DEPARTMENTAL INPUT
CONTRACT/PROJECT MEASURE ANALYSIS AND RECOMMENDATION

☒ New ☐ OTR ☐ Sole Source ☐ Bid Waiver ☐ Emergency Previous Contract/Project No.

Contract **N/A**

☐ Re-Bid ☐ Other LIVING WAGE APPLIES: ☐ YES ☒ NO

Requisition No./Project No.: **AB-052A** TERM OF CONTRACT **90 days (Estimated for Design)**

Requisition /Project Title: **Implementation of Oil Change Program at the Rental Car Center**

Description: The PRCC have requested to implement the oil change program consisting of the addition of: 1. All necessary oil change materials, equipment and components to thirteen (13) allocated bays in the Quick Turn-around Area (QTA); 2. Two (2) individual buildings of 1,000 square feet each to house the new and used oil tanks along with associated pumps and air compressors and; 3. The piping infrastructure to transfer the oil to and from each bay at all levels of the Rental Car facility. The design portion of the project's estimated cost is $300,000.00, which is part and inclusive of the total estimated cost provided by the tenant for this project, which is estimated to be $2,500,000.00. The Construction Analysis and Recommendations for the project are pending. They will be submitted to SBD when Tenant has acquired the scope, dollar value, and trade breakdowns for those areas of the project.

Issuing Department: **MDAD** Contact Person: **Ricardo Lopez** Phone: **(305) 869-3480**

(305) 546-9356

Estimated for Design

Estimate Cost: **$ 300,000.00**

GENERAL FEDERAL OTHER

Funding Source: **Private Funding**

ANALYSIS

Commodity Codes:

Contract/Project History of previous purchases three (3) years

Check here ☒ if this is a new contract/purchase with no previous history.

	EXISTING	2ND YEAR	3RD YEAR
Contractor:			
Small Business Enterprise:			
Contract Value:			

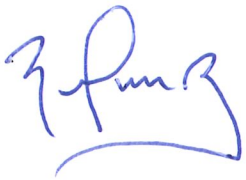
Comments:

Continued on another page (s): ☐ Yes ☒ No

RECOMMENDATIONS

	Set-aside	Sub-contractor goal	Bid preference	Selection factor
SBE		10%		

Basis of recommendation: This recommendation is based on the quality, quantity and type of subcontracting opportunities provided by the nature of the services, and of the availability of SBEs to afford effective subcontracting competition.

Signed: 

Date sent to SBD: 10/06/2020

Date returned to DPM:

Revised April 2005

These Rules and Regulations apply to ALL AREAS of the Rental Car Center and the rental agency's managers, supervisors, employees, including but not limited to their vendors such as fuelers and drivers, as well as, contractors & subcontractors and outside third parties requiring access within the facility.

D) REMOVE KEYS FROM IGNITION AND PLACE THEM ON TOP OF THE DASHBOARD.

E) TOUCH ANY METALLIC SURFACE TO DISCHARGE STATIC ELECTRICITY BEFORE BEGINNING THE FUELING PROCESS.

F) DO NOT RE-ENTER THE VEHICLE WHILE FUELING IS IN PROCESS.

G) INSERT NOZZLE FIRMLY INTO FUEL TANK AND MAINTAIN IN PLACE UNTIL FUELING IS COMPLETE AND NOZZLE IS SHUT OFF.

H) REPLACE HOSE ON DISPENSER WHEN FINISHED FUELING.

3. FUELING SAFTEY:

A) EMPLOYEE IDENTIFICATION BADGES ARE THE PROPERTY OF THE FUEL MANAGEMENT COMPANY AND CAN BE REVOKED AT ANY TIME WITHOUT PRIOR NOTIFICATION.

B) IF GASOLINE IS SPILLED ON THE HANDS WHILE FUELING, WASH IMMEDIATELY WITH SOAP AND WATER AND REMOVE CLOTHING WET WITH FUEL.

C) REPORT SPILLS OF ANY SIZE TO FUEL MANAGER IMMEDIATELY.

D) REPORT TO YOUR SUPERVISOR IF FUELING PIN HAS BEEN DEACTIVATED.

E) ATTEND A MANDATORY SAFETY RETRAINING COURSE TO HAVE FUELING PIN REACTIVATED.

F) SMOKE ONLY IN DESIGNATED SMOKING AREAS OUTSIDE THE FACILITY.

G) DO NOT USE CELL PHONES, RADIOS, HEADSETS OR ELECTRONICS WHILE IN THE FUELING ZONE.

H) IN ORDER TO PREVENT CONTAMINATION OF FUEL TRENCHES, CAR PREWASH ACTIVITY MUST BE DONE IN THE SPECIFIED AREAS THAT HAVE WATER RUNOFF CONTAINMENT.

Employee's Initial

RENTAL CAR CENTER SAFETY PROGRAM

These Rules and Regulations apply to ALL AREAS of the Rental Car Center and the rental agency's managers, supervisors, employees, including but not limited to their vendors such as fuelers and drivers, as well as, contractors & subcontractors and outside third parties requiring access within the facility.

Article VI. Policy and Procedures Violations

1. FIRST VIOLATION:

   EMPLOYEE ID BADGE/MAGNETIC CARD WILL BE SUSPENDED UNTIL RENTAL CAR COMPANY MANAGER CONTACTS THE FUEL MANAGER FOR INSTATEMENT. A FINE OF $250 WILL BE IMPOSED.

2. SECOND VIOLATION:

   EMPLOYEE ID BADGE/MAGNETIC CARD WILL BE SUSPENDED AND NEXT LEVEL OF RENTAL CAR COMPANY MANAGEMENT WILL BE CONTACTED. A FINE OF $500 WILL BE IMPOSED. ID BADGE HOLDER WILL BE REQUIRED TO RETAKE THE SAFETY TRAINING AND BE RECERTIFIED BEFORE RETURNING TO WORK.

3. THIRD AND SUBSEQUENT VIOLATIONS:

   EMPLOYEE ID BADGE/MAGNETIC CARD WILL BE SUSPENDED AND RENTAL CAR COMPANY CORPORATE MANAGEMENT WILL BE CONTACTED. A FINE OF $1,000.00 WILL BE IMPOSED. ID BADGE HOLDER WILL BE REQUIRED TO RETAKE THE SAFETY TRAINING AND BE RECERTIFIED BEFORE RETURNING TO WORK.

4. FOURTH VIOLATION:

   ANY **FOUR VIOLATIONS WITHIN ONE CALENDAR** YEAR WILL RESULT IN THE ID BADGE HOLDER HAVING HIS FUELING AND DRIVING PRIVILEGES REVOKED FOR ONE YEAR.

5. RE-TRAINING:

   ANY EMPLOYEE OR PERSON NEEDING TO RETAKE THE SAFETY TRAINING COURSE DUE TO ANY VIOLATION OF THE RULES AND PROCEDURES WILL HAVE 14 DAYS TO DO SO AFTER WHICH THEY CAN NO LONGER BE RECERTIFIED.

Employee's Initial

RENTAL CAR CENTER SAFETY PROGRAM

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6. SMOKING VIOLATIONS:

   ANY SMOKING VIOLATION WITHIN THE FACILITY WILL RESULT IN A MEETING WITH THE EMPLOYEE, EMPLOYEE'S SUPERVISOR AND THE MDAD ASSISTANT DIRECTOR OF FACILITIES MANAGEMENT TO DETERMINE LEVEL OF DISCIPLINE UP TO DISMISSAL.

   NOTE:

   MIAMI-DADE FIRE RESCUE DEPARTMENT RESERVES THE RIGHT TO ISSUE CITATIONS FOR VIOLATIONS AND NON-COMPLIANCE WITH THE SAFETY PROGRAMS RULES AND REGULATIONS.

Employee's Initial

RENTAL CAR CENTER SAFETY PROGRAM

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SAFETY TRAINING COMPLETED YES ◯ NO ◯

Date completed: _____

I HAVE READ AND AGREE WITH THE RULES AND PROCEDURES FOR WORKING IN THE RENTAL CAR CENTER.

YES ◯ NO ◯

Signature: _____

Print Name: _____

Position: _____

ID Badge No.: _____

Company: _____

Date: _____

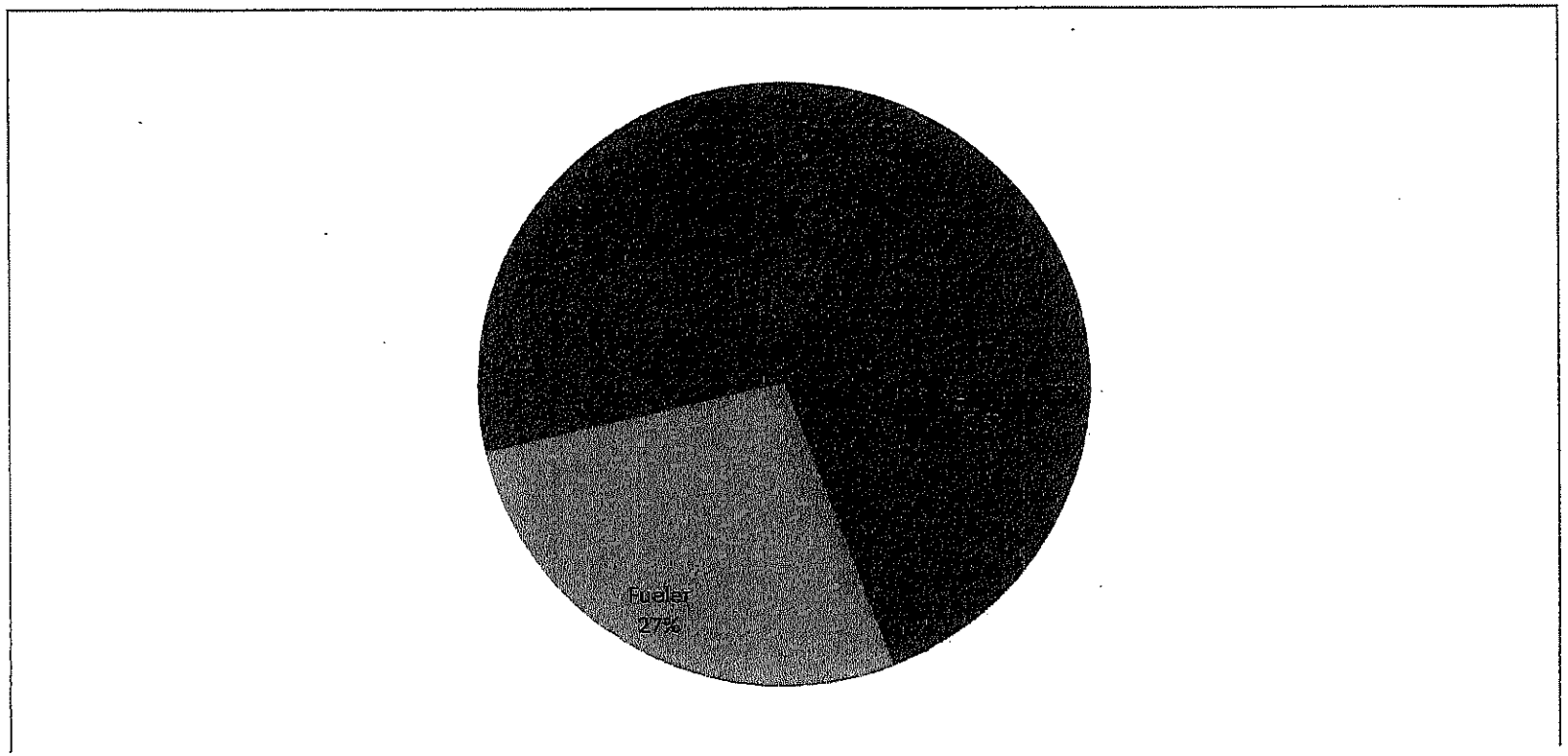
Employee Identification Badges are the property of the Fuel Management Company and can be revoked at any time without prior notification.

_____
Employee's Initial

RCC ID Badges

ID Badge Type	# of ID Badges	PERCENTAGE
Contractor	182	8.08%
Management/CSB	814	36.15%
Fueler	611	27.13%
Driver	645	28.64%

TOTAL	2252	100.00%



May 2018

Reason for Notice	# of NONCs
Engine on while fueling	5
Speeding	46
Prewashing	2
Parking in the QTA area	1
Parking in the exclusion zone	13
Parking in the fire lane	
Smoking	
Careless Driving	
RCC ID Badges	9
Housekeeping	
Gasoline Pin	
Parking Separation	10
Using another employee's fueling pin	1
Use of radios in fueling area	1
No Personal Vehicles Allowed	
Use of object to hold nozzle open	
	88

KPE GLOBAL keep the goal in mind

Houston
627 W 24th St
Houston, TX 77008
t + 1 832 821-5729

Florida
1914 NE 6th St
Deerfield Beach, FL 33441
t +1 954-504-2180

August 15, 2017

Gillian Phillips
CBRE
MIA Rental Car Center
3900 NW 25th St #100
Miami, FL 33142

Subject: Miami Intermodal Center Rental Car Facility
Warrant of Fitness Annual Certification 2017

Dear Gillian,

Please accept this letter as the Warrant of Fitness as required by Section 4.5.5 of NFPA 1, *Fire Code*, for the design of the life safety and fire systems in the Miami Intermodal Center (MIC) including the encompassing Ready Return (RR), Quick Turn-Around (QTA), and Fuel Areas.

Working with both CBRE and Sunshine Gasoline Distributors we have performed onsite inspections, reviewed testing affidavits, maintenance records, certifications, and logs. We conclude that the fire and life safety systems installed in the Miami Intermodal Center are consistent with original performance based design of the facility. This Warrant of Fitness concludes there has been no material changes to the facility, and any operational issues are noted in the attached checklist are minimal.

Reviewing the MIC performance-based design documentation of the facility we have considered and inspected the following systems:

- Fire Sprinkler System
- Foam System
- Fire Standpipe System
- Fire Pump Systems
- Fire Hose Connections
- Fire Department Connections
- Fire Alarm, Notification, and Detection System
- Emergency and Standby Power System
- Emergency Generator Fuel Level Indicator
- Emergency Lighting and Exit Signs
- UV/IR Flame Detection System
- CO Detection System
- CO and Ventilation System
- Smoke Exhaust Systems
- Stair Pressurization Systems
- Fire Shutters
- Fire Doors
- Fire Dampers, Smoke Dampers and Combination Fire/Smoke Dampers
- Fire Separations
- Tunnel Sump Pumping Systems
- Fuel Pumping Systems

- Emergency Fuel Shut Off Systems
- Fuel Containment Pipe Vapor Detection
- Fuel Trench Liquid Detection
- Fuel Trench Flammable Vapor/Liquid Detection
- Water Storage Tanks

This annual certification related to the performance based design followed the attached checklist developed by ARUP USA, Inc. as required by NFPA 1, Section 4.5.5.1.

KPE Global, LLC

Thomas Hecker, PE
Principal Engineer
Florida License #754
Exp. Date: 2/28/19

THOMAS E. HECKER LICENSE No 75421 STATE OF FLORIDA PROFESSIONAL ENGINEER

Date: 8/15/17

Miami Intermodal Center - Rental Car Facility
Warrant of Fitness Check 8/14/17

Item No.	Location	Y/N	Notes
	Ready Return (RR)		
	Separation between RR and Quick Turn-Around Facility (QTA)		
1	Verify that the 5 hour fire rated wall provided between the RR and QTA has no unprotected openings.	Y	Visually checked. In compliance.
2	Verify that the 3 hour fire rate exit doors provided on hold-opens in 4 hour wall are in place that automatically close upon alarm.	Y	Inspect and test per NFPA 80. See Annual Fire Inspection Report from Airwall Systems.
3	Verify that the 2 hour fire rated roll down doors provided for drives are in place that automatically close upon alarm and that the water curtains are in place on both sides of the doors.	Y	Inspect and test per NFPA 80. See Annual Fire Inspection Report from Airwall Systems
4	Verify that the fire rated exit doors and roll-down doors have been inspected, tests, and maintained in accordance with the latest version of NFPA 80, *Standard for Fire Doors and Other Opening Protectives*		Inspect and test per NFPA 80. See Annual Fire Inspection Report from Airwall Systems
5	Verify that water curtains are in place at the courtyard openings on QTA side.	Y	Visually checked. In compliance.
6	Verity that water curtains have been inspected, tested, and maintained in accordance with the latest version of NFPA 25, *Inspection, Testing, and Maintenance of Water Based Fire Protection Systems.*	Y	Inspect and test per NFPA 25. Annual inspection by Advanced Fire Sprinkler Systems, Inc.
	Separation between Customer Service Lobby (CSP) and RR (including CSL core lobbies on Levels 1-3		
7	Verify that the 3 hour fire rated wall provided between the CSP and RR has no unprotected openings	Y	Visually checked. In compliance.
8	Verify that 3 hour fire rated shutters are in place and automatically close upon alarm.	Y	Inspect and test per NFPA 80. See Annual Fire Inspection Report from Airwall Systems
9	Verify that the 2 hour fire rated walls with 90 minute opening protectives are in place for the elevator lobbies connected to the CSL exit passageway.	Y	Visually checked. In compliance.
10	Verify that the fire rated exit doors and shutters have been inspected, tested, and maintained in accordance with the latest version of NFPA 80, *Standard for Fire Doors and Other Opening Protectives.*	Y	Inspect and test per NFPA 80. See Annual Fire Inspection Report. See Airwall Systems Inc Report.
11	Verify that the escalator openings in the core lobbies are protected with draft curtains and closely-spaced sprinklers.	Y	Visually checked. In compliance.
12	Verify that closely-spaced sprinlkers have been inspected, tested, and maintained in accordance with the latest version of NFPA 25, *Inspection, Testing, and Maintenance of Water Based Fire Protection Systems.*	Y	Inspect and test per NFPA 25. See report from Advanced Fire Sprinkler Systems Inc.
	Separation Between Automatic People Mover (APM) and RR CSL		
13	Verify that the 4 hour fire rated wall provided between the CSP and APM has no unprotected openings.	Y	Visually checked. In compliance.
14	Verify that the 3 hour rolling fire shutter provided at openings between CSL and APM is in place and automatically closes upon alarm.	Y	Inspect and test per NFPA 80. See Annual Fire Inspection Report. See Airwall Systems Inc Report.
15	Verify that the rolling fire shutter includes four swinging man doors.	Y	Visually checked. In compliance.
16	Verify that the fire rated shutter has been inspected, tested, and maintained in accordance with the latest version of NFPA 80, *Standard for Fire Doors and Other Opening Protectives.*	Y	Inspect and test per NFPA 80. See Annual Fire Inspection Report. Airwall Systems Inc Report.
	Fire Suppression		
17	Verify that the sprinklers in the extended travel distance area on the first floor of the RR are spaced 10 feet on center with 0.18 density and quick response heads are used.	Y	Visually checked. In compliance.

Miami Intermodal Center - Rental Car Facility
Warrant of Fitness Check 8/14/17

Item No.	Location	Y/N	Notes
18	Verify that the standpipes are provided in each stairwell and on column lines 17, 23, and 29 (from architectural drawings)	Y	Visually checked. In compliance.
19	Verify that water curtains are provided around RR lightwells.	Y	Visually checked. In compliance.
20	Verify that sprinkler system (including water curtains) and standpipes have been inspected, tested, and maintained in accordance with the latest version of NPFA 25, *Inspection, Testing, and Maintenance of Water Based Fire Protection Systems.*	Y	Inspect and test per NFPA 25. Annual inspection completed by Advanced Fire Sprinkler Systems, Inc.
	CSL Smoke Management		
21	Verify that the smoke exhaust systems serving the CSL core lobbies and the main lobby have been inspected, tested, and maintained in accordance with the latest version of NFPA 92B, *Standard for Smoke Management Systems in Malls, Atria, and Large Spaces.*	Y	Inspect and Test per NFPA 92B. CBRE facility engineers inspect, test, and exercise the Smoke Exhaust and Supply Air Fans semi- annually. See report.
22	Verify that the stair pressurization systems provided for Stairs 6A and 9C (from the architectural drawings) have been inspected, tested, and maintained in accordance with the latest version of NFPA 92A, *Standard for Smoke-Control Systems Utilizing Barriers, and Pressure Differentials.*	Y	Inspect and Test per NFPA 92B. CBRE facility engineers inspect, and test the stair pressurization systems semi annually.
	Below-grade exit passageways		
23	Verify that passageways are clear of obstructions.	Y	Visually checked. In compliance.
24	Verify that there are no signs of significant water infiltration in passageways.	Y	Visually checked. In compliance.
	Quick Turn-Around (QTA)		
	Fire Separation		
25	Verify that there are no signs of damage to the fire protective material on structual frame.	Y	Visually checked. In compliance.
26	Verify that the 4 hour rated walls provided for vertical and horizontal pipe chasis have no unprotected openings.	Y	Visually checked. In compliance.
27	Verify that the 2 hour rated fire walls provied for exit stairs have no unprotected openings.	Y	Visually checked. In compliance.
28	Verify that the rated doors to trash chute rooms are self-closing and are kept closed at all times.		Management makes daily inspection rounds. There are visual and audible alarms to doors to insure compliance.
29	Verify that the fire rated doors have been inspected, tested, and maintained in accordance with the latest version of NFPA 80, *Standard for Fire Doors and Other Opening Protectives.*	Y	Inspect and test per NFPA 80. See Annual Fire Inspection Report.
30	Verify that the stair pressurization system provided for Stair 4D (from the architectural drawings) have been inspected, tested, and maintained in accordance with the latest version of NFPA 92a, *Standard for Smoke-Control Systems Utilizing Barriers and Presusre Differentials.*	Y	Inspect and Test per NFPA 92A. CBRE facility engineers inspect, test and exercise the stairwell pressurization fans semi anually. See report.
	3rd Floor Canopy		
31	Verify that the cementitous fireproofing on roof structural members in the bays above the fuel dispensrs is in place and undamaged.	Y	Visually checked. In compliance.
32	Verify that the intumescent protection provided on steel joists in bays not over the fuel dispensers (exect for 36 inch trusses) show no signes of damage.	Y	Visually checked. In compliance.
33	Verify that the 4 foot by 8 foot automatically opening smoke and heat vents provided above each refueling island have been inspected, tested, and maintained in accordance with the latest version of NFPA 204, *Standard for Smoke and Heat Venting.*	Y	CBRE performs test. See supporting documentation by CBRE.
	Design Fire		
34	Verify that each fuel pump will dispense no more than 25 gallons per cycle.	Y	See Sunshine Gasoline Distributors Binder. Max Qty highlighted.

