Fluor-BWXT | Portsmouth

ENGINEERING EVALUATION COVERSHEET

Number: EVAL-DE-2012-0316
ESO#/PR#/NCR#: ESO E4766, E3839, E7694, and E10102
Revision: 3
Duration: Time Limited
Type: Engineering
Title: X-700 Roof Structural Integrity Assessment
Doc Link:
Final Doc Link:

Description/Evaluation Statement:

Revision 3 of this Engineering Evaluation was completed to comply with the 5-year reevaluation requirements for roof structures. The previous revision expires on 27 August 2024, so a new revision is being completed. Engineering conducted a walkdown of the facility for Revision 3 on 22 August 2024. Revision 3 also includes an updated FBP Building Roof Assessment form (Attachment A) and photographs from the walkdown (Attachment B). R3

CONCLUSION

The previous revision's restriction placed on the highbay encompassing columns D4/D7 and E4/E7 is still in effect. Additionally, Engineering found corrosion in the metal decking, not documented in previous revisions, on the Northwest corner of the roof. Engineering is restricting access to the roof in this area encompassing columns F13/F14 and EF13/EF14. If access is needed in these areas, contact Engineering for further analysis. These restricted areas are illustrated in Attachment A.

[Revision 2, Approved 27 AUG 2019]

Revision 2 of this Engineering Evaluation was performed as an update to the structural integrity inspection as part of the five year inspection program required for having a nuclear safety function as described in the Basis for Interim Operations (BIO) of Former Uranium Enrichment Facilities (FUEF). This revision includes an updated roof assessment form and current photos of the roof. The previous restriction placed on the highbay roof encompassed by columns D4/D7 and E4/E7 is still in effect. The steam leak location in the highbay which has caused the corrosion of the metal roof decking in this area is currently slated for repairs in the fall of 2019. Once repairs to the steam leak are completed, repair of the metal decking should be addressed as required by Engineering (thickness testing may be able to be performed to verify deterioration). No additional/new significant structural issues were observed during the 2019 walkdown. Therefore, this Engineering Evaluation is being extended for an additional 5 year period.

Observations from the 2019 walkdown include debris (varies types), evidence of water ponding, break-through of foam roofing, ridging in isolated locations of the built-up roof, clogged roof drains, and evidence of animal activity (possibly raccoons). Engineering recommends clearing debris, cleaning/repairing roof drains, repairing the foam roof near the South penthouse, and relocating the animals. In addition, it is highly recommended that stanchions be placed around the restricted area (as defined above and in the roof assessment form) of the highbay to eliminate access as the area is not clearly evident.

[Approved 28 AUG 2014]

Revision 1 of this Engineering Evaluation includes documentation from a 2014 walkdown to ensure that there are no

signs or issues that would question the structural integrity of the X-700 roof structure. There is only one location located on the highbay roof encompassed by columns D4/D7 and E4/E7 that restricts personnel access due to corrosion of the metal decking. No other significant issues were noted during the walkdown, so this Engineering Evaluation is being extended for 5 years and the X-700 structure is adequate for routine maintenance access and inspection activities, except for the one restricted area discussed above, as defined in this Engineering Evaluation.

NOTE: There have been multiple roof leaks located on the highbay roof, especially in the valley location. In 2009 a spray foam roofing overlay was performed on the lowbay and highbay valley, with the anticipation to complete the rest of the highbay roof the next year; however, due to funding and transition to a new company the highbay roof repair was never completed. Roof work is anticipated for 2014-2015 to perform a TPO overlay over the valley that will extend past the high point of the roof, similar to the TPO overlay performed by TPMC/WEMS on the south portion of the highbay.

[Approved 22 AUG 2012]
Revision 0 discussion:

ESO E3839 requested an engineering evaluation be performed to assess the roof structural integrity for the X-700 Converter Shop and Chemical Cleaning Facility. In the 2012 roof structural integrity walkdown, the entire top of the X-700 roof was visually inspected. In addition, the underside of the X-700 roof structure was also visually inspected.

Summary of results:

The X-700 original roof and the roof addition are adequate for routine assess and maintenance activities, except for the area encompassed by columns D4/D7 and E4/E7. The safe and allowable imposed roof load limits are indicated directly below:

1. A uniform roof live load of 30 PSF is permitted over the entire roof.

-OR-

2. Per Code, a concentrated 300 pound limit per person including hand tools is the limit codified by the Ohio Building Code Table 1607.1 A single concentrated load per person is also codified. For a single worker this is based upon a square area of 2'-6" x 2'-6". For purpose of final clarification, a total of 6 maintenance workers are permitted on a rectangular section of roof bounded on the perimeter by either a column line [e.g. rafter framing member] and/or a purlin. For the original building, the typical purlin is a 16 WF 40. For the building western addition, a W10x21 or W10x39 are typical purlins.

Operability Recommendations: **Operable?** ☐ Yes ☐ No ☒ N/A	**Changes to Design Docs Needed:** ☐ Yes ☒ No **Affected Docs**

Implementation: **Actions Required:** ☐ Yes ☒ No **EIAW/IAW Number:** N/A **USQD Screening Number:** N/A **USQD Number:** N/A	**Date Approved:** 9/4/2024 **Expiration Date:** 9/4/2029 **Next Review Date:** N/A

NOTE: If implementing actions are required, an EIAW/IAW number is also required to assure such actions are completed and do not violate certificate requirements and authorizations.

Non-Conforming Item Disposition:

[X]	N/A	[ ]	NCR VOID (Item conforms)
[ ]	Reject - Return To Supplier	[ ]	Reject - Scrap/Dispose
[ ]	Repair	[ ]	Rework
[ ]	Use-As-Is	[ ]	Upgrade
		[ ]	Documentation

Other Comments or Notes:

Attachments

1) Attachment A - Roof Assessment Form
2) Attachment B - Rev. 3 Pictures
3) Attachment C - Rev. 2 Attachments

APPROVALS

AUTHOR: 9/3/2024 Nathan McLaughlin
Signature/Date

REVIEWER: 09/04/2024 Rick Matulja
Signature/Date

APPROVER: Ellen K. Stone 9/4/2024 ellen stone
Signature/Date

FBP BUILDING ROOF ASSESSMENT

COVER SHEET

Project: **Structural Integrity Assessment**

Engineering Evaluation No.: **EVAL-DE-2012-0316 Rev.3**

Building: **X-700 Complex**

Intended Load: **Routine Maintenance Access**

Location/Area: **Entire Roof**

No. of Employees **6** (x 300 lbs) = **1800 pounds**

Type of Structure: **Steel Frame / Steel Metal Deck (S)**

Each employee plus hand-carried tools plus hand-carried materials may not exceed 300 pounds.

Weight of Equipment + Included above

Age of Structure: **69 Years – Original Structure**
53 Years – Western Addition

Weight of Materials + Included above

Occupied? ☒ Yes ☐ No

Total Weight = **1800 pounds**

Maintained? ☒ Yes ☐ No

Date of Assessment: **22 AUG 2024**

The roof described above has been assessed by representatives of Engineering and Safety for Routine Maintenance Access. The result of this structural integrity assessment is:

☐ Passed (This judgment is based upon a Good-Faith roof assessment for routine maintenance access.)

☒ Conditionally Passed (Most of the roof areas are accessible, except as listed in EVAL-DE-2012-0316 R3)

☐ Did Not Pass (Requires further evaluation prior to FBP and/or FBP-managed contractor employee access.)

A separate engineering evaluation is needed for conditions other than stated above (such as the use or installation of rooftop equipment, or the stockpiling of materials on the roof).

