 Report	2013
1	Vertical masonry crack 1 inch wide in southwest corner	Change in condition was not observed	2	
2	Cracks at lintel on west elevation at south window	Change in condition was not observed	4	
3	Vertical cracks at columns on exposed mezzanine concrete frame on west elevation	Change in condition was not observed	10	
4	Spalls in west elevation	Change in condition was not observed		
5	Badly rusted exterior metal stars on west elevation	Change in condition was not observed	3	
6	Masonry exterior wall at north elevation - fair condition	Change in condition was not observed		
7	Crack at columns in exposed mezzanine concrete frame on east elevation	Change in condition was not observed		
8	Surface spalls on east elevation	Change in condition was not observed		
9	Lots of spalls (impact damage) of concrete columns supporting concrete mezzanine	**Vertical cracking at damaged corners of columns is significantly expanded**	21,22	22
10	Impact damage at concrete mezzanine beams; serious chunk missing in 3 locations	Change in condition was not observed	23,24,25,26	
11	Voids in masonry wall below both mezzanines at closed end	Change in condition was not observed		
12	Roof diaphragm - corrugated metal deck or signs of rusting	**More and larger holes were observed in clerestory metal roof deck**	7,8,17	17

Photo Log:
2009 vs. 2013 Comparison

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PHOTOLOG: Building No. 79 3A Building (2009 vs. 2013 Comparison)

2009 Photo #1: Exterior building looking at Northeast corner

2013 Photo #1: Exterior building looking at Northeast corner

2009 Photo #2: Exterior building looking at Southwest corner

No change observed

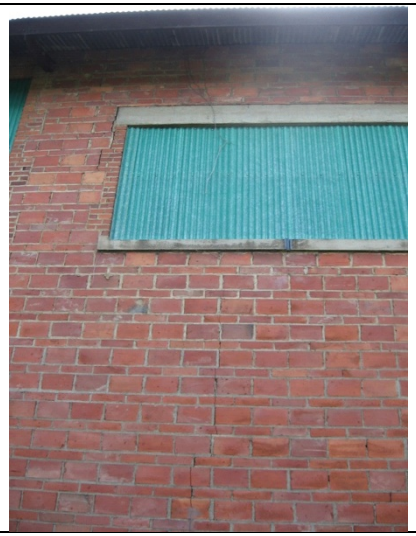
2013 Photo #2:

PHOTOLOG: Building No. 79 3A Building (2009 vs. 2013 Comparison)

2009 Photo #3: Remains of exterior exit stair on West side

2013 Photo #3:

No change observed



2009 Photo #4: Vertical cracks in masonry

2013 Photo #4:

No change observed

PHOTOLOG: Building No. 79 3A Building (2009 vs. 2013 Comparison)

2009 Photo #5: Exterior building South end where track shed was originally attached

2013 Photo #5:

No change observed

2009 Photo #6: Detail view of where track shed roof was attached to building

2013 Photo #6:

No change observed

PHOTOLOG: Building No. 79 3A Building (2009 vs. 2013 Comparison)

2009 Photo #7: Deteriorated metal roof at South end

2013 Photo #7:

No change observed

2009 Photo #8: Deteriorated metal roof on West side

2013 Photo #8:

No change observed

PHOTOLOG: Building No. 79 3A Building (2009 vs. 2013 Comparison)

2009 Photo #9: Minor cracks and spalls in exterior face of mezzanine concrete frame

2013 Photo #9:

No change observed

2009 Photo #10: Substantial crack in exterior mezzanine concrete frame

2013 Photo #10:

No change observed

PHOTOLOG: Building No. 79 3A Building (2009 vs. 2013 Comparison)

2009 Photo #11: Interior building looking North

2013 Photo #11:

No change observed

2009 Photo #12: Interior building looking North

2013 Photo #12:

No change observed

PHOTOLOG: Building No. 79 3A Building (2009 vs. 2013 Comparison)

2009 Photo #13: Concrete mezzanine West side

2013 Photo #13:

No change observed

2009 Photo #14: Concrete mezzanine East side

2013 Photo #14:

No change observed

PHOTOLOG: Building No. 79 3A Building (2009 vs. 2013 Comparison)

2009 Photo #15: Main roof above mezzanine

2013 Photo #15:

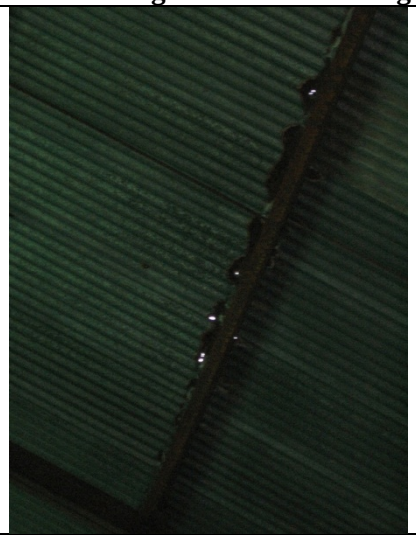
No change observed

2009 Photo #16: Main roof above mezzanine

2013 Photo #16:

No change observed

PHOTOLOG: Building No. 79 3A Building (2009 vs. 2013 Comparison)



2009 Photo #17: Holes in metal roof deck

2013 Photo #17: More and larger holes were observed in metal roof deck in 2013

2009 Photo #18: Cracked and spalled concrete at interior wall

No change observed

2013 Photo #18:

PHOTOLOG: Building No. 79 3A Building (2009 vs. 2013 Comparison)

2009 Photo #19: Large hole in exterior masonry wall

2013 Photo #19:

No change observed

2009 Photo #20: Deterioration from water intrusion at mezzanine concrete frame

2013 Photo #20: Additional deterioration from water intrusion at mezzanine concrete frame was observed

PHOTOLOG: Building No. 79 3A Building (2009 vs. 2013 Comparison)

