

ELECTRICITY SUPPLY EMERGENCY CODE (ESEC)

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Introduction

- 1.1. The Electricity Supply Emergency Code (ESEC) describes steps which the UK Government could take to deal with:
 - a "civil emergency" as defined in section 96(7) of the Electricity Act 1989 "any natural disaster or other emergency which, in the opinion of the Secretary of State, is or may be likely to disrupt electricity supplies"; or
 - an electricity supply emergency of the kind envisaged in section 3(1)(b) of the Energy Act 1976 - "there exists or is imminent in the United Kingdom an actual or threatened emergency affecting fuel or electricity supplies which makes it necessary in Her Majesty's opinion that the government should temporarily have at its disposal exceptional powers for controlling the sources and availability of energy".

It sets out the actions which companies in the electricity industry should plan to take and which may be required to deal with such emergencies.

- 1.2. In the event of an emergency, ESEC enables an equal distribution of electricity supply to customers as far as reasonably practicable, whilst ensuring that pre-designated Protected Sites maintain supplies for as long as possible.
- 1.3. Should these measures require to be introduced, it is very likely there would be accompanying appeals to the public and industry to reduce electricity demand.
- 1.4. The actions described in ESEC are not used to handle sudden shortfalls in generation, or to deal with day-to-day repair and recovery of faulty or damaged parts of the transmission and distribution networks. Such matters are handled by National Grid in its role as owner of the National Electricity Transmission System in Great Britain and the Distribution Network Operators (DNOs) using powers available to them in the Grid Code and/or in company emergency recovery plans. However, long-term and significant damage to the system, or prolonged shortfalls in generation, could result in the National Grid Electricity System Operator (NGESO) and DNOs looking to the UK Government to implement the arrangements and powers described in ESEC. Likewise, if a problem is looming and might be solved or ameliorated by early action, then ESEC or aspects of it can be considered.
- 1.5. ESEC is subject to continuing development, review and testing. The Department for Business, Energy and Industrial Strategy (BEIS) in conjunction with the Energy Emergencies Executive Committee (E3C) are responsible for carrying out this work.
- 1.6. If the Secretary of State proposes to make any amendments to ESEC, BEIS will first consult with E3C, Network Operators and Licensed Generators affected by the proposals. In consulting them, BEIS will set out in detail the amendments proposed, together with an explanation for these, and take account of comments on the proposed modifications before deciding whether to amend ESEC.

Definitions of Terms

- 2.1. **Activation Schedule(s)** schedule(s) for activating or deactivating each Load Block together with the detailed timing for Load Block switchovers, which are derived from the Implementation Rota Plan, issued by NGESO and treated as a set of instructions for implementation by Network Operators.
- 2.2. **Associated load** electricity which is unavoidably supplied to a site which is not a Protected Site, due to its connection to the same circuit as that of a Protected Site with no means of isolation.
- 2.3. **Discrete feeder** an electrical high voltage circuit, which is used solely to connect an individual site to a point of supply on the Network Operator's system. This circuit must be capable of being protected from disconnection by the ability to switch the remaining circuits connected to the point of supply by either local or remote operation.
- 2.4. Cabinet Office Briefing Rooms (COBR) the locations from where a committee is set up to co-ordinate the actions required to be taken within the UK Government in response to instances of national or regional crisis, or during events abroad with major implications for the UK. The composition of a COBR meeting depends on the nature of the incident but is usually chaired by the Prime Minister or another senior minister.
- 2.5. **Electricity supply emergency** an emergency affecting electricity supplies, which makes it necessary that the UK Government should temporarily have at its disposal exceptional powers for controlling the sources and availability of energy.
- 2.6. **Energy Emergencies Executive Committee (E3C)** a senior forum providing engagement and proactive information exchange between government, wider industry stakeholders, regulators and interested parties on energy resilience issues and priorities.
- 2.7. **Department for Business, Energy and Industrial Strategy (BEIS)** the lead government department for emergencies affecting the energy sector.
- 2.8. **BEIS Emergency Response Team (ERT) -** the team within BEIS which will, in the event of an emergency affecting the gas and/or electricity networks, provide the interface between industry and government. The ERT is responsible for:
 - Primary liaison and briefing with ministers for COBR;
 - Liaising with external stakeholders to build situational awareness and analysing the implications for public safety, energy supply, business and wider BEIS/Government policy;
 - Co-ordinating lines to take and the wider communications strategy;
 - Handling Parliamentary interest;
 - Maintaining an audit trail.
- 2.9. **Grid Code** an industry code that specifies the technical requirements for connection to, and use of, the National Electricity Transmission System (NETS) in Great Britain. Compliance with the Grid Code is a requirement under the Connection and Use of System Code (CUSC). National Grid is the code administrator for the Grid Code and

