Epidemic/Pandemic Response Plan Resource

Electric Transmission Organization

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Version History

Date	Version	Notes
05/14/2020	1.0	Original version
06/16/2020	2.0	Added an overview of contact tracing and more information on testing.
08/14/2020	3.0	Added details on cross-sector coordination, prioritized requests for government support, and misinformation.
01/11/2021	4.0	Added information on utilizing a PPE burn-rate calculator. Moved managing health of field workers to main body of document. Added section in appendix for a tertiary control center strategy. Added information on configuration considerations for control centers and office space.
04/05/2022	5.0	Removed some language specific to COVID-19 and replaced with general information.

Contents

About this Document

The Coronavirus disease 2019 (COVID-19, SARS-CoV-2) pandemic—which resulted in unprecedented challenges for utility planning, operations, and response—led to a recognition that organizations need to review existing epidemic/pandemic plans. This document is a resource to help utilities update or formalize their epidemic/pandemic-response plans as a complement to an overall business continuity plan. Each organization using this document should adapt definitions, roles and responsibilities, and process specifics to align with existing procedural protocols. Though focused on electric transmission organizations, the document may be adaptable to other critical infrastructure sectors and subsectors.

This document is the result of contributions from the North American Transmission Forum,[1] U.S. Department of Energy,[2] Federal Energy Regulatory Commission,[3] North American Electric Reliability Corporation,[4] and Electricity Information Sharing and Analysis Center.[5]

[1] See *North American Transmission Forum*
[2] See *U.S. Department of Energy*
[3] See *Federal Energy Regulatory Commission*
[4] See *North American Electric Reliability Corporation*
[5] See *Electricity Information Sharing and Analysis Center*

1. Purpose

An epidemic/pandemic response plan, which is intended to be complementary to an organization's business or operations continuity plans, focuses on planning/preparedness, response, and recovery activities that are specific to the outbreak of a severe epidemic/pandemic. In view of the unpredictable effects, variables, and potential consequences of an epidemic/pandemic event, an effective response will depend on flexible and scalable management strategies and preventive measures taken in advance of widespread illness and absenteeism in the workforce, along with travel and personal interaction restrictions that impair normal business operations.

An epidemic/pandemic response plan provides guidance and direction to promote and protect the health and safety of personnel and staff by implementing strategies to ensure the secure and uninterrupted conduct of mission-critical operations, business, and supporting functions identified in business or operations continuity plans.

2. Scope and Objectives

This document is applicable to electric transmission organizations.

Plan objectives include the following:

- Health and safety
    - Maintaining a healthy work environment for transmission operations employees and offering guidance to contain and minimize the spread of contamination within the workplace.
    - Protecting the health and safety of employees and their families.
- Security
    - Maintaining the cyber and physical security of operations with special considerations to the distraction and challenges imposed by an epidemic/pandemic.
- Communications
    - Communicating epidemic/pandemic preparedness and response guidance.
    - Providing clear direction on how the organization will execute an epidemic/pandemic response plan.
    - Ensuring effective communication to personnel and staff, as well as to the larger community during an epidemic/pandemic.
- Preparedness
    - Identifying roles and responsibilities, oversight structure, and associated chain of command for critical management and essential personnel.
    - Identifying/establishing lines of succession for critical management and essential personnel.
- Response
    - Maintaining continuity of critical processes and essential business functions during epidemic/pandemic events.
    - Providing support of personnel and staff, and their families, needed for continuity of operations of essential business functions.
- Recovery
    - Implementing orderly recovery and the resumption of normal operations as conditions and the available workforce permits following a severe epidemic/pandemic event.

3. Definition of Terms[6]

Action Levels

As outlined in the DOE Recommended Action Matrix for Pandemic Influenza, action levels are keyed to the severity of an epidemic/pandemic, where "Action Level 1" is the least severe and "Action Level 3" is the most severe.

Alternating control center

The practice in which operations personnel are split between multiple control centers (e.g., a primary control center and a backup control center) to avoid contact between individuals working days and those working nights. Alternating control centers might be used when personnel are living at home (under shelter-in-place or less restrictive conditions) or during sequestration.

Center for Disease Control (CDC)

A U.S. Federal agency under the Department of Health and Human Services (HHS). CDC's main goal is to protect public health and safety through the control and prevention of disease, injury, and disability in the U.S. and internationally. The CDC focuses national attention on developing and applying disease control and prevention methods and practices.

Cleaning

The physical removal of foreign material (e.g., dust, soil) and organic material (e.g., blood, secretions, excretions, microorganisms). Cleaning physically removes rather than kills microorganisms.

Clinical disease attack rate

The percentage of an at-risk population that contracts a disease during a specified time interval.

Disinfectant

Usually a chemical agent (but sometimes a physical agent) that destroys disease-causing pathogens or other harmful microorganisms but might not kill bacterial spores. It refers to substances applied to inanimate objects.

Epidemic

Refers to an (often sudden) increase in the number of cases of a disease above what is normally expected within in that population in a given area. An epidemic may be just as, or more, serious than a pandemic, though in a more localized area. A pandemic has widespread, global impacts.

Essential employees

Those who conduct a range of operations and services that are essential to continued operation on the electric grid.[7]

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[6] Some definitions adapted from "https://www.mdanderson.org/cancerwise/coronavirus--covid-19--glossary--21-terms-to-know.h00-159380367.html"; definitions for cleaning, disinfectant, clinical disease attack rate, and sanitizer are from the CDC: https://www.cdc.gov/infectioncontrol/guidelines/disinfection/glossary.html

[7] See: https://www.cisa.gov/identifying-critical-infrastructure-during-covid-19 (although the publication is specific to COVID-19, the guidance is generic)

Monitoring

Ongoing practices to detect symptoms of a particular disease or condition once personnel have entered an area. Monitoring techniques may be like those used for screening; the key differentiator is that monitoring continues after the individual has entered the facility. Reliance on an individual to self-identify that he or she is not feeling well or is experiencing symptoms is not monitoring in this context.

Pandemic

Refers to an epidemic that has spread over several countries or continents, usually affecting a large number of people.

Personal Protective Equipment

Equipment worn to protect personnel from hazards in the workplace that could cause injuries and/or illness. Commonly referred to as "PPE."

Sanitizer

Agent that reduces the number of contaminants to safe levels as judged by public health requirements.

Screening

A series of questions or assessments to determine if an individual should be allowed access to company facilities or certain areas of said facilities, such as a control center. Screening may include taking the individual's temperature and asking questions about possible exposure to someone with confirmed or suspected infection. Reliance on an individual to self-identify that he or she is not feeling well or is experiencing symptoms is not screening in this context.

Self-quarantine

The practice of isolating oneself from others until it is considered safe to return to public life. People who suspect they might have been exposed to a disease-causing pathogen might be asked to self-quarantine for a time appropriate for the particular disease.

Sequester

The housing of essential employees (e.g., system operators) in a location provided by an employer with the intent of limiting the opportunity for employees to contract an infectious disease, thus ensuring that they are available to perform certain critical business processes. Sequestration may take place at an employee's duty station or in an off-site location. Contact between those in sequestration and those not sequestered (e.g., other employees, food service and other vendors, family, and the public) is prevented or highly restricted, as any such contact unnecessarily exacerbates the risk of exposure to disease, running counter to the rationale behind sequestration.

Sequestration area

Facilities and areas used to isolate those under sequestration. This includes the living area for the operators, and in most cases, the primary and backup control centers.

Shelter-in-place

The practice of staying home in order to minimize contact with people outside of your immediate household. May occur by government request, government order, by request from employer, on advice from a medical

provider, or by personal choice. May also be identified as a stay-at-home order. Typically, sheltering in place should only be broken for when essentials such as food, gas, or medicine must be purchased.

Social distancing

The practice of maintaining distance between oneself and other people, avoiding crowds and gatherings, and limiting or cancelling all unnecessary travel to reduce the spread of disease.

Testing

The practice of using blood, urine, saliva, mucus, or some other bodily fluid to determine if someone either has a specific condition or has been exposed to a particular infectious disease.

4. Roles and Responsibilities

The roles and responsibilities outlined below are similar to the FEMA Incident Command System (ICS) structure, which offers a format for designation of roles and responsibilities. The ICS is used universally, making working with external organizations much easier. The entry-level trainings for the ICS are free and available on the FEMA website.[8]

Executive Emergency Management

High-level decision-making responsibilities for this epidemic/pandemic response plan, including determining when to implement the plan and escalation/de-escalation between action levels. The team consists of senior management and executives from each area, as applicable, along with other responsible managers as appropriate. Responsibilities of this team also include overseeing the implementation of strategies or preventive measures necessary in advance of an outbreak in the workforce.

Emergency Response Team (Operations / Business Continuity)

Managing the response actions during emergencies directed by the action levels determined by Executive Emergency Management.

This group is comprised of management-level personnel with the responsibility for directing and implementing actions to deal with an epidemic/pandemic event. The Emergency Response Team consists of management personnel from:

- operations and supervision;
- emergency response;
- IT;
- human resources;
- logistics;
- public affairs and corporate relations;
- safety, security, occupational health.

Among other actions, the Emergency Response Team will do the following:

- Track and distribute information related to the local, regional, and national status and progress of an epidemic/pandemic.
- Coordinate the tracking and status reporting of regional or organization-wide operations and the rates of infection and absenteeism in the workforce.

[8] See, https://training.fema.gov/nims/.

- Advise other responsible managers on specific actions necessary for the implementation of the plan or other contingencies based on severity of the outbreak locally or regionally, status or potential effect on the continuity of operations, and the health status and functional stability of the workforce.
- Meet, as the situation warrants, to deliberate the status and impact of the epidemic/pandemic locally or regionally and develop or consider additional actions or contingencies in response to the situation based on the potential impact on the workforce and continuity of operations.
- Ensure that employees are kept informed of the situation as an epidemic/pandemic evolves, any changes in policies or procedures, and the status of operations by all available methods and media.