2009 Photo #21: Severely spalled mezzanine concrete column

No change observed

2013 Photo #21:

2009 Photo #22: Severely spalled mezzanine concrete column

2013 Photo #22: Vertical crack at corner of column is significantly expanded, indicating progressive deterioration of reinforcing steel

PHOTOLOG: Building No. 79 3A Building (2009 vs. 2013 Comparison)

2009 Photo #23: Heavily damaged mezzanine concrete beam

2013 Photo #23:

No change observed

2009 Photo #24: Heavily damaged mezzanine concrete beam

2013 Photo #24:

No change observed

PHOTOLOG: Building No. 79 3A Building (2009 vs. 2013 Comparison)

2009 Photo #25: Damaged mezzanine concrete beam

2013 Photo #25:

No change observed

2009 Photo #26: Damaged mezzanine concrete beam

2013 Photo #26:

No change observed

Condition Assessment, April 2009

Building Information Overall Building Condition 2 Overall Structural Condition 3

Building Name	81 - 5A Nitrate House		
Period of Construction	1918		
National Register Eligibility	Contributing MSHD, NFDC Context		
Building Height	2 story		
Building Footprint	8,594 SF		
Historic Use | Current Use	Ammonium Nitrate Storage	Rented - Storage, Manufacturing and Machine Shop Operations	
Potential Use | Adaptability	LI, LO, RE, ST, WH	2	

Character Defining Features

Exterior	Interior
Primary Building Form: Rectangular Form with Moderate Sloped Gable Roof and Interrupted Clerestory Building Walls: Hollow Clay Tile w/ Brick Quoins; Expressed Concrete Mezzanine Structure Roofing: Corrugated Metal Windows: Steel with operable hopper Window Headers and Sills: Precast concrete, sills shaped Doors: Rail and Stile, metal covered	**Primary** Spatial Form: Open Central Clerestory, 2 story open Mezzanines at sides of 2 story clerestory Mezzanine Visibility: to and from 2 story open clerestory **Secondary** Spatial Form: Open Floor Plan between Clerestory and Adjacent Space; Exposure of Steel and Concrete Structure; Exposure of Hollow Clay Tile with Brick Quoins

Resource Significance

The National Fertilizer Development Center (fomerly known as Nitrate Plant No. 2) has been recommended eligible to the National Register of Historic Places as a contributing resource in the Muscle Shoals Historic District. The property retains architectural integrity and is historically significant for its' role as a research facility during the World War I and World War II periods and thereafter. The period of significance dates between 1916 and 1970.

TVA Muscle Shoals Feasibility Muscle Shoals, Alabama

Lord, Aeck & Sargent Architecture July 31, 2009

Cyclic Assessment, July 2013

Building Information Overall Building Condition 2 Overall Structural Condition 3

Building Name: 81 - 5A Nitrate House

Current Use: Storage

Building 81 → N

General Comments:

The overall condition of the building remains similar to its condition when it was assessed in 2009.

This building remains in use as a storage facility for maintenance stock. Although unconditioned, the building has frequent visitation by TVA personnel.

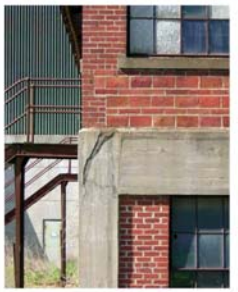
Condition Assessment, April 2009

Building Information

Building Name	81 - 5A Nitrate House		
Period of Construction	1918		
National Register Eligibility	Contributing MSHD, NFDC Context		
Building Height	2 story		
Building Footprint	8,594 SF		
Historic Use | Current Use	Ammonium Nitrate Storage	Rented - Storage, Manufacturing and Machine Shop Operations	
Potential Use | Adaptability	LI, LO, RE, ST, WH	2	

Exterior Materials and Conditions

Building Component	Building Material	Condition
Roofing | Decking	Gable; Deck: Metal	2
Exterior Envelope	Hollow Clay Tile; Brick quoins at openings/corners	3
Exterior Doors	Wood, rail & stile; metal wrapped	5
Windows	Steel with operable hopper	3
Lintels	1st: Concrete; 2nd: Brick, soldier course	1
Loading Dock	North: 1 bay centered	2
Porch	N/A	
Additions	North: Shed, attached to Bulk Storage Bldg	2



Comments

Clerestory consists of steel windows with brick at corners only
Concrete mezzanine structure projects onto exterior on East, West, and South facades
Historic metal clad sliding door at Loading Dock

TVA Muscle Shoals Feasibility
Lord, Aeck & Sargent Architecture

Muscle Shoals, Alabama
July 31, 2009

Cyclic Assessment, July 2013

Exterior Materials and Conditions

Building Component	Building Material	Condition
Roofing / Decking	Low-slope gable with clerestory; Deck: Metal	2
Exterior Envelope	Hollow clay tile; Brick quoins at openings / corners	3
Exterior Doors	Entry; Wood, rail & stile, metal wrapped	5
Windows	Steel with operable hopper	3
Lintels **& Sills**	1st: Concrete; 2nd: Brick, soldier course	1
Loading Dock	North: 1 bay, centered	2
Porch	N / A	
Additions	North; Shed, attached to bulk storage building	2

New Comments

- Steel access stairs to mezzanine rusted and in critical condition
- Structural clay tile damaged on the west and east elevations below the windows
- Steel at doors rusted
- Lots of pipes through concrete on west walls
- Cracked concrete sill on east wall
- CMU loading dock located on north facade
- Water from shed roof runs onto north wall
- Localized plant growth inside building

Condition Assessment, April 2009

Building Information

Building Name	81 - 5A Nitrate House		
Period of Construction	1918		
National Register Eligibility	Contributing MSHD, NFDC Context		
Building Height	2 story		
Building Footprint	8,594 SF		
Historic Use | Current Use	Ammonium Nitrate Storage	Rented - Storage, Manufacturing and Machine Shop Operations	
Potential Use | Adaptability	LI, LO, RE, ST, WH	2	