Miami Intermodal Center - Rental Car Facility Warrant of Fitness Check 8/14/17			
Item No.	Location	Y/N	Notes
35	Verify that vehicles with fuel tanks exceeding 46 gallons are not serviced within the QTA.	Y	Pasanger Cars and Light trucks are only fueled due to height/weight limitations.
36	Verify that only one vehicle is permitted at a time on each side of each service island. All other vehicles should be kept out of the containment areas and beyond the established clear zones to the east and west of the service islands.	Y	Facility operations are consciencious of this, and cameras are installed to mitigate the issue.
37	Verify that vehicles are parked in designed parking, queuing, and service locations only.	Y	CBRE Tenant handbook covers approved vehicle parking areas.
38	Verify that sloped portion of pill containment basins measures at least 10'-6" wide by 27'-6" long, with a depth at the center of at least 2-1/4".	Y	Visually checked. In compliance.
39	Verify that no spill containment basin drains are clogged.	Y	Visually checked. In compliance.
40	Verify that employees at pumping stations check drains at the beginning of each shift.	Y	Tenants are required to clean areas at the beginning of each shift.
41	Verify that an inspection register exists for basin drain inspections.	Y	The CBRE team inspects the basin drains daily. The CBRE inspection log includes a line item for the drains.
42	Verify that fuel is not stored in portable containers anywhere in the building.	Y	Visually checked. In compliance.
	Vapor Cloud		
43	Verify that only regular unleaded gasoline with no more than 10% alcohol addivites is dispensed.	Y	See BOL in Sunshine fuels book noting 10% Ethanol. Verified.
44	Verify that security grills on ground level are largely open and do not differ significantly from the original design.	Y	Visually checked. In compliance.
45	Verify that booths, ductwork, piping, etc. has not been added to the QTA that alter the openess.	Y	Visually checked. In compliance.
46	Verify that the car wash spray guards provide 1 foot of opeing on the sides (protected by an air baffle) and the bottom and 2 feet of opening at the top.	Y	The third floor baffle design does not have the two foot opening. This was approved and accepted during the construction of the facility.
	Fuel System		
47	Verify that there have not been any fuel system renovations since the last inspection.	Y	See supporting documentation in Sunshine Gasoline Distributors, binder.
48	Verify that concrete barriers are provided at the east and west ends of each service island.	Y	Visually checked. In compliance.
49	Verify that an emergency shutoff button is provided at each pump, that each is unobstructed, and that each is in good working order.	Y	Visually checked. In compliance.
50	Verify that the fuel systems and emergency shut-off systems have been inspected, tested, and maintained in accordance with the latest editions of NFPA 30, *Flammable and Combustible Liquids Code*, and NFPA 30A, *Code for Motor Fuel Dispensing Facilites and Repair Garages.*	Y	See suporting documentation in Sunshine Gasoline Distributors binder. EFSO System, PRV, PRV Limit Swithches, Fueld DPS, Fuel Automatic Relief Valve, Fuel System Flow Switches, Fire Alarm System, Flammable Vapor Detectors, and Trace Tek leak detection system.
51	Verify that the leak detection probes provided to detect leaks within interstatial space of double-walled pipe have been inspected, tested, and maintained in accordance with the latest edition of NFPA 30, *Flammable and Combustible Liquids Code,* and NFPA 30A, *Code for Motor Fuel Dispensing Facilities and Repair Garages.*	Y	See Sunshine Gasoline Distributors supporting documents. Leak detection and annual certification letter by I2 Solutions.
52	Verify that the leak detection probes provided to detect leaks within interstatial spaces of double-walled storage tanks have been inspected, tested, and maintained in accordance with the latest edition of NFPA 30, *Flammable and Combustible Liquids Code,* and NFPA 30A, *Code for Motor Fuel Dispensing Facilities and Repair Garages.*	Y	See Sunshine Gasoline Distributors supporting documents. Leak detection and annual certification letter by I2 Solutions. See letter dated March 23,2017.

Miami Intermodal Center - Rental Car Facility
Warrant of Fitness Check 8/14/17

Item No.	Location	Y/N	Notes
53	Verify that the leak detection probes provided in fuel dispense sumps and fuel trenches have been inspected, tested, and maintained in accordance with the latest edition of NFPA 30, *Flammable and Combustible Liquids Code,* and NFPA 30A, *Code for Motor Fuel Dispensing Facilities and Repair Garages.*	Y	See Sunshine Gasoline Distributors supporting documents. Leak detection and annual certification letter by I2 Solutions dated 3/23/2017
	Fire Detection		
54	Verify that the installed UV/IR flame detectors are Spectrex Model 20/20L-LB or functional equivalent.	Y	Visually inspected. In compliance.
55	Verify that the UV/IR and heat detection provided to initiate foam suppression for fuel dispensers have been inspected, tested, and maintained in accordance with the latest edition of NFPA 72, *Nation Fire Alarm and Signaling Code.*	Y	See attached documentation by CBRE's fire vendor. UV/IR and heat detection have been tested.
56	Verify that fuel pumping and distribution is automatically shut down for the floor of origin upon first detection of a fire.	Y	See Fuel Shut Down document in Sunshine Gasoline Distributors binder.
57	Verify that fuel pumping and distribution is automatically shut down for the entire QTA upon second detection of a fire.	Y	See Fuel Shut Down document in Sunshine Gasoline Distributors binder.
58	Verify that the fire alarm system and other detection devices have been inspected, tested, and maintained in accordance with the latest edition of NFPA 72, *National Fire Alarm and Signaling Code.*	Y	Inspect and test per NFPA 72. See fire alarm imspection and testing annual report.
59	Verify that the CO detection system has been inspected, tested, and maintained in accordance with the latest edition of NFPA 72, *National Fire Alarm and Signaling Code.*	Y	Inspect and test per NFPA 72. See fire alarm imspection and testing annual report.
	Alarm Notifications		
60	Verify that audible notification devices and the voice alarm system are provided.	Y	Visually checked. In compliance.
61	Verify that the visual alarms are provided.	Y	Visually checked. In compliance.
62	Verify that notification devices and the voice alarm system has been inspected, tested, and maintained in accordance with the latest edition of NFPA 72, *National Fire Alarm and Signaling Code.*	Y	Inspect and test per NFPA 72. See fire alarm and inspection annual report.
	Fire Suppression		
63	Verify that the sprinklers provided in the QTA (expect above fuel retention basins and dispensers) are spaced 10 feet on center.	Y	Visually checked. In compliance.
64	Verify that the standpipes are located in each stairwell.	Y	Visually checked. In compliance.
65	Verify that water curtains are provided for the clear zone on the east and west sides of fuel dispensing/spill containment areas.	Y	Visually checked. In compliance.
66	Verify that sprinkler system (including water curtains) and standpipes have been inspected, tested, and maintained in accordance with the latest version of NFPA 25, *Inspection, Testing, and Mainteance of Water Based Fire Protection Services.*	Y	Inspect and test per NFPA 25. See CBRE Fire Contractor's report.
	Foam System		
67	Verify that foam system proved at fuel dispensing stations has been inspected, tested, and maintained in accordance with the latest version of NFPA 25, *Inspection, Testing, and Maintenance of Water Based Fire Protection Services.*	Y	Inspect and test per NFPA 25. See Advanced Sprinkler report. CBBRE has report that foam has been tested per NFPA.
	Manual Suppression		

Miami Intermodal Center - Rental Car Facility
Warrant of Fitness Check 8/14/17

Item No.	Location	Y/N	Notes
68	Verify that a QRV is provided with Purple K	Y	Supplied onsite Fire Truck and Maintained by the Dade County Fire Department.
69	Verify that a portable dry chemical extinguisher is provided at each fuel dispensing location.	Y	Visually checked. In compliance.
70	Verify that portable chemical extinguishers have been inspected, tested, and maintained in acordance with the latest version of NFPA 10, Standard for Portable Fire Extinguishers.	Y	Inspected tags and report by Triangle Fire Inc.
71	Verify that layout changes (additions of booths, etc.) do not impact the access of fire fighting vehicles or the ability of fire fighters to fight fires on each level.	Y	Visually checked. In compliance.
	Fire Pumps		
72	Verify that the two fire pumps (one electric and one diesel) have been inspection, tested, and maintained in accordance with the latest versions of NFPA 25, *Inspection, Testing, and Maintenance of Water Based Fire Protection Systems.*	Y	Inspect and test per NFPA 25. See reports from International Fire Protection.
73	Verify that an emergency generator has been inspected, tested, and maintained in accordance with the latest version of NFPA 10.	Y	Inspect and test per NFPA 10. See Standby Generator Inspection and Testing annual report.
	Fire Water Supply		
74	Verify that fire hydrants spaced less than 300 feet apart aroudn the full perimeter of the building.	Y	Visually checked. In compliance.
75	Verify that fire hydrants and water main have been inspected, tested, and maintained in accordance with the ltest version of NFPA 25, *Inspection, Testing, and Maintenance of Water Based Fire Protection Systems.*	Y	Fire hydrants owned and oeprated by Dade County Fire Department.
	Ventilation for Fuel Dispensing		
76	Verify that ventilation in the fuel dispensing area (including the low level exhaust at each dispensing island) has been inspected, tested, and maintained in accordance iwht the latest versions of NFPA 30A, *Code for Motor Fuel Dispensing Facilities and Repair Garages* and NFPA 91, *Standard for Exhuast Systems for Air Conveying of Vapors, Gases, Mists, adn Noncombustible Particulate Solids.*	Y	Inspect and test per NFPA 30A. CBRE facility Engineers inspect, test and exercise the exahaust ventilation system every two weeks as part of their PM system.
	Fire Command Center		
77	Verify that an operational, non-coin operated telephone is provided.	Y	Visually checked. In compliance.
78	Verify that there is a means to access the occupant notification system and the fire emergency communications system.	Y	Visually checked. In compliance.
79	Verify that there is equipment ot receive supervisory signals from the sprinkler/standpipe systems, the fire alarm and notification system, and emergency systems.	Y	Visually checked. In compliance.
80	Verify that there are manual controls for the smoke management system with detailed drawings of the smoke zones.	Y	Visually checked. In compliance.
81	Verify that there are elevator controls and bypass key switches.	Y	Visually checked. In compliance.
82	Verify that systmes signaling through the fire alarm system are indivially annunciated.	Y	Visually checked. In compliance.
83	Verify that the equipment in the Fire Command Center has been inspected, tested, and maintained in accordance with the latest version of NFPA 72, *Nation Fire Alarm and Signaling Code.*	Y	Inspect and test per NFPA 72. See fire alarm inspection and testing annual report.
	Maintenance and Operations		

Miami Intermodal Center - Rental Car Facility Warrant of Fitness Check 8/14/17			
Item No.	Location	Y/N	Notes
84	Verify that non-employees are restricted from entering the QTA (unless accompanies by employees or trained in emregency procedures.)	Y	CBRE tenant handbook indentifies restricted areas. In addition, all doors located on the first floor of the QTA are are locked preventing unauthorized access to the QTA from the outside.
85	Verify that no smoking is allowed anywhere in the building. Inspect for signs of smoking in stairwells.	Y	CBRE tenant handbook limits smoking to designated areas outside the building.
86	Verify hot work permits are required as well as other permits.	Y	CBRE Engineers issue job specific hot work permits, as required.

Dematteï Wong Architecture

Miami International Airport - Quick Turn-Around Facility

Performance-Based Design and Code Analysis Report

Report 02

Issue 05 | March 16, 2015

Job number 232911-00

Arup USA, Inc
955 Massachusetts Avenue
4th Floor
Cambridge MA 02139
United States of America
www.arup.com

ARUP

Contents

1 Project Scope

Arup has been retained to review and assess the conceptual design of the new equipment and associated work, and to develop an initial view on safeguards to support proposed new oil changing bays as outlined in Miami Intermodal Center – Proposed New Equipment Rooms and Maintenance Bays drawings by Dematteí Wong Architecture dated November 11, 2012.

2 Overview

The Miami International Airport (MIA) Rental Car Facility (RCF) Quick Turn-Around (QTA) facility management team proposes to add four oil changing bays on three levels (levels one, two, and three with twelve total bays), and two additions to the existing building to house storage tanks and pumping equipment for new and used motor oil, along with associated new and used oil piping and equipment to serve the new oil changing bays.

2.1 Basis of Design

We recommend the following critical design features will be necessary for the motor oil changes. These features are in addition to the code required features outlines within Appendix A.

Motor Oil Changing Bays

Dual overlapping foam-water deluge systems (6%) for each oil changing bay with foam tanks located outside oil changing bays. The design concentration is based upon the previously approved concentration for the QTA facility in the refueling bays.

Two-hour fire-resistive ceiling over oil bays located on the third level.

Oil changing bay retention area to accommodate foam plus maximum oil spill volume

Regular cleaning staff after each shift and by a third party vendor to remove oil residue. Cleaning intervals and requirements to remove oil residue will be monitored by the QTA management team (currently Sunshine Services and CBRE).

Oil dispensing equipment to limit maximum oil dispensed to two gallons per card swipe

Oil changing bays to be provided with heat detectors to initiate alarm, oil delivery and collection system shutdown, and foam discharge

Manual switch to activate foam systems

Motor Oil Storage Addition

Provide a minimum clear distance of 15 feet from the oil addition storage rooms to QTA exterior

Type 1 construction to match the existing building (South Florida Building Code)

Fire rated separation between oil piping and trash compactor

Protect the piping over the trash from fire and physical damage.

Roll-down doors to protect louver openings in oil storage rooms

Two exits from the oil storage rooms

Sprinkler systems designed for Ordinary Hazard, Group 2

Both Areas

New oil delivery and old oil collection systems interconnected with fire alarm to initiate shutdown upon any fire alarm

New oil delivery and old oil collection systems manual shutdown switch outside oil changing area in an approved location

Overpressure sensor connected to shutdown new oil delivery system, which should monitor the pressure in the new oil piping. Shutdown pressure to be 125% of the maximum pump design pressure or as otherwise determined by the designer of record.

Fire alarm visual notification located within the oil changing bays and the new storage addition

Marked exit paths within oil changing bays and the new storage addition

Restrict welding or other hot-work within the QTA without a hot work permit from Miami-Dade Fire Department

No smoking within the QTA facility (as required by base approvals)

Maintain oil pumping and collection systems as required by all applicable codes

Provide training for all employees allowed within the QTA on the hazards associated with motor oil changing operations. This training to be developed and managed by the QTA management team (currently Sunshine Services and CBRE), or designee.

Bulk oil delivery systems to be designed in accordance with NFPA 30 and all other applicable codes

2.2 Applicable Codes and Standards

Codes

Florida State Building Code (2010 edition) which adopts and amends the 2009 edition of the International Building Code

Florida State Building Code – Existing Building (2010 edition) which adopts and amends the 2009 edition of the International Existing Building Code

Florida Fire Prevention Code (2010 edition) which adopts and amends the 2009 editions of NFPA 1, Fire Code and NFPA 101, Life Safety Code

Other applicable codes such as Mechanical, Plumbing, and Energy.

Standards

NFPA 10, Portable Fire Extinguishers (2010)

NFPA 11, Low-, Medium-, and High-Expansion Foam (2010)

NFPA 13, Installation of Sprinkler Systems (2010)

NFPA 14, Installation of Standpipe and Hose System (2010)

NFPA 20, Installation of Stationary Pumps for Fire Protection (2007)

NFPA 30, Flammable and Combustible Liquids Code (2008)

NFPA 30A, Motor Fuel Dispensing Facilities and Repair Garages (2008)

NFPA 70, National Electrical Code (2008)

NFPA 72, National Fire Alarm Code (2002)

NFPA 110, Emergency and Standby Power Systems (2005)

2.3 Stakeholders and Authorities Having Jurisdiction

The QTA building owned by Miami Dade County.

QTA operations are handled by Sunshine Services and CBRE.

Miami-Dade Fire Department – Aviation Department is the approving authority.

Current RCF tenants are:

1. Enterprise Holdings – parent to Enterprise, Alamo and National.
2. Hertz Corporation – parent to Hertz, Dollar and Thrifty.
3. Avis/Budget Group – parent to Avis, Budget and Payless.
4. Royal Rent A Car
5. SIXT Rent A Car

6. Family Rent A Car
7. All Day Rent A Car
8. Global Rent A Car
9. Advantage
10. E-Z
11. Fire Fly

3 Approved RCC and QTA Performance-Based Analysis

The following approved reports support the existing performance-based analysis of the QTA facility.

- Earth Tech - Miami International Airport - Consolidated Rental Car Facility Fire Protection Engineering Design Brief (April 9, 2001)
- Earth Tech Consultants – Miami International Airport - Rental Car Facility System Safety Assessment (September 2001)
- Earth Tech - Miami International Airport - Rental Car Facility Fire Protection Report, Final DD Issue (October 12, 2001)
- Earth Tech - Miami International Airport - Consolidated Rental Car Facility Performance-Based Fire Protection Report, Revision B (February 2011)
- Miami International Airport - Consolidated Rental Car Facility Systems Safety Assessment: Lubricating Oil, Windshield Washer Fluid, and Compressed Air Systems (January 2003)
- Earth Tech - Miami International Airport - Consolidated Rental Car Facility Vapor Dispersion Analysis Summary Report (February 2011)
- Miami Intermodal Center – Rental Car Facility QTA Fire/Smoke Migration and Evacuation Analysis (July 2006)
- Miami Intermodal Center – Quick Turn-Around Facility Analysis of fire Exposure to Level 3 Roof (May 2009)
- Earth Tech - Miami International Airport - Consolidated Rental Car Facility, Life Safety Evaluation Report, Revision C (February 2011)

4 Goals and Objectives

4.1 Approved Stakeholder Goals

For this effort, the broad goals identified during the October 2000 Fire and Life Safety Workshop for the RCF/QTA are:

- Life Safety,
- Property Protection,
- Business Continuity, and
- Protection of the Environment.

Although each of the fire safety goals is important, life safety is of primary concern to the Miami-Dade Aviation Department, Aviation Life Safety Bureau (ALSB), with protection of the environment also of significant concern.

For the rental car operators, life safety and business continuity are significant fire safety goals.

For the airport operator, it is assumed that each of these goals is important.

There is also a broad goal for balancing the cost of fire and life safety measures with the benefit received for many of the project stakeholders.

4.2 Approved Stakeholder Objectives

The stakeholder objectives were outlined in the Fire Protection Engineering Design Brief submitted as part of Phase I, Schematic Design dated 9 April 2001. The objectives included:

- multi-level fueling,
- indoor fueling,
- car fires in garages,
- gasoline vapor explosion hazards,
- occupant egress in the QTA, and
- Firefighter access (QTA and fuel storage and transfer area).

Specifically, the following objectives have been identified to address the ALSB concerns:

- In the event of a fire or explosion, provide adequate time for all occupants of the facility not intimate with the first materials burning or explosion to reach a place of safety without serious injury from exposure to untenable conditions.
- Limit any fire initiating in a vehicle to the vehicle of origin (i.e., no ignition of proximate vehicles).
- ~~Limit a fire initiating at a fuel dispensing station to that station and the immediate area surrounding it.~~ [N/A for oil changing]
- ~~Limit any fuel release to a single level of the QTA.~~ [N/A for oil changing]
- Limit any single fire or explosion to the QTA level of origin.

- ~~Limit any fuel release to no more than could be expected by an interior fuel system design that complies with NFPA 30A.~~ [N/A for oil changing]
- ~~Prevent any fire initiating in the fueling area from spreading into other areas of the QTA or RCF.~~ [N/A for oil changing]
- ~~Limit the likelihood of developing large concentrations of explosive vapors that could lead to explosions if ignited.~~ [N/A for oil changing]
- ~~Limit the likelihood of static charges building up in the fuel supply system and resulting in explosion or fire initiation.~~ [N/A for oil changing]
- ~~Limit likelihood of explosion due to explosive vapor build up in pipe chases, drainage trenches, and other confined or semi-confined spaces.~~ [N/A for oil changing]
- ~~Limit the impact of any explosion to the immediate area of origin.~~ [N/A for oil changing]
- ~~Limit the likelihood of fire and explosion associated with fuel storage and transfer from supply vehicles.~~ [N/A for oil changing]
- Provide access and facilities for fast firefighter response to all areas of the QTA facility.
- Provide sufficient suppression water supply.
- Provide the ability for firefighting and emergency vehicle access to all parts of the QTA facility.
- Provide adequate access and facilities for fire fighter and firefighting equipment to the fuel storage and transfer area.

The following objectives address the stakeholders' desire to optimize operations to the extent feasible and to minimize structural damage. These objectives are in addition to the ALSB objectives specified above:

- Limit any fire or explosion damage to floor of fire or explosion origin.
- ~~Limit damage involving a fuel dispensing station to no more than the fuel dispensing station of origin and the immediate surrounding area.~~ [N/A for oil changing]
- Limit structural damage anywhere in the QTA facility to less than that which would cause catastrophic structural deformation or failure.
- Limit damage such that all essential but non-emergency systems, if damaged by fire or explosion, can be repaired and made operational within 24 hours.
- Limit maximum downtime resulting from a fire or explosion to no more than 24 hours for any one floor of the QTA facility ~~and no more than one week for any fuel dispensing station~~ [N/A for oil changing].
- Limit internal environmental impact to the QTA facility.
- Limit external, ground-related environmental impact to the QTA facility grounds.

In some cases, the above ALSB and stakeholder objectives may overlap. Likewise, specific protection measures developed to address one stakeholder objective may address other stakeholder objectives. In order to assess this, it is required to develop detailed design (engineering) objectives and performance criteria.

5 Performance Criteria

Performance-based design requires the selection of performance criteria that will be used to determine whether the candidate design solutions will meet the design objectives. Performance criteria must be established to address all design objectives, including life safety and non-life safety objectives.

The following is an initial listing of candidate performance criteria used for the performance-based analysis of the oil changing operations in the QTA facility:

5.1 Approved Life-Safety Criteria

- Smoke layer not to descend below 6 feet[1] along the egress path during the time required for the occupants to reach a safe place.
- Gas temperature and radiant flux exposure to occupants not to result in untenable conditions during anticipated exposure times. The gas temperature is not to exceed 140°F and radiant flux is limited to 2.5 kW/m^2 for 30 seconds.[2]
- Jin's research[3] in visibility and human behavior in smoke found that occupants that were familiar with the space could escape with a minimum visibility of 13 feet. At this smoke density an illuminated sign is visible from 46 feet.

5.2 Approved Non-Life-Safety Criteria

- For reducing the likelihood of item-to-item fire spread within the involved space, the radiant flux will be limited to between 25 and 35 kW/m^2.[4]
- ~~Structural elements and floor construction exposed to the design fires will maintain their integrity for 2 hours when exposed to temperatures of 2000° F.~~ [N/A for oil changing]

[1] NFPA 101, Life Safety Code, NFPA, 2012, Section 8.6.7.
[2] Purser, David, Section 2-Chapter 8, SFPE Handbook 2nd edition, NFPA, 1995 p 2-112
[3] Jin, Tadahisa. "Visibility and Human Behavior in Fire Smoke." The SFPE Handbook of Fire Protection Engineering, Third Edition." NFPA and SFPE. 2002.
[4] DiNenno, P. J, Simplified radiation Calculations from Large Open Hydrocarbon Fires, SFPE Technology Report 82-9, Society of Fire Protection Engineers, Boston, MA, 1989, p 14.

6 Motor Oil Design Fire Scenarios

Arup report titled "Proposed Oil Changing Operations" dated 6 November 2013, provided the following qualitative risk ranking and potential outcomes for fire and vapor dispersion scenarios associated with the oil changing operations. These scenarios are the basis for the design fires, which are detailed in the following sections.

Table 1: Process Failure – Potential Effects Summary and Relative Risk

Vehicle driving into oil changing bay	Oil spill fire	Very Low
	Gasoline spill fire	Ext Low
	Gasoline spill vapor dispersion	Ext Low
	Vehicle fire	Very Low
Lift vehicle	Oil spill fire	Very Low
	Gasoline spill fire	Ext Low
	Gasoline spill vapor dispersion	Ext Low
	Vehicle fire	Low
Drain oil and remove filter	Oil spill fire	Low
Lower vehicle	Oil spill fire	Very Low
	Gasoline spill fire	Ext Low
	Gasoline spill vapor dispersion	Ext Low
	Vehicle fire	Low
Fill vehicle with new oil	Oil spill fire	Very Low
Drive out of oil changing bay	Oil spill fire	Very Low
	Gasoline spill fire	Ext Low
	Gasoline spill vapor dispersion	Ext Low
	Vehicle fire	Low

Table 2: Incidental Failure – Potential Effects Summary and Relative Risk

Filter barrel ignition	Oil spill fire	Low
Soiled rag or other combustible ignition	Other combustible ignition	Low
Oil pipe breach	Oil spill fire	Very Low
	Oil spray fire	Very Low
Refill nozzle failure	Oil spill fire	Low
	Oil spray fire	Very Low
Used oil containment leak	Oil spill fire	Ext Low

Based upon the existing approvals, conditions of these approvals, and the initial hazard assessment, the following three fire scenarios were selected – two "low risk" process failures, and one "low risk" incidental failure. These represent initial selections for discussion.

