

The Kielder Water Scheme: the last of its kind?

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SYNOPSIS. The peculiar history of the Kielder Water Scheme provides insights into the operation of democracy, the politics of promotion of mega-projects and the problems of their subsequent assessment and accountability. Two public inquiries were held before the Scheme was approved but the industry it was planned to supply was already reducing its water requirements before construction started. Opposition to the reservoir, particularly from those whose homes it would displace, was strong and divided Conservative political allegiances. The controversies, which led the Director of the Water Resources Board to claim that schemes like Kielder would never be repeated, continue even today. The history of the Scheme has been explored by examination of the records of the public Inquiry and by interviews with some of the principal actors involved in the drama.

INTRODUCTION

The Kielder Water Scheme was conceived in the mid 1960s at a time when the power and autonomy of water engineers in England and Wales had risen to levels never before, nor since, attained. Unfortunately, engineering accomplishments were often marred by economic miscalculation. The resulting mismatch between vastly increased water supply at a time of diminishing rise in demand, together with huge debts incurred at a time of rapid inflation and high interest rates, had lasting effects on the state's management of water resources. Political intrigue and the overbearing ambition exhibited by the Northumbrian River Authority may have contributed to the replacement of river authorities by water authorities in preparation for privatisation of water supply in 1989.

A regional-scale scheme such as a water transfer network on the scale of Kielder, involving a large storage reservoir and inter-river transport of water through a tunnel, requires support politically and financially at more than the local scale. Big schemes require big finance and state backing to proceed with schemes in the face of strong local opposition. The political setting which encouraged engineers to think of major schemes such as the

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Kielder Water Scheme will be described before its history and implications for water governance.

WATER RESOURCES BOARD

In England and Wales in the 1960s, post- War belief in national planning of resources was undiminished. As late as 1965, the idea of public ownership of all water supplies still appeared in the Labour Party's manifesto but successive governments failed to nationalise water because of fear of antagonising municipal and local authority water undertakings as well as private owners (Hassan, 1994). However, Members of Parliament (MPs) dealing with Private Bills for many reservoir schemes during the 1950s and early 1960s called for a national strategy for water resource development against which individual projects could be assessed. Reservoir construction in England was growing exponentially and many feared the associated damage to amenity and loss of farmland if this upward trend should continue unabated. Parliament wanted professional advice.

Following the 1963 Water Act, a national planning body dedicated to water resources was set up to strengthen the slow-moving Ministry of Housing and Local Government (MHLG) with its multiple responsibilities. This newly-formed body, the Water Resources Board (WRB), was an unique experiment in self governance of water engineers by water engineers and, remarkably, it survived for nearly a decade. Emerging from their customary position in the background, water engineers were allowed centre stage to proclaim their ideas of rational planning at regional and national scales. In typical British fashion, though, their power was limited to the giving of advice and was hampered by being confined to considerations of water quantity, crucially omitting quality.

The WRB's first Annual Report (WRB 1965) announced its role as "the master planner of the water resources of England and Wales", although implementation of its plans was not straightforward. In England and Wales, supplied by many rivers, the case for national planning was not obvious. River catchments appeared to be more suited for management purposes because of the interrelationship between water flowing from the tributaries into the principal rivers, on the way to the sea. Even Barry Rydz, Director of WRB planning, conceded that large areas of England and Wales were best served by local planning of water resources (Rydz 1971). Yet, many of the questions raised by reservoir construction impinged on national policies for industrial growth or for support for agriculture. The WRB was faced with a challenge to reconcile local issues with national policies, based on persuasion rather than authority.

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The WRB built up to a staff of around a hundred and had a modest research budget but its influence conceptually was far greater than its size or budget might suggest. The Third Annual Report of the WRB stated:

‘The Water Resources Act 1963 with its emphasis on collection of data provides the incentive to apply scientific and engineering principles to achieve logical development, so that water can be made available in the quantities required where and when it is needed (WRB, 1967,29).’

Supply “where and when it is needed” was the objective rather than adaptation of human developments to water availability.