Interior Materials and Conditions

Building Component	Building Material	Condition
Corridors	N/A	
Primary Space	Open	1
Secondary Space	Mezzanine/Loft at each side	1
Secondary Space	Office: N/A; Walls: Hollow Clay Tile	2
Secondary Space	N/A	
Flooring	Concrete, unfinished	2
Walls	Hollow Clay Tile	2
Ceiling	Exposed Beams: Steel; Corrugated Metal	2

Comments

Center bay is open from ground level to Celerestory
Mezzanine on each side consists of exposed concrete structural floor and beams
Most windows at Clerestory intact and in good condition
Concrete structure exposed at ground level, steel structure exposed above

TVA Muscle Shoals Feasibility
Lord, Aeck & Sargent Architecture

Muscle Shoals, Alabama
July 31, 2009

Cyclic Assessment, July 2013

Interior Materials and Conditions

Building Component	Building Material	Condition
Corridors	N / A	
Primary Space	Open	1
Secondary Space	Mezzanine / Loft at each side	1
Secondary Space	Office: N / A; Walls: Hollow clay tile	2
Secondary Space	N / A	
Flooring	Concrete, unfinished	2
Walls	Hollow clay tile	2
Ceiling	Exposed beams: Steel, corrugated metal	2

New Comments

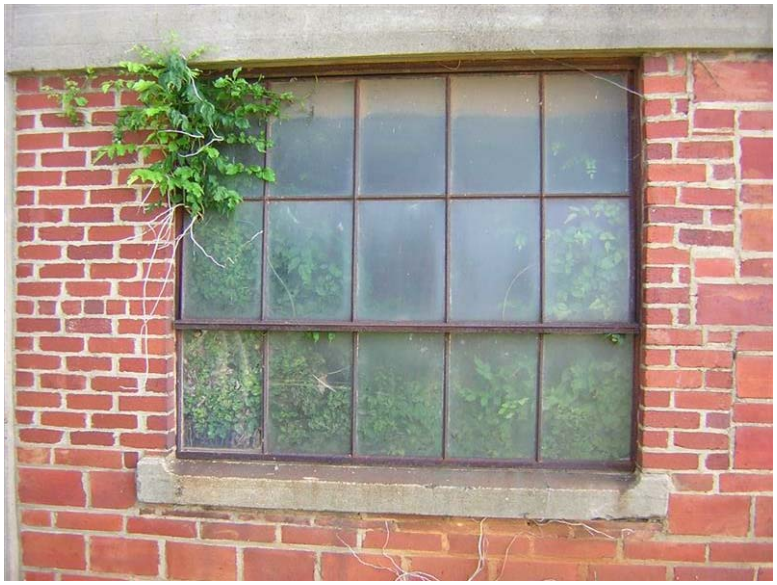
- Corners of columns damaged
- Holes / daylight visible through lower and upper roofing
- Rusting of steel windows
- Penetrations of steel columns for railings on mezzanine
- Holes through concrete mezzanine flooring

Building 81 – 5A – Nitrate House: Overall view from the northwest corner of the building

Building 81 – 5A – Nitrate House: Water flows from the attached shed towards the north wall.

Building 81 – 5A – Nitrate House: The exterior doors are rusted.

Building 81 – 5A – Nitrate House: Localized cracking is visible in the concrete structure.



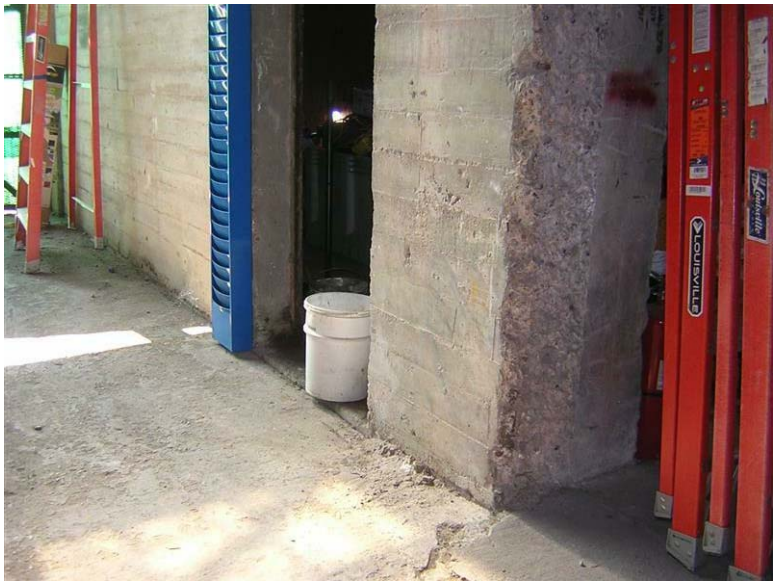
Building 81 – 5A – Nitrate House: Localized plant growth is located in the building.

Building 81 – 5A – Nitrate House: Hollow clay tile and window panes are broken. The window has been partially covered with plywood.

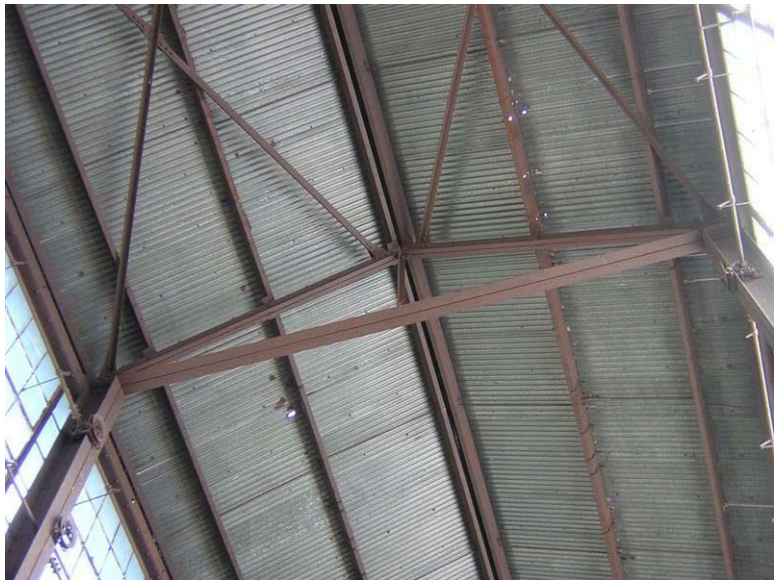
Building 81 – 5A – Nitrate House: Interior view of the building at the first floor

Building 81 – 5A – Nitrate House: Interior view of the building at the mezzanine

Building 81 – 5A – Nitrate House: Interior view of the space beneath the mezzanine.