6.1 Process Failure

As noted in Proposed Oil Changing Operations report, the oil changing process consists of: (I) driving the vehicle into the oil changing bay, (II) lifting the vehicle; (III); draining the oil and removing the filter, (IV) lowering the vehicle, (V) filling the vehicle with new oil, and (VI) driving the vehicle out of the oil changing bay.

6.1.1 Oil spill fire 25 gal

The oil spill considers the equipment failure or operator failure and 25 gallons of motor oil in the basin to form a pool fire, which is based on the following quantities:

- The motor oil dispenser be limited to two (2) gallons maximum in each individual dispensing cycle.
- Maximum expected motor oil capacity of any vehicle being refueled in the QTA is 1.5 gallons.
- Used-oil receiver has a maximum capacity of 25 gallons.

The oil spill pool will require time to reach a maximum sustained burning, and high-fire-point liquids require both a heat source to heat the fluid and a flame source. [1] The pool fire has been conservatively assumed to reach a peak fire size in 30 seconds.

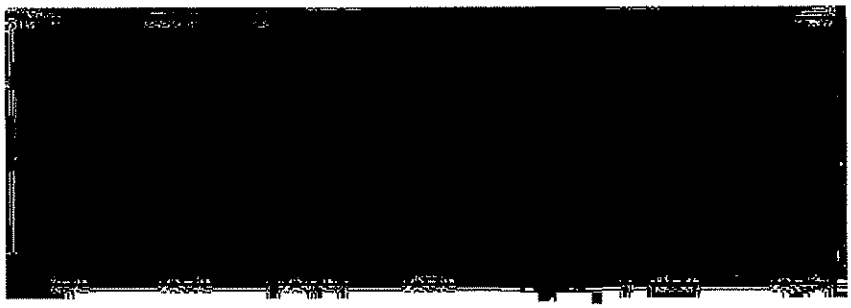


Figure 1: Location of used-oil receiver and possible fire scenario

Figure 2: Overview of used-oil evacuation system, which shows the used-oil receiver (N).

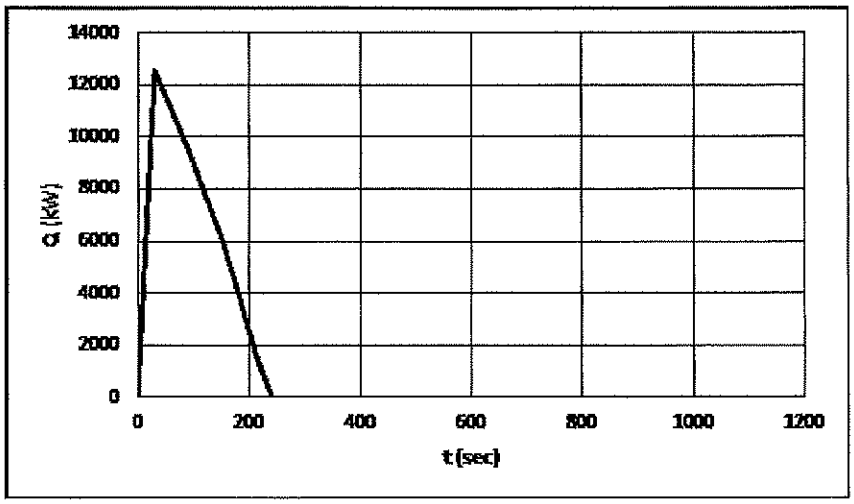


Figure 3: Heat release rate curve for oil spill fire contained in new oil change bay. See Appendix B for calculation.

6.1.2 Vehicle fire [existing approval]

A large variety of heat release rates and fire durations have been reported in the literature. Most literature places a typical passenger vehicle fire HRRs at approximately 5 MW. However, larger vehicles and mini-vans may be processed in the QTA which may have HRRs in excess of 5 MW. Vans have been reported at 15 MW while a bus was reported at 20 MW and trucks from 20-30 MW. Based upon this information, the peak HRR was selected at 12 MW with a duration of 80 minutes (see Figure 5). See additional information related to this design fire in the MIA RCC *Performance-Based Fire Protection Report, Revision B*, dated February 2011.

Figure 4: Location of possible fire scenario in new oil change bay.

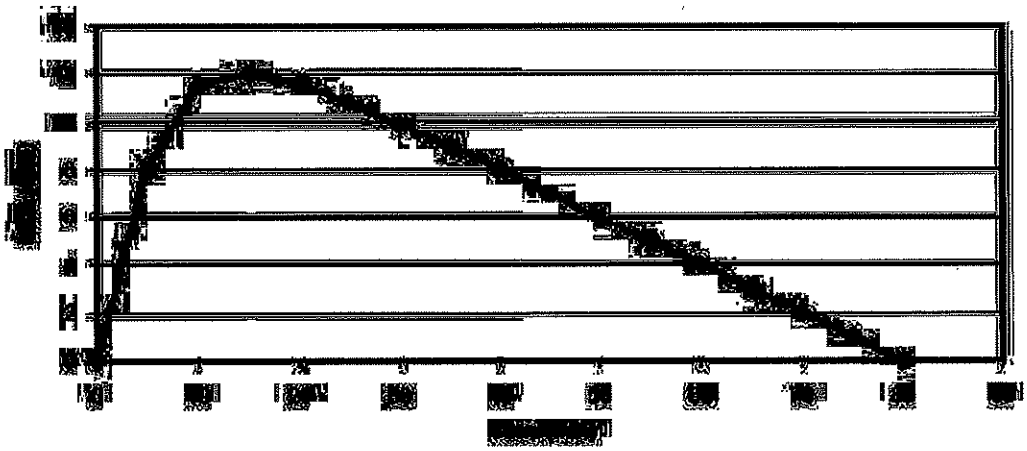


Figure 5: Heat release rate curve for vehicle fire scenario in new oil change bay.

6.2 Incidental Failure

Non-process related incidents, i.e. incidental failures as noted in the Proposed Oil Changing Operations report, potentially consist of: (VII) Filter barrel ignition, (VIII) Soiled rag or other combustible ignition, (IX) Oil pipe breach, (X) Refill nozzle failure, (X) Used oil containment leak.

6.2.1 Filter barrel ignition 58 gal

This scenario considers an incidental failure and 58 gallons of motor oil in the pallet sump to form a pool fire, which is based on the following quantities:

- The sump capacity is limited to 58 gallons maximum before it spills on the bay floor.
- Maximum expected motor oil capacity of each 55-gallon filter barrel on the pallet is much less than the sump capacity.

The oil spill pool will require some time to reach a maximum sustained burning, and high-fire-point liquids require both a heat source to heat the fluid and a flame source. [1] Therefore, the pool fire has been conservatively assumed to reach a peak fire size in 30 seconds.

Figure 6: Location of filter barrels and spill containment pallet in new oil change bay.

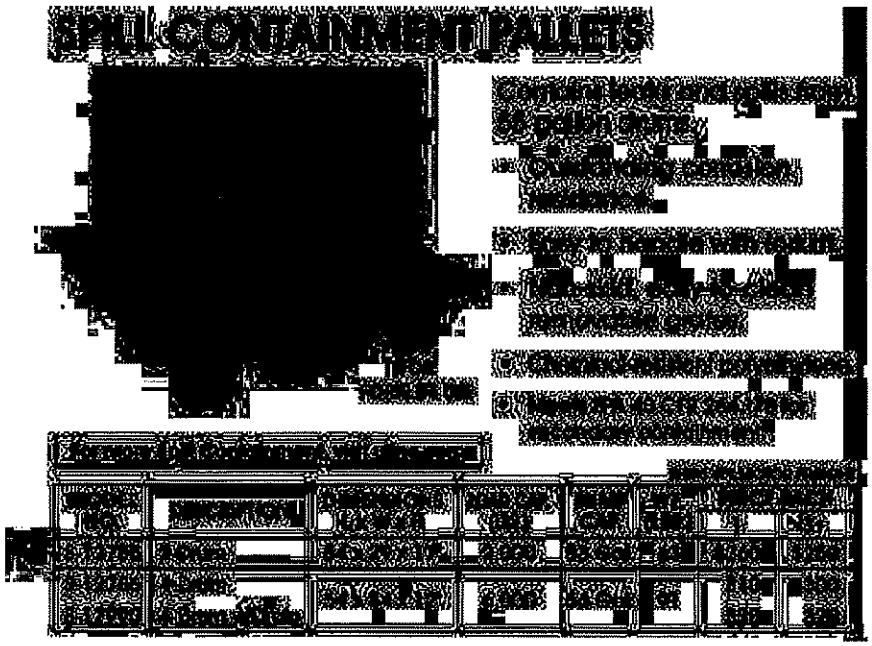


Figure 7: Description of spill containment pallets, which shows the dimensions and sump capacity for the 2-drum model.

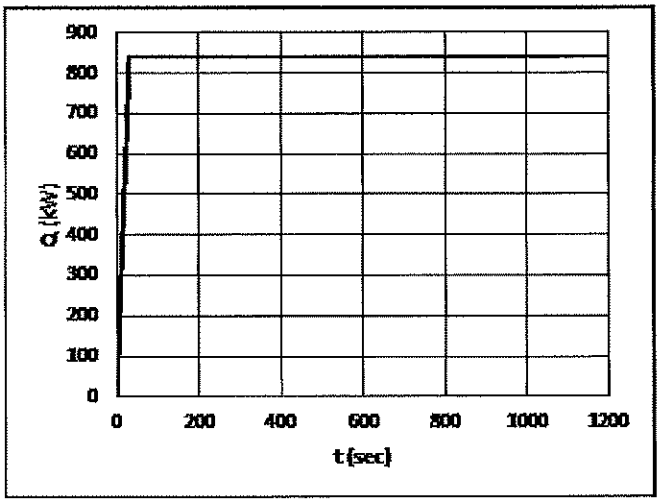


Figure 8: Heat release rate curve for filter barrel fire scenario in new oil change bay. See Appendix B for calculations.

6.3 Expected Fire Sizes

The design fire scenarios captured below are the worst credible scenarios for the given oil change bay configuration. The oil change operations within the building as well as the vehicles provide sufficient fuel for a significant fire.

Max. HRR (MW)	~12.5	~12	~0.83

7 Fire and Smoke Modeling

In order to provide further confidence regarding the fire protection and life safety features of the QTA, a fire within the space was simulated using the computational fluid dynamics (CFD) model Fire Dynamics Simulator (FDS). The FDS model was used to simulate actual conditions with lower smoke layer heights due to the fire flows forcing the smoke under beams. This provides an improved prediction above a zone model that assumes a tenable smoke layer.

In order to assess the temperature of the descending upper layer, a number of 'slices' were used within the model. These 'slices' were used to estimate the average temperature at specific intervals above the egress path. A 'slice' was specified at 6 feet above the egress paths for each scenario (NFPA 101: Life Safety Code Section 8.6.7 permits a smoke layer interface 6 feet above the walking surfaces in buildings for which an engineering analysis is performed to

develop smoke management criteria). This data was used to track the smoke temperature at these heights as time elapsed.

Similar to the initial assessment, three tenability criteria were reviewed: temperature, radiant flux, and visibility. NFPA 130 – Standard for Fixed Guideway and Passenger Rail Systems suggests a maximum tenable temperature exposure of 140°F (60°C) for a few seconds.

Additionally, in situations where a sustained hot smoke layer has been developed, it is possible that the hot smoke layer can radiate heat down to the evacuating occupants. Consideration was given to this possibility by calculating the upper layer temperature required to impart a critical radiant heat flux upon the occupants.

The CIBSE Guide E – Fire Engineering[5] indicates that a 2.5 kW/m2 incident radiant flux upon the skin of an occupant would result in severe burns with a short exposure and recommends using a lower flux. Another reference, the SFPE Engineering Guide, "Predicting 1st and 2nd Degree Skin Burns from Thermal Radiation" indicates that an incident radiant flux greater than 1.7 kW/m^2 would cause pain on the exposed skin of an occupant with a prolonged exposure. Based upon these two references, a thermal flux of 2.0 kW/m^2 was chosen as the design criteria. To provide perspective for this, radiant fluxes from the sun, on a hot day in northern latitudes, are approximately 1.0 kW/m^2. If smoke temperatures are maintained below 350°F (180°C), the thermal radiation from the hot upper layer to the occupants below will not exceed the tenability criteria. The 350°F (180°C) criteria is based upon the radiant flux from a 350 °F infinite blackbody radiator, as previously approved (Miami Intermodal Center – Rental Car Facility QTA Fire/Smoke Migration and Evacuation Analysis, July 2006).

7.1 QTA Egress Analysis

In order to determine the performance of the fire and life safety systems proposed for the QTA against expected fire scenarios, estimations of egress times are required. To accomplish this, the computer egress model STEPS was used.

The Life Safety Evaluation Report for the RCF[6], which has been issued separately, provides a comprehensive discussion of the egress modeling that was undertaken for this analysis. Egress modeling results for the QTA only are presented here. Refer to the Life Safety Evaluation Report for details of analysis parameters and assumptions.

[6] Earth Tech - Miami International Airport - Consolidated Rental Car Facility, Life Safety Evaluation Report, Revision C, February 2011

[6] Earth Tech - Miami International Airport - Consolidated Rental Car Facility, Life Safety Evaluation Report, Revision C, February 2011

Table 3: Summary of Building Evacuation Times

QTA	Level 1	1:00 to 5:00	3:00	0:57 to 1:12	4:57 to 9:12
	Level 2	1:00 to 5:00	3:00	0:58 to 1:17	4:58 to 9:12
	Level 3	1:00 to 6:00	3:00	0:58 to 1:47	4:58 to 10:47
RCF	Level 1	2:00 to 5:00	3:00 to 6:00	9:09 to 11:35	14:09 to 22:35
	Level 2	2:00 to 5:00	3:00 to 6:00	2:57 to 4:17	7:57 to 15:17
	Level 3	2:00 to 5:00	3:00 to 6:00	3:11 to 4:52	8:11 to 15:52
	Level 4	3:00 to 6:00	3:00 to 6:00	6:37 to 10:09	12:37 to 22:09
CSL	Level 4	1:00 to 7:00	3:00 to 6:00	4:06 to 6:29	8:06 to 19:29
APM	Level 4	2:00 to 5:00	3:00 to 6:00	6:09 to 10:48	11:09 to 21:48
Complete Building		1:00 to 7:00	3:00 to 6:00	13:39 to 17:26	17:39 to 30:26

The QTA is designed as a high hazard area with a maximum travel distance of 210 ft. with several stairs. The availability of exit capacity allows for the occupants in the QTA to evacuate based on their movement time rather than having to wait in queues at the exits.

7.2 CFD Modeling Results

There are three different fire simulations evaluated for Level 1 and Level 3 only (Level 2 is similar to Level 1):

1. 25 Gallon Oil Spill Fire
2. Vehicle Fire (Dimensions of a standard mini-van)
3. 58 Gallon Filter Barrel Fire

7.2.1 Fire Input

The computational fluid dynamics program Fire Dynamics Simulator (FDS) was used to model and asses the three different fire simulations for each floor.

The process by which each simulation is developed and subsequently run depends on the dimensions of the fuel source and the potential energy release of the fire. For the first and third simulations, the volume and depth of the oil leak had to be found so the area of the fuel source could be found. The fuel area for the first scenario is calculated as an inverted pyramid with ⅛" per foot floor slope; and the fuel area for the third scenario is based on the area of the pallet sump. This allowed for a heat release per unit area calculation to be made, which determines the energy developed by the fire. For the second simulation, the dimensions of a standard mini-van were used to develop a fire simulation that represented the impact a gasoline fire starting in a vehicle would have on the facility.

In order to develop heat release rates that reflect the behavior of crude oil and gasoline fires, empirical correlations relating fire growth potential and the fuel source had to be used. Figure 8 is a chart representing this fire growth calculation as a function of heat release rate and time.

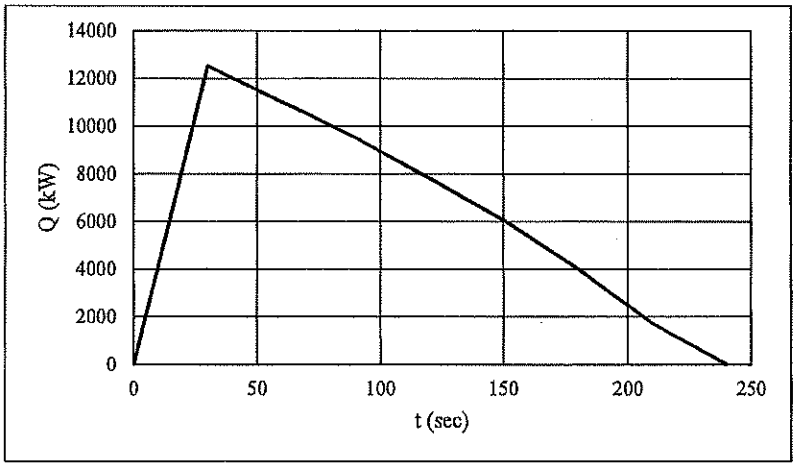


Figure 8. Heat Release Rate vs. Time Illustration.

From this data, the heat release rate per unit area can be found by simply dividing the heat release rate by the area of the fuel source. This value is the input necessary to run a simulation. Table 1 provides an overview of the heat release rate data used for the simulations.

The last critical values necessary to run a model are the ramp-up and –down times, which is related to the mass consumption presented in Appendix B. These time steps indicate how long it takes for the fire to reach its fuel growth potential and burnout stages. Using Figure 8 as a reference, the ramp-up time for this simulation is 30 seconds, and the ramp-down time 240 seconds. This means that once the fire maximizes in size, it would burn itself out after 210 seconds. Table 2 illustrates the ramping times associated with each simulation.

Once heat release rate and ramp times are found, the last set of values needed before executing a simulation are the thermal and chemical properties of the fuels.

The thermal properties of interest include the heat of combustion as well as the soot and carbon monoxide yields. These values determine the potential growth of the fire and the soot generation, which impacts occupant egress from the structure.

Evaluating the chemical composition of motor oil and gasoline, however, is challenging because there isn't a specific chemical formula that defines either fuel; the compositions differ due to fuel clarity and the variability of additives introduced into the mixture. Because of this, the formulae for motor oil and gasoline had to be estimated. It was determined motor oil is most similar to mineral oil / transformer oil and that gasoline is most similar to octane (C_8H_{18}) in nature. Table 3 provides an overview of the thermal and chemical properties of motor oil and gasoline.

Table 4. Heat Release Rate Data for Each Simulation.

Oil Spill	25 gallons	0.095	31.388	9.08	12500	**1376.652**
Vehicle Fire	Standard Car Size	N/A	N/A	10.0	12000	**1199.3**
Filter Barrel	58 gallons	0.44	440	1.01	839	**830.693**

Table 5. Ramping Times for Each Simulation.

Oil Spill	25 gallons	30	240
Vehicle Fire	Standard Car Size	900	4800
Filter Barrel	58 gallons	30	N/A

Note that there is no ramp-down time for the Filter Barrel simulation because the fire burns slowly enough that it would take hundreds of minutes before the entirety of the fuel was consumed, which is beyond the required safe egress time.

Table 6. Thermal and Chemical Properties of Testing Fuels

Motor Oil	39.0[7]	0.041[8]	0.097[9]
Gasoline[10]	41.0	0.011	0.038

Note that production values for motor oil represent empirical data collected for mineral oil. A conservative heat of combustion was used for motor oil. This heat of combustion and the soot production combine to represent a reasonable engineering approximately of the overall smoke production.

8 Summary

The following figures provide smoke temperature and visibility illustrations for the first and third floors at varying points in time. Areas in the immediately vicinity of the fire exceed smoke temperature visibility thresholds have been indicated on each figure. Tables 7 and 8 compare the first and third floors from an architectural and simulation standpoint.

[7] Zalosh, Industrial Fire Protection, Table 7.4 for Transformer Oil
[8] SFPE Handbook, 4th Edition, Table 3-4.16 for Mineral Oil
[9] SFPE Handbook, 4th Edition, Table 3-4.16 for Mineral Oil
[10] SFPE Handbook, 4th Edition, Table 3-4.16 for Octane

Table 7. First floor comparison between the architectural and simulation drawings.

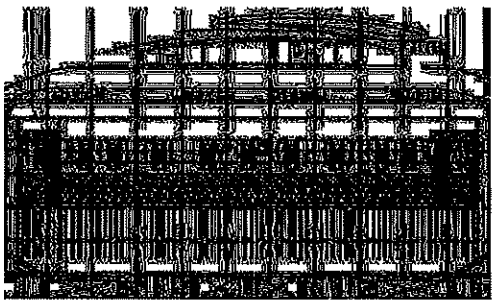
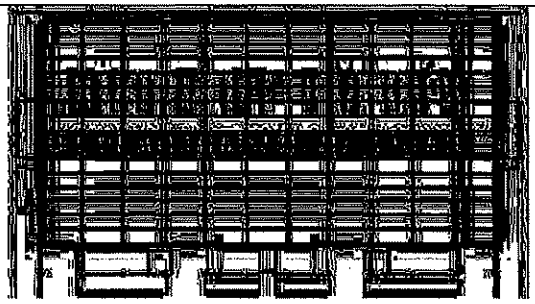
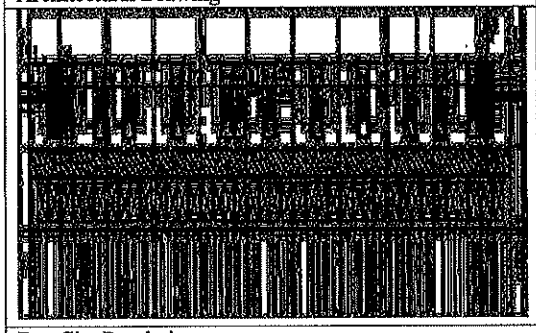
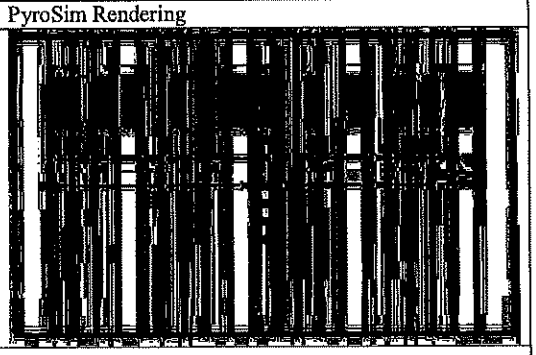
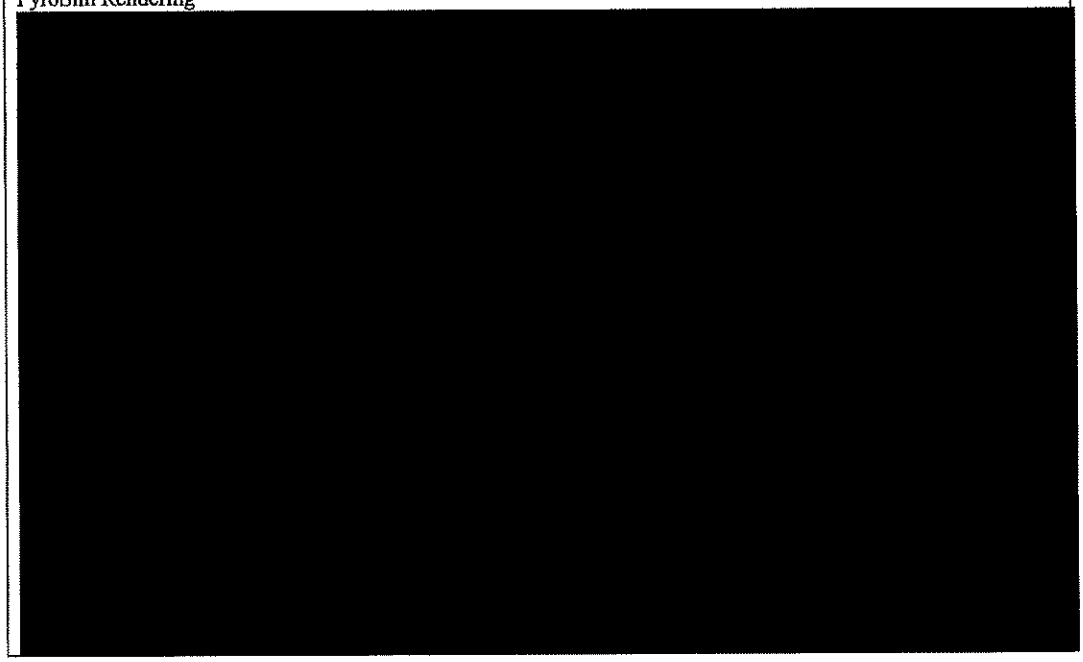
Architectural Drawing	PyroSim Rendering
	
PyroSim Rendering	
	

Table 8. Third floor comparison between the architectural and simulation drawings.

