Maintenance & Operations Standards

Version 5.7

12/11/19

DIGITAL REALTY

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Overview

The purpose of this document is to provide an overview of Digital Realty's Maintenance and Operation Program. Each site utilizes these standards as the basis for maintaining and operating local equipment installations. The individual locations or regions may have variances to this program based upon local legislation, equipment condition, and/or approved customer specific requirements.

Digital Realty reserves the right to amend the Maintenance Frequencies and Maintenance & Operations Standards from time to time. Any previous version of this document will be superseded by the latest published version.

Normal Maintenance Hours

All maintenance is scheduled during business hours, between **6:00 a.m. and 6:00 p.m., Monday through Friday**, excluding designated holidays. Exceptions to this maintenance window shall be approved in writing by a Regional Manager, Data Center Operations.

Normal business hours are the recommended time for maintenance on critical systems due to the following reasons:

- Availability of highest quality vendor support personnel
- Availability of manufacturer's highest quality technical support
- Parts inventory access
- Availability of Digital Realty site support staff

Exceptions may include:

(i) Availability of repair/replacement parts/labor after-hours
(ii) Weekend work to prevent risk of downtime extending into the work week

After-hours Maintenance Requests (Customers w/ dedicated infrastructure only)

Customers may request certain maintenance events to be performed after-hours. Digital Realty will arrange for the necessary schedule changes, however, any additional costs or overtime incurred as a result will be the responsibility of the Customer and invoiced to the Customer during the next billing cycle.

Cancelling Maintenance Requests (Customers w/ dedicated infrastructure only)

Customers may request the deferral or cancellation of a specific scheduled maintenance event by submitting a Risk Acknowledgement Form to local Site Management. All deferrals or cancellations require the approval of a Regional Director, Data Center Operations.

Definitions

a. **Preventive Maintenance** - The care and servicing by personnel for the purpose of maintaining equipment and facilities in satisfactory operating condition by providing for systematic inspection, detection, and correction of incipient failures either before they occur or before they develop into major defects.

b. **Predictive Maintenance** - Primarily consists of condition-based maintenance wherein attempts are made to evaluate the condition of equipment by performing periodic or continuous (online) equipment condition monitoring. Also consists of comparing the trend of measured physical parameters against known engineering limits for the purpose of detecting, analyzing, and correcting problems before failures occur.

c. **Corrective Maintenance** - Maintenance which is required when a system or component has failed, or has been identified as failing, in order to bring the system or component back to working order.

d. **Failure-finding Maintenance** - Involves checking systems or components to determine the overall functionality. This is primarily performed on portions of a system dedicated to hidden functions such as safeties, protective devices, and associated interlocks.

e. **Operational Acceptance Test** – Involves checklists and responsible supervision to ensure each system operates as designed and intended before being accepted as construction completed by the contractor and ready to be commissioned.

f. **Commissioning and Integrated Testing** – One of the most critical activities to ensure operability and availability during the life of the datacenter due to this period's ability to test systems.

g. **Mission Critical Areas** – Consists of all areas, rooms, systems, and equipment associated with network and data processing operations including Meet-Me-Rooms, Point of Presence Rooms, and datacenter spaces. These are typically on raised floors with precision air conditioning and redundant electrical power. Mission Critical Areas also include the areas containing the UPS modules, heat rejection systems, electrical distribution systems, and the computer equipment that depends on these systems.

Standards

Digital Realty considers various guidelines, specifications and recommendations in determining the basis for our Maintenance Programs including, but not limited to the most current editions of the following documents:

a. **National Fire Protection Association** (NFPA 70B - Recommended Practice for Electrical Equipment Maintenance).

b. **International Electrical Testing Association** (NETA Maintenance Testing Specifications).

c. **Institute of Electrical and Electronic Engineers** (IEEE).

d. **American Society of Heating Refrigeration and Air-Conditioning Engineers** (ASHRAE).

e. **Original Equipment Manufacturers** (OEM).

f. **Singapore Standards**

g. **Singapore Code of Practice**

h. **AS/NZS 4801-2001 Occupational Health and Safety Management Systems**

i. **Building Code of Australia (BCA) 2016**

j. **International Electrotechnical Commission** (IEC)

UPS Systems

Digital Realty performs maintenance and inspection activities on Uninterruptable Power Supply (UPS) Systems based on the following guidelines.