Building 81 – 5A – Nitrate House: The concrete wall is damaged.



Building 81 – 5A – Nitrate House: Daylight is visible through the metal roof decking.

Building 81 – 5A – Nitrate House: The metal muntins are rusted and several window panes have been replaced.

Building 81 – 5A – Nitrate House: Penetrations have been made in the steel columns for railings on the mezzanine.

PHOTOLOG: Building No. 81 5A Building (2009 vs. 2013 Comparison)

2009 Photo #1: Exterior building looking at West side

2013 Photo #1: Exterior building looking at West side

2009 Photo #2: Exterior cracks in concrete mezzanine frame at Southwest corner

2013 Photo #2: Exterior cracks in concrete mezzanine frame at Southwest corner exhibit progressive deterioration

PHOTOLOG: Building No. 81 5A Building (2009 vs. 2013 Comparison)

2009 Photo #3: Exterior cracks in concrete mezzanine frame at Southeast corner

2013 Photo #3:

No change observed

2009 Photo #4: Exterior crack in concrete mezzanine column

2013 Photo #4:

No change observed

PHOTOLOG: Building No. 81 5A Building (2009 vs. 2013 Comparison)

2009 Photo #5: Deteriorated metal roof on East side

2013 Photo #5:

No change observed

2009 Photo #6: Deteriorated metal roof on East side

2013 Photo #6:

No change observed

PHOTOLOG: Building No. 81 5A Building (2009 vs. 2013 Comparison)

2009 Photo #7: Interior South end of monitor

2013 Photo #7: More holes and more corrosion were observed on underside of metal roof deck

2009 Photo #8: Interior building looking South

2013 Photo #8: More holes and more corrosion were observed on underside of metal roof deck

PHOTOLOG: Building No. 81 5A Building (2009 vs. 2013 Comparison)

2009 Photo #9: View of concrete mezzanines from above

2013 Photo #9:

No change observed

2009 Photo #10: View of West concrete mezzanine from above

2013 Photo #10:

No change observed

PHOTOLOG: Building No. 81 5A Building (2009 vs. 2013 Comparison)

2009 Photo #11: View from mezzanine looking North

2013 Photo #11:

No change observed

2009 Photo #12: View from mezzanine looking North

2013 Photo #12:

No change observed

PHOTOLOG: Building No. 81 5A Building (2009 vs. 2013 Comparison)

2009 Photo #13: Interior West wall of store room

2013 Photo #13:

No change observed

2009 Photo #14: Interior roof of store room West side

2013 Photo #14:

No change observed

PHOTOLOG: Building No. 81 5A Building (2009 vs. 2013 Comparison)

2009 Photo #15: Surface corrosion on steel framing

2013 Photo #15:

No change observed

2009 Photo #16: Corroded steel column

2013 Photo #16:

No change observed

PHOTOLOG: Building No. 81 5A Building (2009 vs. 2013 Comparison)

2009 Photo #17: Underside of East mezzanine floor

2013 Photo #17:

No change observed

2009 Photo #18: Cracked concrete column at East mezzanine

2013 Photo #18:

No change observed

Condition Assessment, April 2009

Building Information Overall Building Condition 1 Overall Structural Condition 3

Building Name	118 - Greenhouse Complex	
Period of Construction	c.1950	
National Register Eligibility	Contributing MSHD, NFDC & Individual Context	
Building Height	1 story	
Building Footprint	7,917 SF	
Historic Use | Current Use	Greenhouse Complex	Produce Farm; Greenhouse
Potential Use | Adaptability	Greenhouse; CO, RE	5

Character Defining Features

Exterior	Interior
Primary Building Form: Rectangular Form with Flat Roof and Moderate Slope Gable Roof at Greenhouses Building Walls: Glazed CMU Walls Metal and Glass Greenhouse Wood and Glass (Greenhouse) Windows: Steel, awning Doors: Rail and Stile, 2 panel, metal (where remaining) Rail and Stile, 9 light over 2 panel, wood (where remaining)	**Primary** Building Walls: Glazed CMU Walls Open Greenhouse Spaces

Resource Significance

The TVA Greenhouse Research Complex has been recommended eligible for individual listing on the National Register of Historic Places (NHRP) under Criterion A for its association with the historically significant National Fertilizer Development Center. The greenhouse complex is located within the boundaries of the proposed NRHP Muscle Shoals Historic District and recommended as a contributing property to the historic significance of the district.

TVA Muscle Shoals Feasibility Muscle Shoals, Alabama

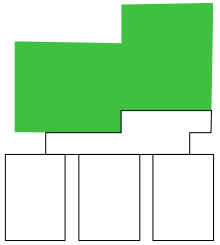
Lord, Aeck & Sargent Architecture July 31, 2009

Cyclic Assessment, July 2013

Building Information Overall Building Condition 1 Overall Structural Condition 3

Building Name: 118 - Greenhouse Complex A

Current Use: Greenhouse



Building 118 N

General Comments:

In the previous condition assessment conducted for TVA, the Greenhouse Complex was assessed as one building. In the current assessment, Building A, the main terra cotta building, was assessed separately, and Buildings B, C and D, the glazed greenhouses, were assessed as a single building.