Architectural Drawing	PyroSim Rendering
	
PyroSim Rendering	
	

Results for the vehicle fire are reported at 1000 seconds as a representation of the fire is because it reflects the time shortly after the peak heat release rate is achieved. The results at this time provide a conservative estimation, and the temperature and visibility results past this time do not worsen.

Oil fire results at 90 seconds were determined to be the most visually conservative time as the temperatures and visibility conditions –from a life safety standpoint – are at their most dangerous at this time. It also shows the time at which the temperature and visibility values cease to deteriorate.

For the filter barrel scenario, the time chosen was 90 seconds for the same reasoning behind the oil fire. Also, the filter barrel fire plateaus and reaches a steady state at 30 seconds, and it was determined that an additional 60 seconds would provide a better visual as to the behavior of the fire. Additionally, it illustrates that the fire does not increase in severity as time transpires.

8.1 Thermal Results

8.1.1 Temperature Results

For the following temperature figures, areas in blue represent ambient temperature conditions at six feet above the floor and locations in black indicate locations where the smoke temperature exceeds the 140°F provision.

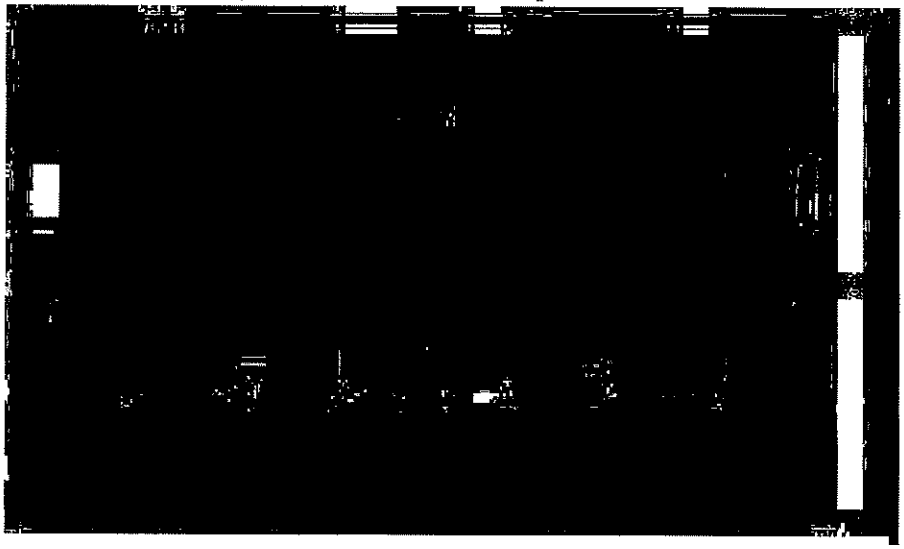


Figure 9. Smoke temperature illustration for the first floor vehicle fire simulation at 1000 seconds. Temperatures inside the oval meet or exceed 140°F.

Figure 10. Smoke temperature illustration for the third floor vehicle fire simulation at 1000 seconds. Temperatures inside the oval meet or exceed 140°F.

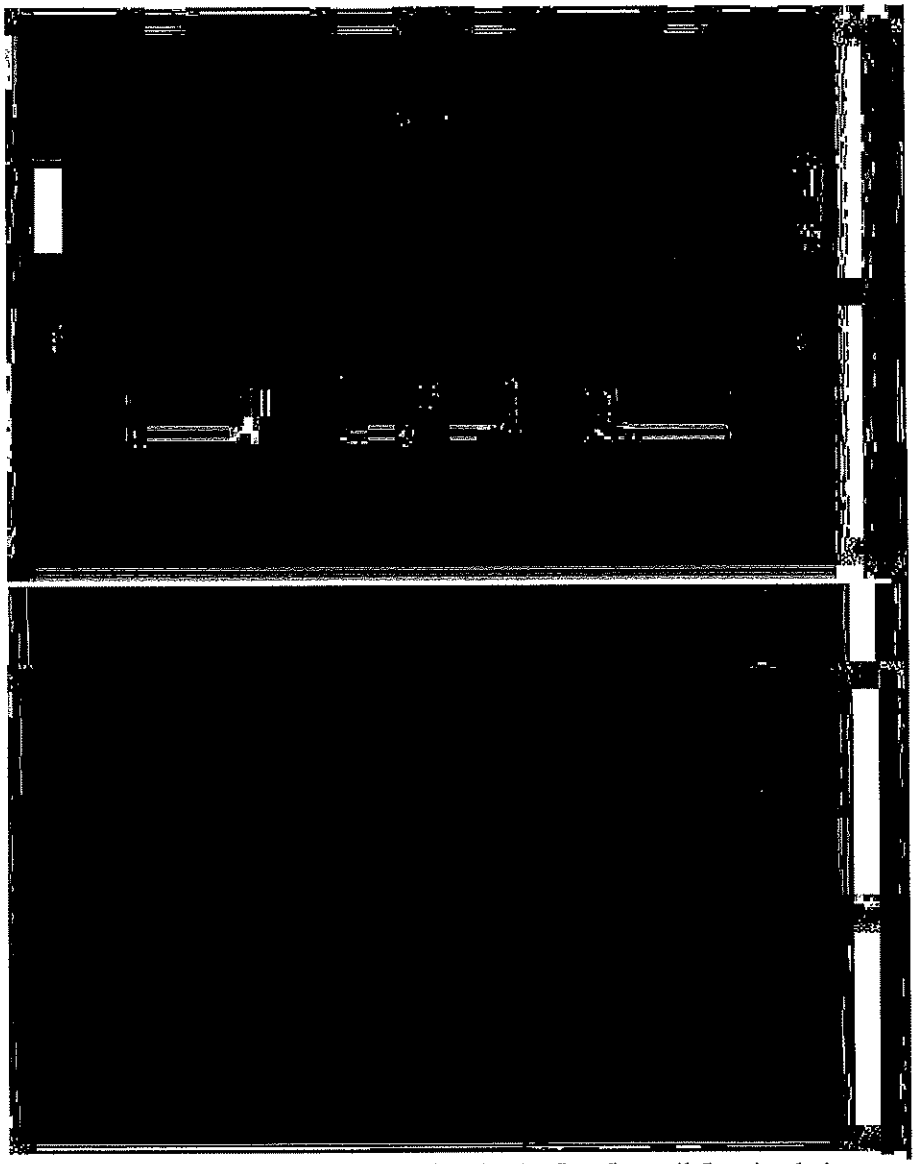


Figure 11. Smoke temperature illustration for the first floor oil fire simulation at 90 seconds. Temperatures inside the oval meet or exceed 140°F.

Figure 12. Smoke temperature illustration for the third floor oil fire simulation at 90 seconds. Temperatures inside the oval meet or exceed 140°F.

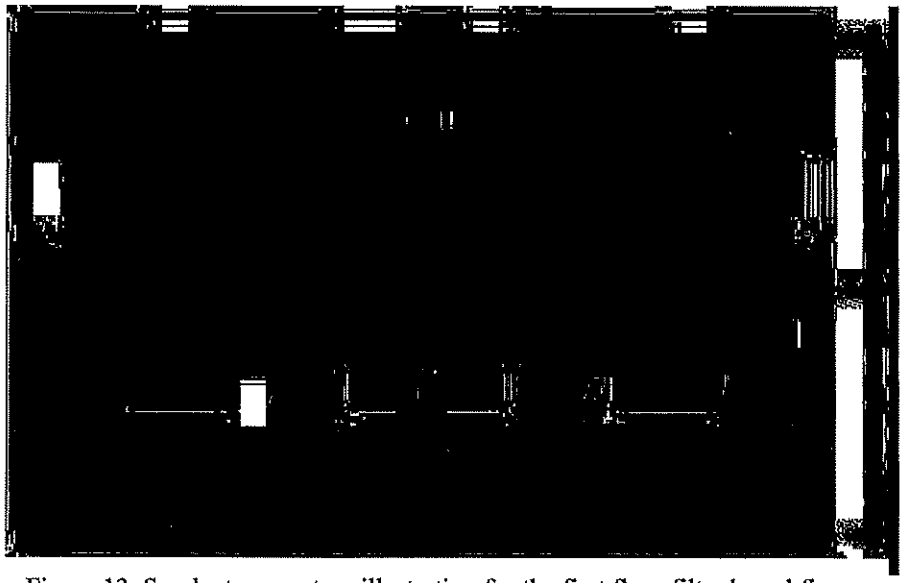


Figure 13. Smoke temperature illustration for the first floor filter barrel fire simulation at 90 seconds. Temperatures inside the oval meet or exceed 140°F.

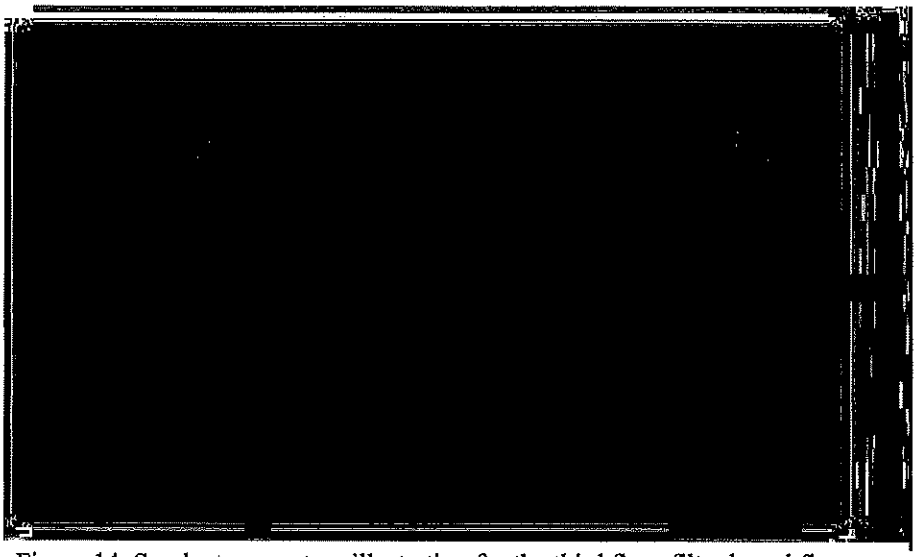


Figure 14. Smoke temperature illustration for the third floor filter barrel fire simulation at 90 seconds. Temperatures inside the oval meet or exceed 140°F.

The pictures indicate that the most problematic areas for occupants are located around the fuel source, which is typically expected for a liquid fuel fire as it is the area with the greatest generation of heat and smoke.

8.1.2 Heat Flux Results

The following figures highlight locations where smoke temperatures meet or exceed 350°F (180°C). The value is critical because it represents the temperature where thermal radiation from the smoke may develop heat flux values around 2.0 kW/m^2, which has the potential to injure occupants. Areas in black represent smoke temperatures at 350°F or greater and areas in blue correspond to ambient conditions. Note that the horizontal baseplate on each figure represents a distance 6 ft. from the floor, which is defined as the lowest allowable level of smoke descent.

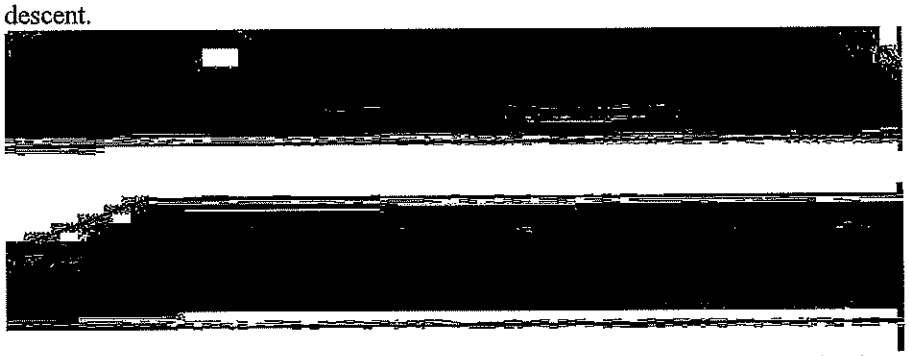


Figure 15. Smoke temperature illustration for the first floor vehicle fire at the time of maximum heat release rate. The top figure is a north-south view and the bottom is an east-west view.

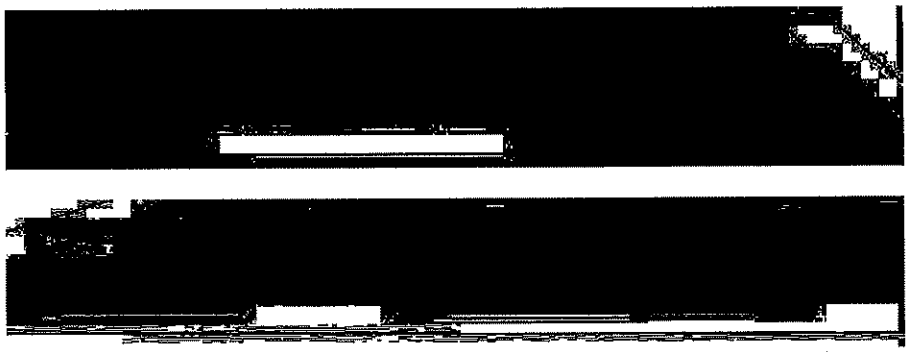


Figure 16. Smoke temperature illustration for the first floor oil spill fire at the time of maximum heat release rate. The top figure is a north-south view and the bottom is an east-west view.

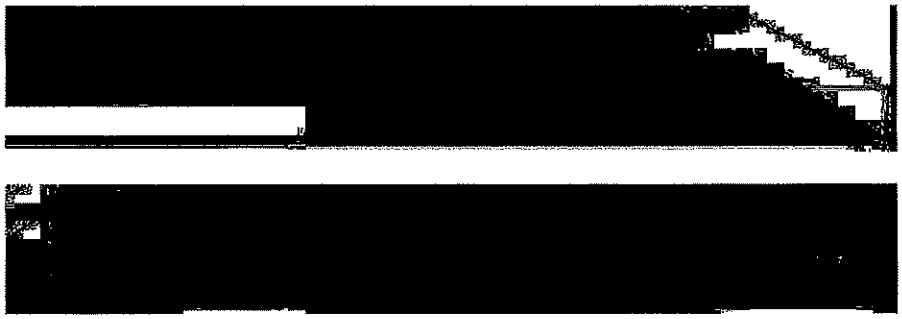


Figure 17. Smoke temperature illustration for the first floor filter barrel fire at the time of maximum heat release rate. The top figure is a north-south view and the bottom is an east-west view.

Figure 18. Smoke temperature illustration for the third floor vehicle fire at the time of maximum heat release rate. The top figure is a north-south view and the bottom is an east-west view.

Figure 19. Smoke temperature illustration for the third floor oil spill fire at the time of maximum heat release rate. The top figure is a north-south view and the bottom is an east-west view.

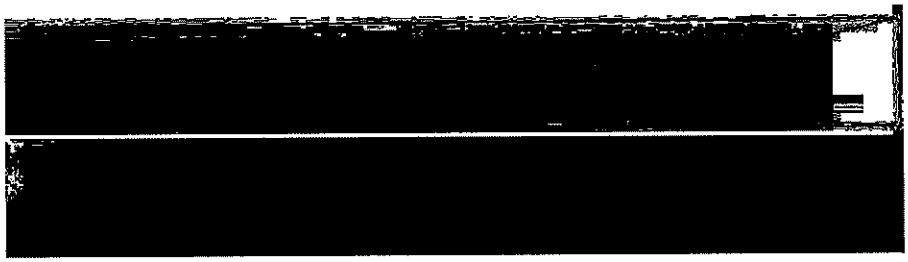


Figure 20. Smoke temperature illustration for the third floor filter barrel fire at the time of maximum heat release rate. The top figure is a north-south view and the bottom is an east-west view.

As shown in the above figures, the only areas where smoke temperature values exceed the 350°F threshold is in and around the fire. This means that occupants will not be exposed to heat flux values in excess of 2 kW/m^2, which complies with the provisions set forth in the SFPE Handbook.

Further review of the results (see Appendix C) indicates that the smoke layer is generally above 6 ft. as indicated by the blue baseplate, and maintains this height for the entirety of the simulation. Thus, tenability is maintained throughout the QTA (except in the immediate vicinity of a fire) for the full duration of the fire event.

8.2 Visibility Results

The following figures illustrate areas where limited visibility may cause egress issues at six feet above the floor. Locations in black represent areas where sightlines are reduced to 13 feet, the minimum distance from which occupants that were familiar with the space could escape.

In the subsequent figures, areas in blue represent unobstructed view conditions and locations in black indicate locations where the visibility is reduced to 13 feet.

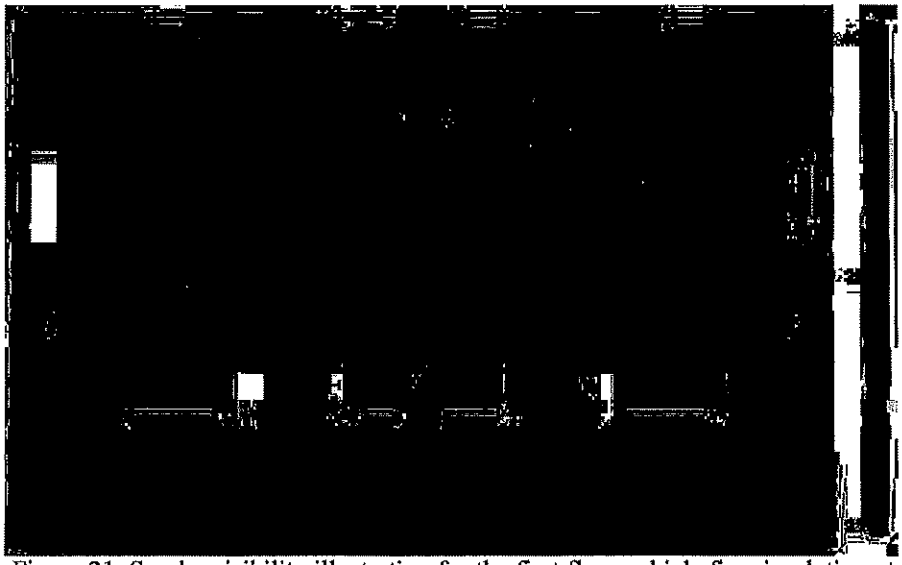


Figure 21. Smoke visibility illustration for the first floor vehicle fire simulation at 1000 seconds. Visibility inside the ovals is 13 feet or less.

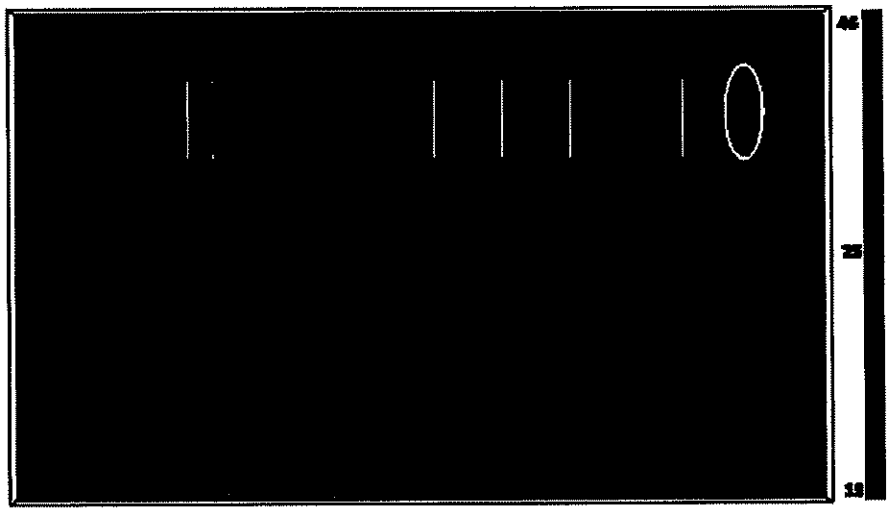


Figure 22. Smoke visibility illustration for the third floor vehicle fire simulation at 1000 seconds. Visibility inside the oval is 13 feet or less.

Figure 23. Smoke visibility illustration for the first floor oil fire simulation at 90 seconds. Visibility inside the ovals is 13 feet or less.

Figure 24. Smoke visibility illustration for the third floor oil fire simulation at 90 seconds. Visibility inside the oval is 13 feet or less.

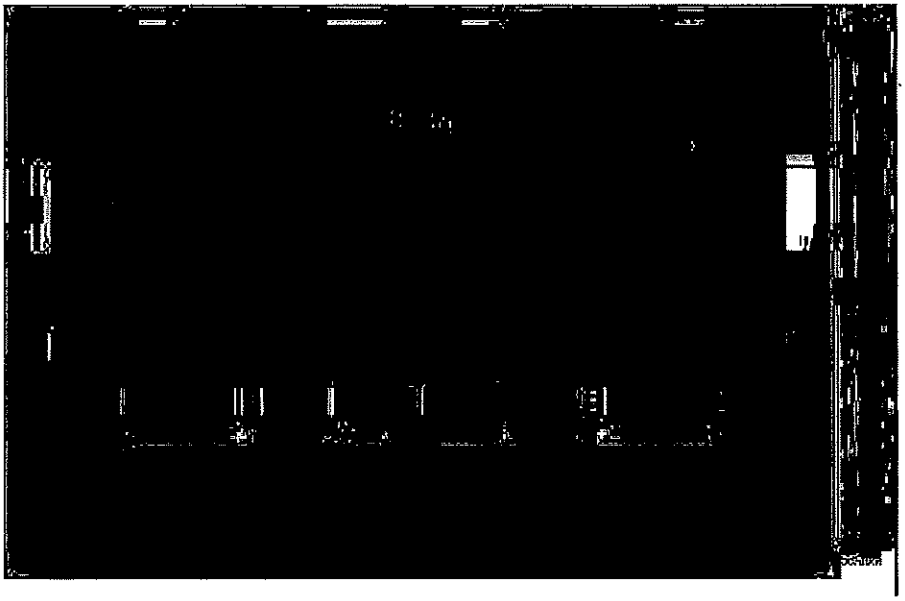


Figure 25. Smoke visibility illustration for the first floor filter barrel fire simulation at 90 seconds. Visibility inside the oval is 13 feet or less.

