Bilsdale Transmitter Fire

Incident Review

Bilsdale Transmitter Fire – Welsh overview

STATEMENT

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1. Overview

1.1 The Bilsdale transmitter was a 314 metre tall structure providing radio and television signals to households across Teesside and much of North Yorkshire. On 10 August 2021, a fire broke out that severely damaged the transmitter and took all services off air for a prolonged period. The mast was so severely damaged that it subsequently had to be demolished.

1.2 Arqiva, the owner of the transmitter, and the organisations that are licensed to provide broadcast radio and television services (the broadcasters and digital multiplex licensees) have plans in place to deal with major incidents. These were quickly invoked and generally worked as expected by the multiplex licensees.

1.3 Following the incident, Arqiva swiftly commenced building temporary transmitters to restore services to affected households, as rebuilding the tall mast would take some time due to the scale of the engineering task.

1.4 There were some issues encountered which caused delays to the building of the temporary transmitter at the Bilsdale site, and some of the multiplex licensees reported there were instances when information has not flowed effectively from Arqiva to them.

1.5 By early 2022, the network of transmitters built by Arqiva as a temporary substitute for the main Bilsdale transmitter is predicted by Arqiva to provide adequate coverage to around 99% of households that formerly relied upon the main Bilsdale mast to receive their TV services.

1.6 Arqiva and the TV and radio multiplex licensees and broadcasters have worked together to help viewers and listeners. Households have been provided with information and support (including in-home assistance from technicians) to help restore reception, although uncertainty over responsibilities caused a delay to establishing the support scheme that was in due course provided by Arqiva. Arqiva estimates that it will have spent in excess of £40m including viewer support, replacement services and the subsequent rebuilding of the main mast.

1.7 Given the extent of the impact of this incident on viewers, Ofcom has been conducting a review to gather information around the incident at Bilsdale and the response of industry partners to that incident. Ofcom has separately commissioned consumer research into the experiences of households whose reception has been affected by the fire at Bilsdale.

1.8 This review document sets out our conclusions about what happened. It also sets out our recommendations for what needs to happen to reduce the likelihood that a similar situation occurs in the future, so as to limit the potential impact on viewers and listeners.

What we have found – in brief

The UK's broadcast transmitter networks are designed to be resilient in the case of faults, and incidents causing severe damage taking services off for prolonged periods are rare.

Arqiva and its broadcaster customers (the multiplex licensees for digital radio and TV, and analogue radio broadcasters) have plans that are tested and can be brought in to use swiftly for most types of infrastructure failure. Arqiva holds a comprehensive stock of equipment specifically for deployment in disaster recovery situations

The fire at Bilsdale destroyed both the mast and transmitter equipment within the adjacent buildings. Once it became clear that the damage was likely to be severe, Arqiva moved quickly to build temporary transmitters to restore coverage, working with the broadcasters to manage the incident and plan the deployment of the temporary equipment.

Implementation of some of the temporary transmitters, particularly the one located at the Bilsdale site, was delayed due to site access issues, and planning and technical implementation issues - some of which arose as a result of the site's location within a National Park and Site of Special Scientific Interest. Having site-specific plans in place would have helped Arqiva to anticipate the problems and may have led to a swifter establishment of the temporary equipment at the site.

Some of the Broadcaster websites, including the BBC's Reception Advice pages, provided information relating to Bilsdale. The main mechanism through which viewer support was initially provided was the standard arrangement used by the TV multiplex licensees, utilising the Freeview Contact Centre and website, which provided an acknowledgement that there was a problem at Bilsdale and fairly general advice only. Once it was established that the incident would affect reception for a prolonged period, there was uncertainty amongst the parties over what the approach for communicating and supporting viewers should be. This led to delays in providing appropriate targeted support for households whose reception was affected by the fire.

Given the seriousness of the incident at Bilsdale, and the impact it has had on viewers and listeners, we consider it is proportionate that the relevant stakeholders review the circumstances of, and response to, the Bilsdale fire promptly, and take steps to address areas of weakness. Ofcom intends to work with those stakeholders and will consider whether further regulatory action is necessary, having considered any new initiatives they put in place, as well as progress made in taking them forward.

Recommendations

Terrestrial broadcast industry stakeholders should review the circumstances and response to the Bilsdale fire and consider what worked well, and also where there are weaknesses and areas that need improving.

Stakeholders should ensure they include in their reviews appropriate consideration of the following:

- Resilience provided by their technical infrastructure architecture;
- Adequacy of plans for recovering services in case of major failures, including the need for site-specific plans; and
- Status of communications and support plans to ensure they are adequate and proportionate for foreseeable eventualities.

Issues relating to planning and legal access to land and how those processes might be streamlined or expedited under emergency circumstances merit further consideration by Arqiva together with the relevant Agencies and Government Departments.

The overview section in this document is a simplified high-level summary only. The conclusions and recommendations we are making, and our reasoning are set out in the full document.

2. Background

2.1 A network of 80 principal transmitters and over 1,000 smaller relay transmitters is used to transmit the UK's Digital Terrestrial Television (DTT) services. DTT is received by households through aerials mounted on rooftops, in lofts, or portable aerials mounted on the TV sets themselves. DTT is commonly known as Freeview and carries free-to-air channels, although some hybrid platforms such as BT TV rely on DTT to provide some of the TV channels it provides to households subscribing to its service, along with others delivered via broadband.

2.2 Around 100 TV channels are available to 90% of UK households that are able to receive their DTT services from a principal transmitter. Around 30 of these services are also broadcast from the smaller transmitters that supplement the coverage of the principal transmitters. Through this combined network of transmitters, DTT is available to an estimated 98.5% of the UK's households.

2.3 The Bilsdale transmitting station situated in North Yorkshire is one of the principal transmitters in the network. Built around 1969, the mast was over 300m tall and served up to approximately 670,000 homes with TV services in the north-east of England, with coverage extending from York to Middlesbrough.

2.4 On the 10 August 2021, a fire broke out at the Bilsdale transmitter site, causing serious damage to the mast and adjacent equipment buildings. There was complete loss of TV and radio services from the site, affecting all households that received their services from Bilsdale or one of its smaller dependent TV relay transmitters. The fire was eventually extinguished on 15 August and it was subsequently not possible to restore the services transmitted from the mast due to the severe damage caused by the fire. Following a period of structural assessment, the original mast was demolished on 6 October 2021 for safety reasons.

2.5 Once it was established that the fire was serious, Arqiva (the company that owns and operates the Bilsdale transmitter) moved to put in place temporary facilities. Over the following days and weeks, it deployed disaster recovery equipment with the aim of restoring TV and radio services to as many households as possible. This saw the deployment of temporary equipment at the Eston Nab, Arncliffe Wood and Sutton Bank transmitter sites, some of which were operational within days. Deployment of a temporary mast at the Bilsdale site itself took until October 2021, with subsequent further improvements to achieve more robust temporary arrangements at the site. Other smaller temporary transmitters came on-air both before the end of 2021 and in early 2022. As a result, some households were without TV services for a considerable period of time.

2.6 The network of temporary transmitters now provides signals that should be adequate to restore coverage to over 99% of the households that would have formerly relied on Bilsdale. Making use of these temporary transmitters may in some cases require households to make changes to their aerials: this is because signals may be weaker than those formerly provided by the original mast in many areas, or signals may only be

available from a temporary transmitter site which is situated in a different location to the original site. It was therefore important that viewers were given adequate information to assist them in restoring reception.

2.7 Support for affected viewers was originally provided by Freeview using their standard website and contact centre which was funded by Arqiva from early September 2021. It was soon recognised that additional resources would be required to provide advice and support for viewers in the Bilsdale area due to the complexity of the messages that needed to be conveyed. An enhanced scheme was launched in October 2021 by Arqiva using printed materials, social media, public relations activity and political engagement to communicate with stakeholders and engage with affected communities. Arqiva has reported that it also provided funding to Age UK's team, the Two Ridings Community Foundation and the County Durham Community Foundation along with the range of local charities those organisations support. Arqiva also provided resources such as in-home help to impacted viewers, prioritising households with the elderly and vulnerable people.

