




Dalgety Bay

Appropriate Person Report

Appendix 8

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Timeline of events relating to radium, Parliamentary Debates, Legislation, Donibristle, Dalgety Bay Development and early monitoring work.

This appendix pulls together various strands of the documents found by SEPA in relation to searches at:

- **British Library,**
- **National Archives,**
- **National Archives of Scotland,**
- **Journals,**
- **Internet,**
- **Health & Safety Executive**
- **Hansard text**

Searches were undertaken using the following search terms:

- Radium, radium-226, Ra-226
- Radioactive, radioactivity, radiation,
- Luminising, luminising,
- Donibristle, Merlin, Cochrane,
- Dalgety, Dalgetty Bay.

Where files identified areas of interest, other search terms have been used – for example the files of the Radioactive Substances Advisory Committee and the Medical Research Council.

1903

Naval Works Bill, 1903, Moray Estates

- http://hansard.millbanksystems.com/commons/1903/jul/27/naval-works-bill-1#S4V0126P0_19030727_HOC_366
- This relates to the purchase of land on the Earl of Moray's estate that is outwith the area of interest.

1921: The creation of British X Ray and Radium Protection Committee

A REMARKABLE MILITARY WRIST WATCH.

Dr Adrian K Thomas

The British Institute of Radiology has been given a wrist-watch that had been presented to Corporal E Wallwork RAMC by Doctors Ironside Bruce (1879-1921), Stanley Melville (1867-1934) and George Harrison Orton (1873-1947). The three doctors had served in the forces in the Great War. The presentation of the watch was as a token of appreciation for his work in the Xray department of the King George Hospital from 1915 to 1919. All of the three doctors suffered from radiation induced disease and their names are all recorded on the X-ray martyr's memorial in the grounds of St Georges Hospital in Hamburg. Ironside Bruce was on the staff on the staff of Charing Cross Hospital and the Hospital for Sick Children in Great Ormond Street. The British radiological world was shocked when Bruce died of radiation induced aplastic anaemia in 1921 at the young age of 42. The outcry resulting from his death resulted in the formation of a national radiation protection committee. George Harrison Orton was a pioneer of radiotherapy and was in charge of the X-ray department at St Mary's Hospital in London. After his death it was said in his obituary that he was 'perhaps the last martyr pioneer of radiology.'

Stanley Melville worked at St George's Hospital in London and was BIR president in 1934. Both Orton and Melville served periods as co-secretary with Sidney Russ of the newly formed British X-ray and Radium Protection Committee. The watch is quite remarkable and its significance will be discussed.

References

Thomas, AMK. The first 50 years of military radiology 1895–1945. *European Journal of Radiology*, (2007) Volume 63, Issue 2, Pages 214-219

Thomas, AMK. The first 50 years of Military Radiology 1895-1945. In *Violence, War, Borders. X-Rays: Evidence and Threats*. Deutsches Röntgen-Museum/ECR (2008) ed.

Vogel, Hermann

Thomas, AMK. Florence Stoney and Early British Military Radiology. In *Der durchsichtige Tote – Post mortem CT und forensische Radiologie*. Eds. H Nushida, H Vogel, K Püschel & A Heinmann, Verlag Dr. Kovač, Hamburg (2010) 103-113

1921 – British X-Ray and Radium Protection Committee

<http://www.umich.edu/~radinfo/introduction/50yrs.htm>

the British X-ray and Radium Protection Committee jointly sponsored by several organizations, issued its first memorandum in 1921 and included a rather lengthy section specifically addressed to radium protection.

Health Physics: A Backward Glance, R. Kathren and P. Ziemer (Editors), Pergamon Press, 1980.

1939

<http://pubmedcentralcanada.ca/picrender.cgi?artid=624468&blobtype=pdf>

British Medical Journal, April 9, 1939

Correspondence

Storage of Radium in War-time

SIR,-Radium is not only a valuable but also a very dangerous substance. If, during an air raid, any quantity of radium was dispersed by violence, the buildings in which it was dispersed, as well as a considerable area surrounding the buildings, would be for many years to come a menace to any people who inhabited them. One hundredth of a milligramme would probably be fatal if inhaled.