While spalling and cracking were visible in the glazed terra cotta tile of Building A, the overall condition of the building remains unchanged from its review in 2009.

Condition Assessment, April 2009

Building Information

Building Name	118 - Greenhouse Complex	
Period of Construction	c.1950	
National Register Eligibility	Contributing MSHD, NFDC & Individual Context	
Building Height	1 story	
Building Footprint	7,917 SF	
Historic Use | Current Use	Greenhouse Complex	Produce Farm; Greenhouse
Potential Use | Adaptability	Greenhouse; CO, RE	5

Exterior Materials and Conditions

Building Component	Building Material	Condition
Roofing | Decking	Flat; Deck: Metal	2
Exterior Envelope	Glazed Tile; Greenhouse: Steel/Glass	1
Exterior Doors	Entry: Metal, flush; Overhead: Metal	3
Windows	Steel, awning	1
Lintels	Steel	1
Loading Dock	N/A	
Porch	Rear: 1-bay centered; Shed; Deck: Corrugated Plastic	2
Additions	East: Glazed Tile; Porch	1

Comments

Original metal fascia/flashing intact; small areas of rust visible
Porch addition is made of steel frame and bar joists with corrugated plastic panels; paint peeling
Window frames rusted through paint; still operable and in very good condition
L-shaped awning over front entry has significant amount of rust
Greenhouses are in very good condition; all original doors and windows still operable; currently in use

TVA Muscle Shoals Feasibility — Muscle Shoals, Alabama
Lord, Aeck & Sargent Architecture — July 31, 2009

Cyclic Assessment, July 2013

Exterior Materials and Conditions

Building Component	Building Material	Condition
Roofing / Decking	Flat Deck: Metal	2
Exterior Envelope	Main Building: Glazed Terra Cotta;	**2**
Exterior Doors	Entry: Metal, flush; Overhead: Metal	3
Windows	Steel awning	1
Lintels **& Sills**	Steel; Concrete	**2**
Loading Dock	N / A	
Porch	Rear: 1-bay centered; Shed; Deck: Corrugated Plastic	2
Additions	East: Glazed Tile; Porch	1

New Comments

- Localized clay tile spalling at north corner and adjacent to some window and vent openings
- Lintels rusting at bearing points on either side of window
- Moisture visible in mortar joints
- Steel at rear shed rusting more since previous assessment

Condition Assessment, April 2009

Building Information

Building Name	118 - Greenhouse Complex	
Period of Construction	c.1950	
National Register Eligibility	Contributing MSHD, NFDC & Individual Context	
Building Height	1 story	
Building Footprint	7,917 SF	
Historic Use | Current Use	Greenhouse Complex	Produce Farm; Greenhouse
Potential Use | Adaptability	Greenhouse; CO, RE	5

Interior Materials and Conditions

Building Component	Building Material	Condition
Corridors	N/A	
Primary Space	Market	1
Secondary Space	Storage	1
Secondary Space	Office	1
Secondary Space	N/A	
Flooring	Concrete	1
Walls	Glazed Tile	1
Ceiling	Corrugated Metal Deck	1

Comments

Water damage visible in small area of exposed Metal Deck
Doors, windows, and portions of interior appear to be original paint color

TVA Muscle Shoals Feasibility — Muscle Shoals, Alabama
Lord, Aeck & Sargent Architecture — July 31, 2009

Cyclic Assessment, July 2013

Interior Materials and Conditions

Building Component	Building Material	Condition
Corridors	N / A	
Primary Space	Market	1
Secondary Space	Storage / Vestibule	1
Secondary Space	N / A	
Secondary Space	N / A	
Flooring	Concrete	1
Walls	Glazed terra cotta	1
Ceiling	Corrugated Metal Deck	1

New Comments

- Localized broken tile at base of wall near main entry
- Paint peeling from ceiling in kitchen area
- Roof leaks at all drains on flat roofs

Condition Assessment, April 2009

Building Information | Overall Building Condition 1 | Overall Structural Condition 3

Building Name	118 - Greenhouse Complex	
Period of Construction	c.1950	
National Register Eligibility	Contributing MSHD, NFDC & Individual Context	
Building Height	1 story	
Building Footprint	7,917 SF	
Historic Use | Current Use	Greenhouse Complex	Produce Farm; Greenhouse
Potential Use | Adaptability	Greenhouse; CO, RE	5

Character Defining Features

Exterior	Interior
Primary Building Form: Rectangular Form with Flat Roof and Moderate Slope Gable Roof at Greenhouses Building Walls: Glazed CMU Walls Metal and Glass Greenhouse Wood and Glass (Greenhouse) Windows: Steel, awning Doors: Rail and Stile, 2 panel, metal (where remaining) Rail and Stile, 9 light over 2 panel, wood (where remaining)	**Primary** Building Walls: Glazed CMU Walls Open Greenhouse Spaces

Resource Significance

The TVA Greenhouse Research Complex has been recommended eligible for individual listing on the National Register of Historic Places (NHRP) under Criterion A for its association with the historically significant National Fertilizer Development Center. The greenhouse complex is located within the boundaries of the proposed NRHP Muscle Shoals Historic District and recommended as a contributing property to the historic significance of the district.

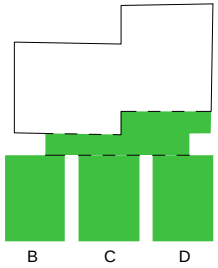
TVA Muscle Shoals Feasibility — Muscle Shoals, Alabama

Lord, Aeck & Sargent Architecture — July 31, 2009

Cyclic Assessment, July 2013

Building Information | Overall Building Condition 1 | Overall Structural Condition 3

Building Name: Greenhouse Complex B, C, D



Building 118

General Comments:

In the previous condition assessment conducted for TVA, the Greenhouse Complex was assessed as one building. In the current assessment Building A, the main terra cotta building, was assessed separately and Buildings B, C and D, the glazed greenhouses were assessed as a single building. The greenhouses are actively used and maintained and their condition has not changed since the previous assessment.