With this objective, the WRB privileged quantifiable information. Their confidence in “logical development” allowed the rubbishing of opposing arguments, which were not proved by hard data. Adverse reaction “to the exploitation of the water resources of an area for the benefit of water consumers far away” was deemed “irrational” (WRB, 1967, para 49). The Director of the WRB, Norman Rowntree, believed “maintenance of our standards of life depends on expanding industrial, commercial and agricultural activity” and the “maximum development of natural resources”. “The solution of water supply problems...will require the construction and operation of large works and highly-developed technical control”. He believed that his opponents should not have a monopoly on emotion, “Enthusiasm and fervour” should be added to the water engineers’ “cold calculations of safety, yield and cost” (Rowntree, 1962, 267).

Large-scale schemes such as interbasin transfers of water or even establishment of water grids on the model of the electricity grid certainly aroused enthusiasm and fervour and recognition for regional planning by the WRB. Without the WRB, and the financial arrangements endorsed by the 1963 Water Act, water resource development in the North East would have been very different.

NORTHUMBRIAN RIVER AUTHORITY

Another important player, this time with executive powers, was the Northumbrian River Authority (NRA), set up with 28 others, by the same Water Act 1963 which established the WRB. The ambitions of the NRA and the WRB reinforced each other. Both favoured large schemes to increase industrial water supply, mainly to Teesside. Like WRB, the NRA lasted only a decade and approval of their Kielder Water Scheme, achieved in 1973, was shortly followed by the taking over of their responsibilities and debts by the Northumbrian Water Authority (NWA), which became operational in 1974.

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The Kielder Water Scheme involved construction of a large, remote storage reservoir and use of innovative tunnelling machines to link regulated rivers. Pipelines were not unusual but Kielder was revolutionary because it was “a very big tunnel and regulating” (Jackson Interview). In the words of the WRB, “The scheme is a bold and imaginative one: the largest single water conservation scheme yet undertaken in this country” (WRB, 1973, Appendix 2, 23).

In contrast, Pearce calls Kielder Water the “Cunningham reservoir” as a journalistic device to denigrate the whole Scheme as “an embarrassing and expensive monument to the follies of water planners in the 1970s” (Pearce, 1982, 8). Andrew Cunningham was jailed in 1974 for accepting bribes from John Poulson the notorious architect in return for a commission to design a grandiose headquarters for the NRA when he was its Chairman. Cunningham was influential in encouraging the ambition of the Kielder Scheme and dogged in its defence but it is wrong to attribute the vision to him. Credit should go to Urban Burston, Chief Engineer of the NRA¹, whose former colleague and successor, Nigel Ruffle, developed the plans soon after the formation of the NWA in 1974 (Rennison, 1979).

HISTORY OF THE SCHEME

In September 1965, the WRB set up a Northern Working Party of water engineers from River Authorities and water undertakers. Andrew McLennan², formerly Director of the Sunderland and South Shields Water Company was the Chairman and Burston was a member. Its role was to consider the possibilities of regional-scale cooperation in the development of water resources. The enthusiasm of Burston for planning water resources on a regional scale influenced the Working Party and his ambition was welcomed by WRB officials, who needed new ideas reaching beyond local water undertakings to justify their national planning role.

At first, the reservoir planned on the North Tyne was called Otterstone, rather than Kielder, and it was endorsed in the Interim Report of the Northern Working Party in 1967. To estimate water demand up to 2000, the Working Party used population projections of a 25% rise from the Office of National Statistics (in fact population declined!), per capita water consumption figures from the USA (despite differences in lifestyles and climate) and assumptions that water demand from industry would continue to grow rapidly. In the Interim Report, the use of aqueduct(s) linking the

¹ Two others, in addition to Burston, were attributed responsibility at the opening of Kielder in 1982, Ted Wrangham, farmer, and Andrew McClennan, Vice Chairman of WRB.

² McClennan was later succeeded as Chairman by J.F. Glennie and B. Rydz

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principal rivers (the Tyne, Wear and Tees) in the North East, offered satisfaction to immediate deficiencies on Teesside but further reflection suggested that such aqueducts could not be built before completion of the newly-approved Cow Green reservoir in 1971 (NRA, 1973). The idea of linking the rivers was shelved only temporarily. If demand continued to rise as rapidly as predicted, even Cow Green would not assuage industry.