Walkdown Date: **22 AUG 2024**

Assessment Team

Dan Joosse Facility Custodian (Print)	DANIEL JOOSSE (Affiliate) Digitally signed by DANIEL JOOSSE (Affiliate) Date: 2024.09.03 09:11:59 -04'00' Facility Custodian (Sign)	Date
Kurt Myers Safety Representative (Print)	KURT MYERS (Affiliate) Digitally signed by KURT MYERS (Affiliate) Date: 2024.08.28 16:08:43 -04'00' Safety Representative (Sign)	Date
Nathan McLaughlin Engineer (Print)	NATHAN J MCLAIGHLIN Digitally signed by NATHAN J MCLAIGHLIN Date: 2024.09.03 12:19:18 -04'00' Engineer (Sign)	Date
N/A Other: N/A (Print)	N/A (Sign)	N/A Date

FBP BUILDING ROOF ASSESSMENT

CHECKLIST

I. WALLS/ROOF SUPPORT

A. Exterior Walls
- 1. Concrete ☐
  - a. Tilt-up panels ☐
  - b. Cast-in-place ☐
  - c. Precast panels ☐
- 2. Masonry ☐
  - a. Block (CMU) ☐
  - b. Brick ☐
- 3. Steel frame w/ Corrugated asbestos siding ☒
  - a. Pre-engineered building ☐
- 4. Wood frame with _____ siding ☐
- 5. Other _____ ☐

B. Interior Walls/Columns
- 1. Concrete ☐
  - a. Cast-in-place ☐
  - b. Tilt-up panels ☐
  - c. Precast panels ☐
- 2. Masonry ☐
  - a. Block (CMU) ☐
  - b. Brick ☐
- 3. Steel frame w/siding ☐
- 4. Wood frame w/siding ☐
- 5. Other Open Structure ☒

II. ROOF

A. Roofing
- 1. Metal type ☐
- 2. Built-up type ☒
- 3. Single-ply type ☐
- 4. Urethane ☐
- 5. Asphalt Shingle ☐
- 6. Other Spray foam roof on main low bay and high bay valley, TPO overlay on high bay ☒

B. Decking
- 1. Reinforced concrete slab ☐
- 2. Precast concrete plank ☐
- 3. Prestressed concrete plank and deck ☐
- 4. Composite concrete slab ☐
- 5. Steel w/concrete fill ☐
- 6. Steel deck ☒
- 7. Composite Steel ☐
- 8. Plywood ☐
- 9. T&G wood plank ☐
- 10. Other _____ ☐

C. Roof Structure
- 1. Concrete ☐
  - a. Waffle Slab ☐
  - b. Concrete encased beams w slab ☐
  - c. Precast concrete plank ☐
- 2. Masonry beam ☐

C. Roof Structure (continued)
- 3. Steel ☒
  - a. Framework type _____ ☒
  - b. Joists ☐
  - c. Trusses ☐
- 4. Wood ☐
  - a. Joists ☐
  - b. Manufactured joists type _____ ☐
  - c. Beams ☐
- 5. Other _____ ☐

III. ROOF CONDITION

A. General Appearance
- 1. Debris ☐
- 2. Drainage (some standing water / fair) ☐
- 3. Visible damage from roof:
  - a. Concave/convex deflection ☐
  - b. Surface uniformity
    - - Loose material ☐
    - - Deviations from one area to another ☐
  - c. Sun damage ☐
- 4. Visible damage from interior:
  - a. Concave/convex deflection ☐
  - b. Notable ceiling damage
    - - Water stains on ceiling panels ☐
- 5. General condition Good ☒
- 6. New equipment/alterations ☐
- 7. Other _____ ☐
- 8. Aged roof ☐

B. Surface Condition
- 1. Bare spots in gravel/ballast ☐
- 2. Visible light from below (through ceiling) ☐
- 3. Alligator/cracking ☐
- 4. Spalling concrete surfaces ☐
- 5. Slippage ☐
- 6. Housekeeping ☐
- 7. Evidence of recent repairs (yrs ago) ☐
- 8. OK ☐

C. Membrane Condition
- 1. Blistering ☐
- 2. Splitting ☐
- 3. Ridging/wrinkling ☐
- 4. Fishmouthing ☐
- 5. Loose felt laps/seams ☐
- 6. Punctures, fastener backout ☐
- 7. Securement to substrate ☐
- 8. Membrane shrinkage ☐
- 9. Membrane slippage ☐
- 10. Evidence of recent repairs ☐
- 11. N/A ☐

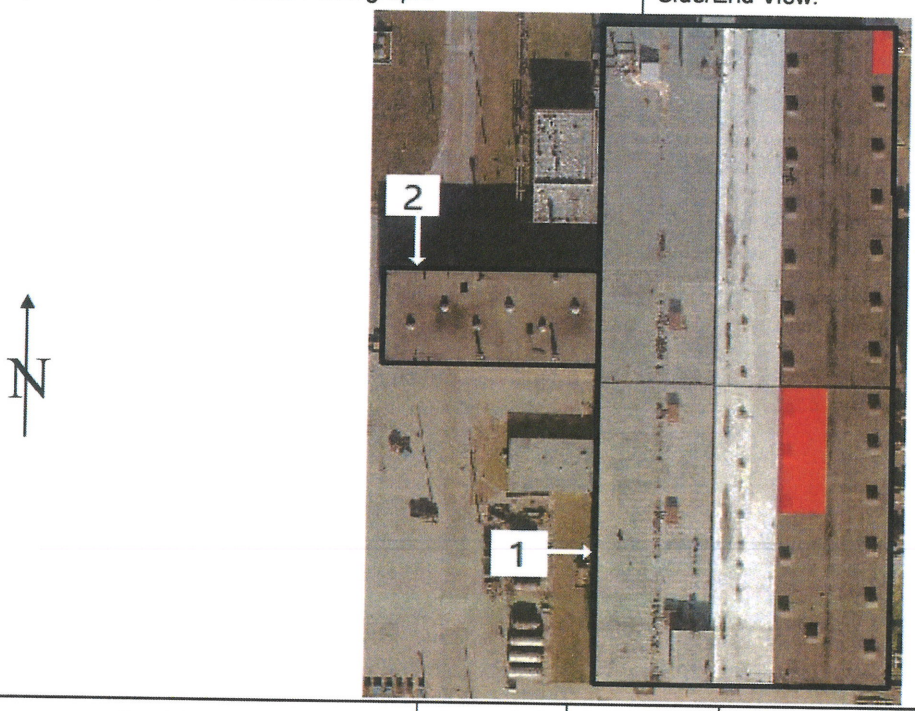
GENERAL: Plant maintenance or building custodian consulted for building history and known hazards. ☒

FBP BUILDING ROOF ASSESSMENT

FINDINGS SHEET

Roof Sketch Legend: ☐ Roof Access Allowed ■ Roof Access NOT ALLOWED

Top View Sketch or Satellite Photograph:



Side/End View:

Roof Sections (see Note No.1)	Inspected (Yes/No)	Passed (Yes/No)
1. Original Structure	Yes	Yes*
2. West Addition	Yes	Yes

NOTES:

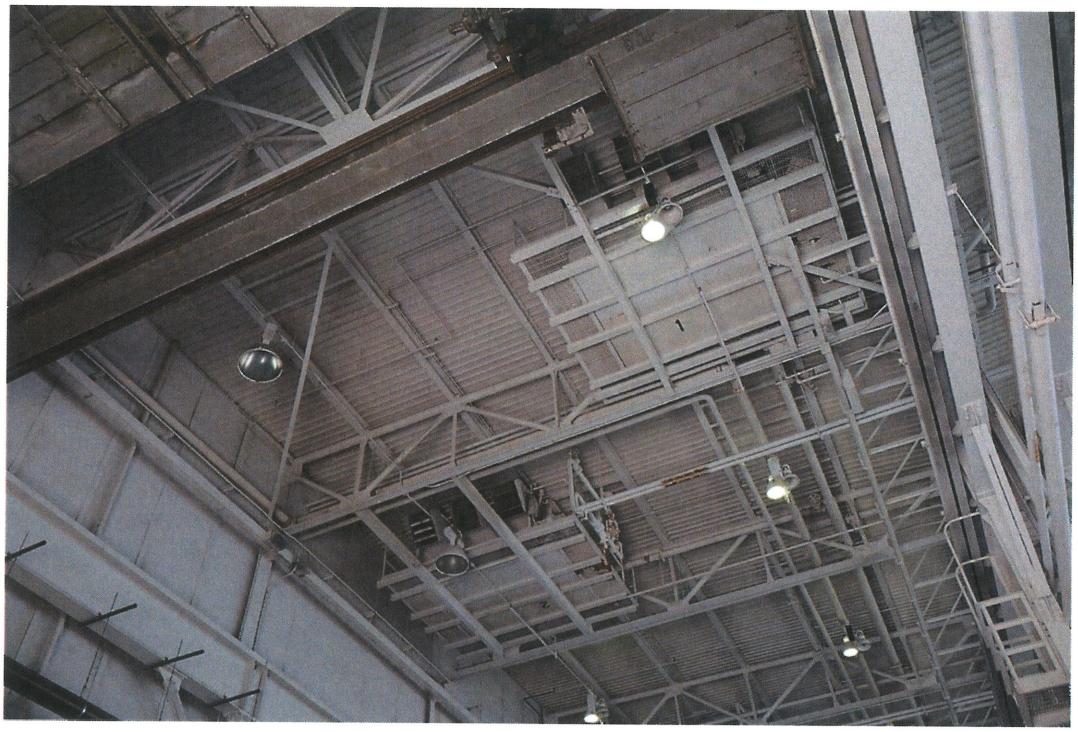
*NOTE: Access to the roof is restricted between columns E4/D4 through E7/D7 and F13/EF13 through F14/EF14.