It is therefore necessary that steps should be taken to provide for the safe custody of radium in war-time, and a conference has been held between representatives of the British X-Ray and Radium Protection Committee, King Edward's Hospital Fund for London, the Ministry of Health, and the National Radium Commission to consider this matter.

The National Radium Commission is compiling a register of owners and holders of radium, with a view to satisfactory arrangements being made. The Commission earnestly requests all persons who have radium in their custody or possession (including the responsible official of institutions holding radium) to notify the Commission, stating the amount of radium held.-I am, etc.,
GEORGE F. STEBBING, M.B., F.R.C.S.,
Secretary, National Radium Commission.
18, Park Crescent, Portland Place,

1943

Annual Report of the Chief Inspector of Factories for 1942, Ministry of labour and National Service (01/01/1943)

Luminising (Health and Safety Provisions) Order. – This Order (S.R.&O., 1942, no. 273 1943, No. 1053) prescribes safety precautions for workers handling radioactive substance for industrial purposes. Investigation, in conjunction with the National Physical Laboratory, is in progress to ascertain if these precautions are sufficient. Work is restricted to those over 16, and initial and periodical inspections must be made. A further safeguard consists in the examination of the exhaled air of workers. So far, there is evidence of an initial stimulating effect on the blood-forming tissues and constant observation is made to see if any subsequent depressant action ensues.

Statutory Rules and Orders

S.R.O 1053, 1943 – The Factories (Luminising)(Health and Safety Provisions)(Amendment) Order, 1943, dated July 14 1943, made by the Minister of Labour and National Service under Regulation 60 of the Defence (General) Regulations 1939.

British X-Ray and Radium Protection Committee

Report of 1943 – Date range 1 January 1943 – 31 December 1943

1944

Ethel Browning, Factory Department, Ministry of Labour and National Service.
“Medical Aspects of Radiations Used in Industry” – a postgraduate lecture given at Manchester University.

- Discusses protection measures and health effects in relation to X-Rays, UV Rays, and Radium Luminising,
- Notes the Radium injuries sustained to the New Jersey workers in 1917 to 1924
- Notes that the Order of 1942 and amendment of 1943 providing the framework for the protection of workers, i.e. personnel monitoring at set intervals, monitoring conditions in workplaces and protective equipment,
- Particular reference made to the *Mayneord Protective Container*, which Dr Browning noted most managers have accepted this appliance with great willingness.
- Notes research on radon estimates being undertaken by the Medical Research Council and Film Badge studies being undertaken by the National Physical Laboratory (Director of NPL, Charles Darwin, became Chairman of the Radioactive Substances Advisory Committee).

1944 – 1948

National Archive - Documents of the British X-Ray and Radium Committee

1945

Annual Report of the Chief Inspector of Factories for the year 1944 (1945)

Comd 6698. HMSO London, Pp, 101. (*British Journal of Industrial Medicine* - <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1035725/pdf/brjindmed00261-0045.pdf>)

Radiological and Ophthalmological Panels (names given in an appendix) have been constituted, in addition to the Dermatitis Panel already set up, and some account of their work is given in general terms. These panels are to advise the Factory Department, in the same way that the Information branch serves the Ministry.

Radioactive Substances and X-rays.

The number of factories engaged in luminising, and the number of persons employed as luminisers is given below:

	1940	1941	1942	1943	1944
Factories	41	52	59	72	69
Luminisers	309	391	378	411	561
Luminisers with more than 1 years experience	112	205	220	274	343

- Health monitoring of luminisers reported to be good. This was attributed to the more widespread use of the Mayneord protective paint chamber
- Some statistics presented on health monitoring.

1947

May 1947: The Factories (Luminising) Special Regulations, 1947.

- Came into force on 2 June 1947, established set processes in relation to Factories undertaking or planning to undertake luminising works,
- Contained prescriptive sections, detailing what would be required, e.g. Glass Screens, receptacles for paint, cleaning processes, ventilation, waste material (disposal each day), compound storage, protective clothing, personnel monitoring (health screening and film badges), conditions relating to the cessation of luminising (notification to Inspector) and re-use of the premises for non-luminising activities.