Static UPS Systems, including Point of Use UPS systems, undergo a daily visual inspection. Maintenance occurs annually by a qualified specialist.

Rotary UPS Systems undergo a daily visual inspection. Quarterly maintenance is performed by a qualified specialist. Rotary UPS Systems also undergo 5 and/or 10-year maintenance events per OEM specific recommendations.

UPS Systems Peripherals

In addition to the UPS modules and batteries, connected equipment is also included in the Digital Realty inspection and maintenance program.

The equipment consists of, but is not limited to, the following:

- Maintenance Bypass Cabinet.
- Load Bus Sync.
- Power Tie.
- System Control Cabinet/ Static Transfer Switch.
- UPS Output Distribution.
- Induction Couplings.

UPS Maintenance Support Guidelines

Certain preventive or corrective maintenance of UPS Systems require removal of a module from service or transfer of the system to maintenance bypass mode. Whenever a module is off-line or a system is in bypass, there is an increased risk profile for the critical load the system serves. The following guidelines have been identified to reduce the risk to the critical equipment during the specific maintenances.

UPS Maintenance/Service Requiring Transfer to Bypass

Whenever a UPS System must be placed into Bypass Mode (Static or Maintenance Bypass), Digital Realty will maintain utility power to the critical load, except under the following conditions:

- The UPS System design and operating redundancy is less than 2N prior to placing any portion into bypass mode;
- There is agreement with the customer(s) that transferring to generator power before performing UPS maintenance is preferred.

- There is a known issue with the utility service into the facility, including:
  - Less than design redundancy of the utility system in the facility;
  - Feeder(s) serving the facility being off-line for any reason;
  - Expected switching activity on the utility system during the work window;
  - Any instability of the utility system;

- There are forecasted weather events which could cause a utility power event, including
  - Thunderstorms;
  - Snow/Ice storms;
  - Extreme heat or cold;
  - High winds;
  - Excessive precipitation.

Under the above conditions, the input power to the UPS System must be transferred to emergency generator prior to placing the UPS into bypass.

Any other special circumstances, including recent unresolved issues with the generator system (suggesting decreased reliability), unavailability of a primary or redundant generator, the likelihood of an extended run in bypass on generator for any reason, or any situations where the requirement is not clearly understood, must be approved by the applicable Regional Data Center Operations Manager prior to finalizing the MOP for the work.

UPS Maintenance/Service Requiring Single-Module Shutdown

Whenever UPS Systems are undergoing off-line maintenance or service work requiring one (of multiple) module to be taken off-line, Digital Realty will place the entire system into Maintenance Bypass mode of operation prior to removing any module from service.

Exceptions to this rule which may be considered include the following:

- For 2N UPS Systems utilizing central static switches, the **entire load on the 2N system (A+B load totalized) does not exceed 40% of the rating of one system.**
  - For the standard 1125kW design utilizing 2 x 562.5kW Liebert 610 or MGE 8000 modules on each system, the total UPS load (A+B) cannot exceed 450kW.
- For 2N UPS Systems utilizing internal distributed static switches, **the entire load on the 2N system (A+B load totalized) does not exceed 25% of the rating of one system.**
  - For the standard 1200kW POD 3.0 design utilizing 2 x 600kW Liebert NX or APC Symmetra modules on each system, the total UPS load (A+B) cannot exceed 300kW.

Under the above or other applicable conditions, an exception to the Standard, allowing one module to be taken off-line without the requirement to transfer the system to maintenance bypass mode, will be considered. This exception must be discussed in advance with the applicable Regional Data Center Operations Manager prior to finalizing the MOP for the work.

UPS Maintenance/Service with Downstream Automatic Static Transfer Switches

When critical load is supported by Automatic Static Transfer Switches with two sources of UPS power, Digital Realty will maintain the ASTS in its normal operating position during all scheduled work on the upstream UPS systems, including work requiring transfer to bypass of the preferred UPS, except under the following conditions:

- If the input to the UPS System to be placed into bypass cannot be served by generator power, although required to by the Digital Realty Standard (“UPS Maintenance/Service Requiring Transfer to Bypass”).
- Initial energization of newly installed equipment served by the UPS under service is to occur during the work window.
- Energization of downstream transformers served by the UPS under service is to occur during the work window.

Under the above or other applicable conditions, the ASTS normally connected to the UPS System under service must be transferred to its alternate source prior to placing the UPS System into bypass mode.

