



*Parliamentary Standing Committee on Public Works*

MINUTES OF EVIDENCE

relating to the proposed construction of an

AUSTRALIAN RADIATION  
LABORATORY

at

Yallambie, Victoria

THE PARLIAMENT OF THE COMMONWEALTH OF AUSTRALIA

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## WITNESSES

	Pages in Evidence
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## *Parliamentary Standing Committee on Public Works*

### RADIATION LABORATORY, YALLAMBIE

## MINUTES OF EVIDENCE

(Taken at Lower Plenty, Victoria)

THURSDAY, 12 SEPTEMBER 1974

#### Present:

Mr Keith Johnson (Chairman)

Senator Jessop	Mr Bonnett
Senator Melzer	Mr Garrick
Senator Poyser	Mr Keogh

**CHAIRMAN**—This is a public hearing to inquire into the need for and desirability of the proposed premises for the Australian Radiation Laboratory.

Mr Donald James Stevens, Director, Australian Radiation Laboratory, Australian Department of Health, and

Mr David George Dunlop, First Assistant Director-General, Australian Department of Health, Canberra, were sworn and examined.

**CHAIRMAN**—Will you be presenting the evidence, Mr Stevens?

**Mr Stevens**—Yes.

**CHAIRMAN**—Would you like to commence.

**Mr Stevens**—My submission reads:

#### 1 DESCRIPTION OF PROPOSAL

1.1 The project before the Parliamentary Standing Committee on Public Works is a proposal by the Australian Department of Health to erect premises for the Australian Radiation Laboratory.

1.2 The site for the proposed premises is an area of approximately seven acres on Australian Government land in the south east corner of the Watsonia Army Camp in Victoria.

#### 2 EXISTING ACCOMMODATION LEADING TO REASONS FOR PROPOSAL

2.1 The Australian Radiation Laboratory is at present carrying out its functions in eight separate buildings. Of these six are located in old buildings on the Australian Government Centre Block in Melbourne, one is located in the grounds of the University of Melbourne and one is located at Maribyrnong.

2.2 The Department of Services and Property advised in August 1972 that buildings used by the Laboratory in Lonsdale Street and Spring Street on the Australian Government Centre block were to be vacated.

2.3 The University of Melbourne has given notice that it wishes to use the land occupied by the small premises of the Laboratory in the grounds of that University for the construction of part of a major complex of its own.

2.4 The premises at Maribyrnong accommodate part of the former Department of Science Fallout Studies Unit which was transferred to the Department of Health (Australian Radiation Laboratory) on 14 December 1973. This unit is being integrated into the Environmental Radiation sub-section of the Laboratory.

2.5 The building occupied by the Laboratory in the grounds of the University of Melbourne was constructed as a specialised laboratory in 1938, the building at Maribyrnong is part of the Department of Manufacturing Industry complex which houses the Defence Standards Laboratory, whilst the other premises are renovated buildings modified for use as laboratories. These last premises inevitably suffer from the disadvantages of compromise and of not being specifically designed and located to satisfy work flow patterns.

2.6 The present accommodation:

- is sub-standard;
- does not provide adequate floor area;
- limits the Laboratory in the effectiveness with which its full functions can be discharged; and
- is fragmented and creates serious problems of communication between those engaged in inter-related activities.

2.7 The inadequate floor area and sub-standard accommodation increase the risk of injury from accidents within the Laboratory and in some areas potentially lead to staff being exposed to unnecessarily high radiation doses.

2.8 Consideration has been given to purchasing or leasing existing premises in Melbourne and modifying these to the needs of the Laboratory. Between August 1972 and July 1973 eight buildings were examined and plans were prepared of the modifications required to convert five of these into laboratory premises (one in detail by the Department of Housing and Construction). However, the Department of Services and Property advised in July 1973 that the modification of existing buildings was proving to be impracticable and that the only satisfactory method to obtain suitable accommodation was by constructing new premises with sufficient floor area and facilities.

2.9 The average rate of growth of floor area by the Laboratory over the past eighteen years has been approximately 9 per cent per year; this growth has been achieved in latter years by the use of sub-standard accommodation in Lonsdale Street and Spring Street, Melbourne. The buildings occupied by the Laboratory and the years in which each was occupied are as follows:

- 1938 Premises in the grounds of the University of Melbourne, Parkville;
- 1957 Premises at Surry Place, Melbourne;
- 1958 Premises at 30 Lonsdale Street, Melbourne;
- 1966 Premises at 36 Lonsdale Street, Melbourne;
- 1970 Premises at 38-40 Lonsdale Street, Melbourne;
- 1972 Premises at 265 Spring Street, Melbourne;
- 1973 Premises at 263 Spring Street, Melbourne;
- 1973 Premises at Maribyrnong.

(Between 1929 and 1938 the Laboratory—this is the building in the table—was situated in part of an existing building made available by the University of Melbourne, between 1950 and 1957 the Laboratory also functioned in a series of Army huts located in the grounds of the University of Melbourne and between 1956 and 1958 a building, since demolished, on the Australian Government Centre block in La Trobe Street was occupied by the Laboratory).

2.10 In forecasting the floor area requirements for the new premises a critical examination was carried out by each section and sub-section of the Laboratory to determine the floor area required for present activities plus an area to allow for expansion up to 1980 due to anticipated increase in workload within the present functions. The survey showed that the total area required corresponds closely to the average 9 per cent annual growth rate shown over the last eighteen years.

2.11 The premises occupied by the Laboratory are old and it is not practicable to provide extension as:

- land is not available for ground floor extensions;
- the construction of the present buildings does not provide for upward extension; and
- the tenure of the present buildings is insecure because of the uncertainties of the future use of the area and neither the Department of Services and Property (in relation to the building on the Australian Government Centre block) nor the University of Melbourne authorities will support extensions of existing buildings.

### 3 SUITABILITY OF SITE

3.1 The site for the proposed premises is approximately seven acres (approximately three hectares) in the south east corner of the Watsonia Army Camp with a frontage to Lower Plenty Road. Advice has been received that arrangements can be made to transfer the land to the Australian Department of Health for the purpose of constructing premises for the Laboratory. It should be noted that the Army Office of the Department of Defence agreed to the transfer of this land subject to the satisfactory removal and re-establishment at the Watsonia Camp on a site to be approved by the Chief Engineer, Headquarters Southern Command, of the house now situated on a small section of the proposed site. The removal and re-establishment of this house is to be at no cost to the Army Office of the Department of Defence. Plans have been made to have the house moved to a specified site in Yallambie Road with all services

provided. The Department of Housing and Construction have estimated the cost of removal and re-siting of the house as \$6,500. The total estimated cost of the proposed premises of \$3.6m at July 1974 prices include this amount for removal and re-siting.

3.2 This site is approximately 10 miles (16 kilometres) in a direct line, and approximately 14 miles (22.5 kilometres) by major roads from the centre of Melbourne. The travelling time by car to the centre of the City of Melbourne is approximately 30 minutes.

3.3 The site has:

- acceptable access to the Tullamarine Airport for the collection of shipments of radio pharmaceuticals from the Australian Atomic Energy Commission at Sydney and from overseas sources;
- acceptable access to air freight and rail freight depots for the dispatch of radiopharmaceuticals and other radioactive materials;
- acceptable access by rail and road for the staff of the Laboratory (Appendix A shows the location of the residences of the staff employed by the Laboratory as at 14 December 1973); and
- acceptable access by road to Melbourne hospitals for the supply of radiopharmaceuticals and other radioactive materials.

3.4 In addition, freeways at present under construction or being planned will further assist access to Tullamarine Airport and to the City.

3.5 In the meantime, improvements in the surface of roads including an overpass over Pascoe Vale Road and the railway line are being planned which will improve access to Tullamarine Airport.

3.6 Copies of the Environmental Impact Statement and Addendum No. 1 have been forwarded to the Department of the Environment and Conservation and the Department of Urban and Regional Development. At the request of these two Australian Government Departments copies of the Environmental Impact Statement and Addendum No. 1 have been forwarded to the Victorian Ministry of Conservation and through that body to the Environmental Protection Authority, the State Department of Health and the Melbourne and Metropolitan Board of Works. Advice has been received that none of these bodies has any objection to the proposal.

3.7 Sketch plans were forwarded to the City of Heidelberg Council and in a letter, dated 23 October 1973 and signed by the Town Clerk and Chief Administrator, that Council advised that it had no objection in principle to the proposal. However, a letter dated 8 July 1974 and signed by the City Manager, quoted a resolution of the meeting of the Council of the City of Heidelberg which modified the earlier advice received from that Council.

### 4 PROPOSED BUILDINGS

4.1 Allowance for Expansion: The proposed design of the building and the area of land available will allow for further construction which will provide for the floor area of the Laboratory to be approximately doubled between 1980 and the year 2000 should this become necessary. Although this is less than the growth rate over the last eighteen years it is considered to be sufficient because although some activities will continue to increase, others are expected to be stabilised by 1980.

### 4.2 Scientific Accommodation

4.2.1 The Laboratory has a low population density expressed as net area per officer because:

- most areas are physics laboratories which normally require a larger floor area than conventional chemistry laboratories;
- automation of some equipment has reduced staff requirements without necessarily decreasing the area occupied by the equipment (e.g. fallout monitoring equipment is now automated to provide counting 24 hours a day, 7 days a week);
- various levels of radioactivity and radiation require separation to prevent equipment recording inaccurate readings of levels of radioactivity;
- the need for radiation shielding (e.g. thick concrete and lead lined walls) result in increased floor area compared with normal partitions; and
- a larger area is provided within some laboratories to separate radioactive sources to assist with the protection of staff.

4.2.2 The proposed premises have been designed to separate the different levels of radioactivity and radiation by providing two wings for scientific functions. These wings are combined into an integrated structure by a connecting central block containing office area and other non scientific support services.

4.2.3 The EAST WING provides accommodation for:

- Radiopharmaceutical sub-section;
- Dosimetry and Sealed Sources sub-sections;
- Health Physics sub-section; and
- Radiographic sub-section.

4.2.4. Radiopharmaceutical sub-section: This area provides for the dispensing, development and quality assurance of radiopharmaceuticals. The Laboratory has the responsibility of procuring artificial radioisotopes for medical use on patients throughout Australia. Some of these are purchased from the Australian Atomic Energy Commission, Sydney (mainly short half-life material) and others are imported from a number of overseas suppliers on a tender basis.

The Laboratory is engaged in the development of new and improved radiopharmaceuticals. In addition, the Laboratory performs quality assurance tests on both purchased radiopharmaceuticals and those developed in the Laboratory. In performing these quality assurance tests the investigations are directed towards examination of stability, presence of other radioactivity as impurity, chemical impurity and deterioration with time by a break-down in the chemical composition.

Separation of radioactive sources and heavily shielded and load bearing benches are provided in order to ensure that the radiation doses received by workers are below the maximum permissible doses which have been based on the recommendations of the International Commission on Radiological Protection.

4.2.5. Dosimetry and Sealed Sources sub-section: This area houses a variety of x-ray equipment and a range of sealed radioactive sources will be manipulated. The x-ray equipment of this sub-section has been placed in the basement area and use has been made of the excavation into the hillside to add to the radiation shielding of this equipment. Thick concrete walls (up to 21 inches thick) are provided in this area as radiation shielding. The sealed radioactive sources are used to provide radioactive material for

medical use for the treatment of cancer and require similar radiation protection precautions to that provided in the radiopharmaceutical area.

4.2.6 Health Physics sub-section: Advice in the field of public health on the hazards of ionising and non-ionising radiation is provided by the Laboratory to Government departments and authorities. Included in this area are two large laboratories—a laser laboratory approximately 50 ft long to allow the required length over which the laser beam may be projected, and a microwave laboratory which is approximately 70 ft long and approximately the height of three storeys.

4.2.7 Radiographic sub-section: This is a small sub-section containing a radiographic laboratory and an office. The Laboratory has a responsibility in the planning of radiographic departments at Australian Government hospitals, and for the investigation of physical aspects of diagnostic radiology particularly those related to x-ray equipment.

4.2.8 The WEST WING provides accommodation for the:

- Technical Services section;
- Radionuclide Metrology sub-section;
- Environmental Radiation sub-section;
- Film Badge Service;
- Lecture Training Room; and
- Computer Area.

4.2.9 Technical Services section: This section undertakes a service to the scientific sections of the Laboratory for the development, construction and maintenance of a wide range of highly specialised mechanical and electronic equipment. The Laboratory works in a narrow field of physics and because of the specialised nature of its activities many items of equipment require construction or modification.

4.2.10 Radionuclide Metrology sub-section: This area provides accommodation for the development of absolute standards of radioactivity and some of the equipment requires heavy shielding from background radiation.

4.2.11 Environmental Radiation sub-section: This sub-section is divided into five areas:

- Chemistry;
- Low Level Measurement;
- Whole Body Monitor;
- Organisation of the fallout sampling program; and
- Data analysis relevant to fallout monitoring and associated research.

The chemistry laboratory is similar to a normal chemistry laboratory. In this laboratory samples with low levels of radioactivity are prepared in a form which allows the radioactivity to be measured with Low Level Measurement electronic equipment. The Low Level Measurement area is a highly automated area providing facilities to measure low levels of radioactivity in the Australian Government environmental radioactive fallout program (e.g. during the testing of nuclear weapons in the South Pacific). The Whole Body Monitor is a steel shielded room (the steel shielding weighing 37 tons) in which large objects can be placed to measure low levels of radioactivity. This room is used for the measurement of radioactivity in human beings and inanimate objects. The remaining area comprises normal physics laboratories, furnace room and office accommodation.

4.2.12 Film Badge Service: This area provides accommodation for the operation of the Film Badge Service. Films are issued to persons working with ionising radiations and these films are used to assess doses received. Dark rooms are provided in the area.

4.2.13 Computer Area: An area has been set aside for the installation of a small computer. An intramural working group is studying the need for a computer, computer terminal and calculating facilities within the Laboratory. At present use is made of computers operated by the Bureau of Meteorology in Melbourne, CSIRO in Melbourne and Canberra, the Aeronautical Research Laboratories and the Australian Department of Health, Canberra.

#### 4.3 Office Accommodation

4.3.1 The CENTRAL BLOCK between the east and west wings provides accommodation for:

- Library;
- Conference Room;
- Executive Offices;
- Administration; and
- Amenities area.

4.3.2 Offices: Section and sub-section Heads have been provided with offices generally in the modular size of approximately 13 square metres (approximately 144 square feet), and a separate room of the same size has been set aside for use by the two Assistant Directors for meetings of sub-section Heads. In addition, offices have been provided for the Director, Deputy Director and Chief Physicist. A number of interview rooms are spaced throughout the Laboratory for use by staff members as required.

4.3.3 Administration. An area of approximately 230 square metres (2500 square feet) is provided for the:

- Registry;
- Typing;
- Duplicating, Photocopying;
- Switchboard;
- Enquiry;
- Purchasing;
- Processing of Accounts;
- Receipt and Despatch of Mail; and
- Telex services.

#### 4.4 Amenities and Staffing

4.4.1 The premises have been designed to incorporate amenities and facilities in accordance with the Amenities Code of the Public Service Board as applied to the location of the premises and the number of staff.

4.4.2 The proposal includes an amenities area of approximately 110 square metres (1150 square feet) on the ground floor of the central block. This area, which opens on to a garden courtyard, will provide for a central luncheon area and will also provide for passive recreation and an area for indoor games (e.g. table tennis and carpet bowls).

4.4.3 The total anticipated staff of the Laboratory when the building is completed will be approximately 90.

#### 4.5 Vehicular parking

4.5.1 Provision has been made for the parking on site of 80 vehicles to cater for official, visitor and staff vehicles. The car parking area could be extended if the need arises.

### 5 COST OF PROJECT

5.1 The cost of the project has been estimated by the Department of Housing and Construction at \$3,600,000 at July 1974 prices.

5.2 As outlined in paragraph 4.2.1 the population density is low which increases the cost per net square metre usable space as compared with normal accommodation. This reflects the special circumstances for which the building is designed as described in section 4.2.

5.3 In addition to the low population density of the building the cost per square metre is exaggerated by the large microwave building which is approximately the height of three storeys and the calibration room and gamma exposure room which are each of the height of two storeys.

5.4 The planned excavation of the site has been turned to advantage in both wings:

- in the East wing, by directing the Cobalt 60 beam into the earth bank behind the concrete wall, and thereby saving on shielding costs.
- in the West wing, by using the bank as an additional shield for the Whole Body Monitor and the Radionuclide Metrology Laboratory.

### 6 CONCLUSION

6.1 The building proposal now under examination is considered by the Australian Department of Health to be the most satisfactory and economic means of providing long term accommodation for the Australian Radiation Laboratory.

6.2 The accommodation is scheduled to be available for occupation approximately two years after all necessary approvals are given. It is anticipated that according to the information at present available this schedule will provide for suitable premises for the Laboratory prior to the need for existing premises to be vacated.

6.3 The Department is confident that the design of the proposed premises will meet the needs of the Laboratory which is of international repute, and which provides important scientific services and which carries out research for Australian application. Appendix A—Map.

**Mr Stevens**—Mr Chairman and members of the Committee, the proposal is recommended to the Committee. I seek your guidance. I have referred to Appendix A. There is in the written statement an Appendix B which defines and discusses the development of the function of the Australian Radiation Laboratory. Is it your wish that I should read this, Sir?

**CHAIRMAN**—No, I would prefer that be taken as read. It will be incorporated in the evidence, Mr Stevens. The Committee members have read it and you will be questioned on it, but in order to conserve time we will take that as having been read.

(Appendix B read as follows)—

### DEVELOPMENT OF THE FUNCTIONS OF THE AUSTRALIAN RADIATION LABORATORY

In 1928 the Australian Government decided to purchase 10 grams of radium and to make this radium available under formal agreements to public hospitals in Australia for the treatment of cancer.

In purchasing and distributing the radium the Government assumed an important responsibility and as the custodian of the radium the Department of Health was required to ensure:

- that the radium would be used with the maximum efficiency; and
- that proper precautions would be taken to give protection from excessive exposure to radiation—to patients, to staff handling the radium, and to members of the public.

As a result, the Commonwealth Radium Laboratory was established in 1929 by the Department of Health within the then existing premises of the University of Melbourne.

The Sixth Australian Cancer Conference held in Canberra in May 1935 included amongst its resolutions a recommendation that a central X-ray laboratory should be established which would undertake research and investigations into the physical problems of radiotherapy and which would set up and maintain accurate standards of dosage.

Acting on the above recommendation, the Government decided to extend the activities of the Commonwealth Radium Laboratory to include the physical aspects of X-ray therapy.

The Commonwealth X-ray and Radium Laboratory (as it then became known) of 1935 had the following objectives:

- to set up and maintain the primary Australian standard of X-ray dosage;
- to set up and maintain an Australian standard of kilovoltage;
- to investigate and research into the physical problems and difficulties of X-ray, radium and radon therapy for the treatment of cancer;
- to encourage the establishment of local physical services in relation to radiotherapy at the various radiotherapeutic centres in Australia;
- to develop uniform methods of determining X-ray quality, depth dose, and other quantities which will be measured for every deep therapy installation by the local physical services;
- to investigate the protection afforded to radiological workers, and advise on methods by which the exposure received by workers with radium and therapeutic and diagnostic X-rays may be determined;
- to act as a co-ordinating centre for information regarding the physical aspects of X-rays and radium; and
- to stabilise, standardise and improve radium and radon techniques.

Two of the above objectives have since been deleted as functions of the Laboratory:

- the setting up and maintenance of a standard of kilovoltage now lies within the scope of the function of the National Standards Laboratory; and
- the encouragement of the establishment of local physical services in relation to radiotherapy at the various radiotherapeutic centres in Australia has been deleted as, due in a large degree to the activities of the Laboratory, this objective has been widely achieved.

In addition to restating the above six objectives of 1935 to reflect the existing situation the present functions of the Laboratory (as outlined below) include additional items which have been added from time to time, for example:

- in 1939 the functions were extended to include advice with respect to X-ray equipment for medical diagnosis;
- in 1946 in collaboration with CSIRO and later (in 1953/54) alone, the laboratory was made responsible for the procurement and distribution of radioisotopes for medical use on patients, for medical and scientific research and for industrial purposes;
- in 1959 the responsibility to undertake the measurement of low levels of environmental radioactivity was given to the Laboratory, although in 1956 it had already undertaken as a special project the measurement of fallout over Australia as a result of British nuclear weapons tests at the Monte Bello Islands in 1956 and at Maralinga in 1956 and 1957;
- in 1965 the Laboratory was appointed as an agent of CSIRO to maintain for, and on behalf of that Organisation, standards of measurement of exposure of electromagnetic radiation and standard of measurement of radioactive nuclides and to be a verifying and reverifying authority with respect to subsidiary standards of measurement in these fields and to issue the necessary certificates;
- over a period the functions of the Laboratory in the field of radiation protection have been extended to include the investigation and evaluation of the potential hazards to public health of persons from the use of laser and microwave radiations.

Following the approval of these revised functions and having regard to the increased workload in other areas of the Laboratory, a recent staff review resulted in an increase in staff by approximately 25 per cent. Following the transfer of staff to the Laboratory from the former Fallout Studies Unit of the Department of Science, the total staff of the Laboratory is now 85. A proposal supporting the creation of two additional positions is before the Public Service Inspector.

To identify better the role of the Laboratory its name has been amended recently to the Australian Radiation Laboratory.

The functions of the Laboratory were recently revised and were embodied in an Order-in-Council of 27 July 1972 under the National Health Act. A statement of the approved functions of the Australian Radiation Laboratory is given below.

