Revue Française de Civilisation Britannique

French Journal of British Studies

XXIII-3 | 2018

A Long Awakening? Environmental Concerns in the United Kingdom Since the Nineteenth Century

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Electronic version

URL: <http://journals.openedition.org/rfcb/2425>

DOI: 10.4000/rfcb.2425

ISSN: 2429-4373

Publisher

CRECIB - Centre de recherche et d'études en civilisation britannique

Electronic reference

Lucie de Carvalho, « “Remember There’s Nothing Secret About a Nuclear Power Station”: Institutional Communication on Invisible Environmental Risks in British TV Footage (1956-1982). », *Revue Française de Civilisation Britannique* [Online], XXIII-3 | 2018, Online since 07 December 2018, connection on 01 May 2019. URL : <http://journals.openedition.org/rfcb/2425> ; DOI : 10.4000/rfcb.2425

This text was automatically generated on 1 May 2019.

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"Remember There's Nothing Secret About a Nuclear Power Station": Institutional Communication on Invisible Environmental Risks in British TV Footage (1956-1982).

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Introduction

Since the early stages of the nuclear age, visual symbols have played a key role in the confrontation between industry and protesters. From the cooling towers of nuclear power plants to the protest movements' peace and radioactivity logos, actors' attempts at encapsulating their stances in visual symbols have turned them into potent icons. Portelli has recently described these icons as "cultural objects" that should not be analysed "as independent and decontextualized entities" but "through the prism of the history of aesthetic representations."¹ Interestingly enough, it was precisely when the iconic cooling towers were, in the 1960s, starting to be embedded as familiar sights in the British countryside, that a culture of protest emerged and gained momentum and media visibility. Visual objects thus became a key ingredient in what was becoming not only a battle of ideas, but also a battle of representations. At the heart of this confrontation stood the need to influence the general public's representations of the environmental risks linked to the civilian applications of atomic energy. Approaching these cultural objects helps explore the dynamic, non-linear influence of the links between the object, its means of production and possible reception.² Similarly, Wise has argued that visual representations constitute an essential facet of "materialised epistemology."³

Britain's nuclear power venture started in the 1950s. The first British nuclear power programme was officially launched in 1956, when four Magnox reactors became operational at the Calder Hall power station. Given their highly dangerous primary material and their close links with the British deterrence programme, nuclear power stations straightaway fell under the authority of the British cabinet. All early nuclear decisions were shrouded in secrecy, away from not only public but also parliamentary oversight and scrutiny.⁴ Consequently, nuclear discourses were institutionally controlled from the outset. The 1950s came to be characterised by strong civilian deference and support for institutional discourses⁵ as this unchecked and unaccountable decision-making process was hardly ever met with public counter-discourses or opposition. According to Hogg, the foundations of the "*British nuclear state*" can be traced back to that period. Characterised by the notions of "*mystery, potency, secrecy, and entelechy*"⁶ the '*British nuclear state*' thus relied on institutional, organisational but also discursive and communication hegemony. Yet, public deference substantially frayed under the impacts of two major events, the *Windscale* (1957)⁷ and *Three Mile Island* (1979) accidents, which gave credence and visibility to the dramatic consequences of severe nuclear incidents. These two events contributed to forging more nuanced perceptions of technological activities and their potential environmental risks.

However, it is often noted that opinion polls around nuclear sites reveal a certain support from the local communities. Drawing on a sociological survey carried out in the Cumbrian region, Brian Wynne argued nevertheless that such facts were not to be seen as evidence of public support for nuclear activities, but as symptomatic of their fatalistic acceptance of risks. Wynne identified an unconscious state of denial that meant that these individuals had buried their risk-related fears under a thick veneer of institutionally-driven rationality which lies at the heart of British nuclear communication.⁸ Analysing TV footage may help investigate this avenue.

Television allows to analyse institutional, discursive and communication hegemony at the same time. Drawing on the categories defined by Peters,⁹ there exist three major groups of images: first *artistic* images, second *substitute* images, aimed at subrogating reality in order to create emotions, and finally *documentary* images, meant to serve reality and therefore create knowledge. Given their essentially informative content, TV footage on nuclear power fall into the latter category. As these short sequences were commissioned or sponsored by either the nuclear industry (UKAEA or CEGB) or the political establishment via the Central Office for Communication (COI),¹⁰ it would not be a stretch to argue that this reality was filtered through an institutional point of view, here distancing the BBC or regional television from their presumably restrained impartiality of broadcasting. This reality is "*a selected perspective presented in a highly structured or filtered way*".¹¹ In that sense, TV footage of the time helped anchor ideas in this reality, while making them present/visible. TV footage gave the viewers the illusion of witnessing the events, and of not being fed with a reporter's second-hand account. Visual communication can also be construed as a carefully-crafted rhetorical exercise that creates meaning through argumentation and demonstration. TV footage allows communicators to *explore another way of telling*.¹² In short, analysing TV footage opens a window on nuclear discourses and how meaning is expressed. They not only reveal how institutions communicated on nuclear power activities and their risks, but also how their discourses were altered, influenced by changes in context, either in terms of public opinion or clear opposition from anti-hegemonic groups. Television coverage helps to