Other special circumstances, including the likelihood of an extended period of bypass operation, or any situation where the requirement is not clear, must be discussed in advance with the applicable RTOM prior to finalizing the MOP for the work.

All ASTSs must have the “Re-Transfer” setting set to “Manual” or “Off”. In the event of an interruption of the preferred source, the ASTS will automatically transfer to its alternate source. The load must remain on the alternate source until a re-transfer back to the preferred source is manually initiated. If any ASTS is found to have the “Re-Transfer” setting set to “Automatic” or “On”, contact the applicable Regional Data Center Operations Manager to assist in developing a MOP to implement a settings change.

STS-PDU

Digital Realty performs daily visual inspections of the Static Transfer Switch-Power Distribution Unit’s (STS-PDU’s) utilized in the operating environment.

Annual Maintenance is performed on these units in accordance with the OEM’s recommendations.

Battery Maintenance

The UPS battery systems undergo regular maintenance as per OEM recommendations.

Battery strings with approved battery monitoring systems in place, have maintenance performed annually.

Battery strings without approved battery monitoring systems undergo maintenance on a quarterly basis.

Battery assessments are also performed prior to commissioning testing or other extended testing such as battery discharge, battery recharge test, and/or tear-down.

A documented report is provided of all measurements and test results which include a summary analysis as well as recommendations regarding any necessary remediation or maintenance actions.

The types of batteries currently being utilized by Digital Realty are as follow:

Valve Regulated Lead Acid – (VRLA)

Flooded lead-acid (Wet)

Lithium Ion (LI)

Thin Plate Pure Lead (TPPL)

Specific maintenance activities are completed in accordance with the PM Procedure and Schedule Guidelines as well as the Predictive Maintenance Standards and Battery Playbook located within the Global Operations Manual.

DC Power Plants

Many of Digital Realty properties contain 48-volt DC Power Plants for telecommunication equipment. Digital Realty supports these critical systems with our maintenance programs.

Digital Realty personnel perform daily visual inspections of the DC Plants.

Maintenance is performed annually by a DC Power Specialist.

The components of the DC Plant include:

- Rectifiers.
- Power Boards.
- Inverters.
- Batteries.

Generators/Engines

Digital Realty performs regular standardized Generator testing, inspections and maintenance; however, exceptions to these standards are dictated by each Customer's site-specific lease terms and local regulations.

Daily Inspections
Digital Realty performs daily visual inspections of the generators and engines to check for leaks or visual and odor anomalies.

Standard Maintenance
Digital Realty's vendor performs regular Annual and Semi-Annual component testing which includes, but is not limited to, the following:

- Fuel System.
- Cooling System.
- Lubrication System.
- Starting and charging system.
- Air induction, filtering and exhaust system.
- Building/System monitoring control system, sensors and hard-wired interlocks.

Digital Realty recommends generator oil maintenance every 250 hours of run time or every three years, in locations where oil testing results remain favorable, this frequency may be extended accordingly.

Monthly Generator No Load Operation
A fifteen (15) minute monthly test will be performed to ensure the generator starts and runs as expected. During this run time the site engineering team will verify that the generator starts and perform a visual inspection of the unit to ensure that fuel is flowing properly, there is no excessive smoke, the engine runs smoothly, and to verify that there are no operating abnormalities.

Quarterly Generator Load Testing
Digital Realty recommends a minimum of Thirty (30) minute quarterly generator load test be performed (consisting of a transfer of all datacenter loads in order to verify the operation of the UPS, batteries, ATS or PLC, Generators, and mechanical systems) to ensure they will function in the event of a power outage or power quality fluctuation.

Biennial Generator Load Testing
Digital Realty will perform Generator load tests every two years (During Energized Maintenance). If a site does not reach 33% of Generator capacity, then a load bank will be utilized for this test. Load testing will be performed for one (1) hour with a load of at least 33% of the rated Generator capacity.

For any site for which the Customer does not allow Quarterly or Biennual Generator load transfers, and the load is equal to or greater than 33%, the **load bank rental and any additional costs incurred will be the responsibility of the Customer.**

Digital Realty will perform "Simulated Outage" testing
Simulated Outage testing will be performed, consisting of a one (1) hour simulated utility electrical outage, also known as a "Pull the Plug" test, on a 60-month (5 Year) interval, and/or at sites with major infrastructure changes or design changes. This test will transfer all datacenter loads in order to verify the operation of the UPS, batteries, ATS or PLC, Generators, and mechanical systems, to ensure they will function in the event of an extended power outage.