### FUNCTIONS OF THE AUSTRALIAN RADIATION LABORATORY

The functions of the Laboratory are:

1. to develop and maintain, as agent of the Commonwealth Scientific and Industrial Research Organisation, standards for the measurement of exposure to ionising radiation and of radioactive nuclides and to calibrate and assess relevant measuring equipment, systems and radioactive nuclides;
2. to develop and maintain standards for measurement of absorbed dose arising from sources of ionising radiation and of electrons, neutrons and protons;

3. to investigate dosimetry of ionising radiation and of electrons, neutrons and protons, to encourage the use in Australia of uniform systems of dosimetry, and to calibrate equipment used in medical radiation therapy;
4. to maintain the Commonwealth radium and strontium-90 applicator holdings, and to operate a service to supply radium, radon and strontium-90 applicators for medical and medical research use, and for use by the Commonwealth and its Instrumentalities;
5. to investigate, and to operate an advisory service on; the hazards of ionising radiation and of lasers and microwaves, to provide a service for monitoring exposure of individuals to ionising radiation, lasers and microwaves and to calibrate relevant instruments and devices, and to maintain an Australian Radiation Incident Register;
6. to provide an inspectorial service for a period of 5 years commencing from the date of this Order for the Tasmanian Department of Public Health under the Tasmanian Radioactive Substance Act and Regulations;
7. to evaluate the objectives, design and methods of environmental surveillance with respect to the peaceful uses of atomic energy and to assess, in conjunction with the Australian Atomic Energy Commission, radiation safety factors in construction and operation of nuclear installations;
8. to monitor naturally occurring and artificially produced radioactive nuclides in man and the biosphere and to investigate mechanisms by which radioactive nuclides pass into the food chain and are absorbed by man;
9. to procure, prepare and distribute throughout Australia radioactive pharmaceuticals for established medical diagnostic and therapeutic purposes, to investigate the quality of radioactive pharmaceuticals, to provide an advisory service on the use of radioactive pharmaceuticals and of radioactive nuclides for medical and medical research purposes and to assess and develop techniques for the use of radioactive pharmaceuticals and radioactive nuclides in medicine;
10. to oversee public health aspects of the distribution in Australia of radioactive nuclides;
11. to investigate and operate an advisory service on the physical aspects of diagnostic radiology and radiation therapy, and on functional planning for medical radiation facilities;
12. to provide inspectorial and advisory services in relation to the use in the Australian Capital Territory and the Northern Territory of sources of ionising radiation and of microwave and lasers.

**CHAIRMAN**—Mr Stevens, do you intend to present the environmental impact statement on this project?

**Mr Stevens**—We had not intended to do so, but we could provide it. We probably cannot provide it at this moment; we may have to get it copied. We have one which was prepared in August 1973.

**CHAIRMAN**—This is the one of which I am speaking. If it is your intention to present that one the course I intend to follow is to

request the Committee to question you now on the evidence that you have submitted already and then ask you to then read the environmental impact statement and you will be questioned on that.

**Mr Stevens**—Do you want me to read that as well?

**CHAIRMAN**—Not now. We will question you on the evidence that you have presented so far, Mr Stevens, and at the conclusion of the cross-examination we will then ask you to read that impact statement to us and we will go through the process of cross-examining you on that. Now, is there anything that you would wish to add to that evidence that you have just presented, Mr Stevens, before I invite the Committee to cross-examine you?

**Mr Stevens**—Sir, I would like to make one other comment, and perhaps it might be too early, but I think it is reasonable to express on behalf of the Australian Department of Health appreciation for the work of the Department of Housing and Construction, for the wide spectrum of officers who contributed to taking up a functional brief which was expressed in what I can say here and now are pretty simple terms. We called on Housing and Construction to design a building which was inherently safe, which was functionally and operationally acceptable; and that it be set in natural bushland. I do not know whether it is usual but anyway I personally, on behalf of the Department of Health, pay a tribute to the contribution and the dedication of the officers of the Department of Housing and Construction who liaised continually with our staff in that activity.

**CHAIRMAN**—I am sure they will appreciate those remarks, Mr Stevens. I now call on Senator Poyser to open the questioning.

**Senator POYSER**—Would you describe this laboratory as a maximum security laboratory?

**Mr Stevens**—It is not a maximum security laboratory in the sense of defence security; it is not that at all. It is a laboratory in which we adopt maximum security procedures for a variety of reasons. Firstly, we, as a laboratory of international repute, feel that we ought to be a model in this area. That may not necessarily be the prime purpose. We have 90 people who are working with radiation; that is their lives' work. They are dedicated to this work and so we wish to protect them. We wish to protect the environment, the people

living in the environment in the neighbourhood, people who move around. We have designed a building with these things in mind.

**Senator POYSER**—I meant more in relation to the maximum security construction of the building because of the contents of the whole rather than in relation to the perimeter of the building.

**Mr Stevens**—We would regard it as a building which needs to be secure. It needs to be a building to which you do not have entry and things of that sort. To that extent an in-confidence security statement has been prepared and this could be made available to the Committee. Mr Dunlop has it here for circulation.

**Senator POYSER**—Have you ever visited a similar type of laboratory overseas, either yourself or Mr Dunlop or both of you?

**Mr Stevens**—I think I can say that there is probably not one absolutely identical to our laboratory, with the broad range of functions, but I have visited a number of laboratories overseas which take up parts of the functions. One that comes closest to this one, perhaps not strangely because we regard it as a sister laboratory, is the National Radiation Laboratory in the suburbs of Christchurch, New Zealand. But it has not completely the same functions.

**Senator POYSER**—Could you tell us whether the similar laboratories you have visited are located in urban areas, isolated areas, big cities, small cities, and so on?

**Mr Stevens**—They vary. One I can think of in England, the Radiological Protection Service it used to be called, it has now changed its name and is part of the National Radiological Protection Board. It is in Sutton, Surrey, which is a pretty built-up area with a major hospital complex. Just as an aside, many of the radiation sources that we are using, and even more powerful ones, are of course located in many of the major metropolitan hospitals which are located in suburbia, and so on. Yes, they vary. I have been into various laboratories where they are handling very, very much greater activities than we are and those tend to be remote. But nevertheless one of that type, the Radio Chemical Centre in Amersham, England, which handles, I would say thousands of times the activity per day in radioactive materials, is situated in a very pleasant little village called Amersham.

**Senator POYSER**—Do you know of any escapes of radioactive material from any of these laboratories overseas that has affected the population in the areas in which they have been located?

**Mr Stevens**—I think escapes have occurred from some of these laboratories. I would say they should not have occurred. Any escape of this type—an escape of radioactivity or radiation—means that the people who designed or worked in the laboratory did not have that laboratory design incorporate the shielding according to internationally accepted principles, based primarily on the recommendations of the International Commission on Radiological Protection. This is the sort of thing that we have taken into account quite completely. There is more than this. It depends very much on the indoctrination and training of the staff, the discipline of the staff, dedication of the staff to recognise that they have certain criteria to come up to in their manipulation of radioactive material.

**Senator POYSER**—You are satisfied that the Department of Housing and Construction has complied in all details with the highest international standards available in the design of this laboratory?

**Mr Stevens**—I believe so, but I think it is fair enough to say in that context that we have not just relied on the Department of Housing and Construction. Their officers were going perhaps into slightly unfamiliar areas. This, then, was a matter of working with us. I would cite as an example and explanation, one area with regard to filters. They took advice from us, and we said: 'Look, let us go to the place in Australia which would know most about this—the Australian Atomic Energy Commission'. Officers from Housing and Construction and officers from the Laboratory went up there. We did not change our views but we wished to make certain that we were not just relying solely on ourselves.

**Senator POYSER**—In paragraph 2.6 you describe the present accommodation. Obviously, from information I have been able to obtain from fellow Committee members, the present accommodation is definitely sub-standard. Did you have any problems with escape of radioactive materials from any of those multitude of laboratories you were working from?

**Mr Stevens**—The only one where there would be any consideration here, would be the radiopharmaceutical laboratory which members of the Committee saw yesterday.

But we have sampled the exit air. The concentrations of radioactivity in that exit air—we measured it at the peak time, when they were handling the most material—are lower than those recommended in the Victorian Radioactive Substances Regulations. That is one thing. They are also lower than the levels recommended—concentrations in air for members of the public breathing air set by the International Commission on Radiological Protection. I make the distinction here that the International figures are for breathing air, not at the top above an exit point from which you get subsequent dilution.

**Senator POYSER**—Can these figures be lower still in a modern laboratory as envisaged in this project? Can they be lowered even further?

**Mr Stevens**—They will be very much lower because we have achieved these levels—which it is desirable we should do—in a city area. But, in the new proposed building, we are going to include what is scientifically referred to as absolute filters. These are not 100 per cent efficient but they are 99.97 per cent efficient. So if we were achieving below the International recommendation for breathing air now, then we are going to be only .03 per cent of that level when we have these filters in.

**Senator POYSER**—Do you have radioactive waste to any extent from your laboratory?

**Mr Stevens**—Any laboratory which works with radioactive material—any hospital, any university research department where there is any radioactive material—is going to have radioactive waste. Yes, we do have radioactive waste. What do we propose to do about it?

**Senator POYSER**—That was my next question.

**Mr Stevens**—Comply completely with the requirements of the Victorian Radioactive Substances Regulations. But the radioactive waste will fall into 2 classes. One is low level, short-lived radioactive material, e.g. materials with a half-life of 6 hours, which decrease their activity to half in 6 hours, to a quarter in another 6 hours and so on. The other is longer-lived radioactive material. All this radioactive waste will be stored. Every day it will go into a store within the building, a fire-proof, lock-up control store. From time to time we will dispose of it. The short-lived

radioactive waste will be disposed of by burial away from the site, under the approval—and we do this now—of the Victorian Health Department and in conjunction with a City Council. This is carried out in deep pits or quarries which are being reclaimed. It is not just a matter of trucks going and tossing it off. The waste is taken there under the supervision of a physicist, and arrangements are made for it to be covered immediately by soil to a depth so that there will be no recovery of it.

**Senator POYSER**—Is this waste in containers when it is buried?

**Mr Stevens**—That sort of waste would be in containers, but it would not be in durable containers. This is low-level waste and at this stage it is almost hard to measure any activity. This is an accepted practice, which is adopted throughout Victoria and in other States for this low-level waste. I turn to the other waste, which is in long half-life materials. We do not have a great deal of this, but on occasions we do get some of this material. We do not want to have it stored in the laboratory; we have arrangements with the Department of Manufacturing Industry to store this in a secure area—very remote, across Melbourne, remote from here. This is being stored permanently in lead containers under inspection conditions.

**Senator POYSER**—In relation to the previous accommodation, I note that there was some endeavour to bring up to standard some of the substandard offices you were working in. Investigations were made but it was decided finally that it would not be satisfactory. Do you have any idea of what the cost factors associated with bringing those substandard laboratories to standard would have been compared to this?

**Mr Stevens**—Perhaps there was some misunderstanding. What we attempted to do in the second half of 1972 and the early part of 1973, was not to cost the bringing up to scratch of our existing buildings, because we almost had eviction notices there. It was the question of acquiring other premises around Melbourne which might have been used for this, that or the other thing, and converting those existing buildings into laboratories. They would have suffered, of course, from the problem of a building which was not designed for laboratory purposes. I cannot give you a comparison of the costs. I think, for one in

particular, a cost was taken out, but I do not have it here. If you wish we could acquire it for you. But it was just one case.

**Senator POYSER**—I note in the evidence also that you anticipate that this current project will be suitable up to the year 1980. You also give information at a later stage that the project will be completed for use in about 2 years. This would mean that you would not occupy it before mid-1976, I would presume. Yet this gives you only 4 years before you will require additional extensions. Is that the picture, as I see it?

**Mr Stevens**—In 4 years, in 1980 we might—we might require additional accommodation. The words I think we used were '... if this should become necessary'. The Department of Health does not see at this point any new functions for the Laboratory. We do not see such a rapid expansion that we will necessarily in the year 1980 have to expand. But we felt it desirable to ask the Department of Housing and Construction to shape the future, not to design a building so that when we came to a need for extension, someone would say: 'Well, look; we cannot extend on there; we will have to pull something down'. I personally do not see a need to extend the building in the year 1980. I would rather—although it is not written down—project it further along than that.

**Senator POYSER**—About 10 years, would you think?

**Mr Stevens**—I would not be thinking in terms of before 1985. But there would be qualifications on that; it may not occur then.

**Senator POYSER**—I noticed that in a supplementary insertion in the evidence associated with section 3(1) it is indicated that you propose to shift the home at present on the site. Do you have any idea how old the house is?

**Mr Stevens**—Would it be reasonable, Mr Chairman, to inquire whether that question might be referred to the Department of Housing and Construction? I think they will be in a better position to answer this. They have been the people who have been carrying out the investigation on the problem of moving the house on the property.

**Senator POYSER**—Would the Department take that one aboard?

**CHAIRMAN**—The Senator has agreed that he will ask that question of the Department of Housing and Construction.

**Senator POYSER**—The following question in relation to that matter will also go to that Department, Mr Chairman. In 3.6 you list the number of bodies that have raised no objections to the establishment of the laboratory on the site that is under consideration. Since then have there been any changes from any of the Government departments?

**Mr Stevens**—We have been notified of no change from any of the Government departments. The only qualification that I would put on this—and I am not suggesting a change, as I understand it, of a position of a department—is that a group in the area was provided with funds from the Department of Environment and Conservation to carry out an environmental impact statement.

**Senator POYSER**—The one body that has actually changed its position is the City of Heidelberg?

**Mr Stevens**—The City of Heidelberg, as I read in the evidence, were given a copy of the plans, I think in early October. The letters are on record. The Council indicated that it approved the matter in principle; and then in July this year they wrote again and varied their point of view. I think I am right in saying that a document to that effect was distributed to the Committee yesterday which gives the resolution of that Council in July or late June 1974.

**CHAIRMAN**—Mr McInerney from the Heidelberg Council will be coming before the Committee.

**Mr BONNETT**—Mr Stevens, could you in ordinary layman's language, explain generally what the laboratory does and what it will do—something for instance that an ordinary old north Queenslander like myself can understand.

**Mr Stevens**—This is a national laboratory, it is an Australian laboratory. The first thing that I have to say is that it is a part of the Australian Department of Health, so immediately one underscores the fact that anything it does is in the public health region—full stop. That is what its activities relate to, public health. What sort of services do we provide, about which the Australian public can really say: 'That laboratory is doing something that helps us'. Every person who goes and has an X-ray in this community, the Australian community—and it will be something like one in three every year—will derive benefit from the work of the laboratory because some of the

activities of the laboratory are related to radiation protection of patients, and to improving the technical procedures from a physical point of view in medical diagnosis. About one in twenty of us all in the Australian community will have a dental X-ray. The laboratory has done a considerable amount of work—and will continue to do so—with regard to radiation protection of the dental patient being X-rayed. About one in thirty of the Australian community in a year will have a diagnostic procedure using radio-pharmaceuticals, as we call them, radio-active materials. Those are all supplied through the laboratory. Successive governments have supplied these at no charge to any class of patient. They all originate either from the laboratory, or on order from the laboratory, for use throughout Australia. About one in three hundred of the Australian community will have radiation treatment in a year, for some form of disease or other. This laboratory maintains the Australian standard of radiation dose. The prescription the doctor writes says: 'Treat this cancer, this tumour, with so many units of radiation dose'. The Australian Radiation Laboratory is the laboratory which establishes the unit of dose, so there is precision in this sort of thing. Anyone who buys a colour television set might think at some time to say 'thank you' to the laboratory because the laboratory did, is doing, and will continue to do, a thorough investigation of the problem of X-ray emission from colour television sets. Anyone who uses a microwave cooker, in cooking foods or in industry, again is in an area in which the laboratory is working. If anyone has a boy or girl at secondary school, or perhaps in some tertiary educational institution, learning physics, where they are handling radio-active materials and radio-active sources, it is most likely that those schools will be basing their safety practices for students on the codes of practice which have been developed through the work of officers of the laboratory. Anyone who works—and many do—with a source of ionising radiation in hospitals, in industry and research, is relying on the services of the laboratory in some shape or form. I do not know if this gives you the sort of picture you want. I have taken the benefits. There are other things we do, but this is the sort of thing. We are a national laboratory. We are a laboratory which is a back-up under departmental government policy for State organisations which constitutionally have the inspectorial and control powers with regard to State territories. We

are a significant back-up to these States, on the basis that they come to us for advice and knowledge, monitoring methods, measurement methods.

**Mr BONNETT**—Thank you, Mr Stevens. I can appreciate your laboratory a lot more now than by just reading all those technical terms. How long has the laboratory been operative? It says '1938' here, but just how long has it been really operative?

**Mr Stevens**—It started in 1929. In 1929 the Australian Government of the day purchased 10 grams of radium for the treatment of cancer. That 10 grams of radium was purchased to a large degree in the form of what we call radium needles or tubes, which are sealed sources, to be made available on loan to public hospitals, teaching hospitals, and used primarily in those days for the treatment of the public patient. That radium of course is not kept in the laboratory. It is where it is supposed to be to do its work. It is on loan to hospitals. That is what started the laboratory in 1929. It set out then to do the job of work of establishing the physical dosimetry methods to help the doctors and to look at the radiation protection problem, and to maintain that radium—which is quite valuable—in the sense of seeing that it is in good condition and to measure it. That is where we were in 1929 when we worked in the basement—I was not there then—of the Physics Department of the Natural Philosophy School of the University of Melbourne. The year 1938 was the first time, and indeed the only time, we had a building which was designed as a laboratory. All the others just happened.

**Mr BONNETT**—You could say, then, that it covers roughly over 40 years?

**Mr Stevens**—Yes, over 40 years.

**Mr BONNETT**—In that time have there ever been any problems with leakage of radiation, or scares of leakage of radiation?

**Mr Stevens**—It is true that within the laboratory itself we have had spills. You may have had pointed out to you yesterday when you visited the laboratory, in the radio-pharmaceutical area—and, if it was not, I will point it out now—that the people handling unsealed radioactive materials there work over a tray when they are doing their dispensing, to catch the solution, should they knock over the solution, spill the solution. These radioactive materials are in solution form in this area. We do not want them to be

knocked over, we hope they are not; we hope the discipline and the training is right—because they are valuable materials, not necessarily in terms of cost, but they are being prepared, for example, to treat 'Mrs Jones' in Royal Perth Hospital or in the Queensland Radium Institute, or somewhere, at 10 o'clock next 'Thursday'. If the staff spill the material, then Mrs Jones does not get her treatment, or her diagnostic procedure. There is the tray—a stainless steel tray. I always say to lady visitors that they would like to have some of these for their kitchens. We then have a stainless steel bench. It is not just a stainless steel bench like that (flat), it has a lip on it, so that if we have a spill, then the spill out of this tray goes on to the bench which is in effect another tray. If we are silly enough to spill a bit more and it goes on to the floor, the floor is vinyl sheet—not tiled, vinyl sheet with a welding where it has to be joined—and that comes up the wall. So in other words we have another tray, a large tray, on the floor. It would be silly to say there can be no spills; no one could sit here from any laboratory, university or hospital, and say they have never had a small spill. But to answer your question, when that occurs, then of course we just do not sweep it out the door or under the mat. There is a discipline, a procedure laid down to deal with it. Spills beyond the confines of the premises? No.

**Mr BONNETT**—You speak here in your evidence of Cobalt 60 beams and other radiation beams into the earth bank behind the concrete wall. Could you explain those beams to me, in layman's language, and tell me whether the beams are dissipated in this earth?

**Mr Stevens**—I wonder whether it would be helpful to the Committee if I did something which I hoped was successful when officers of the Departments of Housing and Construction and Health met with Councillors and Executive Officers of the Shire of Diamond Valley and the Shire of Eltham and the City of Heidelberg, on 3 September, just recently? I thought it would be useful at that discussion to explain something about radiation and radioactivity. Perhaps I could talk about X-ray equipment first of all. I would liken X-ray equipment, in some regard, to those lights up there. When you switch a switch on, you get light; when you switch the switch off, you have no more light. You get light radiation given out. When you switch the switch off, there is no light lying there on the floor. You

can absorb the light. You can put curtains over the window, and no one can see if you make the curtains thicker and thicker. If you have a thin piece of curtain, you see something outside. If you have adequate thickness, then you will absorb the light. It is the same with an X-ray equipment. When you switch on an electrical switch you get X-rays; when you switch off the switch, there are no more X-rays. There is no radioactivity induced in the floor, in the walls, or in you, as the result of having been exposed to an X-ray beam, nor will it occur as a result of being exposed to that Cobalt 60 beam we talk of. Now that, of course, is radioactive material; it is not switched on and off, except insofar as it has a shutter across it, which closes off the beam. It opens it or shuts it. When the beam is open, gamma radiations emerge. We absorb these. We dissipate the energy just the same as the light energy is being dissipated in the curtain. It is dissipated in the soil, in the concrete shielding, in the lead shielding. You looked around the laboratory yesterday and noted that to protect our staff we have lead bricks and so on. This is the story. There is no radioactivity induced in any thing which is exposed to X-rays or to the gamma rays from the cobalt beam. The dissipated energy reappears in various forms; in the form of heat to a small degree and I really mean to a small degree, because it might raise the temperature of the ground by .0003 degree Celsius and I do not reckon we would even be able to detect that.

I go now to radioactive material. I have here a source of radioactive material. In case anyone is disturbed it is just my ashtray. If that is a radioactive source it is decaying, I cannot stop it; no one can stop it decaying. If I seal it—let us say it is sealed—then I have only one matter to consider. If I make a shield around there sufficiently thick the radiation will not emerge or it will be cut down and reduced to a low level. It is only an external radiation problem—it is only letting radiation emerge—but I can shield it. But that radiation it emits just like the gamma rays from Cobalt 60 does not make anything radioactive. The radiation being emitted does not make the shield radioactive. Now, I make it an unsealed source and here is my radioactive material. If I dip my finger in it I have radioactive material on my finger. If I spill it I have radioactive material dispersed. If I lick my finger I now ingest radioactive material and that radioactive



material then, wherever it lodges, will emit its radiation as it does there. I think that helps clarify your point.

**Mr BONNETT**—That does, very much so. Thank you.

**Mr GARRICK**—Mr Stevens, having inspected your existing site, it is quite obvious to me that you need new premises. Has any other site been examined, and if so, what makes the site chosen the most desirable?