In 1969, the Scottish consulting engineering firm of Babbie, Shaw and Morton was appointed to prepare feasibility reports. The team's experience in building hydroelectric dams and tunnels in Scotland was pertinent to the new task. After the WRB's Interim Report, the Babbie consulting engineers made a desk study on alternative sources to meet the predicted rise in demand. The challenge of transferring water between rivers proved very attractive to the engineers involved. David Coats, the consulting engineer who had overall charge of the project, admired Urban Burston's big ideas: "he was very good in thinking forward and he was very keen that something be done". Coats himself was enthusiastic both about tunnelling and about thinking big. His previous work on the large and ambitious Loch Katrine tunnel and reservoir scheme had initially provided an embarrassing surplus of water for Glasgow but, eventually, it had proved to be valuable. Coats believed that "to think small and to assume that things are not going to change is wrong" (Coats interview).

In February 1970, the WRB's Final Report on "Water Resources in the North" recommended that the Tyne-Tees Link should be completed as soon as possible, "to be in operation by 1975"; two sites should be investigated as potential storage reservoirs Otterstone (Kielder) and Irthing. The report favoured Kielder, which could provide a yield of about 200mgd (910,000 m³/d) and could meet all the projected water demands in the area until after 2001 or, alternatively, could meet the needs of both Northumbria and Yorkshire "for about 20 years". One very large new reservoir in Kielder Forest would solve other problems. The Forestry Commission had underestimated the rapid decline in labour requirements which had followed introduction of machinery; they had housing surplus to requirements in this remote area and construction of a reservoir would offer some alternative employment. WRB stated that 'A reservoir here would cause a minimum of disturbance and could be attractive in appearance, offering opportunities for a tourist centre (WRB, 1970a, 29).'

The WRB presented two alternative strategies. Plans for six new reservoirs in the West-East strategy (see Fig.1) looked more challenging politically and less engineeringly-exciting than a very large one at Otterstone (Kielder), with the possible addition of Irthing, with a tunnel linking three rivers as shown in the North-South strategy (see Fig.2) . NRA's Water Resources