Building or Trailer No. **X-700** Location/Area: **Entire Roof**

Comments *(add additional sheets as necessary)*:

See EVAL-DE-2012-0316, Rev.3 for additional details.

The **X-700** roof is structurally adequate for Routine Maintenance Access to the areas identified above in the roof sketch for six employees (as defined on page 1 of this FBP Building Roof Assessment) on each of the two roof sections.



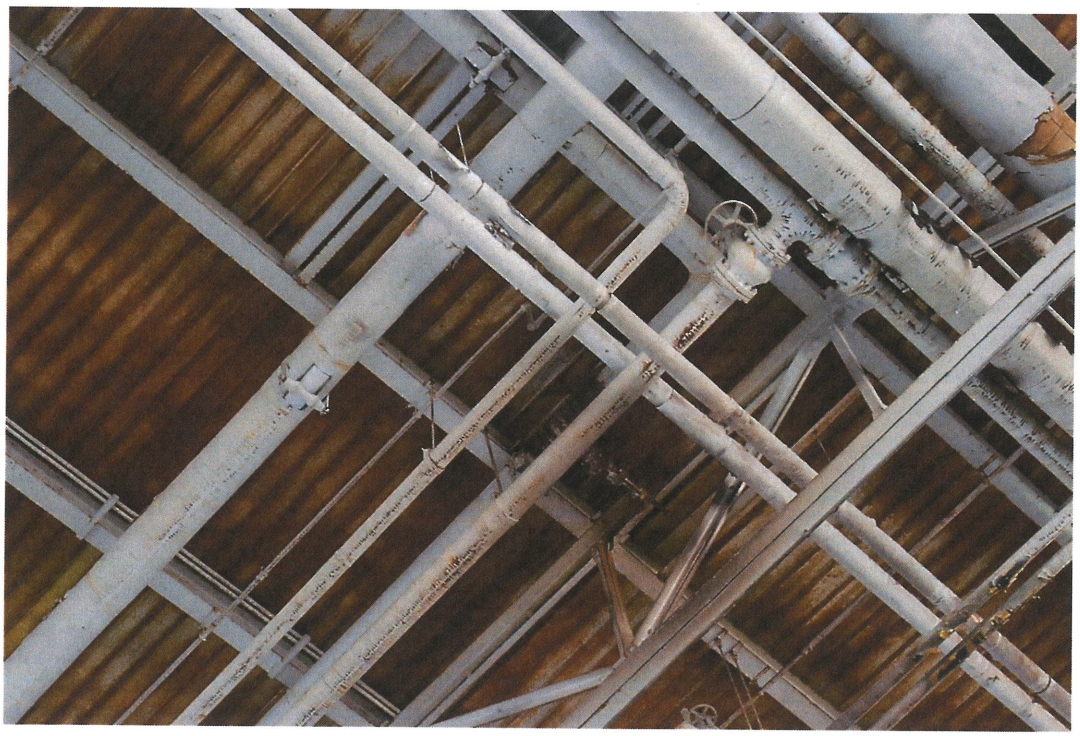
Southeast corner of building

Looking North

Looking North

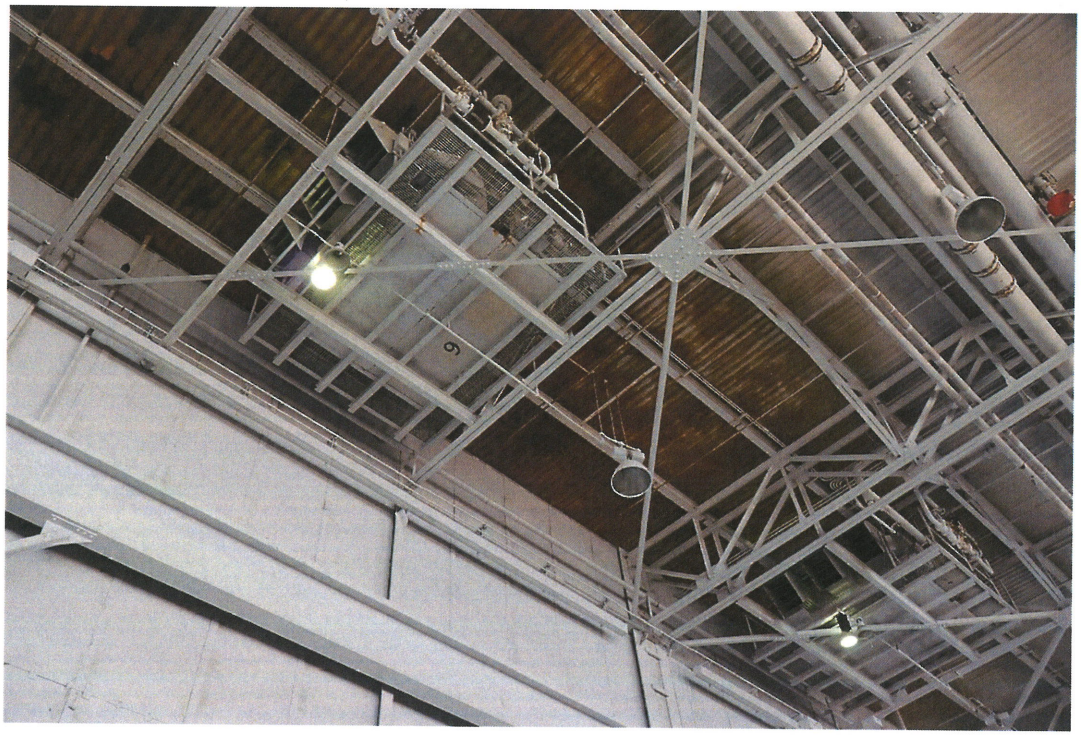
Corrosion in large area of roof between columns D4/D7 and E4/E7