**Mr Stevens**—We examined a number of other sites in collaboration with the Department of Housing and Construction, and we set down before we started some guidelines which would help us in the evaluation of sites. These included—and they are not necessarily the whole lot—the distance from, and ease of access by major roads, to Tullamarine, city airways offices, Spencer Street Railway Station and major Melbourne hospitals; the availability of public transport and public road access; the location with respect to established housing of existing staff; facilities for staff shopping during lunch hour and at conclusion of daily duty; and reasonable distance from tertiary education institutions so that general scientific library services, opportunity for study for staff and appropriate professional contacts would be conveniently available. I should interpolate here that we have our own highly specialised scientific library but it would be pointless for us to try to cover the whole scientific literature. We are a scientific group of people and therefore we need to liaise with and welcome the assistance of other institutions. So we looked for an area in keeping with what we like to think is a prestige laboratory of the Australian Government and an area of land which would permit a building layout to satisfy the requirements of the laboratory. One of the things I would interpolate here is that perhaps the only good feature of our existing layout is that we have a sprawling situation. We have certain problems in our laboratory, not problems of radiation hazards for people but problems of highly sensitive equipment where we are measuring very low levels of radioactivity and we do not want these measurements to be interfered with by activities in other areas. So, in my evidence when I talked of separating the east wing and the west wing this was one aspect of that.

I go on: A site with an electrical main supply not subject to heavy and perhaps fluctuating load demands such as those produced by

large industrial undertakings because our equipment is sensitive to this type of variation; an area which was connected or was scheduled to be connected before the building was occupied to the Melbourne Metropolitan Board of Works sewerage system and the possibility of suitable land being transferred to the Department of Health. I might have noted at the start that quite deliberately, as a matter of policy, we turned our attention to Australian Government land rather than going into the commercial area. Taking all those factors into account the Watsonia Army barracks site has proved to be the most acceptable. You ask whether we have looked at other sites. Yes, we have looked at sites in the Tullamarine Airport environs, in the Essendon Airport environs, again Commonwealth land. Would you like me to indicate why we tossed these aside?

**Mr GARRICK**—I think that is desirable.

**Mr Stevens**—The airport areas, Essendon and Tullamarine were of concern to us because of possibilities of vibration. We are using very sensitive equipment and some of our optical work and some of our laser work just could not bear with vibration—micro balances and things of this sort. Of course, the Department of Housing and Construction can dampen out a lot of the vibration. In the case of the laser room though, they would necessarily be building a vibration-free room which is about 50 feet long and this would be very expensive. We recognised the risk, remote but certainly higher than in other areas, of an aircraft crashing on the building and that is the sort of thing that we would not be very pleased about, even leaving the cost of our very expensive scientific equipment aside. And those areas have low access availability for staff travelling from their existing residences shown in Appendix 'A' of the printed evidence, and involve a much increased travel distance for the majority of the staff. As to Broadmeadows Military Camp, we were informed that there was no land available there. Another site has been variously described as the Commonwealth Serum Laboratory site at Broadmeadows—it is in the Broadmeadows area and is Commonwealth land. The only entry to that site at present is by one road, and I gather it is a small narrow road through a residential area and then across country. The alternative would be to construct a road from what is known as Camp Road through the Army land and this would have added to the cost something like

3 per cent, I gather, from advice from Housing and Construction. There were sites in the Department of Manufacturing Industry area of Deer Park, St Albans and Maribyrnong, but the land available or possibly available there was unsuitable due to flooding. The Department of Housing and Construction looked at this and there would have been considerable underpinning necessary. In respect of the Williamstown Rifle Range the advice we had on that was that there was no land available. We were very interested in the Bundoora area at one stage as there was some Commonwealth land there but that was transferred back to the State so there was no land available to us. In the Keilor area there is a large site situated in Milleara Road which is held by the Department of the Army. It is close to Tullamarine Airport and it is certainly a satisfactory distance to the city by road but it is not well served by public transport. It is well distanced from the homes of the present staff and it has little to offer as a site. It certainly would be an uninteresting sort of site from a building point of view.

**Mr GARRICK**—Mr Chairman, my next and last question to all intents and purposes has already been asked, but I am going to ask it again in the most simple language I can put it because I think it should be well aired publicly. Is there any danger whatsoever from radiation or radioactive materials to the health of people in this area or surrounding areas?

**Mr Stevens**—The design of the laboratory, and the operational procedures—which we do not just think up ourselves: they are based on internationally established procedures—are such that I believe any independent, competent radiation health physicist who made an assessment with full knowledge would come up with phrases like 'There is no hazard', 'There is no significant hazard', 'All is being done to reduce levels' and so on. We have tried to do this completely at the laboratory, and this will come out to a degree in our environmental impact statement. When we came to think about the design of our facility from a radiation point of view, it might have been said that the criteria had been established for us. They have been established by the Australian National Health and Medical Research Council, which has provided 'dose limits', as we call them, for members of the public who might receive radiation from

some installation. Those dose limits of the National Health and Medical Research Council are based on those of the International Commission on Radiological Protection. They relate to what are described as controllable sources of radiation, which are the kind the laboratory uses, as distinct from uncontrolled sources of radiation to which man may be exposed, such as fallout from nuclear weapons tests. We are using controllable sources, and we are controlling the radiation dose. As I say, we could have accepted those international levels, which the Australian National Health and Medical Research Council applies. We could have accepted levels which are established in the Victorian Radioactive Substances legislation, and presumably these are the levels which are being applied in universities, research laboratories and hospitals. We decided, because we want to be a model in this area, because we want to be extremely responsible in it, to ask the Department of Housing and Construction to work with us in the design of radiation protection facilities in the proposed laboratory so that we could apply an additional safety factor of 100 below those recognised and accepted levels. This is what we have done, and that level is at the boundary fence. So someone would have to live at the boundary fence all the year round, 24 hours a day, to get one-hundredth of what is regarded as an acceptable level. What we are talking about, of course, is even if someone lived or camped there year in year out, the maximum radiation dose they could receive would be 5 per cent more than the dose that they would receive if they were camped on the sight now, simply from natural background radiation. This has nothing to do with fallout: this is natural background radiation to which man has been exposed from the year dot. I should say that those limits which the International Commission and the National Health and Medical Research Council have established for members of the public are based on the situation that they would not subject the population to a risk any greater than risks that they are accepting in everyday life. Accepting that, and bearing in mind that we have applied 100 safety factor, then what we are saying is that we are adding one-hundredth to the everyday life type of risk. A point might be made of what is the risk in absolute terms. That might be the sort of thing that you might like to pursue at a later stage when you

consider another document which I understand is going to be presented, because there are some numerical terms in it.

**Mr GARRICK**—Basically, you say, there is no danger?

**Mr Stevens**—That is right.

**Senator JESSOP**—My questions are going to be an extension of those already asked because I think the field has been covered pretty well. The first question I would like to ask is: Why pick Melbourne as the site for this particular laboratory? It seems to me that it is fair to assume that you would be working in fairly close communication with Lucas Heights in many respects. Why, apart from the desirability of minimising convenience to staff, why did you not consider building it near Lucas Heights in New South Wales?

**Mr Stevens**—For one reason, and there are a number, the laboratory has been in Melbourne, it has grown up in Melbourne as an establishment, and you have made the point about staff, but there are other relationships that one establishes. With regard to establishing at Lucas Heights, or in Sydney, or in that area, there is another important point in this. The laboratory with regard to its radiopharmaceutical activity, which is only one small part of its overall activities, works in very close liaison with the Australian Atomic Energy Commission. It is one of the sources of supply. But we procure material from overseas, and, I interpolate here, that is one reason why we were not desirous of going to Canberra, at least at the moment, because there is no international air terminal. We have people getting material off overseas planes, and that is important. In a way we look on Lucas Heights as an agent of ourselves. They supply radiopharmaceuticals to hospitals directly on our order. We place an order on Lucas Heights and say: 'Look, will you deliver materials to these Sydney Hospitals and to Brisbane direct on an order from our laboratory?' We ask them to deliver other things direct to other people. By being in Melbourne we then, as it were, cover the southern part of Australia. If we were all in the one place we would have the logistic problem of supplying the whole of Australia. In fact, by having sources of supply in two separate places we have a much better coverage of an overall Australian supply. There are also the economics of this by buying in bulk

and dispensing doses for hospitals, which, as I said before is on a no refund, no charge basis.

**Senator JESSOP**—You have answered some questions concerning external contamination. I think that is the thing that always worries the general public when we are discussing this sort of laboratory. You have answered most of my questions, but I thought it might be interesting for you to describe the unit measurement that you have managed to record, a maximum result that you have recorded when testing the exhaust air from your existing laboratory and compare that with the standard that you describe that is laid down by the Victorian Government, I assume.

**Mr Stevens**—I have a note on my table; please excuse me until I find some notes so that I can answer the question. Are you referring to water or air?

**Senator JESSOP**—You mentioned specifically air. The thing is, what I am trying to demonstrate is the significance or insignificance of the emission compared with the acceptable standards.

**Mr Stevens**—I have mentioned air, but let me just say something about water, because I happen to have turned it up, if you do not mind, if you want to follow this point up with regard to how we are going to handle radioactive liquid. Effluent goes into holding tanks; we will have 3 holding tanks. We know the maximum amount of radioactive material which is going to go into any of those holding tanks in a week. If that occurred and the tank was full, then the concentrations of the radioactive material in that holding tank would range from about one-twentieth to one fifteen-thousandth of the drinking water levels recommended by the International Commission on Radiological Protection. Now, that of course is in the holding tank. We will use other water in the building which is going to go into the Melbourne Metropolitan Board of Works sewerage system which of course is the subject of an agreement and this is progressing. The effluent from the holding tanks will be diluted by other domestic water from the laboratory which is non-radioactive. It will be diluted by any other water which gets into the sewer so we are down to fantastic reduction factors over what is described as drinking water levels. With regard to the Victorian regulations, the reductions below those are even greater, but I should explain that the Victorian regulations under the Victorian

Health Regulations relate to the concentrations at exit, whereas those of International Commission are drinking water levels.

With regard to air, I think I made the comment that the measurements we have made in our present site, where we do not have filter systems but being responsible we do conduct monitoring there, are below the international level for air that is recommended or permissible for breathing by members of the public, that is where it exits from the outlet at the top of the building, therefore it will be diluted before it gets down. But the filter systems that we are going to put in are going to reduce this. They are going to be effectively 99.97 per cent efficient. Because they are so efficient the concentrations are going to be down to 0.03 per cent of the acceptable air levels of the International Commission. Again, the Victorian levels are different because theirs are at exit as distinct from air that one would breathe and there is a tremendous reduction factor in that.

**Senator JESSOP**—I think it might be interesting if you could tell me what natural sources of radiation can you give as examples that would exceed the emission levels from your laboratory? I will go a little bit further. I understand that your laboratory performs a very important public function and that is to test milk supplies from all over Australia. Do you also test water from all over Australia and can you give that sort of an example to demonstrate whether there are any natural sources greater than the emissions from your laboratory?

**Mr Stevens**—I have a philosophical problem that worries me here. I find it unacceptable to compare the radiation which comes from a controllable situation with the uncontrollable; it is like comparing chalk and cheese. But let me make the point I was going to take up before you expanded the question. Let us take natural radioactivity and that throws aside the fallout material and it is that which we monitor for iodine in milk and so on, 7 days a week and so on. But let us take a particular type of natural radioactivity. Each of us in this room and throughout Australia has in his body a naturally occurring radioactive material called potassium 40. Now, this is a naturally occurring radioactive material. No matter what sample of potassium salt you pick up, potassium carbonate, potassium what-have-you, potassium hydroxide, if that were analysed naturally occurring

potassium 40 is always present in it. Since we have potassium 40, if we have any muscle—because that is where potassium is in the body—each of us has a modicum of this potassium in our body. That potassium will contribute a radiation dose to each and every one of us in Australia which will be about 4 times the maximum radiation dose which anyone would get if they spent a whole year, 24 hours a day, on the boundary of this site. Now, they cannot do anything about it—that potassium 40 is there—you cannot do anything about it.

Now, because we are being irradiated by cosmic rays, by radiation from outer space—it has nothing to do with nuclear weapons tests—this was going on long before the 1890s and Madame Curie was around and they had discovered radioactivity. Natural radioactivity was there although they could not measure it. But radiation doses from what we would call external sources would contribute something of the order of 5 times greater than that absorbed by the person sitting on the fence for 24 hours a day every year. The earth itself, every bit of earth itself, has naturally occurring radioactive material of the radium and thorium series.

I often tell people that a gram of radium, which is about half the amount of salt you would put on the side of your plate for an egg unless you were very generous, is worth about \$20,000. I also tell them that if they go outside and dig to a depth of about a foot for a square mile and then sift that soil they dig up and extract the radium from it, they will get a gram of radium—of course, it would cost them a lot more than \$20,000 to do it. But they are going to be subjected to radiation; we are all subjected to this radiation. Now, that from memory, and I do not have the precise figures, is getting to be something of the order of 9 times. We have a four and a five which is nine and a nine which is eighteen, and I think I said before about one-twentieth, so that is how it would be made up.

**Senator JESSOP**—And this of course applies in commercial areas, too, with television sets and so on. The radiation from those sets would be within the standards that you recommend but would that be in excess of the emission from your laboratory?

**Mr Stevens**—It depends where you sit as regards to your television sets. A lot has been said about television sets and this is not a

public inquiry on them, and one gets worried about them, but there have been radiation standards set for them. There were problems with television sets, particularly colour television sets, some years ago in America. That position has been solved now and they are being designed, to internationally accepted standards, and Australian standards comply with these. If one were to stand next to a television set one would get a high radiation dose. I know there were some members of the television industry here before—and I hope they will not be offended if I say that I am more concerned about the visual and sound emissions from a television set than I am about the X-ray emissions.

**Senator JESSOP**—You did not quite answer my question. I want to demonstrate to the people that there are other things, although there are the latest acceptable standards they are greater than the emission from your laboratory, and I just ask whether the radiation from a television set, minimal though it may be, is greater than emission from your laboratory?

**Mr Stevens**—From black and white television sets I would have to say, no, because one does not get any significant emission of x-radiation from them—and we are talking now of radiation rather like switching on and off the light. There is no radioactivity introduced into a person here; it is just emission of radiation, which disappears when you switch off the equipment. The radiation dose which a person might receive by watching his colour television set would be higher than what he would get by living on that fence. If I could take another example which may interest people. If a person spends about 25 hours a year travelling—as you members of the Committee do—in a high-flying aircraft, then he will get more additional radiation from those flights than that person living 24 hours a day for a year on the boundary. That is because of the intensity of the cosmic rays.

**CHAIRMAN**—You have just given the Victorian Railways some more customers!

**Senator JESSOP**—If you are wearing a luminous watch I gather that would be—

**Mr Stevens**—That is right, if you are wearing a radioactive luminous watch. I do. I wear one, but it is very convenient to check that monitoring equipment is working. I merely put my watch to it.

**Senator JESSOP**—I think you have demonstrated my point. I have one last question. You did describe the proposal with respect to disposing of short-life, low-level waste material by burying it in quarry areas and so on, you touched on the long half-life material and you stated that this is going to be stored in containers, but I do not think you mentioned what you were going to do after storage. How long were you going to store it and how would you dispose of it, and while you do answer that, would you mind for the benefit of the record just telling us what you mean by half-life of a radioactive material?

**Mr Stevens**—Let me take half-life first: If we start with say 100 units of activity—I will not use the actual units, curies or millicuries or microcuries, because this is a simple one. We handle in the laboratories, a radioactive material called technetium 99m, which is used for medical diagnostic purposes—these all have numbers to tag them and to name them—this radioactive material has a half-life of 6 hours. So let us assume it is 12 o'clock, which is just about right now, 12 o'clock today, and we have 100 units of this material. At 6 pm today fifty of them will have disappeared, and you will have only fifty: at midnight tonight we will have only twenty-five; at 6 o'clock tomorrow morning we will have only twelve-and-a-half; at 12 o'clock tomorrow—this time tomorrow—we will have only six-and-a-quarter. A half-life is the period of time identified peculiarly and uniquely with each radioactive material; the activity decays by half, and so it goes on. Technetium has 6 hours half-life; another material, Indium 113 has 2.8 hours; radioactive iodine 8 days; and so on. With regard to long half-life radioactive materials, the one we think of here, particularly, is radium which comes from various sources—medical radium which has been used and is no longer required. As a matter of assistance to States, and in the overall Australian approach, the laboratory is prepared to take this radium into storage. This is the sort of material which is being stored; it has a long half-life—1,840 years for example for radium. It is no good keeping that forever. What are we going to do with it?

Do not be disturbed when I say I cannot say to the Committee that I know what we are going to do with it. There is not yet established in Australia a policy for the disposal of long-term waste. People may have read of the sort of problems that are occurring in

some of the nuclear industry areas in disposing of radioactive waste. They are dealing with some materials which have half-lives in the order of 250,000 years—which is a bit long. We do not have a policy determined. There are groups which are looking at that, and part of those groups quite obviously, is the Department of Health, through the laboratory. But it is stored safely in sealed containers for this purpose. The answer is not available. There are international considerations being given to this at the moment; whether it should be dumped at sea or buried or whether there should be a national burial area.

**Senator JESSOP**—What volume of this is likely to be involved? Are these containers stored in special sort of buildings; or is that necessary?

**Mr Stevens**—They are stored in special buildings, all right. They are stored in buildings under security arrangements; the type of building designed for the safe and secure storage of ammunition. It is not with the ammunition, obviously, but it is that sort of thing; it is under surveillance and it is sealed in drums and lead containers. It is quite safe to walk into the area from a worker's radiation dose point of view and put additional material in there. The volume is not large. Some of the radium I refer to is a gift, in fact, to the Australian Government. The user does not want it any more, and from time to time we, at the laboratory, have this radium reclaimed and remounted in a form to supplement the Commonwealth radium, the Australian Government-owned radium, which is on loan to hospitals. We do not do that reclaiming here. We send it overseas. It is not the sort of operation that my laboratory is designed to do. It goes to the Radiochemical Centre, Amersham, which I mentioned before.

**Senator JESSOP**—So it has some future use?

**Mr Stevens**—That is right; some of it has.

**Mr KEOGH**—Would there be any chance, in future expansion proposals for your laboratory, that you would be doing the reclaiming work you now send overseas?

**Mr Stevens**—Definitely not. That is, may I say, a very positive statement. Let me put it this way: I would recommend in the strongest terms to the Minister that we would never get engaged in this. I would think, as a matter of

department policy, that would be accepted. We have never engaged in it and we have no intention of doing so. We have not the facilities to do it; we just could not do it with our present facilities and we have no future intention.

**Mr KEOGH**—Both Senator Poyser and Mr Garrick have directed questions to you in regard to the dangers involved from your existing premises. I would ask again: Can you indicate whether there have ever been any known incidents of radioactivity or radiation contamination to any person or thing recorded while you have been operating in your existing premises that could be related to your operations?

**Mr Stevens**—I have no knowledge of any contamination which has occurred outside the laboratory as a result of our activities—that is, outside the laboratory. Of course, in the processes of our own work, where people are handling radioactive materials, some contamination—

**Mr KEOGH**—Apart from that.

**Mr Stevens**—No.

**Mr KEOGH**—These existing premises, of course, would have certain precautionary measures built in that have been added over the years, that were not designed initially. Would you say that, to the best of your scientific and technical know-how today, the precautions that will be built into this new proposal at Yallambie will be adequate to prevent such an occurrence.

**Mr Stevens**—I would say that what is designed and what is proposed for the new premises will be much more effective as a radiation protection—overall radiation protection arrangement—than we have in our present facility. One example I would take you back to is the question of the use of those filters which I spoke of in the exiting of air. One gets down to essentially no emission of radioactive material—even though we are now complying with international recommendations and Victorian recommendations and regulations and things of that sort. What we have designed is a high security laboratory, if I could take the Senator's words in a slightly different sense, high security from the point of view of radiation emissions. You might like to follow up this point. Someone might ask: 'What about a fire?' I do not want to preempt a situation in which you might well direct a question to the representatives of the Department of Housing and Construction.

But let me say we have taken this completely on board; they have and we have. If we had a fire in the department where these radioisotopes are to be handled, any release would be still controlled. As soon as the fire started the automatic sprinklers would come on; there would be automatic fire-proof doors which would close. The room itself, in which the material is to be handled, has concrete walls on all sides—floor and ceiling and the whole lot. The Department of Housing and Construction can tell you better than I can—if you wish to pursue the question—what would be the fire security time on that. Then you might say: 'All right, you have some radioactive material; it is trapped in there, and you are going to wash it down. What happens to that?' We have thought of that too. The floor from that building drains into our holding tanks; it does not go directly into the sewer. It goes into our holding tanks first. This is the sort of thing. Perhaps I have taken that as an example. Yes, we have included in this proposed building the highest standards you could envisage for such a facility.

**Mr KEOGH**—Whilst we may have had quite a lot of information from you in regard to people generally, would you deal more specifically with the safety of pregnant women who may reside in close proximity to the laboratory?

**Mr Stevens**—The additional radiation dose that such a person would get on that boundary there—again, I have to stress this—is going to get smaller and smaller as you go away and there are only about 13 houses or so on the boundary. If you have radiation exposure of a person there from this source, they would get additional radiation exposure. Now, is this significant? That is the question, I think, you are drawing attention to. That person could get greater radiation exposure unknowingly—not declared if you like—by the fact that a member of the family was wearing a radioactive luminous watch, or they themselves might be wearing a radioactive luminous watch, or the bedroom clock has a radioactive luminous dial, or they might go and take a trip overseas and fly at high altitudes for a number of hours. This is the sort of thing. There is a small increment of dose. It may be that they would go and spend a long term holiday at greater altitude because you do not have to be flying in an aeroplane to get an increase of cosmic ray dose; it

increases as you go up. The increase in radiation dose would be so infinitesimal. I think it is reasonable to say it is within the fluctuations that one would get with natural background, and I did not make the point when Senator Jessop was asking questions before that another variable factor which changes natural background, is the building material of which you make your house. I would say that some building materials have radioactive material in them depending on the source of them. You may say, 'I will build my house of timber' but that may not be the best thing to do because if you build it of brick or some other materials which might have radioactive material in them, timber is not a very good absorber of the external gamma radiation which is coming from the dirt outside. So it is a matter of compromise. You do not in Australia, as they have done in some other countries, use trash from uranium mining to fill in and reclaim areas and then build houses on them. They did that in one country, which had better be nameless, and they ran into problems in this sort of thing. There are fluctuations in natural background and such fluctuations can cause doses which would be greater than could be added by this proposal to build new laboratory premises.