  For example, conduct daily safety briefings prior to shift work, or field workers going on service calls, and develop an internal website with FAQs that are updated once a day on PPE guidance and other mitigation requirements.

- Ensure unity of message via clear and open communications to employees, families, stakeholders, and the community:
  - As new information regarding the disease and situation becomes available, disseminate accurate, timely information.
  - Be vigilant of any misinformation that is propagating and disseminate the correct information.
- Coordinate recovery and return-to-workplace operations as the effects of an epidemic/pandemic subside.

Further details on specific preparation and response duties are outlined in Section 6: Preparation and Mitigation Strategies and in Section 7: Response Actions.

5. Assumptions

As evidenced by previous pandemics, outbreaks may have significant impacts on business, commerce, government agencies, and the health care system, and can be exacerbated by the absence of readily available vaccines.

Health Assumptions[9]

- Diseases
    - In general, the workplace, schools, child-care facilities, restaurants, or any place where large numbers of people gather or frequent, will all act as points of contact and infection transmission allowing the disease to spread more easily from person-to-person.
    - In the absence of a vaccination to promote immunity, susceptibility to infection is nearly universal, resulting in sustained person-to-person transmission with unusually high rates of illness and mortality.
    - Infection and illness from one strain of a disease does not typically provide immunity from infection and illness from another strain of the same disease.
    - On average, infected individuals will transmit the infection to at least 2 or more other persons.
    - The clinical disease attack rate may be 30 percent or higher. The illness rates will be highest among certain groups denoted as having increased levels of risk. Among working adults, an average of 20 to 50 percent will become ill during a given wave of infection and illness.
    - Some individuals will become infected but not develop clinically significant symptoms. Asymptomatic or minimally symptomatic individuals can still transmit infection to others and may develop immunity to subsequent infection as a result.
    - The first and most severe wave of an epidemic/pandemic will generally last 6 to 8 weeks, with subsequent waves of infection and illness of similar duration. Historically, the largest and most severe waves have occurred in the fall and winter months, but neither the seasonality nor the duration of an outbreak cannot be predicted with certainty.
    - The stages of onset for an epidemic/pandemic have historically occurred sequentially, though they may overlap or occur so rapidly as to appear simultaneous or with some stages being skipped.
- Healthcare systems
    - The number of hospitalizations will depend on the infection rate of the disease. Risk groups for severe and fatal infection cannot be predicted with certainty, but are likely to include infants, the elderly, pregnant women, and persons with underlying chronic medical conditions.

[9] For pandemic specific guidance, see CDC – Emergency Preparedness and Response https://emergency.cdc.gov/planning/index.asp

  - The public health and health care system in general may become overwhelmed during an increase in the clinical disease attack rate and the associated increase of individuals who would seek medical care or require hospitalization.

- Vaccinations:
  - A vaccine (epidemic/pandemic-specific strain) will not be available for distribution in the near term after the clinical confirmation of sustained human-to-human epidemic/pandemic transmission.
  - Available vaccines are not universally accepted and there is limited ability to mandate that employees are vaccinated.

- Medication
  - Strains of potentially epidemic/pandemic diseases may respond to existing medications. During the buildup of a disease outbreak, the CDC will provide guidance to public health authorities and to healthcare providers regarding the projected effectiveness of the medications on the particular strain(s) causing the outbreak.
  - If the disease is susceptible to treatment with drugs, high demand may lead to shortages of those drugs. Access to drugs may initially be limited or in short supply, or later prove to be ineffective.

Workforce Assumptions

- Staffing
  - Staffing and related actions necessary to counter the effects of an epidemic/pandemic will differ considerably in detail and execution from other events noted in a business-continuity plan. In general, standard business-continuity planning and strategies will not apply entirely, as the risks and disruptions may exist at every level of business, commerce, and society nationally.
  - A sufficient number of critical personnel will need to be available to ensure the safety, security, operation and maintenance of critical systems, facilities, and infrastructure. Therefore, some essential personnel or designated alternates must be relied upon to physically report to work for the duration of an epidemic/pandemic.

- Absenteeism
  - A severe epidemic/pandemic could affect a significant amount workforce at the peak of the epidemic/pandemic cycle and may rapidly infect entire groups (clusters) of employees who work in close proximity or share the workspace, furnishings, and equipment.
  - Certain public health measures enacted (e.g., school and day care closures, quarantines, shelter-in-place) may increase rates of absenteeism.
  - High rates of absenteeism, illness, or mortality could threaten the functioning of multiple national critical infrastructure sectors, the movement of goods and services, and the operations of critical private sector businesses, institutions, as well as government agencies.

- Resources
    - Significant supply chain interruptions and transportation disruptions will likely occur, affecting basic services and leading to shortages of essential supplies for varying periods of time. This could have significant ramifications for the economy, security, and the basic functioning of society.
    - Personal protective equipment (PPE) and others supplies may not be readily available.
- Other
    - Some geographical areas of the nation may see significantly greater rates of infection and absenteeism in the workforce in comparison to others during the course of epidemic/pandemic waves or cycles. This variance may also be present between regional offices.
    - Stringent restrictions (e.g., during an imposed community quarantine) on the non-essential movement of the population may be imposed by federal, state, local, or provincial authorities, potentially encumbering the movement of essential personnel to and from their assigned work locations, especially if work locations are in access-denied areas. This may require continuous liaison and coordination with federal, state, local, tribal, or provincial public health and law enforcement organizations in order to ensure that these personnel are not unnecessarily detained or restricted from travel to and from their assigned work locations.

6. Preparation and Mitigation Strategies

The organization should work to prepare and mitigate for an epidemic/pandemic by disseminating and implementing this plan as a supporting document to the organization's business-continuity plans, along with providing relevant training and planning/conducting exercises to test employee capabilities and system functionality. The organization should also continue to emphasize and promote public health guidance and non-pharmaceutical intervention within the organization to prevent the transmission of infection.

Preparation Strategies

While organizations have existing business continuity plans, the unique circumstances, and potential consequences of a severe epidemic/pandemic necessitate the development of additional strategies for the management of and response to such events. Responsible managers at all levels should be prepared to implement flexible and scalable administrative, operational, and security response strategies that are designed to decrease the spread of infection in the workforce, counter the potential impact, and ensure the continuity of operations for the duration of an epidemic/pandemic.

- Tracking and screening of employee health
    - Develop mechanisms for tracking the cause of employee absences and workplace-contact tracing of employees with confirmed cases. See the "Contact Tracing" section of the plan for additional information.
    - Continuously monitor and track known cases and rates of absenteeism in work groups and the workforce in general to assess the potential impact on operations, particularly in work groups vital to the conduct of mission-critical operations, business, and support functions. Rates of infection and absenteeism among employees in a work group can increase rapidly- such instances cannot be predicted but should be anticipated and planned for in advance.
    - Develop procedures for tracking the health of employees that must travel to high-risk areas and restrict non-essential business travel, as appropriate.
    - Develop procedures for the screening of employees and visitors from high-risk areas prior to permitting their access to workspaces where mission-critical operations, business, and support functions are conducted (e.g., control centers). Procedures should be developed using best practices and public health guidance.
- Testing
    - Establish and maintain relationships with healthcare organizations and professionals to ensure a resource is available to help explain the effectiveness and accuracy of test kits when they become available for an epidemic or pandemic
    - Since test kits may be limited, especially at the beginning of a pandemic, procedures should cover which employees (e.g., essential employees) and when (e.g., start of sequestration) they should be tested.
    - Work with government officials to establish testing priorities for essential employees.

- Identification and staffing of “essential” positions
    - Identify and prioritize the role of each organizational element and associated functions or operations in terms of “essential” and “non-essential,” in the event a severe epidemic/pandemic preempts the ability to sustain normal operations. Consider limiting or reducing the conduct of non-essential functions and operations, as advisable or as directed, under conditions of increasing risk and unusually high rates of illness and absenteeism in the workforce. In this case, non-essential operations should be curtailed, temporarily suspended, or conducted remotely and the focus should be shifted to the conduct of essential operations with the available workforce. There may be considerations with respect to contractual arrangements or unions that need to be accounted for in this decision.
    - Accounting for unusually high rates of illness and absenteeism during the course of an epidemic/pandemic wave (e.g., control centers), develop contingency plans for the temporary replacement of employees in organizational elements or work groups tasked with the conduct of mission-critical operations, business, and support functions. This may require the temporary augmentation of with volunteer staff from other areas with relatively low rates of illness and absenteeism.
    - The use of public transportation should be avoided for essential personnel whenever possible; given the high transmissibility of diseases that reach an epidemic/pandemic level, the use of personal or company vehicles should be strongly encouraged or mandated. Social distancing practices should still be followed in non-public transportation, for instance, no more than one individual should be permitted within a company vehicle at a time.
    - Employee work schedules and compensation
        - Develop work schedule plans for essential employees.
        - Develop shift-change plans and protocols for essential employees working shift jobs (e.g., control room operators and transmission field personnel).
        - Develop staggered shifts or flexible working hours to limit interpersonal contact in the workforce. This strategy is fundamentally the most effective method to control and limit the spread of infection and illness in the workforce. However, to be effective such measures must be implemented before escalating rates of infection, illness, and absenteeism become a crisis.
        - Develop financial compensation plans for essential employees (e.g., lump sum payments, bump up in hourly pay rates), given possible hardships they may be asked to face (e.g. sequestration, extended work hours)
- Quarantining and sequestering of employees
    - Develop self-quarantine plans for essential employees; self-quarantining is defined as an employee voluntarily going into isolation at home for the CDC recommended timeframe (e.g., 7 days, 14 days) prior to reporting to work.

  - Develop plans for shelter-in-place orders or sequestering of essential employees (to include sequestration area access control), including any special provisions for support services (e.g., food service, prescription delivery).
    - Plans should include details for safe delivery of products or services, such as special delivery containers, use of masks, and ingress/egress procedures.