Closer look at corrosion

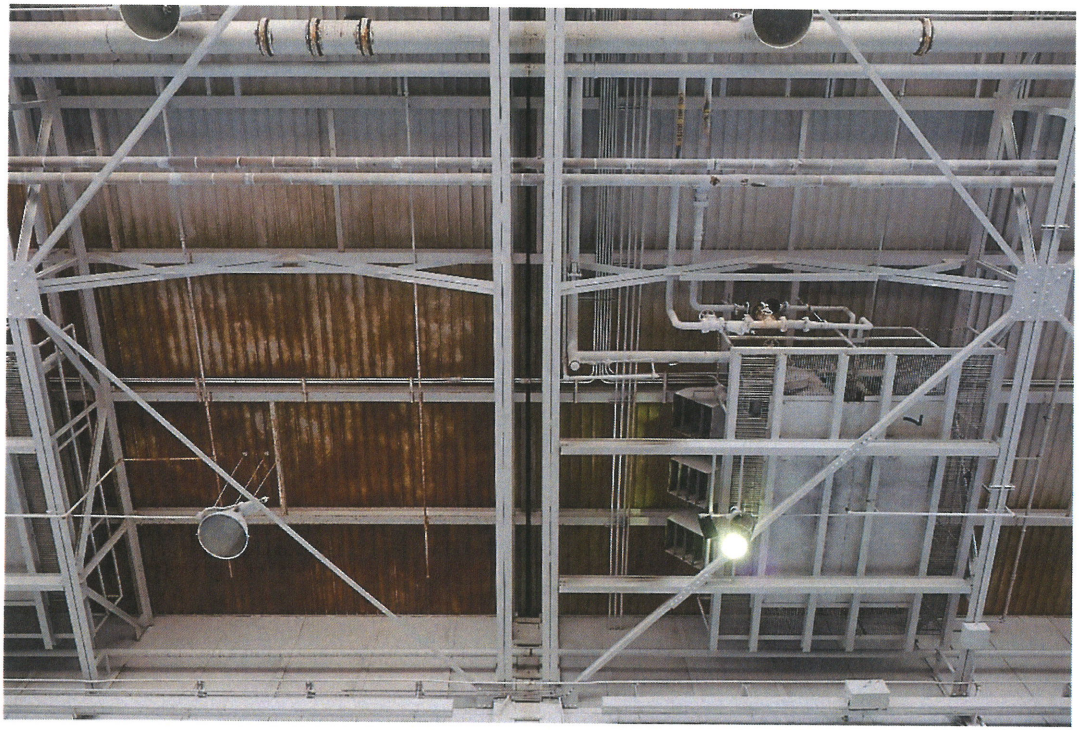


Close up of corrosion

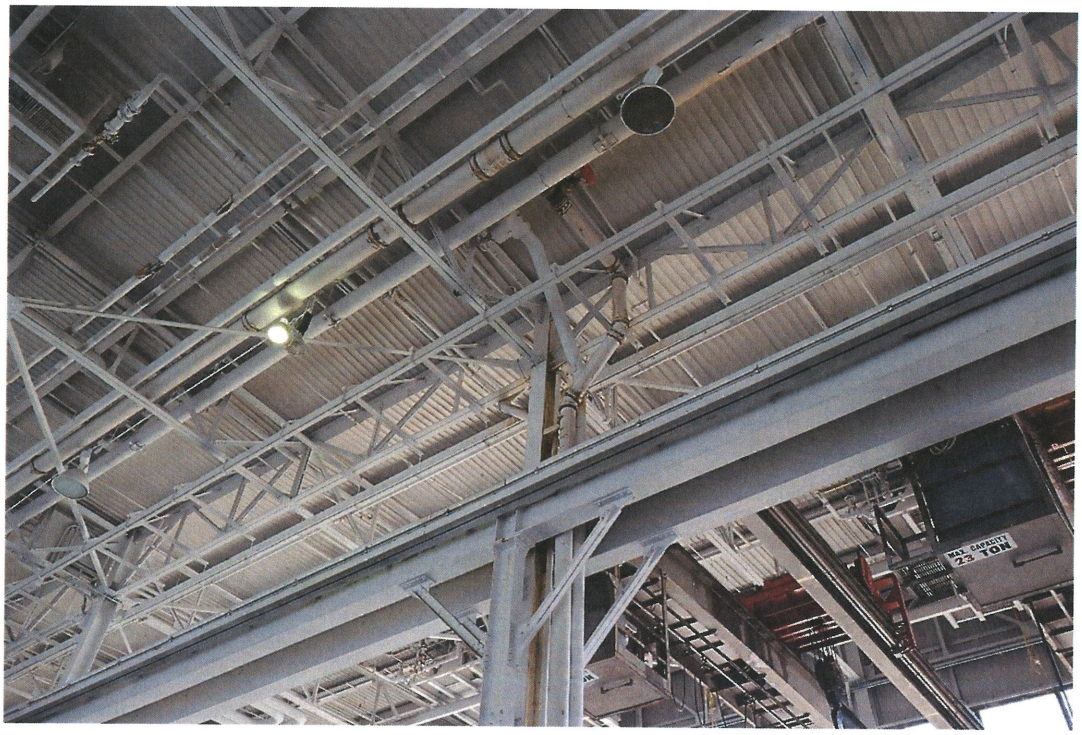
Roof on East side of the Cleaning Area



Corrosion between columns D4/D7 and E4/E7

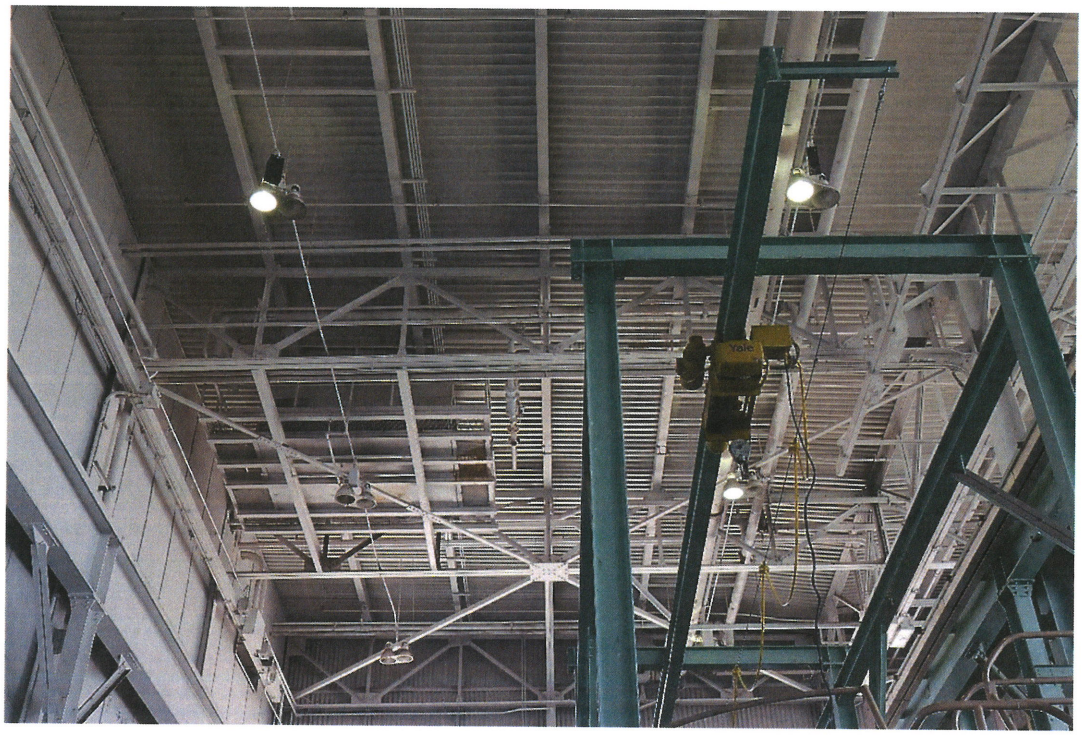


Corrosion between columns D4/D7 and E4/E7



Near column E8

Near column E12



North side of building

Corrosion on Northeast side of roof between columns EF13/EF14 and F13/F14

Close view of corrosion

Evidence of some sort of repair near column E12

South side of Highbay

Southeast side of Highbay

Southeast side of Highbay

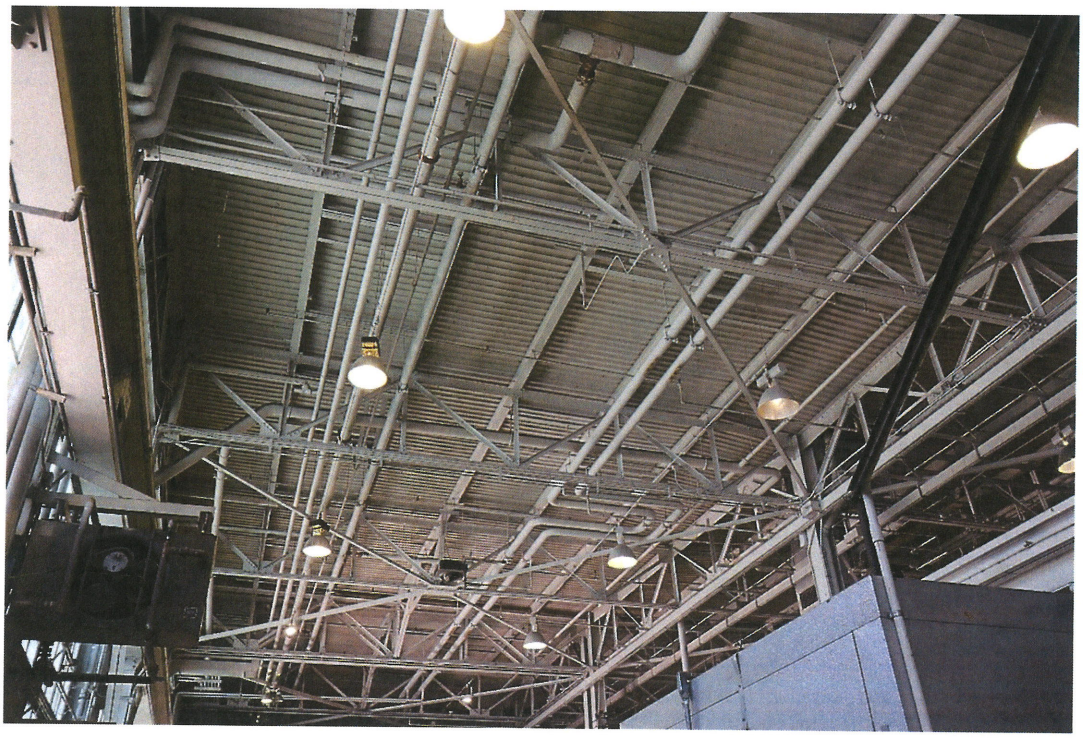
Evidence of water leak on column B3

Column B3

Looking North in Highbay

