Laboratory and Old Explosives Store Chatterley Whitfield Colliery Stoke-on-Trent Staffordshire

Historic Building Investigation and Recording

Oxford Archaeology

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Laboratory and Old Explosives Store
Chatterley Whitfield Colliery, Stoke on Trent, Staffordshire

HISTORIC BUILDING INVESTIGATION AND RECORDING

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Historic Building Recording and Investigation

SUMMARY

Oxford Archaeology has undertaken a programme of building investigation and recording on a pair of adjoining buildings at Chatterley Whitfield Colliery in Stoke on Trent in Staffordshire. The main building is a former laboratory which was constructed in the 1930s while the other structure is believed to have been a former explosives store that may have been adapted to serve as an electrical sub-station and still houses an electrical transformer. The work was concentrated principally on the laboratory building which has two principal construction phases but whose internal layout appears to have changed relatively little following the mine closure in 1977. The buildings are to be converted to a new use as part of the wider redevelopment of the former colliery site. The interiors will be cleared during the refurbishment and therefore a programme of building recording has preceded any works.

ACKNOWLEDGEMENTS

Oxford Archaeology would like to acknowledge the help of Frank Sanders in preparing this report. Mr Sanders is a former Scientific Photographer who worked for many years at Chatterley Whitfield in the Laboratory building and he has provided OA with scans of several relevant photographs of the building from when the colliery was operational, and allowed these to be used in the current document. Mr Sanders also discussed in some detail the former use of each room of the building. OA would also like to thank Ken Edmondson of Stoke on Trent City Council (Clerk of Works for Chatterley Whitfield site) for arranging access to the site and Rob Sutton of Atkins Heritage for commissioning the work.

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1 INTRODUCTION

1.1 Background

1.1.1 Oxford Archaeology (OA) has been commissioned by Atkins Heritage, acting on behalf of English Partnerships and English Heritage, to undertake a programme of building recording and investigation at Chatterley Whitfield Colliery on the northern outskirts of Stoke on Trent in Staffordshire. Chatterley Whitfield Colliery is the most complete surviving large colliery in England and is amongst the country's most important monuments of the coal industry. Much of the site is a Scheduled Ancient Monument and it includes many listed buildings (see Fig 2). It was formerly the National Mining Museum but is currently undergoing a mixed-use redevelopment led by English Partnerships which is being overseen by English Heritage to safeguard the historic structures on the site.

1.1.2 The current recording concentrated on two buildings towards the north-western edge of the main colliery complex: a laboratory and a former explosives store. The buildings are unlisted and not included within the scheduling (although the ground beneath them is scheduled) but they do form part of a historically significant group of buildings. The laboratory is particularly of interest as its internal layout appears to have altered little since its original construction in the mid 1930s. One of the interesting features of the former explosives store is a large transformer within it which probably dates to the 1960s. The two buildings are being converted to new uses in the current redevelopment and although they are being retained their interiors will be cleared of the existing fixtures and fittings. Therefore English Heritage has requested that a programme of building recording be undertaken prior to the clearance and subsequent conversion. Oxford Archaeology produced a written scheme of investigation detailing the works they would undertake and this was approved by English Heritage.

1.2 Aims and objectives

1.2.1 The overall aim of the work was to make a detailed record of the buildings prior to their conversion and then to make the results of the record (and the archive itself) publicly accessible. The principal objective was to create a record of the internal layout of the laboratory and of the internal fittings. A more general record of the shell of the two buildings was also created.

1.3 Methodology

1.3.1 The recording was broadly undertaken to RCHME Level III (as defined in the RCHME's *Recording Historic Buildings: a Descriptive Specification*). This is a relatively high level and reflects the overall significance and sensitivity of the Chatterley Whitfield site.

1.3.2 The site work included three principal elements: a drawn survey, a photographic survey and a written, descriptive survey. The ***drawn survey*** included plans of each building as well as details of specific features. The plans were based on an existing outline survey of the buildings and were traced at an appropriate scale on to archivally stable permatrace to which additional survey data and descriptive annotation was added. The ***photographic survey*** consisted of general shots and specific details (external and internal) and was undertaken using black and white print film and colour slide film. The photographic work was undertaken using 35 mm film. The ***descriptive survey*** complemented the other two surveys and added further analytical and descriptive detail. The main site work was undertaken between the 14 and 16 February 2005.

1.3.3 The current investigation has not included any substantial historical research. Readily available sources have been consulted to provide some background understanding of the site but as the site has undergone many previous historical studies it was not felt necessary to duplicate this work here. However the site has been discussed with Frank Sanders, a former employee at the laboratory (scientific

photographer) who has access to a large collection of old photographs of the site and who retains an interest in the site. Mr Sanders has provided invaluable information about the operations of the building and also copies of several photographs relating to the laboratory. Much information from Mr Sanders has been included in the current text including what each room was used for.

1.3.4 All the material produced by the current study (site drawings, photographs, slides, photographic negatives, a copy of the current report etc) will be ordered and deposited with an appropriate museum or other body. The archive will be added to material produced in a small previous below-ground archaeological project undertaken by OA at Chatterley Whitfield Colliery in 2004.

2 HISTORICAL BACKGROUND

2.1 Chatterley Whitfield Colliery

2.1.1 A description of the Chatterley Whitfield Colliery was prepared by English Heritage (EH) as part of its record of scheduled monuments and an abridged version is reproduced below.

2.1.2 The monument is situated in the north Staffordshire coalfield on the north-east outskirts of Stoke on Trent. It includes intact buildings, ruins and the earthwork remains of parts of Chatterley Whitfield colliery and parts of an associated railway network. The site, which is grouped around five main shafts (called Old Bellringer or Institute, Middle Pit, Platt, Hesketh and Winstanley), is set partly within an area of reclaimed colliery waste which has been re-shaped as part of the Whitfield Valley Public Open Space Programme.

2.1.3 Although the exploitation of coal in the Whitfield area dates back to the 18th century, the development of the present colliery site did not begin until the early 1860s. The opening of the Biddulph Valley Railway in 1860 prompted landowner, Hugh Henshall Williamson, to widen and deepen abandoned shallow shafts on the Whitfield Estate and a short railway line was built to connect these shafts with the Biddulph Valley line.

2.1.4 In c.1872 the site was purchased by the Chatterley Coal and Iron Company with the intention that Whitfield coal should be used in the manufacture of iron. By the early 1890s the company was renamed Chatterley Whitfield Collieries Ltd. A programme of modification and improvements took place at the site which brought the colliery to the forefront of mine electrification and mechanisation processes. Three of the Whitfield shafts were deepened in order to strike lower coal seams and one of these, the Old Bellringer shaft, was renamed the Institute in 1874. A number of early and mid-20th century structures associated with this shaft remain standing and are situated in the south eastern part of the site. These include an engine house, built during the 1950s-60s, and the steel headgear, erected in 1922. To the north of the shaft, the fan drift and fan house which, at one time, ventilated both the Institute and Platt shafts, remain standing. This building, also constructed during the 1950s-60s,

houses an intact electrically driven ventilation fan which is included in the scheduling. The brick-built engine house, built to replace the original winding house, retains its electrical winding engine which is included in the scheduling. The buried remains of earlier structures associated with the Institute shaft, including the original winding house, are thought to survive beneath the ground surface.

2.1.5 Immediately to the east of the Institute shaft are the headgear and winding house of the Platt shaft which was developed in the 1880s to replace the destroyed Laura shaft. The Platt winding house is thought to be the oldest surviving structure at Chatterley Whitfield and was constructed in 1883. A sloping corrugated sheet roof was added to the buildings at a later date. The original winding engine has been removed and the building now houses a restored engine from Silverdale colliery. The winding engine itself is excluded from the scheduling, although the building and the ground beneath it are included. To the north of the Platt shaft is a second fan house, built during the 1920s-30s. Its original fan is no longer extant and the building has been converted for other uses in recent times. It is excluded from the scheduling, although the ground beneath is included.