Factories Act 1937

- Minister of Labour & National Service, makes the Factories (Luminising) Special Regulations 1947, which covers factories where luminising is or planned to be carried out,
- Supersedes the Factories (Luminising)(Health and Safety Provisions) Orders 1942 & 1943, which were made under Regulation 60 of the Defence (General) Regulations 1939,
- Repeals the previous orders through the Factories (Luminising)(Health and Safety Provisions)(Revocation) Order 1947

Chief Inspector of Factories made the following appointments under the Factories Act 1937:

- Dr A.C MacEwen to be Examining Surgeon for the Dunfermline district of Fife

Note in the Edinburgh Gazette of May 13, 1947:

- The Right Honourable George Isaacs , Minister of Labour and National Service appoints A. H. Norris to be His Majesty's Inspector of Factories

June, 1947: Factory Department, Ministry of Labour and National Service:

- Memorandum on The Use of Radium In Industry, with particular reference to luminising with radioactive material
- Memorandum produced by the Advisory Panel on Radiological Problems in Industry, with the hope that proper precautions are taken so that work with radium and radioactive luminous compounds in carried out without danger to workers,
- Note that the '...radioactive properties are likewise independent of the state of chemical combination, and cannot be destroyed by burning or chemical action. It is for this reason that waste or spoilt luminous compound, etc., must be regarded as being equally as dangerous as the new material and must be handled with just the same precautions.."
- Notes details issues with dose measurement, types of emissions and half-life
- Five precautions noted:
 - Cleanliness, Ventilation, Radiation, Waste Material, Distance
 - Waste Material was to be carefully collected and stored in a suitable receptacle, with quantities being kept to a minimum by

returning waste to the supplier frequently. Radium could then be re-extracted from the waste material.

1948

HC Deb 30 June 1948 vol 452 c2250 [2250](#)

Radioactive Substance Act 1948 gains Royal Assent

1953

Correspondence to British Medical Journal

- From Cuthbert Andrews & Sidney Ross, who were the two surviving members of the original committee, notifying of the history & subsequent demise of the British X-Ray and Radium Protection Committee,
- Notes that the Medical Research Committee undertake research, and the Statutory Committee has a duty (under the Radioactive Substances Act) [1948] to cover the regulations and licenses and codes of practice,
- Notes that the British X-Ray and Radium Protection Committee had no statutory authority, however it had attained International Status,
- Note Professor Mayneord was a Chairman of the Committee (Mayneord Protective Container referenced in Dr Ethel Browning's 'Medical Aspects of Radiations Used in Industry' Report

1955 – 1959

National Archive – Documents of the Radioactive Substances Advisory Committee

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1955

Nuclear Weapon Tests (Genetic Effects)

HC Deb 29 March 1955 vol 539 cc182-3

Debate on the genetic effects of nuclear weapons testing, with comments that this field is of a long-term nature but that the progress that has been made has been published in Scientific Journals. Also that the Medical Research Council had been working on the issue of protection from the effects of radiation for the past eight years.

NUCLEAR RADIATION (MEDICAL ASPECTS)

HC Deb 29 March 1955 vol 539 cc196-7

Request in Parliament for a White Paper to be published containing all available facts and information, together with report received from British Scientists, on the effects of continuing radioactive contamination of the world's atmosphere. Sir Winston Churchill, then Prime Minister, notes that the Government has already invited the Medical Research Council to review the existing scientific information on the medical aspects of nuclear radiation and to prepare a report. The report will cover the medical aspects of nuclear radiation, including the genetic aspects. It will review existing scientific information and set forth the most up to date information and the latest research results available. The report will be laid as a White Paper.

Radioactive Substances (Health Precautions)

HC Deb 01 November 1955 vol 545 cc819-20

Debate on the hazards of radium, with the Parliamentary Secretary (Mr. Watkinson) noting the protection measures of The Factories (Luminising) Special Regulations, 1947. The MP Dr. Stross notes recent developments in handling this material and wishes to ensure that the Inspectorate are aware and the and Regulations take account of this.