Looking North in Highbay

Column B4



Roof above Shop Area

Minor corrosion in roof near column B6

Close up of minor corrosion

Roof on Northeast side of Shop Area

Roof on Northwest side of Shop Area

Roof in Retubing Area

Roof in Retubing Area

Roof in Retubing Area

Roof in Retubing Area

Roof in Retubing Area

Roof in Retubing Area

Roof in Retubing Area

Roof in Retubing Area

Roof on Northeast side of Retubing Area

Roof in West building addition

Roof in West building addition

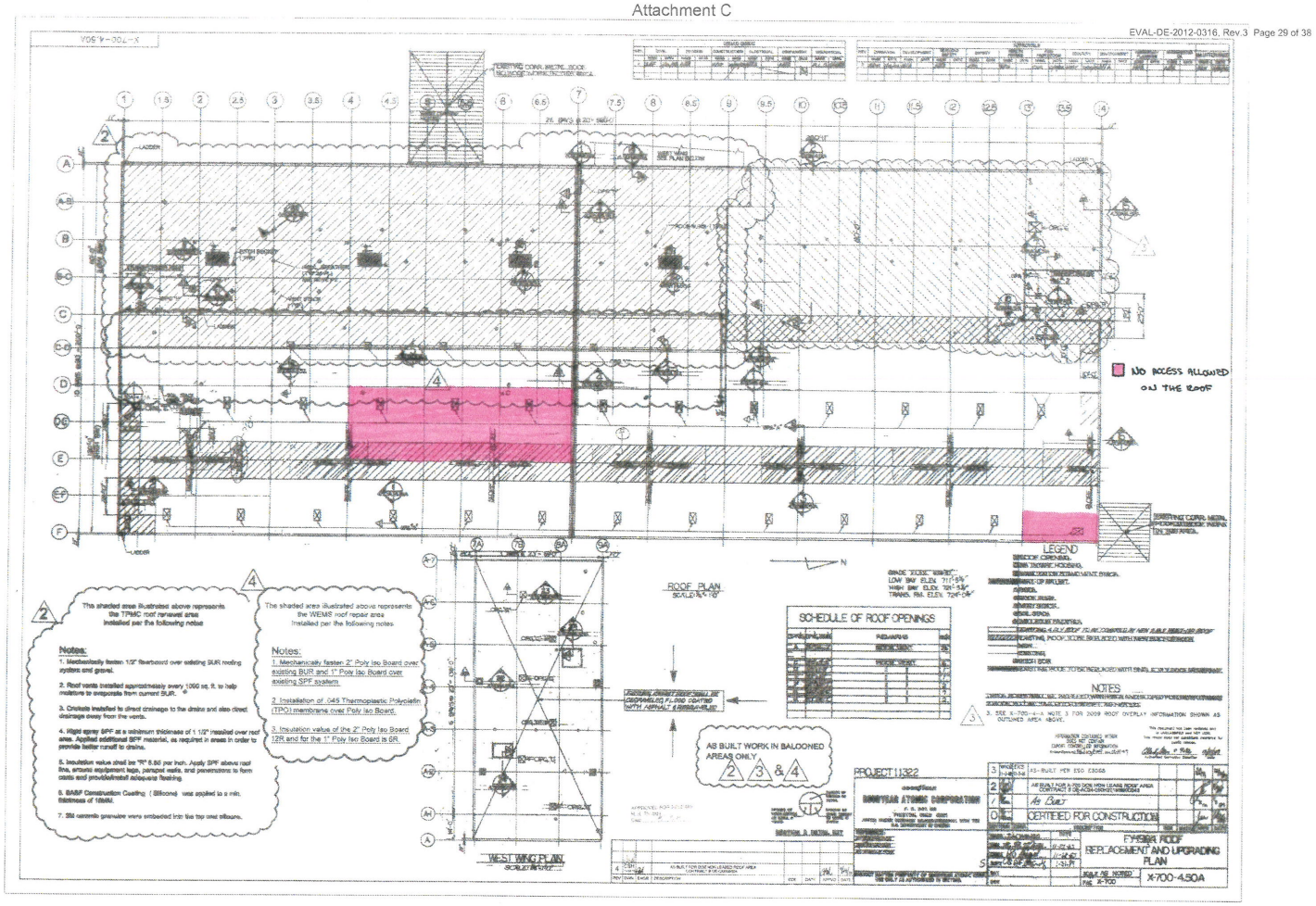
Roof in West building addition

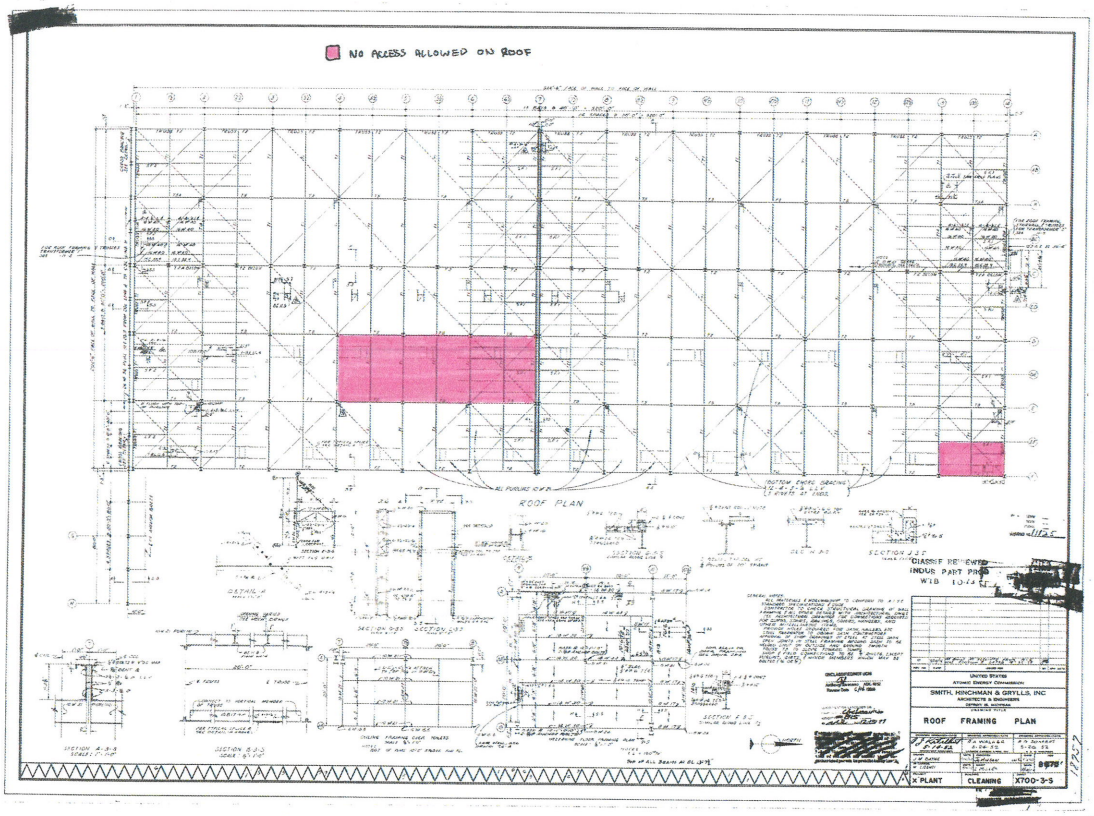
Roof in West building addition

Roof in West building addition

Roof in West building addition