2.1.6 In 1891 work began on the construction of a chimney stack which served several banks of Lancashire boilers situated around its base in the central part of the colliery complex. The chimney, originally approximately 60m high, has since been shortened but it survives in good condition. The main boiler plant, built during the 1920s-30s, is situated immediately to the north of the chimney and is thought to have replaced an earlier structure. This building has been partly demolished but retains ten Lancashire boilers and their associated pipework and is included in the scheduling. Also situated within the central part of the mine complex is a building, Listed Grade II, which originally served as the site's electrical and mechanical fitting shop and was constructed in the late 1930s or early 1940s. This building was extensively altered for mine car repair work and, in recent years, for use as a locomotive repair shop. It is excluded from the scheduling, although the ground beneath is included.

2.1.7 During the early 20th century the production of coal at the site increased dramatically and two further shafts were sunk at the site, the Hesketh and Winstanley shafts. The former is situated in the south east corner of the colliery complex and was the deepest shaft to be developed at Chatterley Whitfield. The heapstead (the buildings and works around a mine shaft), the headgear and the complex which houses the compressor, power and winding houses remain standing and are included in the scheduling. The steel headgear of the Hesketh shaft dates to c.1920 and the brick and girder heapstead was developed during the 1920s and 1930s as the exploitation of coal through the Hesketh pit increased. A complete mine car circuit still survives within the heapstead and includes tipplers and creeper railways which were linked to the screens, to grade the coal, and the railway loading bridges which loaded the coal onto the main line railway. The screens have since been demolished but the loading bridges, although partly derelict, survive and are included in the scheduling. Also in this part of the site are a number of railway

tracks which extend for a distance of approximately 300m eastwards beyond the Hesketh heapstead. A 40m sample length of these tracks is included in the scheduling in order to preserve the relationship between the railway and the colliery buildings. The brick-built Hesketh complex is one of the finest surviving structures at the site and was constructed from 1914-15 onwards. The winding, compressor and power houses for the shaft are situated on the building's upper floor while the basement was utilised for machinery and winding rope storage. The Hesketh winding house retains its original Worsley Mesnes twin cylinder horizontal steam engine and this is included in the scheduling. The compressor house currently houses a reconstructed steam compressor engine which was removed from Sutton Manor colliery and this engine is excluded from the scheduling, although the building and the ground beneath it are included.

2.1.8 The Winstanley shaft and its associated heapstead are situated in the south west part of the site. The shaft was sunk in c.1917 partly to improve ventilation in the Middle Pit, sited immediately to the east. The Middle Pit was capped and backfilled in 1966 but its power house, dating to c.1905 and situated to the north of the shaft remains standing and is included in the scheduling. The power generating machinery was originally located on the upper floor of this building and the ground floor housed a haulage engine for powering the underground haulage systems within the Middle Pit. The machinery and engine have since been removed from the power house and the building is now derelict. The Winstanley shaft has also been capped and backfilled, but the heapstead survives and incorporates a winding house of a unique brick construction and German design encasing the head wheels. The original steam winder has been replaced by an electric winder which remains operable and is included in the scheduling.

2.1.9 Approximately 75m to the north of the Winstanley shaft and heapstead is the colliery's weighbridge and weighplates which are included in the scheduling. The building housing these features was constructed during the 1950s and the weighplates survive intact with one side remaining operable.

2.1.10 To the north and north-west of the Winstanley shaft are a pump house, which has been stripped of its pumping equipment, and the building which originally housed a methane plant. These structures are excluded from the scheduling, although the ground beneath is included. In the north western part of the site is a group of buildings, erected during the 1930s, which served as the colliery offices and laboratories. These buildings are excluded from the scheduling, although again the ground is included.

2.1.11 Before World War II, Chatterley Whitfield was the largest colliery in Staffordshire and in 1937 it became the first mine in Britain to draw more than one million tons of coal in a single year. The year 1947 witnessed a new era in mining and, after nationalisation, the majority of mines, including Chatterley Whitfield, became part of the National Coal Board. The 1960s saw a steady decline in the colliery's fortunes in the wake of a fall in international demand for coal and a decision was made to

extract the surviving coal measures on the Whitfield site by way of Wolstanton colliery, some four miles to the south.

2.1.12 In March 1977 coal mining ceased at Chatterley Whitfield although key site buildings continued to be utilised by the Coal Board for non-mining activities until March 1989.

2.1.13 For an industrial site, there is also a remarkable collection of documentary information which provides evidence for the history and development of the colliery.

3 LABORATORY

3.1 External description

3.1.1 The laboratory building (no. 14) is rectangular in plan and is orientated northwest-southeast. The building was known as the western laboratory in the 1970's and was part of a larger laboratory complex that included a lower laboratory building constructed at basement level to the south of the present building (Plate 5). The lower laboratory was constructed of wood and housed the main computer and is thought to have been demolished in 1977. The western laboratory building (the main subject of the current study) has been built on the eastern edge of a terraced slope and subsequently the walls on the southern and western faces are a storey taller than the corresponding northern and eastern faces.

3.1.2 The laboratory building has two very clear phases of construction. The earlier building was constructed in about 1935 and represents the eastern end of the laboratory. The building has been constructed of dark red brick, 230mm x 110mm x 75mm, laid in a stretcher bond pattern bonded with a hard, cement based mortar. The windows have metal frames and have six by four glazed window panes with a centrally opening glazed unit. The roof was not accessible during the building survey. The later building abuts the western face of the original building and was constructed prior to 1951 (pers comm Frank Sanders; the date that he was first employed). The building has been constructed of a light red brick, 225mm x 110mm x 70mm, laid in a stretcher bond pattern bonded with a hard, cement based mortar. The windows have metal frames and have five by three glazed window panes with two opening windows and differ to the window units seen in the original building.

3.2 Internal description

3.2.1 The laboratory building had been previously cleared of much of the internal equipment and furnishing associated with the building's use prior to the commencement of the building survey. Many internal fixtures and fittings have been retained within the building including many of the laboratory benches and shelving. The original function of the laboratory internal rooms remains uncertain. The following laboratory room functions have been partially determined during the building survey, but largely from the memories of the NCB scientific photographer Mr Frank Sanders who worked in the building. The use of the rooms may vary over

time and their occupants are transient within the working environment. The room functions can be loosely determined, but the inter-relationships between them are more tenuous.

3.2.2 ***Room 1: The Coal Testing and Preparation Laboratory*** is accessed from the western end of a central corridor and has an additional external access in the western end of the laboratory building. The room has a red ceramic tiled floor surface and cement rendered walls which are consistent with the arrangement seen throughout the rest of the building. The height of the room is also consistent throughout the laboratory building at 3.25 m (10ft 8in). The room has three large softwood, light oak effect laboratory benches with grey Formica worktops and various arrangements of cupboards and drawers below. Two of the benches are located along the western and southern walls and the third is positioned at right angles to the bench on the southern wall. Each bench has a recess for a single sink unit although only a single sink remains in the southern bench, a 15in x 11in 'Westwood' sink. A large glazed roof light is located at the northern end of the room which provides additional natural daylight to the laboratory and subsequently to the Furnace and Balance rooms (Room 12 and 13) through internal glazed windows in the northern rooms. Two shelving units were originally positioned either side of the windows in the 1980's but no longer remain, see (Plate 3). The room was heated by three iron radiators and a single 1970's 'Myson' wall heater. The 'Myson' wall heater has been used throughout the rooms of the later laboratory extension building, while an earlier fan assisted panel heater is more common within the earlier original building.