Condition Assessment, April 2009

Building Information

Building Name	118 - Greenhouse Complex	
Period of Construction	c.1950	
National Register Eligibility	Contributing MSHD, NFDC & Individual Context	
Building Height	1 story	
Building Footprint	7,917 SF	
Historic Use | Current Use	Greenhouse Complex	Produce Farm; Greenhouse
Potential Use | Adaptability	Greenhouse; CO, RE	5

Exterior Materials and Conditions

Building Component	Building Material	Condition
Roofing | Decking	Flat; Deck: Metal	2
Exterior Envelope	Glazed Tile; Greenhouse: Steel/Glass	1
Exterior Doors	Entry: Metal, flush; Overhead: Metal	3
Windows	Steel, awning	1
Lintels	Steel	1
Loading Dock	N/A	
Porch	Rear: 1-bay centered; Shed; Deck: Corrugated Plastic	2
Additions	East: Glazed Tile; Porch	1

Comments

Original metal fascia/flashing intact; small areas of rust visible
Porch addition is made of steel frame and bar joists with corrugated plastic panels; paint peeling
Window frames rusted through paint; still operable and in very good condition
L-shaped awning over front entry has significant amount of rust
Greenhouses are in very good condition; all original doors and windows still operable; currently in use

Cyclic Assessment, July 2013

Exterior Materials and Conditions

Building Component	Building Material	Condition
Roofing / Decking	**Gable, Aluminum and glass greenhouse system**	**1**
Exterior Envelope	**Aluminum and glass greenhouse system over concrete foundation wood**	**1**
Exterior Doors	**Wood stile and rail with 9 lite glazing on Building D**	**2**
Windows	**Aluminum and glass greenhouse system**	**1**
Lintels **& Sills**	N / A	
Loading Dock	N / A	
Porch	N / A	
Additions	N / A	

New Comments

- Localized broken glass panes
- Localized cracking in concrete foundation wall; some moisture staining and mold growth on foundation; some erosion of concrete where water runs down the wall
- Paint failure at wood doors, but old-growth wood still solid, only minor repairs needed
- Soiling and condensation on glass

Condition Assessment, April 2009

Building Information

Building Name	118 - Greenhouse Complex	
Period of Construction	c.1950	
National Register Eligibility	Contributing MSHD, NFDC & Individual Context	
Building Height	1 story	
Building Footprint	7,917 SF	
Historic Use | Current Use	Greenhouse Complex	Produce Farm; Greenhouse
Potential Use | Adaptability	Greenhouse; CO, RE	5

Interior Materials and Conditions

Building Component	Building Material	Condition
Corridors	N/A	
Primary Space	Market	1
Secondary Space	Storage	1
Secondary Space	Office	1
Secondary Space	N/A	
Flooring	Concrete	1
Walls	Glazed Tile	1
Ceiling	Corrugated Metal Deck	1

Comments

Water damage visible in small area of exposed Metal Deck
Doors, windows, and portions of interior appear to be original paint color

TVA Muscle Shoals Feasibility — Muscle Shoals, Alabama
Lord, Aeck & Sargent Architecture — July 31, 2009

Cyclic Assessment, July 2013

Interior Materials and Conditions

Building Component	Building Material	Condition
Corridors	N / A	
Primary Space	**Greenhouse**	1
Secondary Space	Storage / Vestibule	1
Secondary Space	N / A	
Secondary Space	N / A	
Flooring	Concrete	1
Walls	Aluminum and glass greenhouse system	1
Ceiling	Aluminum and glass greenhouse system	1

New Comments

- Paint failure at wood doors, but old-growth wood still solid only minor repairs needed
- Localized broken glass panes

Building 118 – Greenhouse A: Overall view of the main entrance

Building 118 – Greehouse A: Rusting is visible in the steel shed structure at the rear.

Building 118 – Greenhouse A: Localized spalling has occurred in the tiles at this corner of the building.

Building 118 – Greenhouse A: The glazed tiles have spalled adjacent to the vent opening.

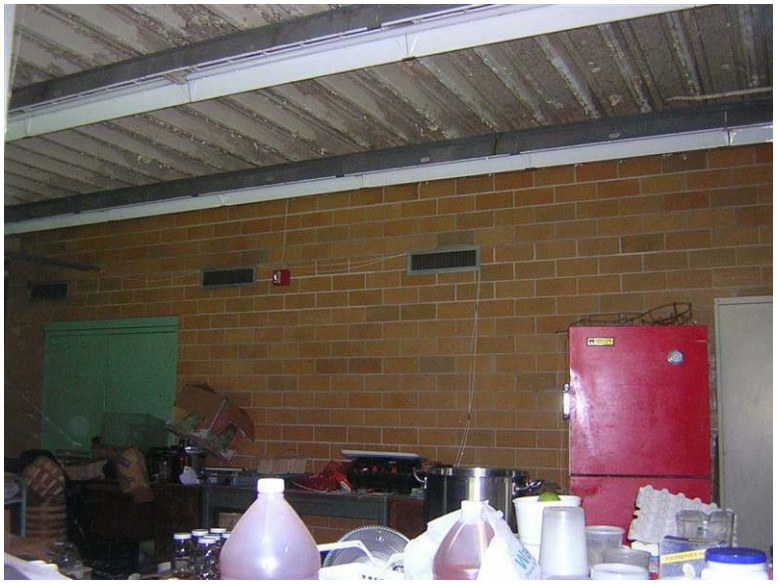
Building 118 – Greenhouse A: The lintels are rusting at the bearing points.

Building 118 – Greenhouse A: Plastic covers the broken window.

Building 118 – Greenhouse A: Localized damage is visible at the corner of the concrete foundation.

Building 118 – Greenhouse A: Interior view of the primary space

Building 118 – Greenhouse A: Interior view of a secondary space



Building 118 – Greenhouse A: Paint is flaking from the metal ceiling.