- maintains it. All changes to the Grid Code are subject to industry consultation and approval by Ofgem.
- 2.10. **Indicative Rota Plan** the rota plan decided upon by the BEIS ERT on the day ahead of an electricity supply emergency and used to communicate publicly the potential impact on customers. Depending on the expected duration of the emergency, this plan could be published up to a week ahead on a rolling basis.
- 2.11. **Implementation Rota Plan** the rota finalised by NGESO from the Indicative Rota Plan and which minimises the level of disconnection. It will be used by NETSO to derive Activation Schedules and to communicate publicly the impact for the following day.
- 2.12. **Licensed Generator** any person who has been granted a generation licence under section 6(1)(a) of the Electricity Act 1989.
- 2.13. Load Blocks each distribution network is divided into 18 x 5% load blocks, with a suffix letter (A, B, C, D, etc) attributed to each. All connected customers are assigned a block letter corresponding to the relevant point of connection on the network. A block letter of V indicates that the site is on the Protected Sites List, or is protected from rota disconnection due to associated load.
- 2.14. **Network Operator** any person who has been granted a transmission licence under section 6(1)(b) or a distribution licence under section 6(1)(c) of the Electricity Act 1989.
- 2.15. **National Grid Electricity System Operator (NGESO)** the system operator for the National Electricity Transmission System (NETS) in Great Britain.
- 2.16. **Protected Site** any site that is protected in the terms set out in ESEC. A list of Protected Sites is compiled and kept up to date by Network Operators.
- 2.17. Rota Plan one of 18 plans that set out the level and sequence of Load Block disconnections and reconnections. Together, the Rota Plans are another way of illustrating the content of the Variable Rota Disconnection Plan. A Rota Plan, once it has become the Indicative Rota Plan, is used by NGESO to derive the Implementation Rota Plan and Activation Schedules.
- 2.18. **Rota disconnection procedures** pre-prepared plans held and produced by each Network Operator. They take into account the local network configuration, physical characteristics and limitations, Load Blocks, Protected Sites and the control tools used to operate the network.
- 2.19. **Standby generation** electricity generation equipment which is capable of providing a supply of electricity adequate for the continuation of activities to avoid damage to plant, for the continuous operation of manufacturing processes, or for safety reasons.
- 2.20. Variable Rota Disconnection Plan (VRDP) the core plan used to establish the disconnection and reconnection of electricity supplies in an electricity supply emergency.

ESEC Event Process

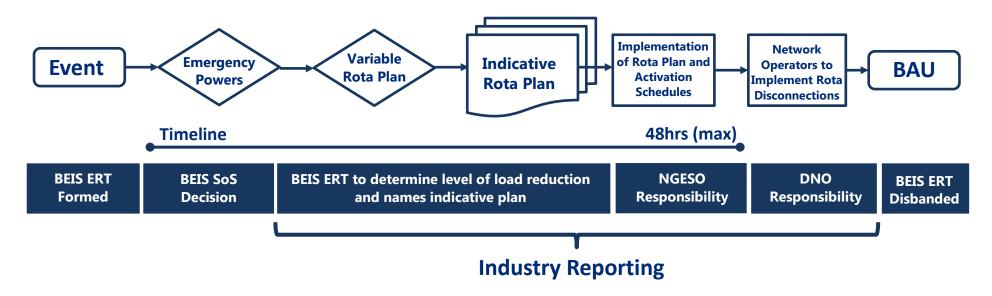


Figure 1 - Overview of the emergency process from event indication to business as usual