3.2.3 The coal preparation laboratory was used to analyse the coal samples from the underground mining operation. In this room the samples were tested for a number of properties and chemical inclusions, the coking properties of coal were ascertained, and the total percentages of organic sulfur and Chlorine within a coal sample was measured. It was necessary to determine coals with high percentages of Chloride and sulfur as they can cause corrosion to the boiler and furnace heat component surfaces when the coal is burnt. The laboratory cannot be looked at in isolation and the analysis carried out in this room was integrally linked with rooms 2, 12 and 13.

3.2.4 ***Room 2: The Calorific Testing Room*** was accessed from the eastern side of the Coal preparation room and originally was arranged into two smaller rooms. The central dividing wall has been removed and the roof was supported with an RSJ beam, and the northern room door access was blocked with concrete blocks. A small bench with a marble effect Formica top survives in the northern end of the room with a wall mounted 'Myson' heater. Part of a probable heater remains in the southern end of the room along with a ventilation vent in the window. The calorific testing room was used to determine the quantity of heat that could be liberated from one pound of coal measured in BTU (British thermal unit).

3.2.5 ***Room 3: Gents Lavatory and Cloak Room***. The cloak room has a wall mounted iron radiator that was positioned below several wall mounted coat hooks. The toilet has three ceramic sink units positioned by the eastern facing window that looks onto

the glazed roofed stairwell. Two lavatory bowls are noted, one has no manufacturers mark and the other is manufactured by 'Linone', no. 353280

3.2.6 ***Room 4: The Mine Air Laboratory*** is accessed from the southern side of the central corridor and has a similar style of benches as those noted in room 1. The room has two softwood light oak effect laboratory benches with various arrangements of cupboards and drawers and grey Formica worktops. One bench is located on the western wall of the room, and the other is positioned centrally in the room, parallel to the first. An additional L-shaped bench supported on rendered bases is located in the north eastern corner of the room below a contemporary extractor hood. A photograph taken in the 1970's of a mercury analysis machine on a Formica topped bench shows the arrangement prior to the extractor hood (Plate 4). The room was heated by a single fan assisted panel wall heater. A large glazed roof light is located in the roof to give additional natural daylight to the laboratory. The northern wall of the laboratory has windows positioned along its length to provide light to the corridor/hallway. The laboratory was responsible for the preparation and analysis associated with the air quality in the mine environment. The amounts of fine coal dust in the mine air could prove highly explosive and breathing the dust could cause the pneumoconiosis condition.

3.2.7 ***Room 5: The Mine Air Office*** is accessed from the eastern side of the mine air laboratory and only contained a single fan assisted panel heater. The flooring matches that on the floor of the mine air lab and consists of 150mm x 150mm red ceramic tiles.

3.2.8 ***Room 6: The Area Chief Scientist Office*** is accessed from the central hall and has additional access from the research room. The flooring within the room consists of wooden block laid in a herring bone pattern with a two block wide border. One fan assisted panel heater is mounted on the northern wall while another has been removed from the eastern wall. A photograph taken in the 1970's of the area chief scientist, Mr. William Monroe Robertson, at his desk provides an idea of the furnishings and internal arrangement of his office (Plate 1).

3.2.9 ***Room 7: The Pneumoconiosis Research and Microscope Room*** is accessed from the central hall, from the area chief scientist office and the darkroom. The room has a small softwood desk with a grey Formica top attached to the southern wall and rendered chimney. An original fan assisted panel heater is located on the. Clearly the function of the room was to undertake research into the lung disease Pneumoconiosis, caused by the inhalation of coal mine dust.

3.2.10 ***Room 8: The Photographers Dark Room.*** The room is accessed from the research room and through the dust laboratory office of the main hall. The room has the only suspended plasterboard roof in the building that reduces the height of the ceiling to 2.82 m above the floor as oppose to the usual 3.25m The room has no furnishings except for a 'Myson' wall mounted heater.

3.2.11 ***Room 9: The Dust Laboratory Office*** is accessed from the central hall and the photographer's dark room. The room has no furnishings or fixtures and is illuminated with a central positioned glazed roof light.

3.2.12 ***Room 10 The Hallway and Stairwell.*** The hallway has red ceramic tiles throughout its length. The main entrance doorway to the laboratory building is located at the eastern end of the hall with the Coal testing laboratory situated at the western end. The western end has a rectangular glazed skylight in the ceiling and a 'Myson' wall heater on the wall. The stairwell linked the central hall of the upper laboratory to the yard area where the former lower laboratory/computer laboratory was sited. According to Frank Sanders the stairs were constructed in or about 1977 following the demolition of the lower laboratory building. The stairwell is illuminated from the glazed roof above and from a single window located above the external door opening. From the layout of the building the stairwell must have truncated the previously larger Room 3. The west wall of Room 4 is a structural wall at the end of the primary building and clearly when the Phase 2 building was added it would have extended up to this wall rather than demolishing this wall and extending stepping Room 4 out into the new building.

3.2.13 ***Room 11: The Oil Testing Room*** was accessed from the central hallway and by an external door on the northern face of the building. The room has been divided by a wooden partition wall with sliding door access. Within the larger of the divided rooms, wall mounted shelving remains on the eastern wall while on the western side of the room, a stainless steel sink and a grey Formica topped cupboard were noted. The smaller divided room leading to the external door also once had wall mounted shelving which has since been moved. In the oil testing room the break down temperature of the oil was tested prior to the oil being used in the various machinery of the colliery site.

3.2.14 ***Room 12: The Balance Room*** is separated from the furnace room by a central dividing wall which also incorporates a glazed window at ceiling height in order to disperse the light between the two rooms. Both the rooms are also illuminated from the coal testing laboratory through two other windows. The balance room has a white ceramic sink near the window and a long, black glass topped bench along the eastern wall. Inside the balance room the samples were analysed and weighed after they had been in the furnace to assess the ash contents in the coal which can subsequently add to both the cost of handling and can adversely affect the burning characteristics of the coal.

3.2.15 ***Room 13: The Furnace Room*** has a black glass topped bench supported on rendered bases and rests against the central dividing wall. The glass top overlies an earlier red tiled bench surface. Opposite the bench, a large steel extractor hood has been constructed along the length of the western wall. The furnaces that were once sited beneath the extractor hood had already been removed. The furnaces were used to determine the moisture and ash contents in coal. Anthracite coal has the highest economically usable coal with moisture contents less than 15% by weight and a heating value as high as 15'000 BTU's per pound. Bituminous coal, the most

common type of coal, has moisture contents less than 20% by weight and a heating value of 10,500-14,000 BTU's per pound.

3.2.16 ***Room 14: The Ladies Lavatory*** has a single WC and sink and is located at the southeastern end of the corridor. It is smaller than the Gents WC presumably reflecting the smaller number of women expected to be working in the building.

4 OLD EXPLOSIVES STORE

4.1 External description

4.1.1 The explosives store building (No. 112) is located 9.50m northwest of the laboratory building (building 14) and has been constructed besides an earth and masonry blast bank. The building is rectangular in plan and measures 9.17m (30ft 1in) in length and 4.59m (15ft 1in) in width. The lateral walls at either end of the building have been constructed of a double thickness of red brick to a width of 250mm and the longitudinal walls have a thickness of 400mm. The external face of the building has been constructed of red brick, 230mm X 110mm X 70mm, laid in a garden wall bonding pattern, with a courses of headers for every three courses of stretchers and capped with a single course of soldiers; air bricks have been used throughout the external faces. The roof has been constructed of concrete to a depth of 275mm (11 in). A heavy 10mm thick primary phase steel door, recessed into a 10mm steel surround, is located in the northern face of the building and a secondary phase timber door is located in the southern face.