2.8 Ofcom is responsible for licensing the terrestrial television and radio broadcasters, and multiplex operators under the Broadcasting Acts of 1990 and 1996, and the Communications Act 2003. Given the impact the incident has had on viewers, as well as considerable interest from the public, elected representatives and the media, Ofcom has been carrying out a review to gather information around the incident at the Bilsdale transmitter. Our review has helped us to draw conclusions about what happened, and has led to us making recommendations for what now needs to happen to reduce the impact on viewers should a similar situation arise in the future.

3. Ofcom's Review

Legal basis for our review

3.1 Ofcom has a principal duty in carrying out its functions to further the interests of citizens in relation to communication matters and of consumers in relevant markets[1]. In carrying out our duties, Ofcom is required, among other things, to secure a number of objectives including promoting the interests of all members of the public[2].

3.2 Ofcom is also required to have regard to the principles under which regulatory activities should be transparent, accountable, proportionate, consistent and targeted only at cases in which action is needed[3]. Further, in performing our duties, we are required to have regard to a number of specific objectives and a range of other considerations, as appear to be relevant in the circumstances[4]. This review has been conducted as part of carrying out our functions[5].

3.3 Ofcom is responsible for licensing the terrestrial broadcasters under the Broadcasting Acts of 1990 and 1996, and the Communications Act 2003[6]. Under this legislation, Ofcom is required to include conditions in the licences for Channels 3, 4 and 5, and in the licences for multiplex services issued under the 1996 Act, relating to transmission standards and reliability. Specifically, Ofcom must include such conditions as are appropriate for securing *"that the signals carrying the multiplex service attain high standards in terms of technical quality and reliability throughout so much of the area for which the service is provided as is for the time being reasonably practicable[7]".*

3.4 Accordingly, these licences include conditions requiring the licensee to observe the requirements of Ofcom's Television Technical Code in all the operations under its direct control, in the Distribution of the Programmes included in the licensed services, and by any third parties involved in the provision of programmes included in the service. This includes specific targets for the reliability of principal and smaller transmitters.

Areas for review

3.5 We have focused our review on addressing three principal areas:

a) How prepared are the Public Service Broadcasters to deal with a major transmission incident and how effectively did they respond to the fire at the Bilsdale mast, and the subsequent loss of services?

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[1] Communications Act 2003, s.3(1)
[2] Communications Act 2003, s.4(5)
[3] Communications Act 2003, s.3(3)
[4] Communications Act 2003, s.3(4)
[5] Communications Act 2003, s.1(3)
[6] Ofcom must also, when carrying out its functions in relation to radio spectrum management and use, have regard to certain duties. Spectrum use, licensing and interference management are set out in the Wireless Telegraphy Act 2006.
[7] Broadcasting Act 1996, s.12(1)(g)

b) What impact has the incident had on viewers, and was appropriate information and support available for those affected?

c) What lessons can be learned and where should improvements be made?

3.6 We are not addressing the cause of the fire which was still under investigation at the time we carried out this review. On 20 May, Arqiva issued a statement[8] concerning the cause of the fire which stated that *"Arqiva has been informed that its insurers have now concluded their investigations and whilst the precise findings have not been shared, Arqiva understands that the root cause of the fire has been attributed to water ingress to an electrical component connected to third-party equipment."* We will in due course work with Arqiva and the broadcast industry stakeholders to implement the lessons learned once the detailed cause of the fire is known, alongside the recommendations set out in this review.

How Ofcom carried out the review

Industry stakeholders

3.7 There are several parties involved in delivering terrestrial television and radio services to viewers and listeners in Teesside and much of North Yorkshire. These include:

a) **Broadcasters** - provide individual programmes services and content as a 'channel' or 'station' (for example BBC One, ITV or Absolute Radio).

b) **Multiplex licensees** - for digital terrestrial television and digital radio, the programme services are grouped together and are transmitted in groups of channels known as multiplexes. There are a number of organisations that Ofcom licences to broadcast digital multiplexes. For television, the main multiplex licensees are the BBC, Digital 3&4, SDN, Comux and Arqiva[9]. For Digital Radio the multiplexes are provided by organisations including the BBC, Digital One, and SDL which provide national radio multiplexes, and Muxco and Bauer Digital Radio which provide local radio multiplexes for North Yorkshire and Teesside respectively.

c) **The infrastructure provider (Arqiva)** - owns and operates the transmission equipment, including transmitters and masts that broadcast the TV and radio signals. The multiplex licensees contract with Arqiva to broadcast their services. For analogue radio there are no multiplexes, and the owners of analogue stations such as Classic FM contract directly with Arqiva.

d) **Other industry bodies** - Digital UK is a body funded by some of the TV broadcasters that performs a coordination role across the digital terrestrial TV platform. It works in conjunction with DTV Services (the organisation that markets the Freeview brand and coordinates the development of the service provided by the terrestrial television platform in the UK).

[8] Arqiva update on investigations into cause of fire at Bilsdale Mast | Bilsdale Mast: Project Restore

[9] As well as providing broadcast infrastructure, Arqiva holds licences to broadcast some digital TV and radio multiplexes.

3.8 In our review we have concentrated on the response to the fire of the stakeholders involved in delivering television services to viewers. For technical reasons, television was more affected by the loss of the Bilsdale transmitter than radio services. We have however included the impact on radio listeners in our consumer research and our conclusions are also applicable to radio.

3.9 During the days and weeks following the fire, the industry stakeholders held a series of incident calls attended by the multiplex licensees and Arqiva, as well as representatives of some of the broadcasters and other industry bodies such as Freeview. Ofcom was a participant in these calls as many of the temporary measures planned by Arqiva and the multiplex licensees would require us to amend their licences.

3.10 In addition to our engagement through the incident calls, Ofcom sent specific information requests to Arqiva in its role as infrastructure provider, as well as to the television multiplex licensees: the BBC, SDN, Comux, Digital 3&4 as well as Arqiva's multiplex division. These requests sought detailed information on what plans the infrastructure provider and multiplex licensees have in place to deal with major incidents when they occur, and how they communicate with each other and consumers when such major incidents occur.

Consumer research

3.11 Ofcom commissioned consumer research in January 2022 in order to gather information on the impact that the loss of the Bilsdale transmitter has had on consumers in Teesside and North Yorkshire. The research was carried out by Kantar who gathered feedback from 1,757 households in areas where TV and Radio services are expected to have been affected by the loss of the Bilsdale transmitter. The survey asked householders a range of questions seeking information on how their reception had been affected by the fire, how long the disruption had lasted, what help they had received, and whether they were subsequently able to receive the services that they could previously. We have published the findings of the research alongside this report.