decode the nuclear venture as not only a technical but also an ideological project, through what Jasanoff and Kim labelled "*sociotechnical imageries*". These sociotechnical imageries refer to "*collectively imagined forms of social life and social order reflected in the design and fulfilment of nation-specific scientific and/or technological projects*" determined by official or institutional actors.¹³ The following corpus was gathered through four sets of online archives:¹⁴

release	TV footage TITLE	length	Nuclear sites construction dates (completion date)	
1956	First commercial nuclear power station	3'21	Berkeley (1962)	1 st PROGRAMME (MAGNOX)
1956	Atomic Achievement	4'28		
1956	How nuclear power works: Nuclear Power Station Atomic Achievements	19'15		
1957	Atomic Milk	1'25	Bradwell + Hunterston A + Hinkley Point A (1962, 1964, 1965)	
1959	Reactor on Tow: Bradwell	1'00	Trawsfynydd (1965)	
1959	Scotland's nuclear power station	4'42		
1961	The Berkeley Nuclear power station	5'00	Sizewell A + Oldbury: (1966-1968)	
1962	Atomic Power station	3'36		
1962	Bradwell Atomic Power Station	200		
1962	Berkeley Power Station	2'52		
1963	Windscale Atomic Factory	7'06	Wylfa (1971)	
1965	Wylfa Nuclear power station under construction	5'48	Dungeness B (AGR) (1983)	2 nd PROGRAMME (AGR)
1966	Bradwell Power Station	3'08		
1966	Power accepts Challenge	1'12		
1966	This is Bradwell	14'31		
1966	Bradwell Power Station	3'08		
1967			Hinkley Pt B + Hunterston B (1976)	
1968			Hartlepool (1983)	
1969			Heysham (1983)	
1975			Negotiations started to build Sizewell B	
				3 rd PRGRAMME

1980	<i>Look East</i>	3'33	Heysham II + Torness (1988)
1982	<i>Opportunity at Sizewell</i>	21'41	
1987			Sizewell B (1985)

This analysis aims at looking into the long-term evolution of the visual representation of nuclear-related environmental risks. This time frame focusses on the 'infancy' and 'teenage years' of the industry, which are crucial moments that were to serve as templates for the industry's subsequent communication strategies.

The aim is therefore to determine how these environmental risks are defined, characterised and challenged in these discourses. Defining risks linked to nuclear activities is complex. Nuclear risks are not limited to the physical and health safety of workers or neighbours, but also include the community's environment.¹⁵ Nuclear risks encompass multi-faceted issues, which are likely to lead to conflicting definitions, especially given their essentially invisible nature. From radiation to contamination or pollution, it is by essence difficult to see and comprehend nuclear environmental risks, as they remain impossible to detect or perceive with human senses. In risk acceptance, visibility stands as one of the most crucial challenges to overcome.¹⁶

Recurring semiotic patterns (1956-1982)

The vision of the machines and power

All the TV documentaries studied draw on the evocative power of visual imagery to stress the power and inevitability of the nuclear technology. They also fall in line with the then-prevailing rhetoric of progress and modernity, characteristic of the nuclear establishment of the time. Most documentaries still draw on popular fascination with the alien and distant nuclear venture. Yet, if most TV spots commend science and its practitioners, the locus of attention here shifted from fundamental to applied research, staging no longer physicists or researchers, but engineers, as illustrated by the following examples with control rooms and rods:

How Nuclear Power Works (1956)

Scotland's first nuclear power station (1959)

The "Press-Button Age" in BBC Look at Life series (1961)

Berkeley Power Station (1962)

Atomic Power Station (1962)

Atomic Power Station (1962)

This is Bradwell (1966)

Bradwell Power Station (1966)

Opportunity at Sizewell (1982)

These different images provide a very sleek and almost clinical representation of the insides of the nuclear power stations. The viewers are undoubtedly struck by the strongly aesthetic visual, with machines radiating control and command, while the outside shots strengthen the towering yet harmonious effect of the exterior buildings. Even though these screen captures span more than three decades, they depict very similar visual symbols which tap into the same iconographic register: nuclear artefacts or props, such as fuel cartridges, measurement screens, and white lab coats, or places, including the easily-recognisable control rooms. Such focus on artefacts and visual nuclear truisms hints at revealing / objectifying and making this esoteric scientific practice and its founding component – the nuclear reaction – visible and material.

However, most documentaries do not only represent and bring the machines and the technical apparatus into the foreground. These instruments are indeed never represented as functioning independently. Around them, operators manoeuvre calmly and composedly, manipulating levels, turning sliders, pushing buttons, perusing gauges, or handling them with control and intent. Such staging stands out when compared to images found in expert journals for instance, which tended to only represent iconic objects, as illustrated by the photos used for the *Engineer* article on Calder Hall published on 5 October 1956 (see S.10).

Overall, a constant feature that emerges is the strength of the control and mastery of the machines by men – here engineers and operators. The stereotypical representation of the scientists in white lab coats is here again perpetuated. Between 1957 and 1982, this scenography, including camera angles and shots, hardly changed, thereby participating in the prevailing quasi-sacralised depiction of the nuclear technicians in action.