**Mr KEOGH**—You refer to the wearing of a radioactive luminous watch. Is that what we would normally call a luminous watch, or a luminous clock in simple terms?

**Mr Stevens**—No. I want to make a distinction because not every luminous watch has a radioactive dial.

**Mr KEOGH**—How many do? Are these very unusual, very limited?

**Mr Stevens**—No. I think a lot of us do have watches with radioactive luminous dials. It is a zinc sulphide, to be slightly technical, to which a small amount originally of radium was added, and the radiation from the radium, the alpha rays from the radium caused the zinc sulphide to fluoresce, to give off light. That same zinc sulphide has a property of fluorescing, giving off light, even when it is exposed to sunlight and things of this sort. Some of the devices just have plain zinc sulphide, one of these phosphors as we call them, without any activator such as radium, and they just rely on the energy that they store. Mr Bonnett asked me a question about what we did. I think you might be pleased to know that we also at Christmas time go and collect a few of these luminous toys which

are around the place and measure these. Happily we have never found them containing radioactive material; they just have the non-radioactive zinc sulphide. So not all luminous dials are radioactive. I should have spoken about radioactive luminous dials.

**Mr KEOGH**—They are commonly worn. People might not even know that they are radioactive and wear them just as normal luminous watches.

**Mr Stevens**—That is right.

**Mr KEOGH**—I have every sympathy for the people that you have had working with you, considering the conditions in which they have had to work in the present premises. Have you had any difficulty over the years in engaging or holding professional and technical staff?

**Mr Stevens**—That is a question which I have been asked by international visitors. 'How do you hold staff? How do you hold staff at this laboratory?' I have taken this as a reasonable sort of question, because people do have difficulty, and I answer it as well as I can. We have an extremely good record of holding staff, and I think this is a compliment to the dedication of the people who are involved in a very important area of public health work. Many of them have been here now for twenty or thirty years. Of course we have our inevitable wastage for various reasons—women getting married and so on. Just as an aside, because these laboratory workers are exposed to much higher radiation doses than members of the public, special precautions must be taken in cases of pregnancy. Our staff, of course, to some degree is highly specialised. Physics is as wide as you like. Then you start to get down into radiation physics, and then you get to our very highly specialised field, which is extremely narrow, both professionally and technically. Our record of holding staff is very, very good and I think it is a credit to the staff that they do stay under the working conditions they have.

**Mr KEOGH**—You talked about the suitability of this site in many respects, and you mentioned that it is handy, if I can put it that way, to the staff. Does any of your staff live close to Yallambie?

**Mr Stevens**—One staff member lives in the Shire of Diamond Valley, and two others live in this general area.

**Mr KEOGH**—Has anyone expressed concern about the proposed movement of the Radiation Laboratory out into this area?

**Mr Stevens**—No.

**Mr KEOGH**—In the evidence on page 11, paragraph 4.2, there is reference to the whole body monitor—a steel shielded room. Can you give me some idea of the protection that is available at the present site, and that will be provided at this proposed new site, for these objects when they are being transported or moved into this room?

**Mr Stevens**—Protection in what sense?

**Mr KEOGH**—Protection in the sense that they are people obviously that tests of the nature of radiation are going to be carried out on. Are they a potential danger at any stage that they are being moved into the room, or away from the room after the tests have been carried out?

**Mr Stevens**—Some of those people who come in for tests from hospitals are being tested for the natural potassium they have in their body.

**Mr KEOGH**—The people or the objects are not presenting any real risks to the community by being moved in and out?

**Mr Stevens**—No, they are a transport container, in a sense; they are transporting the radioactive material quite safely.

**Mr KEOGH**—As to the possible saturation of the earth bank where you are collecting waste from your cobalt machine, and in any other respects, can any of the areas where you are collecting this waste become saturated and then become a danger?

**Mr Stevens**—No. We are not going to put into the ground, in any form, radioactive material. We are going to use the soil to absorb gamma radiation, which does not produce radioactivity in the soil, so there will be no radioactivity produced in the soil as a result of our activities.

**Mr KEOGH**—You referred to material taken away from the site to be dumped. Would you give me some idea of the protection that is available there, as far as concerns accidental damage on the highways or spilling by accident, in the movement away from the site?

**Mr Stevens**—Is it acceptable to you if at the same time I embrace in that question the whole question of transport of radioactive material?

**Mr KEOGH**—I am quite happy; I have one or two more questions that you will cover in that answer.

**Mr Stevens**—The transport of radioactive material is a highly specialised and a highly considered subject. Yesterday at the laboratory as you passed round you may have seen—or some members of the group will have had it pointed out to them—the type of transport containers which are used. They range from a fairly simple little package—I talk about radiopharmaceuticals being transported. If that was a container in which some radioactive material, a solution, was contained, it would be hermetically sealed, first. It is put then, if necessary, into a small lead pot or container so as to reduce the radiations which it will emit, because there are certain international requirements on the amount of radiation which should emerge from the package when it is finished. It goes into a tin; we call it a jam tin. Around the inside of that jam tin, absorbing material is inserted, material which will absorb liquid, so that in the event of that fracturing or leaking, then the radioactive material would be absorbed in that packing material inside the tin. Then the tin is hermetically sealed with a rubber gasket, a hermetical seal. We have a small can sealer there. That becomes the inside package, and that is then placed inside an outer package, a cardboard carton or what have you, and special labels are put on it, and so on. This sort of packaging—and I have just described one sort—is subject to a whole lot of international requirements about labelling, and about testing of those requirements. Let me illustrate. The sort of package I have been talking about is subject to prototype tests, including these: The package has to be put in the equivalent of 2 inches of rain for an hour. It then has to be dropped from different heights on to a solid surface. It has to be dropped from a greater height on to a spike. It has to have twice or a multiple of its own weight put on top of it. That is package testing which is to ensure that in any impact situation the integrity of the container is maintained. That applies to this sort of container. In other types, for different types of material, there is fire testing, in the event of fire. You have to subject this type of container to fire, then you have to drop the container, and so on. Having done all that, then the transport of radioactive material on the roads themselves is subject to the requirements of the Victorian Radioactive Substances Regu-

lations as they relate to radioactive material, and we will comply with those. Any transport of radioactive materials that we do complies with the Victorian Regulations. With regard to the transport of radioactive waste, if it is going away in terms of long-lived materials, that will go in the sealed container in which it is going to be stored, and that will be a suitable transport container. The lower level wastes, which will have been held (the short half-life materials) are transported not in permanent containment devices, but are carried in a vehicle in such a manner to ensure that there is no risk of loss or damage in this way. Again, all these vehicles which carry radioactive materials, have in them, according to the requirements of the Victorian regulations, a notice saying that this vehicle is carrying radioactive material and, in the event of an accident, to contact so and so.

**Mr KEOGH**—There would not be any possible danger if these packages were to fall off a truck and be picked up by any of the local people? Would people be subject to any danger from that?

**Mr Stevens**—We stick by our procedures. With the practice we adopt, we just cannot have a loss off the truck. We would ensure that it is closed, contained, so there is no risk of this sort of occurrence.

**Mr KEOGH**—Referring to a question asked by Mr Garrick on the suitability of the site, you talked about the extension of the Melbourne Metropolitan sewerage system out to here. It is not that I detected anything in what you said, but I just want to have it reaffirmed that nothing of a dangerous nature, by way of waste disposal, will go into the sewerage system and eventually into any of the local waterways or creeks.

**Mr Stevens**—As I indicated, the dilution factors of our releases are such that when they are released from our holding tanks, which are going to be monitored, they would be down below by factors of something like 1/20th down to 1/15,000th, the drinking water levels for members of the public, for radioactive materials, set by the International Commission. That is when it comes out of the holding tank and then it is going to be diluted by our own additional water and by other wastes. With regard to going into the waterways, again I would seek guidance on this but maybe the question of the Melbourne Metropolitan sewerage system might be a matter which Housing and Construction could discuss better than I, because I think they are

better informed as to the developments which are in progress now or are planned with regard to metropolitan sewerage systems. I know that a tremendous amount of discussion has gone on on this.

**Mr KEOGH**—I was really seeking information on the nature of what is to go into it. A change in attitude of the Heidelberg Council in recent times was indicated to us last evening, and evidence that you have given us this morning leads me to ask my next question. It is for reassurance that you and officers of your Department who have taken part in discussions with the Heidelberg Council and representatives of other community organisations have at all times been available and have always been able to give all required information in an endeavour to reassure and to satisfy these organisations.

**Mr Stevens**—I think we have done all we could do to be helpful in this. We have met representatives of groups when they asked for consultation. We have shown the model and plans to people in the first group that we met. I think that was on 28 November last year—which was not very long after this thing got off the ground, which was only in August. It had been brought to the attention of the Heidelberg City Council in October. In fact it was then that we learnt of one of the community groups. They made an approach to the Department of Housing and Construction and officers of the Department of Health. Unfortunately I was overseas at a meeting of the United Nations Scientific Committee on the Effects of Atomic Radiation, so I could not attend. But the Director of the Australian Department of Health in Victoria attended, with other officers, and with officers of the Department of Housing and Construction. The plans, as they existed then in November, were taken out, as well as the model as it was then. Many questions were answered, I understand; opportunities were provided for more questions, and we in fact anticipated at that time additional questions from the group. Nothing more was heard, I think, until about February of this year, when an approach was made to the Director of the Australian Department of Health in Victoria to meet a deputation from the community group. He did that and showed them the updated plans, which took account quite significantly of some of the points, interestingly enough, that they had raised. It did not change the general lay-out of the building at all, but there were certain significant changes that were made in

taking account of those points. Co-operation was given in answering questions. Particularly again I refer to a document—which I understand will be before the Committee during this hearing—the environmental impact statement prepared on behalf of the community group. You will find it in an appendix with quite a deal of question and comment that we provided, to be helpful. Most recently Mr David McKenzie, M.P. for the Diamond Valley electorate, having been approached by the Shire of Diamond Valley, requested that we should meet with Councillors of the Shires of Diamond Valley and Eltham and of the Council of the City of Heidelberg. That was on 3 September. I think roughly 15 or 17 members of the Shires and Council and executive officers were present at the Civic Centre in the Shire of Diamond Valley. There were useful frank discussions there. We took the model out, and took the plans out, and so on and, to the best of our abilities, answered all the questions asked. There was no holding back on this.

**Mr KEOGH**—In your mind, then, there is no reason why they should not fully, absolutely, completely understand the purposes and proposed operations of the laboratory.

**Mr Stevens**—I think any misunderstanding that they may have, or lack of understanding, should not be slated against the Department of Health.

**Mr KEOGH**—I do not want to be unfair to you but I would like to have the opportunity to ask you this. I would certainly have the opinion, from listening to your evidence, that there would probably be few others in Australia, perhaps no others in Australia, who would have a greater, a deeper knowledge, of the operations of the laboratory and of all the proposed commitments that you will have here in your new proposal, wherever it may be, and that probably nobody would be more aware than you of any potential risks that may occur from the laboratory at the moment or in the future. I would not want you to think, from the question, that I am suggesting that you should sell up where you are at the moment and come out to live here, but I want to pose this hypothetical question to you, with all due respect to the fact that I would understand that your answer would be in the same strain, a hypothetical answer. Would you yourself or any other members of your family, however old or young they might be, have any objection whatsoever to coming

out to live somewhere close to this laboratory, say in Lower Plenty Road, or just around the corner somewhere?

**Mr Stevens**—Facetiously, at one stage of the designing of this building, I said: 'Well, it is about time the Director of the Laboratory had a residence built into the building.' I would be happy to build my home, to live on the site, to live in a residence there, but I do not think it is provided for in the arrangement. I tried, but I was not successful. I would think it is highly likely that in due course some of my staff would well move out in this direction to live. To answer your question quite honestly, I myself have no intention of moving, but I have no objection to it whatsoever. The only reason I am not moving is that I am well established in my existing home.

**Senator MELZER**—Mr Stevens, on page 2 of your submission you point out that the present accommodation limits the laboratory in the effectiveness with which its full functions can be discharged. What do you mean by that?

**Mr Stevens**—Let me perhaps pick on a problem—it is a question of inefficiency, if you like—the question of the way we live in scattered buildings. You would have seen them yesterday. There are problems of, let us say, the Technical Services Section of the laboratory, which of course is not a heavy industrial activity but one in which we do maintenance of equipment. If we have a piece of very valuable equipment—and we have much of this—which needs repair, needs taking down to the workshop, under our present circumstances it is likely to have to be dragged in the rain down a cobbled lane, or down across an overpass, which is in fact covered, and then carried down steps, and things of this sort. There are 6 buildings in that complex down in the city area, and there is one up at the University. We do not have a Technical Services Section up there, so if we have a repair job, a breakdown job, an electronics repair job, then a staff member has got to go up there. We have a group of people out at Maribyrnong. We have that sort of thing. It is just not a practicable proposition to run a scientific laboratory where the officer in charge of the Technical Services Section, taking that as an example, literally may not know where his staff is. A little of the trouble is that because these remote areas are operating he has to send a person at a more senior level of qualification who can work by himself without immediate supervision, whereas if

they were working in a complex, then he could have a less experienced person to do the work because it is just a matter of coming back and making contact. Now that is just one example, but there are many of them. Consider the film badge service, the service by which we monitor the radiation dose of workers throughout Australia. It is not because we wish to do this, it is just forced on us. As you will have seen yesterday, there is one group of people in this activity up at the University, and there is another group of people down in the building in Surry Place. Now this is completely inefficient and completely ineffective. Unfortunately, by virtue of the arrangements we have, we have some artificial groupings of people, and we do not get the necessary liaison that we should have between disciplines.

**Senator MELZER**—Does it limit the amount of work that you can do?

**Mr Stevens**—Yes, our present premises limit the amount of work we can do because it is inefficient. There is one room at the University of Melbourne which you might recall going in yesterday where there are 5 X-ray equipments and the cobalt 60 source, which are all intended for use in the standardisation, a very important task, of the calibration of instruments used in hospitals to measure the radiation dosage which is part of the treatment of cancer. This is a most important aspect, because if the cancer is given an inadequate radiation dose that is bad from an end result, if it is given too much it is equally bad. Those 5 units are intended for 5 different types of calibration purpose. Because we have them all in one room, we can only use one at a time. That therefore extends out the calibration of these dosimeters, which come from hospitals and laboratories all over Australia. Yes, we have problems.

**Senator MELZER**—There was a time when all shoe shops had X-ray machines. Did the doing away with those machines emanate from your Department?

**Mr Stevens**—I think it would be wrong if I said that we waved the magic wand and therefore the shoe fitting machines disappeared, but I can assure you we were very prime movers in investigating these to make the assessment of what they really meant in terms of radiation dosage to the feet of growing children. They gave a very high radiation dose, particularly if young Johnny's father owned the shoe store in the suburb with one

of these things and Billy's father owned a milk, soft drink, lollies sort of shop, because Johnny could have some lollies and Billy could put his foot in and have a look. Yes, we worked very solidly on that problem.

**Senator MELZER**—In part of the submission you point out that in some areas, because of the bad conditions you have been working under, it potentially leads to staff being exposed to unnecessarily high radiation doses. What do you do about your employees? Are they regularly checked? They obviously are people who are in much higher danger from these things than any of the rest of us. Do they go through regular checks, regular results, and if somebody for instance did find that somebody was overexposed would you move them away or out of the area? What happens?

**Mr Stevens**—There are laid down standards again, National Health and Medical Research Council, international standards, with regard to what we call maximum permissible doses. For members of the public we call them dose limits. For radiation workers we call them maximum permissible doses. What we do is to monitor the staff, and those film badges are one sort of monitor. We have others. Yesterday afternoon members of the Committee did not see the people working in some of the areas. If you did, they would look a bit like spacemen because they are likely to have a detector on their heads, because we are concerned about a high radiation dose to the eyes. They could have a measurement device on their hands and so on. So we monitor these from the point of view of external radiation dose. We did not point this out to you yesterday, but where they are handling what I call in the jargon 'open radioactive materials', unsealed radioactive materials, they would be working in gloves, not to absorb the radiation but to avoid contamination.

**Senator MELZER**—To avoid the putting the finger in?

**Mr Stevens**—That is right, to avoid licking the fingers. They cannot smoke—you may have seen various places where you cannot smoke—you cannot eat in these laboratories. These are good practices, these are accepted international practices. When they come out of those laboratories, even though they have been wearing gloves and so on to avoid contamination—and they will be wearing special coats, coats of a distinctive colour, and they will be disciplined if the very bright blue coat

is worn outside the laboratory—they monitor their hands to see that their hands are clean, free of contamination. Every now and again, of course, at an appropriate interval, those members of the staff who are handling open radioactive materials go into our whole body monitor, that device where we can detect infinitely small levels of radioactivity.

They are all, of course, as members of the service medically examined on entry. As appropriate, depending on their results of monitoring, they have regular blood counts, which is a pretty rough yardstick of any early radiation effects. If there was any reason to suspect that a person was subject to higher levels of radiation, or was in an accident situation within the laboratory, then we have guidelines laid down on how we deal with it. If they have contamination on their hands, they wash their hands. What they do not do is get the sharpest scrubbing brush they can get and abrade the skin, because that is one route of entry of the radioactive material of their body. They do it gently, and we have gentle washing only. There are showers provided—there will be showers provided in the new premises—but the washing water from the showering of these people will not go down the sewer, but into the holding tank. If they have contamination which cannot be removed immediately we have a very simple trick, and this just illustrates that we are prepared. What we give them to put on their hand is a rubber surgical glove. Why put a rubber surgical glove on? One reason is that it prevents the contamination being transferred, but it is also a very good way of getting rid of contamination because it makes their hands sweat and the best way of getting rid of contamination is making the hands sweat, it sweats it out. So next day you wash your hands and it is all gone. I just use that as an illustration of the procedures. The procedures we are employing in the laboratory are not just ones that we think up, although we have some thoughts on them. These are internationally accepted standards, and I can say this without any concern because I was part of the team which went to an International Labour Conference some years back and which drew up the ILO convention on safety in the use of ionising radiation for workers. I have other personal commitments in this area. I happen to be a member of a committee of the International Commission on Radiological Protection, which deals with this sort of problem.

Literally we just could not hold our heads up to the people to whom we are giving advice if our procedures were not 100 per cent spot on.

**CHAIRMAN**—I am sorry to interrupt the questioning, but before we adjourn for lunch I would like to announce that at very great expense to the management and for the great convenience, we hope, of those members of the public present we have arranged to have amplifiers installed in the hall after lunch, and they will be here again tomorrow. We realise the difficulty in hearing this evidence, and it is important that it should be heard, and so at very great expense to the Australian Government, which is going slowly broke, we have hired an amplifier.

#### Luncheon adjournment

**Senator MELZER**—Mr Stevens, you talked about the suitability of this particular site. In the submission you talk about acceptable access to Tullamarine. As a citizen of Melbourne, if I wanted to find a site that was accessible to city hospitals, Tullamarine and to railway stations, I would not come to Watsonia because, as a case in point, Mr Garrick and I had to come out from Melbourne today, and according to your submission it is supposed to take 30 minutes and it took more than 30 minutes from Clifton Hill. In heavy traffic I can imagine it taking longer. I notice that the hospitals themselves are complaining, perhaps gently, but they are still complaining that they cannot get deliveries when they want them from your place in Spring Street. On top of that you already have one laboratory, or some such, at Maribyrnong Munitions Supply Laboratory, and with the scaling down of production of munitions would not the Munitions Supply Laboratory complex out there offer you better access to Tullamarine and the railway stations, and also access to public transport for your staff, because although there is a bus that travels here, you would not exactly call this site accessible to public transport? The essence of the question is: Why not stay at the Munitions Supply Laboratory, where I would imagine—and it is only imagination—there would be some space available, rather than come right out here?

**Mr Stevens**—Well, of course, we have not considered the Defence Standards Laboratories. At the stage we were working on this the situation you portray did not exist. Of course, one has to get a balance between where we want to go. I was trying to put my

hand, as you were speaking, on a chart we prepared—and I think we have copies of this which the Committee could have—of the distribution of the hospitals which are currently receiving radio-pharmaceuticals—let us bear in mind this is only one of our commitments—those hospitals which are expected to be involved in daily deliveries within one to five years and regular deliveries at present. I think, if it would be acceptable to the Committee, we would table this document—which is a page like this with some coloured spots showing the hospitals. In fact, if we found ourselves over in the Defence Standards Laboratories area we would be remote from the hospitals.

I suppose if one wanted to pick the ideal setting for a laboratory, one would put it in the centre of Melbourne; right in the centre of the city; that is where we are now. For a number of reasons, our Minister, the Minister for Health, has his own views on this. He does not feel it is appropriate that we should be located in the centre of the city. He favours moving out a little from the centre, only from a decentralisation point of view and no other. There is really no possibility—and this is what we explored—of premises we thought of reconditioning somewhere else achieving a laboratory layout which would meet our requirements, so it is a matter of compromise. If one goes to and from Tullamarine—and these problems of driving times are always on—we have done a certain number of trial runs ourselves to and from Tullamarine, around to the north there. And if I could find the sheet, or if my staff could help me, we did have some information on the sort of thing that we did on measured test runs. Of course, one strikes different problems. For example: At 8 a.m. to 8.36 a.m., it takes 36 minutes from Yallambie to the city; Yallambie to the city at 9.50 a.m. to 10.15 a.m. is 25 minutes; travel from Tullamarine to Yallambie was 37 minutes at 9.10 a.m. to 9.47 a.m.; between the existing laboratory at 36 Lonsdale Street to Tullamarine, 14.2 miles, was 24 minutes along the freeway. As we all have discovered from time to time, that freeway does not operate too well and you find that drivers say: 'We will go the old way because it is faster.' It was a question of balance. As I said, we tried to make the assessment of these various places but none was perfect; I suppose you never get a perfect site. But taking all into account, we felt that this was the best one. And I think that you

will find you have copies of the site assessment file. We have copies in sufficient numbers and it would be interesting for the Committee to see this, but unfortunately it is a photocopy and it is a bit pale, but you will see the distribution of the possibles in relation to the proposed site.