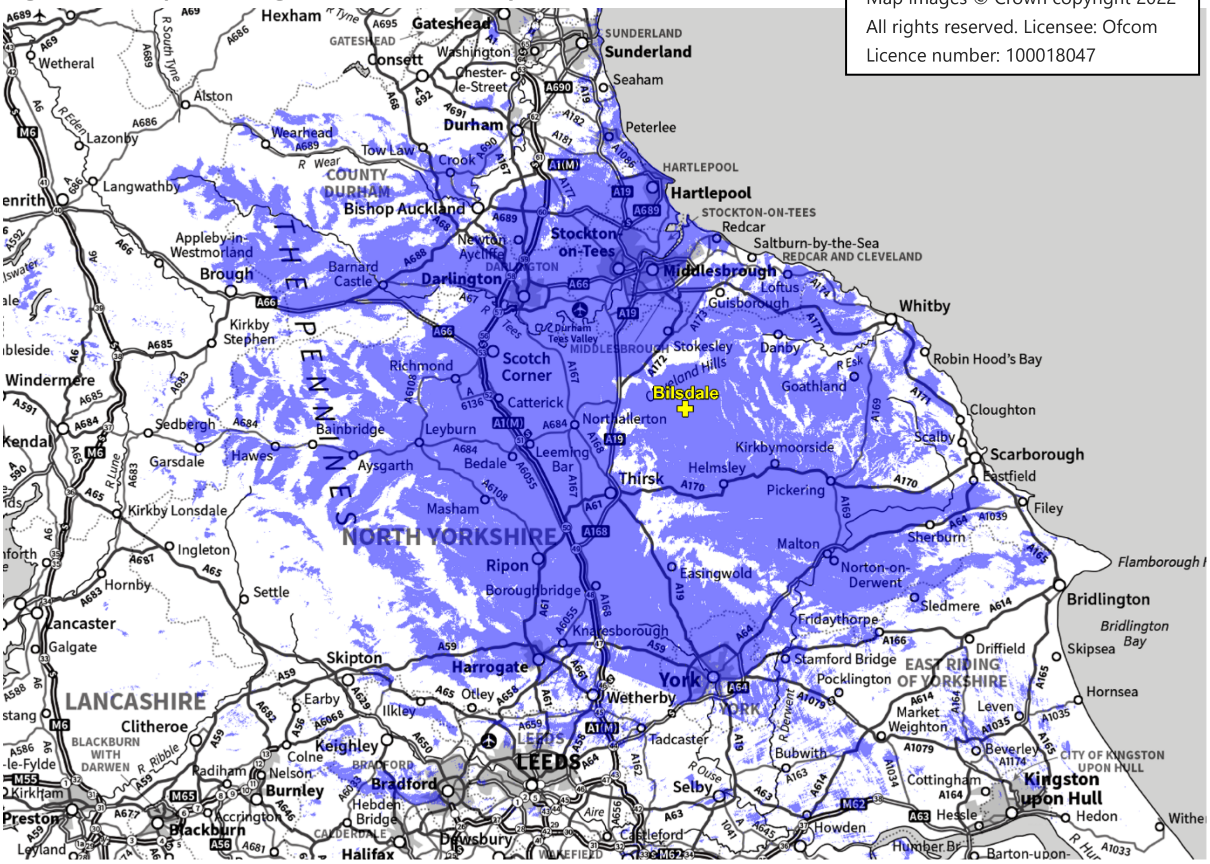
4. The Bilsdale Fire

The area and services affected by the fire

Coverage

4.1 The Bilsdale transmitter is a broadcasting station located at Bilsdale West Moor, North Yorkshire. The transmitter provided TV and radio services to homes throughout Teesside and the surrounding areas including North Yorkshire and southern County Durham as shown in Figure 1 below.

Figure 1 - Map showing the area served by the Bilsdale transmitter fo



4.2 It is difficult to know exactly how many households rely solely on TV signals from Bilsdale, as the coverage of neighbouring transmitter sites overlaps to some extent, and neither the broadcast industry nor Ofcom hold detailed information on where individual households' aerials are pointing. However, Arqiva has estimated that Bilsdale would have been the 'best' transmitter for up to approximately 670,000 households.

4.3 The number of households actually receiving signals from Bilsdale would have been somewhat lower than this figure as some households use satellite, cable or online streaming as their main source of receiving television. Allowing for this might reduce the number of households that use Bilsdale to receive TV services on either a main or secondary TV set by between 25%-50%, to somewhere in the range 340,000 to 500,000

households. Where households were using Bilsdale for secondary sets only, they would have retained their principal means of receiving TV services

4.4 Throughout this review document when coverage figures are mentioned, these are based on the estimated number of households who are technically served by (able to receive) signals from a particular transmitter (or transmitters): i.e. the figures make no allowance for the number of households using other platforms to receive TV services.

Broadcast services transmitted from Bilsdale

4.5 The Bilsdale transmitter broadcast seven digital television multiplexes carrying over 100 TV services, five digital radio multiplexes carrying over 70 radio services, as well as nine FM radio services.

Table 1 – Broadcast services formerly transmitted from Bilsdale

Digital TV multiplex	**Licensee**	**Example services carried**
PSB1	BBC	BBC One, BBC Two, BBC Three, BBC Four, CBeebies
PSB2	Digital 3and4	ITV Tyne Tees, Channel 4, Channel 5
PSB3	BBC	BBC One HD , BBC Two HD, ITV HD, Channel 4 HD, Channel 5 HD
COM4	SDN	Quest, QVC, 5Star, CITV
COM5	Arqiva	Sky Arts, Dave, 4Music, Pick
COM6	Arqiva	Yesterday, QVC Beauty, DMAX, Talking Pictures TV
LTV	Comux	Teesside TV, GREAT! tv, Tiny Pop
COM 7	Arqiva	BBC Four HD, BBC News HD, QVC HD, Quest HD
Digital Radio multiplex	**Licensee**	**Example services carried**
National - BBC	BBC	BBC Radio 1, BBC Radio 2, BBC Radio 4Extra, BBC Radio 6Music
National - Commercial 1	Digital One	Classic FM, Absolute Radio, Talk Sport, Magic
National - Commercial 2	SDL	Virgin Radio, Planet Rock, Mellow Magic, Scala Radio
North Yorkshire local	MuxCo North Yorkshire Ltd	This is The Coast, BBC Radio York, Hope FM, Capital Yorkshire
Teesside local	Bauer Digital Radio Ltd	TFM, BBC Radio Tees, Heart North East, Capital NE

Analogue radio	Services
National – BBC	BBC Radios 1, 2, 3 & 4
National - Commercial	Classic FM
Local - BBC	BBC Radio Tees
Local - Commercial	TFM, Heart NE, Capital NE

The fire and its aftermath

Outbreak of the fire

4.6 On the 10 August 2021, a fire broke out at the Bilsdale transmitter, causing significant damage to the mast and surrounding site. All of the TV and radio services listed in Table 1 ceased transmission on that day. The fire continued to burn for several days until it was extinguished on 15 August. During that time, the broadcast services remained off-air, and could not be re-powered. Arqiva's maintenance staff were prevented from accessing the site, around which a 300m exclusion zone was placed as a safety precaution, in case the mast collapsed. This exclusion zone remained in force while structural assessments were carried out, and was only lifted once the damaged mast had been demolished on 6 October 2021.

Restoration of services through temporary transmitters

4.7 As a result of the exclusion zone being in place from 10 August, Arqiva was not able to attempt restoration of broadcast services from the former structure or transmitters which, although not known at the time, were in fact damaged beyond repair.

4.8 Instead, over the following days and weeks, Arqiva worked to restore coverage by building temporary transmitters and by increasing the coverage of other existing transmitter sites. Arqiva first increased the power of the TV transmitter at Eston Nab: this site was originally built as a low power transmitter and provided TV services from the Public Service Broadcaster[10]s to a part of Middlesbrough. As well as the power increase at Eston Nab, Arqiva added additional transmitters to the site so that it broadcast all of the commercial TV multiplexes. All TV services at Eston Nab were operational by 12 August.

4.9 Arqiva subsequently brought on air a temporary transmitter at Arncliffe Wood to provide coverage into Darlington which was operational from 20 August. These measures taken together provided signals for over 400,000[11] of the 670,000 households formerly served by Bilsdale. Some households would however have needed to make adjustments to their

[10] TV services provided by the BBC, as well as ITV, Channel 4 and Channel 5

[11] Arqiva has calculated the coverage figures contained in this document. For the coverage provided by the temporary transmitters, they have used a method based on identifying locations as being 'served' where their planning model predicts that signals are sufficiently strong and free of interference to be received 95% of the time. This planning target is slightly more relaxed than that used for planning permanent TV services which is based on 99% time.

rooftop aerials in order to receive signals from the temporary transmitters as they were in different locations (and therefore directions) to Bilsdale. A further transmitter at Sutton Bank was brought on air on 8 September to improve coverage in the southern part of Bilsdale's area until the Quarry mast was brought on-air in October.

Quarry Mast temporary transmitter

4.10 On 13 October Arqiva brought on-air a temporary transmitter located on the North York Moors which they named the Quarry Mast site. The transmitter was originally expected to be on-air during August 2021, although was delayed by Arqiva experiencing difficulties agreeing access to suitable land, which they have told us was due to a combination of planning rules relating to the site's locations within a National Park, being in a Site of Special Scientific Interest, and the requirements of the processes set out in the Electronic Communications Code[12].The Quarry mast site was within a few hundred metres of the original Bilsdale mast which meant that viewers' existing aerials would not need re-repointing. The Quarry Mast was 80 metres tall which is somewhat shorter than the original 300 metre mast, and its transmitters operated at half the power of the former permanent transmitters. These differences meant that coverage was not as extensive as that achieved by the former mast.

4.11 Nevertheless, Arqiva's calculations indicate that the combination of Eston Nab, Arncliffe Wood and the Quarry Mast provided adequate signals for just under 650,000 households, or around 96% of Bilsdale's original coverage. The signal levels may however have been lower than those provided by the original mast in many locations. This may have required some viewers' aerials to be upgraded if they had been relying on an aerial that does not meet the planners' assumed standard[13]. If all households took action to adjust or replace their aerials, Arqiva estimates that as of the end of 2021, TV reception would have been restored to 99.4% of households in Bilsdale's original service area.