Two control rod actuating mechanisms (1956).

Rationalising and popularising discourses on nuclear practices and risks

Several sections of the TV footage materials are silent. Their purpose is not necessarily to explain, but to *show*, to let the public *enter* the premises, and *see* what a nuclear power station looks like from the inside – to *see* science in action. They constitute as many attempts at popularising science by resorting to traditional rhetorical strategies. For instance, jargon and specialised terms are never used, even when going into technical procedures. The prime popularising process is based on using schoolbook-like visual representation of scientific processes for the structure of atoms, of nuclear reactions, or of the cooling circuit, for instance.¹⁷ However, the environmental risks of pollution / radiation are never depicted in these visual materials, except the radiation emitted during the controlled nuclear reaction inside the reactor. These radiation waves are most of the time depicted in an unaggressive light-blue glow (1966 TV footage). These visual, educational materials are used to explain and educate viewers on nuclear matters. Such a pedagogical approach is coupled with the unescapable presence of the semantic fields of rationality, reliability and necessity.

Over the whole period, the public remained considered as a group of irrational and emotional beings, likely to be easily influenced by set ideas or counter-arguments based on fears and anti-innovation rhetoric. It then follows that if citizens did not support nuclear power, it was because they did not understand it. Labelled the 'knowledge-deficit model', this vision of the public's lack of scientific understanding justified these attempts at popularising nuclear activity. Even the presenter from the 1982 documentary argues that once the public understands the "*facts*", they would support the controversial

Sizewell PWR project. Journalist Peter Fairley argues that he himself is *"personally convinced of their case. Yet it's a complex matter so the CEGB is anxious that everybody should understand the facts. That's why this film has been made."*

Lumped together, these characteristics conjure up the main features of a technocentric system. Techno-centrism is characterised by a belief in rationality, linked to an unbounded faith in human capacities, coupled with a strong admiration for the scientific feats which enabled scientists to develop techniques and increase material wealth. Its presence in these visual institutional discourses evokes what Johnson defines as *"manifest rationality."*¹⁸

Consequently, environmental risks stand at the crossroads between these two communication strategies that at first sight seem incompatible, with on the one hand, a sacralising of scientific practices, and on the other, a trivialising of civilian nuclear activities. This recurrent hybrid approach allowed communicators to somehow popularise nuclear science, while simultaneously securing a hierarchy between the science world and the public. In other words, most of the footage studied hints at the existence of regular symbiotic patterns, or recurring *"knowledge, imagery, and artefacts of applied nuclear physics"*, that characterise the *"British nuclear culture."*¹⁹ We can therefore go further and argue that this nuclear culture is underpinned by a famous *"technocratic pose"* or vision of nuclear activities, based on *"a stance that rhetorically places technological activity above and beyond the sphere of politics and reach of politicians."*²⁰ Advertising science through a controlled presentation of scientific practices aimed at guaranteeing public acceptance. A technocratic system revolves on the notion that rationality stands as the bedrock for public policymaking and political choices. It follows that civil society, along with political actors and other stakeholders, are expected to assume a deferential attitude regarding recognised expertise.²¹ Such technocratic ethos undoubtedly underpinned most of the TV footage studied.

To a certain extent, TV acted as an echo chamber for institutional communication which lifted the lid on nuclear activities on TV and allowed viewers to literally enter the nuclear sites thanks to the camerawork. Did abstract and immaterial environmental risks undergo a similar treatment?

First nuclear programme (1957-1965): The Nuclear State in action

Using television as a prime vehicle for nuclear communication conveniently took science out of museums. Over the period studied, television entered a period of formidable expansion. As opposed to museums, exhibitions or specialised journals, the small screen then surfaced as a powerful communication tool to disseminate information. As the very first mass media, television stood as a much more democratic, powerful, albeit passive, tool to reach as many recipients as possible.²²

Harnessed progress and national pride

TV here plays the role of a primary didactic vector, used as an institutional instrument to strengthen Britain's national identity and pride in its industrial and engineering capacities. Britain is construed as ready to rule the electrical waves. Just as nuclear bombs

played a critical role in defining British cultural and geopolitical identity during the Cold War,²³ its civilian counterpart followed a similar path in the economic sector, forging the image of a new industrial leader. Britain's role at the vanguard of the global commercial nuclear venture is often stressed. In 1966, Britain for instance already had "*a very long lead in th[e nuclear] field in the rest of the world*" (*Power Accepts Progress*, 1966). In the mute 1961 TV footage of Berkeley nuclear power station, the use of cranes to shoot high angle panning shots of the buildings further underscored the size of the structure. As claimed in the 1962 *Atomic Power Station* footage, these buildings provide "*a glimpse of the future*".

This unrelenting atmosphere of optimism and pride in nuclear technologies through its buildings is sustained by the formidably epic movie tones used as background music in the *Reactor on Tow: Bradwell* (1959), the *Atomic Power Station* (1962), or the 'Press-Button Age' footage (1961) – all worthy of the most iconic Hollywood film soundtracks of the 1950s. All in all, most TV footage shot between 1956 and 1966 conveyed the overall Whiggish rhetoric of technological and industrial progress. Against the backdrop of this communication strategy however, the Windscale accident came as a clap of thunder in a clear British sky.