1956

- 6 June 1956, Archive: Hazards to Man of Nuclear and Allied Radiations
Cabinet papers detailing the response to the Medical Research Council opinion on radiostrontium fallout from weapons test.
(<http://filestore.nationalarchives.gov.uk/pdfs/large/cab-129-81.pdf>)
- 26 July 1956, HC vol 557 cc 664 – 759
(<http://hansard.millbanksystems.com/commons/1956/jul/26/industry-and-employment-scotland>)

1958

- 10 February 1958 – Green Light for the Forth Road Bridge Project

Cabinet Papers from National Archives: Ref CAB/128/32

- Discussing the closure of the aircraft repair yard at Donibristle and proposed development of the industrial yard
- First Lord of the Admiralty prepares text of the Parliamentary announcement C. (58) 38, which was reworked following the Cabinet meeting.

C. (58) 38, 11 February :

- Draft text for statement noted above
- The tasks of the Home Air Command will be concentrated in larger groups at fewer bases. The Aircraft Repair Yard at Donibristle will be closed by the end of 1959
- With the assistance of the President of the Board of Trade, everything possible will be done to bring the facilities at ...Donibristle...to the notice of suitable industrial interests.
- HC Deb 18 Feb 1958 vol 582 cc 1043-9
(<http://hansard.millbanksystems.com/commons/1958/feb/18/royal-dockyards-naval-air-establishments>)
 - Statement to the House from *The Civil Lord to the Admiralty (Mr. T. G. D. Galbraith)* regarding the closure of Donibristle and other sites of the Home Command.
- HC Deb 17 Nov 1958 – factories Bill – notes hazards of radium
(<http://hansard.millbanksystems.com/commons/1958/nov/17/factories-bill>)

1959

- HC Deb 3 June 1959, approx para 262 – notes Admiralty wanted to sell, not lease land at Donibristle.
<http://hansard.millbanksystems.com/commons/1959/jun/03/industry-employment-and-roads>
- HC Deb 23 July 1959 vol 609 c164w
(http://hansard.millbanksystems.com/written_answers/1959/jul/23/aircraft-repair-yard-donibristle)

Hansard Debate – The Radioactive Substances Bill HL Deb 24 November 1959 vol 219 cc873-90

- This debate was to introduce the Radioactive Substances Bill white paper to Parliament. During the debate the responsible Minister for the Bill highlighted concerns relating to the hazard of multiple luminised dials. Additionally the debate highlighted concerns about burying or incinerating radium and the sale of premises without passing on knowledge of the hazards posed, where development may occur with the hazards still present. This highlights that the hazards of radium disposal practices were known, and that issues may arise with sites where knowledge of practices/disposals was not passed on. There is as yet no link between this and the activities at Donibristle or development of Dalgety Bay, however there is a link between the Admiralty and Medical Research Council. Further evidence may be provided via the National Archives papers from the Radioactive Substances Advisory Committee, the Medical Research Council, the Factories Inspectorate or the British X Ray and Radium Protection Committee.
- “...This applies to very large quantities of radioactive solids, but the small quantities are much more of a problem. The small users are much more likely to be careless about it than are the large users. The disposal of these wastes from factories present a real difficulty to the factory employer. The sort of thing he has to get rid of are valves, the cathodes of which have been treated with radium, and the solid waste from making and using luminous paints, particularly, for example, where large quantities of dials are being scrapped from obsolete aircraft. These dials individually present no hazard, but if a great many are concentrated together they become an appreciable hazard. The same applies to scraps of radium silver foil. The bulk destruction of instruments needs careful control. They can be buried or incinerated, but that is a fairly unsatisfactory way of doing it, particularly if, later on, the premises are sold to somebody else. The new owners may start building operations and come across the canister or a mass of this radioactive material without knowing what it is. It is to avoid that sort of difficulty that it is essential to have the registration provisions in this Bill...”