Station Mast and 'not-spot' relays

4.12 Over the following months Arqiva built additional temporary transmitters or modified existing ones at 13 locations[14] in order to provide coverage into 'not-spot' areas that could not be reached by the initial temporary transmitters. These not-spot transmitters provided signals to around 8,000 further households that would otherwise have been unserved.

4.13 Following the demolition of the damaged mast on 6 October 2021, Arqiva was able to resume work on the original Bilsdale site where it built a more robust temporary structure named the 'Station Tower', to replace the Quarry Mast. The Station Tower entered service in February 2022. With all of the not-spot relays, coverage was at that point available to an

[12] The Electronic Communications Code (Conditions and Restrictions) Regulations 2003 (legislation.gov.uk)
[13] The standard planning assumption is for an aerial mounted 10m above ground with a gain of 10dB, and 3dB of feeder loss (i.e. a nett gain of 7dB).
[14] Loftus, Thirsk, Kirkbymoorside, Bainbridge, Ripon, Castleton, Masham, Leyburn, Helmsley, Seaham, Sunderland, Blackhall Colliery and Northallerton.

estimated 97.4% of households (with unadjusted rooftop aerials), or to 99.9% of households if all took the necessary action to replace or re-point their aerials.

Replacement permanent mast

4.14 In parallel to putting the temporary transmitters on air, Arqiva has been working to plan and build a replacement 300m permanent mast. The site location in a National Park and a Site of Special Scientific Interest means that the construction works are subject to special requirements, and the process of obtaining planning permission involves a greater degree of scrutiny than would otherwise be the case. Arqiva obtained planning permission for the replacement mast on 25 October 2021. Work has started work on the replacement mast, and recent media articles[15] [16] have suggested that under ambitious plans, it may be completed as early as the end of 2022. Arqiva has told us that it anticipates that the new mast will be built by Autumn 2022, and be operational between then and Spring 2023.

Timeline

Table 2 below illustrates the some of the significant events since the fire on 10 August.

Date	Event
10 August 2021	Fire Breaks out at the Bilsdale Transmitter site. All TV and Radio services broadcast from that site go off air
11 August 2021	PSB[17] TV services restored at Eston Nab (an existing low power transmitter near Middlesbrough) and BBC Radio Tees and TFM added to the site. PSB services restored at two of Bilsdale's relay transmitters at Whitby and Guisborough
12 August 2021	Further digital TV services added at Eston Nab, via a temporary mast and additional transmitters installed at the site. Capital FM added to the site
13 August 2021	Heart FM added to Eston Nab, thereby restoring all local radio services to the majority of their previous audiences
14 August	Classic FM added to Eston Nab
15 August	The fire at Bilsdale was finally extinguished
17 August 2021	Digital 1 and SDL digital radio multiplexes added to Eston Nab
19 August 2021	Power at Eston Nab transmitter increased 12-fold to improve coverage of the PSB services

[15] Bilsdale transmitter: New mast erected by end of year - operator - BBC News
[16] Arqiva provide update on completion of new Bilsdale mast and if it will cause disruption | The Northern Echo
[17] PSB = Public Service Broadcaster, ie BBC TV, ITV, Channel 4 and Channel 5

20 August 2021	Transmitter at Arncliffe Wood brought on-air using a temporary mast and transmitters
24 August 2021	Arqiva announced delay in proposed temporary mast at Bilsdale site which had been expected to come on-air before the end of August
2 September 2021	All 12 of Bilsdale's relay transmitters are now back on-air[18]
8 September 2021	Temporary transmitter site at Sutton Bank goes live which brings total Freeview TV restoration to 500,000 homes (of an estimated 670,000 predicted to have lost TV reception). Temporary transmitter for BBC Radio Tees serving Darlington put into service.
6 October 2021	Fire damaged mast felled at Bilsdale
13 October 2021	The 80m 'Quarry Mast' at Bilsdale comes on air
25 October 2021	Planning consent granted for Station Tower at Bilsdale, 80m in height
30-31 October 2021	Temporary transmitters covering Thirsk and Loftus went into service
23 November 2021	Further power increase at Eston Nab
29 November 2021	Two new TV temporary transmitters are switched on to improve or restore TV services in and around Bainbridge and Kirkbymoorside
3 December 2021	Temporary transmitters serving Ripon and Castleton came on-air
14 December 2021	The Masham temporary transmitter goes live
21 December 2021	Temporary transmitter serving Leyburn came on-air
23 December 2021	The Helmsley temporary transmitter goes live
End of 2021	PSB services predicted to be available to 98.4% of households formerly served by Bilsdale. The figure rises to 99.4% if households also get their aerials pointed at the most appropriate temporary transmitter
14 January 2022	Temporary transmitters are brought on at Seaham & Sunderland
23 February 2022	Station Tower at Bilsdale comes on air, Quarry mast switched off.
8 March 2022	The Northallerton temporary transmitter goes live
End- March 2022	PSB services are predicted to be available to 98.7% of households formerly served by Bilsdale. The figure rises to 99.9% if households also get their aerials pointed at the most appropriate temporary transmitter
20 May 2022	Arqiva confirms the fire was caused by water entering a component of third-party equipment on the mast

[18] Some relay transmitters were not able to carry local news for the North-east

5. Industry response to the incident

What plans and infrastructure did Arqiva and the broadcasters have in place and were these followed?

5.1 In this section, we concentrate upon the terrestrial transmitter network, although the principles can be extended to other parts of the transmission broadcast transmission chain.

Measures to avoid service interruptions

System design

5.2 The TV transmitter network comprises over 1,000 transmitter sites which are grouped into categories by agreement between Arqiva and its customers. Those transmitters serving the largest number of households typically have completely duplicated signal paths, so that any single failure will not take the service off-air. This means Arqiva provides:

a) two separate power feeds fed from different parts of the power grid to the transmitter site, as well as a standby generator;

b) two separate feeds of the programme content to the transmitter site;

c) duplicated transmitter and associated equipment; and

d) main and reserve transmitting antennas.

5.3 Bilsdale is one of the UK's larger transmitters, and was equipped with all of the above features, although it has only one power feed plus a generator, due to the difficulty of providing a second feed to the remote location.

5.4 Masts and towers are not duplicated due to the cost and impracticality of providing a second tall structure, as well as the historically low likelihood of a tall broadcast structure failing (though such failures have occurred in the past).

Preventative maintenance

5.5 Arqiva has several fire prevention measures in place. Periodic mast and antenna inspections take place, with routine checks to capture defects. All new installations are tested prior to be being energised and commissioned into service.

5.6 Desktop analysis and inspection data capture is used to identify sites at a high risk of suffering damage due to wildfires, and this allows risk mitigation plans to be put in place.

5.7 Arqiva has defined standards which must be met for customer installations on its sites, and where necessary, it carries out direct supervision of third parties carrying out installations on its sites to ensure that these standards are met.

5.8 Regular maintenance includes removal of any flammable waste. Broadcast transmission equipment and electrical distributions systems also undergo regular maintenance checks.

5.9 Arqiva's fire protection systems include fire detection and suppression, and feeder protection where a fire-resistant coating stops the feeders being a source of fuel. This latter measure has not been implemented at all sites.

Disaster recovery plans

Contractual requirements

5.10 The contracts between the DTT multiplex licensees and Arqiva differ in some respects, although all contain targets for the reliability for the individual transmitters in the transmitter network. In case of a fault occurring, the contracts set out target response times to attend site to repair faults.

5.11 Arqiva is required to hold and deploy disaster recovery infrastructure in case a transmitter site suffers a catastrophic fault, an example being a failure of the structure.

5.12 The contracts contain provisions which incentivise Arqiva to meet the target availability requirements.

Platform incident management and communications between the parties

5.13 Arqiva has standing instructions and protocols agreed with its customers, including notification and escalation processes to be followed in case of a major incident occurring. Initial notification of major service impacts is carried out by Arqiva's 24 hour Broadcast Operations Centre. Subsequent communication is established through Arqiva's customer accounts teams.

Disaster recovery infrastructure and deployment

5.14 As for communications, Arqiva has documented processes agreed with its customers for deployment of emergency infrastructure in case of major incidents occurring.