Environmental risks: the impact of the Windscale Accident

Among the examples studied, the 1956 footage – therefore before the Windscale accident – is the only one which explicitly represents workers wearing airtight protective gear and respirators, as illustrated in the following screenshot. Such an image would not appear again in the subsequent footage.

Atomic Achievements (1956)

Windscale provided material evidence that risk control was not absolute. Despite the prevailing rhetoric of confidence, control and reassurance, the issue of contamination was nonetheless indirectly broached. In the wake of the radioactive leakage, the milk from 200 square miles of farmland around the plant was condemned as radioactive. Yet, in the 1957 *Atomic Milk* footage, the serious nature of radioactivity is undermined through humorous comments. For instance, the broadcaster claimed that the managing engineer could not "*kiss his wife for 4 days,*" while discussions on the long-term environmental risks were simply eluded since "*you can't explain radioactivity to a cow*".

After 1957, TV material was visibly altered as if to pre-empt a potential rise in popular anxieties. The clinical representation of the machines functions here as syllogisms to stymie the potential emergence of anti-nuclear protest. The 1961 *Press-Button Age* footage goes even as far as shooting a nuclear operative handling highly-dangerous material labelled with the iconic radioactive pictogram, while the voice-over defiantly claims that this man has "*the simplest and safest of jobs*" of handling bulk uranium.

The 'Press-Button Age' (1961)

The radioactive pictogram was glaringly absent from previous footage. This visual code for nuclear risk was thus claimed from anti-nuclear protesters and dragged back into the institutional visual rhetorical arsenal. This footage refers once to "*stringent precautions*", but these safeguards are less intended to protect the staff, than to protect "*the reactor from the outside world*" – thus operating an interesting reversal in the victim/threat dynamic. Such a description rather stands apart from the 1956 footage.

All in all, the documentary footage from the first nuclear programme still tended to reveal the discursive power of the nuclear state in countering the politics of potential and harmful vulnerability²⁴ of nuclear facilities. Between 1956 and 1966, TV nuclear footage remained rather homogenous in the way it broached nuclear power activities and explored - or did not explore - its environmental risks. Apart from the instances cited, very little visibility was given to environmental risks - quite the opposite. Several documentaries show shots of cattle peacefully grazing around electricity pylons, with the iconic cooling towers in the background of this almost Arcadian view. Such shots may convey the idea that nuclear activity has no disruptive force regarding the environment and should therefore not be opposed to nature protection and conservation. As Jolivet underlines, "*nature and nuclear are read not as polarised opposites but part of a common, historically specific culture in which the visual forms, rather merely reflects the discourses of the age.*"²⁵ The outset of the second nuclear programme however, was marked by a distinct shift in communication paradigm on environmental risks.

The second nuclear programme (1966-1982): environmental risks as battleground

Making risks visible through unveiling strategies and linguistic cleansing

The 1966 documentary follows a group of tourists composed of both men and women as they visit Bradwell nuclear power station. The footage starts with an aerial view of a bus driving along small, winding roads in the countryside. In the background, a light-hearted soundtrack accompanies this group. Straight from the beginning, this documentary sounds both light in tone and entertaining.

Moreover, the second nuclear programme TV footage seem less intended to fully explain the workings of nuclear reactions and energy production, than to "*domesticate*"²⁶ the atom - to make it enter everyday life. Hence, numerous metaphors or comparisons to everyday life or known items or practices are drawn to divert attention towards visible and familiar dangers, to trivialise nuclear risks. In many instances, sophisticated nuclear activity is presented as harmless and benign.²⁷ For instance, Raymond Baxter, the TV presenter of the 1966 documentary, claims that "*working at a nuclear power station is a lot safer than crossing Piccadilly*", since "*nothing is left to chance*."²⁸ He echoes and upholds the prevailing visual imagery of control and command previously identified and the industry safety record that here presumably ward off any potential accidental radiation or contamination on site. Words such as "*harmless*", "*nothing mysterious*", "*perfectly safe*" are repeated as an enchanting leitmotiv to hammer in the viewers' minds that in a power station, "*everything is controlled*."

Similarly, the environmental risks of pollution and radiation of the vicinity are addressed more explicitly. The 1966 footage extensively dwells on shooting operatives measuring the 'natural radioactivity' of the fauna and flora around Bradwell. However, the actual environmental and health risks linked to radioactivity - contamination, pollution, radiation - are never explicitly mentioned as such. Why? Because close monitoring allows to pre-emptively manage them, hence making these risks twice invisible. These risks are only visually referred to through the measurement instruments, and the sample-taking routine presumably daily performed by the operators. The way environmental risks are dealt with sketches out a certain definition of 'risks', that leans towards 'hazards', rather than 'risks'. Hazards can be understood as easily identifiable and predictable, while 'risk' entails a polysemous and ambiguous notion, probabilistic and yet less predetermined, and whose potential consequences are less easy to identify. All in all, such visual representations were construed as essential to endow the invisible with substance.