- Family support for essential employees
  - Develop support plans for to families of essential employees who may be called on to work in high-risk areas, or who may be sequestered. These plans should consider, among other things, family lodging, food, medical support, and mechanisms for communication between essential employees and their families.

- Identification of key supply chain requirements
  - Identify key supply chain requirements and take appropriate measures in advance to ensure availability of critical materials and supplies from vendors and suppliers who may also experience disruptions in manufacturing or delivery capabilities.
    - Such considerations will likely extend to PPE, which may include face shields, surgical masks, etc.
  - Stockpile specialized personal hygiene supplies (e.g., Food and Drug Administration-approved anti-viral hand sanitizers) to help protect, control, and prevent the spread of infection in the workforce for the duration of an epidemic/pandemic.

- Workplace sanitation, social distancing, and related activities
  - Consistent with public health guidance, develop procedures for increased sanitary measures in common areas and workspaces, including provisions for providing surface disinfectants to employees, facility maintenance, and/or outsourced custodial services to help control and prevent the spread of infection in the workforce. Such measures include, but are not limited to:
    - Frequent disinfecting of high-touch surfaces by a cleaning service;
    - Disinfecting of phones and desks at the beginning and end of shifts;
    - If possible, avoid system operators using the same console as the previous shift, allowing the console to be cleaned and remain dormant for a period;
    - Issue a personal keyboard, headset, and mouse to each operator.
  - Develop strategies to implement “social distancing” in the workplace.
    - For more details, see Social Distancing in the “Mitigation Strategies to Limit Transmission of Illness” section and Social Distancing Model in Appendix 3.
  - Relax the requirement for employees to obtain written proof of illness from a physician after multiple consecutive days of absence on sick leave. During the course of an epidemic/pandemic,

the health care system in general may be under significant strain and unable to accommodate this requirement.

- Epidemic/pandemic-specific security posture
    - Cyber: Develop strategies to address the increased threat of phishing attempts and cyberattacks.[10]
    - Physical: Develop strategies to maintain physical security, such as ensuring camera sight lines are not impeded by RVs or other equipment staged for sequestration.
- Work from home
    - Simplify policies and procedures, and broadly expand work from home capabilities for both "essential" and "non-essential" employees using virtual private network (VPN), virtual desktop infrastructure (VDI), or similar technologies. This strategy is, without exception, the best method to implement "social distancing" in the workforce throughout an epidemic/pandemic and for any other emergency event that requires functional remote access from an alternate location to sustain employee productivity and the continuity of operations. Work from home capabilities should be fully implemented and tested prior to the occurrence of an evolving health crisis or emergency event.
    - Consider development of policies that would allow employees to take equipment and furniture home with them to increase productivity (e.g., office chairs, scanners, printers, stationery supplies, etc.).
- Vaccinations and seasonal preparedness
    - Implement a comprehensive employee awareness campaign to educate and keep employees informed before and during the typical vaccine cycle (e.g., cold and flu season), and for the duration of an escalating health crisis resulting from the outbreak of a severe epidemic/pandemic. Encourage the vaccination of all employees, as it remains the primary and most effective measure to protect, control, and potentially prevent the outbreak of infection in the workforce.
    - Develop a strategy to influence prioritization of essential-employee immunizations. It is assumed that an effective vaccine will not be available in the near term after the start of any epidemic/pandemic. When a vaccine does become available, the demand will likely exceed the supply for some time.
    - Develop a strategy that addresses provisions for employees who choose not to be vaccinated.
    - Conduct comprehensive senior management reviews to assess and ensure readiness and effectiveness of epidemic/pandemic response plans, procedures, or policies.

[10]COVID-19 Exploited by Malicious Cyber Actors, see https://us-cert.cisa.gov/ncas/alerts/aa20-099a

- Other
    - Provide relevant training on the epidemic/pandemic plan.
    - Conduct drills/exercises to ensure workforce readiness, such as bi-annual or annual mass-telework testing.
    - Develop cyber security and physical security checklists to ensure corporate security requirements can still be met.
    - Organizations should work with federal, state, provincial, tribal, and local partners to develop and maintain freedom of movement travel credentials for key personnel to carry and present as needed during shelter-in-place order.[11]
    - Develop preparation and implementation checklists to verify all planned actions have been performed.

Mitigation Strategies to Limit Transmission of Illness

These strategies are designed with the intent to stop, slow, or otherwise limit the spread of an epidemic/pandemic. Strategies include stockpiling personal protective equipment (PPE) and disseminating information (in advance) on good housekeeping tips, social distancing, and contract tracing.

Epidemic/Pandemic PPE

Review industry-critical PPE needs for epidemic/pandemic planning purposes. Maintain awareness of the current PPE inventory, supply chain, and utilization rate. Since PPE may be limited, especially at the beginning of a pandemic, procedures should cover how much inventory should be carried considering which employees or job functions should have priority to the PPE available. An additional consideration is that PPE has a limited shelf life which varies according to item. As such, inventories should be rotated and plans developed on that basis to assure efficient use of the PPE before it expires.[12] The CDC has developed a PPE burn rate calculator to help companies plan and optimize the use of PPE.[13] Examples of PPE may include the following:

- Nitrile gloves
- Shoe covers
- Protective clothing
- Goggles/glasses

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[11] For example, a freedom of movement package may include: 1) a letter from CEO or equivalent outlining the DHS guidance and company mission, 2) a company-issued vehicle placard, 3) a memo from the Attorney General instructing all US Attorneys to work with state and local partners to ensure essential workers have freedom of movement, and 4) a DHS/CISA critical employee identification memo.

[12] For example, PPE could be donated to local hospitals months or longer before it expires assuring proper use and while providing societal and potential financial benefits to the utility.

[13] To download and customize the CDC burn rate calculator, see https://www.cdc.gov/coronavirus/2019-ncov/hcp/ppe-strategy/burn-calculator.html.

- Hand sanitizer
- Masks (dust, respirator, etc.)
- Anti-bacterial soap
- Trash bags
- Wipes (anti-bacterial, alcohol, antiseptic)
- Thermometers
- Batteries

Good Household and Personal Hygiene[14]

- Cover your mouth and nose when you sneeze or cough
- Wash your hands
- Don't share personal items
- Keep surfaces clean
- Avoid close contact with others (social distancing)

Control Center and Office Space Considerations[15]

Considerations should be given regarding the configuration of workspaces in which employees operate. This is especially true for control centers, as the reliability and safety of the grid is reliant upon their safe operation. Beyond ad hoc retrofitting of control centers to address the immediate threat of an epidemic/pandemic, modifications should be made to ensure that the readiness endures into the future.

Environmental systems considerations include heating, ventilation, and air conditioning (HVAC) modifications such as:

- pathogen filtration;
- use of UV light as a disinfectant medium;
- increasing the rate of airflow;
- negative/positive air pressure setups.

Workplace modification considerations include:

- disinfecting workplaces with UV light;
- providing personalized equipment to each employee and an associated storage locker;

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[14] For additional information on water, sanitation & environmentally-related hygiene, see https://www.cdc.gov/healthywater/hygiene/index.html

[15] For additional information and examples of control center and office space considerations, see Appendix 5.

- using portable air cleaners;
- separating physical workspaces;
- installing hand sanitizing stations, screening stations and PPE storage;
- thermal imaging capabilities;
- antimicrobial entry mats and surfaces;
- no-touch and hands-free hardware.

Social Distancing

Social distancing is a strategy where one avoids crowded places, large gatherings of people, or close contact with others. In these situations, diseases can easily spread from person-to-person.

This strategy is fundamentally the most effective method to control and limit the spread of infection and illness in the workforce. However, to be effective it must be implemented before escalating rates of infection, illness, and absenteeism reach crisis levels. Social distancing measures, such as limiting public gatherings and reducing operations are most effective to limit exposure to the disease if implemented before or at the onset of the disease's entry into the organization's workforce.

- Use telephone, secure video conferencing, or the internet to conduct as much business as possible (including within the same building).
- Cancel or postpone any non-essential travel, meetings, workshops, etc.
- Consider staggered shifts or flexible working hours to further limit interpersonal contact in the workforce.
- Encourage employees to practice social distancing while they are away from the office (e.g., home, commuting, etc.).

See "Social Distancing Model" in Appendix 3 for more details of a social distancing model.

Contact Tracing

Contact tracing involves working with an individual diagnosed with an infectious disease to identify and provide support to others who may have been infected through exposure to the initially infected individual. The goal of this process is to prevent further disease transmission "by separating people who have (or may have) an infectious disease from people who do not. It is a core disease control measure that has been employed by public health agency personnel for decades."[16]

Any contact tracing effort should be developed in coordination with organized labor (if applicable), HR professionals, and legal counsel, and should be communicated clearly to the workforce and to other

[16] For additional information on contact tracing, see the Centers for Disease Control and Prevention, available at: https://www.cdc.gov/coronavirus/2019-ncov/php/contact-tracing/contact-tracing-plan/contact-tracing.html

stakeholders. In addition, the process should emphasize and value employee confidentiality and adhere to applicable federal, state, and local privacy laws.[17]

Managing Health of Field Workers[18]

For field workers operating in high-risk areas, the following practices should be considered:

- Separate field operations into geographic areas; no employees to leave assigned area without management approval.
- Field employees should employ social distancing to the fullest extent possible and take extra hygiene precautions.
- No congregating in office spaces, no groups without approval.
- Work schedules should be adjusted to accommodate social distancing.
- Contractors required to practice social distancing and have no access to crew headquarter facilities.
- High-risk employees to be sent home and will be dispatched for outage-response only.
- Allow only one employee in any company vehicle at a time.
- Adjust deployment of workforce between active and work-at-home or sequestered (e.g., half of workers in field, half at home).