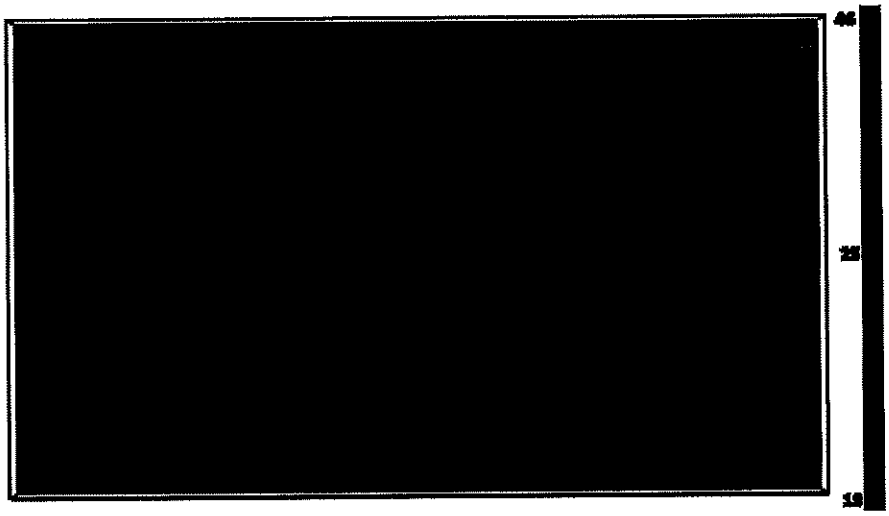


Figure 26. Smoke visibility illustration for the third floor filter barrel fire simulation at 90 seconds. Visibility inside the oval is 13 feet or less.

As was the case with the temperature illustrations, the areas of most concern with respect to the occupants' ability to egress are around the fire.

For both temperature and visibility analyses, the third floor results are considerably less severe in regard to occupant egress. This is because the ceiling height of the third level is much greater than that of the first level, meaning that the smoke has more volume to fill before reaching the 6-ft layer provision defined in NFPA 101.

8.3 Comparison to Evacuation Times

The STEPS evacuation modeling resulted in an estimated maximum per-floor movement time of approximately 107 seconds. This time, in conjunction with a maximum 6-minute detection time and a maximum 3-minute pre-movement time assumption, yields a maximum estimated evacuation time of 647 seconds for the top floor level of the QTA. The lower floors are estimated to require no more than 542 seconds. At this time, all occupants have either entered an enclosed stair or passed through a horizontal exit.

The FDS analyses indicate that QTA occupants would be provided with sufficient time to safely evacuate the building even if the suppression systems fail. In fact given the upper layer reaches steady state, occupants should have more than two times the time necessary to evacuate.

8.4 Comparison to Vehicle Fueling Scenarios

The results were also compared to results from the 45 MW gasoline pool fire at each fueling station. We have included sample temperature results in Figure 27

below, which is the temperature prediction at 6 feet above the floor a7 270 seconds.

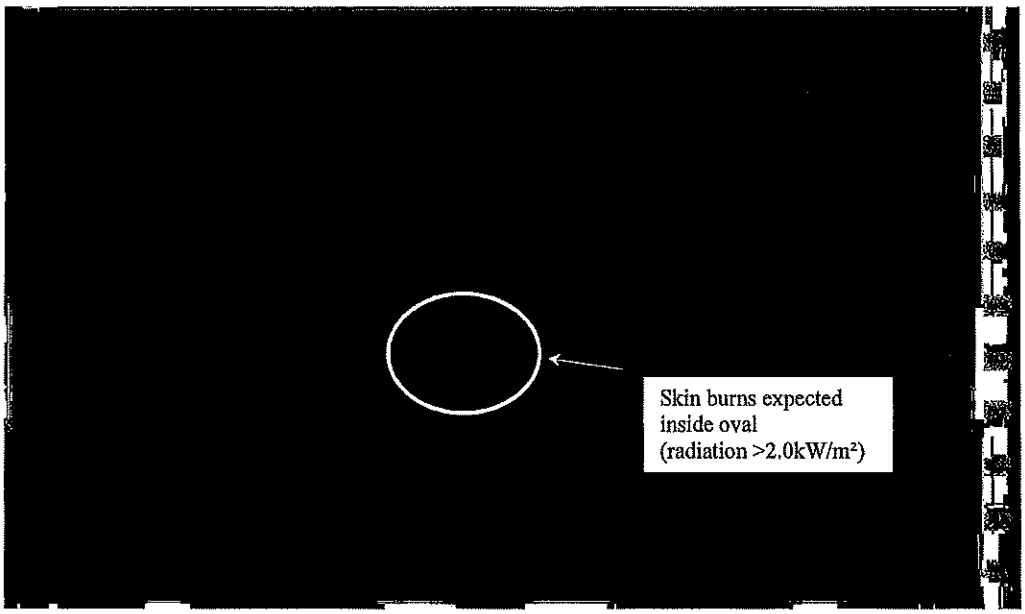


Figure 27. Temperatures at 6 feet above floor at 270 seconds for Gasoline Refueling Fire (Taken from Figure 6 in Miami Intermodal Center – Rental Car Facility QTA Fire/Smoke Migration and Evacuation Analysis, July 2006 for additional information)

9 Critical Design Assumptions

In the development of the assessment, we have made the following assumptions. This list will be expanded as the assessment progresses.

- For each scenario, it is assumed ignition occurs at the maximum spill size.
- A large gasoline spill fire is not assumed to occur within the oil change bay. However, a potential fire scenario involving gasoline is included within the vehicle fire heat release. This assumes no gas tank rupture.
- We have assumed that the systems and features listed and described within the Basis of design are installed and maintained. These are critical systems and need to be serviceable during operations.
- While the assessment does not rely upon suppression systems, these systems are critical and need to remain in service to allow any motor oil changing within the QTA.
- We have assumed that all features of the new motor oil operations will meet all applicable codes and standards.
- Security measures should be considered to prevent any unauthorized access to the Quick Turnaround Facility (QTA). Security means such as ID cards or badges to identify QTA personnel and visitors and provisions for visitor check-in should be considered.
- We have assumed that parking will be limited to designated parking, queuing, and service areas. Tenants must be informed of these limitations and the facility operators must ensure that this operation practice is being followed.
- As discussed in our Performance-Based Fire Protection Report and in our letter to Gary Dunn of FDOT dated April 20, 2010 regarding training, operations, and maintenance procedures, a twenty (20) foot wide clear zone on the east and west sides of the service island/containment basin areas is required to be maintained at all times. Parking and queuing of cars in the twenty (20) foot clear zones is not permitted. Tenants must be informed of these limitations and the facility operators must ensure that this operation practice is being followed.
- No smoking policy must be strictly enforced.

10 Summary

A performance assessment has been completed to review motor oil operations within the consolidated Rental Car Facility at the Miami International Airport Intermodal Center.

Design fire scenarios were developed through a qualitative risk assessment outlined in Miami Intermodal Center – Proposed New Equipment Rooms and Maintenance Bays drawings by Dematteí Wong Architecture (dated November 11, 2012). Based upon this risk assessment, heat release rate curves were developed for each scenario. These heat release rates were used as the basis for FDS an assessment of smoke and heat movement throughout the QTA. Note that the heat release rate assumptions do not account for suppression by the dual overlapping foam systems.

The smoke and heat movement assessments were compared to evacuation times listed within Earth Tech - Miami International Airport - Consolidated Rental Car Facility, Life Safety Evaluation Report, Revision C (February 2011). This comparison indicates that the motor oil operations are less hazardous than the vehicle refueling operations. Further, based upon natural ventilation within the building, smoke passively vents to the exterior and allows a tenable egress path without active systems, based upon the predicted temperatures and visibilities. Therefore, predicted evacuation times are less relevant and occupants not intimate with the fire should not be in immediate danger.

Arup makes all reasonable efforts to incorporate practical fire protection concepts into its advice. The extent to which this advice is carried out affects the probability of safety. It should be recognized, however, that life safety evaluations are not based on exact science. No amount of advice can, therefore, guarantee freedom from injury, death or damage.

Appendix A

Code Analysis

Contents

No table of contents entries found.

1 Code Analysis

The following presents the concept level code assessment of the proposed oil changing operations.

This assessment is limited to fire and life safety. Accessibility is beyond the scope of this report.

1.1 Codes and Standards

The MIA QTA was originally constructed under the South Florida Building Code.

The following codes and standards apply to the alterations of and additions to the MIA QTA.

- Florida State Building Code (2010 edition) which adopts and amends the 2009 edition of the International Building Code
- Florida State Building Code – Existing Building (2010 edition) which adopts and amends the 2009 edition of the International Existing Building Code
- Florida Fire Prevention Code (2010 edition) which adopts and amends the 2009 editions of NFPA 1, Fire Code and NFPA 101, Life Safety Code

Other codes such as the Florida Mechanical, Plumbing, Electrical Codes apply but are outside the scope of this report.

2 Existing Building Code

The Existing Building Code allows the owner to choose from three approaches to modifying an existing building. They are Prescriptive, Level of Work and Performance methods.

> Note: In the context of the Existing Building Code, the performance method is significantly different than the performance approach taken for the QTA fueling. The Existing Building Code performance method uses a scoring approach, rather than performance-based fire protection engineering methods outlined in the Life Safety Code.

Based on the fact the performance-based approach serves as the basis for approval of the existing building, the prescriptive method is the method best suited for the motor oil operations alterations and additions.

The prescriptive method can only be used when alterations or additions to the existing building result in a situation that is no less conforming with the provisions of the Florida Building Code than the existing building was prior to the alterations. The Prescriptive approach requires all new or modified systems and

building components, and additions, to comply with the requirements of the Florida Building Code for new construction.

The existing building was designed on a performance-based fire engineering approach. All of the new systems will comply with the code for new construction, therefore, the modified building will need to be no less conforming to the requirements of the Florida Building Code than the existing building.

The proposed motor oil changing operations requires a review of the proposed systems for the goals and objectives of the performance-based fire engineering approach. This review is detailed within the report.

The new ground floor motor oil storage spaces will be treated as an addition to the existing building complying with the prescriptive method.

3 Prescriptive Code Summary

3.1 Occupancy

The QTA facility was designed as a Hazardous Occupancy (Group E, Division 2) under the South Florida Building Code and a High Hazard Industrial Occupancy per the Life Safety Code.

Motor Oil

As noted in this report, motor oils are classified as Type IIIB combustible liquids.

The Florida State Building Code general limits for storage and use of Class IIIB liquids are: 13,200 gallons in closed systems, 3,300 gallons in open systems, and 13,200 gallons in storage. These amounts are not limited within buildings fully protected with automatic sprinklers (FBC Table 307.1(1) Note f).

The refueling areas of the QTA is protected with foam – water sprinklers. The remainder of the facility is fully protected with sprinklers. The addition will also be fully sprinkler protected. The motor oil quantities would not be limited within the building per the prescriptive code.

Alteration

The proposed oil changing operation can be considered a motor vehicle repair garage. Motor vehicle repair garages are classified as Moderate Hazard Storage, S-1 under the Florida State Building Code, in occupancies with hazardous material quantities under the exempt quantities. Since this is part of the larger High Hazard Industrial occupancy, the oil changing operations will be incorporated into the overall classification.

Addition

The addition contains oil storage under the exempt quantities. The addition will be classified as Moderate Hazard Storage, S-1 under the Florida State Building Code, and will be separated from the QTA.

3.2 Structural Protection

The Alteration will not affect the existing building structural frame fire ratings.

The existing approved roof on the third floor is primarily non-rated, except the bay over the refueling islands. See *Miami Intermodal Center – Quick Turn-Around Facility, Analysis of Fire Exposure to level 3 Roof,* dated May 2009 for more details on QTA roof protection.

Since the roof on the third floor over the oil changing bays is not fire rated, a two hour fire rated lid will be provided over the third floor oil changing bays. This approach is consistent with the existing 2 hour fire rated only provided over the refueling bays.

The existing structural frame is 4 hour fire rated construction (SFBC Sections 1002.1 and 1202.1). The addition will follow SFBC Type 1 construction with 4 hour primary structure and bearing walls. The roofs of the new and oil storage additions will be 2 hour fire rated.

3.3 Fire Rated Separations

Fire rated separations are not required between the new oil changing operations and the other operations within the building.

Piping in the vertical shafts associated with the transport of the new oil and used oil to and from the holding tanks is required to be separated by 2 hour rated construction from adjacent spaces. These will be located in the existing 4 hour chases. (Base building permit)

The oil changing bays on the third floor will be provided with a 2 hour fire rated lid.

The new ground floor addition will be separated from the remainder of the QTA by a minimum distance of 15 feet. Since this addition is treated as part of the overall facility, the wall facing the QTA will be treated as a 2 hour fire rated occupancy separation. (508.4)

Fire-rated assemblies will be required at all penetrations to rated wall, floor and ceiling assemblies. (713)

3.4 Means of Egress

The egress provisions for a hazardous occupancy, as detailed in NFPA 101 and the Florida Building Code, apply to the oil changing operation. There are no changes in the egress provisions for the space. Fire Code required egress provisions are summarized in the NFPA 101 section below.

FSBC limits travel distance to 100 feet. (10.14.3)As part of the performance analysis, the travel distance as approved was allowed to be approximately 205 feet to the nearest exit. Travel distances will not be revised by the oil changing operation renovations.

The addition will be treated as a separated occupancy and will meet the FSBC and NFPA 101 requirements.

- Travel distances: 400 feet
- Common paths of travel: 100 feet

3.5 Fire Detection and Notification

The fire alarm and emergency voice alarm systems will be revised within the oil changing bays to match the new layout and extended into the additions.

Detection will be provided within the oil changing bays as part of the foam water deluge suppression system. This will include heat detection through the oil changing bays and foam water manual pull stations. Manual pull stations are required to use colors and signage to match the existing systems and are required to be in locations approved by the Miami-Dade Fire Department.

No detection will be provided for the new additions. Water flow indicating devices will be connected to the fire alarm and notification system.

The emergency voice alarm and visual annunciation systems will be revised within the oil changing bays and extended into the additions. The emergency voice alarm and visual annunciation systems will be provided through each oil changing bay and in the addition.

3.6 Fire Suppression

The existing building is provided with an automatic sprinkler system in the areas proposed for the oil changing operations. The existing sprinkler system is designed based on the provisions of an Ordinary Hazard, Group 2.

The new oil changing bays require suppression. These areas will be provided with new dual overlapping foam water deluge fire suppression systems complying with NFPA 16. The foam water system will be supervised by the fire alarm and notification system. The foam will be required to be located outside the protected area.

The additions require fire sprinkler protection. The existing sprinkler system will be extended into the additions. The additions will be provided with a separately zoned and annunciated Ordinary Hazard, Group 2 sprinkler protection design in accordance with the provisions of NFPA 13. Valves will be supervised by the fire alarm and notification system.

Standpipes will be required for the addition in accordance with NFPA 14.

Portable fire extinguisher will be required for both the new oil changing operations and the addition, in accordance with NFPA 1 and NFPA 10.

3.7 Emergency Lighting and Power

Emergency egress lighting with emergency power backup is required. The emergency lighting system will provided for the new oil changing bays and extended into the additions.

3.8 Smoke Control

No changes are required to the smoke control.

3.9 Elevators

No changes are required to elevators.

3.10 Acceptance Testing

The design build construction team will coordinate acceptance testing with the Miami-Dade Building and Fire Departments

4 NFPA 1

NFPA 1 addressed repair garages in Chapter 30.

Chapter 30 requires motor vehicle repair garages to comply with the provisions of NFPA 30A, *Motor Fuel Dispensing Facilities and Repair Garages.*(30.2.1)

Occupancy

NFPA 1 classifies oil changing as a motor vehicle repair garage. A motor vehicle repair garage is considered a special purpose industrial occupancy as defined by NFPA 101. (30.2.2)

Based on the performance based design; the occupancy was originally treated as a high hazard industrial occupancy and will continue to be treated as such.

Egress

The means of egress, except for existing travel distances, will meet all applicable requirements for high hazard industrial occupancies, as set forth in NFPA 101. Travel distances have been approved as part of the performance-based approach.

The floor assembly in the area used for servicing of vehicles are required to be constructed of noncombustible, liquid-tight materials and sloped to drains, if provided. (30.2.5 & 30.2.5.1)

Sources of Ignition

Smoking is not allowed within the building. (Base building permit)

Fire Extinguishers

Fire extinguishers are required for the oil changing bays. (30.3.2.2)

Waste Handling

Waste handling is required to be in accordance with NFPA 30A. (30.3.3)

Housekeeping

Areas within any dike shall be kept free of debris and other material not necessary for operations. (30.3.4)

5 NFPA 101

Occupancy

The base building treats the QTA as a high hazard industrial occupancy provisions. The design has separated the addition to create a separate moderate hazard occupancy.

Egress

The oil changing operations and addition require clear access to exits.

Based on the performance analysis, the travel distance as approved is approximately 205 feet. (Base building)

There are no other egress provisions that apply to the proposed oil changing operation.

6 NFPA 30A

The majority of NFPA 30A addresses fuel dispensing operations and associated equipment. NFPA 30A requirements for the oil changing operation are addressed under the repair garage provisions.

Occupancy

NFPA 30A defines repair garages as special purpose industrial occupancy, per NFPA 101.

Egress

Egress is required to meet NFPA for special industrial occupancies

Drainage

There are no code provisions to provide drains as opposed to a local collection system for the oil changing operation. The tanks are located within the building will be double walled for containment. (4.3.9.3)

Storage

Class IIIB liquids are allowed to be stored in and dispensed from tanks that meet the requirements of Chapter 9 and Chapters 21 through 23 of NFPA 30, *Flammable and Combustible Liquids Code*, as applicable. Tanks will need to meet NFPA 30 spacing and suppression requriements.

Fire Hydrants

The existing fire hydrant locations will need to be reviewed the Miami-Dade Fire Department for the new use.

Piping

The design and installation of the piping system shall meet the requirements of Chapter 27 of NFPA 30, *Flammable and Combustible Liquids Code*. (5.2.1) In addition, piping is required to be installed in accordance with the manufacturers' installation instructions. The majority of NFPA 30 requirements related to piping are associated with materials and methods of installation and are outlined in the NFPA 30, Chapter 27.

Piping is required to be located so that it is protected from physical damage.

All piping inside buildings must be enclosed within a horizontal chase or a vertical shaft used only for piping. Vertical shafts and horizontal chases are required to be constructed of materials having a fire resistance rating of not less than 2 hours.

Shutoff and check valves are required to be equipped with pressure-relieving device to address thermal expansion of the liquid.

7 NFPA 30

The NFPA 30 requirements below are those from Chapters 9, 21, 22, 24 and 27 that have not been superseded by the provisions of NFPA 30A. The majority of the provisions in these NFPA 30 chapters relate to materials, design parameters or testing of assemblies.

Storage Building

The storage building is required to be located 5 feet from any public way and the nearest important building on the same property.(Table 24.4.2) The storage building shall be of at least 2-hour fire resistance rated construction.(24.5.2) The storage tank building shall be accessible from at least two sides for firefighting. (24.4.8)

Tanks

Tanks in buildings are required to be separated from each other and from the building walls and roof by not less than 3 feet. (24.5.6) Each tank within the building is required to be accessible from at least two sides. (24.4.8)

Tanks are required to be protected against flooding when either empty or full. (22.5.2.5)

Pipes

Provisions in NFPA 30 relative to piping are material and system design related.

Valves

Piping systems are required to provide valves to operate the system properly and to isolate the equipment in the event of an emergency. (27.6.6.1)

Appendix B

Detailed Calculations

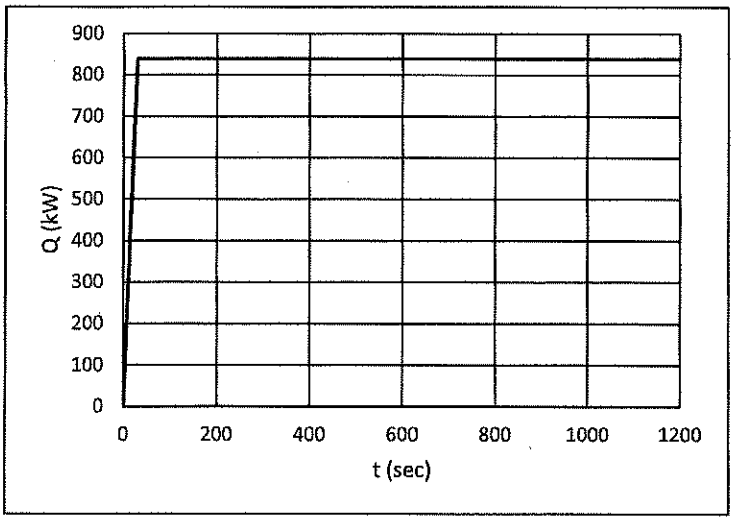
Volume	[redacted]	m^3
Area		m^2
Depth	0.44	m
D	1.13	m

$Q = m"\Delta H_c x_{chem} \pi D^2/4$ Equation 7.4.1 [1]

$m" = m''_\infty \left(1 - e^{-k'D}\right)$ Equation 7.4.2 [1]

Transformer Oil [1]

m''_∞	39	g/m^2-s
ΔH_c	46.4	kJ/g
k'	0.7	m^-1
ρ	0.76	g/cm^3
xchem	0.84	
xc	0.56	
xr	0.28	



t (sec)	Q (kW)	m (kg)	
0	0	[redacted]	58 gal
30	839	166	
60	839	165	
90	839	164	
120	839	163	
150	839	162	
180	839	161	
210	839	160	
240	839	159	
270	839	158	
300	839	157	
330	839	156	
360	839	155	
390	839	154	
420	839	153	
450	839	152	
480	839	151	
510	839	150	
540	839	149	
570	839	148	
600	839	147	
630	839	146	
660	839	145	
690	839	144	
720	839	143	
750	839	142	
780	839	141	
810	839	140	
840	839	139	
870	839	138	
900	839	137	
930	839	136	
960	839	135	
990	839	134	
1020	839	133	
1050	839	132	
1080	839	131	
1110	839	130	
1140	839	129	
1170	839	128	
1200	839	127	

References

[1] Zalosh, Industrial Fire Protection Engineering

ARUP

232911-00/MD MIA RCC Oil Change Fires -- 25 gal Oil Spill

22 December 2014

Volume 0.095 m^3
[redacted] gal

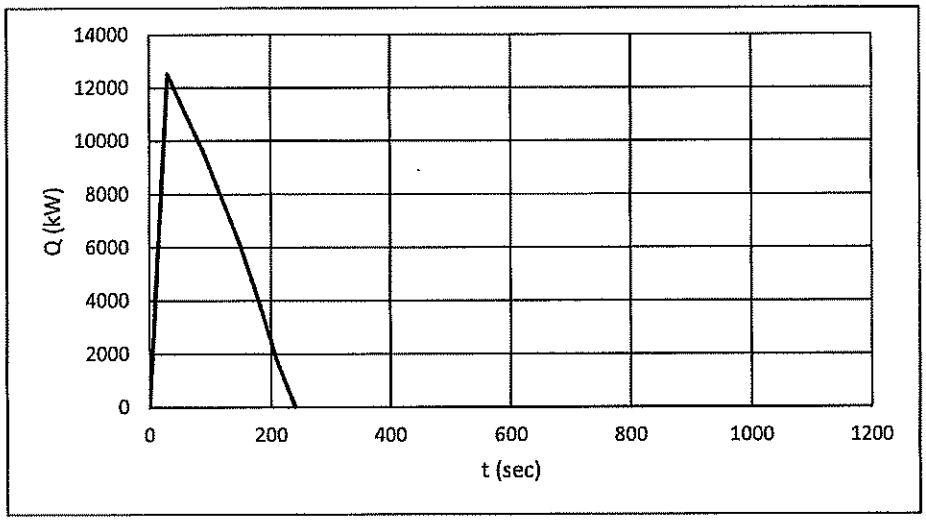
V	0.095 m^3
h	31.388 mm
A	9079664 mm^2
V (check)	0.095 m^3