When the second nuclear programme was launched, advertising and communicating on environmental risks helped guarantee support and acceptance, not necessarily from the whole population, but more importantly from the local communities. Tony Shaw depicted the 1960s' BBC as "*an official publicity arm*" for the nuclear industry, as it would regularly broadcast short films on nuclear power material which "*had something of a tranquilising effect*" on the British population.²⁹ These institutional discourses were thus tailored to respond to rising concerns over potential nuclear-induced environmental and health effects and hinder the development of counter-discourses.³⁰ This approach indeed coincided with the rise in a new culture of protest, especially among students and

intellectuals against large-scale industrial complexes as a whole. At the turn of the 1970s, this rise in tensions regarding the environmental consequences of capitalist and industrial activities participated in bringing environmental questions and risks onto the political agenda: in 1969 the newspaper *the Ecologist* was founded; the Department for the Environment was set up in 1970. The first *Friends of the Earth UK* group, then specifically opposed to nuclear power, was also established in 1971.

At the turn of the 1970s, these environmental groups primarily focussed on the radiation and contamination risks incurred when dealing with dangerous materials. The government then attempted to provide political safeguards to deflate growing environmental anxiety. In 1970 the Heath Government notably introduced new radiation legislation, one of the most critical of its kind. The 1970 Radiological Protection Act established a new public authority, the National Radiological Protection Board, overtaking and expanding powers and responsibilities previously vested in the UKAEA Health and Safety Branch. Welcomed by the scientific community, this initiative was further hastened by the rise in the levels of long-lived atmospheric radioactivity for the first time in several years. According to the *New Scientist* newspaper, "*the creation of this new entity provide[d] an ideal opportunity to close the existing gap in understanding between the nuclear industry and the public.*"³¹ Mostly providing guidelines and advice, this institution played a major role in defending the idea of *relative* nuclear radiation, to set the threshold under which the levels of ionising radiations remained a minimal *acceptable* risk for both citizens and the environment.

The Sizewell B case: upping the ante in communication strategy on environmental risks

The communication strategy in the 1982 Sizewell footage differs from the other instances as environmental risks are explicitly identified and broached. However, even though they are mentioned, it is via the use of negative phrases: "*there's been no nuclear accidents at Sizewell, no contamination with radioactive materials outside the power station area, and no serious exposure of any member of staff.*"³² In a performative fashion, institutional communication no longer hinges on covering or eluding environmental risks, but rather on publicising their absence, thus breathing new life in the control rhetoric. Environmental risks are here addressed following a mentioning-erasing dynamic, illustrating what Halary and Couégnas identify as the "*smoothing-out*" strategy.³³ However, this transparency policy remains cosmetic, since certain plant areas remain out of reach to visitors. According to the presenter of the 1980 documentary, only practical reasons prevent visitors from for instance accessing the cooling pools:

There's nothing dangerous, nothing secret about a nuclear power station, there's nowhere in the working areas that you can't go to, and by prior arrangement a visitor with a specialised interest can see anything. But in practice there are many places which are uncomfortable or inconvenient for a large party.

Farley argues that visiting the cooling ponds would entail wearing protection gear and watertight boots, not to be protected from the radioactive cooling water, but to avoid getting wet. Overall, communication on nuclear-linked environmental risks created the mirage of sharing knowledge and information on safety issues and environmental risk, while still entrenching distance between the information provided and the viewers. Once again, public acceptance emerged as a fundamental prerequisite for technological and nuclear expansion, forestalling potential stalemates in the subsequent public inquiries on

potentially future nuclear sites. Anti-nuclear movements indeed tended to be more successful at mustering popular support in the sites earmarked for future construction, as was the case in Scotland or Cornwall in the early 1980s.

This shift in risk communication strategy may have been triggered by both domestic and international factors. At home and for many environmental groups, the 1970s coincided with a shift in focus from the military to the commercial dimension of the nuclear programme, transferring activist practices including marches and sit-ins along with it. Although anti-nuclear power movements never attracted as much media coverage and visibility as CND did, they partook in the rise of a broader and more politically-driven environmentalism³⁴. Internationally speaking, the 1979 *Three Mile Island* accident in the US gave nuclear risks a visual reality. The accident also led to re-forging the previous risk-numbing process of the 1960s' visual and linguistic rhetoric. Dealing with the emotional impact of *Three Mile Island* became a priority of the nuclear industry, as the PWR project at Sizewell was to have the same reactor model as *Three Mile Island*.