1960

- HC Deb 11 Feb 1960 vol 617 c 67w (http://hansard.millbanksystems.com/written_answers/1960/feb/11/donibristle-site)
 - The Civil Lord of the Admiralty, [Mr. C. Ian Orr-Ewing](#) responds to question raised regarding a buyer for the Donibristle site. “*Despite wide advertisement of the property no offer has yet been made. We are still continuing our efforts to find a buyer for the 90 acres available*”
- HC Deb 8 March 1960 – debate on Radioactive Waste Bill. Notes waste will be no longer stored in ‘old tin sheds’. Highlights discover of radioactive waste by 3 boys who opened a drum in Wishaw. ‘Control of Radioactive Wastes’ document, part of White Paper which formed RSA 60 (<http://hansard.millbanksystems.com/commons/1960/mar/08/gas-money>)

1962

- HC Deb 17 May 1962 vol 659 cc 1509 – 10 (<http://hansard.millbanksystems.com/commons/1962/may/17/industrial-site-donibristle>)
 - Further Parliamentary Questions relating to the promotion of sale of Donibristle Industrial Site. Parliamentary Secretary, Mr N. MacPherson is satisfied everything is being done to promote the opportunity, and notes that this will become more attractive with the opening of the Forth Road Bridge.

Cabinet Papers from National Archives: Ref CAB/129/110

- Discussing the draft Ministerial Statement on the forthcoming decline of the Scottish Coal Industry,
- Notes that Donibristle RN Air Station would be developed as an industrial estate, as announced to the House on 26 June.
- Sir John Gilmour, Hansard, 19 July 1962 – notes publication of Dalgetty New Town in papers a few days ago (Cross Ref needed) (note spelling) (http://hansard.millbanksystems.com/commons/1962/jul/19/scotland-industry-and-employment#S5CV0663P0_19620719_HOC_393)

1964

- Opening of Forth Road Bridge on 4 September, connecting Dalgety Bay to Edinburgh

1968

Ionising Radiations (Unsealed Radioactive Substances) Regulations 1968

- Complementary to the Ionising Radiations (Sealed Sources) Regulations 1961,
- Offered protection to persons employed in premises which were covered by the Factories Act 1961,
- Revoked the Factories (Luminising) Special Regulations 1947 (S.R & O 1947/865)

1990

Note of a teleconference

- By J. Wilson (HMIPI) with Mr R. Ball, Flag Officer Scotland and Northern Ireland (FOSNI), 21 November 1990.
- Mr Ball was actively researching Donibristle activities from 1940 onwards.
- He advised that there would have almost certainly been an instrument workshop, which would have undertaken luminising work.
- Re-luminising was necessary because of the damage caused to the instrument by vibrations in the aircraft, such as the Seafires & Seafuries. The radium compound flaked off & became cracked during active service.
- National Archive of Scotland, file reference DD9/724

Correspondence

- From J Wilson, Chief Inspector, HMIPI to R Ball (FOSNI), G Jardine (NRPB) and R Killick (RRD), December 1990.
- Flag Officer of Scotland and Northern Ireland/ Rosyth Royal Dockyard
- Provides report of find of June 1990 by RRD staff undertaking routine survey and identifying and removal radium-226 of man-made origin. Two active pieces of glass and 1 piece of grit containing 3.5×10^5 Bq and 1×10^4 Bq were removed. No fission or activation products were found which could be attributed to naval PWR operations.
- RRD repeat survey at request of HMIPI on September 5, finding a further 14 spots showing high activity (undefined term). HMIPI and Dunfermline District Council informed. NRPB commissioned to do their first survey on 6 September 1990. Total Contaminated Objects to September 5 1990 was 17.
- NRPB survey observed by various individuals recovered 11 items up to 2×10^5 Bq.
- Initial thoughts focused on HMS Merlin activities and decommissioning. Items found included pieces of pottery with government marking, pieces of electrical equipment and pieces of heavy duty cable. FOSNI undertook a search of the Fleet Air Arm Archives.
- MAFF survey in October 1990 found 24 contaminated items, one with contact dose rate of 28 mSv/h. The staff involved in this survey examined a part of the beach, now identified as the demarcated high-activity area, which the RRD and NRPB had not covered in their surveys.
- J Wilson notes that "in view of an earlier illegal discharge of radioactivity in this area (Marconi/Ni-63), MAFF had been instructed to take some sediment samples from the mud/beach to examine them for Ni-63. A sample had been taken in July and reported no activity above background, additionally that sample did not contain Ra-226.
- Tentative conclusions at that time were that Ra-226 was the only contaminant and that it had been used luminised instruments and that luminising had

occurred (waste from this had been part of the general refuse stream). Site clearance lead to incineration of material, ash/grit spread over a wide area, bottles containing radium salts had been incinerated. Also considered that particles of radium may have been discharged to atmosphere.