$Q = m''\Delta H_c x_{chem} \pi D^2/4$ Equation 7.4.1 [1]

$m'' = m''_\infty\left(1 - e^{-k'D}\right)$ Equation 7.4.2 [1]

Transformer Oil [1]	
m''_∞	39 g/m^2-s
ΔH_c	46.4 kJ/g
k'	0.7 m^-1
ρ	0.76 g/cm^3
xchem	0.84
xc	0.56
xr	0.28

t (sec)	V (m^3)	h (mm)	A (m^2)	Q (kW)	m (kg)
0	0.095	31.388	9.08	0	[redacted]
30	0.095	31.388	9.08	12525	72
60	0.08	29.641	8.097	11008	61
90	0.066	27.8	7.122	9511	50
120	0.051	25.51	5.997	7798	39
150	0.037	22.922	4.842	6066	28
180	0.022	19.275	3.424	3998	17
210	0.008	13.758	1.744	1717	6
240	-0.007	-13.159	1.596	0	-5

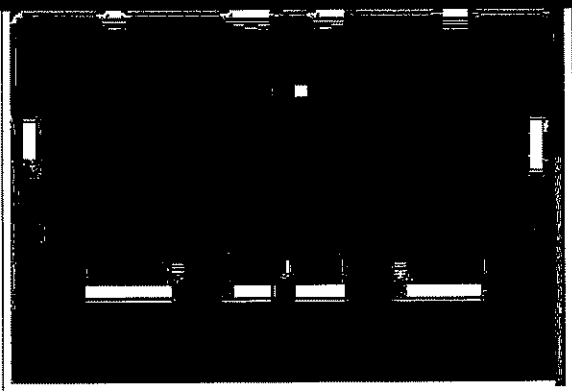
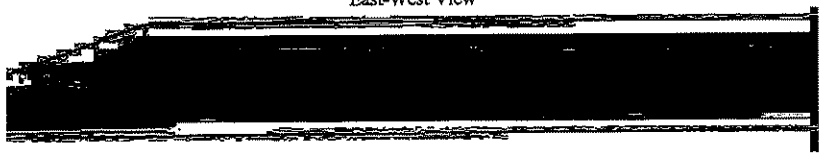
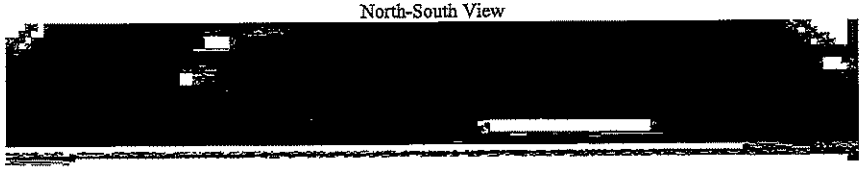
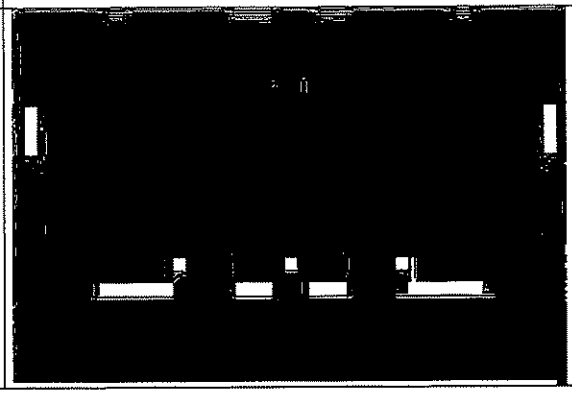
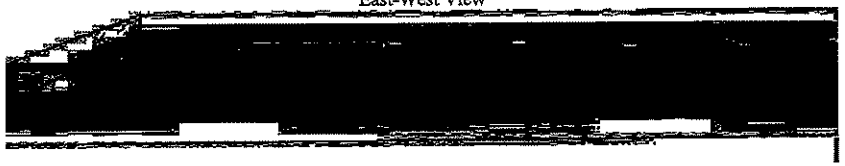
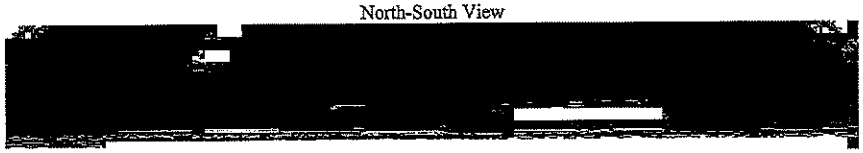