Fuel
Generator fuel will be tested annually to ensure it meets or exceeds industry standards for quality.

- Minimum Fuel Standards are #2 Off Road Diesel
- All fuel is purchased and shipped meeting or exceeding ASTM D975 standards.
- Annual Testing occurs to ensure the quality has not degraded below ASTM D975 Standards.
- Fuel additives and fuel polishing will be utilized as needed per annual fuel testing results.

Fuel tanks will be maintained at 90% of rated capacity or at a capacity to support operational load for a minimum of 24 continuous hours.

In a standby state, fuel tanks will be scheduled for refill after falling below 80% capacity or at a point where load cannot be maintained for the target timeline.

During extended generator operation, fuel refill will be scheduled to occur prior to the tank falling below 40% capacity.

Following extended generator operation fuel tank will be returned to 90% capacity or targeted support run time as soon as possible.

Upon fuel delivery and prior to filling tanks, a "white bucket" test will be performed to ensure fuel being delivered is clear, free of contaminants and without signs of degradation.

Electrical Infrastructure

At 24-month intervals, preventive/predictive maintenance is performed on the critical electrical distribution system while it is **energized**, unless local laws or regulations require more frequent maintenance; in that event, Digital Realty complies with local requirements.

The following list includes some representative testing and inspection services that are conducted as appropriate.

- True RMS Voltage and Current.
- Voltage Drop.
- Infrared Thermographic Imaging.
- Ultrasonic.
- Voltage and Current Harmonics.
- Power Factor.
- Visual and Mechanical Inspections.
- Phase-Balance.
- Insulating-Liquid Analysis.
- Thermal Imaging Scans.

In addition to the services above, at a recommendation of either 60-month intervals, or as necessitated by results of the energized maintenance or condition assessment, the electrical distribution system and/or electrical component(s) will be **de-energized,** to allow for a detailed inspection of the infrastructure. If local laws or regulations require more frequent maintenance, Digital Realty complies with local requirements.

The following list includes some representative testing and inspection services that are conducted as appropriate.

- Re-torque feeder terminations if annual thermal imaging scan reveals hot spots.
- Insulation Resistance.
- Winding Resistance.
- Contact Resistance.
- Circuit Breaker Service (Low Voltage).
- Ground Resistance.
- Transformer Inspection.
- Motor Inspection.
- Visual and Mechanical Inspection

Equipment covered includes, but is not limited to, the following:

- Switchgear and Switchboard Assemblies.
- Transformers.
- Conductors and Cables.
- Metal-Enclosed Bus ways.
- Switches.
- Circuit Breakers.
- Circuit Switchers.
- Protective Relays.

- Regulating Apparatus.
- Grounding Systems and Ground-Fault Protection Systems.
- Rotating Machinery (AC/DC Motors).
- Motor Control, Motor Starters.
- Adjustable Speed Drive Systems.
- Surge Arresters.
- Capacitors and Reactors.
- Outdoor Bus Structures.
- Emergency Systems, Engine Generator (Electrical Only).
- Uninterruptible Power System (UPS) (A/C Power only).
- Transfer Switches (Automatic, Static and Manual).
- Automatic Circuit Reclosers.
- Electrical Safety Equipment
- Power Distribution Units (PDU) (as required).
- System Control Cabinets.
- Relay Calibration.
- Remote Power Panels (RPP).

Dissolved Gas-In-Oil Analysis in performed on an annual basis (At the locations where we do not have the ability to pull samples without risk to the equipment or personnel, due to the lack of sample ports, sample ports will be scheduled to be installed during the next De-Energized maintenance cycle)

Short Circuit Coordination and Arc Flash Study Requirements

A periodic review of the entire electrical system is required to determine if anything has changed within the electrical system and thus the corresponding Arc Flash Hazard levels.

Per NFPA 70E guidelines, the incident energy analysis shall be reviewed for accuracy at intervals not to exceed 5 years. The incident energy analysis shall also be updated when changes occur in the electrical distribution system that could affect the results of the previous analysis. This should also include a review of the available fault current value provided by the local electric utility. For all studies, the method of calculating the incident energy and the data to support the information for the label shall be documented.

HVAC Systems

Maintenance programs for chilled water and glycol cooling systems are performed dependent upon the site and specific equipment's OEM recommendations.