When and how ESEC will be used

Use of Emergency Powers

- 3.1. In an electricity supply emergency it may be necessary to restrict customers' consumption of electricity. Restrictions over the longer term can be achieved by one or more of the following methods:
 - Public appeals by the UK Government for voluntary restraint;
 - Orders or directions under the Energy Act 1976 requiring restrictions on consumption by industry, commerce and other undertakings;
 - Directions under the Energy Act 1976 or the Electricity Act 1989 requiring rota disconnections and associated restrictions.
- 3.2. Orders and directions under the Energy Act 1976 or the Electricity Act 1989 to restrict consumption by industrial, commercial and other sites may contain a schedule exempting certain premises and purposes from the scope of the order or direction. The categories exempted in these schedules are likely to be more extensive than the categories of sites protected from rota disconnections. In order to use the powers under the Energy Act 1976 to their fullest extent, an Order in Council would need to be made and be in force before any order could be made or any directions could be given.
- 3.3. One of the orders which could be made under the Energy Act 1976 to restrict the use of electricity in industrial, commercial and other premises would require consumption to be reduced by a certain percentage. (This is to be distinguished from a direction instituting rota disconnections). It is an alternative to an order which would restrict the use of electricity to specified days of the week. If a percentage reduction order was made, it might also be necessary for directions to be given to suppliers requiring them to provide information showing sites whose consumption was above a certain level, so as to enable the UK Government to monitor observance of the order.
- 3.4. If the BEIS ERT considers that rota disconnections must be introduced, the Secretary of State may implement the emergency powers in the Energy Act 1976 by making an Order in Council. Once that Order in Council is in force, BEIS can give a direction to all Network Operators affected to implement a schedule of rota disconnections across their licence area(s) throughout the period of the emergency. Under this direction and within the provisions of the Grid Code, NGESO will instruct Network Operators to restrict the supply of electricity to sites, other than Protected Sites, by rota disconnections to achieve a specified level of reduced demand. The period over which the overall process of rota disconnections continues, together with the level(s) of disconnection, will be decided by the Secretary of State in light of advice from the BEIS ERT. Subsequent changes to that period and/or level(s) of disconnection will be confirmed by the giving of an amended direction.
- 3.5. A shortfall in available generation could initially be handled via Grid Code arrangements. If the shortfall were to worsen or be prolonged, this may make it necessary for the Secretary of State to invoke ESEC. Alternatively, the electricity supply emergency could

dictate an orderly and planned move to rota disconnections without utilising the Grid Code arrangements if, for example, the situation developed over the weekend and it is clear that there is likely to be a substantial difference between demand and available generation on the Monday.

Protected Sites

- 3.6. Sites are protected if they need to have their electricity supply maintained because of:
 - a national or regional critical need;
 - · public health and safety issues;
 - the potential for catastrophic damage to high value plant.

The sites' details will be held on a list maintained by the Network Operator for their area of supply. This will be known as the "**Protected Sites List**" or **PSL**. For further details, see section 5.1 below.