4.2 Internal description

4.2.1 The building is internally subdivided into two rooms by a double thickness brick wall laid in an English garden bonding pattern and houses an electrical transformer and electrical switchgear. The northern room houses a 'Bryce' two tonne, wheel-mounted, oil electrical transformer of a model dating to the 1950's, while the southern room houses contemporary 1950's electrical switchgear. The transformer was manufactured by Bryce electric construction CO. LTD of Hackbridge, Surrey, and was for use underground in accordance with BS 355/1939. The transformer was used to convert 3.3KV power from the preparation substation into three phase, 415V output, to the switchgear installed in the southern room. The 3.3KV electrical input cables are fed to the transformer via an open electrical duct built on the eastern edge of the switchgear room and are fed to the transformer, via a subterranean service duct within the concrete floor on which the transformer rests. The 415V output from the transformer to the switchgear has a mirrored arrangement on the western side of the building (see Figure 5 for the electrical distribution board diagram). The concrete floor and electrical ducts would appear to be secondary to the buildings original configuration and crude holes have also been broken through the internal and southern external brick walls in order to accommodate the cables. Within the switchgear room the remnants of a second internal brick wall were noted. The top of the wall remains in-situ near the concrete roof and has been supported with the

insertion of an RSJ beam. The wall has been abutted on both faces by centrally placed concrete beams that support the primary concrete slab roof. Regular spaced recesses are also noted within the intact dividing brick wall and the internal faces of the walls at the end of the building.

4.3 Interpretation

4.3.1 The building has been known as the explosives store for some time and the name probably reflects its location besides the blast bank. An electrical distribution board diagram recovered from within the building identifies the building as the 'Magazine substation'. It is believed that when the later addition to the laboratory building was constructed in the 1940's-1950's, the existing (previous) magazine explosives store was located too close to the building, in the event of an explosion, and therefore a new store, the structure which survives today, was rebuilt 33m to the north.

4.3.2 The business of carefully handling explosives is of vital importance in a colliery and an effective system which governs the handling and storage of these items is paramount. Explosive magazine stores require good ventilation and their design needs to be such that in the event of an explosion the blast is as carefully controlled as possible. Their design has been discussed with Peter Walker, Museum Manager at the Big Pit Mining museum in Blaenavon, Wales, where there is a comparable brick built explosives magazine store of the 20th century, and the two buildings share many constructional similarities indicative of an explosives store. Both buildings have solid concrete roofs, thick brick walls, they have solid steel recessed doors (with steel surround) and they include air bricks in their external walls to ventilate the buildings. Such buildings usually have two compartments to allow the detonators to be kept separate from the explosives and although this is not the current arrangement at Chatterley this may have been removed during its secondary use as an electrical substation. The building also lacks a concrete serving counter to provide additional blast resistance, which is a common feature of 19th century brick built explosives stores, but this again may have been removed.

4.3.3 The thick concrete roof of the explosives store at Chatterley Whitfield is in some ways the exact opposite of many explosive magazines but Peter Walker from Big Pit has confirmed that this is normal for many colliery explosive stores such as this. It is usual for many stores (especially military magazines) to have a relatively light roof and the main structure partially underground to ensure that in the event of an explosion the blast would be forced upwards. This may be particularly so at a military site where there is likely to be rows of many magazines adjacent to each other due to the danger of a sideways blast from one magazine triggering an explosion in a neighbouring magazine. At a colliery, where there was presumably just a single explosives store, this would be less of an issue and if the roof was allowed to blow off this would have the danger of scattering debris across much of the colliery site. If an explosion could be allowed to blow out an end wall, into open ground away from the main colliery site or into a blast bank, this may be a safer way of controlling the explosion.

5 CONCLUSION

5.1.1 The two structures at Chatterley Whitfield Colliery which have been recorded in the current exercise are clearly not among the most prominent, distinctive or historically significant buildings at the former colliery. This is reflected in the fact that they are unlisted, unlike many of the other structures at the site, and they are specifically excluded from the site's scheduled status (although the ground beneath them is included). However they form part of a group of structures which are of great industrial archaeological significance and as such are worthy of retention, reuse and recording.

5.1.2 Coal mining was of immense historical importance in the industrialisation of Britain but the industry has shrunk with great rapidity in the last 20 years and there are relatively few surviving monuments from the industry. Whereas new uses can be relatively easily found for the remains of many dying or contracting industries (eg converted mills, warehouses, breweries etc) the surviving structures from collieries are much less easily converted and their complete demolition is frequently inevitable. In addition, it has frequently been the case that once collieries close the whole sites are cleared before any record can be made of the structures and the fact that so many structures survive at Chatterley Whitfield is what gives it such importance. Surviving subsidiary buildings such as the laboratory and former explosives store provide a broader understanding of complexes such as Chatterley Whitfield and the range of different buildings which were necessary outside the more obvious structures such as the headstocks, winding gear and engine houses.

APPENDIX I BIBLIOGRAPHY

EH 1997 *Record of Scheduled Monuments: Description of Monument No. 21575, Chatterley Whitfield Colliery*

Oxford Archaeology *Archaeological Watching Brief report* September 2004 (Unpublished client report)

The Ironbridge Gorge Museum Archaeological Trust, Chatterley Whitfield photographic survey, 1994

APPENDIX II SUMMARY OF SITE DETAILS

Site name: Laboratory and old explosives store, Chatterley Whitfield Colliery, Stoke on Trent, Staffordshire
Site code: CHAT05
Grid reference: SJ 8839 5326

Date and duration of project: The site work was undertaken 14-16 February 2005.

Location of archive: The archive is currently held at OA, Janus House, Osney Mead, Oxford, OX2 0ES. It will ultimately be deposited with an appropriate agreed body.

Contents of Archive:
The archive for the current work will consist of three A1 sheets of permatrace with plans and other drawings of the buildings. It will also consist of photographs (black and white prints and colour slides), negatives and a copy of this report.

APPENDIX III GAZETTEER OF NON-FIXED EQUIPMENT AND PLANT FOUND BENEATH LABORATORY

Introduction

After the start of construction works a ground floor vandal board was removed from the adjacent building immediately next to the laboratory and this led into a small series of rooms partially extending beneath the laboratory. Due to the steeply sloping ground the south-west end of the complex of rooms is beneath ground level but at their north-east end they are above (or at least partially above) ground level.

The rooms divide into four distinct spaces:

Room 1 is the first area entered and it comprises a small lobby at the north-west end and a thin gents WC (1.8 m wide) extending beneath Building ___ immediately to the south-west of the laboratory. The floor and walls of this area are tiled and there remains various features probably dating to the 1930s. There are ceramic sinks, a riveted metal water tank, two urinals and a crittal-type 1930s window in the south-east elevation.

Room 2 is the main storeroom of the basement area and it is beneath Room 4 and the Hall of the laboratory. It has a concrete ceiling and the brick walls are painted. In the north-west wall is an original crittal-type 1930s window with sill which would clearly originally have been external but now looks onto the underside of the 1970s staircase. There are several sets of metal shelves in this area on the shelves are many items of plant (mainly scientific testing equipment). These are detailed in the attached gazetteer.

Room 3 is a corridor (96 cm wide, 4.9 m long) through from the WC to Room 2. Its ceiling is formed of metal shutters and presumably supports a concrete slab above. The door at the south-west end of the corridor is constructed of wood and is formed of slatted louvres.

Room 4 is a small area underneath the 1970s staircase.

Classification	Boiler
Item No.	Lab 0001
Location	Laboratory (Building 14) Room No. 1
Qty	1
Description	Boiler not in-situ. Various cut of pipes: three in top, one main pipe outlet in side and smaller ones just above seal, towards mid point and one below seal. 1.3 m tall. 31 cm diameter boiler cylinder, stands of four iron posts with circular pressure seal immediately above. Manufacturers plate on side shows order No (68406), Test pressures (Casing 50A lbs battery 160) and maximum working pressures (25 lbs, 80).
Manufacturer	Rother Boiler Company Ltd, Rotherham
Date of Manufacture	25 November 1959
Other Information	Boiler may have provided hot water for the adjacent WC but this couldn't be confirmed from the truncated pipes. (To be cleared??)