5.15 Arqiva has a system of tiered plans for dealing with catastrophic events which divide a recovery plan into four phases:

a) Phase 1 - Establish a service

b) Phase 2 - Improve the levels of service

c) Phase 3 - Establish equivalent service

d) Phase 4 - Planning and rebuilding of the permanent arrangement

5.16 Arqiva aims to complete Phases 1 and 2 within hours or a few days of an incident occurring. Timescales for Phases 3 and 4 depend on the scale of the damage caused by the incident, and the amount of re-building that is required. They are likely to be measured in terms of months, or more than a year in case of very severe damage as occurred at Bilsdale.

5.17 Following the moorland fires that occurred in 2018 that could have damaged some of its transmitters in the north-west of England, Arqiva carried out a review of its readiness to

deal with major incidents. As a result of this review, it carried out a test construction of some structural equipment that it holds for disaster recovery use, including an 80 metre tower, as well as procuring additional infrastructure, such as transportable temporary masts and a disaster recovery DTT antenna. Much of this infrastructure was in fact later deployed at Bilsdale.

5.18 Arqiva holds a comprehensive stock of infrastructure that is available for deployment in case of a major incident rendering a transmitter site inoperable and beyond repair. The equipment includes temporary masts of various sizes, as well as transportable transmitter equipment mounted in shipping containers that can be transported to site and deployed at short notice. This equipment is held at a number of locations across the UK.

5.19 Except for a few sites where Arqiva has developed specific deployment plans for its disaster recovery infrastructure, the deployment plans are general in nature. This means that any site-specific implementation issues will need to be dealt with at the time the equipment is being deployed, which may delay the restoration of broadcast services where site-specific issues are encountered.

What plans were in place for communicating with viewers and stakeholders in the event of a major incident?

5.20 Viewer support for the DTT platform is principally provided though Freeview, which delivers viewer information and support through a website (www.freeview.co.uk), presence on several social platforms (Twitter, Facebook, Instagram, YouTube) as well as a telephone support line.

5.21 Digital UK is an organisation established by some of the broadcasters to provide a coordinating role in the DTT platform, and works closely with Freeview on matters relating to consumer messaging. Digital UK has procedures and agreements in place with Arqiva and the multiplex licensees should a major incident arise at a transmitter site.

5.22 The protocol agreed between Arqiva, the multiplex licensees and Digital UK is that Arqiva will take a lead role in resolving the incident, and should provide information to its customers (the DTT multiplex licensees) and also to Digital UK's incident management team, which will assist with developing communications lines for consumers. Arqiva should provide information to Digital UK about the nature of the incident, its effect on viewers, and estimated resolution times. Digital UK communicates directly with viewers via the Freeview Advice Line, the Freeview website, and Freeview's social media channels.

5.23 Arqiva is expected to take the overall lead in formulating the lines for communication to the media in relation to transmitter issues and disseminating them to the appropriate stakeholders, which could include operators of platforms that depend upon DTT (e.g. BT, Now TV), DCMS, journalists, as well as Ofcom.

5.24 The protocols are general in nature, with no pre-prepared communications lines in place. Also, in cases where specific viewer support may be required, the level of that support is not specified. Multiplex licensees have told us that the advice presented to viewers will

depend upon the specific situation, and are therefore prepared adaptively to respond to specific circumstances.

How well were the plans executed and were any issues experienced?

Execution of disaster recovery plans and deployment of infrastructure

Platform incident management and communications between the parties

5.25 When the fire occurred at Bilsdale in the afternoon of 10 August 2021, a major incident was declared by Arqiva and communicated out to the DTT platform stakeholders promptly. The transmitter infrastructure shut down at 13.26, and Arqiva alerted its customers through a combination of automatic systems reporting the fault, as well as telephone calls due to the severity of the incident. Arqiva was typically calling its broadcast customers within 15 minutes of the incident occurring.

5.26 Communications between Arqiva and the multiplex licensees appears to have been effective during the first days following the incident with multiple updates typically being provided each day as new information became available. As the situation stabilised, updates were subsequently provided at weekly or fortnightly intervals.

5.27 Multiplex licensees have told us that the incident management and communications protocols were followed and were initially effective. However, as the incident unfolded over the following days and weeks, some of the multiplex licensees have told us that they felt that information was not quickly forthcoming from Arqiva, or that information they would have expected to have been given directly was instead learned from local media outlets. Separately, Arqiva told us that it took the lead in providing information to viewers, local stakeholders and responding to media questions.

5.28 As it became clearer that service could not quickly be restored at Bilsdale, the multiplex licensees and Arqiva recognised that an approach tailored specifically to Bilsdale would be required. The multiplex licensees asked Digital UK to set up an incident management group comprising the DTT multiplex licensees, Arqiva, Digital UK/Freeview, DCMS and Ofcom. This was supported by two specialist sub-groups, one that focused upon communications and another on coverage. These groups met approximately once or twice weekly initially, with the frequency of meetings subsequently adjusted as required. These meetings were generally helpful, although Ofcom's impression from its attendance was that on occasions, information flowed into the meetings after it had been made publicly available.

Disaster recovery infrastructure and deployment

5.29 Within hours of the fire taking services off the transmitter, Arqiva established internal technical working groups to work through the response to the incident. The first temporary transmitter was brought on at Eston Nab to restore coverage to much of Middlesbrough the following day for the PSB TV services as well as the local radio services BBC Radio Tees and TFM. These were supplemented by the commercial digital TV multiplexes as well as

analogue radio stations Heart FM and Classic FM within the next two days. Arqiva also restored transmissions from four of Bilsdale's 15 relay transmitters within the first week, and another seven the following week.

5.30 The Coverage working group, comprising specialists from Arqiva and the BBC, was effective in identifying which households may be able to get TV services from an alternative transmitter, as some households are in overlap areas that are also served by transmitters other than Bilsdale. Where reception from another transmitter was not possible, the group was effective at identifying sites at which temporary transmitters could be built and predicting the coverage that could be achieved.

5.31 The situation in the Bilsdale area was rapidly changing during the first days and weeks after the incident. This meant that signal coverage patterns changed and some households would have needed to take action on more than one occasion to restore their reception, as and when additional temporary transmitters came on air. While the Coverage group's focus was on providing as much coverage as was practicable, there was collectively less emphasis during September and early October on trying to explain to viewers what they needed to do. Without this information and advice, viewers would not be able to take advantage of the coverage that the temporary transmitters were progressively delivering.

5.32 Arqiva's teams worked hard to plan and build the temporary transmitters. There were however some issues that caused some significant delays to temporary equipment being brought on-air. The most notable instance was in establishing the Quarry Mast temporary installation, which was located close to the damaged Bilsdale transmitter. Arqiva initially announced that the Quarry Mast site would come on air by the end of August. Unfortunately, due to a combination of issues relating to obtaining planning consent in a National Park and Site of Special Scientific Interest, finalising legal access to the land for the temporary transmitter, as well as some on-site implementation issues, the site did not come on-air until 13 October.

Communication with viewers

5.33 Arqiva worked with Digital UK and Freeview as set out in the previously-agreed protocol, with Arqiva generating the lines for communicating to media, and Digital UK/Freeview doing so for consumers. The initial response was to provide advice on the Freeview website, and a recorded message was carried on the Freeview contact centre number for viewers enquiring about loss of programmes in Teesside and North Yorkshire. This was in place from 24 August, initially with the recorded message evolving to a staffed line funded by Arqiva from 10 September.

5.34 Most of the DTT multiplex licensees rely upon Digital UK/Freeview to provide support to viewers. The BBC also has its own comprehensive reception advice service (www.bbc.co.uk/reception). The BBC's coverage checker is updated automatically using fault information provided by Arqiva and anyone using the BBC's coverage tool would have been alerted that the Bilsdale transmitter had shut down on 10 August. The BBC also provided a bespoke area of their reception advice website within an hour of the incident

occurring and set up a 'live issue' with their call centre operator to provide lines for viewers and listeners calling about loss of service in Teesside and North Yorkshire.

5.35 ITV provided information for viewers in the ITV Tyne Tees area of its website. This contained information on which areas were affected by the Bilsdale incident, whether viewers should retune their TVs, how people could watch programmes in the meantime, where viewers could find the latest updates on the situation, which radio services were impacted and how to watch the evening news programme uploaded to the website each night. Some of this information was also provided via social media using ITV's Tyne Tees Facebook pages and Twitter.