Variable Rota Disconnection Plan

- 3.7. ESEC utilises a Variable Rota Disconnection Plan (VRDP), the format of which is set out in Annex 1. The VRDP is intended to ensure that the available supplies of electricity in an electricity supply emergency are shared as equitably as possible amongst all non-protected sites.
- 3.8. The **VRDP** divides non-protected sites in a Network Operator's licence area into 18 groups of near equal demand. For the purposes of ESEC, these groups are referred to as Load Blocks. Supply to these Load Blocks is sequenced for rota disconnections in the **VRDP**. It sets out the nominal three-hour disconnection periods, i.e. eight periods in any 24-hour day, and respects the need for equality of treatment between non-protected sites as far as reasonably practicable. The rota level and level of disconnection will be based on the shortage of supply. During an emergency, if available supplies diminish, higher levels of disconnection will mean that an increasing number of Load Blocks are disconnected in any one period.
- 3.9. At levels requiring disconnection of up to four Load Blocks, the **VRDP** is designed to concentrate disconnection periods on the three days of Monday, Tuesday and Wednesday or Thursday, Friday and Saturday, for any one Load Block.

Sequencing of Load Blocks

3.10. The 18 Rota Plans each contain a master sequence of Load Block disconnections nominally starting and finishing within the eight periods of the day: see Annex 2. During an electricity supply emergency, NGESO will regularly update the BEIS ERT on the levels of disconnection considered necessary. NGESO will normally advise the BEIS ERT no later than 14.00 each day of the Rota Plan it considers necessary for the following 24-hour period, scheduled to commence at 00.30. When advising the BEIS ERT of the Rota Plan required, NGESO will take into account an optimum margin of remaining generation available and the level of flows on interconnections with neighbouring transmission systems. The BEIS ERT will confirm the Indicative Rota Plan

- to be used, taking into account the national generation/demand position and shape of the load curve, no later than **15.00**. NGESO will seek to minimise the amount of rota disconnection for the following day and will generate an **Implementation Rota Plan** from the **Indicative Rota Plan**.
- 3.11. From the Implementation Rota Plan, NGESO will derive a detailed Activation Schedule(s) of rota disconnections and issue these schedules to Network Operators by 17.30 the day before. The schedules will confirm detailed timings for the disconnection and reconnection of Load Blocks and shall be treated as a set of instructions for implementation by the Network Operators.
- 3.12. The detailed Activation Schedule(s) are required for individual Network Operators to stagger when Load Blocks are disconnected and reconnected to match the minute-by-minute demand for electricity to available generation and avoid excessive load swings. In the worst case, where nine Load Blocks may require disconnecting and nine different Load Blocks reconnecting, this changeover period could take up to 60 minutes.
- 3.13. NGESO will continue to review the national demand/generation position and may reissue modified Implementation Rota Plans and Activation Schedule(s) if necessary. The BEIS ERT will keep the level of disconnection and choice of Rota Plan under continuous review throughout the emergency, in consultation with NGESO, and if necessary may change the Indicative Rota Plan at any time.

Other priority needs in an ongoing emergency

3.14. Should an emergency be prolonged, it may be in the public interest for additional sites to be considered as Protected Sites within the criteria for receiving this status, e.g. essential pharmaceutical companies manufacturing vaccines or anti-viral medication during an influenza pandemic. Sponsoring government departments may make representations to the BEIS ERT directly or through COBR if essential services are significantly impacted. This process may take several days to complete and, although directions to Network Operators to include new Protected Sites may be given after consideration of the wider consequences/benefits for the public against the availability of supplies, this should not be assumed. Organisations should ensure that they have robust business continuity arrangements in place to maintain adequate electricity supplies and not rely on these arrangements.

Severe shortages of power

- 3.15. In the event of a severe shortage of electrical power, it may not be possible to maintain equal distribution of available power supplies while protecting the industries and services on which the well-being of the nation depends. In this eventuality, the BEIS ERT will advise the Secretary of State according to the circumstances.
- 3.16. It is considered impractical to enforce statutory restrictions on domestic customers. Therefore, it will be necessary to use the non-protected site Load Blocks set out in the **VRDP** in Annex 1 for as long as possible.
- 3.17. All Protected Sites are expected to, as far as is reasonably practicable, reduce load broadly in line with the level of disconnections applied to non-protected sites. As the