**Senator MELZER**—And it is no worse?

**Mr Stevens**—No, it is no worse. Do you wish me to take up your point with regard to what you refer to as mild complaints of hospitals with regard to their deliveries of isotopes at the moment, and I think this is of interest because I am aware that some hospitals have made comments on this?

**Senator MELZER**—Yes.

**Mr Stevens**—In December 1969 the laboratory offered to the Melbourne hospitals which were using the radiopharmaceutical services of the laboratory at that time, a delivery each week day of the short-lived radioactive material Technetium 99m, this is the 6-hour half-life material which we spoke about to Senator Jessop. This arrangement of delivery was not all unselfish, because it enabled us to save government expenditure because the alternative was to supply each of these hospitals with its own generator from which it could prepare Technetium and this would have been much more expensive in terms of supplying each of the five or six hospitals which were using it. On the other hand it was helpful to the hospitals because if we did that then they would have to employ technical staff to do the preparation in the hospitals. We provided this service with deliveries but we did not tell them they had to use it, we offered it. They could make collections if they wanted them. It operated extremely well in the early stages, we believe, but the problem expanded as the hospitals found themselves using more and more of the material. Because they were using a very expensive type of technical system to carry out their diagnostic tests and because hospitals, like the rest of us, do not have money growing on trees, they said: 'Right, we cannot buy another one of this very expensive equipment, so the way we will cope with this is to extend our daily diagnostic requirements.' They wanted to start earlier and earlier in the day. Now, because it is a half-life material of 6-hours that we are talking about we cannot prepare it the night before because this is a waste of money.

We attempted at the laboratory to overcome this problem by a number of means: We started a few of the technical staff somewhat earlier, as I explained yesterday. But we provide for a collection—if the hospital wants it—of the material at half-past eight from the laboratory, or a delivery service starting about 8.45 a.m. Now if you have a delivery, a milk run or whatever it is, there is always someone at the end of the line who gets the last delivery. I suppose if we were Solomon we would alternate the circuit so that one week it went one way, and one week it went the other, but that does not help you because hospitals wanted to plan their operations. It was simple enough of course when they were using this simple Technetium compound, but then you go the step further and for some of the diagnostic procedures you use this simple Technetium compound and you make complex radiopharmaceuticals. Now that takes time so that extends the operation. We thought we would try to overcome this because we—and I am talking about the people who work in this field generally here and overseas, including the Australian Atomic Energy Commission became involved in the development of prepackaged chemicals for a particular type of operation, say, for scanning for diagnostic procedures on kidney and bone. The chemicals, which are non-radioactive, can be prepared in advance and it is then a relatively simple matter for the hospital to get the radioactive Technetium in the morning, to mix them together and do a few very simple procedures to produce the complex chemical material. I think at the moment, there are two complex radiopharmaceuticals which can be prepared in this way. We believe we are going to move more and more this way, so we are going to go more and more into solving this type of problem.

We are thinking continually about the situation because it gives me no joy to have to call on staff to start earlier and earlier because, while it might be a pleasure in the summertime it is a little more unpleasant in wintertime. But we have been trying to solve this. We did not want at this time—and I think anyone who would think about this would agree—to be definitive and say: 'Right, if the building, the proposed building, is established in the site at Yallambie, then this is what we are going to do.' What we undertake to do is to continue to study the problem to see how it develops. There is reason to

believe that some of the diagnostic procedures which currently use radiopharmaceuticals may be abandoned for techniques that do not use them. We are looking at this, and the development of the possibility of running 2 parallel circuits of delivery and the possibility of providing low-activity generators if the hospitals wish to start very early, so that they can produce their Technetium for the early 8 o'clock start—if they want to start that early. We would then back it up with material for the rest of the day. These are the things that we are thinking of. And what we have planned to do if and as this project goes on, is to have discussions with the hospitals in metropolitan Melbourne to work out a scheme which is effective in terms of costs, efficiency and their requirements.

**Senator MELZER**—What do you do about places like Geelong, Ballarat and the La Trobe Valley?

**Mr Stevens**—Geelong—I am sorry, if someone could show me a copy of that map again—at the moment they are not users, they are projected users, I think. What we would have to do with them of course, is to provide their material. There are 2 approaches. Hospitals outside Victoria, say, Launceston, Hobart and Perth will have a generator supplied and they can produce the Technetium from the generator supplied by the Commonwealth. This is a radioactive material, a parent material, which decays to produce Technetium, what we call the daughter product. They will be getting some of these prepackaged chemicals and preparing them themselves. Now, Geelong might be dealt with that way. On the other hand we could use another approach, depending on their workload, of dispensing a higher activity material which means problems with packaging and so on, and get it down to them by various means, by road transport. And we would define the activity at the time of dispensing taking account of the decay. We can do this for when they want to use it, although it is more expensive.

**Senator MELZER**—Ballarat, Bendigo and La Trobe Valley—do they get a service at the moment?

**Mr Stevens**—Moe is one—I will just check that—they have a generator. At another hospital in the semi-remote areas, there is what you might call a visiting specialist in nuclear

medicine. He, in fact, gets the material from us and takes it down. That is the sort of thing that is going to happen.

**Senator MELZER**—I see. The answer to a question you gave earlier is, I think, a bit of a worry. This laboratory has a life until 1980, which is really very close. You were not sure in the answer to the question. You said you were not sure whether you would need an extension then or whether you would not. Now, you are obviously a very honest man in the answers you have given to other questions. What is the answer to this? At this moment do we not know what is going to be happening in 1980? I can imagine people here having a fear. Say 20 years ago, we would not have thought that the French would be letting off atomic bombs in the Pacific; we would have said that was science fiction; but today they are. I can imagine local people having a fear once you are established here. You say you do not know whether you will have to increase that accommodation or not. They could have a fear of not knowing what is going to happen. Is there any way of knowing what is going to be happening in 1980? Any indications at all as to whether you will need more laboratories out here, or not?

**Mr Stevens**—As I see it, there are no new functions in our general area which would be added to those existing. So therefore one would not anticipate any need in the year 1980 for that type of expansion because of a new function. I think it is fair to say we are now covering as well as we can—taking all things into account—the broad spectrum of our function. I do not see—but I do not want to go on the record and say it because we only projected to 1980—I am willing to say that I do not believe that we will be making an approach to the Government for funds to increase the dimensions of building before 1985 or 1990 at the earliest. We will have had at least some of the staff—I will not still be there then—with experience in crowding up and so on. There will be certain functions where we have urgent need to do work or where, to a large degree, we may have completed the work.

You referred specifically to nuclear weapons testing. I could not project what is going to be the pattern of nuclear weapons testing in the atmosphere in the year 1985. There may be none, in which case that activity will essentially have disappeared.

There will still be work to be done in other areas of environmental radiation and natural radiation. But these are all the imponderables. I think the important words—and I tried to give some emphasis to them as I read the written evidence—are the words there in some paragraph or two about expansion: ' . . . should this be necessary.' I think this is very important—that is, doubling the space and so on. There is no preconceived idea about this. Mr Dunlop, who is from Central Office, might be kicking me under the table and saying: 'You have no chance of getting funds because the Department of Health has a lot of other things they want to do.' I think, in hard, crude terms, that if this laboratory space is provided we ought to be happy and we will be happy.

**Senator MELZER**—Are you satisfied that from where you sit in this organisation this laboratory has all the fail-safe devices it can possibly have to safeguard both the people inside the complex and the people who live around the complex?

**Mr Stevens**—We have tried to apply faithfully the highest standards recognised by international bodies. I refer to the International Commission on Radiological Protection—this is a non-governmental body, just made up of a group of scientists who have no axe to grind and are not answering to governments; and to the International Atomic Energy Agency, the World Health Organisation, the International Labour Office. I refer to all the experience which has gone into the design of this sort of laboratory to give the highest standards for staff. If you are going to protect the staff working with the higher levels of radiation, immediately you imply a higher degree of safety for everyone. The safety is many times higher for anybody outside the laboratory than for the staff working in the area. Someone raised a question about pregnant women and I will go back to it. We do have married girls who become pregnant and work on in the laboratory. One of them worked in the radiopharmaceutical section. Even so, there are rules laid down for that. We are applying the best possible standards and I think the Department of Housing and Construction has matched this by their effort, their input. I have never had a tougher taskmaster than the Department of Housing and Construction. It wanted to know all along the line: Why, why, why?

**CHAIRMAN**—Perhaps you can tell me what is the existing total floor area of the ARL. How does it compare with the total floor area proposed for the new building?

**Mr Stevens**—I might have trouble in giving you an answer at this time, in terms of total floor area. What I have data on here is in terms of what we describe as usable office and laboratory area. The Department of Housing and Construction in their evidence, I think, quoted total floor area. I would not like to give a figure precisely but it was 84,000 square feet, if my memory serves me. I am sorry; 84,500 square feet is gross area. I cannot give you the gross area of our existing laboratory but existing usable space is 24,000 square feet; the proposed laboratory is 53,000 square feet. There are some areas I think I mentioned yesterday—and I am right in saying—that are underspaced very considerably. There are very significant increases in space in some areas, which you may have got the impression we need. On top of that, there are areas provided for amenities. At the moment we have none.

**CHAIRMAN**—At paragraph 2.7 in your evidence you say that inadequate floor area and sub-standard accommodation increases the risk of injury from accidents within the laboratory. In some areas it could potentially lead to staff being exposed to unnecessarily high radiation doses. Perhaps you could explain to me how serious are these risks?

**Mr Stevens**—Let us deal with the case of ordinary accidents—I mean accidents in terms of mechanical accidents or things of this sort. The technical services section, which has a machine tool section, is very crowded. So much for example, when they want to move a piece of metal around all the other people have to duck or they get their heads knocked off. There is a grinding tool and things of this sort which at the moment are almost in passageways where people are walking through. We have an enviable record, I would say, in terms of laboratory injuries to staff, but one gets concerned when one is responsible for staff when you have situations that are poor. We have a situation, as I mentioned earlier this morning, where heavy equipment is physically lumped up and down stairs and this type of thing results in back injuries and so on. It is necessary to have lead shielding to reduce the natural background radiation in detecting apparatus, as you saw the other day, and this creates the possibility of injury,



dropping and so on. In the new proposed building there is going to be goods lift approach to solve some of these problems even though it only goes up one floor. With regard to the radiation, there is a philosophy with regard to radiation work. There is a maximum risk prescribed, and one who is responsible for radiation protection for workers aims at producing situations where the radiation dose that staff receive in the course of their work is as low as practicable taking into account economic and social considerations. One does not go to, say, reducing radiation dosage to staff down to zero. This is not part of the operation; they are working with radiation. But when you get a crowding-up situation, when you get, say a radiopharmaceutical dispensing situation as we exist now, you can get four or five people working side by side, almost as close as this, then what he is doing can result in radiation exposure to me. We want to get some distance. We have talked about radiation protection being achieved by shielding and by other means. One of the very effective ways of achieving improved radiation protection is distance, because radiation dose from a regulated source falls off according to an inverse square law. If you double the distance the radiation dose is reduced by a factor of four. So we are not in a serious situation at all but I would be less than responsible if I did not, as I have informed my Director-General, state that one of the things that concerns me as a responsible person in an operating laboratory is that the present accommodation potentially exposes the staff to these situations.

**CHAIRMAN**—Following on that, will the proposed building be fully occupied when completed, or has floor space been provided for future expansion?

**Mr Stevens**—I would say that the only area at the moment that is unallocated in the sense that we do not know what we are going to put there is in the area I referred to this morning as a computer area. This might even be called a contingency. I did outline that we were using at the moment, I think, four different computers. The extent to which we are going to go to our own computer depends on a lot of things—technology, the question of having a terminal there, and the question of need. One of our heavy uses of computer services at the moment is this fall-out monitoring program, which I spoke of. We have people regularly spending time on the Bureau of

Meteorology computer and the computer of the Aeronautics Research Laboratory because we have not such facilities available, and we want results fast. Because we are designing for the sort of situation that may occur because we are a scientific laboratory and not a situation where you put a certain number of people round desks—a development comes along or an assigned problem comes along—we will need a little bit more space than we had 6 months after we moved in. It will depend on what we have set up. We must have a laboratory with some expansion space—some space for setting up additional equipment. In the existing laboratory today you might find that a particular area surprisingly does not have much equipment in it but next week it might have something in it because of a particular experiment that is going on. We are both a scientific service and a scientific research laboratory and therefore we need some space to set up research experiments.

**CHAIRMAN**—Having regard to public attitude in the community, there seems to be some concern about the site itself. How important was staff access in the final decision to choose this particular site?

**Mr Stevens**—It was a point of relevance. If one looks at the diagram of distribution of present residences it is predominantly over the eastern and south-eastern side of the city and this site was probably more favourable than many of the alternative sites on Australian Government land which we looked at and were available to us. We looked at the question of staff housing. We sent a circular around to staff presently employed and of the something like eighty-five staff I think seventy said they would be coming by car or relying on a car-pool type of approach rather than using public transport. Of course that is a situation which applies now with the one exception that the staff has problems with parking where we are now—we have not much space for parking at all.

**CHAIRMAN**—The environmental impact statement prepared by Mr O'Connor has not yet been presented but I have had the benefit of reading it and in part it states:

The proposed site has very few transportation advantages over other areas within the metropolitan region. At present there are no special road transport facilities and public transport services are poor.

That appears in appendix 4, at page 2, paragraph 4 of that submission. But in your submission at page 5 paragraph 3.3, you assert that there is 'acceptable access by rail and

road for the staff'. Would you like to comment on the apparent conflict between these two statements?

**Mr Stevens**—If I heard you clearly, the environmental impact statement referred to public road transport. When we said, 'acceptable access by rail and road' we were referring to the question of adequate feeder roads for people driving their own vehicles. We have looked at this. We asked the people who were going to drive their own cars to indicate from which direction they would be approaching the site and I think something like 60 per cent would be coming from the western direction and 40 per cent from the eastern direction. I think the conflict there, if any, if I heard you clearly, was in relation to established public transport by road—buses from the railway station. I think Senator Melzer mentioned that there was only a bus there. We, perhaps, incidentally were envisaging this area as a developing one and bus services and things of this sort do increase.

**CHAIRMAN**—I will pursue that matter with Mr O'Connor when he comes forward. Still on this subject of transport, and speaking about cars, in your brief to Housing and Construction, what was the aim of your laboratory so far as staff parking of cars was concerned?

**Mr Stevens**—We set out with the idea of being able to provide adequate parking for members of staff who wished to travel to work by their own private vehicles. We wished also to provide adequate space for the parking of any cars which may come bringing visitors, who range from professional and technical people to interstate people, and official cars. Also you might have, on occasions, patients coming from hospitals in taxis or ambulances. I should add that in that case those patients who come are not desperately ill in the sense that they need medical care for their survival on the spot. We asked the Department of Housing and Construction to provide adequate spacing for the accommodation of cars. We left it to them to locate where, in their experience in design and layout this should best be in relation to the laboratory.

**CHAIRMAN**—Would it be fair to say that parking space will be available for all of those who wish to drive to work?

**Mr Stevens**—Yes.

**CHAIRMAN**—You may not be able to answer this and I may have to refer it to the

Department of Housing and Construction, but have you any idea what timing is involved in the suggested freeway and road improvements which it is suggested will give better access to the site?

**Mr Stevens**—I have not got any notes on that. It might be better for Housing and Construction to have that question raised, and perhaps we can confer on it.

**CHAIRMAN**—Thank you, Mr Stevens those are all the questions I have. The normal procedure of the Committee is for supplementary questions now to be asked, but as the Department of Health will be presenting the environmental impact statement we would be pleased if you remained with us at the table. Mr Dunlop will be questioned on the environmental impact statement, and if members of the Committee have supplementary questions which they would like to ask of you in relation to the evidence that you have presented they are quite free to do it. On the completion of the formal questioning of Mr Dunlop, we will have a quick round of supplementary questions again and then you gentlemen will be excused. I think you understand that you will be required to come back after all witnesses have been called. The Committee would require you to give answers to questions that may be raised by other witnesses.

Mr Dunlop, the Committee has had the benefit of reading the environmental impact statement and it is the view of the Committee that the first 5 pages are repetitive of evidence already given by the Department of Health. Page 14 to page 17 deals with an Australian Dental Standards Laboratory, which is not included in the project, and the appendices. Questions on the site evaluations have been very adequately answered by Mr Stevens. So it is suggested that, in order to conserve time, you commence reading from page 6, paragraph 6, through to the conclusion of page 13. The Committee has read the rest of the evidence. As I mentioned, the part relating to the Australian Dental Standards Laboratory is of no relevance at all and therefore will be excluded. The rest of the evidence will be included in the transcript as though it had been read and the Committee will be free to question you on it, even though you do not read it. Will you please begin reading from page 6, paragraph 6?

**Mr Dunlop**—Yes, Mr Chairman. It reads as follows:

## 1 INTRODUCTION

This statement is intended to provide to Cabinet a preliminary assessment of the resultant effect of the proposed building on the present environment.

After studying the project in terms of the issues examined, no detrimental effects or controversial aspects have become evident.

## 2 PRESENT SITUATION

The Australian Radiation Laboratory of the Department of Health is at present carrying out its function in 7 separate buildings.

Of these, 6 are located in old buildings on the Australian Government Block in Melbourne and 1 is located in the grounds of the University of Melbourne.

Only the last mentioned building which was constructed in 1938 was designed specifically for the purposes of the Laboratory.

The other premises, four of them connected in two pairs, are renovated buildings which inevitably suffer from the disadvantage that the scientific, technical and administrative work space has been fitted into them rather than the buildings having been designed to meet special needs and work flow patterns.

The present accommodation which is considered sub-standard by the Chief Property Officer (Victoria)

- does not now provide adequate floor space.
- results in inefficiencies due to difficulties in communication and in inter-disciplinary liaison on scientific and technical problems between the various sub-sections of the laboratory.
- potentially leads to staff being exposed to unnecessarily high radiation doses.
- limits the Laboratory in the effectiveness with which it can discharge its full functions.

## 3 FUTURE SITUATION

There is a rapid expansion in the work programs within the approved functions of the Laboratory with respect to

- the supply of radiopharmaceuticals for use on patients
- the quality assurance of radiopharmaceuticals
- the investigation of physical aspects of safety in the increasing use of micro-waves and lasers
- the standardising responsibilities of the Laboratory as an agent of CSIRO under the Weights and Measures (National Standards) Act and regulations
- the development, construction and maintenance of a wide range of mechanical and electronic equipment.

The effectiveness of the work of most sections and sub-sections of the Laboratory is impaired by the present accommodation and it appears likely that, in the absence of additional suitable accommodation, some of the important functions of the Laboratory will have to be set aside or at least undertaken at a reduced level.

Significant expenditure on maintenance and new works will be necessary in the existing premises if occupancy of them is to continue for long.

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The University of Melbourne has given notice that it wishes to use the land occupied by the present small premises of the Laboratory in the grounds of that University for the construction of a major complex of its own.

The Department of Services and Property advised in a memorandum of 15 August 1972 that the buildings occupied by the Australian Radiation Laboratory in Lonsdale Street and Spring Street are to be vacated. Currently the site is subject to an early submission to Cabinet for developing the site as office accommodation. The date the site will be required is not yet known but at the earliest would be in early 1975. Provision could be made in the proposed Building Program to construct the new building around the existing laboratories for the early part of the building program.

## 4 OBJECTIVES SOUGHT BY PROPOSAL

An important objective is the unification at the earliest time of all the sections of the Australian Radiation Laboratory. Because of the diverse nature of the activities the Laboratory carries out within its functions, it is essential that the new premises should take account of special requirements for some activities.

These requirements include

- high weight bearing capacity for some floor areas.
  - floor loads will vary from 200 to 500 lbs per square foot.
- isolation of 'high' and 'low' level radiation levels.
  - activities in the radiopharmaceutical dispensing and preparation areas will not interfere with measurement of low levels of radioactivity such as fall out measurement programs and radioactivity standardisation.

The proposal aims at providing adequate space in a building specially designed for the activities to be undertaken so that the Laboratory may carry forward effectively and efficiently the full work programs which derive from its approved functions.

An important benefit from the proposal will be the establishment of facilities which will ensure that these work programs can be carried out under conditions which meet recognised standards for work involving

- ionising radiation,
- radioactive substances,
- microwaves, lasers and toxic substances,
- of mechanical and electronic equipment
- and machine tools.

## 5 PROPOSAL

### 5.1 Building Design

The overall proposal is the construction of a laboratory and administrative complex to accommodate all of the activities of the Australian Radiation Laboratory.

The design will take the form of a double storey administrative block which will be joined by a communication corridor to two wings housing the various scientific and technical laboratories.

These laboratories will be of single storey construction and will be arranged to provide the necessary separation between incompatible activities.

The accommodation proposed will be planned to meet anticipated expansion to the year 1980.

Further expansion of the accommodation if required will be possible by the extension of one or both of the wings.

### 5.2 Site Location and Access

The proposed site is an area of eight acres on Australian Government land which is at present used by a horse riding school in the south east corner of the approximately 440 acre Watsonia Army Camp Site in Victoria.

The site is approximately 10 miles in a direct line, and approximately 14 miles by major roads from the centre of Melbourne.

The travelling time by car to the centre of the city of Melbourne is about 25 minutes.

The site has acceptable access to the Tullamarine Airport for the collection of shipments of radiopharmaceuticals from the Australian Atomic Energy Commission at Sydney and from overseas sources. Acceptable access to air freight and rail freight depots for the dispatch of radiopharmaceuticals and other radioactive materials together with reasonable access by rail and road for the staff of the Laboratory is available.

### 5.3 Future Access

In addition freeways at present under construction or being planned will further assist access to Tullamarine Airport and to the city.

Freeway (F5) is proposed to be constructed from Calder Highway to Greensborough and to connect with the Tullamarine Freeway.

It is understood that the Freeway (F5) is planned to go ahead but will not commence within the next five years.

It is understood that improvements in the surface of roads including an overpass over Pascoe Vale Road and the railway line are being planned which will improve access to Tullamarine Airport.

A further freeway connecting Freeway (F5) to Greensborough at Yallambie Road is proposed.

When the work is carried out a freeway network will eventually be available from Tullamarine Airport to the Watsonia Army Camp Site.

Completion of the Eastern Freeway will facilitate access to the city via Rosanna and Burke Roads.