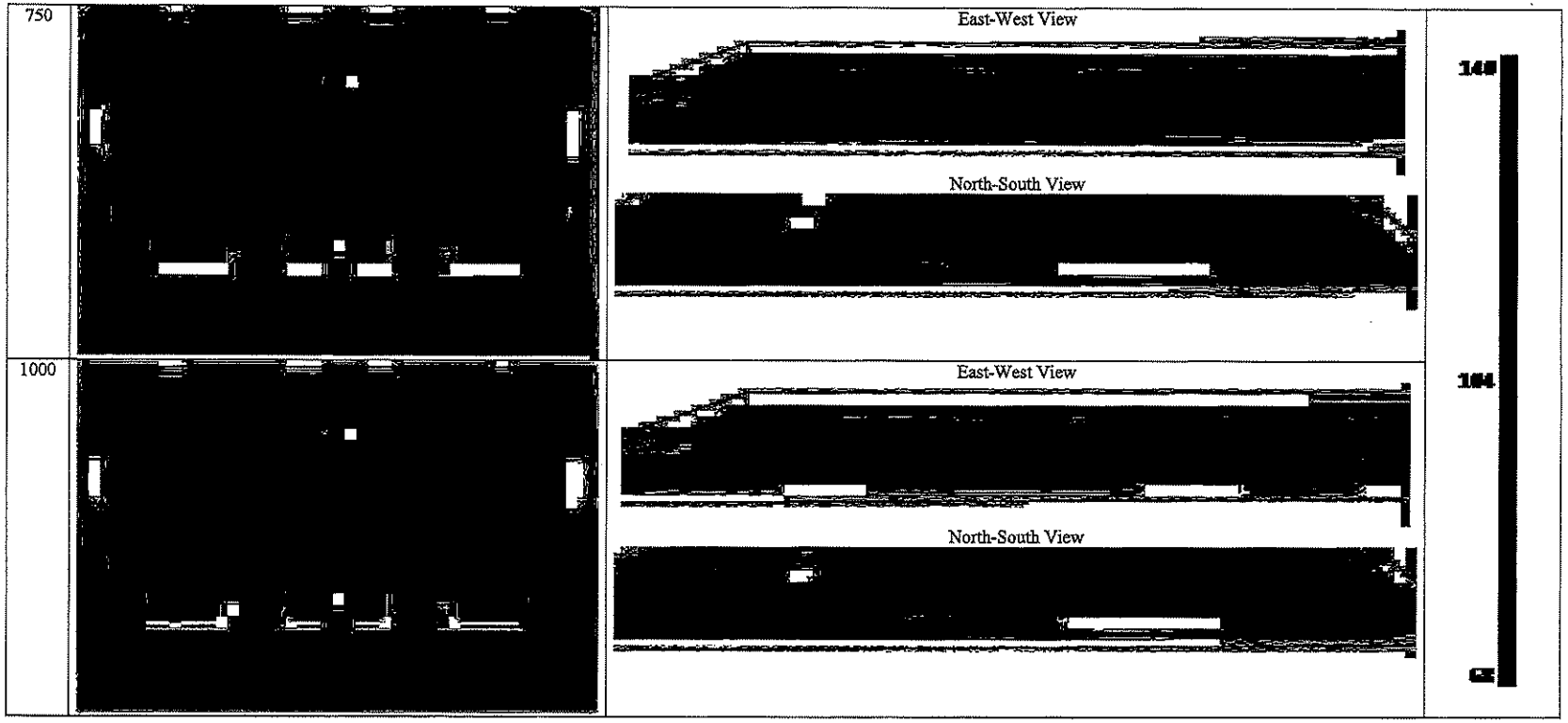
References

[1] Zalosh, Industrial Fire Protection Engineering

Appendix C

CFD Modeling Results

250		East-West View  North-South View 	148 184
500		East-West View  North-South View 	0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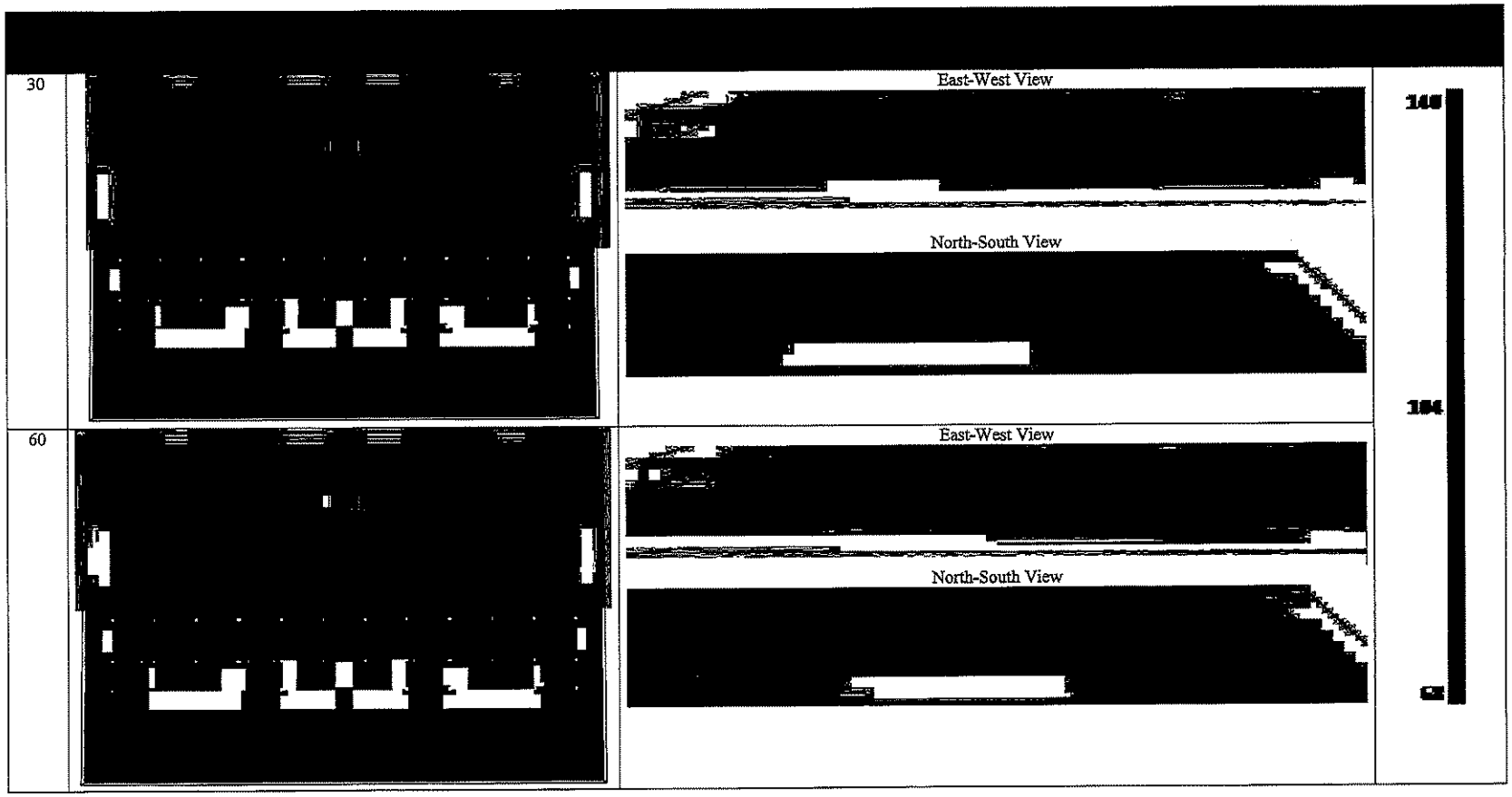
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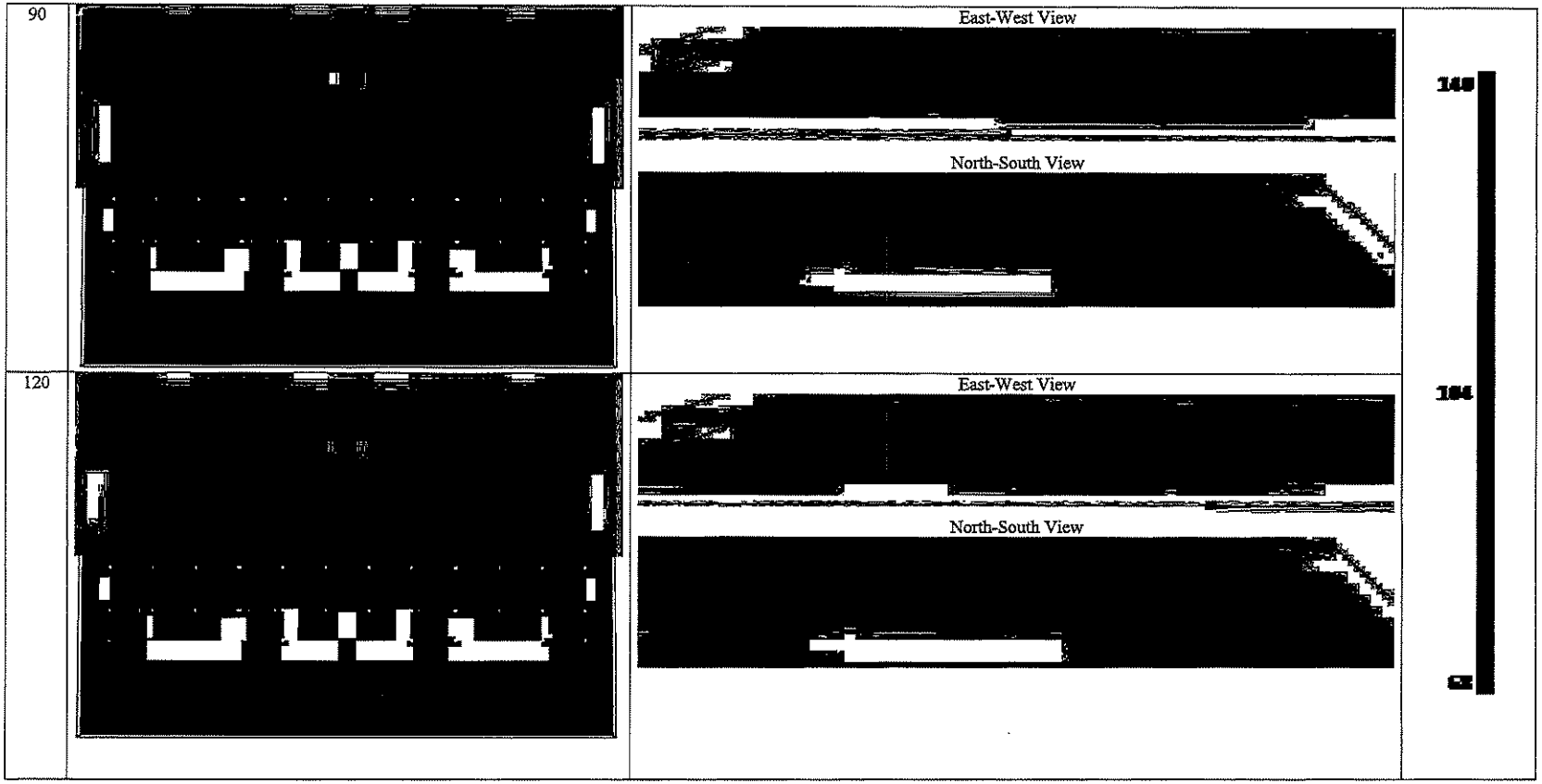
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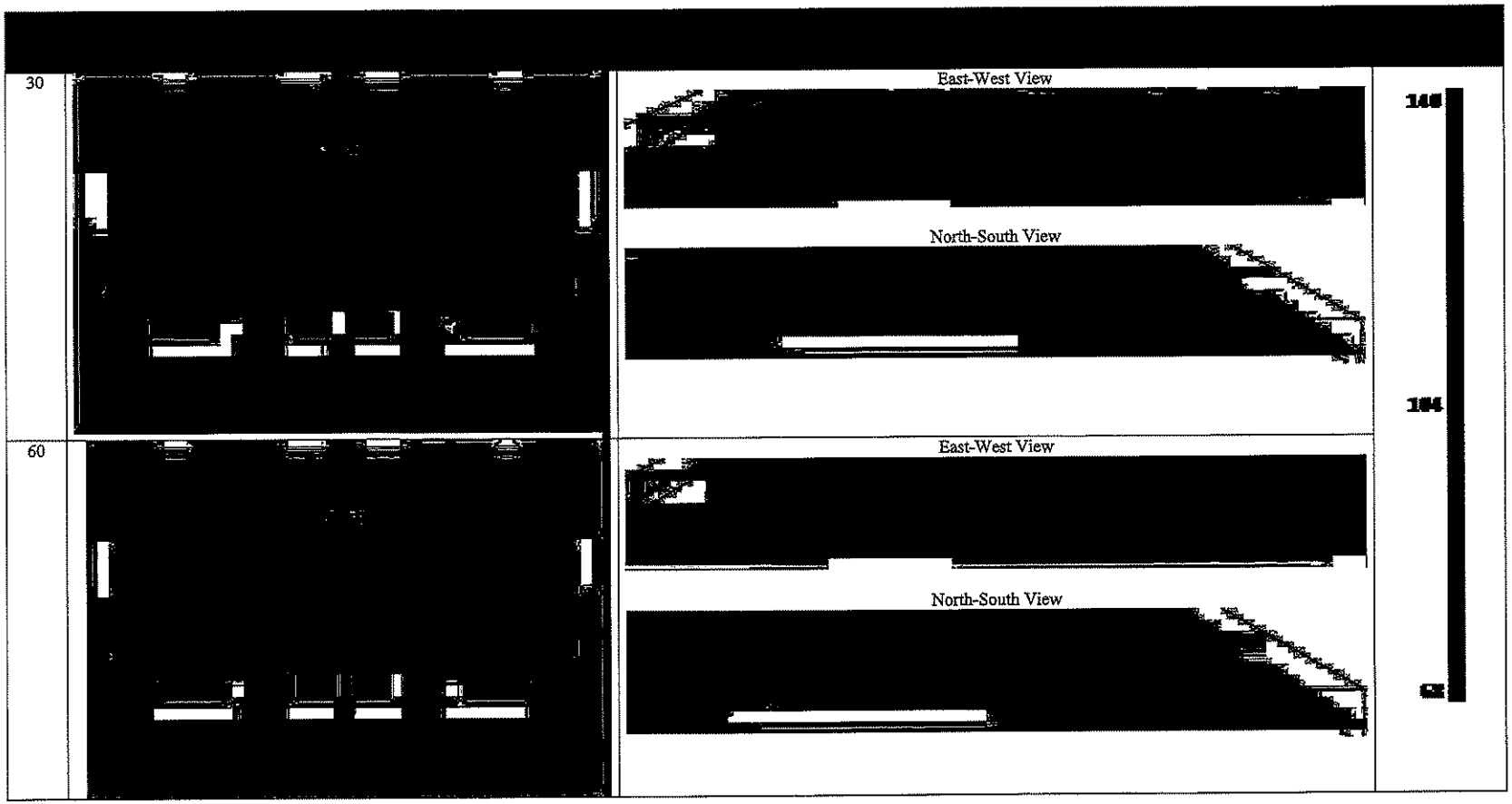
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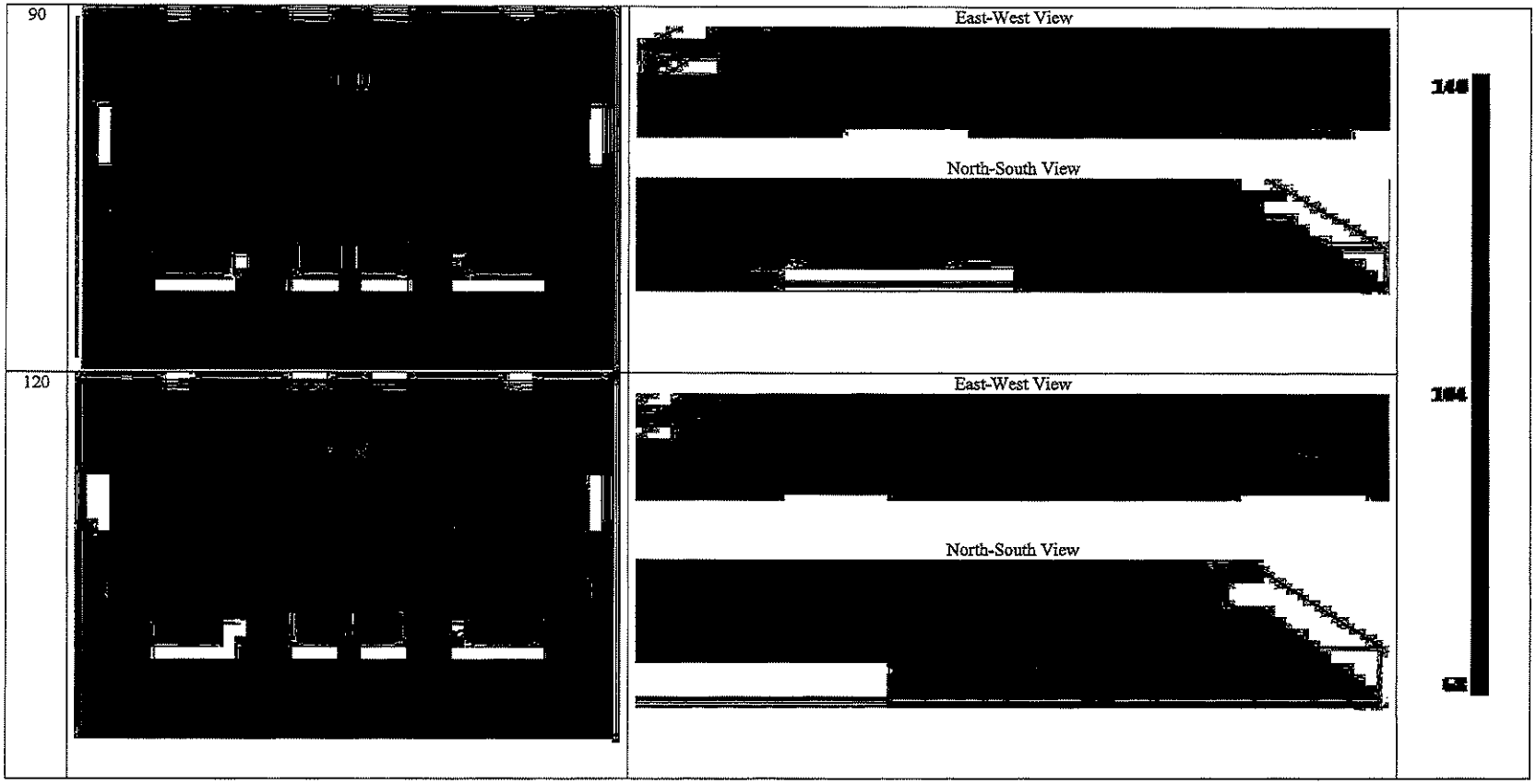
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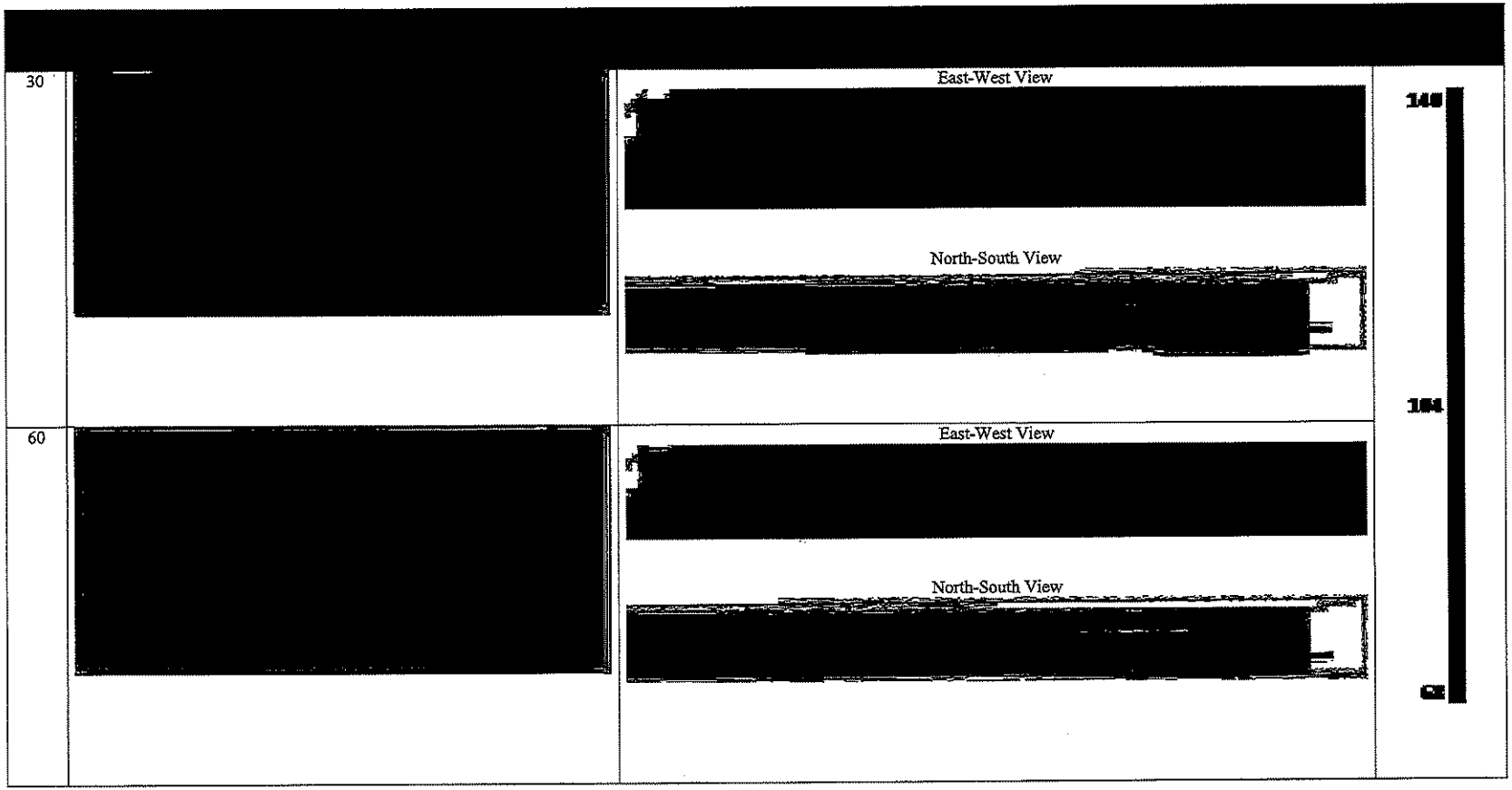
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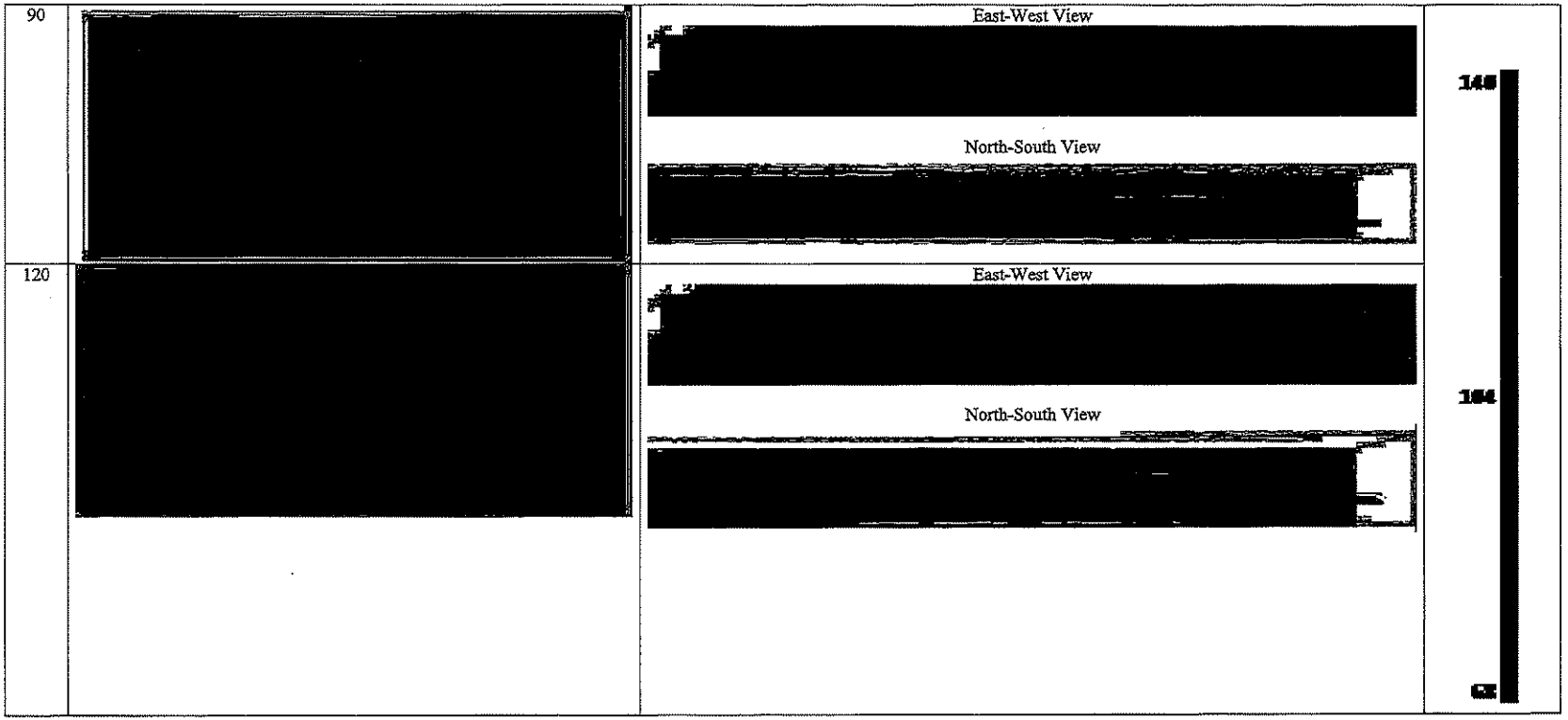
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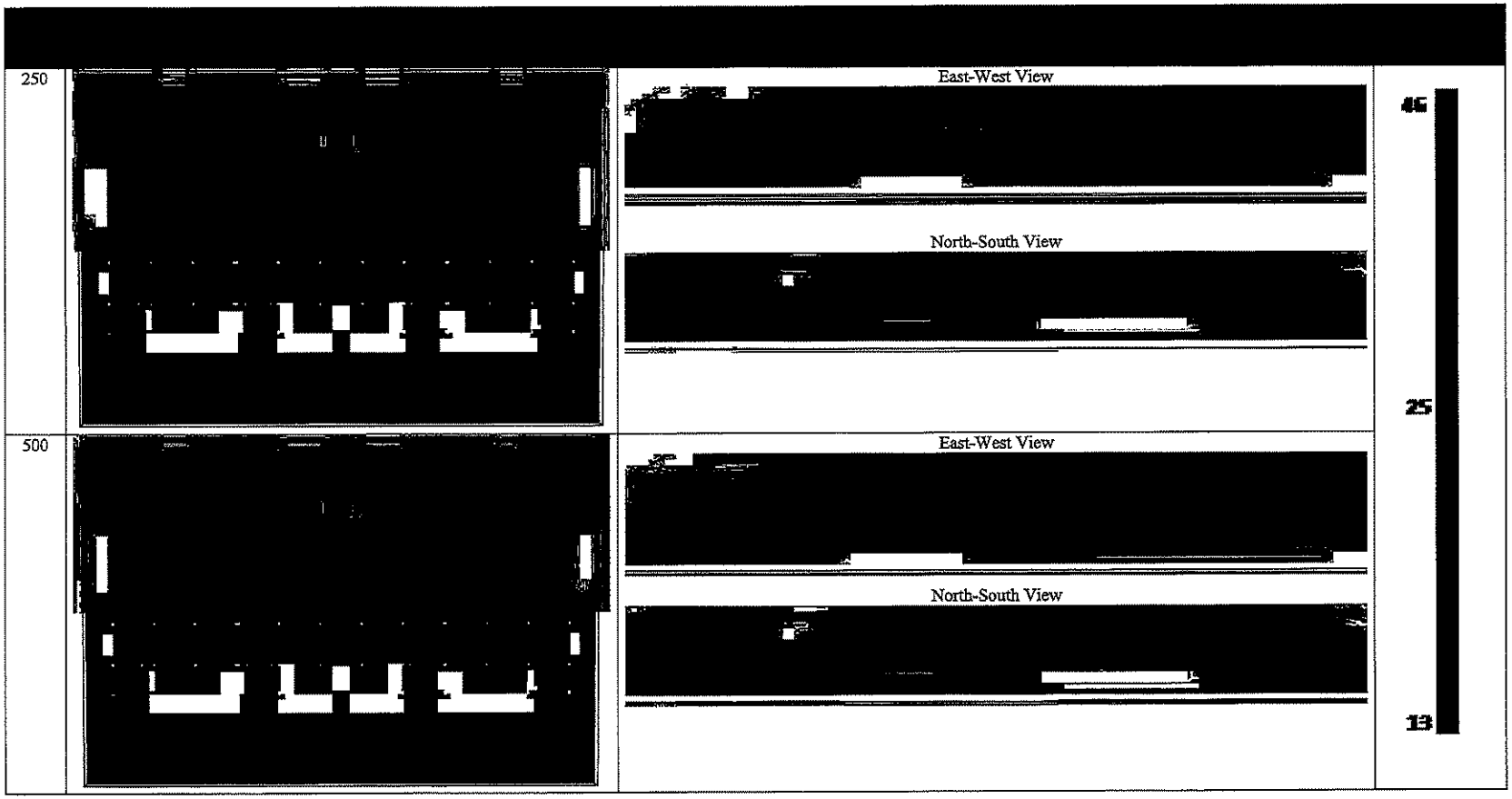
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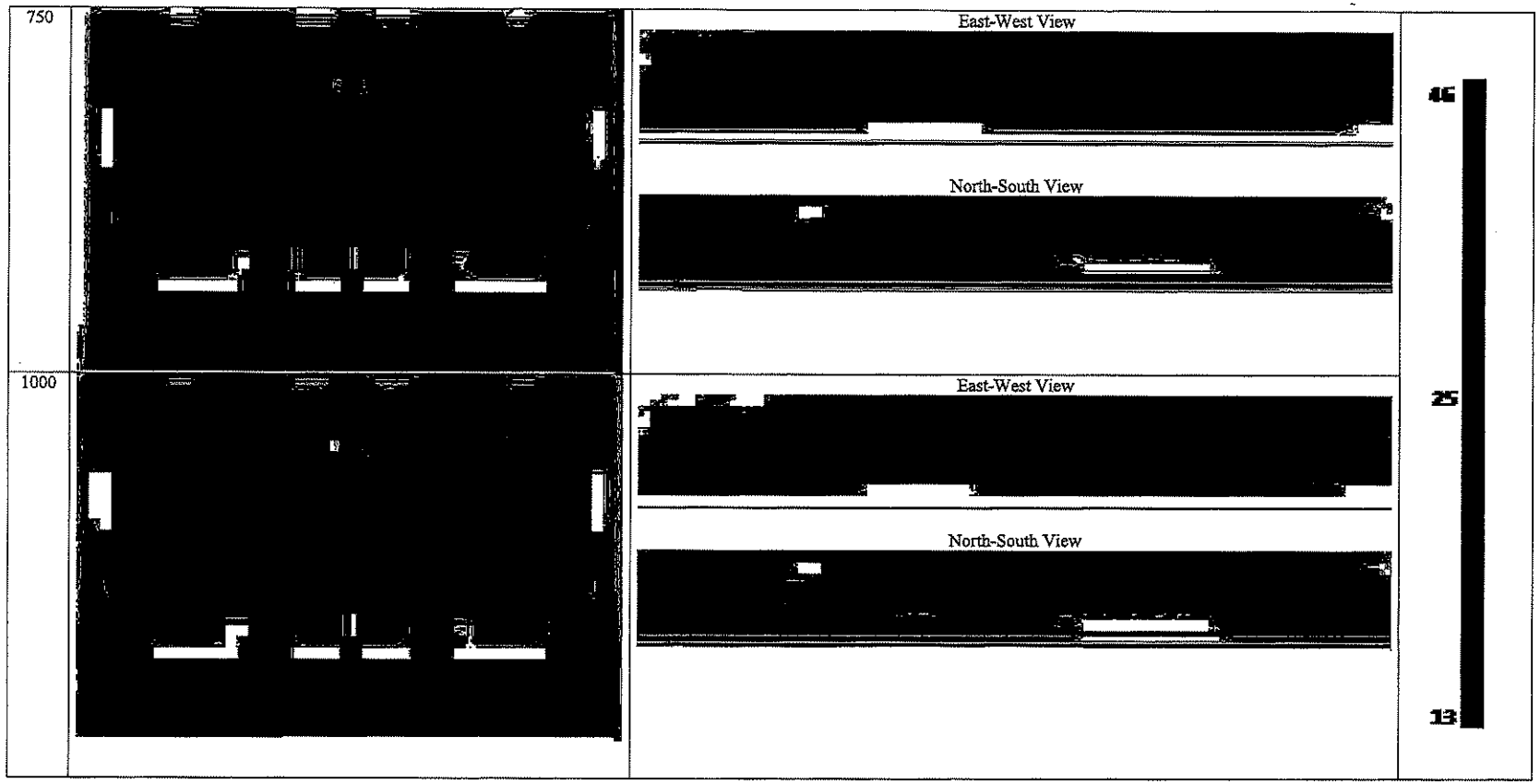
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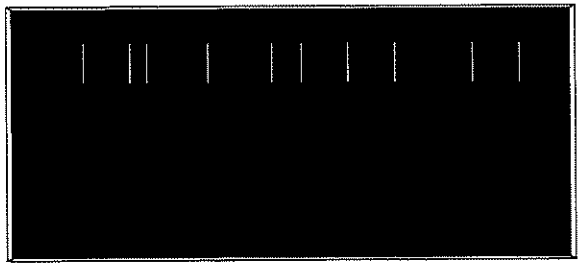
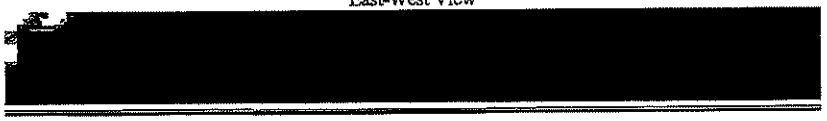
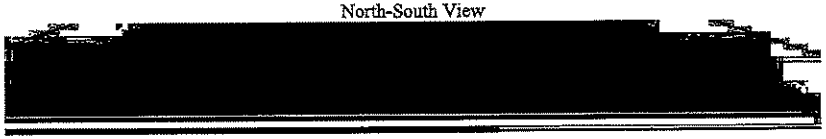
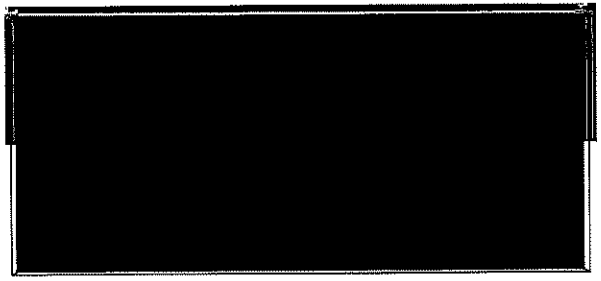
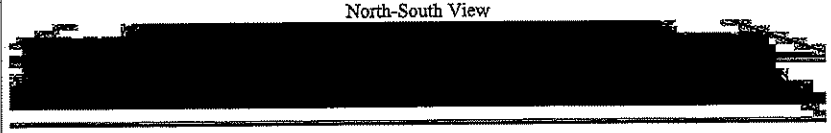
250		East-West View  North-South View 	46 25
500		East-West View  North-South View 	13