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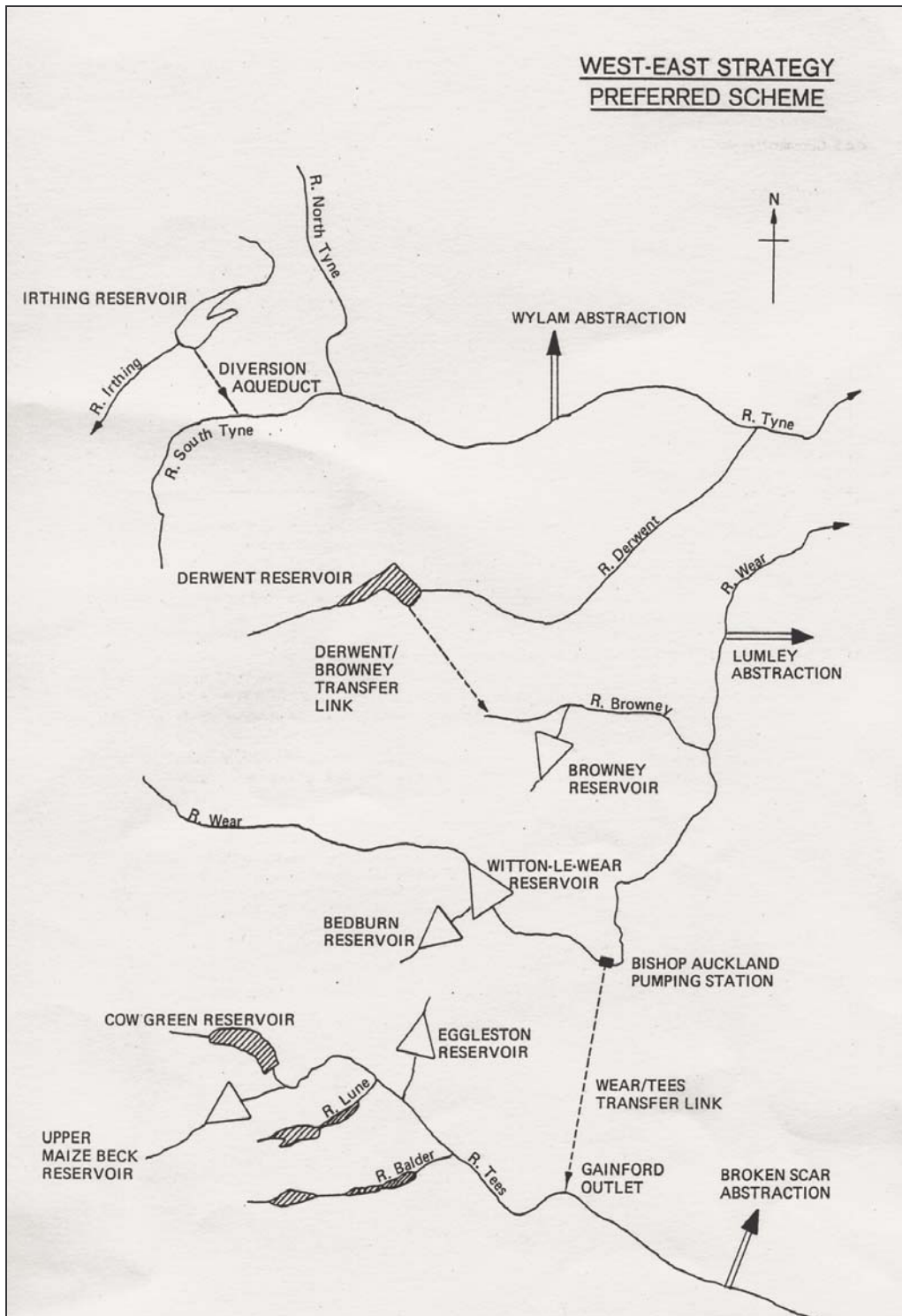
Committee considered the two strategies with a report on comparative financial costs in July 1970. A recommendation “that powers be sought to develop the Otterstone Reservoir site and to construct an aqueduct tunnel linking the Rivers Tyne, Wear and Tees” was confirmed by NRA in September 1970 (NRA, 1973).

WRB suggested that the water grid proposed for the NRA should extend beyond its boundaries into Yorkshire but the political barrier of establishing co-operation between two neighbouring River Authorities proved insuperable. Recent experience of building reservoirs in the North East in rapid succession: Selsby (1960), Balderhead (1965) and Cow Green (1971) for TVCWB, and Derwent Reservoir (1966) for the South Shields Water Company, suggested that fewer, larger reservoirs would avoid several long and expensive battles to gain permission as well as, more doubtfully, economies of scale. The prospect of raising regional finance and external funding following the 1963 Water Resources Act gave hope that the undertakers would not have to await last minute decisions by the main industrial beneficiaries for capital provision.

Enthusiasm for the Scheme was not just espoused in the local NRA and in the WRB but also within the MHLG. Senior civil servants were convinced that such schemes were the way forward. The Under Secretary, Jack Beddoe, wrote a memo to a colleague:

‘within the next few years the most economic organisation of water conservation will require substantial transfer of water between the areas of the present River Authorities, the switching of sources between different distribution networks at different times, changing water undertaking sources to river regulation and the building of large-scale transmission links to supplement the transfer of water in rivers (HLG, 1970).’