Advice has been received that Lower Plenty Road will be widened and this has been taken into consideration in designating the proposed building.

### 5.4 Vehicular Parking and Movement

On site parking for 68 cars will be provided the majority of which will assemble and disperse over a half hour period each morning and afternoon from Monday to Friday.

It is anticipated that there could be movement of up to one-third of these cars to and from local shopping areas at about mid-day.

Outside the above movements there would be some early morning traffic because of the need for staff in the Radiopharmaceutical Sub-Section to commence duty early to dispense and dispatch short half life radiopharmaceuticals for use in hospitals throughout Australia.

During the day, there would be a small movement of traffic to and from the Laboratory for deliveries and collections and for the transport of visitors.

Apart from special programmes such as involving attendance of staff on duty each night and each week-end to measure fallout samples with respect to French nuclear weapon tests in the atmosphere in Polynesia, the traffic to the Laboratory during out of normal duty hours would be small, arising only from essential overtime duty and evening meetings of Committees.

## 6 IMPACT ISSUES

### 6.1 Fauna and Flora

The site at present has on it a number of trees (mainly gums) and it is proposed to retain as many of these as is feasible in the design and location of the building on the site.

It is planned that the area of the site which is not used for building purposes and paved for roads, car parking and for out-of-door experiments will be kept as natural park land rather than turned into formal lawns.

It is proposed to plant Australian native trees and shrubs on the site to provide a pleasant setting for the building.

Efforts will be made to encourage local flora and fauna (especially native birds).

### 6.2 Environmental Protection

The actions which will be taken to protect the environment are best summarized by referring to the activities undertaken by the Australian Radiation Laboratory and to identify components of them which may be potentially harmful to the environment.

### 6.3 Building Functions

6.3.1 Administration: Apart from the movement of vehicles already outlined in paragraphs 4.4 no activities potentially harmful to the environment can be identified.

6.3.2 Technical Services Section: This section undertakes the development, construction and maintenance of a wide range of mechanical and electronic equipment. Essentially this equipment is of the laboratory type and does not involve heavy engineering and accordingly noise pollution will not be a problem.

Fumes will arise in welding and spray painting but these fumes will be dealt with by the installation of a properly designed spray painting booth and welding fumes will be exhausted to the atmosphere with a high degree of air dilution.

A small amount of work is carried out with molten lead and arrangements will be made to protect staff and the environment from lead fumes.

Efficient extraction systems will be provided to collect sawdust and shavings from woodworking machines and from small metal grinding wheels.

### 6.3.3 Dosimetry and Health Physics Section

This section includes

- Dosimetry and Sealed Sources Sub-Section,
- Health Physics Sub-Section.

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6.3.4 Dosimetry and Sealed Sources Sub-Section: In this sub-section a variety of X-ray equipment is in use and a range of sealed radioactive sources will be manipulated, none of which will give rise to a release of radioactivity into the environment.

The facilities in which the X-ray sources are operated and sealed radioactive sources are manipulated will be designed, and work procedures (including monitoring) will be planned, so that any radiation dose received by a member of the staff of the Laboratory will be within the limits laid down by the current Radiation Protection Standards of the Australian National Health and Medical Research Council.

These Standards are based on the recommendations of the International Commission on Radiological Protection.

With respect to the potential external irradiation of the members of the public from these X-ray equipments and these sealed radioactive sources used in the Laboratory, facilities, work procedures and monitoring will ensure that no person at the boundary of the site could receive a radiation dose in excess of one-hundredth of the dose limits established by the Australian National Health and Medical Research Council for such persons.

Again these dose limits are based on the recommendations of the International Commission on Radiological Protection.

6.3.5 Health Physics Sub-Section: This Sub-Section makes use of a variety of X-ray equipment, sealed radioactive sources, unsealed radioactive sources, sources of microwaves and of lasers.

With all these sources of ionizing and non-ionizing radiation facilities, work procedures and monitoring will ensure a safe environment for the staff of the Laboratory and an even greater reduction of any potential exposure to those radiations by members of the public and lower forms of life in the area.

6.3.6 Radioactivity and Environmental Radiation Section

This section includes

- Radionuclide Metrology Sub-Section,
- Environmental Radiation Sub-Section,
- Radiopharmaceutical Sub-Section.

6.3.7 Radionuclide Metrology Sub-Section: In this sub-section very low levels of unsealed radioactive sources are measured.

This activity involves preparation of these sources.

Facilities which will include absolute filters on 'glove boxes' used for manipulating unsealed sources, work procedures and monitoring will ensure a safe environment for the staff of the Laboratory and for members of the public.

6.3.8 Environmental Radiation Sub-Section: This sub-section carries out assays on a wide range of environmental samples and on foodstuffs, water, etc. to determine the levels of radioactivity in them due to naturally occurring radioactive materials and to man-made sources such as fallout from nuclear weapon tests.

In addition, it carries out measurements of environmental radiation (such as in buildings).

Accordingly the levels of radioactivity and radiation involved are those already present in the environment, in foodstuffs, etc, and the activities of this sub-section do not create an environmental hazard due to ionizing radiation.

In the preparation of samples for assay both ashing and chemical procedures are used.

Ashing is carried out in temperature controlled furnaces and the emission of air impurities from these furnaces will be adequately controlled.

The chemistry laboratory will include fume hoods, the exhaust flues of which will be discharged vertically upwards above this laboratory.

The distance between the proposed chemistry laboratory and the site boundaries will be sufficiently great to dissipate this discharge at a concentration which will not affect the surrounding environment and any forms of life.

The discharge of chemicals including acids will be dealt with in a later section.

6.3.9 Radiopharmaceutical Sub-Section: In this sub-section bulk supplies of radioactive materials in an unsealed form are used.

Some of these are dispensed, without prior preparation, into individual patient dose.

Others of them are used in the preparation of radiopharmaceuticals for subsequent dispensing into individual patient doses.

The amount of radioactivity involved and its nature both pose potential problems as an external source of radiation exposure and also as a source of environmental release of radioactivity.

The laboratory in which this sub-section will operate will be provided with radiation shielding as required and will operate under laid down work procedures and monitoring so as to ensure that the conditions outlined in paragraph 6.3.4 with respect to external radiation are satisfied.

The release of radioactivity into the working environment of the staff, and into the outside environment, will be controlled.

In addition to laid down work procedures and monitoring, use will be made of 'glove boxes' and fume hoods.

Ventilation of the work area will be by exhausting the air through the exhaust flues of these units.

The emissions of radioactivity from these exhaust flues will be reduced to below the levels prescribed in the Victorian Radioactive Substances Regulations by the use of appropriate filter systems on the exhaust flues.

The question of the dispersal of radioactive materials in liquid form will be discussed in a later section.

## 7 WASTE DISPOSAL

### 7.1 Sewerage

In addition to normal domestic-type waste, various other substances from laboratories and other sources may be introduced into the sewerage system.

### 7.2 Acids

Acids from all laboratories, and in particular from the chemistry laboratory in the Environmental Radiation Sub-Section, will be flushed with adequate water supplies through a neutralising pit.

Weekly pH readings of the discharge from the pit will be taken to monitor the effectiveness of the neutralising agent and determine the need for its replacement.

### 7.3 Chemical Solvents

Most of the solvents used in all sub-sections will be evaporated away during use.

Those solvents which are not evaporated will be disposed of according to whether they are water soluble or not.

Water soluble materials will be highly diluted and discharged into the sewerage system.

Non-water soluble solvents will be collected from laboratories and disposed of by burning in an industrial incinerator (see below).

### 7.4 Other Chemicals

Other chemicals will be highly diluted and disposed of directly into the sewerage system.

### 7.5 Radioactive Waste in Liquid Form

Radioactive waste in liquid form will be disposed of into the sewerage system at concentrations which meet the requirements of the Victorian Radioactive Substances Regulations.

In some circumstances the concentrations will be achieved solely by dilution with water and direct disposal into the sewerage system.

Higher levels of liquid radioactive waste will, after dilution, be transferred to one or more holding tanks to permit reduction of concentration of radioactivity by radioactive decay to a level such that the requirements of the Victorian Radioactive Substances Regulation will be met when the tanks are flushed into the sewerage system.

Any release from these holding tanks into the sewerage system would only be made after an evaluation of the concentration of the effluent in them.

### 7.6 Radioactive Waste in Solid Form

Radioactive waste in solid form will be disposed following procedures approved of by the Victorian Department of Health under its Radioactive Substances Regulations.

### 7.7 Products Emitted to the Atmosphere

No obnoxious fumes will be emitted to the atmosphere.

Provision will be made to disperse fumes from chemical laboratory exhaust system.

Any air exhausted from radioactive areas will be through absolute filters.

7.8 Incineration (Deleted by direction of Chairman at the request of Mr Stevens).

## 8 TRANSPORT OF RADIOACTIVE SUBSTANCES

Radioactive substances in shipping containers will be transported from the Laboratory.

The procedures for such transport carried out by the Laboratory will comply with the requirements of the Victorian Radioactive Substances Regulations or the Code of Practice prepared by the International Atomic Energy Agency for such transport, whichever is the more stringent.

Environmental Impact Statement relating to the Australian Dental Standards Laboratory deleted by direction of Chairman.

## SITE EVALUATIONS

### 1 INTRODUCTION

Details of a number of commercial sites in the inner suburbs have been provided by the Department of Services and Property. However investigations have not been made of these sites because

- it is considered land at present owned by the Australian Government should be examined first
- the cost of commercial land in these areas is expensive
- the land available was mainly of a smaller area and would have necessitated a multi storey building thereby increasing costs and possibly increasing difficulties in construction due to incompatibilities of functions of the Australian Radiation Laboratory
- the time necessary for the Department of Services and Property to obtain the land would possibly delay the building program beyond an acceptable date.

### 2 GOVERNMENT OWNED SITES

Australian Government holdings examined included

- Site (1) at Bundoora
- Site (1) at Keilor
- Site (1) at Campbellfield
- Sites (3) at Essendon Airport
- Sites (4) at Watsonia.

Investigations of each of these sites have been undertaken and the following information has been ascertained.

### 3 SITE AT BUNDOORA

This site in Plenty Road near Grimshaw Road was part of an original site sold to the Australian Government by the State of Victoria.

Early inquiries suggested that this was Australian Government land.

Subsequent inquiries established that the Australian Government sold the land back to the Victorian Government and the Victorian Government had committed the land for a particular use and feasibility studies to determine the best manner to use the area are at present being undertaken.

The evaluation was that to make any attempt to negotiate with the Victorian Government to purchase part of this land at Bundoora would involve considerable delays in arriving at a decision with respect to a site for the proposed building.

Although the land was considered satisfactory for the siting of the Laboratories such a delay was unacceptable in terms of the planned time scale for achieving new premises for the 2 laboratories.

### 4 SITE AT KEILOR

This is a large site situated in Milleara Road, Keilor, which is held by the Department of the Army.

This land is close to Tullamarine Airport and is a satisfactory distance to the city by road.

The area is not well served by Public Transport and is well distant from the homes of present staff of the Laboratory, and appears to have little to offer in its favour as a site for the 2 laboratories.

The site was considered as unsuitable.

## 5 SITE AT CAMPBELLFIELD

This site was part of a site available at the back of a large area of land held by the Australian Government on Camp Road.

Only entry to the site is by one road through a residential area and then, at present, across country.

A lengthy road would need to be constructed to gain access to the land.

The site was considered unsuitable.

## 6 SITES AT ESSENDON AIRPORT

A number of sites were examined at Essendon Airport.

Initially it was advised that land may be available in the general area of the old passenger terminal.

Later advice, however, limited the available sites to:

- Site North of the reservoir
- Site on Northern boundary
- Site cut off airport by the Tullamarine Freeway.

The first and second sites above were considered unsuitable being sites on the edge of the present airfield and being remote from public transport.

Site three above is within easy access to Tullamarine and the City and would be the preferred site of the three offered in the Essendon Airport area.

This land is triangular and bounded by the Freeway, First Avenue and Carnarvon Road.

The site is at present used as park land and is in a built-up residential area.

It is anticipated that a laboratory may be considered an unsuitable amenity to the area.

In general, sites on Essendon Airport land are not preferred because

- it is understood that no firm policy decision had been taken concerning the future use of the total area of Essendon Airport.

Formal approach for an allocation of land at the Essendon Airport might give rise to delays while policy decisions are made, and may bring possible opposition from other organisations and persons who have already expressed interest in the possible development of the Essendon Airport site.

- Possible effects of vibration, due to low flying aircraft, on scientific equipment
- Possible noise arising from aircraft engine maintenance.
- Possible interference with scientific equipment by radar equipments in the area.
- The risk (recognised as remote but higher than in other areas) of an aircraft crashing on the building.
- Problem of daily transport for many of the existing officers of the two laboratories.

## 7 SITES AT WATSONIA

Four sites were examined on land held by the Army at Watsonia.

These sites were as follows

- Area in the N.E. corner with frontage to Yallambie Road
- Area east of the present entry from Lower Plenty Road

- Area with a frontage to Greensborough Road near south west corner

- Area in the S. E. corner with a frontage to Lower Plenty Road.

The area in the N. E. corner was an excellent site except that:

- the nearest public transport is about one mile from the site
- power lines are adjacent to the site, although these may be far enough distant from the building not to cause interference
- the site is close to a proposed S.E.C. terminal and this could cause problems with scientific equipment when the terminal is built.

The area east of the present entry from Lower Plenty Road is considered too small for the proposed construction and advice has been received that the Army has not yet made a firm decision as to when the entry to the camp from Lower Plenty Road is to be constructed.

A site with frontage on Greensborough Road was, on first evaluation, considered to be the most satisfactory.

However, Greensborough Road is to be widened and advice has been received that no access road will be provided to this site from Greensborough Road.

Advice has also been received that there could be some difficulties in connecting sewerage to the site.

It is considered that the most satisfactory area on land held by the Army at Watsonia is the area in the south east corner of the site with frontage to Lower Plenty Road.

The land falls west to east with approximately a 1 in 10 fall to a creek.

This fall will ensure good drainage of the site at all times.

A regular bus service travels between Research and Heidelberg via the site and connects with the train service at Rosanna Station.

The site is considered to be good building land and at this stage, without the result of test holes, nothing detrimental to building is known.

## CONCLUSION

As a result of the investigations made, the Australian Department of Health and the Australian Department of Works believe that the establishment of the proposed laboratories will provide services of benefit to the community and will not have any detrimental effects on the environment.

## ENVIRONMENTAL IMPACT STATEMENT ADDENDUM No. 1

Proposed Premises for the Australian Radiation Laboratory at Lower Plenty Road, Yallambie

An Environmental Impact Statement was prepared in August 1973 outlining a proposal to construct new premises for the Australian Radiation Laboratory and Australian Dental Standards Laboratory.

Since the preparation of this Impact Statement a departmental decision has been taken not to include the Australian Dental Standards Laboratory in the complex. Separate arrangements are being made to accommodate Australian Dental Standards Laboratory.

A further decision was taken to transfer the former Fallout Studies Unit from the Department of Science to the Department of Health (Australian Radiation Laboratory).

The small area (approximately 1/6 of the total area) previously allocated to the Australian Dental Standards Laboratory has now been allocated to the Australian Radiation Laboratory to provide for this increased activity.

The former Fallout Studies Unit will be integrated into the Environmental Radiation sub-section of the Laboratory (refer paragraph 6.3.8 of Environmental Impact Statement) and will give that sub-section the following additional activities.

'The organisation of the fallout sampling program, the undertaking of data analysis relevant to fallout monitoring and associated research'.

There is no fundamental change to the design of the building as previously proposed.

The additional impact on the environment will be of minor nature. A total of seven staff positions have been transferred from the Department of Science and the total staff of the Laboratory will be approximately 90, about the same as previously envisaged.

The volume of ashing of samples performed by the sub-section in temperature controlled furnaces will be increased. The additional emissions of air impurities from the furnaces will be adequately controlled, as was the plan with the earlier lesser work volume.

The transfer of the Fallout Studies Unit from Department of Science further increases the need to unify the Australian Radiation Laboratory from its present scattered premises. In addition to the 6 buildings on the Australian Government Centre block and the building at the University of Melbourne, part of the activities of the former Fallout Studies Unit will continue to be carried out in premises at Maribyrnong until new premises are available for the whole Laboratory.

In the Victorian Government Gazette No. 98 of 10 October 1973 page 3430 notice was given of intention to assign the name 'Yallambie' in the north east area of the City of Heidelberg. In anticipation of the name 'Yallambie' being assigned to this area the address of the proposed premises for the Laboratory is being shown as Lower Plenty Road, Yallambie, Victoria.

**CHAIRMAN**—Is there anything you wish to add to that statement before we turn you over to the tender mercies of the Committee for cross-questioning?

**Mr Dunlop**—Mr Stevens would like to add something to the statement. I think then, in the questions, as a lot of them may be concerned with radiation, that it would be preferable for Mr Stevens to answer them rather than for me to attempt to answer them.

**CHAIRMAN**—Yes, you are free to answer these questions through whoever you feel is the most competent on that particular subject as the questions arise. That course will be followed.

**Mr Stevens**—A point which I would wish to draw to the attention of the Committee relates to Section 7.8 'Incineration' which Mr Dunlop has just read. This impact statement was prepared in August 1973. At that stage it was intended that we would establish in the laboratory an incinerator to burn the type of package there described. It is non-radioactive. It just had some labels on it. We felt that it was prudent not to create public concern. The character of the exercise, which I have been stressing several times, is that this is what we indicated to the Department of Housing and Construction that we would like to have. After studying the problem, they said: 'We cannot produce an incinerator located where you want it for this purpose.' So now we strike from this all references to an incinerator on site. There will be no incinerator on site and that is not shown in the plans at all. There is no incinerator to burn any waste from the laboratory. We will dispose of these wrappings by other means, again to safeguard public concern because of the labelling.

**CHAIRMAN**—Then, Mr Stevens, you want paragraph 7.8 struck from the record, is that correct?

**Mr Stevens**—Thank you.

**CHAIRMAN**—It shall be done, and it will be treated as if it had not been read or presented.

**Mr BONNETT**—You beat me to the punch there, Mr Stevens. There are a couple of things I am not quite sure of, which I think need amplification or clarification. You mentioned early in the submission, on page 2, a temperature-controlled furnace, and said that the emissions of air impurities from this furnace will be adequately controlled. I did not notice any furnaces in your laboratory yesterday. Do you have them there? I would like to have a little more information on these temperature-controlled furnaces, particularly with regard to the emission of air impurities and how you are going to control them.

**Mr Stevens**—There is one furnace in our existing laboratory, which was visited yesterday. There are additional furnaces for the same purpose in the section at the Defence Standards Laboratory at Maribyrnong, which you did not view yesterday. These furnaces are used as indicated, as I recall it in the evidence Mr Dunlop read, to reduce to ash environmental samples which may range from

flour to grasses, ion exchange columns, adhesive discs and so on. This is done to reduce the bulk of the sample, prior to its chemical treatment to extract the particular radioactive component, fall-out component, for example, to measure Strontium-90 or Caesium-137. These are environmental samples. The matter of dealing with any possible emission from that, of course, again we referred to our colleagues in the Department of Housing and Construction. Their advice is that the flue gases from the ashing furnaces will be collected and passed through a direct gas-fired after-burner system to effectively break down any substances which may be present. Anticipated flue gas treatment temperature is expected to be of the order of 850 degrees Celsius, with a retention time of .5 seconds. I am reading from a statement. It is an engineering design. We posed the problem to the Department of Housing and Construction, and that is the note that I have from there. You might like to follow it up with them.

**Mr BONNETT**—And then on page 7 again, it states:

Efficient extraction systems will be provided to collect sawdust and shavings from woodworking machines and from small metal grinding wheels.

I would like also a little information about efficient extraction systems.

**Mr Stevens**—The amount of woodwork that we use in the laboratory is very small. Our estimate is that we would accumulate less than half of one 4-gallon drum of sawdust or woodshavings in any week, but not every week. As I recall it, you can put on a circular saw an extraction bag into which the sawdust goes. It is not a big operation, but we wanted to take care of it. If I could emphasise it more from our own point of view, we do not want to get this sort of rubbish mixed up with our machine tools. It is only at low level, and the same could be said about swarfs from lathes and so on—about half a 4-gallon drum collected in any one week. It is not, as we have said in the evidence, a big heavy engineering operation.

**Mr BONNETT**—Fair enough. All I wanted was information about the efficient extraction systems. I wanted to know what the score was there. On page 10, you have me a bit flummoxed:

The chemistry laboratory will include fume hoods, the exhaust flues of which will be discharged vertically upwards above this laboratory.

The distance between the proposed chemistry laboratory and the site boundaries will be sufficiently great to dissipate this discharge at a concentration which will not affect the surrounding environment and any forms of life.

I imagine these fumes collected by the fume hoods go up the exhaust flues and are dissipated? Is that right? There is no filter system at all on these?

**Mr Stevens**—Not on those chemistry hoods.

**Mr BONNETT**—Nothing that you use in the chemistry laboratory warrants a filter system?

**Mr Stevens**—No. A lot of the things which are done in there would be no more, in a lot of cases, than reducing volume, for example evaporating 4-gallon drums of water. It is a question of evaporating the water down; that will be carried up, to use that as an example.

**Mr BONNETT**—At the bottom of page 10 you say:

The release of radioactivity into the working environment of the staff, and into the outside environment, will be controlled.

I am a tiger for a bit of detail. How will it be controlled?