Attachment C




NO ACCESS ALLOWED ON ROOF
ROOF PLAN
CLASSIF REVIEWED
INDUS PART PROG
WIB
UNITED STATES
ATOMIC ENERGY COMMISSION
SMITH, HINCHMAN & GRYLLS, INC
ARCHITECTS & ENGINEERS
DETROIT 26, MICHIGAN
ROOF FRAMING PLAN
X PLANT
CLEANING
X700-3-5

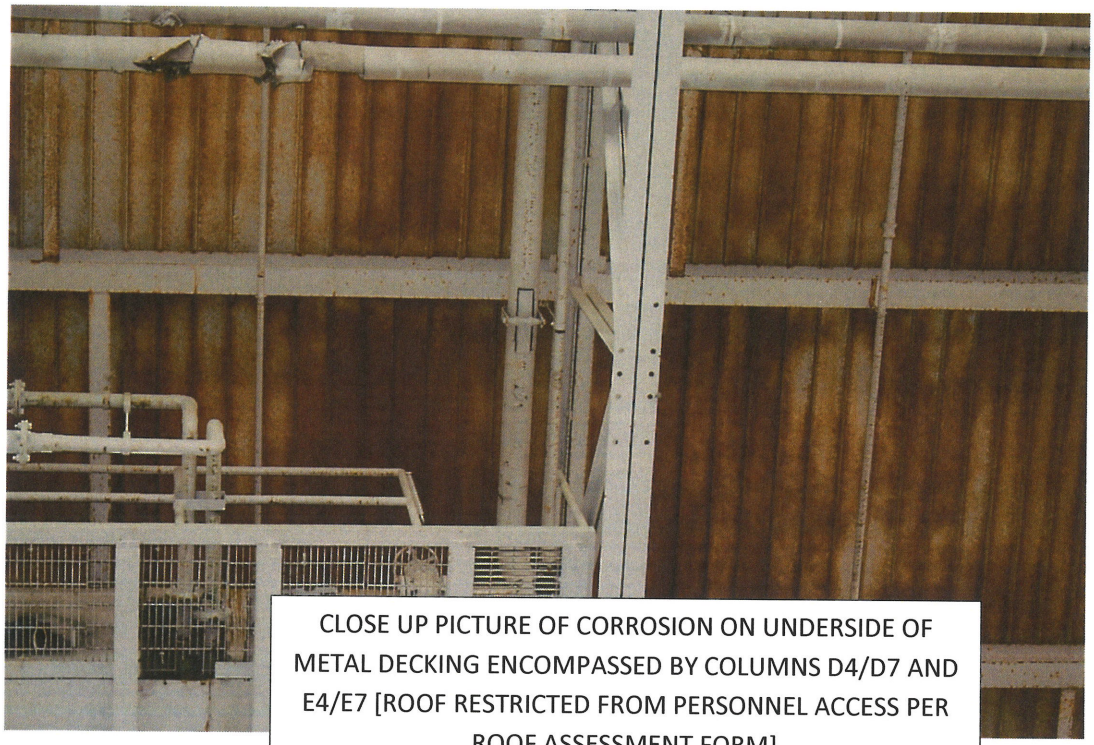
2014 ROOF STRUCTURAL INTEGRITY INSPECTION PICTURES

X-700 HIGHBAY ROOF – EAST/SOUTH SECTION (FBP AREA) (CONT.)

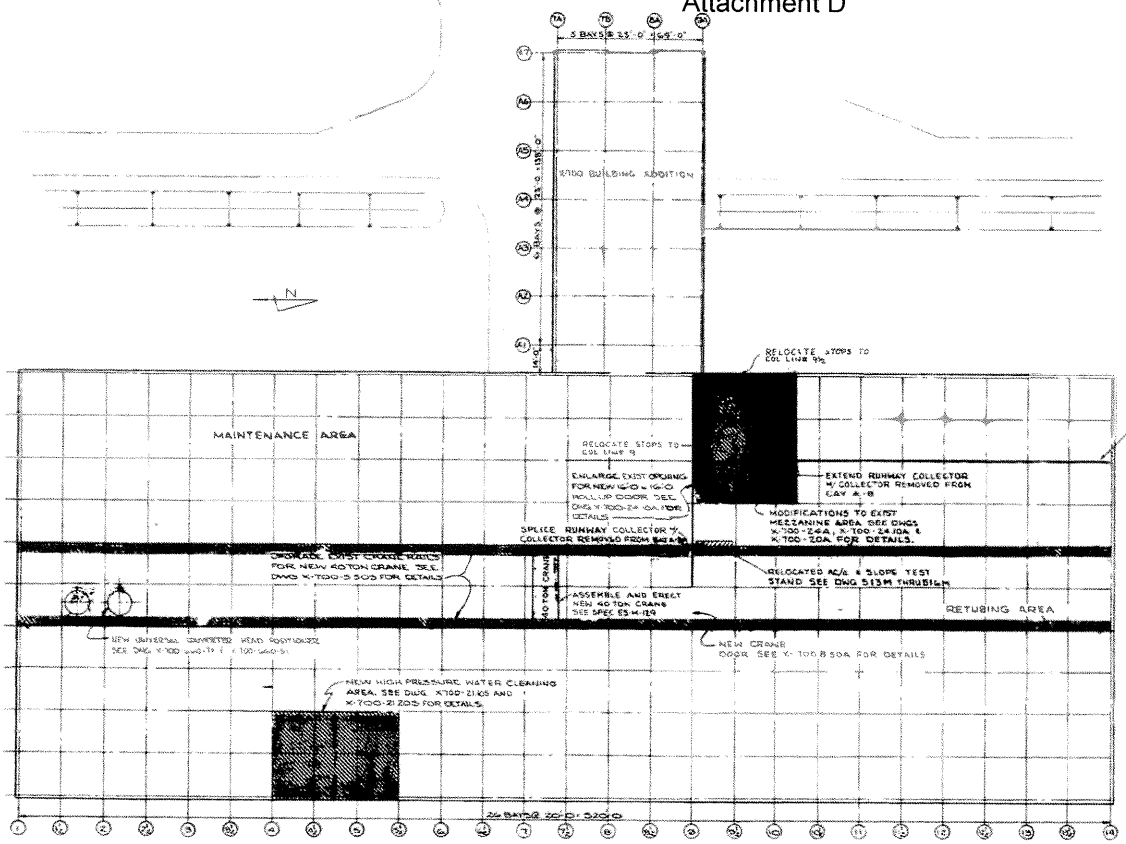
CORROSION DETECTED ON UNDERSIDE OF METAL DECKING ENCOMPASSED BY COLUMNS D4/D7 AND E4/E7 [ROOF RESTRICTED FROM PERSONNEL ACCESS PER ROOF ASSESSMENT FORM]

2014 ROOF STRUCTURAL INTEGRITY INSPECTION PICTURES

X-700 HIGHBAY ROOF – EAST/SOUTH SECTION (FBP AREA) (CONT.)