The 1980 TV footage features an anti-nuclear activist who openly questions the rationale and guarantees provided by a CEBG representative on the safety of the PWR reactor to be built at Sizewell. Both interviewees are standing in front of the plant yet from different angles. The unnamed activist cuts a very serious-looking academic figure, which nonetheless contrasts with the stern corporate outfit sported by the industry representative. The activist calls onto recognised expertise from UK scientists and engineers to make his case: "*leading scientists and engineers in the UK – we are not only talking about US guys – have come out and said that PWRs are inherently less safe than other systems. So of course, I'm very worried about safety.*" Instead of eluding opposition, this footage therefore stages it. In that sense, the institutional strategy slightly differs from traditional discourses, "*identified as being guided by a double structuring principle, combining stabilised arguments and covered conflicts.*"³⁵ This staged confrontation between the protester and nuclear representative helps mitigate the assumed 'information vacuum' among the public: here the CEBG representative firmly discards the protester's safety fears on the grounds that firstly, the UK industry boasted a stellar safety record, and secondly that the PWR reactor would be adapted to the British regulatory and technical standards – being technically not a US model in practice. Staging this indirect Q&A between the CEBG representative and the campaigner thus opened a dialogic window to fight anti-nuclear movements on their own traditional rhetorical grounds since the 1970s' environmental discourses primarily contested nuclear power's alleged safety records to denounce nuclear-induced hazards.³⁶ By inviting an anti-nuclear campaigner, the 1980 TV footage director chose to visually represent and confront the contesting and anti-hegemonic discourses on the environmental impacts of nuclear activities. It thus reveals the industry tacitly acknowledged the need to confront activists' perceptions of risk, which can be understood as "*a culturally-framed concept which acts as a metaphor for individual feelings about a loss of control, powerlessness and the drift of social change away from what is good for the Earth towards what seems to be bad.*"³⁷ As such, it highlights how risks then needed to be mediated and their acceptance negotiated. By giving anti-hegemonic discourses a platform on television, the footage aims at visually staging the superiority of the industry's knowledge over that of the public and independent scientists: here the CEBG representative boasts insider knowledge over the technicalities of the Sizewell project and is the last shown - thus implicitly controlling the closure of the interview in a somewhat patronising fashion. Openly confronting anti-nuclear discourses on

environmental risks on television, coupled with the overall shift in communication paradigm, therefore participated in entrenching a technocratic ethos as a pillar of British nuclear culture.

Conclusion

Television is "*the story of our times*," providing both liveness and historicity to research.³⁸ Choosing to depict – or not – certain phenomena using images, icons, or linguistic symbols undoubtedly provides valuable epistemological material to analyse the history of British nuclear science. This analysis therefore partakes in a general rise in interest in nuclear power narratives, as illustrated by the special issue of the *British Society for the History of Science* on the British Nuclear State.³⁹ This analysis of the way environmental risks were dealt with on TV helps draw several conclusions. Firstly, environmental risks are tightly intertwined with the understanding of the capacities and roles of the citizens, as opposed to official scientific expertise.

Secondly, communicating on how to manage risks *in situ* echoed the widespread idea that citizens needed to understand the activity but not its sanitary consequences. Nuclear discourses still heavily relied on the idea that citizens were emotionally-controlled individuals, who needed to be educated and reassured to support the nuclear venture. Nonetheless, the TV coverage of the British expansion came to be much more open about environmental risks. A strong shift at the beginning of the second nuclear programme and the rise of anti-nuclear protests entailed that environmental risks had to be communicated upon, just like the workings of a nuclear reactor during the first nuclear programme.

In that sense, these changing parameters paved the way for the critical 1985 Bodmer Report on the *Public Understanding of Science (PUS)*.⁴⁰ This critical report gave birth to a movement that would gain strong momentum in both academic and political circles in the following decade.⁴¹ The Bodmer Report argued that the population remained too disconnected from the scientific world, and that scientific knowledge had to be bolstered for a better understanding of scientific contents, to improve people's attitude regarding scientific endeavours. Aimed at cultivating less conflictual relations between science and the public, the PUS thus turned the vision of science as a Messiah (knowledge-deficit model) into a vision of science as a missionary (PUS). This shift would act as a catalyst for many alterations in the decision-making process and media treatment of science questions⁴² until being questioned and abandoned with the 2000 *Science New Deal*.⁴³ This PUS movement gained impetus just as the public acceptance of risks became a prime research topic in Anglophone sociological research.⁴⁴

However, this analysis also offers to nuance and rethink the periodisation of the Public Understanding of Science movement. In his much-reviewed seminal work, Wynne considers the 1980s as the turning-point in the perception and role of the public, and the Bodmer Report is often identified as a yardstick in the development of the "*knowledge-deficit model*". As far as environmental risks go, this analysis of TV footage traced the shift from the deficit model to the PUS back to the late 1960s and the second British nuclear programme, and not later. Spanning thirty years of institutional communication on the British nuclear venture, these TV documentaries shed light on the way the various stakeholders harnessed rationality to vie for the public's interest, acceptance, and trust.