- situation worsens, Protected Sites may be directed to reduce their consumption to the minimum load necessary for the avoidance of damage to major plant.
- 3.18. The needs of Protected Sites may vary daily or even by the hour in an extreme situation. In the event of electricity supplies being insufficient to meet the needs of all the Protected Sites within their licence area, Network Operators may need to exercise discretion in allocating the available electricity supplies. In such cases, priority should be given to the maintenance of life and to minimising the risk of disasters, which would involve loss of life or major damage to plant. It is recognised that the electricity industry's own requirements need to be met, particularly those to maintain generating capacity and nuclear safety.
- 3.19. In the event of a partial or total system shutdown during an electricity supply emergency, Network Operators will implement the operating procedures set out in the Grid Code, so that affected demand may be restored in the shortest possible time.

Restoration of supplies

3.20. As supplies of electricity are restored, it may be necessary for the Secretary of State to give further directions on rota disconnections following advice from the BEIS ERT. When supplies of electricity have been fully restored and stabilised, the BEIS ERT should inform the industry of a formal stand down from ESEC.

Network Operator Responsibilities for Protected Sites

Rota disconnection procedures

- 4.1. Each Network Operator is obliged by ESEC to keep up to date procedures for the introduction of rota disconnections. These should be available for activation as soon as possible, and within 48 hours of the Secretary of State's decision that ESEC must be implemented. Except for Protected Sites, the procedures will apply equally, as far as is reasonably practicable, to all customers supplied through the networks of Network Operators. This includes non-embedded customers (i.e. customers, other than Network Operators, receiving electricity direct from the NETS).
- 4.2. Network Operators may identify areas of their network within a Load Block that contain one or more unlicensed generators. Depending on the circumstances at the time, these areas may provide a net output on to the network which is deemed sufficiently significant such that disconnection should be avoided if reasonably practicable. Consequently, some sites could find their supplies maintained despite the expectation they would be disconnected according to published information. Protection of unlicensed generators would only occur in exceptional circumstances and is at the discretion of the Network Operator at the time.

Protected Sites

- 4.3. The Protected Site List (PSL) should contain the name, address, and business activity of each Protected Site, with Network Operators taking all reasonable steps to keep this accurate. Network Operators should write out to each site owner every two years to validate their eligibility for Protected Site status, and provide an updated PSL to BEIS on the 1st October, enabling BEIS to review and ensure the criteria for listing are being applied consistently.
- 4.4. Section 5.2 below sets out the criteria for being designated as a Protected Site.
- 4.5. Network Operators are required to use reasonable endeavours to maintain supply to listed Protected Sites during an ESEC activation period and will give as much notice as possible if protection from disconnection is at risk.
- 4.6. Network Operators should inform successful applicants for Protected Site status that their sites have been listed. Unsuccessful applicants for Protected Site status, where the applicant has grounds for disputing the Network Operator's decision, may seek a determination from the BEIS Energy Resilience Team as to whether they should be given that status. BEIS may make such a determination having discussed the matter with the Network Operator, the relevant government department and the applicant.

Commercial implications

- 4.7. If rota disconnections are directed, providing that an Order in Council under the Energy Act 1976 is in force, the Secretary of State will, where appropriate, grant an authority under section 4 of the Energy Act 1976 authorising Network Operators to disregard or fall short of their statutory or contractual obligations to supply, to such extent as is necessary for them to comply with the directions on rota disconnections.
- 4.8. Rota disconnections constitute a permitted discontinuation of supply under regulation 29 of the Electricity Safety, Quality and Continuity Regulations 2002. Network Operators should make reasonable efforts to give adequate notice of disconnections; there is no requirement under the regulations to report the effects of rota disconnections to the Secretary of State.
- 4.9. The BEIS ERT would require, at the least, daily reporting by Network Operators regarding the ongoing situation in their licence area. Precise timings and other requirements of the reporting would be set by the BEIS ERT at the time.