Building 118 – Greenhouse A: Most of the interior glazed tiles are intact.

Building 118 – Greenhouse A: Paint is flaking from the metal ceiling.

Building 118 – Greenhouse A: The glazed tiles are chipped at the base adjacent to the main entrance.

Building 118 – Greenhouse B-D: Overall view of greenhouse B

Building 118 – Greenhouse B-D: The glazed tile building is connected to the greenhouses with a glass addition.

Building 118 – Greenhouse B-D: Staining from moisture and cracking is visible on the lower concrete wall.

Building 118 – Greenhouse B-D: Localized broken panes occur in the glazed walls.

Building 118 – Greenhouse B-D: Although paint is flaking from several of the wooden doors, the wood remains in good condition.

Building 118 – Greenhouse B-D: Metal doors are used at this entry.

Building 118 – Greenhouse B-D: The wood doors are good condition.

Building 118 – Greenhouse B-D: Interior view of a space.

Building 118 – Greenhouse B-D: There are several localized broken panes.

Building 118 – Greenhouse B-D: The broken pane has been sealed with an orange substance.

Structural Assessment – General Information

Building No.: 118 Greenhouse	
Building Name:	Greenhouse
Original Function:	Greenhouse Complex
Subsequent Modification:	N/A
General Building Structural Description:	Building No. 118 is a complex of eight buildings, four of which are interconnected. The Lab Building is a one story structure with load bearing masonry walls and a long span metal roof deck approximately 4 ½ inches deep. The Lab Building has a steel frame open covered storage area with a translucent panel roof, and is joined to three greenhouses by a multi-gable steel tube frame connecting structure with a translucent panel roof. Each greenhouse consists of panelized clear glazing supported by lightweight steel angle frames. The remaining four detached structures include two greenhouses of similar construction as those connected to the Lab Building, a storage building made of corrugated metal panels on a lightweight steel frame, and a free-standing "screened porch" constructed of translucent panels on wood roof trusses supported by lightweight steel framing. **(2013: Only the Lab Building and three connected greenhouses were evaluated.)**
General Building Structural Condition (2009):	Structural General Building Condition Code = 3 "Fair". **(2013: Structural General Building Condition Code = 3 "Fair".)** The overall Green House complex is in fair to good condition. The Lab Building roof and walls have water intrusion damage in some isolated areas. The steel frame open covered storage area has mild to moderate corrosion. The greenhouse structures are in generally good condition; some cracks were observed in the foundation stem walls. The metal storage building has surface corrosion on the roof. A large portion of the translucent panel roof covering at the Screened Porch appears to have been torn away, exposing the wood roof trusses to weather.
Summary of Observations Regarding Present General Building Structural Condition (2013):	**No significant changes were observed. Minor changes noted include progressive deterioration of mildly corroded steel framing at open covered storage area and refinishing of the corroded steel awning at the masonry lab building.**
Summary of Recommended Structural Repairs (2009):	The Lab Building roof membrane must be repaired or replaced, and water intrusion damage to the metal roof deck must be repaired. The steel framing at the open covered storage area should be cleaned and painted. Concrete foundation walls should be repaired, including cracks in the greenhouse stem walls and a spalled corner of the turned-down slab at the Lab Building. The metal roof at the Storage Building should be cleaned and coated, and the translucent panel roof at the Screened Porch should be replaced. Deteriorated wood framing at the Screened Porch roof must be replaced or reinforced.
Additional Recommendations (2009):	Not applicable

Table 1: Structural Systems Assessment

Structural Component	Previous (2009) Condition Code	Present (2013) Condition Code	Comments
Lowest Level Floor System	2	2	
Exposed Foundation/Stem Walls	3	3	
Exterior Slabs at Canopies	3	3	
Interior Load Bearing Walls	2	2	
Exterior Walls	3	3	
Exterior Wall Framing and Subframing	2	2	
Roof Framing and Subframing	2	2	
Roof Deck	3	3	
Canopies (Framing and deck)	3	3	**Minor progressive deterioration of corroded steel framing was observed**
Awnings (Total Assembly)	4	**3**	**Corroded steel awning has been refinished**

Condition Code Description

(1) Excellent - Visual observation indicates no remedial work required. (less than 10% repair)
(2) Good - Visual observation indicates minimal remedial work required. (less than 10% replacement and/or 25% repair)
(3) Fair - Visual observation indicates remedial work required. (up to 25% replacement and/or 50% repair)
(4) Deteriorated - Visual observation indicates significant remedial work required. (up to 50% replacement and/or 75% repair)
(5) Critical – Visual observation indicates extensive replacement and/or repair. (over 50% replacement and/or 75% repair)

Table 2: Itemized Structural Defects

Defect Item No.	Defect Description (2009)	2013 Assessment of 2009 Itemized Defects	Photo Log Reference Nos.	
			From 2009 Report	2013
1	Masonry bldg/roof	Change in condition was not observed	7,8	
2	Flaking paint on roof deck	Change in condition was not observed	5	
3	Floor and walls in good condition	Change in condition was not observed		
4	Left greenhouse (addition)	Change in condition was not observed	11	
5	Greenhouse connector	Change in condition was not observed	9	
6	Middle greenhouse toward masonry bldg (original)	Change in condition was not observed	10	
7	Right greenhouse (original)	Change in condition was not observed	12	
11	Cracks in stem wall - right hand original greenhouse	Change in condition was not observed	14	
12	Concrete stem walls	Change in condition was not observed	13	
14	Flimsy metal frame in fair condition	Change in condition was not observed		
15	Corroded lightweight joists and heavy steel posts and beam on canopy at left rear of masonry bldg	**Additional deterioration observed.**	4	**4**
16	Context photo of above, etc.	Change in condition was not observed	3	
17	Spalled foundation wall - same corner as water intrusion	Change in condition was not observed	6	
18	Corroded steel awning	**Steel has been refinished in this area.**	2	**2**
19	Context photo of masonry bldg	Change in condition was not observed	1	**1**