Digital Realty performs a daily visual inspection on all HVAC and support systems on a daily basis.

Maintenance is performed on the following types of equipment in the specified frequencies.

Computer Room Air Conditioner (CRAC)
CRAC's are maintained on a Semi-Annual basis.
Computer Room Air Handler (CRAH)
CRAH's are maintained on a Semi-Annual basis.
Roof Top Units (RTU)

RTU's are maintained Quarterly.
Air Handling Units (AHU)
AHU's supporting critical space are maintained on a Semi-Annual basis.
Air-cooled or Water-cooled Centrifugal Chillers
Chillers are maintained on a Semi-Annual basis.
Cooling Towers
Cooling Towers are maintained on a Semi-Annual basis.

The following equipment, which supports our HVAC Systems, is also included in the maintenance program.

- Blower Section.
- Compressors.
- Chilled Water Valve Actuator.
- Humidifier and replaceable elements.
- Reheat Section.
- Evaporator Coil.
- Condensate drain pan (cleaning and bacterial/mold cleaning and remediation).
- Condenser Coils and Fans.
- Electrical Panels.
- Heat Rejection Units - Air Cooled Condensers.
- Heat Exchangers
- Pumps
- Filters.
- Controls & Smoke Detectors.
- Thermostats, temperature, humidity and other sensors
- Regular recording and archiving of set points and motor amperages.

Fire and Life Safety Systems

The following table is taken from ***NFPA 25, Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems*** and takes precedence as the basis for all preventive maintenance performed on the Fire/Life Safety Systems in the North American Market:

Table 5.1 Summary of Sprinkler System Inspection, Testing, and Maintenance

Item	Activity	Frequency
Gauges (dry, pre-action, and deluge systems)	Inspection	Weekly/monthly
Control valves	Inspection	Weekly/monthly
Water flow devices	Inspection	Quarterly
Valve supervisory devices	Inspection	Quarterly
Supervisory signal devices (except valve supervisory switches)	Inspection	Quarterly
Gauges (wet pipe systems)	Inspection	Monthly
Hydraulic nameplate	Inspection	Quarterly
Buildings	Inspection	Annually (prior to freezing weather)

Hanger/seismic bracing	Inspection	Annually
Pipe and fittings	Inspection	Annually
Sprinklers	Inspection	Annually
Spare sprinklers	Inspection	Annually
Fire department connections	Inspection	Quarterly
Valves (all types)	Inspection	Weekly/monthly
Obstruction	Inspection	5 years
Water flow devices	Test	Quarterly/semiannually
Valves supervisory devices	Test	Semiannually
Supervisory signal devices (except valve supervisory switches)	Test	Semiannually
Main drain	Test	Annually
Antifreeze solution	Test	Annually
Gauges	Test	5 years
Sprinklers — extra-high temperature	Test	5 years
Sprinklers — fast-response	Test	At 20 years and every 10 years thereafter
Sprinklers	Test	At 50 years and every 10 years thereafter
Valves (all types)	Maintenance	Annually or as needed
Obstruction investigation	Maintenance	5 years or as needed
Low-point drains (dry pipe system)	Maintenance	Annually prior to freezing and as needed
Obstruction	Investigation	As needed

The systems and equipment covered includes, but are not limited to, the following:

- Fire Detection and Alarm Systems.
- Pre-action Systems (Cross-zoning verification).
- Dry Pipe Systems (Winter Set Up).
- Wet Pipe Systems.
- Fire Pumps Assemblies.
- Fire System Service Main; Pit, Isolation Valves, PRV, Back Flow Device and Metering Devices.
- Air Compressor and Air Systems.
- Valve Maintenance (All Systems).
- Deluge Systems.
- Electric Motor Pumps.
- Fixed Chemical Extinguishing Systems.
- Portable Fire Extinguishers.
- Standpipe and Hose Systems.
- Total Flooding Chemical Extinguishing Systems.

APAC and EMEA Regions will maintain their site-specific Fire/Life Safety equipment as detailed by Local, Regional and National Regulatory Code.

Raised Access Floor Systems

The raised floor systems will be kept in clean condition as described in the OEM's specification through a combination of coordinated supervised periodic maintenance efforts and supervision of activities to eliminate the need for auxiliary cleaning. Customers and contractors shall not leave any of their work debris on or under the raised floor system and take care to replace panels in the same "as found" condition and proper fitting manner.