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NOTES

1. Aurélien Portelli, "What cultural objects say about nuclear accidents and their way of depicting a controversial industry", in Ahn Joonhong et. al., *Resilience: A New Paradigm of Nuclear Safety* (Springer, Cham, 2017), p. 137.
2. Roger Chartier and Pierre-Antoine Fabre, « Histoire des représentations », in Sylvie Mesure and Patrick Savidan (eds.), *Le Dictionnaire des sciences humaines* (Paris, PUF, 2006), p. 1005-1007.
3. Norton Wise, "Making Visible", *Isis* 97: 1, 2006, p. 81.
4. Margaret Gowing, *Independence and Deterrence: Britain and Atomic Energy 1945-1952* (London, Palgrave Macmillan, vol. I, 1974), p. 45.
5. Brian Wynne, *Rationality and Ritual: Participation and Exclusion in Nuclear Decision-Making* (London, Earthscan, 2011, 2nd edition), pp. 41-42.
6. William Kinsella, "One hundred years of nuclear discourse: Four master themes and their implications for environmental communication", *The Environmental Communication Yearbook* 2 (2005), p. 53. Entelechy is a rhetorical concept which means giving substance to the abstract.
7. The Windscale Incident is Britain's major level-5-nuclear incident. Set in Cumbria, Windscale (now Sellafield) was one of the first nuclear power sites established in the mid-1950s. On 10 October 1957, a fire broke out owing to a major technical failure in the temperature-controlling mechanism of one of the reactors' piles. After raging for three days, the fire was contained; yet a substantial radioactive cloud was released resulting in the contamination of farmlands in the vicinity of the plant.
8. Brian Wynne, Robin Grove-White and Claire Waterton, *Public Perceptions and the Nuclear Industry in West Cumbria* (Lancaster, Lancaster University Press, 1993), p. 49.
9. Susan Dodge Peters, "Elizabeth McCausland on Photography", *Afterimage* 12, May 1985, pp. 10-15.
10. As indicated by the credits when provided. However, no information was found as to their specific broadcasting context.
11. Charles Hill and Marguerite Herlmers, *Defining Visual Rhetorics* (Oxford, Taylor & Francis, 2008), p. 52.
12. Fabio La Rocca, « Introduction à la sociologie visuelle », *Sociétés* 95 : 1, 2007, p. 39. This analysis thus considers not only spoken words, but also settings, staging strategies, camera angles, logical links between images and speech, the use of visual signs or symbols, and finally sounds and soundtracks. See also: Andréa Catellani, « La Défense de l'énergie nucléaire comme pratique discursive : analyse sémio-rhétorique », *Revue française des sciences de l'information et de la communication* 9, 2016, <https://journals.openedition.org/rfsic/2036#notes>, consulted in May 2017.
13. Sheila Jasanoff and Sang-Hyun Kim, "Containing the Atom: Sociotechnical Imaginaries and Nuclear Power in the United States and South Korea", *Minerva* 47, 2009, p. 120.
14. Online Archives: *East Anglia Archives*, <http://www.eafa.org.uk/>, *The Central Office for Information Archives*, <https://media.nationalarchives.gov.uk/>, *British Pathé Archives*, <https://www.britishpathe.com/>, *Huntley Archives*, <http://www.huntleyarchives.com/>, all consulted in June 2017.
15. Peter Sandman, "Risk Communication", In Ruth Eblen (ed.), *The Encyclopaedia of the Environment* (New York, Houghton Mifflin Company, 1994), p. 620.
16. John Adams, "A Richter scale for risk? The scientific management of uncertainty versus the management of scientific uncertainty", Conference on ecological risks and prospects of transgenic plants at the University of Bern, 28-31 January 1998.
17. See for instance, the 1959 TV footage on Bradwell, the 1963 *Windscale Atomic Factory* video or the 1982 documentary on Sizewell.

18. Ralph Johnson, "The Principle of Vulnerability", *Informal Logic* 17:2, 1995, p. 259. "In the practice of argumentation, rationality is not merely the inner reality but also the outward appearance of the practice. The practice must not just be rational; it must also appear rational."
19. Kirk Willis, "The Origins of British Nuclear Culture, 1895-1939", *Journal of British Studies* 34: 1, 1995, p. 60.
20. Gabrielle Hecht, *The Radiance of France: Nuclear Power and National Identity after World War II* (Cambridge, MIT press, 1998), p. 336. A similar conclusion can be found in: Michael Schüring, "Advertising the Nuclear Venture: The Rhetorical and Visual Public Relation Strategies of the German Nuclear Industry in the 1970s and 1980s", *History and Technology* 29: 4, 2013, pp. 369-398.
21. Thomas Gieryn, "Boundaries of Science", in Sheila Jasanoff (ed.), *Handbook of Science and Technology Studies* (Thousand Oaks, Sage Publications, 1995, 2nd edition), p. 393.
22. Between 1952 and 1962, the number of television sets rose exponentially from 1 million to 13 million. The 1960s are thus considered as "the Golden Age" of British Television as the expansion of TV audiences was accompanied by major shifts in terms of content, values and traditions which deeply altered TV culture. See John Caughie, *Television Drama: Realism, Modernism and British Culture* (Oxford, Oxford University Press, 2000), pp. 57-87.
23. Jonathan Hogg, *British Nuclear Culture* (London, Bloomsbury, 2016), pp. 145-147.
24. Daniel Cordle, "Protect/Protest: Britain's Nuclear Fiction of the 1980s", *The British Journal for the History of Science* 45:4, 2012, p. 654.
25. Catherine Jolivet (ed.), *British Art in the Nuclear Age* (Surrey, Ashgate, 2014), p. 2.
26. Jean-Baptiste Gouyon, "Making Science at Home: Visual Displays of Space Science and Nuclear Physics at the Science Museum and on Television in Postwar Britain", *History and Technology* 30: 1-2, 2014, p. 53.
27. Such a strategy allows for a two-fold dealing of environmental and health risks posed by nuclear activity, by dealing with both on-site areas and the environment surrounding a nuclear power station.
28. Raymond Baxter, "This is Bradwell", 14'00, 1966. Raymond Baxter was a famous BBC TV and radio broadcaster. He hosted several BBC science programmes such as *Eye on Research* or *Tomorrow's World* in the 1960s and 1970s. He is credited for having encouraged British television's interest in science. He was the first recipient of the Raymond Baxter Science Communication Prize in 2000.
29. Tony Shaw, "The BBC, the State and Cold War Culture: The Case of Television's *The War Game* (1965)", *The English Historical Review* 121:494, December 2006, p. 1354.
30. Ian Welsh, *Mobilising Modernity: The Nuclear Moment* (Abingdon, Routledge, 2000).
31. Unknown. "Nuclear Hazards and the Citizen", *New Scientist*, 7 January 1971, p. 4.
32. 1982 TV footage.
33. Nicolas Couegnas and Marie-Pierre Halary, « Signification et communication du risque : le cas du nucléaire », *Quaderni* 48, 2002, p. 93.
34. Brendan Prendiville, "British Environmentalism: a Party in Movement?", *LISA* 12: 8, 2014.
35. Alice Krieg-Planque, *Analyser les discours institutionnels* (Paris, Armand Colin, 2012), p. 12.
36. Dave Toke, *Green Politics and Neoliberalism* (London, Palgrave Macmillan, 2000), p. 27.
37. Timothy O'Riordan, *Environmental Science for Environmental Management* (Harlow, Longman, 1995), p. 296.
38. Staffan Ericson, "The times of television: representing, anticipating, forgetting the Cold War", The Media, Culture and Society division, Nordisk medieforsker konferens 2011.
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40. William Bodmer, *The Public Understanding of Science* (London, Royal Society, 1985).
41. Alan Irwin and Brian Wynne (eds.), *Misunderstanding Science? The Public Reconstruction of Science and Technology* (Cambridge, Cambridge University Press, 1996).