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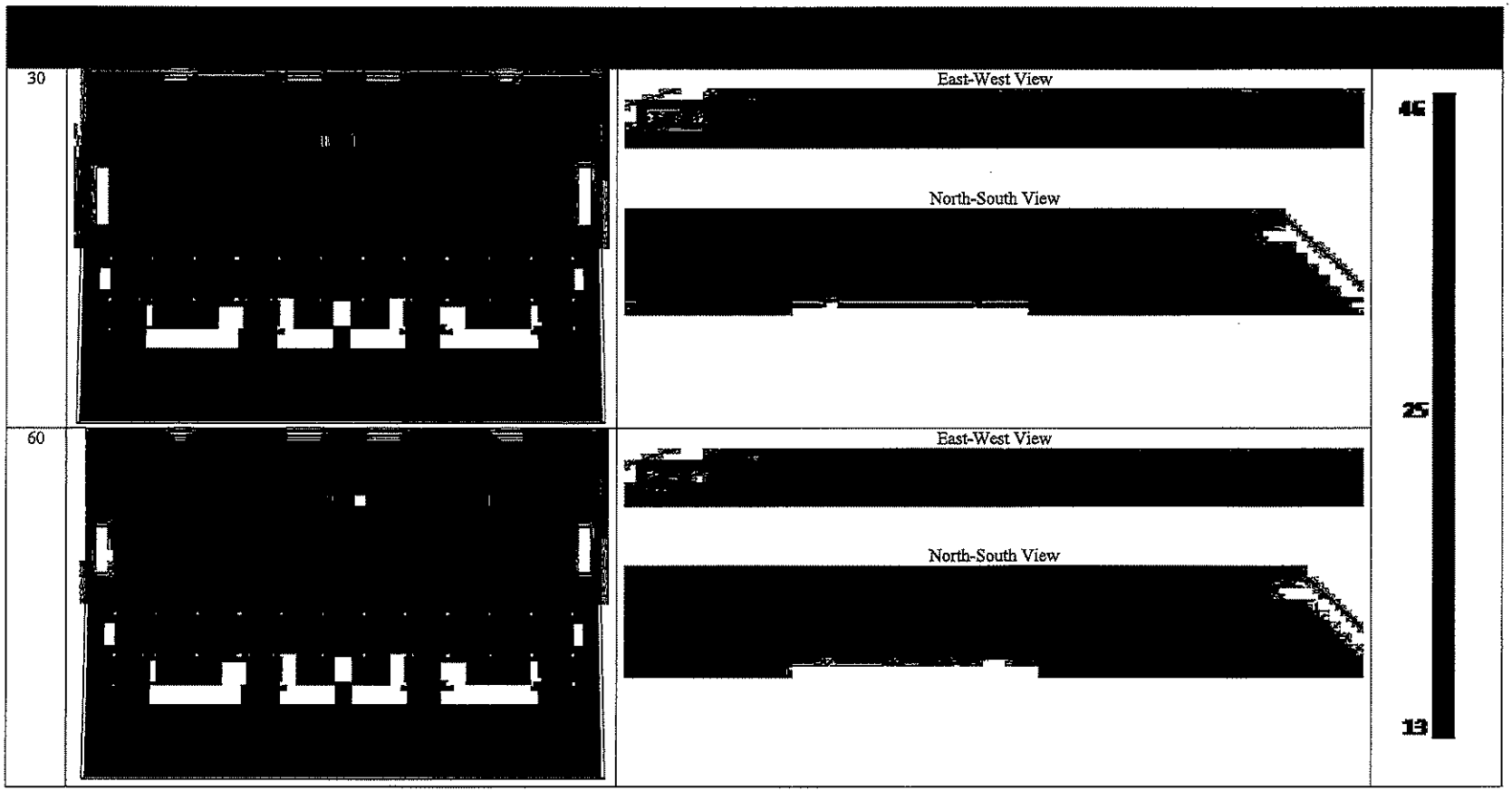
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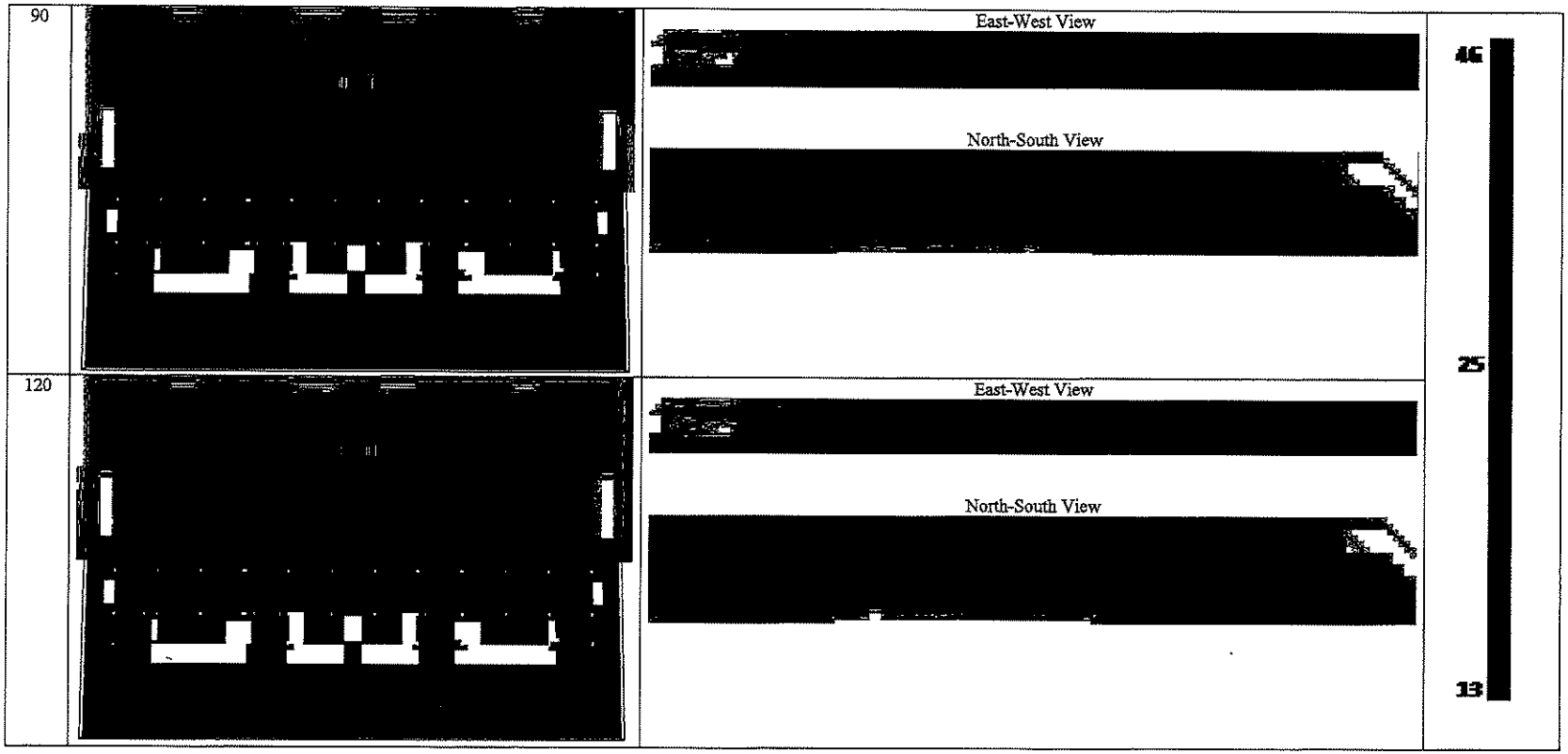
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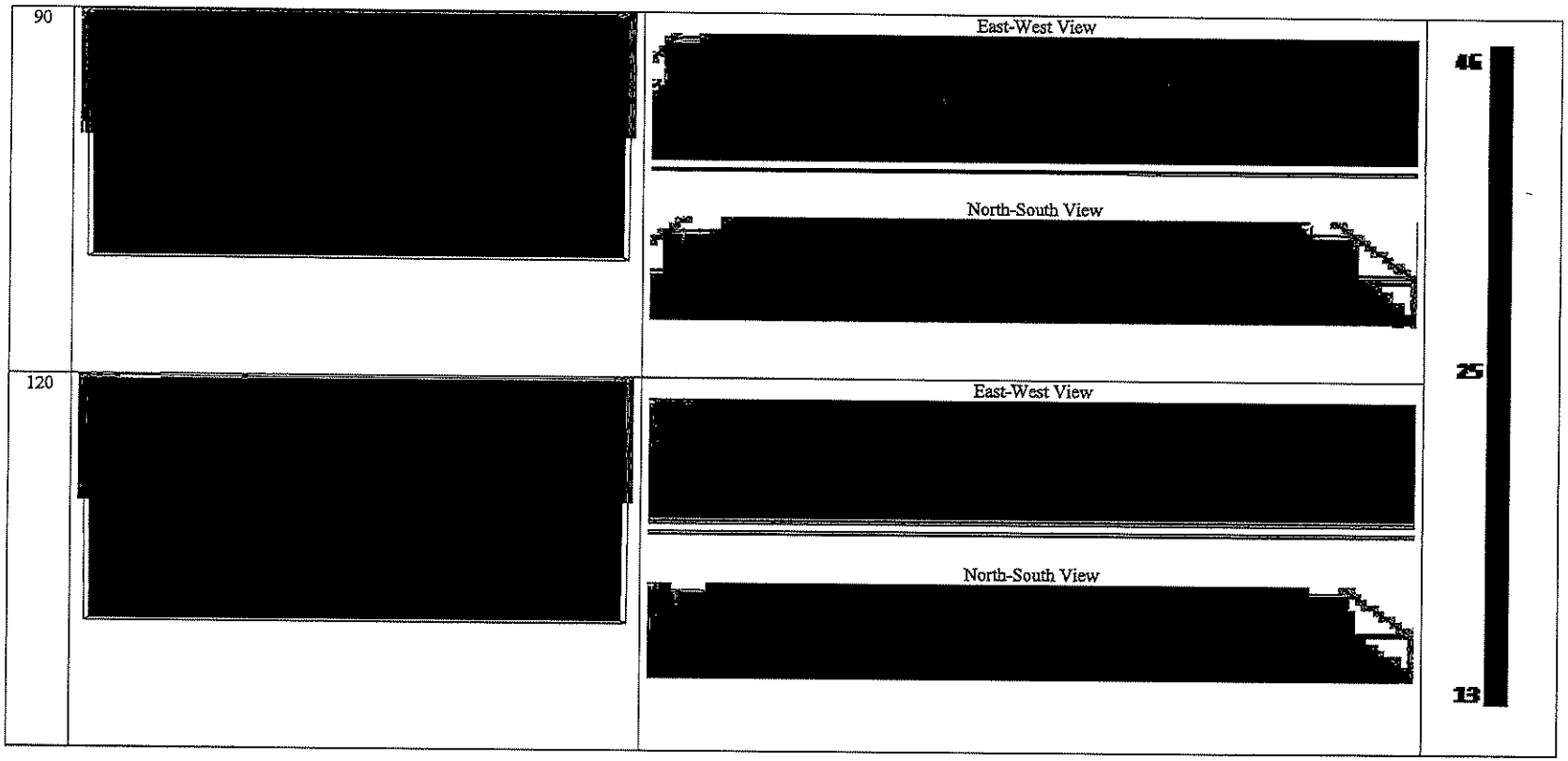
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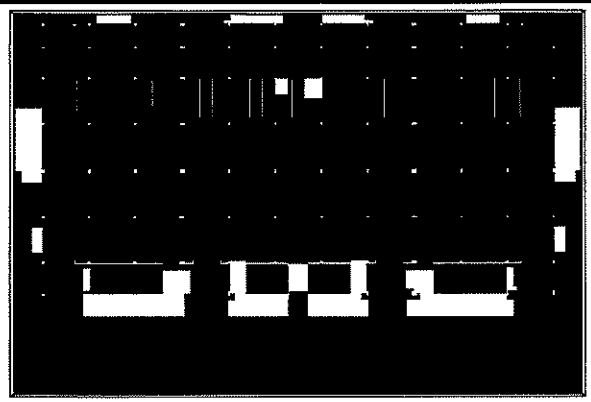
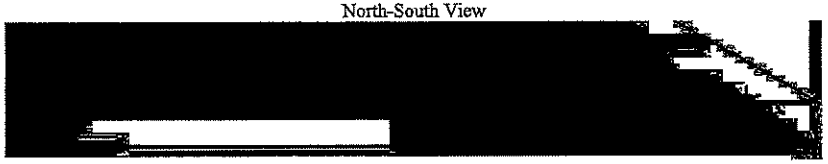
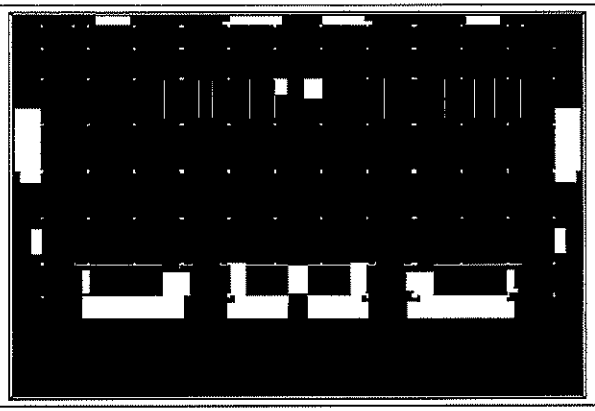
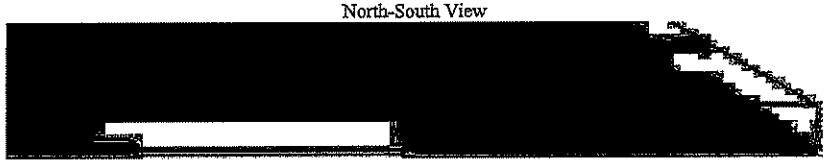
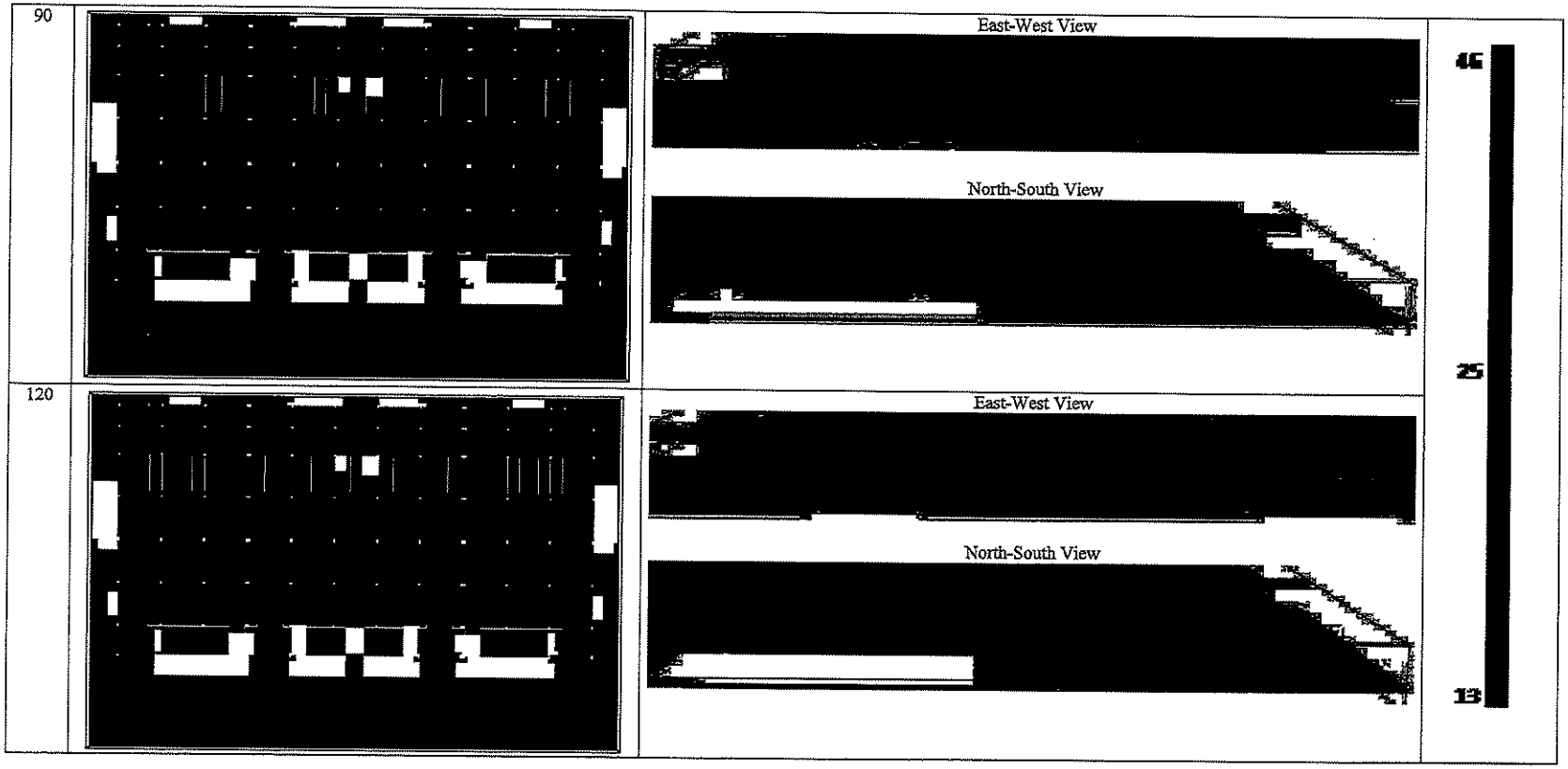
30		East-West View  North-South View 	
60		East-West View  North-South View 	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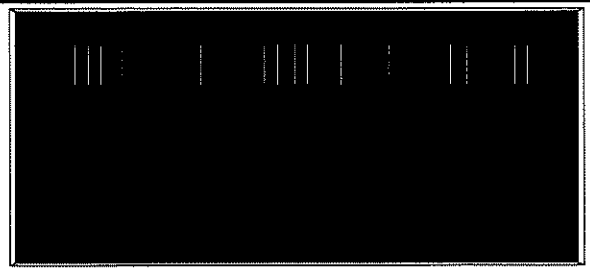
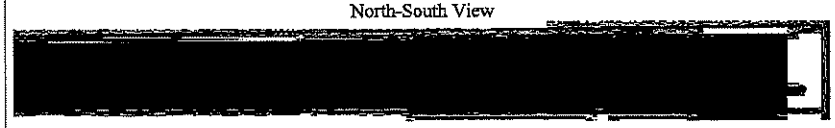
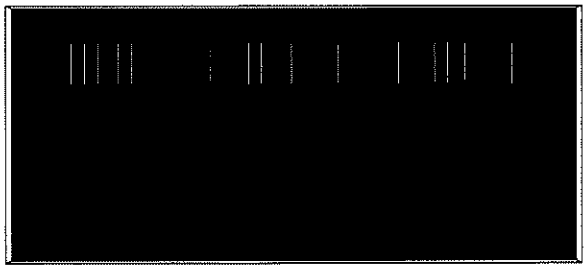
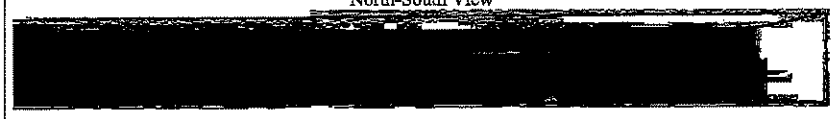
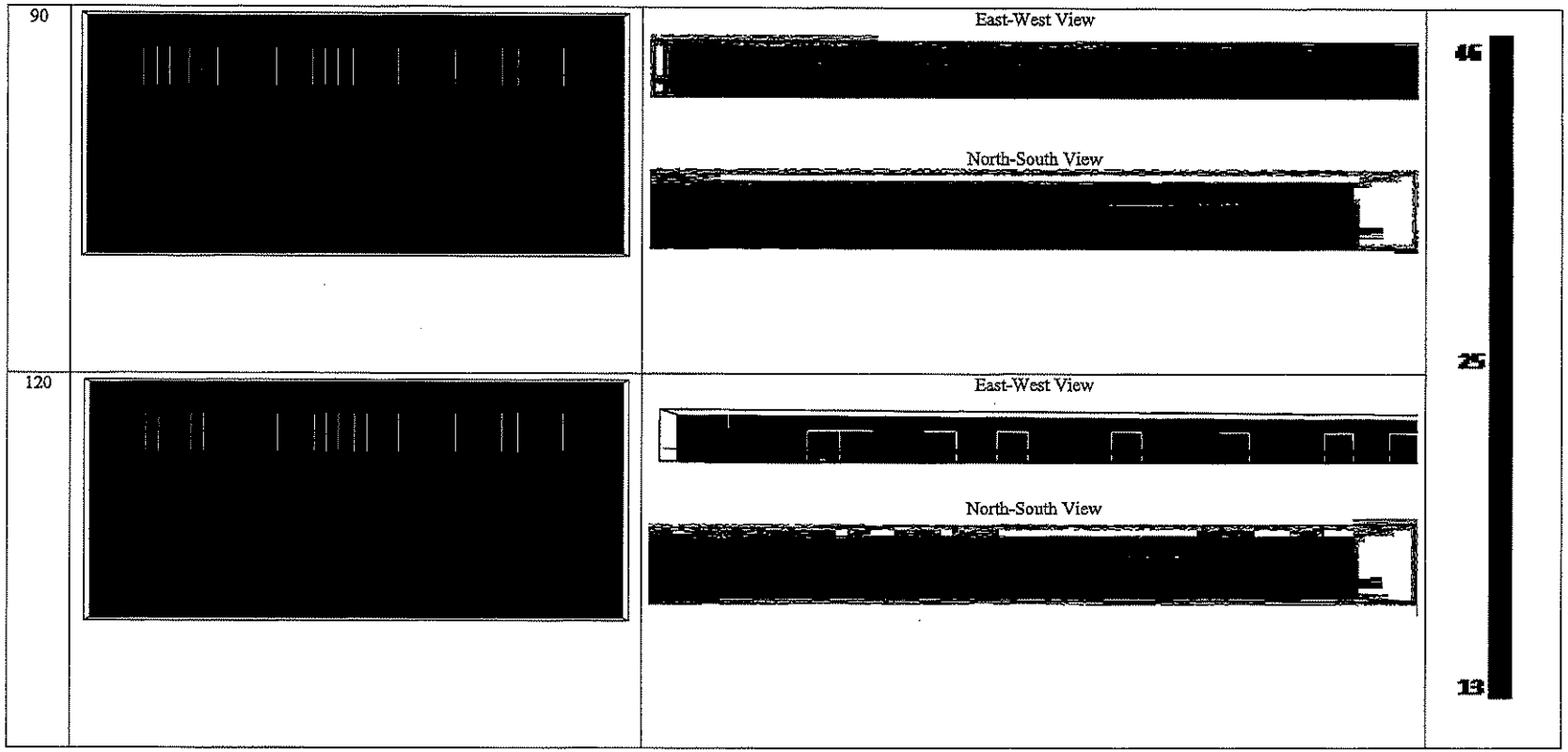
30		East-West View  North-South View 	
60		East-West View  North-South View 	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Agha-Long, Grisel (Aviation)

From: Jay I Gillespie <jay.gillespie@ey.com>
Sent: Thursday, May 7, 2020 5:51 PM
To: Diaz, Ray (Aviation); Pelkowski, Vivien (Aviation); Joe Rodi; tito gomez; joey tamayo; MMcBee@hertz.com
Cc: Tianyi Yang
Subject: RE: Miami Intermodal Center - Oil Change Facility Project

Hi Ray,

Hope you are doing well and staying safe considering the current situation.

FDOT has confirmed that there are no additional procurement requirements for the oil change project and that they do not need to manage the procurement. The County would just need to follow the regular procurement process for capital projects such as this one. Note that the next opportunity for a disbursement of funds would be on the October 1, 2020 payment date.

Let me know if you have questions or need anything else.

Thanks and take care,
Jay

Jay Gillespie | Senior Vice President | Infrastructure Advisory

Ernst & Young Infrastructure Advisors, LLC
Office: +1 404 817 4245 | jay.gillespie@ey.com

From: Diaz, Ray (Aviation) <RDIAZ@miami-airport.com>
Sent: Wednesday, March 11, 2020 8:17 AM
To: Jay I Gillespie <jay.gillespie@ey.com>; Pelkowski, Vivien (Aviation) <VPelkowski@miami-airport.com>; Joe Rodi <jrodi@dwainc.net>; tito gomez <titogomez@bellsouth.net>; joey tamayo <joeytamayo@att.net>; MMcBee@hertz.com
Cc: Tianyi Yang <Tianyi.Yang@ey.com>
Subject: RE: Miami Intermodal Center - Oil Change Facility Project

Great Jay-

Now we need the State to opine if they have any requirements, or if it can be handled on the local level.

Ray Diaz, Division Chief
Commercial Operations
Miami-Dade Aviation Dept.
P.O. Box 025504
Miami, Florida 33102-5504
T 305-876-7627
C 305-342-2420
F 305-876-7615
rdiaz@miami-airport.com
www.miami-airport.com

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From: Jay I Gillespie <jay.gillespie@ey.com>
Sent: Tuesday, March 10, 2020 11:48 PM
To: Diaz, Ray (Aviation) <RDIAZ@miami-airport.com>; Pelkowski, Vivien (Aviation) <VPelkowski@miami-airport.com>; Joe Rodi <jrodi@dwainc.net>; tito gomez <titogomez@bellsouth.net>; joey tamayo <joeytamayo@att.net>; MMcBee@hertz.com
Cc: Tianyi Yang <Tianyi.Yang@ey.com>
Subject: FW: Miami Intermodal Center - Oil Change Facility Project

This is an EXTERNAL email. **Exercise Caution**. DO NOT open attachments or click links from unknown senders or unexpected emails. Please use your Report Spam button if this is a suspicious message.

Hi All,

I wanted to pass along the confirmation email below from USDOT – looks like all is confirmed now.

Let me know if you have any questions.

Thanks,
Jay

Jay Gillespie | Senior Vice President | Infrastructure Advisory

Ernst & Young Infrastructure Advisors, LLC
Office: +1 404 817 4245 | jay.gillespie@ey.com

From: Fang, Jenny (OST) <jenny.fang@dot.gov>
Sent: Tuesday, March 10, 2020 7:01 PM
To: Churchill, Jacki <Jacki.Churchill@dot.state.fl.us>; Jay I Gillespie <jay.gillespie@ey.com>
Cc: 'Sequeira, Jacqueline' (Jacqueline.Sequeira@dot.state.fl.us) <Jacqueline.Sequeira@dot.state.fl.us>; Tianyi Yang <Tianyi.Yang@ey.com>; Rivera, Jorge (FHWA) <Jorge.Rivera@dot.gov>; Min, Keith (OST) <Keith.Min@dot.gov>; DeTizio, Andrew (FHWA) <Andrew.DeTizio@dot.gov>
Subject: RE: Miami Intermodal Center - Oil Change Facility Project

All,

The Bureau agrees that the oil change facility is not part of the TIFIA-funded project and, as such, you do not need to comply with Federal requirements in constructing that facility solely due to the TIFIA loan.

Please let us know if we can be of any further assistance.

Best regards,

Jenny Fang
The Build America Bureau
U.S. Department of Transportation ~ W12-445
Office: (202) 493-0329 ~ Email: jenny.fang@dot.gov
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RON DESANTIS
GOVERNOR

Florida Department of Transportation
605 Suwannee Street
Tallahassee, FL 32399-0450

KEVIN J. THIBAULT, P.E.
SECRETARY

October 11, 2019

Mr. Ken A. Pyatt
Deputy Aviation Director
Miami-Dade Aviation Department
Post Office Box 025504
Miami, Florida 33102

SUBJECT: Miami Rental Car Facility (RCF) Deferred Oil Change Program

Dear Mr. Pyatt:

We have reviewed your letter dated June 13, 2019, regarding use of funds from the Secondary Reserve Fund for capital costs related to the Oil Change Program. Because the RCF original design and construction included elements for an Oil Change Program (the Project), FDOT concurs on the direct use of funds in the Secondary Reserve Fund with capital costs up to $2.5 million contingent on meeting all the conditions pursuant to the Security Agreement 2.09(i) (excerpt below) (copy attached):

> *"On each October 1 or April 1 following Substantial Completion of the RCF, if the PLCR exceeds 1.40 in the current year and no Contingent Rent is anticipated for the remainder of the Maturity Period, then amounts on deposit in the RCF Secondary Reserve Fund in excess of the sum of the requirements in subsections (a) through (e) above, with respect to October 1, and (a) through (d) above and (f) above, with respect to April 1 plus $10,000,000, at direction of the County after consultation with the Borrower and the PRCC, may be retained in the RCF Secondary Reserve Fund, or allocated in part or whole (i) for RCF capital replacement expense and extraordinary operating and maintenance costs (ii)* ***for the payment of the capital costs and/or the principal of and interest on indebtedness incurred by either the Borrower or the County to pay the cost of RCF improvements as contemplated in the full build-out of the RCF design as described in Article 3, Section 3.01 of the Concession Agreement, and in accordance with Section 11 of the Loan Agreement****; ...".*

No additional indebtedness shall be incurred as sufficient funds appear to be available in the Secondary Reserve Fund to fulfill the needs of the Project pursuant to the aforementioned Security Agreement 2.09(i).

We have received approval from The Build America Bureau on the use of the RCF Secondary Reserve Fund to complete the Project that was originally intended in the full build-out of the RCF. In addition, the procurement of the Project must comply with the same federal guidelines as the original RCF Project.

Should you have any questions, please contact Jacki Churchill at 850-414-4421 or by email at jacki.churchill@dot.state.fl.us.

Sincerely,

Stacy L. Miller, P.E.
Assistant Secretary for Finance & Administration

SLM/jca

cc: Ray Diaz, Chief Commercial Operations, Miami-Dade Aviation Department
Vivien Pelkowski, Manager, Rental Car Center, Miami-Dade Aviation Department
Robin Naitove, Comptroller, FDOT
Shacarra Sigler, Project Finance Specialist, FDOT
Nilia Cartaya, Modal Development Administrator, District 6, FDOT