**Mr Stevens**—The control here is the special effort, to which I have made reference on several occasions: The use—this is for the external environment—of absolute filters, as they are termed. These filters which are 99.97 per cent effective for removing particulate material, are referred to as HEPA filters, high efficiency particulate air filters. There will be mounted also with those in appropriate laboratories—and a radio-pharmaceutical laboratory is an appropriate one—an activated carbon filter which will extract vapours like radioactive iodine. These filter systems are ones which we in the laboratory were familiar with, and no doubt the Department of Housing and Construction could have found this out too by literature search if they were not previously familiar with them for their use in terms of radioactivity. But, as I think I have already mentioned this morning, we were not satisfied with this; we went to the Australian Atomic Energy Commission, who have had experience in this area, and said: 'What should we use?', and this is it. That was the type. We went further, though. We are not just going to think in terms of those. These are going to be subject to very rigidly

described tests for efficiency. The test procedure described, which is considered equivalent at this time, is what we call a hot 'DOP' test. It is a chemical procedure, and this is specified in a U.S. military specification. This is a recognised standard test for efficiency. This test of efficiency of the filter not only tests the efficiency of the filter material itself, but also is designed to test the efficiency of installation and efficiency during use. The whole system is to have a ducting system. There is to be a monitoring system to monitor radioactivity after material passes through the filters, so that you can check on it. The Department of Housing and Construction has also designed into the filter system a monitoring system, and an alarm cut-off system should the filter differentials of pressure deteriorate for any reason. So that there are going to be built-in alarms to cut the filters off, so that the material will not go out should the filter be not operating efficiently. Does that answer your question?

**Mr BONNETT**—Yes, thank you. On page 11 you talk of acids being flushed with adequate water supplies through a neutralising pit. Briefly, what is in this neutralising pit?

**Mr Stevens**—Somewhere—I think it is in some of the statements which we supplied in response to questions to a community group, and to the group preparing the independent environmental impact statement—we did say that we were going to use marble chips, calcium carbonate. But we have all along in this project been in consultation with the Melbourne and Metropolitan Board of Works, and we bend to their guidance. Most recently we advised the authorities whom we had told that we were going to use marble chips, that the Melbourne and Metropolitan Board of Works are now requiring us to use anhydrous sodium carbonate as an effective treatment. This is a pit which contains quite a large volume of water which neutralises acids. It is a standard chemical laboratory pit.

**Mr BONNETT**—That is fair enough. On page 9 you are talking about 'glove boxes' and unsealed sources. I think I know what glove boxes are, but I would like to know for sure.

**Mr Stevens**—A glove box is a sealed box which will have an exhaust flue from the radioactive area that will go through this filter system in the exhaust. Then it will have, where you put hands in, some rubber gloves.

I talked earlier of people using materials in terms of wearing their own gloves. These are gloves which are fixed in, so you can never touch the outside of the glove which is inside the glove box itself. You do not even put your hand in. This is the standard practice for this sort of thing. It is not only used in radioactive areas.

**Mr BONNETT**—The conclusion states:

As a result of the investigations made, the Australian Department of Health and the Australian Department of Works believe that the establishment of the proposed laboratories will provide services of benefit to the community and will not have any detrimental effects on the environment.

As we have gone to such great lengths in questioning this morning, plus the submissions, I would like to have seen it stated that there will be no detrimental effects on humans. I know that probably humans are included in 'environment' but I would like to have seen it mentioned.

**Mr Stevens**—I am sorry. That is an omission. It was intended to cover the environment, the biosphere, including humans.

**Mr GARRICK**—Mr Stevens has already destroyed most of my questions, but there is one here I think it would be wise to have answered. He mentioned that radioactive waste in liquid form will be disposed of in the sewerage system and concentrations would meet the requirements of the Victorian Radioactive Substances Regulations. Actually I understand your answer, it satisfies me, and I would think that already you are doing this very thing within the City of Melbourne now, but can you give an assurance that there is no danger to the environment or to the surrounding district, by putting this waste into the sewerage system?

**Mr Stevens**—I can give that assurance and say that what we are proposing to do in the proposed premises is much more stringent than what we are employing now. I could go into details of it, if you want me to. It is a very interesting subject. We are doing a tremendous amount with these holding tanks. This morning I mentioned that even after we have filled one of these 3 holding tanks taking into account the volume of material, the small amount of the material that we will release, we would be still talking in terms of fractions of the International Commission on Radiological Protection drinking water levels, of 1/20th to 1/15,000th. And that then will

be diluted by the other domestic waste that comes from the rest of the laboratory and the domestic waste that is going into the sewer. We have appraised the Melbourne Metropolitan Board of Works of the full details of this matter.

**Senator JESSOP**—I have just one short question, and that concerns the laundering, if laundering is carried out, of the uniforms that are normally not to be taken away from the so-called areas of contamination. Is there any laundering process or any other sterilising process for other protective items, for gloves and so on?

**Mr Stevens**—Any contaminated material of that type, or query 'contaminated material' is first going to be monitored with a monitor to see whether there is contamination on it. If it is contaminated, then there are several approaches we can adopt. One is of storage until the material decays. Another is local washing, but local washing again would be carried out in the area where the washing water will go into the holding tanks. This is what these holding tanks are for. Any radioactive material which goes down in liquid form goes into a holding tank.

**Senator JESSOP**—The only other question I have concerns the computer which you envisage installing: This is going to happen, I gather. You do use computers at the moment from other areas, the Aeronautical Research Laboratory, and so on. Is there a cost benefit advantage in this?

**Mr Stevens**—When we use the computer at the Department of Health in Canberra, we get that for nothing. When we use CSIRO computers, we pay for those. We use those for what you might call our bread and butter type of activity. When we come to the use of the computers at the Bureau of Meteorology and at the Aeronautical Research Laboratory, these are, by arrangement used only for our fall-out monitoring programs. It is a matter of interdepartmental arrangements, because of the importance of this activity in terms of government attitudes and policies, and the need for getting the results, and the need to have the results when we want them. This is being done under a special arrangement and we are not charged at the moment. It is inordinately inconvenient to have to go from the centre of Melbourne down to the Aeronautical Research Laboratory or from place A to

place B, as we do now, to get from the computer the results of the 40 samples a day that we are monitoring from our fall-out monitoring program. Even though the Bureau of Meteorology computer is just half a block down from us, we cannot get all the time we want on that, because they have to have the use of their computer. So we are using the Aeronautical Research Laboratory computer at the moment. We have not explored our attitude thoroughly. I think I pointed out that inside the laboratory we have an intramural group of officers looking at this. We have not reached the stage yet of talking about on-line possibilities with the Canberra computer in our own Department. It depends on what availability of time there is. We certainly do not want to go computer-mad in this. I have to say that the computer area is one that we felt it was desirable to put in at this stage of planning. I do not guarantee that we are going to have a computer there. This may be one of those areas which, in 1985, we have not used, and we could be using it as laboratory space and not expanding the premises.

**Mr KEOGH**—Mr Stevens, this statement read by Mr Dunlop is entitled an Environmental Impact Statement. An indication was given by the Chairman of my attitude to a lot of it when he said that much of it was repetition of information that we have been given earlier today. This leads me to the question I am going to ask you. Without wishing to be offensive to you or to the officers of your Department, I rather feel that it is a statement of opinion. Could you give me any idea of the background and the qualifications of the people from your Department who prepared this Environmental Impact Statement, if in fact it was prepared by your Department?

**Mr Stevens**—It was prepared by officers of the Australian Radiation Laboratory in consultation with the officers of the Department of Housing and Construction, because it is a joint problem. You ask for the qualifications of the people who contributed to the preparation of this statement. I take your criticism in the way in which it was meant. It is not a highly technical document; it was not prepared as such. I can tell you the type of technical back-up which was used to prepare this. The technical back-up was prepared and was in fact used and is the subject of the types of detailed answers which the laboratory has provided to the community group questions

appendix H, and in relation to the appendix to the Environmental Impact Statement. You asked for their qualifications: They range from physicist—I am not going necessarily down or up—to chemists and administrative officers. The people involved range from myself—I have mentioned my responsibilities in the international area, some of which are in radiation protection—to people who are in charge of the radiation protection service or the health physics, people who are members of international committees, by correspondence, and of national committees. One observation I would like to make at this stage is that I think it is borne out by the published technical appendix in an environmental statement yet to be presented which was prepared by a competent radiation health physicist. A criticism which is a reasonable one has been made by Mr Keogh that we have not produced all the technical annexes. It was intended to be prepared for 2 purposes: One, because Cabinet required it and we submitted it in what we might call lay language to identify the issues, and two, to indicate to the Cabinet of the Australian Government, to the Department of Urban and Regional Development, and to the Department of Environment and Conservation, the things that we pin-pointed, the things on which we propose to take action, the things that we thought were important to say. I have mentioned before that we at the laboratory—or the Department of Health, because it is the Department of Health Impact Statement—imposed on ourselves a 100th down factor on the NHMRC permissible doses for members of the public and on those of the ICRP. If I could just stress another point, you would see in reference 2 there, and Mr Dunlop read it out, a statement saying that we would meet the requirements of the Victorian Radioactive Substances Regulations. We did not say of such and such a year. We did that deliberately because we have committed ourselves by those words, we commit ourselves to comply with those regulations, whatever they are, whenever they are changed, if there is any change. This is to identify the situation. Let me assure you that we did the sums, we did the type of assessment that can be done on this. We expressed it perhaps unfortunately in a lay type language and, if we want to use an excuse, we were a little short of guidelines as to what one might well prepare in this sort of impact statement. Not too many have been prepared.

**Mr KEOGH**—Can you give me a quick resume on what liaison you had with the Department of Environment and Conservation, particularly with reference to whether they have sighted and endorsed or approved this environmental impact statement?

**Mr Stevens**—I do not have the correspondence with me; we could produce it for the Committee if it wished. But I think the order of approach was this. It was prepared. We discussed the project with the Department of Urban and Regional Development in Canberra—a personal discussion—and left them a copy of the impact statement. We discussed it with the Department of Environment and Conservation. It was at their suggestion and request that we submitted it to the Ministry of Conservation, Victoria, who referred it to the Environmental Protection Authority, the Victorian Department of Health, the Melbourne and Metropolitan Board of Works. As I recall it—this may not be the precise terms—the Australian Department of Environment and Conservation asked us to do this. They had a mutual agreement between themselves and the State environmental authorities that they would see that this was done. Subsequently, when the Victorian Ministry of Conservation informed us that they had no objection to the proposal, this went back to the Department of Environment and Conservation. In the case of the Department of Urban and Regional Development, I am sure the Minister for that Department wrote and had no objection. In the case of the Department of Environment and Conservation, it was the Department that wrote and had no objection. We could, if it was the wish of the Committee, provide copies of those letters tomorrow; they are on record.

**Mr KEOGH**—Yes, I would like to have copies if you have them available. Just to sum up: This would indicate to me that the Government Department of Environment and Conservation would agree with the statement on page 24 of your submission, with perhaps the addition suggested by Mr Bonnett that it would have no detrimental effects on the environment or on any persons or living things.

**Mr Stevens**—That would be my interpretation. When we submitted the documents we, as the scientists, trying to make the correct approach to this, said: 'Please let us know if you want any further information.' We had

no approach from any of those departments, including the Victorian Ministry of Conservation, EPA, the Victorian Department of Health. The only people with whom we had subsequent discussion—that was understandable and inevitable—were the Melbourne and Metropolitan Board of Works. This was directed to the trade waste agreement which has to be drawn up. We said: 'Please let us know if you want any more.' The response was nil. We will produce those letters tomorrow.

**Mr KEOGH**—The impact issue referred to on pages 6 and 7, Fauna and Flora is going to be very important to the overall concept to my way of thinking. It would certainly come very high in my consideration in the deliberations that we will be undertaking following this inquiry. Could I have your assurances—as being responsible for the establishment of these new premises—that you would not tolerate any cutback on any of these things that you referred to? Should it get to the stage, towards the end of the program, that escalating costs make someone suggest: 'Well, we have gone far enough; we cannot spend any more. Perhaps we need not do these things straight away; they can follow a little later?'

**Mr Stevens**—Yes, I will be pleased to answer that question. Our colleagues from the Department of Housing and Construction probably got sick of me in the early stages because I was so adamant. Apart from getting a laboratory which was inherently safe and efficient, and so on, I was hammering every time I talked to them: 'I want that laboratory set in a native bushland setting.' We pressurised them on this. I am sure, later on when they present evidence, they will show a very comprehensive landscaping program. It will indicate to the Committee the degree to which they have gone to plan this. They have sought out conservation groups who have given them the best advice as to the trees and what they will attract and so on. I kept hammering 'I do not want a laboratory set in ordered woods and gardens; I want a laboratory set in lawn, about that long; in a native sort of thing.' I think when you have an opportunity of looking at this material—how the construction was produced—you will be impressed by it, as I am. I said to one of my officers: 'Well, I am very grateful that they have produced this in such a well-documented

form because they are not going to get out of not producing an adequate building; they have it down'.

**Mr KEOGH**—I am quite satisfied with that.

**Senator MELZER**—People are always upset about lead and what people are going to do with it and the fumes that come from it. Are you going to do any work with lead of any consequence? Are you satisfied with the precautions that have been taken to protect people?

**Mr Stevens**—Yes, we do work with lead. Our work with lead is minimal. We have, as you have seen around the laboratory, a lot of things constructed of lead in various shapes. It would be ludicrous to ask the laboratory to undertake that type of construction. We get all our heavy lead castings, all our heavy lead work, done outside the laboratory on a commercial basis. We do not want to be employing lead pattern makers and people of this sort. We machine lead castings but, of course, that does not create a vapour problem because you can keep the machine tools at an appropriate temperature. We do, from time to time, produce small, special lead castings. I hold up my fist and talk about that sort of size. Again, we posed the problem to the Department of Housing and Construction. They have come up with the situation that the generation of lead fumes is going to be minimal; we are going to be working at temperatures just sufficient to melt the lead. To protect against the release of the lead fumes, exhaust air from hoods over lead-melting pots will pass through fabric type filter-collector systems of an efficiency of 99 per cent on a particulate basis; emissions will be below the levels set by the Victorian Environmental Protection Authority. Under these conditions, it is unlikely any significant release of fumes will occur. It is proposed that monitoring of lead vapour will be undertaken both in and outside the laboratory, using methods which are applied by the Industrial Hygiene Division of the Victorian Department of Health.

**Senator MELZER**—You talk about protecting people by monitoring. What do you mean when you say 'monitoring'?

**Mr Stevens**—Well, film badges—that is one type of monitoring. Monitoring what radioactivity, if any, they have on their hands, on

their clothes, by the whole body monitor. That is within the laboratory. On outside monitoring, I have already referred—in an answer, I think, to Mr Garrick or Mr Bonnett—to the question of in-built monitors in the air exhausts. I have also mentioned, in answer to a question, or in the evidence, that any release of effluent from the holding tanks will be after the liquid in the holding tank has been monitored to see if it meets the requirement. There will be monitoring of external radiation by measuring systems in the laboratory, in the work areas, and outside the laboratory, to establish that we do not exceed the radiation dose at our boundary. I cannot say that we are going to put monitors on the fence, because the levels of radiation dose are going to be so small that fluctuations in natural background which occur because of radon release from the soil, for example, would make this unmeaningful. But we can do monitoring to assure ourselves on all those aspects, and people working in this field just live by monitoring; it is a basic sort of situation. We have said in response to questions from the community group and from the group preparing the environmental impact statement, independently I think, that those monitoring results with regard to effluents from the building and in the area outside—but not of the staff, because that is a personal sort of thing—will be available for inspection by arrangement with the laboratory. I have no objection to that. Also in the grounds of the laboratory we will have sampling for fall-out monitoring. That is the most sensitive detector that you could have of any radioactive releases in the area, and I have indicated that the results of that as they relate to activities of the laboratory will also be available. I would not be prepared, for a number of reasons, to make the fall-out results just available generally, because that is a matter to go to the Minister before it is released.

**Senator MELZER**—When you talk about ashing things like milk and bones, in normal circumstances that creates a very unpleasant smell. How are you going to prevent that here?

**Mr Stevens**—This is the after burning flue that I referred to, and this is a situation which the Department of Housing and Construction has dealt with. The assessment of the Department is that at 850 degrees C this will destroy the odour.

**Senator MELZER**—As we saw in the inspection, you have these boxes and tins to dispose of. You are not going to have an incinerator on the site. What are you going to do with them?

**Mr Stevens**—Our problem with these is to dispose of them without creating public concern, because they have a label which says they contain radioactive material—which they then do not, because they are empty and not radioactive. We have not really decided what we are going to do. We are either going to pulp them or shred them—that is the cardboard and so on. As for the tins, we have that problem now. They are free of radioactivity and perfectly clean, because they can be monitored to see that they are clean. Some of those have the words 'radioactive material' on them. We just have to face up to this situation. We will take them by arrangement to a tip, and they will not just be tossed on top of the tip, but buried under rubbish, so they will not be available for people to see. They are not dangerous in any sense, but they could create concern because of the labels.

**Senator POYSER**—I am interested in the impact issues mentioned in paragraph 6.1, Fauna and Flora. You indicate that there will be some trees that will have to be removed. When I inspected the site this morning, I did not notice a great number of trees in the actual construction area. Have you any idea as to how many trees are to be removed from the area?

**Mr Stevens**—Subject to correction on the part of the Department of Housing and Construction, I would say approximately 40, but I would hasten to add that the plan which the Department has drawn up, and which will be presented to you, provides for the planting of 1,000 native trees and 1,000 shrubs.

**Senator POYSER**—I was going to follow up by asking if there would be a far greater replacement to the number of trees to be removed. Presumably many of them would be quick-growing native shrubs and trees.

**Mr Stevens**—They have made a study of this. They have it all planned. They are planning to have them up to a certain height in pipes. They have found it unsatisfactory to remove some of the existing trees. They have established by consulting the right people, that there would be a big loss in moving

existing trees and transplanting them. There are to be 2,000 trees and shrubs planted.

**Senator POYSER**—What type of fencing is going to be used?

**Mr Stevens**—Could I ask for that question to be deferred because I do not have the answer, positively, on that.

**Senator POYSER**—We can take that up at a later stage. What I did notice when I was inspecting the site was an unbelievably clean paddock that horses are kept in. I suspect there is a very enthusiastic gardener here who follows around with a bucket and spade to keep it as clean as I saw it this morning. But the question I want to ask is that if you were a potential home owner and were to buy a house in that area, would you prefer to buy it as now, overlooking a horse paddock, or as an aesthetically designed site.

**Mr Stevens**—I do not intend to be facetious before this Committee. I did take my wife over there—you know, rules of the home—and asked her: 'How would you like to buy a house here?' She said: 'Not on your life. I complain about the flies in the area where I live now'. I do not know what the density of fly population is, but I do know, having come from areas in Queensland, that when you have that type of set-up you are likely to have flies and rodents and things of this sort. I make that general observation; I have no official view.

**Senator POYSER**—I raise this point because there are suggestions that if this laboratory does go into this area there will be a devaluation of properties. From my observation there would be an up-valuation. I just wanted to make that point because I am unable to be here tomorrow when the other witnesses will before the Committee.

**CHAIRMAN**—Mr Stevens, I understand you wanted to make some further comments on the fume cupboards?

**Mr Stevens**—Thank you very much for the opportunity. I apologise to the Committee for missing a point with regard to the fume cupboards. My colleagues here reminded me that I should have known, that in the exhaust systems not equipped with high efficiency HEPA filters backed up with activated carbon filters in appropriate areas, there are what we call scrubbers—water sprays which cleanse the air

as it goes through. The scrubbers in the fume cupboards are very efficient in my experience.

**Mr KEOGH**—I have only three questions for you, and I think one of them has been well traversed. But I do not think it would do any harm if we went through the exercise again. At Page 10 of the Environmental Impact Statement, paragraph 6.3.9, could you again briefly outline the precautions to be taken in the radiopharmaceutical sub-section in the light of your statement which reads:

The amount of radioactivity involved and its nature both pose potential problems as an external source of radiation exposure and also as a source of environmental release of radioactivity.

Could you outline briefly these precautions?

**Mr Stevens**—The first observation I would make is that that statement of course explains the character of the Environmental Impact Statement that we prepared. It clearly identifies as a scientific statement what was the positive impact. What do we intend to do about it? We have two problems, as I was saying earlier when you have a radioactive source, and this is a radioactive source there, and in this section it is going to be an unsealed radioactive source. There is your source of radioactive material and it is emitting radiation and so you have the problem of people working near it, being exposed to radiation, and you have the potential problem of the radiation emerging over a distance but decreasing in radiation dose, following up that inverse square law, that 10ft away the level is so much, 100ft away—which is ten times it—it will be down by a factor of 100. That is one problem. Now, to deal with that distance, that is why we ought to get a bit more space from the staff point of view. We will require local protective barriers in the form of lead bricks in the laboratory for protection of staff; and then protection in the walls as necessary in appropriate areas to cut down external radiation. The other problem is that of the radioactive material itself and its dissemination. We concern ourselves about materials being exhausted. We are having the activated carbon filters backed up by these absolute HEPA filters, with monitoring systems, both to detect the levels of radioactivity and monitoring systems to see that the filters are working effectively. We then think in terms of possible spillage and dissemination within the laboratory. This is a controlled area in the sense that the people there work

under special arrangements; they do not go out of the laboratory in their shoes; they wear overshoes and special coats so that they do not distribute the contamination outside. Particularly we do not want them to do it because of other important measurements of low-level activity but also for the other reasons of environment and so on. Should a spill occur, we do not just sweep it under the mat, sweep it out the door, things of this sort. The approach is to contain the spill. I do not know if you saw them in the laboratory yesterday when you were there—and I do not want to advertise a particular firm's products—but you might have seen things that looked like packets of Kleenex tissues. It is not because everyone has a cold in the laboratory, but from the point of view should a spill occur you want to put some material on it which will sop it up and not let it down everywhere. That is what they are there for, to mop up drops, to contain them. If a clean-up job occurs, then the drainage from that floor will go into the holding tank, any effluent which may contain radioactive material, all those things, will go into the holding tank. The showers which the staff will use if contaminated, or when they want to, will run into the holding tanks, where we have this big dilution tank where the effluent will be monitored before it goes down the sewer. Now, all those precautions would be not worthwhile without a properly indoctrinated, trained staff prepared to deal with any emergency should it arise. There will be available in cupboards special clothing to be worn in the event of a local spill, so that people can be safeguarded from this point of view. And I reiterate that the procedures we are using are not ones we have just conjured up out of the air. They are well established procedures. To anyone who has visited a laboratory of this sort or who has worked in one it is well prepared for such an emergency.

**CHAIRMAN**—You mentioned the laboratories that we visited yesterday and lead shielding and various methods of protection. I gained a very strong impression that a great deal of the shielding that you have in that laboratory is not to protect the outside environment from radiation escaping from the materials with which you are working, but rather so that you can accurately identify the level of radiation in which you are working and to protect the materials from radiation inherent in the environment.