Classification	Flow regulator
Item No.	Lab 0002
Location	Laboratory (Building 14). Room No. 1
Qty	4
Description	Wooden board (67 cm x 20 cm) which would have been fixed to the wall, on which testing apparatus is fixed. Two long, linked thin vertical pipes fixed to circular bakelite (?) base which is fixed to board. Smaller metal tube rises from bakelite base to link with two further bakelite flat cylinders with flexi tube between them. Makers No. 72307 Patent No 430157 Presumably they are testing equipment for oxygen masks (or similar).
Manufacturer	Sigma Instruments Co Ltd, Letchworth
Date of Manufacture	-
Other Information	Four similar flow regulators in WC. None in-situ and clearly all relocated here from other building (or possibly upstairs in laboratory).

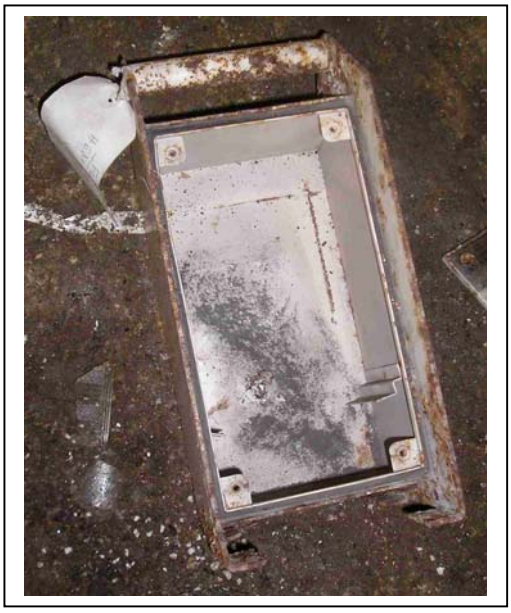
Classification	Gas Chromatograph Model 111
Item No.	Lab 0003
Location	Laboratory (Building 14). Room No. 2
Qty	1
Description	Grey metal box (48 cm x 41 cm) from which the top and rear have been removed. Front has two dials, two large switches, various smaller switches and 10 small plugs along the bottom to connect wires to (?). Some switches labelled helium and argon
Manufacturer	Designed and made by National Coal Board Scientific Dept, Edinburgh
Date of Manufacture	-
Other Information	

Classification	Glass measuring cylinder
Item No.	Lab 0004
Location	Laboratory (Building 14). Room No. 2
Qty	4
Description	Glass measuring cylinder, enclosed and protected by metal frame (open box). 61 cm tall x 7 cm wide. Inlet and outlet valves at top and bottom for gas/air to enter and exit cylinder. The measuring numbers on the cylinder go from 6 to 60 cubic feet/hour 70% methane 30% air 15ºC 760 mm Hg ABS. Exact use not known. Small manufacturers plate stuck to front.
Manufacturer	Rotameter manufacturing Co. Ltd, Croydon
Date of Manufacture	-
Other Information	Not in-situ. In storage in room beneath laboratory. Similar to lab 0005

Classification	Glass measuring cylinder
Item No.	Lab 0005
Location	Laboratory (Building 14). Room No. 2
Qty	1
Description	Glass cylinder used to measure gas/air. 42 cm x 9 cm. Similar to Lab 0005 but measuring numbers on the cylinder go from 0.3 to 2.9. Also on cylinder is written: Free cubic feet/minute town gas SG 0.39 20ºC 2.5 Nwg. A label is tied to instrument: 'Domestic fuel section Maritime Laboratory Pontypridd'. Small manufacturers plate fixed to front.
Manufacturer	Rotameter manufacturing Co Ltd, Croydon
Date of Manufacture	-
Other Information	Clearly no longer in-situ and presumably has come from entirely separate colliery in Pontypridd. Possibly moved when site served as national mining museum.

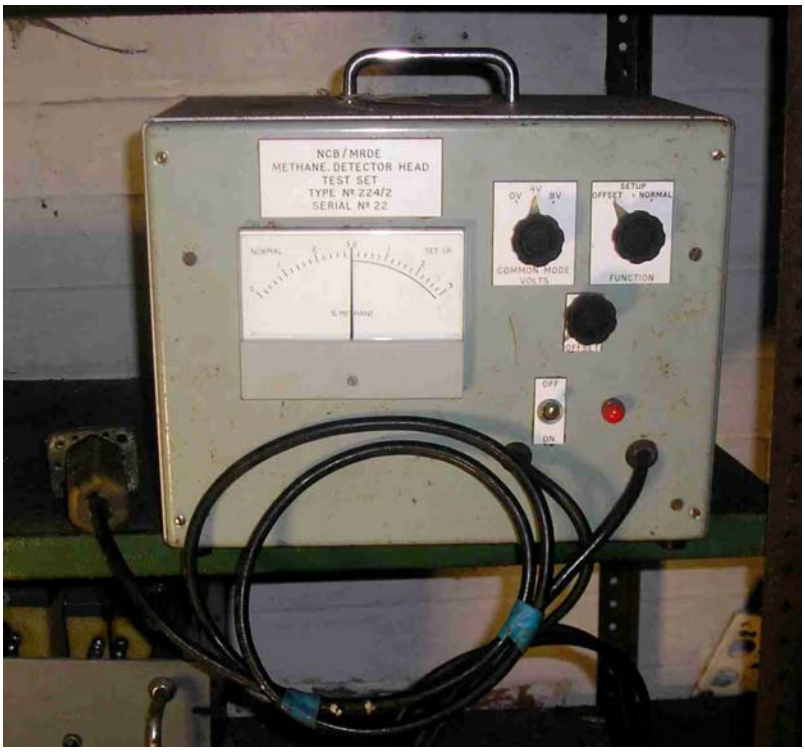
Classification	Battery packs or battery recharger
Item No.	Lab 0006
Location	Laboratory (Building 14). Room No. 2
Qty	12
Description	Metal lined boxes (12 cm x 18 cm x 12 cm) filled with hard resin and with 11 very small holes in resin presumably for wires or nodes to be plugged into. All sides of box fixed except for rear (where wires would plug in) which is open. Metal brackets to base. Resin-filled boxes would have slid into holders (lab 0007) and metal covers then placed over.
Manufacturer	
Date of Manufacture	
Other Information	

Classification	Holder for battery chargers
Item No.	Lab 0007
Location	Laboratory (Building 14). Room No. 2
Qty	11 boxes and 11 backs.
Description	Metal boxes for holding battery chargers (lab 0006) with bar handle on top for hanging. 16 x 36 x 16 cm with brackets inside onto which the brackets of the chargers would slide. Also detached metal backs which would be fixed on to secure battery packs inside. Plate on back with info: Battery Power Supply Part MRD 55727. To BS1250 M&O signalling apparatus approval No 64. To be used only with equipment appropriately certified for such use. Two large holes towards bottom of back ('input' and 'output') and a small one ('Power on')
Manufacturer	J & S Sieger Ltd, Poole
Date of Manufacture	
Other Information	