Protected Sites

Introduction

5.1. The criteria for receiving Protected Site status are set out below. Customers who consider that their site or sites meet these criteria can apply to their Network Operator for the site(s) to be part of the Protected Sites List (PSL). By seeking and securing Protected Site status, customers are also agreeing to certain obligations.

Criteria

5.2. The criteria consist of two main elements, both of which must be met. Firstly, a customer's site must fall within the list of approved designated services set out in Table 1. For activities where the definition includes 'major' or 'of national significance', the relevant lead government department or devolved administration will have a say in the Network Operator's decision. Secondly, Protected Sites must also meet the additional criteria in section 5.3 below, and customers must agree to the obligations in section 5.10 below. By exception, sites which do not meet the above criteria may make a representation to the relevant Lead Government Department for consideration of Protected Site status, given that the criteria and obligations set out in sections 5.3 and 5.10 below are met, and the significant impact of not having Protected Site status can be demonstrated.

Table 1 - List of Approved Designated Services

Designated Service	Lead Government Department/Devolved Administration
Gas reception terminals; storage installations including boosting and compression equipment; gas compressor stations and principal development and control sites for the control of gas supply systems and emergency procedures	BEIS
Licensed electricity generators, and licensed network operators	BEIS
Oil refineries and vital oil pumping stations	BEIS
Sites with a continuous manufacturing process, not sustainable through standby generation, where regular shutdown for 3-hour periods is not possible and would cause significant financial damage	BEIS
Major airports and associated control facilities	Department for Transport
Significant railway operations	Department for Transport
Ports and docks which have a national infrastructure significance	Department for Transport

Essential water and sewerage installations	Department for Environment Food & Rural Affairs, Scottish Government or Welsh Government
A major location for essential food manufacture, processing or storing	Department for Environment Food & Rural Affairs,Scottish Government or Welsh Government
Hospitals as agreed with NHS Foundation Trusts, Primary Care Trusts, Acute Trusts, Local Health Boards (in Wales), Welsh NHS Trusts and NHS Health Scotland	Department of Health, Scottish Government or Welsh Government
Digital and telecommunication services where there is a national need for continued operation	Department for Digital Culture Media & Sport
Emergency services of regional significance	Home Office, Department of Health, Scottish Government or Welsh Government
Armed forces sites that provide civil protection support	Ministry of Defence
Financial services where there is a national need for continued operation	HM Treasury

Additional Criteria

- 5.3. To ensure the total demand from the PSL remains at a manageable level, the following additional criteria will apply to Protected Sites:
 - the site does not have standby generation and has demonstrated that it is not possible to install standby generation; and
 - either
 - (i) the site is connected to a discrete feeder; or
 - in the opinion of the Network Operator, maintaining supply during rota disconnections would involve retention of not more than a marginal amount of associated load; or
 - (iii) the Network Operator has been required to list the site by BEIS pursuant to section 5.5 below.

Process for listing Protected Sites

- 5.4. Sites shall only be listed in the PSL if:
 - customers have informed the Network Operator in writing that they consider their sites' activities fall into one of the categories set out in Table 1;
 - the Network Operator agrees that the activities fall into one of those categories; and

- customers have also informed the Network Operator in writing, and the Network Operator agrees, that the sites meet the additional criteria.
- 5.5. If a Network Operator is unsure whether a site's activities fall into one of the categories, it will inform the customer accordingly. The customer may then:
 - a) provide further clarification to the Network Operator on the site's activities, or
 - approach the lead government department or devolved administration responsible for the service or industry concerned, which will advise BEIS if the site's activities fall within the approved designated services and whether it should be listed.

Only on BEIS's written instructions will the Network Operator include the site on the PSL. Pending resolution of the matter, the site shall not be listed.