5.36 As noted above, the Coverage group planned all of the sites described in Section 4, including the Quarry Mast, Station Tower and not-spot relays. There were however shortfalls in building on this technical planning work and the subsequent delivery of coverage from temporary transmitters, and using it to develop advice for households. For example, households would at least need to be alerted to the possibility of reception from temporary transmitters when signals became available, and to the need to re-tune their TV sets. Those signals might be weaker, or come from a different direction than the original transmissions form Bilsdale, meaning viewers may also need to make changes to their aerials in addition to retuning their TV sets.

5.37 Once it was established that the situation would not be resolved quickly, the DTT stakeholders agreed that a more comprehensive communications plan would be required, including a strategy for supporting affected viewers. However, other than the incident protocol mentioned above, there were no plans in place or agreements between the parties about how this would be delivered, or who would be responsible for providing such support.

5.38 The DTT multiplex licensees, Arqiva and Digital UK considered various models for delivering viewer support from early-to-mid September. There were, however, a number of factors that delayed establishing a more comprehensive communications plan. In the absence of agreement, Arqiva elected to step in and provide advice and support for viewers that had lost their reception. This required them to establish a business to consumer communications capability as well as a home support team. Arqiva has not previously carried out such functions and building the capability took some time, with its support line and a dedicated 'Bilsdale Project Restore' website (www.bilsdalemast.co.uk) only being made available from 14 October. This enabled a transition from the Freeview Helpline which Arqiva had been funding from early September.

5.39 One consequence of these events was that specific information for viewers was slow to materialise. Until Arqiva's communications programme was established, there was no central source of information from which enquirers could obtain information on what specific actions they could take to restore reception. As noted above, some of the TV broadcasters provided information on their websites for viewers affected by the Bilsdale incident, and/or directed them to the Freeview website, which provided general advice.

5.40 Once established, Arqiva's information campaign used printed materials, social media, PR activity and political engagement to communicate with stakeholders and engage with affected local communities. Arqiva has told us that it also provided funding to Age UK's team as well as the Two Ridings Community Foundation and the County Durham Community Foundation along with the range of local charities those organisations support, to help them provide support in relation to the Bilsdale fire. Arqiva also provided guidance on what help it was making available through its support scheme, with elderly and vulnerable being supported as an initial priority. The Bilsdale Project Restore website provided a place to direct viewers and listeners seeking information, where they could register issues and make contact. Alongside this, an expanded call centre was funded by Arqiva to deal with public contact and arrange engineer visits.

5.41 The Arqiva support scheme was launched in October 2021 to help those households who did not have access to the main Public Service Broadcaster TV channels. There were four main elements of the scheme which were:

a) A contact call centre which was staffed with agents who were able to assist callers in retuning equipment or taking bookings for in-home engineer visits

b) The Bilsdale Project Restore website which provided updates on the incident and retuning advice as well as a postcode checker so that viewers could determine their expected coverage and apply for call-back from the contact centre should predicted coverage at their location be sub-optimal.

c) A voucher scheme, which involved Arqiva posting vouchers for the purchase of alternative devices for TV reception (such as an internet streaming stick) to households located in areas predicted to receive no or limited coverage from the Quarry Mast.

d) An engineer visit (if requested by the viewer). The programme of in-home engineering support consisted of five teams from October increasing to 20 teams in December 2021. These provided support through over 550 visits a week at peak demand assisting with retuning, aerial realignment or installing satellite TV equipment (Freesat) in areas where reception could not be restored through other means.

5.42 Taken together, Arqiva's Help Scheme probably offered as much help and support to affected households as could reasonably be expected. Despite extensive publicity through the channels mentioned above, we found awareness of the scheme and uptake of help by the public to be relatively low amongst those that responded to our viewer research[19]. This highlights the challenges that can be encountered when communicating with a large number of people in differing circumstances, a proportion of which have lost access to broadcast TV and/or radio services.

5.43 Nevertheless, by December 2021, Arqiva's Help scheme had received nearly 17,000 calls to the dedicated freephone helpline and more than 3,750 homes had been visited by an engineer. The website received over 167,000 visits. More than 6,880 vouchers have been redeemed of the 15,220 vouchers that were mailed by Arqiva to homes affected by loss of

[19] Section 7 of this review report summarises the results of the viewer research carried out by Kantar for Ofcom

TV services. Those vouchers could be used to claim up to £50 towards the cost of an alternative means of receiving TV services, such as a streaming device. Arqiva estimates that, to date, it has spent well in excess of £5m in providing viewer support.

6. Impact on viewers and listeners

6.1 The fire at Bilsdale has affected a large number of viewers and listeners across the Teesside and North Yorkshire, some for a prolonged period. To better understand the impact on consumers, Ofcom commissioned Kantar to carry out consumer research in areas where TV and Radio services are expected to have been affected by the loss of the Bilsdale transmitter.

Form of the survey

6.2 The high-level purposes set out by Ofcom for the viewer research were to understand the impact of the loss of TV services on households and to find out how many households managed to restore their TV reception, as well as the level of satisfaction with any support provided. We were also hoping to understand any problems viewers encountered, and for those households that are using only TV delivered over broadband, and whether that is an adequate replacement for broadcast TV.

6.3 Ofcom asked Kantar to seek feedback from a target sample of 2,000 households. The research was spilt into three areas:

a) Not-spot areas - where viewers would be expected to have been receiving TV services from Bilsdale before the fire, and temporary transmitters should at the time of survey not yet be providing an adequate signal to restore coverage to existing rooftop aerials (without quality improvements);

b) Overlap areas- where reception from the Emley Moor[20] transmitter is expected to be possible as an alternative to Bilsdale (where a proportion of viewers may not have been using Bilsdale before the fire);

c) The core Bilsdale Transmitter area where viewers would be expected to have been receiving TV services from Bilsdale before the fire, and where temporary transmitters should at the time of survey have been providing an adequate signal to restore coverage.

6.4 Kantar identified postcodes in affected areas and sent cards to a sample of households in those areas inviting householders to take part in the survey. No incentives were offered to people participating in the survey, and around 20,000 invitations were sent out with Kantar anticipating a 'return rate' of around 10%.

6.5 Householders were asked to complete an online survey comprising around 30 questions. Those that did not have access to the internet were able to request a paper survey. A summary of the question themes is given below.

[20] Emley Moor is a large broadcast TV and radio transmitter located near Huddersfield which serves many parts of Yorkshire. It is possible to receive TV services from Emley Moor in the southern part of Bilsdale's coverage area.

6.6 Responses were gathered in January and February 2022. This means that some of the responses will have been received before some of the temporary transmitters were on air, including the Station Tower at Bilsdale, and not-spot transmitters at Seaham, Northallerton and Sunderland, which came on-air in 2022 as the survey period was closing. Nevertheless, we still expect the themes raised in the survey feedback to be valid, primarily because the coverage provided by the Station Tower transmitter at Bilsdale is similar to that of the former Quarry mast, and the proportion of the total temporary coverage contributed by individual not-spot transmitters is fairly small. Nevertheless, it is worth bearing this in mind when interpreting the results of the survey, as well as other caveats set out at the end of this section.

Questions

6.7 The survey asked a range of questions beginning with whether respondents had lost reception of TV services after the fire occurred on 10 August. Those that lost services were then asked further questions dealing with the following areas:

a) The demographics of the household;

b) Which TV platform(s) are in use in the household, and whether occupants have access to the internet;

c) Whether households are now able to watch TV services and what methods they have used to restore reception;

d) Satisfaction with the current way of receiving television;

e) Communications and sources of support since the fire occurred; and

f) Whether reception of radio services was affected and if so, which ones.

6.8 Annex 1 contains a full list of the questions that respondents were asked.

Responses and findings

6.9 The survey received valid responses from 1,757 householders. A larger number of householders did respond, but anyone that had not experienced any disruption was not taken forward through the survey, as they cannot have been receiving their TV services from Bilsdale (or its relays), or may be using a platform other than DTT.

