

NE England Control Centre

Central Electricity Board (CEB)

REPORT on site investigations carried out on 19 FEB 2004 by Hazel Fleming and Dave Gunning to obtain information concerning power system control development in the North East of England prior to the opening of the post-war Grid Control Centre (GCC) at Pelaw House, Chester-le-Street in 1957.

A PREVIOUS UNDERSTANDING

a1 Interconnection of power undertakings for increased economy and security of supplies had been pioneered in the North East at the beginning of the twentieth century by the Newcastle, later North Eastern, Electric Supply Company (NeSCo) and was to influence the production of the 1919 Electricity (Supplies) Act which empowered Joint Electricity Authorities throughout the country.

a2 It could be supposed that rudimentary Control Rooms might have been set up to co-ordinate these interconnections although some may have been located in the major power stations concerned rather than being remote from the electricity systems as did happen later.

a3 A new System Control Room (SCR) was constructed in the NeSCo Headquarters building, Carliol House, to oversee the operation of both the NeSCo and North East England (NEE) Central Electricity Board (CEB) systems in the early 1930s. This combined operation was because the NeSCo interconnection was already developed in the manner proposed for the CEB and, since the new network was a relatively small extension to that which already existed, it was considered that the second tier of supervision did not merit a another Control Room or Central Indicating Station (CIS) as the CEB referred to them.

a4 A GCH contact has stated that "there was a glass partition between the NeSCo and CEB sections of the Control Room at Carliol House". The Control Room staff performed both the CEB and NeSCo functions although it is not known how this allocation was financed between the two organisations. Possibly, NeSCo staff were empowered to act on behalf of the CEB.

a5 The CEB indicator board was of metal-clad panels, to the then current power station practice, arranged in a semi-circle. The animation of the indicator board was by equipment manufactured by Standard Telephones and Cables (STC) and it is not known for certain whether this apparatus was contained within metal bays, the backs of which formed the indicator board or if it was rack mounted in the area behind the board. Vague recollections of this type of apparatus, seen at STC's factory, for use at other installations would suggest this latter arrangement.

a6 In his report and recommendations in 1950 for the re-equipping of the existing CISs before the decision to build new ones away from the city centres, Percy Gunning says about Carliol House:

"The indicating equipment is not located in a good position, being situated at the top of a comparatively tall building, against an outside wall, and behind one of the Control boards in the Control Room itself.

a7 Although the Grid and NeSCo Controls were combined at Carloli House, the CEB NEE Scheme District Office was located at 80, Jesmond Road.

a8 Following Nationalisation in 1948, the Control Room at Carloli House continued to supervise both the British Electricity Authority (BEA) North Eastern Division and the North Eastern Electricity Board (NEEB) until the opening of the new GCC at Pelaw House by the Central Electricity Authority (CEA) in 1957.

B UNCONFIRMED KNOWLEDGE

b1 The CEB Mid-East England (MEE) Control Centre at Leeds was similarly equipped by STC and it would appear from a small photograph possibly of the BEA Leeds Grid Control Room (GCR) that it was temporarily re-equipped to cope with the already rapid post-war expansion of the Grid beyond the capabilities of the old CEB apparatus before the 1957 appearance of Percy Gunning's new Standardised System. Despite some availability of the new indicating equipment in its early form, this does not seem to be evident in the photograph. Whatever was employed seems to have been combined with a hand-dressed indicator diagram which appears to be STC's "PinFix" product. Metering was provided by early versions of STC's then new pulse-rate telemetering which was to become a major part of the later Standardised System. It is understood that the Leeds GCR and its equipment room were relocated within the same building to facilitate these changes.

b2 From the above, it is reasonable to suppose that this same temporary modernisation might have been practised at Carloli House. However, if this Control Room is the original, then the change would have been achieved without any relocation and would have caused congestion problems in a busy operating area. However, further reference to Percy Gunning's 1950 report states:

"Should the Leeds Area be refitted [with the Standardised System] before the Newcastle Area, the discarded equipment from the former could be put to temporary use for the new stations in the Newcastle Area

"By 1955, the Control Room would have to serve the following new stations:

"Generating Stations: Blyth, Seaton Carew and Stella

"Switching Stations: Harton, West Boldon, Potter House and Paton &

Baldwins"

Certainly, it would have been easier to add more of the same apparatus than to introduce totally different equipment whilst maintaining the original system until final changeover and then to scrap redundant items without disrupting operation of the new arrangement. Percy Gunning also states:

"The CEB indicating board should be replaced at an early date and, at this stage, the existing transformer tap and load indications would be scrapped....the new equipment should be installed in the central basement together with reliable diesel standby, batteries, chargers and an emergency control centre".