CLOSE UP PICTURE OF CORROSION ON UNDERSIDE OF METAL DECKING ENCOMPASSED BY COLUMNS D4/D7 AND E4/E7 [ROOF RESTRICTED FROM PERSONNEL ACCESS PER ROOF ASSESSMENT FORM]



MODIFICATIONS - TO - EXISTING - X-700 - BLDG

SCALE: 1" = 20'-0"

10/34

PROJECT 35002

GOODYEAR

GOODYEAR ATOMIC CORPORATION

4	CERTIFIED FOR CONSTRUCTION		
3	ADDED CONVERTER HEAD POSITIONER	NA	
2	CHANGED BAY A-B CRANE COLLECTOR	NB	
1	APPROVED - TITLE II	LHJ	
0	FOR APPROVAL - TITLE II		

REFERENCES: X-700 and P.I. X-700-440-91
X-700-5.50B
-21.05
-21.20B
X-700-513M THRU 516M

X-700-8.50A
-24A
-24.10A
-24.20A

X-700 BUILDING MODIFICATION

BUILDING PLAN

SCALE: 1" = 20'-0" X-700

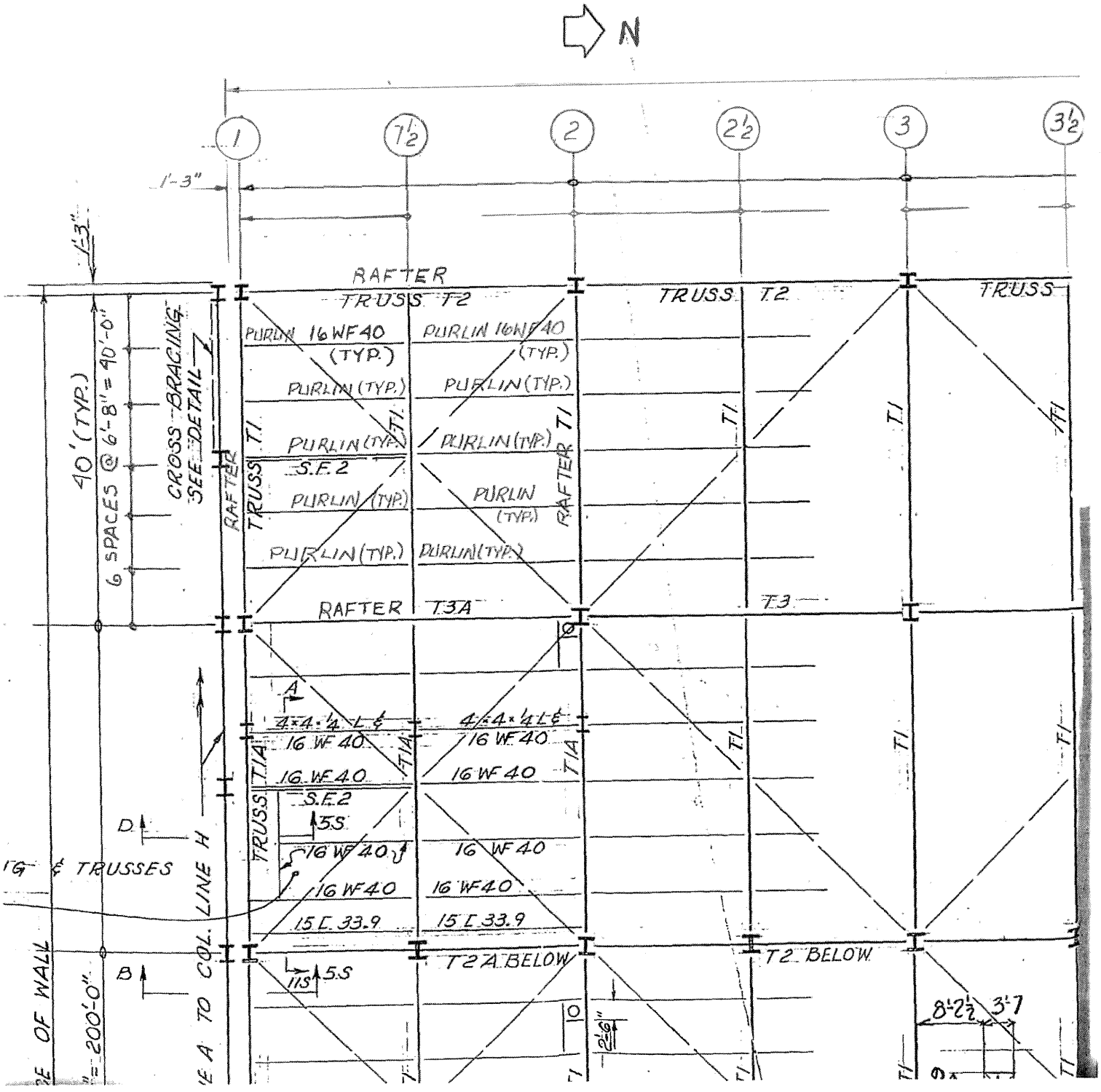
X-700-0.50A

PAGE 9

11/34

Partial Roof Framing Plan - Main (or Original Building)

Dwg. X-700-3-S



ROOFING	6.0
INSUL.	6.0
ROOF	12.0
PURLINS	3.0
EQUIP.	5.5
SNOW	30.0
	37.5 #/sq. ON PURLINS
EQUIP.	2.5
	60.0 #/sq. ON, E.f W. TRUSS
TRUSS	4.0
	64.0 #/sq. ON N.f S. TRUSS

ROOF FRAMING LOADING

WIND LOAD 20#/sq.ft.
OR
EARTHQUAKE 2% G.