General themes

6.10 General themes that Kantar identified are:

a) At time of interview (January/February 2022) approximately 5 months after the fire, the majority of households that responded in each area are using the Freeview TV service only. Around a quarter are using a broadband service only.

b) Age has a bearing on how households have responded to the problem. For those aged 70+, there is a greater reliance on Freeview services – 2/3 use Freeview only, and 1/10 use a mix of Freeview and a broadband service.

c) In younger households, over a third are using Freeview only, and another third are using broadband services only. Approaching 20% of these younger households that responded claim to have no service at all.

d) Where broadband services are being used on their own, then levels of satisfaction with the TV service available are poorer – and the level of dissatisfaction among younger households is strongest. Kantar believe the size of household and presence of children may accentuate the problem for this age group, presumably because of the challenges of restoring TV using broadband on all TVs in the household.

e) For older households using Broadband services only, there appears to be a sense of uncertainty – a greater percentage claim to 'not know' whether the Freeview service has yet been restored

Differences between areas

6.11 Kantar also observed some differences between the three types of geographical areas studied:

a) Usage of Broadband services only is highest in the 'Not-Spots' areas where the temporary transmitters are not expected to have fully restored service. However, across all areas, the majority of households are currently using Freeview services only.

b) In the Not-Spots areas, 6% of households that responded claim to have no service at all.

c) In all areas, if broadband services are used alone, then the levels of dissatisfaction with service quality is greater.

d) In the Not-Spots areas we see the greatest level of dissatisfaction, due to the limited availability of channels and frustrations with broadband, such as not being able to view live TV or not being able to view specific regional programming.

e) In all areas, those using broadband only services have spent more money to try to rectify the problem than those using Freeview only – around double in our cost estimations.

f) Householders that responded to the survey feel less supported by official communications and believe friends and family have generally provided the best support, followed by local press and radio.

g) There is a sense through verbatim comments that communication has been particularly challenging in the Overlap areas – the use of another transmitter has created additional problems (including set up, continuous retuning, and lack of regional programming). It is in this region where there has been greatest claimed installation of broadband services.

6.12 We have published Kantar's summary findings from the research alongside this review and have also made data for the responses to each question available for researchers that may wish to carry out their own analysis of the underlying data.

Observations and caveats

6.13 The following observations and caveats apply to the results of the viewer survey:

a) As noted above, the survey was carried out between January and February 2022. This was before the Station Tower at Bilsdale, and not-spot transmitters at Seaham, Northallerton and Sunderland came on air. These transmitters would have improved coverage in some of the areas from which we received responses, although it is not possible to say how much the feedback received by Kantar might have changed as a result. In addition, signal levels will not be fully returned to their previous (pre-fire) levels until the main mast is rebuilt.

b) Respondents chose whether to participate in the survey. Because no incentives were offered for participation, those who were unhappy with their reception would probably be more motivated to respond than those whose reception has returned to normal.

c) Most responses were received from older people, with the 16-39 age group accounting for only 7% of responses, the 40-69 age group accounting for 52%, and those aged 70+ accounting for 41% of responses. It's not clear whether this age distribution is a reflection of the demographic profile that relies on DTT, or whether it is due to survey respondents to the survey being those that perhaps have more time available, for example in retirement.

d) Only a proportion of households in areas we classified as "Not-Spots" would have received a voucher from Arqiva for a broadband TV stick. This is because Arqiva targeted these vouchers at households that were predicted not to receive adequate signal levels until the main mast has been rebuilt. Our not-spot areas also included households that would have had a significant drop in signal level but could have had their TV restored by improvements to their rooftop aerial (as offered by the Arqiva home support scheme).

e) Where householders have expressed dissatisfaction with TV services delivered via broadband, it is not possible from the responses to determine whether viewers' dissatisfaction was due to unfamiliarity with the broadcasters' applications or their inability to find content (possibly due to technical differences between TV sets), as the PSBs do make both live content and regional news services available on their on-demand platforms.

f) Householders that have reported feeling unsupported by 'official' communications will probably not have been aware that part of the information campaign by Arqiva was to engage with local media and other organisations to share information. Respondents to the survey may not have recognised these channels as being 'official' communications and consequently the score may be lower than if those channels were to be included.

7. Lessons learned

7.1 In their responses to our requests for information, Arqiva and the multiplex licensees have told us that they have learned lessons from the incident at Bilsdale and are planning (or are already) making changes to various aspects of their arrangements for dealing with major incidents.

Incident management and communications

7.2 Multiplex licensees consider that the response and communications processes between Arqiva and its broadcaster customers in the period immediately following the fire worked well on the whole. They also largely agreed that coordination through a body such as Digital UK is useful where common issues affect all multiplex licensees, and that this arrangement generally worked well in the immediate aftermath of the Bilsdale fire.

7.3 Multiplex licensees highlighted a number of issues which they expect to work through collectively, and also with Arqiva. These relate to:

a) Decision processes for a transition from the emergency response immediately after an incident to a communications and support strategy for managing a significant long-term outage, recognising the high impact this has on audiences;

b) Digital UK carrying out a 'lessons learned' exercise focusing on communications;

c) The ability of the planning system and property law framework to deal very quickly with emergency situations given the delays that Arqiva experienced in these areas, and Arqiva itself has suggested that it would be helpful if the Electronic Communications Code be included in the scope of the discussions.

7.4 Separately, Arqiva has commissioned an external review of its Disaster Recovery and Business Continuity Planning, and is working to deliver what it terms an 'Operational Resilience Improvement Plan'. Arqiva has already implemented a range of measures to enhance its fire mitigation, fire protection and disaster recovery procedures and capabilities including areas such as: additional inspections, upgrades to lighting, enhanced audits and records of telecom installations, testing of fire stopping products and paints, taking forward tenders for additional disaster recovery structures and commencing work on additional site-specific plans.

Assessing and minimising the risk of a similar occurrence at other sites

7.5 Following the fire at Bilsdale, Arqiva and the Multiplex licensees have told us that they are planning to take a number of actions to reduce the risk of a similar incident occurring elsewhere. These are outlined below.

Arqiva actions

7.6 Arqiva has begun reviews and inspections of each of the main transmission sites to assess their susceptibility to a fire such as occurred at Bilsdale. The mast at Bilsdale was a cylindrical structure resembling a tall, enclosed tube, which differs from the more common open metal lattice mast type used at most other large sites. A closed cylindrical structure is prone to acting as a chimney, drawing air up its centre and potentially fanning any fire that breaks out within the structure or close to its base. The replacement mast at Bilsdale that Arqiva is procuring will be of a conventional latticed steel construction, which will not feature the same closed interior environment as the cylindrical mast it replaces.

7.7 Following the fire at Bilsdale, Arqiva's focus has focused initially on four other sites that feature cylindrical masts, putting in place additional fire precaution measures to protect those structures against fire. As well as additional inspections, Arqiva is planning on implementing a number of modifications to aspects of the masts and their interior cabling and equipment to reduce the likelihood of a fire occurring, and also limit the damage caused should a fire break out. These works are expected to be completed during 2022.

7.8 Arqiva has also been carrying out inspections on the other 40 or so main sites checking for factors that indicate an increased risk of a fire occurring.

Multiplex licensee actions

7.9 Multiplex licensees have told us that they will be seeking to work with Arqiva to focus on

a) the resilience of the transmission chain, and to identify whether there are any vulnerabilities of the sort that led to the incident at Bilsdale;

b) examining the overall resilience of the network; and

c) ensuring that sufficient resources are put into the resilience of the transmission chain.

Ofcom response

7.10 Fires or other major incidents causing severe damage to a major broadcast structure are fortunately rare, although not unheard of. In the past twenty years there have been four such instances, including the fire at Bilsdale. The other three incidents were:

- A fire at the Peterborough radio transmitter site in 2004 that resulted in its collapse;
- A fire in the main TV antenna at the Oxford transmitter site in 2010 that destroyed the antenna. The standard on-site resilience was sufficient to permit the TV services to be restored by using the reserve TV antenna after the fire had been extinguished. Radio services were unaffected, and the structure was not damaged;
- Mechanical failure that resulted in damage to one of the masts at the Start Point Radio transmitter that subsequently had to be demolished in 2016

7.11 Although rare, the consequences of an incident can be severe and long-lasting. We welcome the actions identified by the multiplex licensees, and their transmission service provider Arqiva, that address many of the issues that we have identified as requiring

attention in our review. If taken through to conclusion, these measures should both reduce the likelihood of a repeat incident occurring in the future, and improve the response to the incident, with a swifter resolution and support for affected consumers.