Cross-Sector Coordination/Interdependencies

- Cross-sector impacts need to be reconsidered in light of a pandemic, which is a "people" event, rather than a traditional system event.[19] Coordination efforts may need to be increased for the traditional sectors (e.g., energy (natural gas), water and wastewater systems, communications, etc.). Further, during pandemic conditions, additional coordination may be required with other critical infrastructures sectors (e.g., healthcare and public health, transportation systems, emergency services, etc.)
- A vital U.S. Federal Government effort to identify, analyze, prioritize, and manage strategic risk across the critical infrastructure and key resource (CIKR) sectors is through the National Risk Management Center (NRMC). This work has resulted in the identification of the National Critical Functions; these are functions of Government and the private sector so vital to the United States that their disruption, corruption, or dysfunction would have a debilitating effect on security, national economic security, national public health or safety, or any combination thereof.[20]

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[17] For additional information on planning considerations for contact tracing in the electric power industry, see the May 11, 2020 Electricity Subsector Coordinating Council guidance, available at: https://www.electricitysubsector.org/-/media/Files/ESCC/Documents/Contact-Tracing-Planning-Considerations---May-2020-FINAL.ashx

[18] For additional practices on planning considerations for field and construction work, see *ESCC - Assessing and Mitigating the Novel Coronavirus (COVID-19): A Resource Guide*

[19] See *NERC Special Report Pandemic Preparedness and Operational Assessment: Spring 2020*

[20] https://www.cisa.gov/national-critical-functions-set

- Developed by FEMA, the *National Response Framework (NRF)*,[21] presents the guiding principles that enable emergency responders to prepare for and provide a unified national response to disasters and emergencies. Federal and many state governments organize much of their own emergency response resources and capabilities under the 15 Emergency Support Functions (ESF),[22] which serve as the mechanism through which federal resources and capabilities can be leveraged in both Stafford Act and non-Stafford Act incidents.

[21] Available at https://www.fema.gov/sites/default/files/2020-04/NRF_FINALApproved_2011028.pdf.
[22] Information for each ESF can be found in its corresponding annex, which is available at https://www.fema.gov/media-library/assets/documents/25512.

7. Response Actions

Department of Energy Recommended Action Matrix for Pandemic (Modified)

In effectively meeting the management and operational challenges posed by an epidemic/pandemic, organization responses should be based upon pre-determined action levels at various stages of the epidemic/pandemic. A useful guide to define the response actions is the DOE Recommended Action Matrix for Pandemic Influenza. As such, the organization should develop a modified version of this matrix. This matrix identifies three numerical action levels that are keyed to the severity of an epidemic/pandemic, where "Action Level 1" is the least severe and "Action Level 3" the most severe.

The organization, with input from the CDC and other federal/state/provincial/tribal/local government agencies, should determine the recommended Action Level by identifying the scope and severity of the epidemic/pandemic. If and when the situation warrants, the organization should notify employees of the evolving situation and recommend actions appropriate and consistent with the corresponding Action Level. In addition, depending on differences within the organization, it may be determined that varying Action Levels are needed, based on local and regional conditions, or varying criticality of functions.

> The DOE Recommended Action Matrix for Pandemic Influenza should be used to inform actions taken by the organization to address the management and operational challenges posed by an epidemic/pandemic. Organizations should develop a modified version of this matrix for their own internal use.

The tables on the following pages represent the modified DOE Recommended Action Matrix for Pandemic Influenza. The tables briefly summarize:

- conditions and characteristics of each level;
- associated planning, preparedness or response actions for the organization;
- responsibilities for actions.

ACTION LEVEL 1
VIRAL OUTBREAK

Small outbreaks of infection and person-to-person transmission.

Response Actions
Managers and Supervisors

- Remain aware of the status and effects of a pandemic locally, regionally, nationally, and on operations.
- Monitor and keep the management chain informed of any evolving situation where employee absenteeism threatens to degrade the continuity of mission essential functions or critical supporting business operations.
- Ensure employees are kept informed of the status and potential effects of the pandemic and preventive measures to protect themselves, family members, and coworkers.
- Review applicable business-continuity and pandemic-response plans. Update and revise as necessary.
- Ensure that employee emergency contact rosters are up to date.
- Ensure lines of succession and delegation of authority protocols are current and understood.
- Review pandemic response plan with employees, ensuring they clearly understand their roles and responsibilities during the course of a pandemic.
- Ensure telework/telecommuting agreements are in place for personnel designated as "essential" to the continuity of operations, and relied upon to continue working from a remote location (home) as conditions warrant for the duration of pandemic.
- Review all planned work projects (e.g., computer system upgrades, construction and maintenance of T&D) for next 8-12 weeks and determine which ones are priority and need to be continued during the pandemic and which ones can be deferred until after the pandemic.
- Ensure plans for sequestering of essential employees and any support persons (e.g., food service, janitorial) who will be needed to support these essential employees are ready to be implemented. This includes things such as contracts with local hotels, etc.
- Ensure plans to provide support to families of essential employees who made be called on to work in high risk areas or who may be sequestered are ready to be implemented. These plans should consider things such as family lodging, food, and medical support as well as mechanisms to provide for communication between essential employees and their families.
- Implement self-quarantining of essential employees in anticipation of needing to move to sequestering at level 2.
- Develop specific work schedules for essential employees in anticipation of needing to move to level 2.
- Ensure "essential" personnel designated to perform telework/telecommuting are appropriately trained, equipped, proficient in the use of the applied technology, and capable of completing required work assignments or tasks from a remote location (home).
- Remain aware of applicable human resource guidelines and policies regarding sick

leave and family leave policies during a pandemic.

- In the event of a CDC travel advisory, restrict non-essential business travel accordingly.
- To the extent practical, institute “social distancing” (face-to-face interaction) protocols and limit attendance or hosting of conferences, and restrict non-essential business travel.
- To the extent practical, promote adherence to recommended preventive measures, such as the use of hand and surface sanitizers, sneeze and cough etiquette, and influenza vaccinations.
- Coordinate with public affairs/relations to develop and implement communications plan to ensure consistent messaging and comprehensive outreach.

Response Actions
Departments/Offices of Safety, Security, Occupational Health

- Monitor specialized information resources for evolving trends and health alerts (i.e., Centers for Disease Control, Department of Health and Human Services, Department of Homeland Security, and DOE Headquarters).
- Monitor the status and effects of the pandemic locally, regionally, and nationally and keep the management chain informed of any evolving situation that could threaten the health of the workforce and degrade the continuity of operations.
- Review applicable business-continuity and pandemic-response plans. Update and revise as necessary.
- Begin planning for the phased implementation of business-continuity and pandemic-response plans, in conjunction with organizational senior management teams.
- Maintain currency on known or potential criminal activity and terrorist threats. Ensure the continuation of facility security, access control, and critical infrastructure protection functions.
- Brief senior management on the nature of any potential health or security threats.
- In conjunction with safety committees, develop and promote pandemic awareness campaigns to keep employees informed on the symptoms of influenza, the potential effects of a pandemic, and preventive measures to protect themselves, family members, and coworkers.
- Promote the use of hand and surface sanitizers and coordinate their procurement and distribution to the workforce.

Response Actions **Administrative Officers/Human Resource**
➢ Remain aware of the status and effects of a pandemic locally, regionally, and nationally. ➢ Develop or revise telework policies and procedures for personnel designated as "essential" to the continuity of operations and relied upon to continue working from a remote location (home) as conditions warrant for the duration of pandemic. ➢ Develop policies for the temporary replacement of employees in organizational elements or work groups tasked with the conduct of mission essential functions and critical supporting business operations, resulting from unusually high rates of illness and absenteeism during a pandemic wave. ➢ Develop policies for compensation of essential employees ➢ Develop or revise policies and procedures on telework for designated "essential or critical" personnel during a pandemic or business-continuity emergency event. ➢ Develop policies concerning the use of administrative, annual, and sick leave during a pandemic; ensure management and employees are informed. ➢ Coordinate the scheduling and administration of influenza vaccinations to the workforce. ➢ Monitor CDC travel advisories and develop policies for the use of administrative or annual leave following the return of employees from business or personal travel from regions or areas identified in the travel advisories.
Response Actions **Information Technology**
➢ Develop, implement, and test the capability to support enhanced telework/telecommuting using virtual private networks or remote desktop protocol for designated "essential" personnel. ➢ Develop associated training or support mechanisms for "essential" personnel designated to perform telework. ➢ Begin planning for the implementation and support of telework as the situation warrants, or for the duration of a severe pandemic.

ACTION LEVEL 2
VIRAL OUTBREAK
Large outbreaks of infection and person-to-person transmission.

Response Actions
Managers and Supervisors

- Senior managers begin evaluation of the situation and plan or consider the phased implementation of applicable elements of business-continuity, business-resumption, and pandemic-response plans, dependent on local and regional conditions.
- Remain aware of the status and effects of the pandemic locally, regionally, nationally, and on operations.
- Monitor and keep the management chain informed of any evolving situation where employee absenteeism threatens to degrade the continuity of mission essential functions or critical supporting business operations.
- Ensure employees are kept informed of the status, potential effects of a pandemic, and preventive measures to protect themselves, family members, and coworkers.
- Implement the full-time use of telework/telecommuting for personnel designated as "essential" to the continuity of operations as conditions warrant, or for the duration of pandemic to develop proficiency and ensure functional capabilities.
- Implement sequestering of essential employees.
- Implement family support programs for essential employees.
- Defer planned work projects (e.g., computer system upgrades, construction and maintenance of T&D) not deemed to be critical per review performed in level 1.
- To the extent practical, increase the use of "social distancing" (face-to-face interaction) protocols and the restriction of non-essential business travel.
- To the extent practical, continue to promote adherence to recommended preventive measures.
- Coordinate with public affairs/relations to develop and implement communication plan to ensure consistent messaging and comprehensive outreach.