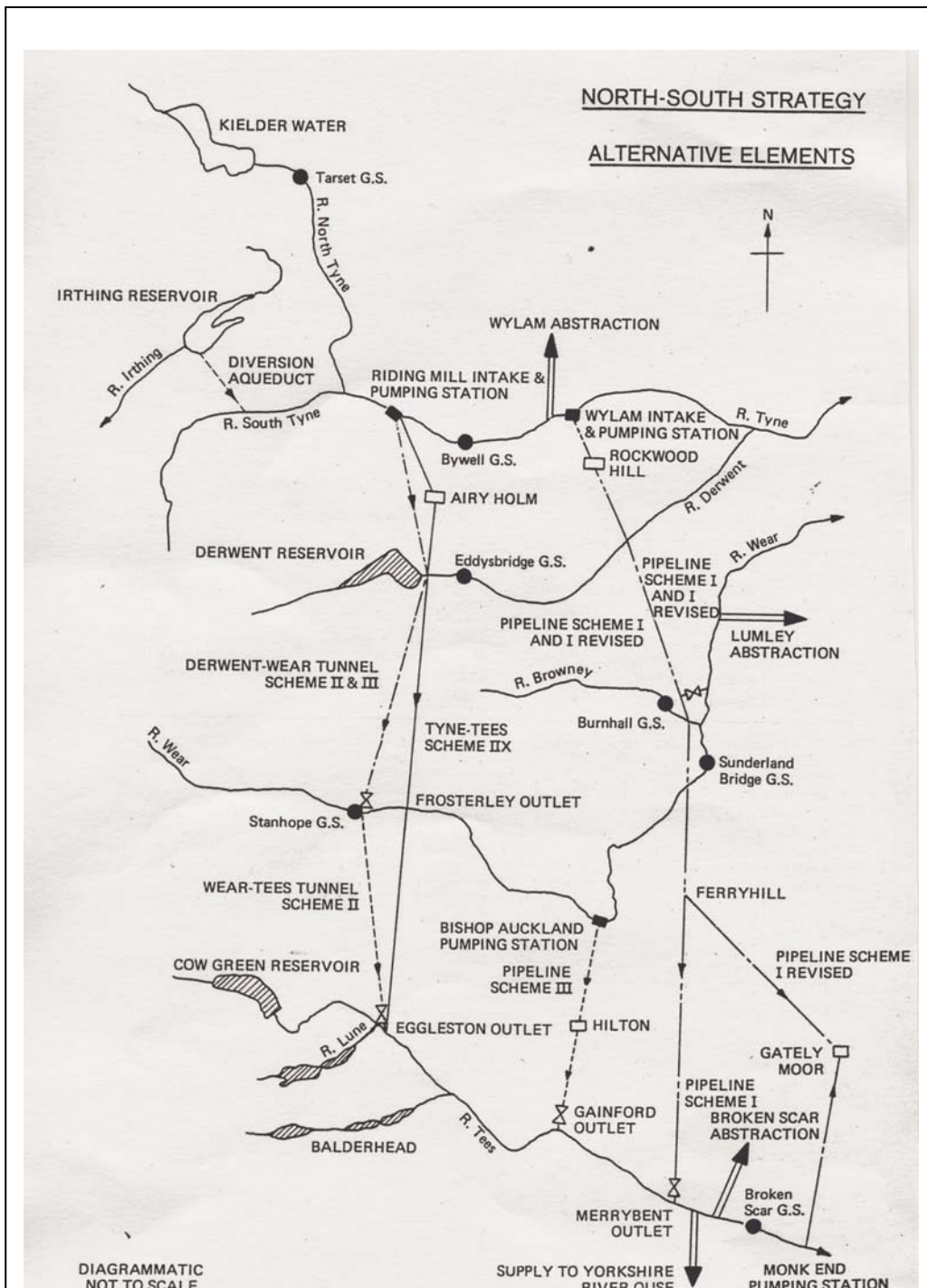
The concept of large-scale water planning had come of age but Beddoe foresaw “major financial and administrative problems” (ibid, 1970). The limit to the extension of grids of water supply would be political more than technological.



Source: WRB Water Resources in the North. Northern Technical Working Party Report 1970. Not to scale.

Figure 1: WRB's West-East strategy. This strategy would have involved construction of 6 new reservoirs and 3 tunnels.

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Source: WRB Water Resources in the North. Northern Technical Working Party Report 1970. Not to scale.

Figure 2 WRB's North-South Strategy: only 2 new reservoirs, Kielder and Irthing were needed to augment the Tees via the Tyne-Tees tunnel.