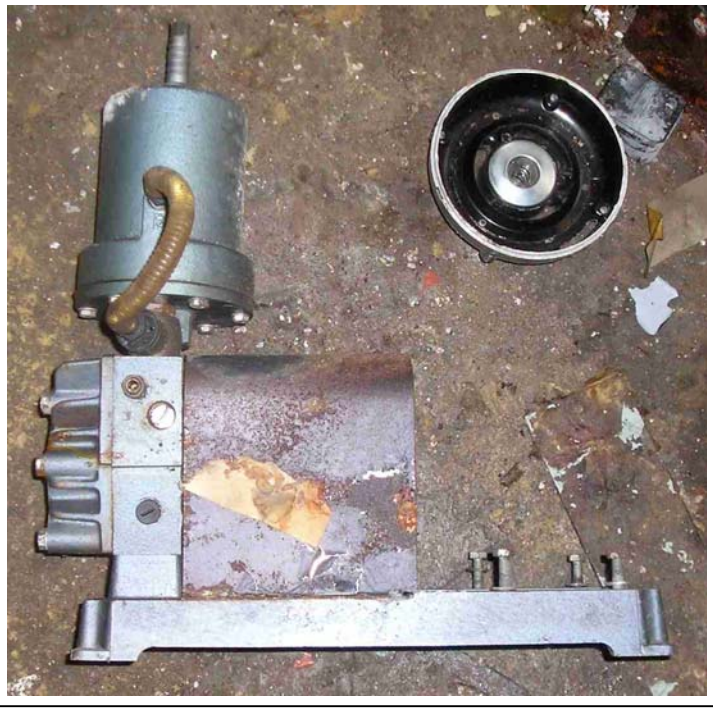


Classification	Carbon Monoxide Data Logger
Item No.	Lab 0008
Location	Laboratory (Building 14). Room No. 2
Qty	1
Description	Metal wall cabinet (60 x 37 x 20 cm) with plate on front showing manufacturer and titled CODALOG. Switch board and many wires inside with truncated tubes on side.
Manufacturer	Designed and made by National Coal Board Scottish Regional Laboratory Edinburgh
Date of Manufacture	-
Other Information	Not in-situ. Stored on shelves

Classification	Methane detector head test set
Item No.	Lab 0009
Location	Laboratory (Building 14). Room No. 2
Qty	1
Description	Metal box with fixed handle on top. 33 x 24 x 20cm. Type No 224/2 Serial No 22. Large dial indicating on front showing methane %.
Manufacturer	NCB/MRDE
Date of Manufacture	
Other Information	Not in-situ. Stored on shelves in room beneath laboratory.



Classification	Vacuum pump compressor
Item No.	Lab 0010
Location	Laboratory (Building 14). Room No. 2
Qty	1
Description	Metal pump. Labelled Edward's vacuum pump compressor, Crawley, England. 40 cm x 45 cm tall.
Manufacturer	Edward's
Date of Manufacture	Undated but from condition and label probably 1970s.
Other Information	



Classification	Possible holders for miners lamps and battery
Item No.	Lab 0011
Location	Laboratory (Building 14). Room No. 2
Qty	5
Description	Yellow metal boxes; tops and bottoms to enclose something (battery). Label states: ‘multiflash. Intrinsically safe circuits and apparatus to BS 1259 1958. Telecommunications. Not to be opened underground’.
Manufacturer	Plessy Telecommunications.
Date of Manufacture	
Other Information	Not in-situ. Stored on shelves in room beneath laboratory.

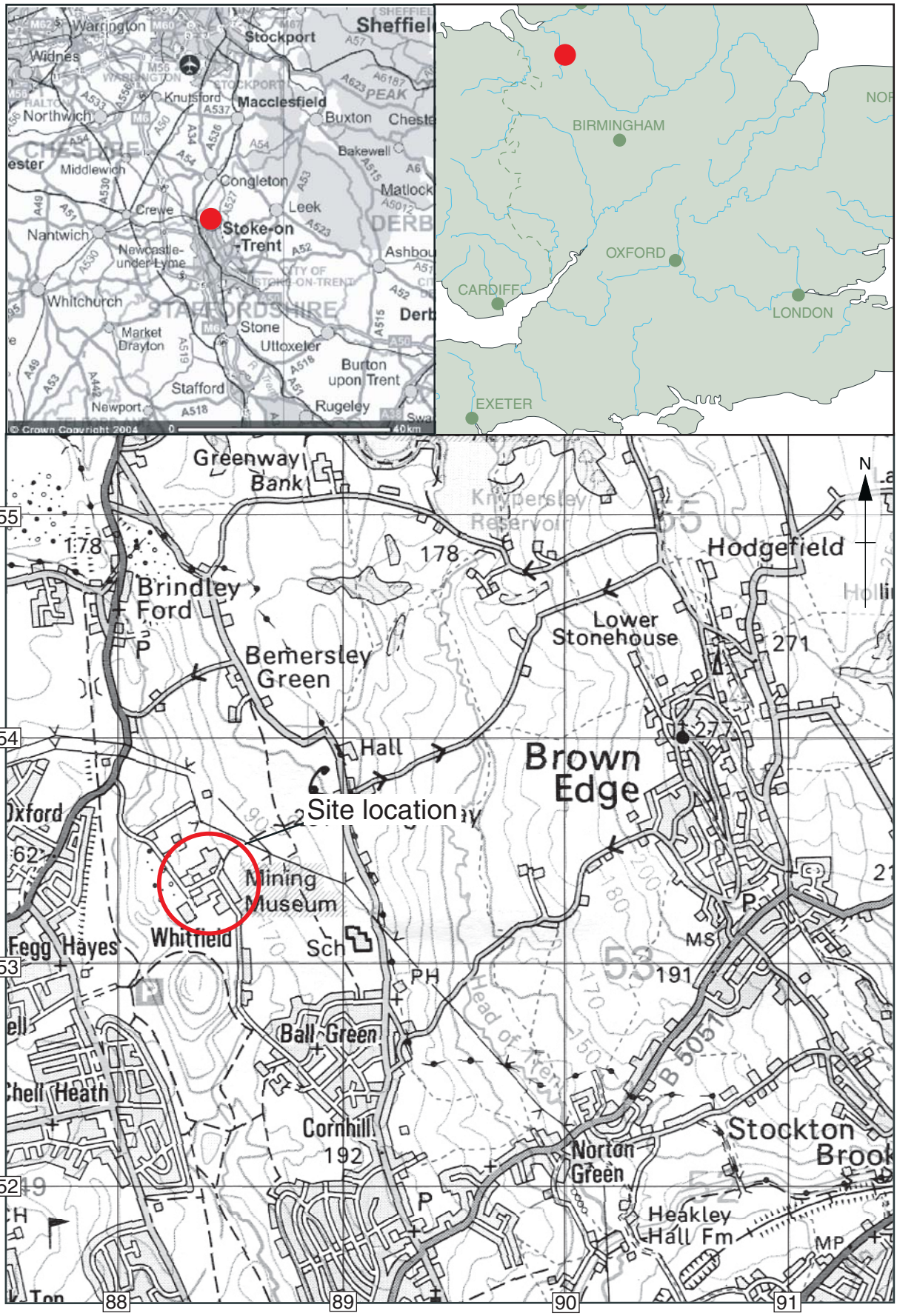
Classification	Recording calorimeter
Item No.	Lab 0012
Location	Laboratory (Building 14). Room No. 2
Qty	1
Description	Locked wall cabinet with roll of graphed paper inside. Presumably used to record readings with fluctuating dial. Pipes to the side with inlet
Manufacturer	Sigma Instruments ltd.
Date of Manufacture	
Other Information	

Classification	Carbon monoxide detector
Item No.	Lab 0013
Location	Laboratory (Building 14). Room No. 2
Qty	2
Description	Metal box with dial indicating percentage of carbon monoxide. Switches towards bottom of front controlling gas inlet and range. Circular opening covered by mesh at top of front to allow general air to be tested.
Manufacturer	National Coal Board scientific department NW division
Date of Manufacture	Undated but from style it is probably pre-1970.
Other Information	Not in-situ. Stored in room below laboratory.

Classification	Gas alarm
Item No.	Lab 0014
Location	Laboratory (Building 14). Room No. 2
Qty	1
Description	Metal box with handles at front. 20 x 43 x 50 cm. Meter dial, various lights indicating flow, water level indicator. Model 2100
Manufacturer	J & S Sieger Ltd Poole, Dorset
Date of Manufacture	Undated but possibly 1970s.
Other Information	Not in-situ. Stored on shelves in room beneath laboratory.