Response Actions **Departments/Offices of Safety, Security, Occupational Health (depending on organization)**
➢ Continue monitoring specialized resources for evolving trends and health alerts. ➢ Continue monitoring the status and effects of the pandemic locally, regionally, and nationally and keep the management chain informed of any evolving situation that may threaten to degrade the continuity of operations. ➢ Brief senior management on the nature of any potential health or security threats. ➢ Plan or consider the phased implementation of applicable elements of business-continuity, business-resumption, and pandemic-response plans, in conjunction with organizational senior management teams. ➢ Maintain currency on known or potential criminal activity and terrorist threats. Ensure the continuation of facility security, access control, and critical infrastructure protection functions. ➢ In conjunction with safety committees, continue to promote the use of preventive measures and keep employees informed of the situation and the potential impact of the pandemic.
Response Actions **Administrative Officers/Human Resource**
➢ Remain aware of the status and effects of the pandemic locally, regionally, or nationally. Make any necessary changes to existing policies or procedures as the situation warrants. ➢ Continue monitoring CDC travel advisories and make changes to existing policies as necessary. ➢ Consider providing additional accommodations for individuals who identify themselves as “high risk,” for complications associated with illness from influenza, by reducing their social contact with the workforce at large to extent practical.
Response Actions **Information Technology**
➢ Continue to support or potentially expand telework/telecommuting capabilities for designated “essential” personnel for the duration of the pandemic. ➢ Ensure continued technical and service support for mission essential functions and supporting critical business operations.
Response Actions **Procurement/Budget**
➢ Ensure purchasing and vendor services are in place and ready to use. (Procurement) ➢ Ensure emergency funds are available for essential personnel. (Budget)

ACTION LEVEL 3
SEVERE PANDEMIC OUTBREAK
Increased and sustained transmission in the general population nationally.

Response Actions
MANAGERS AND SUPERVISORS

- Senior management teams continue to evaluate the situation and business-continuity and pandemic-response plans, as appropriate.
- Ensure the continuity of mission essential functions and supporting critical business operations.
- Remain aware of the status and effects of the pandemic locally, regionally, nationally, and on operations.
- Monitor and keep the management chain informed of any evolving situation where employee absenteeism threatens to degrade the continuity of mission essential functions or critical supporting business operations.
- Ensure employees are kept informed of the situation and potential effects of the pandemic.
- To the extent practical, continue the use of "social distancing" (face-to-face interaction) protocols and the restriction of non-essential business travel.
- To the extent practical, continue to promote adherence to recommended preventive measures.
- Coordinate with public affairs/relations to develop and implement communication plan to ensure consistent messaging and comprehensive outreach.

Response Actions
Departments/Offices of Safety, Security, Occupational Health (depending on organization)

- Continue monitoring specialized resources for evolving trends and health alerts.
- Continue monitoring the status and effects of the pandemic locally, regionally, and nationally and keep the management chain informed of any evolving situation that may threaten to degrade the continuity of operations.
- Brief senior management on the nature of any potential health or security threats.
- Implement applicable elements of business-continuity and pandemic-response plans, in conjunction with organizational senior management teams.
- Maintain currency on known or potential criminal activity and terrorist threats. Ensure the continuation of facility security, access control, and critical infrastructure protection functions.
- In conjunction with safety committees, continue to promote the use of preventive measures and keep employees informed of the situation and the potential impact of the pandemic.

Response Actions **Administrative Officers/Human Resource**
➢ Remain aware of the status and effects of the pandemic locally, regionally, or nationally. Make any necessary changes to existing policies or procedures as the situation warrants. ➢ Continue to monitor CDC travel advisories and make changes to existing policies as necessary.
Response Actions **Information Technology**
➢ Continue to support or potentially expand telework/telecommuting capabilities for designated “essential” personnel for the duration of the pandemic. ➢ Ensure continued technical and service support for mission essential functions and critical business operations.
Response Actions **Procurement/Budget**
➢ Support the need for expenses, purchases and vendor services to ensure “essential” personnel have logistical items to continue working at the organization’s facilities.

8. Recovery Actions

The goal of recovery is to resume normal operations and services in a deliberate and prioritized manner. The onset to the peak of the epidemic/pandemic occurs over a period-of-time, depending on the characteristics specific to the epidemic/pandemic. Similarly, the recovery will occur over a period-of-time. Generally, the same levels and triggers as used during escalation can be considered, in reverse, for the recovery process. Key elements of the restoration will be de-escalating in a manner and at a pace such that electric transmission reliability and resilience are steadily increased and the epidemic/pandemic does not reemerge, especially within essential functions or staff.

General organizational actions will include, but are not limited to:

- staying informed of CDC guidelines and adjusting action as needed;
- staying informed of federal, state, provincial, and local government restrictions
- continuing screening and health checks as appropriate;
- remaining vigilant for signs of illness returning to employees and the community;
- restocking depleted supplies;
- returning to usual job functions and scopes of practice;
- hiring and training, as needed;
- continuing to promote principles of good household and hygiene;
- analyzing data from the epidemic/pandemic and drafting or contributing to “after-action” reports and corrective-action measures;
- completing work for financial reimbursement, as appropriate, through national emergency plans.

Additional, tactical actions the organization can consider are as follows:

- maintaining significant portions of the workforce as remote, consistent with adequate fulfilment of job functions;
- prepare for a scenario of extended, or even permanent, work from home for specific jobs;
- restricting visitors, in particular to functional areas essential to reliability and resilience;
- limiting staff travel and avoiding large face-to-face meetings, especially when not able to properly apply social-distancing recommendations;
- continued use of periodic, mandatory health questionnaires, appropriate personal protective equipment, and effective mass screening (infrared temperature monitoring at ingress).

Additionally, for employees who suffered losses during the outbreak, support should be provided to help deal with the associated grief and stress. Group grief counseling should be considered for work groups where employees have died. This also provides a reminder of the opportunities for further individual counseling.

9. Other Resources

- CDC Pandemic Preparedness Resources: https://emergency.cdc.gov/planning/index.asp
- CDC Cleaning and Disinfecting Your Facility: https://www.cdc.gov/coronavirus/2019-ncov/community/disinfecting-building-facility.html
- Department of Energy Pandemic Response Plan: https://www.energy.gov/downloads/doe-pandemic-response-plan

Appendix 1: Template

Below is a template approach for developing a response plan with a suggested list of sections to include and a brief description of each section.

Introduction

Include a brief introduction to note why the organization has an epidemic/pandemic response plan.

Purpose

Include a purpose statement to explain what the plan is designed to accomplish.

Scope and Objectives

State the scope (e.g., to which parts of the organization the plan applies) and some specific objectives (related to health and safety, preparedness, etc.).

Plan/Document Organization

Include a table of contents or list of topics.

Definition of Terms

Include definitions for certain terms that may be open to interpretation or have a specific meaning in relation to the plan. When possible, base definitions on input from sources with expertise in the topic.

Roles and Responsibilities

Define which parts of the organization are responsible for developing and implementing the plan.

Assumptions

Include a set of assumptions to help baseline organizational understanding of a pandemic and its potential impacts (on the general public and the organization). Gather input from governmental and other credible sources and update the section periodically or when emergent/new information becomes available.

Preparedness and Mitigation Strategies

Include details for how the organization will prepare for a pandemic and limit the spread of illness.

Response Actions

Include a set of actions to take when a pandemic is imminent or underway. This section should detail what actions are necessary at stages of the pandemic. Companies will generally use a multi-step plan, especially transmission operators (organizations) with a control center.

Recovery Actions

Include a section on recovery actions to support an orderly return to normal operations and initiate follow-up actions to learn from the pandemic and the organizational response to the situation.

Other Resources

Include a section on where to find related information, such as governmental websites.

Supplemental Information

Include supplemental information, as appropriate, in specific sections of the pandemic response plan or in an appendix.

Appendix 2: Examples of Epidemic/Pandemic Actions

Information in this appendix was created from NATF member actions during the COVID-19 pandemic.[23]

Control Center Response Plan

Level 0 (Awareness)

- Ongoing meetings of corporate and/or division epidemic/pandemic oversight committee.
- Monitor national, state/provincial/tribal, and local government guidance.
- Review epidemic/pandemic plan; update contact information as needed, confirm critical business functions, and identify critical employees.
- Start to leverage subject-matter experts outside of the electric industry to start preparing (i.e., epidemiologists, health care professionals, epidemic/pandemic response teams, etc.).

Level 1 (Limited Risk of Community Transmission)

- Limit business-related travel; staff who have personally traveled, or have members of their household who have travelled, to an area with an active travel notice or a known area with sustained community transmission, should notify supervisor and may be asked to self-quarantine. Similarly, employees may be asked to be tested for infection prior to returning to work.
- Implement social distancing in the workplace.
- Review hygiene recommendations.
- Disinfect workstations at shift turnover and in the event an operator takes ill during shift.
- If possible, assign workstations to specific operators (avoid sharing workstations).
- Assign personal headsets for operators.
- Ask employees who are ill to stay home.
- Clean/disinfect high-touch areas daily.
- Use a checklist to ensure compliance with requirements.
- Cancel in-person operator training cycle; use CBT and/or telepresence if needed.

Level 2 (Sustained Community Transmission)

- No visitors to facilities.
- No in-person meetings.

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[23] For additional examples of operational strategies and actions, see EPRI website Powering Through Together: Identifying COVID-19 Transmission and Distribution Operations Practices and COVID-19 Bulk System Impacts: Demand Impacts and Operational and Control Center Practices

- Operations personnel that are not on shift work from home.
- All off-shift operations staff advised on precautions to take at home.
- Control room and support personnel use separate entrances, kitchens, and bathrooms.
- Limit control room entry to tasks necessary to maintain system reliability.
- Limit entry of control room and control room support personnel into other areas of building.
- Plan for operator sequestration.

Level 3 (Widespread Community Transmission; Authorities May Declare Need to Shelter-in-Place)

- All non-operations personnel who can work from home do so.
- Implement alternating control centers.
- Implement at-home and/or start of shift health screening.
- Ask incoming shift to shelter-in-place at home (if not required by government order) to make sure they are available.
- Prepare for operator sequestration.