7.12 In Sections 8 and 9 we set out the conclusions of our review and make some high level recommendations for how the terrestrial broadcast industry stakeholders can improve how it deals with major incidents.

8. Conclusions

8.1 Infrastructure at the UK's main broadcast transmitter sites is designed to be resilient, with main and reserve programme chains. Failures such as fires that cause severe damage that takes services off-air for prolonged period are rare. However, as shown at Bilsdale, the consequences for broadcasters and the impact on their audiences of such a rare failure can be serious. Restoring those services quickly and fully also presents an immense challenge to the company providing the transmission service, in this case Arqiva.

8.2 All of the television multiplex licensees have contracts with Arqiva to transmit their services. The television multiplex licensees' contracts vary to some extent, although they typically contain requirements for Arqiva to provide transmission services to defined levels of availability, including response times to repair faults and requirements for restoration in case of disasters. These contractual requirements appear to have worked satisfactorily with Arqiva mobilising quickly to restore services, with the first temporary arrangements coming on air the day following the incident. Arqiva has told us that it went well beyond its contractual requirements in providing support services to viewers.

8.3 Arqiva has a stock of transmission infrastructure that can be deployed in case of a serious failure of equipment at a transmitter site, as well as generic plans for how to deploy the equipment in case of a serious incident occurring. Except for a very few transmitter sites where site-specific plans exist, the plans are general in nature. This meant that although temporary equipment existed, it could not be rapidly deployed at Bilsdale as no immediately suitable location existed to assemble a temporary mast due to an exclusion zone around the damaged mast (which was at risk of collapse).

8.4 Additional delays arose in accessing adjacent land because the site is located within a National Park, a Site of Special Scientific Interest, and because it took some time to negotiate an agreement to use the land, which included following the process set out in the Electronic Communications Code. This led to announced dates for the temporary Quarry Mast and Station Tower being missed. Having site specific deployment plans would have helped identify some of these issues in advance and potentially reduced the time it took to establish the temporary transmitters at Bilsdale. Issues relating to planning and legal access to land and how those processes can be streamlined or expedited under emergency circumstances merits further consideration by Arqiva together with the relevant Agencies and Government Departments. For example, there might be benefit in having plans for where to deploy Disaster Recovery equipment in a range of mast failure scenarios and provisional agreements in place in advance to enable speedy implementation of such plans.

8.5 The BBC, ITV, Channel 4 and Channel 5 pay for Digital UK to carry out various coordination activities across the DTT platform, including providing communications to viewers in case of technical problems that could affect reception. The terms of reference for Digital UK state that Arqiva will provide media lines in case of transmitter issues and that Digital UK/Freeview is responsible for formulating the Consumer Line, including what viewer

support arrangements are in place. This arrangement does not seem to have worked well in providing specific advice and support over a long period for those affected by the Bilsdale fire. To address this shortfall, Arqiva established its own viewer communication capability, although it was not able to deliver advice until two months after the incident had occurred (noting that before this date it had been funding the Freeview advice line from early September). This was partly due to uncertainty amongst the DTT platform main stakeholders on the model that should be adopted for delivering advice, and partly because communication with viewers is not a function Arqiva had performed previously. Having a plan in place for how consumers would be supported through a prolonged incident would have meant that the DTT platform stakeholders collectively could have delivered targeted information and support more swiftly, and would have had clarity on who would be responsible for delivering it.

8.6 Digital UK established an incident coordination group at the request of the DTT multiplex licensees. The group was a forum in which the multiplex licensees could receive updates from Arqiva on the damage to the transmitter, and discuss and agree Arqiva's plans for restoring services, as well as considering communications with viewers. These meetings were generally helpful, although information did not in practice always seem to flow as expected.

8.7 The temporary transmitters built by Arqiva are now predicted to provide adequate signals to 99% of households in the areas affected by the loss of the Bilsdale mast, subject to households having a rooftop aerial of sufficient quality. The results of the viewer research commissioned by Ofcom suggest that there is still a significant number of households that continue to experience difficulties and have not been able to find help. The main reasons for this seem to be a lack of awareness of where to look for help on the part of some households, while other households are simply waiting for the transmitter to be repaired.

8.8 Despite Arqiva setting up the viewer support scheme, which has been widely publicised through multiple media outlets, only 4% of those responding to the survey said they had received any help from the support scheme with retuning their TVs, with the majority saying they have received no help or have had help from friends. Overall, 54% of households that responded to the survey felt communication had been weak. 65% of respondents were unhappy with the speed of restoration of services, with nearly three-quarters of younger households unsatisfied. This highlights the challenges of providing information to a large number of households when many of those have lost access to radio and television services, and that not all households may find the help and support that is on offer.

9. Recommendations and next steps

Recommendations

9.1 We make a number of recommendations building upon the information we have gathered as part of this review and the conclusions drawn. These are actions for the terrestrial broadcast industry stakeholders generally (which includes multiplex licensees for digital television and radio, analogue broadcasters for analogue radio, as well as their chosen transmission service providers, and associated coordination and marketing companies). We anticipate that different parties will need to take the lead on different aspects of the recommendations.

9.2 Our recommendations are listed below:

a) Terrestrial broadcast industry stakeholders should review the circumstances and response to the Bilsdale fire and consider what worked well, and also where there are weaknesses and areas that need improving.

b) Stakeholders should ensure they include in their reviews appropriate consideration of the following:

- Resilience provided by their technical infrastructure architecture;
- Adequacy of plans for recovering services in case of major failures, including the need for site-specific plans; and
- Status of communications and support plans to ensure they are adequate and proportionate for foreseeable eventualities.

c) Issues relating to planning and legal access to land and how those processes might be streamlined or expedited under emergency circumstances merit further consideration by Arqiva together with the relevant Agencies and Government Departments.

Next steps

9.3 Given the seriousness of the incident at Bilsdale, and the impact it has had on viewers and listeners, we consider it is proportionate that the relevant stakeholders review the circumstances of, and response to, the Bilsdale fire promptly, and take steps to address areas of weakness. We are encouraged to have found that many of the areas are already being addressed by the industry stakeholders. Ofcom intends to work with those stakeholders and will consider whether further regulatory action is necessary, having considered what initiatives they put in place, as well as progress made in taking them forward.

A1. Kantar's Bilsdale Transmitter research – survey questions

Survey questions

Q1. Did your household lose some or all of your television broadcast services (Freeview) on 10th August?

Q2. Gender

Q3. Age

Q4. How many people are currently living in your household, including yourself?

Q6. Are there any members of your household who would be considered vulnerable?

Q7. Does anyone in your household - including yourself - receive any of the following benefits?

Q8. Do you have access to the internet in your household?

Q9. Which, if any, of these TV services are used in your household to watch programmes, shows or films?

Q10. Earlier you said that you had lost service, was this on your main TV set in the household, or on other TV sets within the house, or both?

Q11. And when did you get the Freeview service back on your Main TV set, if at all?

Q12. And for other TV sets in the household?

Q13. And as of today, are you and your household able to watch TV, either by using Freeview or by using other means?

Q14. What method or methods have you tried in order to regain TV service in your household?

Q15. And why did you not attempt to regain TV service in your household?

Q16. And have you provided any support to others who have been affected?

Q17. Have you had any support with retuning your TV broadcast service, and if so, what support have you received?

Q18. And did you receive a £50 Currys voucher to help buy a TV broadband stick?

Q19. And how easy was it to use the TV broadband stick?

Q20. And roughly how much have the methods you have tried to restore the TV service cost you and your household?

Q21. Now we would like you to think about your main TV set. How would you describe the TV service you receive now compared to the service you received previously?

Q22. Now we would like you to think about your other TV sets in the household. How would you describe the TV service you receive now compared to the service you received?

Q23. And why is the service worse than before?

Q24. How would you describe the solution you are using now to receive TV services?

Q25. How satisfied are you with the speed of the restoration of your TV service?

Q26. How satisfied are you with the TV service you now receive?

Q27. And since the fire in August, where have you found or looked for support?

Q28. And which was the best source of help?

Q29. How satisfied are you with the communications regarding the situation since the fire?

Q30. And finally, along with losing your TV service, did you lose radio service as well?

Q31. What stations did you lose?

Q33. As a result of the survey you have just completed and the information you have given us, we may like to contact you in future about this subject - is that all right?