DECISIONS ON THE PROMOTION OF THE SCHEME.

As soon as the Water Resources Act 1971 allowed powers to be sought without a Private Bill, the Kielder Water (draft) order was published in June 1971. In December 1971, the Secretary of State for the Environment, Rt. Hon. Geoffrey Rippon MP called for a public Inquiry and this was held 3 February to 15 March 1972 under an Inspector, Mr. A.R. Chaun, who was not a water engineer but a qualified town and country planner. The engineering case was strengthened by appointment of an “Engineering Assessor”, Mr J. Keith Jackson, a former Superintending Engineer in the MHLG. The Engineering Assessor was allowed to submit a report in parallel with the Inspector’s report.

The context of the public Inquiry was a time of great political tension with the Conservative Government, led by Prime Minister Edward Heath, being faced with strikes by the miners, railwaymen and other public sector workers, violence in Northern Ireland and rising inflation. In the drama of the opening meeting on a dark February day, Keith Jackson remembered trying to read documents by torch and candlelight because of a power cut (Jackson interview).

The political complications for the Environment Minister, Geoffrey Rippon, did not end with pressure to quell restive miners in the North East, to support manufacturing industry and to increase employment. The Conservative Party, at the time, was perceived as a defender of the rural way of life and the Hexham constituency, in which Kielder lay, was Geoffrey Rippon’s seat. Yet, when he was called upon to adjudicate over Kielder, he confronted by his retired predecessor as Conservative MP for Hexham, Sir Rupert Spier, who was leading local opposition to Kielder reservoir as Chairman of the North Tyne Preservation Society. The NRA was led by strong Labour politicians.

Faced with such conflicts, retreat into compromise had its attractions for Rippon. The Inquiry heard pleas from people who would be displaced by the reservoir; fears that the Scheme’s high cost would result in expensive water and that there might be an industrial depression. Despite this, the Inspector recommended the Scheme in its entirety and the Engineering Assessor was also enthusiastic. In January 1973, the Minister made a ruling: he agreed to the tunnel and the North-South strategy, but asked for a reconsideration of the Kielder reservoir site, which would drown 58 homes, displacing 130 people; he called for an investigation of the remote Irthing

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site, affecting 'two families at most', as an alternative. The Secretary of State's letter stated:

'...the degree of hardship, particularly for those who would have to leave their homes and the damage to the environment which would result from flooding the site ought not to be accepted without first testing more fully the case for and against constructing a reservoir on the River Irthing...(NRO, 1973)'

His response was a shock for the engineers promoting this pioneering attempt to provide the first regional water grid: technological progress threatened to be impeded by social considerations for a small minority of affected locals. However, by being persuaded that the tunnel was a necessity, the Minister eventually lost any argument against the Kielder reservoir because only the huge quantity of water that Kielder could yield would justify the large tunnel. His verdict was only a temporary delay.

The NRA was not to be thwarted. Not only would Irthing produce less water than Kielder, it was in the region of the Cumberland River Authority and would not be fully under NRA control. The financial and administrative barriers foreseen by Beddoe were formidable. Jackson (Personal communication) reports that the NRA sent a sharp response on 2 February 1973 to the Secretary of State saying that they had no intention of considering the Irthing site for the main reservoir. The need for the water, they said, was too urgent for any delays. This reassertion of the power of the NRA proved effective in getting the Inquiry reopened. The power of the petitioners against the Scheme was diminishing.

Almost simultaneously in February 1973, a White Paper was published: "Steel-British Steel Corporation: 10-year Development strategy" (Cmd. 5226). This promised that Teesside would have one of the largest and most modern steel complexes in Europe. Large quantities of water would be needed. The recommendation of Spens' report (Spens, 1947, 7) that "the North East Development Area is not an area into which really large water using industries should be encouraged to develop" was ignored.