Considerations for Moving to Level 3

- Community transmission in the locations around the control center or where employees live.
- Exposure of any company employee to someone who tested positive.

Level 4 (Extreme Community Transmission; Authorities Declare Need to Shelter-in-Place)

- Operator sequestration (see “Sequestration Model”).

Considerations for Moving to Level 4

- Percentage of community in the vicinity of the control center infected by the virus.
- Potential or known positive case at the control center.
- Number of volunteers available to be sequestered.
- Suitability of facilities for long term sequester.
- Regulatory directive.
- Consider sequestration as a last option due to impact on operators being separated from families and potential fatigue. For additional information, see “Sequestration Triggers” below.

Health and Medical Practices

Practices for Shelter-In-Place to be Fit for Duty

Essential personnel should take precautions, up to and including sheltering-in-place. As state and local authorities issue shelter-in-place orders, companies should ask essential personnel to take additional precautions, especially for those employees scheduled to rotate into sequestration.

- Employee stays at home, no activities outside of the home.
- No non-essential visitors to the home.
- Do not share a bed or bathroom.
- Practice social distancing in the home.
- Wash laundry frequently and thoroughly.
- Disinfect all high touch surfaces every day.
- Monitor for signs of illness and report immediately.

Operator Health Screening and Monitoring

Operators and other essential personnel need to enter the control center as part of daily shift changes, rotations of sequestered operators, or to provide support for emergent issues. Practices to reduce the risk that an infected individual will be allowed into the facility include:

- health questionnaires, including previous potential exposures;
- temperature checks;
- testing for the specific virus, to the extent available.

In addition, it is important to monitor the health of individuals working in the control room by periodically (e.g., two times per day) assessing their health in one or more ways:

- asking employee to self-identify if not feeling well or experiencing symptoms;
- self-administered or medical-staff-administered temperature checks.

Responses to Positive Test for Control Room Operator

Procedures for responding to an operator with a positive test or symptoms that suggest that the worker is infected include:

- If the employee is in the company facility, send employee home; if at home, ask the employee to remain there.
- Notify company health and safety personnel.
- Notify supervision.
- Determine if other employees had close contact with the individual.
    - Consider employees on same shift and proximity to potentially infected employee.

  - Consider if person shared workspace with other operators.
  - Consult with company health and safety personnel to determine risk.
- Determine if conservative operations are to be implemented.
- Determine if there is need to adjust staffing guidelines or isolation status.

Criteria for returning to work for infected personnel

If an operator is diagnosed or may have been in contact with someone that exhibits symptoms, the operator is directed to stay home and self-quarantine. After the quarantine, they may return to work if specific criteria is met.

In some cases, infected employees are excluded from returning to work until a doctor's release is submitted. Upon return, the employee must:

- Adhere to the company policies and procedures, including CDC guidelines and company protocols on social distancing and hygiene steps, and
- Self-monitor for any recurrence of symptoms, and report any symptoms

Managing health of field workers

Companies established and communicated guidelines to limit exposure of field workers. The following steps were considered:

- Have all non-essential salaried support employees work from home/remotely
- Have high-risk employees work from and dispatch for outage response only
- Separate field operations into geographic areas; no employees to leave assigned area without management approval
- Require field employees to employ social distancing except when work makes it impossible; if not possible, provide PPE and take extra hygiene precautions
- Adjust work schedules to accommodate social distancing
- Have field employees report directly to jobsite where possible to avoid congregating in company facilities and riding together in vehicles
- Do not allow congregating in office space or group meetings without approval
- Require contractors to practice social distancing and eliminate access to crew headquarter facilities
- Allow only one employee in any company vehicle at a time
- Allow half of workers in field, half at home at any one time

Modifying and Maintaining Facilities and Tools to Reduce Transmission

This section describes member practices for modifying, cleaning, and disinfecting facilities and tools to reduce the risk of disease transmission

Configuring and cleaning control rooms

Steps can be taken to modify how the control room is used, or even change the layout, to reduce the risk that an asymptomatic or pre-symptomatic employee will transmit disease to co-workers:

- Increase distance between operating desks, either by moving desks or requiring operators to spread out
- Issue a personal keyboard and mouse to each operator
- Issue dedicated headsets to each operator and avoid use of telephone handsets
- When possible, avoid using the same console or desk as the previous shift, allowing the console to be cleaned and remain dormant for a period

Implement enhanced cleaning practices for individual workstations as well as common areas, such as kitchens and bathrooms. This includes frequent disinfecting of high-touch surfaces by the cleaning service and operators disinfecting phones and desks at the beginning and end of shifts.

Using an alternating control centers strategy allows desks to remain dormant for at least 12 hours and allows the control center that is not in use to be cleaned. Some strategies may include:

- Using alternating control centers on four-day intervals and hiring a professional company that specializes in disinfecting
- Using a company to wipe down and “fog” the control rooms
- Having the control centers treated with anti-microbial agents
- Stop outside cleaning services to avoid non-essential personnel in the facility

Operator Training and Certification

Training

In order to balance the need to maintain qualifications, keep the workforce safe, and prepare them for the special circumstances of an epidemic/pandemic, the following should be considered for training:

- Tools
    - Provide training/quick reference guide on use of web conferencing software tools (e.g., WebEx, Skype, Microsoft Teams).
    - Ensure technology (e.g., laptops, servers, VPN, mobile hotspots, etc.) supports large numbers of remote workers.
    - Ensure communications (e.g., phones, teleconferencing capabilities, microphones, webcams) are sufficient quality and support large numbers of remote workers.
    - Develop capability to access and use simulator remotely for training.

- Approach
    - Suspend in-person training.
    - Provide virtual training sessions (e.g., similar to in-person sessions by the company training group but via web/video conferencing).
    - Consider only training on critical tasks or implementing smaller, on-demand modules.
    - Document any deviations to regular training plan, as a result of the epidemic/pandemic.
    - Provide independent, online training (e.g., by purchasing NERC-approved training modules).
    - Where possible, while ensuring safety and physical distancing guidelines, as well as all CDC recommended safety protocols, provide on-site apprentice skills assessment progression training.

Staffing Qualified Operators

Beyond compliance, there is a need for adequate numbers of qualified operators to maintain the reliability and security of the transmission system. To plan for potential operator shortages due to an epidemic/pandemic, the following may be considered to identify additional resources:

- Current employees who are former operators and have maintained NERC certification.
- Recent retirees whose certification remains current.
- Support engineers who are NERC certified.
- Accelerated operator training for new operators.
- “Mutual assistance” relationships with other utilities as a last resort.

Consider limiting training for these additional resources (personnel) to “critical” tasks in order to expedite readiness. With this approach, these personnel would be placed on shift with experienced operators to complete their on-the-job training.

Appendix 3: Social Distancing and Sequestration Models

Social Distancing Model

Working adults may contract illnesses from their coworkers. Social distancing is one form of nonpharmaceutical intervention (NPI) designed to decrease the transmission of illnesses between people by minimizing exposure opportunities. This social distance model provides a comprehensive set of guidelines aimed at minimizing employee exposure to the influenza virus.

Social distancing affords opportunities to avoid contracting a virus. Social distancing, combined with other NPI, may:

- delay an eventual increase in the number of cases, buying time for the production and distribution of vaccines;
- decrease the epidemic peak, or maximum number of people ill at the same time;
- reduce the total number of cases over the course of the epidemic.

The types of social distancing are discussed below and are presented in order of implementation based on increasing levels epidemic/pandemic severity and the criticality of business processes being performed.

Suspend Group Activities. Group activities, such as meetings and presentations, often require close-quarter contact for long periods and should be avoided if possible. If meetings can be conducted over the telephone, by email, or by other means, they should be conducted as such. If the epidemic/pandemic is severe enough, all group activities should be suspended.

- Keep in-person meetings short.
- Maintain at least 6 feet distance between participants.
- Utilize alternate meeting options if possible.

Suspend Non-Critical Business Processes. During an emergency, the company does not need to perform all business processes. To improve employee safety non-critical business processes should be suspended, allowing employees to stay home. Business processes should only be resumed when safe to do so. Employees should receive periodic communications from their managers during this time.

Employees with special skillsets may be asked to support critical business processes that require additional staff.

Increase Physical Distance. Increasing the physical distance between employees during an epidemic/pandemic is the first step in social distancing.

It is not always possible to maintain an appropriate distance between yourself and others. In this case, you should make every effort to avoid direct person-to-person contact with others and to avoid direct spray from a cough or sneeze.

- Avoid shaking hands and other physical forms of greeting others.
- If possible, keep an empty desk or cubicle between yourself and the next employee.
- Allow adequate space between you and others when passing in close quarters.

- When in confined spaces, such as elevators, do not face anyone directly.

Sequestration Model

This sequestration model suggests what needs to be considered when developing detailed plans to implement sequestration. Quality and availability of support services are critical to ensuring that plans are implemented effectively and that employees are willing to volunteer to be sequestered. Support plans should include provisions for the following:

- **Duration**: Using available public health guidance determine a minimum sequestration duration, in order to ensure the availability of a replacement sequestered shift, given the minimum length of an ordered quarantine for exposure. Similarly, a maximum sequestration duration, driven by the expense associated with providing the support services for shifts and the exposure risk associated with shift changes, should be identified.

- **Lodging**: Most control center facilities either do not have existing designated lodging space; or only have spaced designed for temporary use during more traditional circumstances, such as storm responses. Given the extended nature of sequestered shifts, control centers may either need to retrofit existing spaces to accommodate personnel for longer periods of time, or they procure sleeping trailers and recreational vehicles to house operators on-site. Accommodations should limit the number of people in each designated sleeping space for comfort, with consideration for gender. Current cost assessments identify 6 weeks as cost parity for buying trailers vs. renting them.