- Standard cleaning will be performed at the discretion of onsite management, by properly trained janitorial personnel.
- Above Standard, above floor and under floor, heavy cleaning will be performed at the discretion of onsite management, or annually if required, by a contractor who is a specialist in this service.
- At the discretion of the onsite management, or every 3 years, a deep clean will be completed, which includes all of the aspects of the annual heavy cleaning, both above and under floor.
- Floor panels are realigned wherever possible and pedestals are inspected for sufficient adhesive, which is reapplied as needed.
- Any missing or damaged understructure components are replaced and/or repaired.
- Floor panels are repaired or replaced, if necessary.

Roofing Systems

Roofing Systems are inspected Quarterly by Digital Realty Engineering staff.

Annual Inspections are performed by a vendor who specializes in inspection and repair of roofing systems.

Revision History:

Author	Date	Comments
Ted Martin	Oct 1, 2006	
Jim Smith	Oct 3, 2006	Incorporate comments from TM, AS and publish
Ted Martin	Aug 1, 2007	Reviewed and updated
Ted Martin	April 24, 2008	Reformatted and updated
Ted Martin	June 26, 2008	Added NFPA 70B Chart
Ted Martin	July 30, 2008	Added PM time schedules and generator run.
Ted Martin	Oct 7, 2008	Updated format for Lease Document
Ted Martin	Mar 16, 2009	Inserted Emergency Response Time table.
Ted Martin	Feb 9, 2010	Reviewed and updated
Ted Martin	July 17, 2010	Inserted Rotary UPS specifications
Deerns America	Jan 02, 2012	Reviewed and updated
Danny Lane Frank Burchi	Oct 31, 2012	Reformatted Removed Digital Realty from Footer Section IX:B –c: added “If applicable per lease” to RPP bullet point in. Section VIII: D-iii: changed “Assumption of Risk” to “Risk Management.” Section IX**:** B: changed “de-energized schedule from 3 years” to “Industry Standards and OEM recommendations.”
Chuck Grosbier	Aug 08, 2013	Section VIII: added “F – Fuel Availability”
Joseph Grassi	Dec 1, 2014	Section VI: added “UPS Maintenance Support Requirements”
Steven Wencis	April 8, 2015	Section X: Revised maintenance intervals
Timothy Brown	May 2, 2017	General Revisions and Updates Reviewed and Updated Frequencies Added STS/PDU Maintenance Section Added Roof System Maintenance Section Reviewed and Updated HVAC/Mechanical Frequencies
Timothy Brown	Nov, 29, 2018	General Revisions and Updates
Timothy Brown	Sep 10, 2019	• Changed version number to 5.7 and updated date. • Changed name of Availability Section to Fuel, in Table of Contents, for clarification. • Addition of right of amendment and document prioritization language to the Overview. • Added Point of Use UPS’s to the UPS Systems section.

		• Addition of customer specific language regarding transfer to generator while performing UPS maintenance to the "UPS Maintenance/Service Requiring Transfer to Bypass" section.
		• Addition of Lithium Ion and Thin Plate Pure Lead batteries to the battery types portion of the Battery Maintenance Section.
		• Revised maintenance activities language removing IEEE reference and referencing Predictive Maintenance Standards and the Battery Playbook instead.
		• Change of generator oil change recommendations, to match 3 years or 250 hours of runtime, with allowance for longer periods based upon test results.
		• Changed Quarterly Load testing to a recommendation.
		• Changed Bi-Annual to Biennial, to resolve confusion and changed Bi-Annually to every two years.
		• Fuel section changes including:
		  ○ Minimal fuel standard of #2 Off Road Diesel
		  ○ All fuel is purchased and shipped meeting or exceeding ASTM D975 Standards.
		  ○ Annual testing is performed to ensure our fuel does not degrade below ASTM D975 Standards.
		  ○ Added a load support target of 24 hours to the fuel capacity guidelines.
		• Removed Dissolved Gas In Oil Analysis from Energized Maintenance
		• Verbiage change to De-Energized maintenance referencing a recommendation of either 60 months interval or as necessitated by the results of the energized maintenance.
		• Added Dissolved Gas In Oil Analysis to De-Energized Maintenance
		• Removed the reference to Annual DSE Maintenance, to leave them at Semi-Annual.

Timothy Brown	Dec 10, 2019	Updated with suggested changes from feedback.