Faced with these pressures, in April 1973, the Minister ruled that the Inquiry be reopened. The second Inquiry, 19/06/73 to 09/07/73, had a different Inspector, this time a barrister, Sir Robert Scott, but the same Engineering Assessor. Scott tried to avoid going over old ground and at the end refused to make a recommendation. He wrote, "There was no new Application before the inquiry and therefore no occasion for formal recommendations." One of the intended main beneficiaries, ICI, did not bother to send a representative. The spokesman who forecast a huge increase in water for

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British Steel Corporation “ did not stay to be cross-questioned, perhaps because the plans on which he based his estimates had not been, and never were, approved ” (Charlton, 1982, p.16). Scott stated in the final paragraph of his report.

‘With Kielder the centre of interest, lukewarm support for alternatives except as lesser evils than Kielder, and the need for further site investigations, the reopened inquiry cannot be considered a satisfactory test of the case for an alternative scheme (Scott, 1973, para. 90).’

Despite this equivocal ending, Scott reflected that the North-South strategy already had the stated preference of the Minister based on the first Inquiry and that the weight of evidence was in favour of a tunnel in the light of WRB figures suggesting that the tunnel would cost £26m (£193m)³ set against pipelines at £39m (£289m).

The Minister approved the Scheme in October 1973 and the Kielder Water Order was made in April 1974. The newly-formed Northumbrian Water Authority, with wider responsibilities, crucially including sewage and water quality, took over the Scheme. Perhaps in response to the behaviour of the River Authorities, the Water Authorities were set up with fewer local politicians and a majority of Ministerial appointees. The Kielder case threw question marks against the Ministerial Order procedure, which replaced the previous adjudication by Select Committees.

TUNNEL TEMPTATION

Throughout the discussions, the Tyne-Tees tunnel was key. Once the 32 km long, 2.9 metre diameter tunnel was approved, then a massive water discharge was needed to justify its huge size. The tunnel was tempting both technically and politically.

An attraction for ambitious engineers was the innovation of powerful tunnelling machines which performed “full face penetration” and which could be imported from Germany and the U.S. (Brown, 1975). The long and large tunnel would allow the three rivers to be used conjunctively.

Politically it was also attractive. Whereas a conventional pipeline would require way-leave permissions and construction disruption along the A68 main road, a tunnel would be bored underground and cause little visual upset on the surface, requiring few negotiations with landowners. In a depressed region, with declining coal mines and shipbuilding industries, infrastructure investment would provide some employment, and gave a little

³ Figures in brackets indicate conversions to 2002 prices <http://www.eh.net>

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hope that new industries might be attracted, or at least not deterred by lack of water.

Financially, the proposition was less appealing. The NRA was suspected of having a gung ho attitude towards costs, knowing that the Water Authority would soon supplant it. At the time of the Inquiry in 1973, the costs quoted were £26m (£193m) for the tunnel and £13m (£97m) for Kielder reservoir. By 1978, the cost estimates had risen to £70m (£391m) (Lambert, 1978, p.32). Later, the tunnel costs rose further because an unexpected outcrop of extremely hard dolerite of the Little Whin Sill was encountered (Coats, Berry and Banks, 1982) and a new £1m (£2.2m) boring machine had to be brought in, setting back completion by a year (Newcastle Journal, 1982). High capital costs were only part of the problem. Running costs would be high also because water abstracted from the Tyne 56km downstream of the Kielder dam at Riding Mill, Britain's largest pumping station, had to be pumped up 200 metres over a distance of 6.2km to the highest point of the aqueduct near Airy Holm whence the water could flow without further assistance as far as Teesside (NWL, 1993). Before the Scheme was built but only after the decision to go ahead had been made, doubts were expressed about the likely high operating costs, which would dwarf even the high capital costs (Ray discussion of Burston and Coats, 1975, p.149). When industrial water demands fell and the hoped for expansion of the steel industry in the North East did not materialise, local residents were faced with large increases in their domestic water bills.

IMPLICATIONS AND RECRIMINATIONS

The Scheme is described on a bronze plaque at the reservoir site as one of the biggest water projects ever undertaken in Europe and Kielder Water as the largest man-made lake in Europe. Today, the reservoir rests mostly idle. The water is rarely needed for supply and then mainly for transfer to the Wear rather than the Tees. The hydroelectricity, generated as an afterthought to the original plans, is a small contribution to the National Grid and the reservoir's claims as a tourist attraction are hampered by its remoteness, rainy climate and monotonous coniferous plantations with associated populations of vicious midges.