Classification	Measuring instrument
Item No.	Lab 0015
Location	Laboratory (Building 14). Room No. 2
Qty	1
Description	Glass fronted box with Arkon written on plate inside. Series 1600. Handle inside to control flow into mechanism within box. Pipe into top of box at rear.
Manufacturer	Walker, Crossweller & Co Ltd, Cheltenham
Date of Manufacture	-
Other Information	Not in-situ. Stored on shelves in room beneath laboratory.

Classification	Specific gravity recorder
Item No.	Lab 0016
Location	Laboratory (Building 14). Room No. 2
Qty	1
Description	Glass fronted metal box. Freestanding on four legs. Flexi pipe provides inlet into rear 40 x 43 x 36 cm. Patents chart No 820. Roll of paper for taking measurements.
Manufacturer	Sigma Instruments Co Ltd, Letchworth
Date of Manufacture	
Other Information	Not in-situ. Stored on shelves in room beneath laboratory.



Scale 1:25,000

Figure 1: Site location

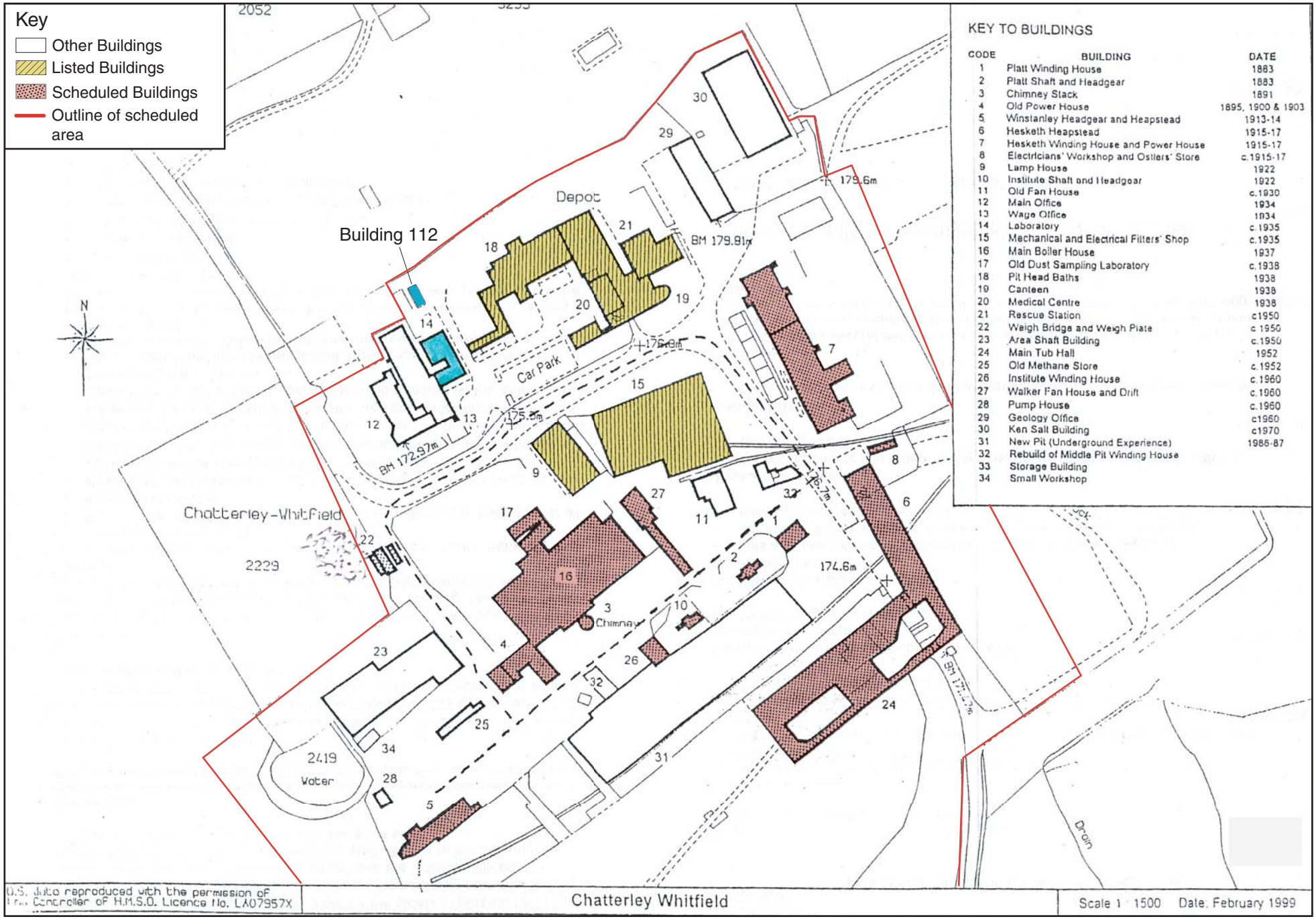


Figure 2: Location plan

BUILDING PHASE 2 (C.1950s)
LIGHT RED BRICK, 225mm X 110mm X 70mm, IN A STAGGERED STRETCHER BOND PATTERN BONDED IN A COMPACT CEMENT BASED MORTAR.

BUILDING PHASE 1 (C.1935).
DARK RED BRICK, 230mm X 110mm X 75mm, IN A STAGGERED STRETCHER BOND PATTERN BONDED IN A HARD CEMENT BASED MORTAR.

N

13.68m

NORTHERN ELEVATION

9.16m

LENGTH OF ELEVATION 22.840m

WESTERN ELEVATION

Room 13

Room 12

Room 11

Room 8

Room 7

Room 6

Room 9

Room 10

HALL

Room 2

Room 1

Room 3

Room 10
GLAZED ROOF

Room 4

Room 14

Room 5

EASTERN ELEVATION

LENGTH OF ELEVATION 13.738m

SOUTHERN ELEVATION

0 2 m
1:60

Figure 3: Laboratory floor plan (Building no. 14)

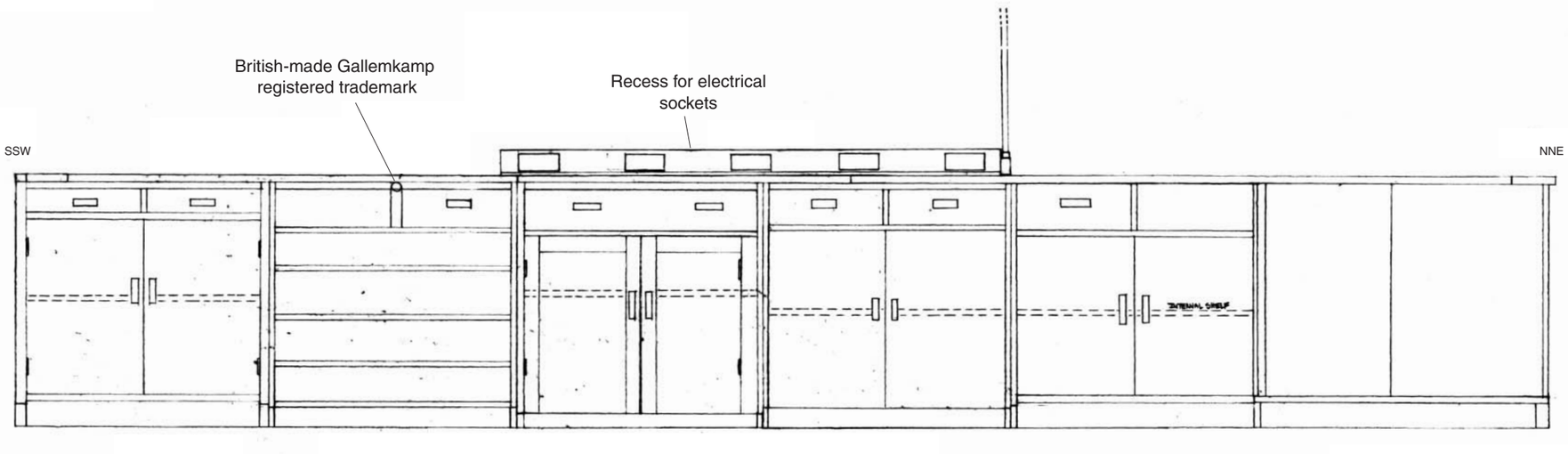


Figure 4: Laboratory building no.14, internal bench elevation (Room 1)

Stone Blast Bank

MAGAZINE SUBSTATION (DISTRIBUTION BOARD).