- **Family Support**: Connectivity with family members is essential to ensuring the ability of operators to perform their jobs. Addressing unique family requirements such as childcare, medical requirements, transportation needs, and food/groceries should be considered during discussions with sequestration volunteers.

- **Food:** Determine the appropriate policies for providing prepared food to shift personnel, to include the frequency of delivery (to limit exposure risk from frequent interactions with delivery personnel). Consider the sanitation practices of the food provider to ensure the lowest possible risk. When adequate kitchen facilities are available, groceries may be delivered so that volunteers can prepare their own food.

Sequestration Triggers

Sequestration is likely to be the most effective means of reducing risk to critical control center employees during an epidemic/pandemic, but it is also the most resource- and cost-intensive option to implement. Sequestration also presents additional challenges to employees and their families at a time when stress and uncertainty already are running high. Careful consideration of the circumstances, or “triggers,” that dictate a decision to enact sequestration is necessary for determining if, and when, sequestration is necessary.

The decision to enact sequestration is driven by individual organization risk assessments and should not be based on any one criterion or data point alone, but it should consider the situation for a specific control center holistically. Considerations may include, but are not limited to, the following:

- The number of people showing symptoms or testing positive as a percentage of the population for the government jurisdiction (county or municipality) where the control center is located. This is largely based on the availability of testing and requires constant communication with staff who are both on-

and off-shift to monitor their health. Consideration should be given both to the location of the control center and the home addresses of employees who commute from outside the jurisdiction where the control center is located.

- The number of people showing symptoms or testing positive who perform certain job functions, primarily based on particular certified skills and the ability to hire a replacement. Acceptable risk should be based on the minimum staffing requirements of the control center and should include the availability of a reserve shift for critical position backfills. For example, shift supervisors are commonly certified in all positions in the control center, and the unavailability of more than one-third of a single organization's shift supervisors could compromise operations.
- The rate of infection spread across a geographic region. Special care should be taken to identify the point at which control center personnel are more likely than not to come into contact with an infected individual during their off-shift hours. The degree of risk to an employee is affected by the government and private-sector measures implemented to limit the spread of the virus, such as regulatory directives, closing of schools, daycare centers, public venues, restaurants, etc., or the implementation of a state- or city-wide shelter-in-place mandate.

Appendix 4: Control Center and Office Space Considerations

Environmental Systems

HVAC System Modification

Most HVAC systems include *air filtration* of some type, which is rated in terms of their Minimum Efficiency Reporting Value (MERV). Filters with a MERV value ≤ 8 are commonly used in office and industrial settings; while a MERV 8 filter will remove 85% of particles between 3-10 microns, such filters are not even tested against particles smaller than 3 microns (e.g., COVID-19 droplet nuclei). Filtration at the droplet nuclei level would require filters rated at ≥ 12 MERV. Note, MERV 10 should remove 50-65% of all particles between 1.0-3.0 microns, with MERV 12 being 90% efficient.[24]

Advantages of air filtration modifications include known effectiveness and simplicity; increased filtration may be as simple as replacing an air filter, and ratings are assigned based on testing against consensus standards by independent bodies. HVAC recommendations to help control infectious aerosol dissemination in non-healthcare buildings are available from the American Society of Heating, Refrigerating and Air-Conditioning Engineers. Note, however, that a more "efficient," that is, a higher MERV rating, filter may place a strain on components of the HVAC system, and other systems may not have the mechanical capacity for increased ratings—the appropriate technical and mechanical engineers should be consulted prior to any change in filter density. For instance: 1) some air handlers may not be capable of moving an adequate volume of air through a filter rated ≥ 12 MERV, thus requiring further system modification; and 2) energy consumption may rise, while system component lifespan may be degraded.

UV-C is defined as light between the 200-280 nanometer wavelength and "deactivates" viruses by damaging their DNA or RNA, provided there is adequate exposure to such light. Air duct UV-C utilization is common in the medical community, which has utilized it for decades in healthcare facilities.[25]

While UV-C systems have a proven and lengthy track record, HVAC systems may require physical modification at the time of installation. Furthermore, trained technicians may be required to maintain and repair the system, as effectiveness diminishes rapidly if the system is poorly maintained. Trained professionals should be consulted with respect to the design and installation of any such system.

In addition to in-duct utilization of UV-C light, a technique known as upper-room GUV can also be employed.[26] However, strict protocols and measures need to be established for all staff that remain at their workstations when GUV lights are in use, given the ability of GUV lights to cause skin cancer, destroy human cells, and damage corneas. If the control center has high ceilings and adequate ventilation, it can safely use upper-room GUV lights while staff are inside the control center without the need for additional protective clothing or

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[24] EPA, "What is a MERV Rating?," available at, https://www.epa.gov/indoor-air-quality-iaq/what-merv-rating-1.
[25] Illuminating Engineering Society, "IES Committee Report: Germicidal Ultraviolet (GUV) – Frequently Asked Questions", https://media.ies.org/docs/standards/IES-CR-2-20-V1-6d.pdf.
Lou Yu, et. al. "Catching and Killing of Airborne SARS-CoV-2 to Control Spread of COVID-19 by a Heated Air Disinfection System," June 16, 2020, available at, https://www.biorxiv.org/content/10.1101/2020.06.13.150243v1.
[26] For additional information on ultraviolet germicidal irradiation, see EPRI COVID-19 Research and Support: Safety and Operational Guidance for Ultraviolet Germicidal Irradiation.

eyewear, as this setup and configuration mounts UV light fixtures high up near the ceiling and angled away from humans below. When used with proper ventilation, upper-room GUV lights are effective against the spread of airborne bacteria, fungi, and viruses. This is equivalent to replacing the air in an indoor room up to 24 times in an hour.[27]

The *rate of air flow*, which can be measured in terms of "air changes per hour" (ACH), must also be considered. The CDC does make available a table for required ACH in the health care setting.[28] While recommendations range from 4-15 ACH, the six ACH recommendation is likely most applicable to most control centers. The increasing of ventilation can help control the spread of airborne pathogens by reducing the concentration of airborne contaminants.[29] The CDC recommends consulting with an HVAC professional to improve the ventilation specific to the airborne pathogen, local conditions, and the needs of building occupants.

Within a control center environment, airborne infection isolation rooms and *negative/positive pressure systems* could also be used to isolate workers from the rest of the facility.[30] A room is negatively pressurized when it has greater exhaust than supply air volume. Air flows away from rooms with positive pressure, and into areas with negative pressure. Fans can create this exhaust, either into the HVAC system or directly to the outdoors. Negative pressure rooms are used to prevent airborne microorganisms from entering pressurized spaces outside of the negative pressure room. Negative pressure rooms are typically used in healthcare settings to isolate patients and prevent airborne pathogens from entering the spaces outside of the patient room. According to the CDC, airborne infection isolation rooms are single occupancy rooms with negative pressure that provide a minimum of six air exchanges per hour for existing structures or 12 air exchanges per hour for new construction or renovations.

The CDC also recommends that employers ensure that ventilation systems are working properly, especially after any periods where systems were shut down.[31] Specific recommendations for ventilation rates vary based on occupancy and state, local, and industry-specific guidelines. Furthermore, windows or doors can be used to naturally ventilate a space and, in general, increased ventilation will reduce the risk from infectious aerosols, though consideration must be given to safety and security protocol. However, this natural ventilation can be engineered to maximize its benefits considering building design, local outdoor quality, outdoor temperature, and humidity.[32]

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[27] NPR, "Coronavirus Sparks New Interest In Using Ultraviolet Light to Disinfect Indoor Air," July 13, 2020, available at, https://www.npr.org/sections/health-shots/2020/07/13/890387205/coronavirus-sparks-new-interest-in-using-ultraviolet-light-to-disinfect-indoor-a.

[28] See: https://www.cdc.gov/infectioncontrol/guidelines/environmental/appendix/air.html.

[29] EPA, "Ventilation and Coronavirus (COVID-19)," accessed November 18, 2020, available at, https://www.epa.gov/coronavirus/ventilation-and-coronavirus-covid-19.

[30] CDC, "Guidelines for Environmental Infection Control in Health-Care Facilities (2003)," accessed November 18, 2020, available at https://www.cdc.gov/infectioncontrol/guidelines/environmental/background/air.html.

[31] CDC, "Employer Information for Office Buildings," October 29, 2020, available at, https://www.cdc.gov/coronavirus/2019-ncov/community/office-buildings.html.

[32] American Society of Heating, Refrigerating, and Air-Conditioning Engineers, *ASHRAE Position Document on Infectious Aerosols*, April 14, 2020, available at, https://www.ashrae.org/file%20library/about/position%20documents/pd_infectiousaerosols_2020.pdf.

Workplace Modifications

GUV for Workstations

Within the healthcare space, it is common for hospitals and medical facilities to use large GUV lights suspended from the ceiling to disinfect entire centers when no one is inside of them, such as before and after a surgery is performed.[33] In addition to in-duct and upper-room GUV systems, hospitals and healthcare facilities also employ autonomous mobile GUV devices (robots), which can move around a room emitting multidirectional GUV lights to disinfect surfaces in areas that traditional GUV lights fail to reach due to shadows and line of sight obstructions.[34] For high-contact areas within shared facilities such as workstations, additional attention may be necessary to ensure they remain safe between the rotation of workers. By utilizing procedures similar to hospitals and medical facilities, robots can be programed to use their multidirectional GUV lights to disinfect workstation areas including entryways to the facility.