Teesside continues to be supplied from the Teesdale reservoirs without supplementation from Kielder because the cost of pumping water from the Tyne to the highest point of the Tyne-Tees tunnel is greater than the cost of supply by gravity flow from Upper Teesdale dams. Only twice in its history has the Tyne-Tees transfer tunnel been used to transfer water to the Tees, first in 1983 and then in 1989, (FOE, 2003) although water has been transferred as far as the Wear to supplement the underperformance of the

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Derwent reservoir (Soulsby *et al.*, 1999). David Archer, a former employee of Northumbrian Water and the Environment Agency, asserts that Kielder has “saved the North East from serious water restrictions during the droughts of 1989 and 1990s”, although he concedes that a smaller reservoir would have sufficed (Archer 2003 155).

Such over-investment was enabled by separation of the industrial consumers from funding of water supply infrastructure. Rather than continued iteration with the industrial consumers to judge its effectiveness in promotion of economic development, the dedicated focus on water supply made it an end in itself and safeguards against overinvestment were weak. Uncritical extrapolation of water demands at the outset was not corrected at later stages when British Steel failed to expand on Teesside. Unlike the financial arrangements in Teesdale, reformed regional funding meant that those industries which demanded more water at the Kielder Inquiry made little or no contribution to the capital costs of the Scheme (McCulloch 2004 59-60). Brady concluded that major industries should have a direct financial stake in such resource developments and “pay the cost of the works whether or not their share of the increased demand is taken up, provided that the industries remain solvent” (Brady, 1985, p.140).

Instead, the Government in the 1980s decided that the “consumers of the NWA should meet the charges incurred by Kielder and that the costs should be borne regionally” other than “Temporary assistance given one year by way of a repayable grant”(Sir Peter Harrop’s evidence to the House of Commons Committee of Public Accounts 1984-1985 para1166). The suffering of the regional domestic consumers was somewhat lessened by the writing off of some of the debts in preparation for the privatisation of water supply in 1989 and continuing subsidies from the Environment Agency (NSL Group 2003).

CONCLUSION

At the opening ceremony in 1982, banners decried the reservoir as a White Elephant but the Chairman of the NWA, Sir Ralph Carr-Ellison gave reassurance:

‘Beyond any shadow of doubt, it was correct to go ahead with this scheme. Not only have we got a reservoir to serve the needs of the region for the 1980s but we have a reservoir that will serve its needs until 2050...The price we have paid will turn out to be cheap (Newcastle Journal 26/05/82).’

Yet, even in the engineering press, there was scepticism:

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'It is possible that no water from Kielder will be required for consumption within the next decade with the scheme not being fully utilised until the second half of the next century (Hayward, 1982, 27).'

The controversies over the Kielder Water Scheme led the Director of the WRB, Norman Rowntree to doubt whether such ambitious water schemes would ever be repeated (Wolf interview). The cost of the Scheme, both its capital cost and the running cost, threw doubts on the sufficiency of checks and balances on infrastructure expenditure by public bodies, once the main industrial beneficiaries were not obliged to fund the construction. Privatisation post-1989 has been accompanied by re-regulation of the water supply industry. Now the plans of engineers are overseen by economists, accountants and others in the Office of Water Services (OFWAT) and by biologists and engineers within the Environment Agency. Political and financial barriers to the exercise of engineering technology remain strong today. Sir Norman Rowntree may well have been prescient in his belief that the Kielder Water Scheme was likely to be the last of its kind in England and Wales.

ACKNOWLEDGEMENTS

The author is most grateful to David Coats, Consulting Engineer; Keith Jackson, Engineering Assessor; David Newsome, Barry Rydz and another former senior member of the staff of the WRB; Professor Peter Wolf and a member of staff of Northumbrian Water for their kindness in providing information. Any errors are the author's own.

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