SUB LIGHTS & LANE LIGHTS
WIND TUNNEL & ENVIRONMENT
OFFICES UPSTAIRS L/130
LAB WORKSHOP L/137
MINE AIR L/138
BATHS FANS L/139
COAL SECTION L/141
METAL & BELT L/140
SAMPLE PREP L/136
WATER OIL DUST CHEM L/135
ASH FUSION L/132
MAIN INCOMER L/133
BRYCE 150 KVA L/131 L/130

3.3KV FROM ELECTRIC SHOP VIA SAMPLE PREP SUB

BUILDING ROOF (11 INCH THICK CONCRETE)

WIDTH OF BUILDING 4.59m (15FT 1INCH)

RECESS FOR FORMER/ ORIGINAL ROOF RAFTERS?
BATH FANS
HEATING PIPE
LANE LIGHTS
RECESS
ELECTRICAL DUCT
RECESS 2.42m ABOVE CONCRETE FLOOR.
DOORWAY
SCAR OF REMOVED WALL
46 INCH
39 INCH
46 INCH
30 INCH
BUZZ BARS
0-75 AMP
0-30 AMP
0-30 AMP
0-4 AMP
0-30 AMP
0-600 AMPERES
DIAL
BREAKER
ELECT. DUCT
PIPE
0-400 AMPERES
ELLISON
MAIN INCOMER.
RECESS THROUGH WALL FOR FORMER ROOF (RAFTERS)
SUBTERRANEAN ELECT. DUCT
RECESS 2.24m ABOVE CONCRETE FLOOR
CONCRETE BEAM IN ROOF
CONCRETE BEAM IN ROOF (RESPECTS REMOVED WALL)
CONCRETE FLOOR
STEP DOWN 0.16m
LOCAL TRANS
ADVANCED ELECTRICAL SHOP (REVROLLE) 51P779
ELECTRICAL DUCT
HEATING PIPE
2½IN DIAMETER PIPE
SCAR OF WALL
RECESS IN WALL SIGN OF WALL
ALTERNATE GUARDS STRETCHER BARS OF RAFTERS
BRYCE TRANSFORMER.
L.130
INSPECTION P.I.T
CONCRETE STEP.
CONCRETE SURFACE
POSSIBLE SERVICE DUCT?
LENGTH OF BUILDING 9.17m (30FT, 1INCH)

0 1 m
1:30

Figure 5: Old explosives store floor plan (Building no. 112)

Plate 1: The upper laboratory Area Chief office room 4 W. Robertson facing SE

Plate 2: Colliery manager Dug Dorn and co. after the final shift in 1977 outside building 13 facing N

Plate 3: The upper laboratorycoal lab room 1 about 1983 facing NE

Plate 4: The upper laboratory mine air lab room 4 Mercury analysis instruments about 1970 facing SE

Plate 5: The upper laboratory external elevation facing N

Plate 7: The upper laboratory front elevation with Area Chief W. Robertson and co. facing NW

Plate 6: The upper laboratory coal lab room 1 W. Robertson, Joice Hatfield and Irene Wood facing SW

Plate 8: The upper laboratory external elevation facing NW

Plate 9: View of laboratory south-east

Plate 10: Laboratory from east

Plate 11: East face of laboratory

Plate 12: View from south within Room 1

Plate 13: View from east within Room 1

Plate 14: View from south-west in Room 13

Plate 15: View from west in Room 1

Plate 16: View of skylight in Room 1

Plate 17: View from west within Room 4

Plate 18: Substation viewed from North

Plate 19: North-west end of substation

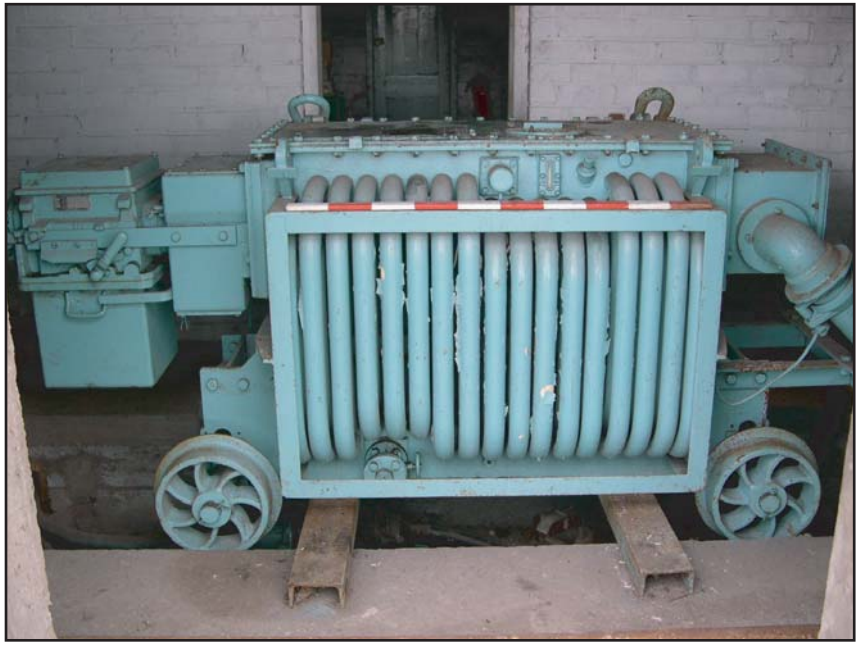


Plate 20: North-west face of transformer

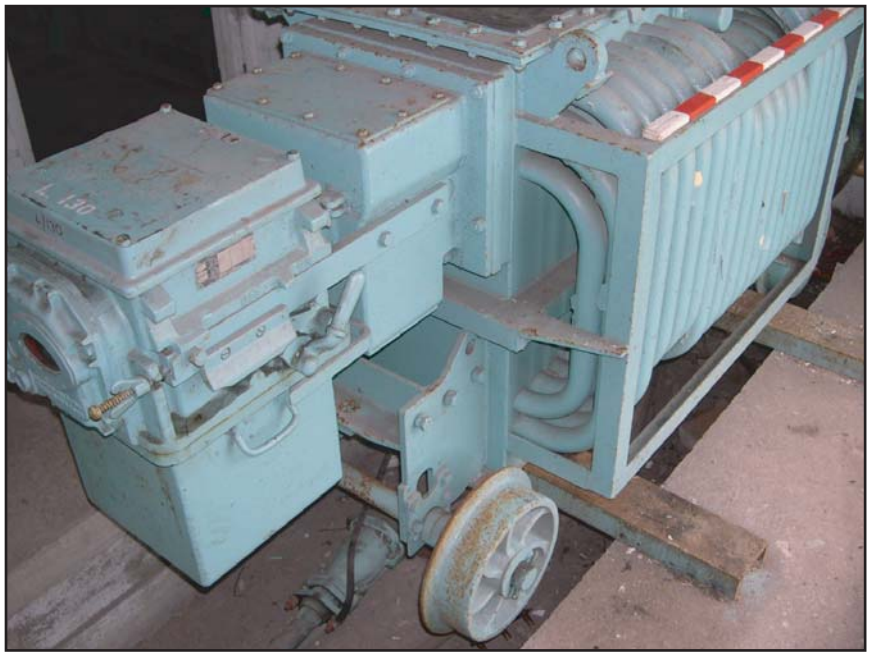


Plate 21: North end of transformer

Plate 22: South-east face of transformer

Plate 23: View of switchgear in substation

Plate 24: View from the south-east