- 5.6. If the Network Operator considers that the site's activities fall into one of the categories, and: a) the site does not have standby generation; b) the site is not connected to a discrete feeder; and c) maintaining supply to the site during rota disconnections would, in the opinion of the Network Operator, involve retention of more than a marginal amount of associated load, then the Network Operator will advise the customer that they should either pay for a new or modified connection by means of a discrete feeder or install standby generation.
- 5.7. If the site is not prepared to install standby generation and pay for a discrete feeder, the Network Operator will refer the matter to BEIS with an estimate of the amount of associated load which would need to be kept on supply if the site were to be protected. BEIS will consult with the lead government department or devolved administration concerned, and with the Network Operator, and will instruct the latter whether the site should exceptionally be listed. Pending resolution of the matter, the site shall not be listed.
- 5.8. If the site does not have standby generation, it will be required to provide justification to the Network Operator as to why it is not possible to install standby generation.
- 5.9. If the site has standby generation but the service it provides is deemed vital to a region or nationally, rather than locally, then the customer may approach the lead government department or devolved administration responsible for the service, which will ask BEIS to consider whether the site should be listed. Pending resolution of the matter, the site shall not be listed.

Obligations for Protected Sites

- 5.10. By applying for, and being given, Protected Site status, Protected Sites agree to meet certain obligations:
 - In the event of the Network Operator being directed to make rota disconnections, Protected Sites will reduce their consumption by a percentage broadly commensurate with rota disconnections as far as is reasonably practicable. Protected Sites must retain records of consumption and make these available to BEIS for monitoring purposes if requested. Protected Sites that are deemed to be of national or regional

- significance, and which cannot reduce consumption whilst still providing their service, may agree an exemption from this obligation.
- Protected Sites will notify the Network Operator immediately if their activities change and no longer meet the criteria, and of any change to the customer's name and registered contact details.
- The Network Operator will also confirm with Protected Sites every two years that they
 still meet the criteria to qualify for Protected Site status. Failure to disclose details to
 the Network Operator at this point may result in removal from the PSL.

Annex 1 - Variable Rota Disconnection Plan

Order of Disconnection for Load Blocks A to U

Day of Week	Period	Time	ava no	ailabl minal	e for thre	disc e ho	onne urs th	ction ii ne amo	nto 18	equiva switch	alent a	derive mount volved	s. Álth	ough (each d	lisconr	nection	perio	d is a	/ the
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Monday (Tuesday)	1 2 3 4 5 6 7 8	0030-0330 0330-0630 0630-0930 0930-1230 1230-1530 1530-1830 1830-2130 2130-0030	A D B E C G B C	B E C G A D H J	C G A D B E T U	H J K H J K L N	T U S T U S A K	N R L P M Q M S	L P M Q N R K T	M Q N R L P G A	K T J U S H J L	G A E B D C R B	J K T S H U D H	R L P M Q N S M	D B C E A P E	SHUJKTEP	P M Q N R L U G	E C D A G B Q Q	U S H K T J C D	Q N R L P M N R
Tuesday (Wednesday)	1 2 3 4 5 6 7 8	0030-0330 0330-0630 0630-0930 0930-1230 1230-1530 1530-1830 1830-2130 2130-0030	E H G J D K E G	G J D K E H A B	DKETGJNM	A B C A B C P R	M N L M N L D C	P U Q S R T Q L	Q S R T P U C E	R T P U Q S K Q	C M B N L A B A	K E J G H D U D	B C M L A N H P	UQSRTPLJ	H G K D J E S S	L A N B C M J K	SRTPUQTN	J D H E K G M T	N L A C M B G H	T P U Q S R R U
Wednesday (Thursday)	1 2 3 4 5 6 7 8	0030-0330 0330-0630 0630-0930 0930-1230 1230-1530 1530-1830 1830-2130 2130-0030	J B K C H A H K	K C H A J B D E	HAJBKCRQ	D E G D E G T U	QRPQRPJG	SLTMUNSP	T M U N S L G J	U N S L T M A T	G Q E R P D E D	A J C K B H L H	E G Q P D R B S	L T M U N S P C	B K A H C J M	P D R E G Q C A	M U N S L T N R	C H B J A K K N	R P D G Q E U B	$N \otimes L + M \cup Q L$
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