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Photo Log:
2009 vs. 2013 Comparison

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PHOTOLOG: Building No. 118 Greenhouse (2009 vs. 2013 Comparison)

2009 Photo #1: Exterior view of lab building

2013 Photo #1: Exterior view of lab building

2009 Photo #2: Corroded awning at lab building

2013 Photo #2: Awning at lab building, steel has been refinished.

PHOTOLOG: Building No. 118 Greenhouse (2009 vs. 2013 Comparison)

2009 Photo #3: Exterior view of lab building and attached open covered storage area

No change observed

2013 Photo #3:

2009 Photo #4: Mildly to moderately corroded steel at open covered storage area

2013 Photo #4: Corroded steel exhibits progressive deterioration.

PHOTOLOG: Building No. 118 Greenhouse (2009 vs. 2013 Comparison)

2009 Photo #5: Interior evidence of moisture intrusion at lab building roof

2013 Photo #5:

No change observed

2009 Photo #6: Spalled foundation wall and exterior evidence of interior water intrusion

2013 Photo #6:

No change observed

PHOTOLOG: Building No. 118 Greenhouse (2009 vs. 2013 Comparison)

2009 Photo #7: Interior of work room at lab building

2013 Photo #7:

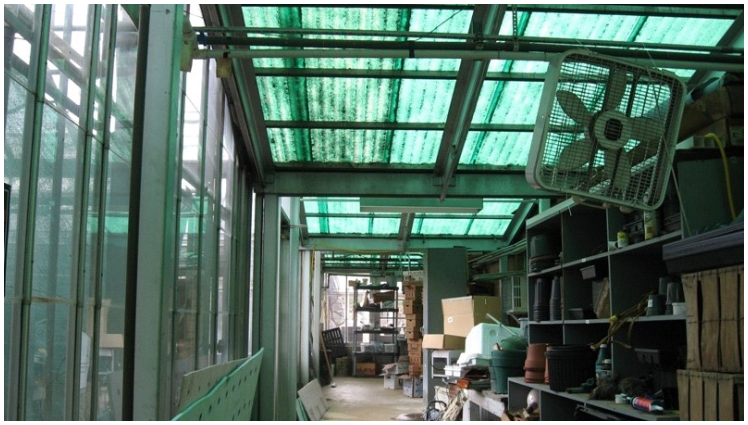
No change observed

2009 Photo #8: Metal roof deck at lab building in generally good condition

2013 Photo #8:

No change observed

PHOTOLOG: Building No. 118 Greenhouse (2009 vs. 2013 Comparison)



2009 Photo #9: Steel frame enclosure between lab building and greenhouses

2013 Photo #9:

No change observed

2009 Photo #10: Interior of greenhouse 2 looking at lab building

2013 Photo #10:

No change observed

PHOTOLOG: Building No. 118 Greenhouse (2009 vs. 2013 Comparison)

2009 Photo #11: Interior view of greenhouse 3

2013 Photo #11:

No change observed

2009 Photo #12: Interior view of greenhouse 1

2013 Photo #12:

No change observed

PHOTOLOG: Building No. 118 Greenhouse (2009 vs. 2013 Comparison)

2009 Photo #13: Foundation walls at greenhouses

2013 Photo #13:

No change observed

2009 Photo #14: Cracks in foundation wall at greenhouse 1

2013 Photo #14: No change observed.

No change observed

Glossary of Structural Assessment Terms

2-way slab: A reinforced concrete slab that spans to vertical supports without beams or joists.

Clerestory monitor: A portion of the roof structure above the main roof that has windows above the roof, typically on each side.

Concrete pan joist: A reinforced elevated concrete slab that is poured in place on forms to create a series of concrete joists below a continuous concrete slab.

Concrete piers (footing piers): Concrete pedestals constructed on top of concrete footings, typically extending above the floor slab, that serve as the base for steel column attachments.

Delaminated: A condition of steel or concrete where the surface material is separating from the base material.

Diaphragm: A roof or floor deck that is used to transfer lateral loads to walls and/or framing members.

Efflorescence: A condition of concrete or masonry caused by water intrusion where calcium from within the material forms stains on the exterior surface of the material.

Elevated slab (structural slab): A reinforced concrete slab that spans between structural supports and is not supported directly on grade.

Foundation wall: A concrete wall, partially below grade, that extends from the wall footing and terminates above the finished floor.

Girders: Concrete or steel beams that span between vertical supports which support primary (vs. secondary) framing.

Girts: Secondary horizontal wall framing, typically located between columns, used for the attachment of wall material.

Joists: Secondary concrete, steel, or wood framing used to attach and support floors and ceilings. Also used to describe some framing components for low-slope roofs.

Lateral bracing: Structural system components (beams, braces, diaphragms, etc.) used to transfer wind and/or seismic loads to vertical supports that transfer these loads to the structural foundations.

Lintel: Structural component at the top of a wall opening that supports wall material above opening.

Lintel beams: Structural component at the top of a wall opening that supports wall material above and also provides lateral bracing between vertical framing members at or within exterior walls.

Parapet: The top portion of an exterior wall that extends above the roof.

Purlins: Secondary roof framing members that span between primary roof framing and are used for the attachment of roof material (sometimes described as “rafters”).

Rafters: Roof framing members that are used for the attachment of roof material. The term “rafter” is most commonly used to describe closely spaced wood framing at pitched roofs.

Route: The mechanical widening and shaping of a crack with a drill-type grinding tool in order to install sealant with a caulk gun rather than using injection tools and procedures.

Soffit: The bottom surface of an elevated concrete slab or beam. Also an exterior ceiling.

Spalls: Voids in the exposed surface of concrete components where delaminated concrete has fallen out of been removed. Spalls may or may not be caused by corroded reinforcing steel within the concrete.

Structural slab-on-grade: A concrete slab, supported on grade, that is strengthened with reinforcing steel rather than welded wire mesh used for conventional slabs-on-grade.