Letter from I Wright (HMIPI) to PS/Lord James Douglas-Hamilton (Cc multiple), providing latest update on the developing situation at Dalgety Bay. Of note:

- Notes MOD confirmed 800 aircraft were scrapped during 1946 at HMS Merlin
- MOD noted that these aircraft would have contained radium
- States evidence that debris from demolition work at the air station was used the infilling purposes between 1946 and 1951.
- National Archive of Scotland, file reference DD9/724

1991

File Note from Mr Wilson

- 15 May 1991
- Tay Homes of Glasgow were concerned about the monitoring survey being undertaken at Dalgety. Note this probably referred to the Garden Survey undertaken by NRPB due to the date.
- Tay Homes were developing parts of the area for housing between St Davids Harbour and Hillend Industrial Estate. The site had been surveyed for toxic chemicals and asbestos but not surveyed for radioactivity. He was going to contact the Lothian Regional Analyst for further advice. Mr Wilson offered further information once the current survey had been completed, although noted that there were no plans to extend the search to that area.

File Note from Mr Wilson

- 17 May 1991
- Letter from Mr Wilson to Mr Russ (MoD) citing the find of contamination in gardens of The Wynd.
- Material identified as clinker and ash, similar to residues from controlled combustion processes. Requests information on where the boiler plant was located and states reason to believe that an incinerator may have also been on site.

1991

Letter

- from Mr Hetherington to Mr Wilson (HMIPI) on 7 June 1991 providing an update on a recent survey by NRPB.
- Marion Milton of NRPB noted that a metallic fragment of 5 x 10 mm was found at about 450 mm depth in a garden. Activity estimates were not available, however there was little doubt that it was associated with the surface coating which was paint. The paint was noted to be flaky and some radioactivity was recovered from the soil immediately surrounding the main items. Of note:
- It was suggested that the garden find might have been present as a result of operations to move material from the workshop area to the dumping area,
- Concern that the item was visually interesting lead to the identification of the need to consider a contaminated item being picked up inadvertently,
- Notes initial view of incomplete survey that contamination not widespread on the terrestrial side with the exception of one of the gardens (decontaminated

in 1990s and again in 2007). Coincides with Salvage Area, which was thought at that time to be associated with luminising operations.

- Surveys into the undeveloped land, which is thought to refer to Ross Plantation (i.e. between the early beach surveys and the housing developments where contamination was found in gardens at that time). It was noted that the path traversing the area coincides in parts with an old metal roadway. [It is suspected that this is similar to the metal bars found in the trial pits – sommerfeld tracking.]

Letter from Mr Hetherington to Mr Wilson

- June 1991
- Citing follow up work and notes
- Nothing else found in selected residential properties
- Note that a local individual stated that the area around Sealstrand was used for the disposal of material excavated during the construction of the foundations for the Sailing Clubhouse. Subsequent checks found elevated patches of contamination which were removed to approx 10 cps above background (50 cps). Examination of the material recovered indicated that it is not identical to the clinker like debris found in selected garden but it is more friable. It is noted that it could however still be a form of furnace residue.

1996

- November 1996
http://hansard.millbanksystems.com/written_answers/1996/nov/15/radium-luminising (*extract*)
- [Mr. Soames](#) Radium luminising took place during the 1940s and 1950s prior to the introduction of controls under the [Radioactive Substances Act 1960](#). No record of facilities or sites specifically engaged in this work were therefore maintained, but where past practices involving the use of radium luminised materials have resulted in contamination of the site, this is addressed as part of the land quality assessment—LQA—process with decontamination being undertaken where necessary.