It is not known how the continuation from 1950 to 1957 was actually achieved.

b3 No other confirmation has been obtained and this speculation is all derived from a concentrated study of one small photograph (of the Leeds GCR) and of the Percy Gunning archives.

b4 After the 1957 commissioning of the Pelaw House CEA GCC, the "modernised" post-war ex-CEB Grid Control facilities at Carliol House would have been removed and the whole room adapted to enable less cramped facilities for the continuing Area Board operation.

FINDINGS ON 19TH FEBRUARY 2004

C CARLIOL HOUSE

c1 The appearance of Carliol House from Market Street is impressive. It is of six floors and its frontage extends round three sides from Pilgrim Street to Carliol Street with a grand central entrance halfway along its major length in Market Street. The building's size is further enhanced by the curve of Market Street and the falling gradient maintaining the apparent height by countering the normal perspective view. There is a metal plaque to one side of the entrance describing the previous occupation of the land on which Carliol House now stands. The Pilgrim Street corner of the building is curved and originally had a showroom entrance. At the top of the building, this curve is surmounted by a circular, flattened dome. The structure has a stone base but closer examination shows this to extend barely above ground level, as the building appears to be of concrete, in keeping with the art-deco appearance and the prevalence of such building methods in the early 1930s.

However, Carliol Street makes a turn round to the rear of the building at the junction with Dobson Street and this view is much less pleasing. Being mainly of brick and having three bays standing proud of the main construction, this gives more of a "factory" impression which is further illustrated by an elevated covered gangway, crossing the street diagonally to connect the middle bay with the corner of the building occupying the angle between Carliol Street and Erick Street at the first or second floor level. Towards the Dobson Street end of the Carliol House rear is a ground-floor electricity intake substation.

c2 By good fortune, access to view the redundant Control Room was granted. This is located on the sixth floor at the Carliol Street end of the building and is approached through a wood-panelled corridor and a vestibule. Entry reveals a circular room of approximately thirty feet in diameter, also panelled in light oak whose ceiling is supported by a pair of rectangular, panelled, pillars standing in line with the door and another door diametrically opposite. At a similar radius to the pillar positions is a mutli-sided lowered ceiling section enclosing lighting and ventilation units. This also is panelled.

c3 In semi-circular plan on either side between the doors are two identical wall diagrams, approximately 8-feet high, which would have been used to depict the electricity transmission and distribution networks in the North East. The wall diagrams have been cleared of network detail and are now of plain board and the top panelling space provided for a clock above the diagram on one side as viewed from the door is now vacant.

c4 At the foot of each wall diagram there protrudes a plinth and around the edges of these are many modern telephone jack sockets in groups, some sockets being labelled eg "Control Room A". This would indicate that the Control Room was still in use after telephone privatisation in the 1980s.

c5 From the entry vestibule are doors to left and right, that to the right leading behind the right-hand wall diagram which is enclosed by curved wooden sliding doors above waist height which are screwed shut. The diagram structure curves and passes closely to a straight wall showing that that the circular Control Room enclosure is constructed within a rectangular building space. Access through the left-hand door was not obtained.

D CENTRAL LIBRARY

d1 Little of use was found apart from a bound copy of the Electricity Commissioner's definition of the North East England Scheme Plan issued from Savoy Court in 1929 for consideration by the CEB together with the modifications and conditions for acceptance. It shows that, although the aims of the original scheme were fulfilled, the CEB adopted version differed in the arrangement of the interconnections.