Additionally, a promising emerging technology known as far UV (far end of the UV spectrum) is also in commercial use. Far UV lights have wavelengths that are safe for human exposure because they do not penetrate the skin or eyes. Because of this, far UV lights can autonomously and continuously disinfect bacteria, fungi and viruses in spaces while humans are in the workspace including entryways to the control center facility. These products are commercially available in the United States and are in use worldwide.[35] Control centers could also benefit from using far UV lights as it would allow work inside the control center to continue without disruption or harm to workers while simultaneously disinfecting the workstations.[36]

Personal Peripheral Equipment

The provisioning of personal peripheral equipment such that each control center operator has his or her own keyboard, mouse, headset, etc. serves as an effective, and cost-effective, method for reducing potential pathogen infection from a surface-borne sample; given the nature of such tools, they are often the most physically interacted with in the control center/office. However, certain considerations may need to be addressed based on the type of devices such equipment is intended to interface with. For example, whereas wireless keyboards and mice may work for the administrative LAN and non-SCADA computers, SCADA devices should be paired with wired keyboards and mice. Similarly, hands-free headsets or other Bluetooth-capable devices must be compatible with a facility's phone and recording systems, and device frequencies should be calibrated to prevent bleeding over. Notwithstanding their being the sole user of such peripheral equipment, employees should still be encouraged to disinfect said equipment regularly/before and after each shift, so as to further reduce the possibility of lingering pathogens. This solution can also be paired with wheeled cubbies or mini lockers, providing employees with secure on-site storage thus reducing the chances of equipment being forgotten at home or otherwise misplaced, while further ensuring that others do not use equipment which was not issued to them.

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[33] Dana Mackenzie, "Ultraviolet Light Fights New Virus," *Engineering*, August 2020, Vol. 6 No. 8, available at, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7319933/.
[34] William Wright, "Germ-Killing Robots Fight Drug-Resistant Pathogens at Army Hospitals," July 27, 2017, available at, https://www.army.mil/article/191241/germ_killing_robots_fight_drug_resistant_pathogens_at_army_hospitals.
[35] An example of such can be found at: https://healtheinc.com/learn/far-uvc-222/.
[36] For additional information on LED technology development has led to a new class of lighting with the potential for disinfection capabilities at a longer, human compatible wavelength, see EPRI website Light-Based Technologies for Air and Surface Disinfection

Portable Air Cleaners

The best use of portable air cleaners is to supplement other measures within a control center/facility. The "average" control room has ~1,500 sq./ft. of floor space, with ~10 ft. ceilings, resulting in ~15,000 cubic feet of space. Large-model portable air cleaners are capable of providing the recommended 5 air exchanges per hour for 1,180 sq./ft., therefore the "average" control center would require multiple cleaners. These units cost approximately $2,500 each and require a (minimum) of one filter replacement annually, which costs ~$180.00. The Environmental Protection Agency (EPA) recommends that portable air cleaners be intended for the room size in which they will be used, and satisfy at least one of the following: 1) be designed as a high-efficiency particulate air (HEPA), 2) it is clean air delivery rate (CADR) rated, and 3) the manufacturer states that the device will remove most particulates in the size range below 1 um.[37] Placement of the cleaners should be strategic, and prevent the blowing/circulation of air from one individual to the next. Organizations should also evaluate the efficacy of these cleaners in control centers, where communication is of paramount importance, with respect to noise pollution, as high flow settings can range from -40dBa to -68dBa.

Sanitizing Stations

Sanitizing stations should also be installed around a facility, and especially at all major non-emergency points of ingress/egress into such. At entryways, PPE and sanitizing stations should be combined such that employees and visitors can disinfect and obtain masks, etc. at the same station. There are off-the-shelf solutions available which make available hand sanitizer, gloves, and masks in one central location. Infrared/no-contact thermometers can be co-located at such stations, allowing entrants to also perform a temperature self-check prior to entry; to ensure maximum sanitary use, hands should be sanitized and/or gloves worn prior to utilizing the thermometer. If possible, PPE should be separated into single units in protective packaging to further reduce the risk of cross contamination. Throughout the facility, no-touch hand sanitizing stations should also be made available in order to provide employees with maximum opportunities to sanitize throughout the day. *PPE storage* is an associated consideration of sanitizing/PPE stations—inventories should be done in accordance with the individual organization's guidelines and in advance of any specific outbreak/pandemic in order to avoid runs on supplies and resultant shortages. If standalone PPE/sanitization storage cannot be achieved, existing storage/supply space should be repurposed for the task.

Thermal Imaging

Thermal imaging offers another alternative to temperature self-checks with infrared thermometers and is already employed in certain highly trafficked locations, such as casinos or stadiums. One such advantage of these systems, according to the FDA, is that "When used correctly, thermal imaging systems generally have been shown to accurately measure someone's surface skin temperature without being physically close to the person being evaluated."[38] To maximize effectiveness, the thermal imaging system must be set up in accordance with the manufacturer's instructions to generate an accurate reading, and the individual tested must follow the testing guidelines set by the manufacturer to ensure an accurate scan. Similarly, the FDA has issued policy documents for thermal imaging systems during the COVID-19 public health emergency that should be applicable

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[37] EPA, "Air Cleaners, HVAC Filters, and Coronavirus (COVID-19)," accessed November 24, 2020, available at, https://www.epa.gov/coronavirus/air-cleaners-hvac-filters-and-coronavirus-covid-19.

[38] FDA, "Thermal Imaging Systems," accessed November 17, 2020, available at, https://www.fda.gov/medical-devices/general-hospital-devices-and-supplies/thermal-imaging-systems-infrared-thermographic-systems-thermal-imaging-cameras.

for future use.[39] Note, when purchasing a thermal imaging device, supply chain risk management practices should be followed, as companies may wish to avoid certain manufacturers.

Antimicrobial Entry Mats

In addition to providing PPE and screening solutions at facility entryways, the use of antimicrobial entry mats should also be considered. Such mats are predominantly installed in the medical or healthcare industry as bacteria and microbes can be transmitted in large quantities by patients in healthcare facilities through unprotected shoes. They are also installed in the hospitality, auto, and technological industries, and a similar approach can be taken within the energy sector to mitigate against microscopic threats. Antimicrobial floor mats also offer ergonomic comfort, floor safety, and floor protection.[40] Given their benefits, the installation of these mats should also be considered beyond facility entryways and extend to control rooms and other select office spaces.

Installing antimicrobial floor mats in combination with other technologies, such as the aforementioned far UV entryways, at every entrance to a facility can assist in the prevention of contamination and cross-contamination within the site to promote a more sterile working environment. Such mats are designed to trap contaminants such as bacteria, fungi, and viruses that could be carried throughout a control center on the soles of shoes. They also possess active antimicrobial agents that inhibit the growth and multiplication of bacteria and other microbes and can be changed regularly to ensure maximum effect.

Physical Separation of Workspace(s)

With respect to the physical separation of workspace(s), the associated significant changes to building layouts, cost, and design/construction time may render this option impractical for general use, though renovations or construction of new control centers present ideal opportunities to operationalize this section. Physical separation of workspaces in this context refers to physically separated workspaces, to include those within the Physical Security Perimeter, that include the functionality of control room consoles and have visibility of the map board and/or video wall, but are completely physically separated and have independent entrances/exits. Such workspaces can provide space for surge workers or workers that are not a normal part of the team. Importantly, if support is needed for testing or other system events, or if quarantined individuals are needed to support continued operations, this additional workspace serves to facilitate.

Antimicrobial Coatings

Also in common employ in the healthcare space are antimicrobial coatings, which can help reduce the spread of germs, provide long-term protection from disease-causing microbes, and maintain high indoor air quality in air handling systems. Such coatings have also seen application in other industrial, commercial, building product, outdoor, and houseware applications, and would further benefit high-touch facilities within the energy sector, to include utility control centers. Common building facilities in a control center can include, but are not limited

[39] See: https://www.fda.gov/regulatory-information/search-fda-guidance-documents/enforcement-policy-telethermographic-systems-during-coronavirus-disease-2019-covid-19-public-health.
[40] "6 Things You Need to Know About Antimicrobial Floor Mats," accessed November 18, 2020, available at, https://www.floormat.com/6-things-you-need-to-know-about-antimicrobial-floor-mats/.

to, elevator buttons, tables, doorknobs, light switches, countertops, handles, desks, phones, keyboards, toilets, faucets, and sinks.[41]

Antimicrobial coatings use chemicals and materials such as graphene, polycationic hydrogel, silver nanoparticles, polymer brushes, dendrimers, copper and copper alloys to hinder the growth of pathogens through cellular membrane perturbation. These coatings also protect against harmful disease-causing microbes and can increase a surface's durability, appearance, and corrosion resistance. In addition to protecting against the growth of various microbes, other benefits of antimicrobial coatings include reducing the need for harsh cleaning agents and disinfectants, combating the spread of infections or diseases in places with a large number of people, reducing maintenance costs, increasing lifespan of objects, protecting hard-to-access areas such as between keys on keyboards, and adding value to the building and its overall infrastructure.[42]

No-Touch/Hands-Free Hardware and Systems

In addition to antimicrobial coatings, the installation of no-touch and hands-free hardware throughout office facilities can also help to reduce the risk of infection from surface-borne pathogens. For instance, the CDC itself recommends the use of no-touch water fountains and trash cans,[43] with other solutions including automatic doors, faucets, and paper towel dispensers. Whereas no-touch hardware and systems are best characterized as requiring no physical interaction with the user, relying on infrared or other detection and triggering mechanisms, hands-free devices are best described as hardware which allows for the operation of doors, cabinets, etc., with other body parts, such as an elbow, forearm, or foot. Hands-free solutions such as arm pulls, foot pulls, and exit devices can, when done professionally, easily be retrofit onto existing doors and the like.

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[41] CDC, "Disinfecting Your Facility," July 28, 2020, available at, https://www.cdc.gov/coronavirus/2019-ncov/community/disinfecting-building-facility.html.

[42] Dr. Atul Tiwari, "A Guide to Antimicrobial Coatings," Paint & Coatings Industry Magazine, July 14, 2020, available at https://www.pcimag.com/articles/107649-a-guide-to-antimicrobial-coatings#:~:text=In%20layman%20terms%2C%20an%20antimicrobial,from%20harmful%20disease%2Dcausing%20microbes.

[43] CDC, "Employer Information for Office Buildings.", available at, https://www.cdc.gov/coronavirus/2019-ncov/community/office-buildings.html