HORIZ. LOADING

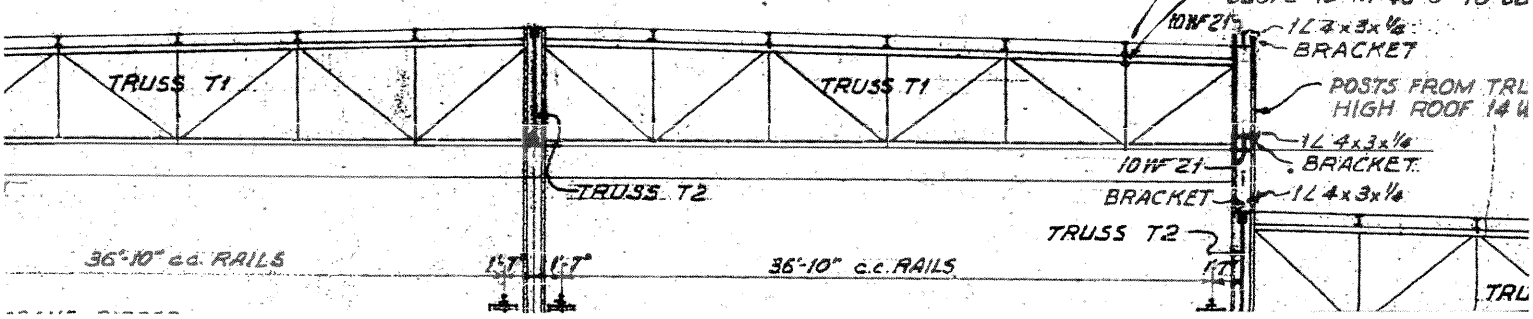
Dwg. X-700-4-S

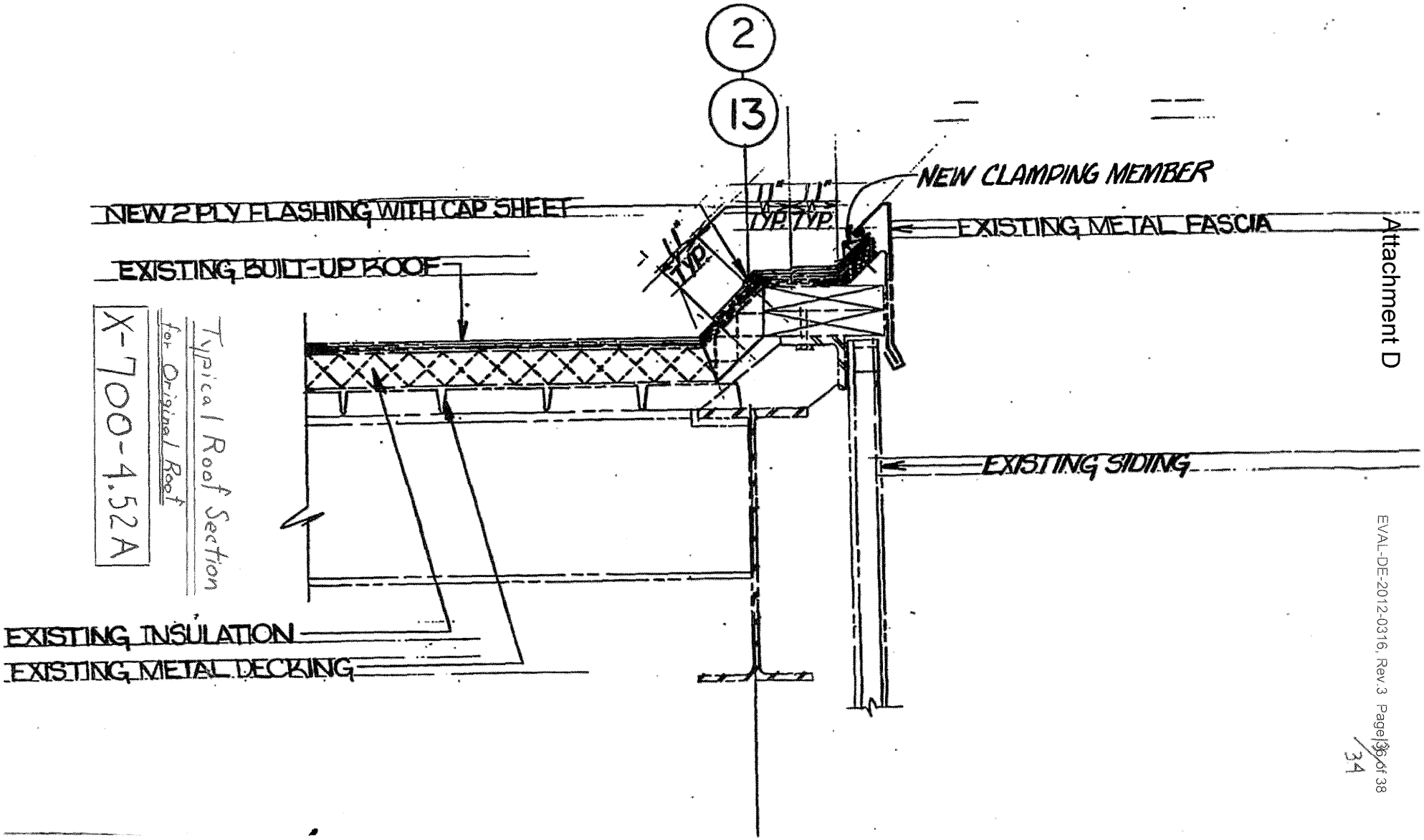
Original Roof Load Design Requirements

12/34

PURLINS 10 WF 21

ROOF TO BE 1½" #18 GA. METAL DECK WELDED TO SUPPORTING MEMBERS.





Attachment D

EVAL-DE-2012-0316, Rev.3 Page 36 of 38

34

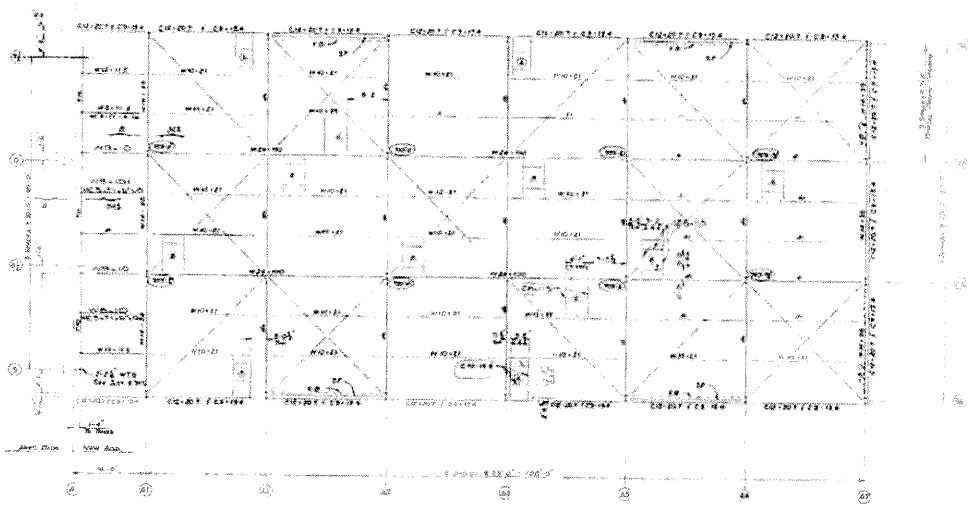
X-700-345

ROOF FRAMING LOADING

ROOFING	7.0 #/SQ FT
INSULATION	2.0
DECKING	3.0
FRAMING	3.0
	15.0
EQUIPMENT	15.0
SNOW	30.0
	60.0 #/SQ FT

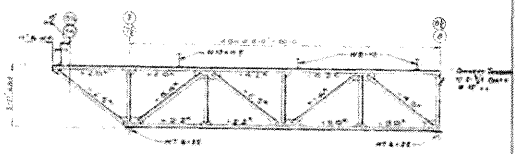
HORIZONTAL LOADING

WIND LOAD 20 #/SQ FT

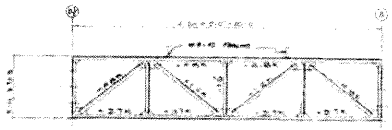


ROOF FRAMING PLAN

NOTE: EXPANSION JOINT OR JOISTS AT PERIMETER OF BLDG. SHALL BE 70'-0", ALL OTHER ELEV. MARKED ○

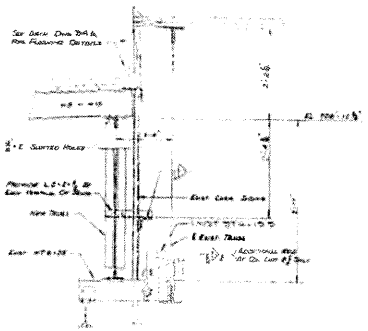


TRUSS T10

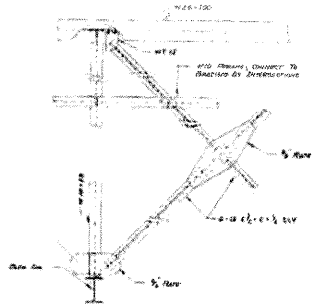


TRUSS T11

SWAY FRAME



SECT. A-345



TYPICAL ROOF BRACING DETAILS

SECT. A-B4S

PROJECT 33001

GOODYEAR
GOODYEAR ATOMIC CORPORATION
PIKETON, OHIO
A DIVISION OF
THE GOODYEAR TIRE & RUBBER COMPANY

2	CERTIFIED FOR CONSTRUCTION
1	APPROVED TITLE II
0	FOR APPROVAL - TITLE II

X-700 BUILDING ADDITION

ROOF FRAMING PLAN

A3 METRIC X-700

X-700-345

Attachment D

EVAL-DE-2012-0316, Rev.3 Page 37 of 38

Page 34

15/3A

X-700-345

ROOF FRAMING LOADING

ROOFING	- 7 0 #/SQ FT
INSULATION	- 2.0
DECKING	- 3 0
FRAMING	- 5 0
	17 0
EQUIPMENT	- 18 0
SNOW	- 30 0
	65.0 #/SQ. FT

Partial Roof Framing Plan - Building Addition

Dwg. X-700-345