E NEWCASTLE DISCOVERY (MUSEUM) ARCHIVE SECTION

e1 A wider range of documentation exists here but the aspect of electricity supply system control is rather elusive, often being buried within less obvious works. The first of these was a set of papers read before the Newcomen Society, one of which being by a former junior colleague of Percy Gunning, Tony Hadfield. He says that system control had achieved an advanced state before the advent of the CEB in that the pioneering interconnections were supervised from a Control Room at the Carville generating station in Wallsend and this attracted engineering attention from many countries. The control diagram totalled 960 square feet in area.

e2 With the ending of CEB and NeSCo at nationalisation, each Director of the company was presented with a souvenir booklet by the Senior members of the staff on 23rd March 1948. A copy (of a copy) of this booklet was obtained and, in addition to much interesting information there is a small photograph showing half of the Carloliol House System Control Room (SCR) as viewed from the door and shows the following details:

e21 Engineers' desks are arranged facing the wall diagram and there is a 3-stepped "hop-up" on the plinth which may have been on retaining rails. Over the desks are large, curved lighting units recessed in the ceiling and a clock is seen in the panelling above the wall

diagram. The nearest desk has an angled panel with what appear to be switches on it across a third of its width.

e22 The central section of the room is multi-sided, vertically panelled to approximately four feet high, topped with a polished flat sill of about nine inches width and then glazed to the ceiling from the inner edge of the sill. On the outer faces of these vertical panels are mounted various meters which can be viewed by the engineers by turning around from their usual positions facing the diagram.

e23 Within the central section is an engineer's desk and, beyond this is a sloping surface horizontally matching the angular changes of the panelling and its surmounted glazing.

F CONCLUSIONS AND FURTHER QUESTIONS

f1 The existence of the Carville Control Room confirms the theory posed in a2.

f2 The visit to the old Carliol House Control Room was most unexpected.

f21 The area behind the right-hand wall diagram was insufficient to contain any equipment such that this side was probably for the NeSCo diagram. The sliding panels must have covered something although their apparent distance from the diagram face was not large. There could, therefor have been small indicators or lamps mounted in the diagram face.

f22 It is regretted that the area behind the left-hand diagram was not investigated since, if this was the CEB side, there would have been more space behind it to accommodate the apparatus racks or bays and the rear equipment of the the CIS Indicator Diagram. To achieve this, the circular Control Room would have been positioned eccentrically within whatever rectangular building space had been allocated.

f23 The photograph does not reveal its period. From a4 we do not know the arrangement of the glass partitioning since the Control Room probably underwent some changes during its lifetime. Nor do we know whether the partitioning was retained by NeSCo after it took the whole area for its own use although this might be unlikely. Most of the CEB Control Rooms had miniature diagrams in addition to their Indicator Diagrams for switching security purposes and the sloping surface shown could have been this feature.

f24 The post-war upgrading might have been achieved by replacing the Indicator Diagram by STC's "PinFix" panels above banks of lamp or mechanical indicators and meters. Whether there would have been sufficient space behind the diagram for the new equipment is not known (see b2 and f22 above).

f25 Estimations of the Control Room dimensions produces a wall diagram of only 750 square feet for the whole circumference including the door spaces. The estimates were obviously inaccurate but this may be excused by the presence of furniture stored there. However, the Carville diagram may have been larger due to the indicators and meters available in earlier times requiring more space.

f26 When the CEB started operations, it would have taken over the Load Despatching function almost totally, leaving the majority of the switching to NeSCo. However, the CEB would have continued to control switching of the high-voltage CEB interconnections and the Grid transformer tap settings at the interfaces with existing NeSCo system.

f27 All of the CEB CISs except those for NEE and SEE were positioned away from city centres and, with hindsight, it would seem imprudent to position a System Control Room at the top of a prominent building (see b2 above) in what could have been a target area for enemy aerial action. As it transpired, although Newcastle suffered several relatively light raids during the war the SCR escaped. Compare this with the plight of the SEE CIS which had to be abandoned permanently for an underground location at the height of the Blitz due to its vulnerable position.

f28 A 1944 CEB communications map shows that Newcastle was the only CIS not to have an Emergency Control Centre (ECC) and Percy Gunning also notes this in his report previously quoted.

PLANS AND DIAGRAMS

Plan GCHQ4227 (see separate document) is based upon the brief visit observations, study of the small photograph from the souvenir booklet and assumptions made from a general understanding of the CEB GCR practice.

Solid lines are used for observed features and those apparent in the photograph. Otherwise, lines are shown dotted. Percy Gunning's statement that the equipment was against an outside wall leads to supposition as to the alignment of the Control Room with respect to the main building. As has been noted, the rear of Carliol House has three protruding bays such that the Control Room could be orientated two different ways whilst still satisfying this statement. The doorway opposite the normal Control Room entrance leads, we were informed, to a fire escape which may penetrate the outside wall referred to.