42. According to Bauer, UK media treatment became much more favourable to scientific endeavours at the turn of the 1990s, compared to the 1960s: Martin Bauer *et al.* *Science and Technology in the British Press 1946-1992*, vol. 1-4, Technical Reports (Science Museum and Wellcome Trust for the History of Medicine, London, 1995).
43. Simon Locke, "The Public Understanding of Science – a Rhetorical Invention", *Science, Technology, and Human Values* 27, 2002, pp. 87-111.
44. Céline Kermish, *Les Paradigmes de la perception du risque* (Paris, Editions Lavoisier, 2010), p. 145. A special chair called the Simonyi professorship for the Public understanding of science was established at the University of Oxford in 1995.

ABSTRACTS

At the start of the British nuclear programmes, most technological choices were made away from public scrutiny and behind closed doors. Early nuclear decision making was backed by the rationale that British citizens lacked technical and specialised knowledge to make informed decisions on nuclear questions. The emergence of public debates on nuclear risks was thus greatly hindered by limited public communication. However, this technocratic decision-making model came under fire in the wake of the 1957 Windscale accident and the rise of environmental opposition throughout the 1960s. The environmental risks of contamination, pollution, and radiation became a source of heightened tension between industry and anti-nuclear activists. This paper aims at exploring the impact of the rise in public environmental anxiety on state-sponsored television footage released between the late 1950s and the early 1980s. Analysing television footage helps identify the institutional communication strategies used to negotiate the British public's understanding and acceptance of nuclear-induced environmental risks between 1956 and 1982. This analysis suggests that the industry's communication approach was only cosmetically altered by this changing context. It contends that, if these cultural productions participated in constructing a more nuanced depiction of nuclear risks, they nonetheless remained based on the idea that citizen opposition mostly reflected deficiencies in scientific literacy.

Les premiers programmes nucléaires britanniques se sont caractérisés par un modèle de confinement de l'information et d'absence de droit de regard citoyen, légitimé par l'existence d'un supposé déficit de connaissances des citoyens. Toutefois, l'accident de Windscale de 1957 et la montée en puissance des mouvements environnementaux au cours des années 1960 portent un coup sévère à ce processus décisionnel technocratique. La question des risques de contamination, de pollution et de radiation induits par les activités nucléaires se place alors au cœur des confrontations entre l'industrie nucléaire et les groupes environnementaux. Cet article analyse l'impact de la montée des préoccupations environnementales sur les stratégies de communication institutionnelle autour des activités électronucléaires britanniques, telles qu'elles émergent à travers les productions télévisées de l'époque (1956-1982). Cette étude s'attache à identifier et interpréter les mécanismes de communication visuelle mis en place afin de restaurer la confiance du public autour des risques nucléaires environnementaux. L'analyse des mécanismes de communication mobilisés par ces productions culturelles fait alors émerger une image certes plus nuancée des risques nucléaires, mais celle-ci demeure profondément

ancrée dans une vision technocratique du public britannique, dont les préoccupations seraient finalement toujours le fruit d'un déficit informationnel.

INDEX

Mots-clés: risques environnementaux, objets culturels, médias, télévision, énergie nucléaire

Keywords: environmental risks, cultural objects, media, television, nuclear power

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