**Mr Stevens**—This is our major worry. When we try to measure the levels we are measuring, and when we want precision, we cannot afford to operate equipment which is going to be impaired or have its results impaired by the radiation which we are creating in the laboratory. One of the worst things we in the laboratory fear we could do in our heavy responsibility of environmental fallout monitoring would be to produce a set of results which were wrong because of contamination created in our own laboratory. We have very stringent rules for procedures, even in the present situation, for how people who can go from that radiopharmaceutical section to the lower levels. You might have noticed that it was not perchance that yesterday when members of the Committee visited the laboratory, we took you through the lower-level laboratory first and then to the radiopharmaceutical laboratory, even though when you went into the radiopharmaceutical laboratory we asked you, please, to comply with the requirement of putting on a coat and putting on overshoes. This is plain good housekeeping, if you like. We are trying to measure levels of activity which are of the order of one thousand million millionth of a curie in some of these fields. We cannot play carelessly from the point of view of the equipment with which we are dealing if we contaminate it. We just do not say: 'We will throw this away, or scrub it down with water', it is very difficult to get clean.

**CHAIRMAN**—You would have to get a very good supply of coats to find one to fit round my girth. Also, just a couple of quick questions to satisfy my mind on this whole question, Mr Stevens. I take it that it is normal practice to dispose of radioactive wastes in liquid form via the sewerage system.

**Mr Stevens**—This is an acceptable and well catered for practice. It is catered for in the Victorian Radioactive Substances Regulations and in that legislation which is applied in other States, modelled on an Act, and Regulations produced by the National Health and Medical Research Council. But immediately I should say that that is only applicable when you have very low levels of radioactive waste. You do not just throw any radioactive material down. You make certain—and I go on record again that we are talking now of reducing the levels of effluent when it comes out of the holding tank and before it has had the additional dilution by our own additional



domestic waste and other domestic wastes, to well below drinking water level.

**CHAIRMAN**—Finally, from my point of view, and you may have said this, but I will ask the question anyhow: Are you able to say where radioactive waste in solid form is disposed of?

**Mr Stevens**—Yes, I can say, but I could not identify the particular place since it changes. When we have the problem of disposing of radioactive waste in this low-level material, we dispose of it in quarries and that type of thing which are being reclaimed. This is a practice which is accepted provided the levels are low enough—again it is in conformity with the practice which is approved of by the Victorian Radioactive Substances Regulations. It is a practice which is applied with the same sorts of radioactive waste produced in universities' research laboratories, hospitals and so on, but the important thing is that we just do not go and throw it on the tip. We send a physicist, a responsible professional officer, who takes account of what goes out and is responsible for ensuring, on a prior arrangement with the Health Department and the City Council or Shire Council, whichever may be involved, that a bulldozer or equivalent is used to ensure that the waste is covered with soil so that no scavenger or what-have-you can go over it.

**CHAIRMAN**—Thank you very much, gentlemen. After we have heard all the other witnesses we will want you to come before us again, and we will have further questions for you.

**Mr Stirling George James Parker**, Assistant Secretary (Medical and Scientific), Department of Housing and Construction, Head Office,

**Mr Ian Southey Bickerstaff**, Associate Director, Projects Division 1, Victorian and Tasmanian Region, Department of Housing and Construction,

**Mr Keith John Walters**, Principal Architect, Scientific, Department of Housing and Construction, Head Office,

**Mr Daniel Paul Rodis**, Project Architect, Department of Housing and Construction, Head Office,

were sworn and examined.

**CHAIRMAN**—Mr Parker, who will be presenting the evidence?

**Mr Parker**—I will, Mr Chairman.

**CHAIRMAN**—Very well. We would be pleased if you would commence presenting your evidence.

**Mr Parker**—Mr Chairman, there have been a number of amendments made to our submission, and I will read it as amended.

**CHAIRMAN**—Thank you, Mr Parker.

**Mr Parker**—The submission reads as follows:

#### 1 INTRODUCTION

The Department of Health requested the Department of Housing and Construction to prepare designs for the redevelopment of the Australian Radiation Laboratory on a new site in the South East corner of the Watsonia Army Camp Site—Victoria and to have the building ready for occupation within 2 years of PWC approval.

The Department of Housing and Construction agreed to this extremely tight time schedule on the basis that site works would commence in May, 1974 and building work would commence not later than July 1974. However, the deferment of the PWC hearing has not permitted these targets to be achieved. This project is now scheduled to be completed 2 years from the time it gains New Works Program status and a tender target month.

In order to avoid wet weather time loss, my Department will use the Housing Commission of Victoria's Concrete House Project Precasting Factory for supply and erection of components, however, a saving in cost is not expected but we expect a saving in time, therefore enabling us to meet the target dates.

On this basis we have planned the building complex using the Commission's system with modifications to suit our requirements.

#### 2 SCOPE OF PROPOSAL

The proposal comprises the erection of 2 storey air-conditioned block to accommodate the Laboratory and supporting Engineering Services; Landscaping; Road Works and Car Parking.

#### 3 SUPPORTING INFORMATION

This Brochure contains the statement, the following drawings and illustration:—

- Site Location Plan, 1.
- Basement Plan, 2.
- Lower Ground Floor Plan, 3.
- Upper Ground Floor Plan, 4.
- Elevations, 5.
- Sections, 6.
- View from South East, 7.

#### 4 THE SITE

The site of approximately 7 acres (330,000 sq. ft) or 3 hectares approximately (30,600 m<sup>2</sup>) in area is located in the suburb of Watsonia now known as

Yallambie, approximately 10 miles (16 kilometers) north east from Melbourne and is bounded on the South side by Lower Plenty Road; the East side by a Residential development known as Yallambie estate and the North and West Sides by Watsonia Army Camp land now used for horse grazing by a private Riding School. The Department of Defence (Army Office) has agreed to the transfer of the site subject to the satisfactory removal and resiting of an existing Army House. Demolition of Stables, Sheds, Fences, etc. will be undertaken prior to the commencement of site works.

The extent of all building work associated with the new laboratories is contained within the site boundaries.

The site falls from West to East to a small creek on part of the east boundary of the site and falls gently from Lower Plenty Road northwards some 200 ft then gently rises and falls to give an undulating terrain.

A 1:200 scale model illustrating the massing of the building and site usage has been prepared.

#### 5 GENERAL PLANNING

Analysis of the Australian Health Department's Brief showed that the following functional requirements would fundamentally affect site planning:

- 1 The nature of the levels of radiation, radioactivity and the risk of contamination necessitated the separation of some laboratories from others by as large a distance as possible.
- 2 Separate entrances are required for—
  - (a) Main Entrance Foyer
  - (b) Radiopharmaceutical Section
  - (c) Store
  - (d) Technical Services Section
  - (e) Whole Body Monitor with separate vehicular roads to—
    - (i) Main Entrance Foyer
    - (ii) Radiopharmaceutical Deliveries
    - (iii) Store, Technical Services and Whole Body Monitor.
- 3 The principles of flexibility are to be followed in planning the laboratory benches, cupboards and drawer units. Provision for moveable partitions shall allow for a particular area originally designed as an office to be converted at a later date to a laboratory area and vice-versa.

#### 6 PLANNING CONSIDERATIONS

The separation and shielding of Radioactive areas from each other and from other parts of the building is a complex problem. This has been achieved in placing high radioactive areas in the basement of the east wing with the direction of radiation westwards into the hill. As earth is an excellent absorber of Radiation this has lowered the amount of shielding that will be required by other means.

The digging into the hill of the Lower Ground Floor to the west wing and the raising of the east wing above ground level to achieve the same floor level has resulted in the planner being able to keep the majority of the Radiation Sections on the one level. The areas under the floor to the east wing comprise the Basement Area, SEC Sub-station, Radiopharmaceutical Deliveries, Air Conditioning

Plant Rooms for Radiopharmaceuticals Area and an Under Floor Space which is used as duct space for all services.

The building is divided into three levels and the following is a summary of the areas in each—

#### BASEMENT

##### East Wing

1. Health Physics Sub Section comprising a 2 storey Calibration Laboratory.
2. Dosimetry Sub-Section comprising Comet Laboratory; Measurement Laboratory 1; Cobalt 60 Laboratory; a 2 storey Gamma Ray Laboratory; AE G50 Laboratory; Measurement Laboratory 2; Maximar Laboratory and Clinical Measurements.
3. Radioactive Waste Store.
4. General Store.
5. Radiopharmaceutical Sub-Section comprising Holding Store, Delivery Store, Load and Unload Area, Goods Lift (Dumb Waiter) and Stair to Lower Ground Floor.
6. SEC Sub-station.
7. Air Conditioning Plant Room for Radiopharmaceutical Section.
8. Under Floor Space used for servicing the Lower Ground Floor above.

##### North Wing

1. Health Physics Sub-Section comprising a Micro Wave Laboratory and the Lower section of the 3 storey Anechoic chamber.

#### LOWER GROUND FLOOR

##### East Wing

1. Health Physics Sub-Section comprising Laser Laboratory; Unsealed Sources Laboratory; Radon-in-air Laboratory; Upper part of Calibration Laboratory; TLD Laboratory; Office-Head of Sub-Section; Office-Staff and Equipment storage and testing; External Paved Area for Experimental purposes;
2. Dosimetry Sub-Section comprising Physical Experimentation Laboratory; Electrical Standards Measuring Laboratory; B. ray measuring Laboratory; Light tight room; Office-Head of Sub-Section; Upper part of Gamma Ray Laboratory.
3. Radiographic Sub-Section comprising Office and Radiographic Laboratory.
4. Sealed Sources Sub-Section comprising Strong Room; Source Loading Laboratory; Gold Drawing Laboratory; Box Preparation, Store and Staff Area.
5. Radiopharmaceutical Sub-Section comprising Chromatography Laboratory; Animal Room; Counting Laboratory; Development Laboratory; Radiopharmaceutical Storage; Dispensing Laboratory; Generators Laboratory; Sterility Laboratory; General Storage; Vial Preparation, Records and Staff; Change Rooms; Waste Store; Kit Dispensing Laboratory; Can Sealing Laboratory; Receipt and Despatch Laboratory; Interview Room and Office-Head for Sub-Section.

##### South Wing

1. Administration Section comprising Entry; Enquiries; Display Area; Male and Female Toilets; Staff Amenities; Interview Rooms; Calculating Facilities; Reproductive Facilities; Typing Area and Open Office Area; PABX Rooms and Rest Room.

## West Wing

1. Radionuclide Metrology Sub-Section comprising Counting Laboratory; Source Preparation Laboratory; and Office for Head of Sub-Section.

2. Whole Body Monitor comprising Waiting Room; Change Room and Toilet; Area for 2 whole body monitors; Area for electronics, Equipment and Staff Area.

3. Technical Services Section comprising Mechanical Workshop; Welding and Lead Pouring Room; Spray Painting Room; Decontamination Room; Drafting and Layout Room; Holding Store; Low Level Workshop; Electronic Laboratory; Office—Head of Section.

4. Laboratory Store comprising Unloading Bay; Goods Lift; Stairs; Office and Store Area.

## North Wing

1. Central Plant Area for Air Conditioning Plant.

2. Health Physics Sub-Section comprising Micro Wave Laboratory and the central section of the 3 storey Anechoic chamber.

## UPPER GROUND FLOOR

### South Wing

1. Administration Section comprising Display Area; Conference Room; Foyer and Tea Room; Interview Room; Assistant Director (R & ER); Assistant Director (D & HP); Chief Physicist; Confidential Typing; Administrative Officer; Deputy Director; Director; Director's Steno-Secretary's Office and Waiting Area; Library and Toilets.

### West Wing

1. Film Badge Service comprising Photographic Room, Dark Rooms and Annex; Film Badge Service.

2. Environmental Radiation Sub-Section comprising Low Level measurements; Low Level Chemistry including chemistry Laboratory; Instruments and Staff Room; and Office-Head of Sub-Section; Equipment Development; Warm Laboratory; Dirty Preparation Laboratory; Unprocessed Sample Store; Furnace Room; Pre Ash and Post Ash Rooms; Sample Processing Laboratory; Processed Sample Store; Natural Radioactivity Laboratory; Interview Room.

3. Computer Area comprising Computer Room and Terminal.

4. Library Store.

5. Training Room comprising a large room divisible into two by a folding door.

6. Unloading Area comprising a Goods Lift; Stairs and an Unpacking Area.

### North Wing

1. Health Physics Sub-Section comprising the upper sections of the 3 storey Anechoic Chamber.

2. External Roof Deck comprising Tank Stands; Cooling Towers and External Equipment.

## 7 BUILDING AREA

The total gross area of the building complex is 84,500 sq ft (7850m<sup>2</sup>) plus 1,000 sq ft (930m<sup>2</sup>) of Under Floor Access Space.

## 8 FUTURE EXPANSION

Provision has been made to expand the west wing northwards, the south wing southwards and the east wing northwards, as shown on the Site Plan to an additional 80,000 sq ft approximately (7400m<sup>2</sup>). This proposed expansion should be sufficient to cater for growth between the years 1980 and 2000.

## 9 SITE ACCESS

Vehicle entry to and from the site was discussed with the Country Roads Board and the Town Planner from the Heidelberg Council. The existing Lower Plenty Road is narrow in width and very dangerous for traffic entry to and from Yallambie Road.

The CRB have verbally advised that Lower Plenty Road will be widened to a dual lane highway probably by the end of 1975. Access to and egress from the site will be directly onto Lower Plenty Road and for safety, deceleration and acceleration lanes will be provided in the first stage of the construction works.

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Roads and parking spaces will be bitumen surfaced with concrete kerbs and gutters.

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## West Wing

1. Radionuclide Metrology Sub-Section comprising Counting Laboratory; Source Preparation Laboratory; and Office for Head of Sub-Section.

2. Whole Body Monitor comprising Waiting Room; Change Room and Toilet; Area for 2 whole body monitors; Area for electronics, Equipment and Staff Area.

3. Technical Services Section comprising Mechanical Workshop; Welding and Lead Pouring Room; Spray Painting Room; Decontamination Room; Drafting and Layout Room; Holding Store; Low Level Workshop; Electronic Laboratory; Office—Head of Section.

4. Laboratory Store comprising Unloading Bay; Goods Lift; Stairs; Office and Store Area.

## North Wing

1. Central Plant Area for Air Conditioning Plant.

2. Health Physics Sub-Section comprising Micro Wave Laboratory and the central section of the 3 storey Anechoic chamber.

## UPPER GROUND FLOOR

### South Wing

1. Administration Section comprising Display Area; Conference Room; Foyer and Tea Room; Interview Room; Assistant Director (R & ER); Assistant Director (D & HP); Chief Physicist; Confidential Typing; Administrative Officer; Deputy Director; Director; Director's Steno-Secretary's Office and Waiting Area; Library and Toilets.

### West Wing

1. Film Badge Service comprising Photographic Room, Dark Rooms and Annex; Film Badge Service.

2. Environmental Radiation Sub-Section comprising Low Level measurements; Low Level Chemistry including chemistry Laboratory; Instruments and Staff Room; and Office-Head of Sub-Section; Equipment Development; Warm Laboratory; Dirty Preparation Laboratory; Unprocessed Sample Store; Furnace Room; Pre Ash and Post Ash Rooms; Sample Processing Laboratory; Processed Sample Store; Natural Radioactivity Laboratory; Interview Room.

3. Computer Area comprising Computer Room and Terminal.

4. Library Store.

5. Training Room comprising a large room divisible into two by a folding door.

6. Unloading Area comprising a Goods Lift; Stairs and an Unpacking Area.

### North Wing

1. Health Physics Sub-Section comprising the upper sections of the 3 storey Anechoic Chamber.

2. External Roof Deck comprising Tank Stands; Cooling Towers and External Equipment.

## 7 BUILDING AREA

The total gross area of the building complex is 84,500 sq ft (7850m<sup>2</sup>) plus 1,000 sq ft (930m<sup>2</sup>) of Under Floor Access Space.

## 8 FUTURE EXPANSION

Provision has been made to expand the west wing northwards, the south wing southwards and the east wing northwards, as shown on the Site Plan to an additional 80,000 sq ft approximately (7400m<sup>2</sup>). This proposed expansion should be sufficient to cater for growth between the years 1980 and 2000.

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was too technical and which nobody other than an expert in the particular field could understand. Nor did they want a statement that conveyed nothing. So Mr Barwick and his staff prepared guide lines. The statement was to be written in layman's language but must be backed up with required technical information. The statement presented by the Department of Health to the Committee today is in line with the guide lines decided upon by the Department of the Environment and my Department.

**CHAIRMAN**—Thank you, for that explanation. I now ask Mr Garrick to commence the questioning.

**Mr GARRICK**—You mention in the planning considerations that the separation and shielding of radioactive areas from each other and other parts of the building is a complex problem.

**Mr Parker**—Mr Rodis will take this question. He is the architect who joined Mr Stevens' staff in the initial discussions to enable our department to become fully conversant with the requirements of the laboratory.

**Mr GARRICK**—Are you satisfied that all the complexities have been overcome and that the finished product will satisfy the Department of the Environment and solve the problems that you consider existed, that is, that there will be no leakage of radiation from radioactive materials that could affect the environment or the people living in the vicinity?

**Mr Rodis**—Yes, I am satisfied.

**Senator JESSOP**—I refer to the removal of the house as requested by the Army. Is this a feasible proposition? Does the \$6,500 estimate cover that cost today or was it an estimate that was arrived at on July prices?

**Mr Bickerstaff**—The house is quite a number of years old and you may consider that it does not warrant re-location, but the Army has specifically requested that we do re-locate the house so that it can be made available for use by Army personnel. The estimate was prepared some months ago; it would have been round about May. Costs have probably increased by from 10 per cent to 15 per cent since that time but it is not a large proportion of the overall cost of the project. It will be covered by a separate requisition.

**Senator JESSOP**—I think that follows a question asked by Senator Poysler, I was interested in cost actually.

**Mr Bickerstaff**—There is not a great deal of basic material involved. It is just a matter of picking it up and transport charges.

**Senator JESSOP**—The anechoic chamber has been referred to in evidence. Would you enlighten us on that part of the project?

**Mr Rodis**—There are 2 types of anechoic chambers. One is the sound solution where we want to kill the sound. We are not concerned with that type. This type is for the forming of microwaves. An anechoic chamber is lined with prisms of foam material which come from overseas. These prisms are up to 6 feet long depending on the range of absorption that is required. There is nothing like this particular chamber in the country. There are a number overseas, in the United States, England and Europe, but none equipped to do the sort of work required in this laboratory.

**Senator JESSOP**—Was the environmental impact statement prepared by the Department of the Environment and Conservation itself or in conjunction with outside consultants?

**Mr Parker**—The environmental statement is prepared as a family arrangement. The sponsor who has a responsibility for presenting the environmental statement receives all the assistance the Department of Housing and Construction can possibly give. By that I mean that Mr Barwick's section is available to give any assistance whatsoever. From that point it is sent to the Department of the Environment for their comment.

**Senator JESSOP**—I refer now to fire protection, in particular fire protection afforded special radioactive areas. I think Mr Stevens in his evidence mentioned something about special closing doors and special treatment. Could you elaborate on that?

**Mr Rodis**—The floor in this particular area is concrete. It has a concrete roof over it and there are concrete masonry walls. The doors to the area are protected by a sliding steel-clad fire door in case of fire. This is on a fuse door link. If a fire occurs, heat builds up, the links melt and the doors close. Also the area is protected by sprinklers which come on in the same way, as heat sets them off by melting. If the air conditioning system breaks down and there is no air coming into the

area, it is covered with water and the fire should go out very quickly in such an area. As well as that, there are alarms connected to the local fire brigade to ensure that it is notified that the fire is in the building and that the brigade will arrive in good time.

**Senator JESSOP**—So that you are sure with that protection that there is no possibility of any escape of any radioactive material?

**Mr Rodis**—The fire would have to rage for something like 3 hours, maybe longer, to burn its way through the walls or doors.

**Senator JESSOP**—And you cannot foresee that that is a possibility?

**Mr Rodis**—I cannot foresee it.

**Mr Bickerstaff**—The intention of installing an automatic sprinkler system is that you contain the fire in the quickest possible time. Just going on from Mr Rodis' statement on the operation of the doors, we have been giving further thought to this and in view of the fact that it is a fairly large room it may be more desirable to operate the self-closing doors by means of a flow control on the automatic sprinkler system rather than rely on some thermal link, because it is a big room and it may be some time before the heat from a small fire gets across to a thermal link on a door. It may be better to operate the door by some mechanism which is controlled by a flow in the sprinkler system, and then one sprinkler only can come on and that can actuate the actual closing of the doors.

**Senator JESSOP**—Does this mean that you are a little uncertain about what is going to be done about that?

**Mr Bickerstaff**—We are still weighing the particular problems in the detail design, yes.

**Senator JESSOP**—It is not going to affect the estimates at all? On page 13 you mention the question of air conditioning and the fact that it is not designed to cater for possible future expansion. Can you tell me why you have not allowed for future expansion?

**Mr Parker**—It was felt advantageous that any expansion to the building should have its own air conditioning plant, because at this point in time nobody is really sure what would go into that extended area.

**Senator JESSOP**—My final question refers to security lighting on the boundary of the site. Is that where the external lighting is going to be situated, and if so is this likely to interfere with or cause any annoyance to nearby residents?

**Mr Bickerstaff**—Consideration has been given to this. The external lighting would be located at a point somewhere between the building and the external fence and directed back towards the building. It would serve to light up the portions of the car park in which people may, working back, keep their cars but certainly it should not cause any interference with local residents.

**Mr KEOGH**—Mr Parker, I do not think you answered the question actually that Senator Jessop asked on the removal of the house. I want to ask if you could outline to us alternative considerations that were given to this decision to remove that house at a cost now—it naturally would have increased, I would imagine—of some \$6,500. Have you considered using that house as a site office? Could the Army be told that they had better accommodate the person concerned in one of the other Army houses? I understand there is a group of them, somewhere not far away from here. This would be preferable to moving this house, which seems to me to be fast approaching the end of its life, and spending probably \$7,000 or even more on it.

**Mr Bickerstaff**—We did consider the use of the house as a very suitable accommodation site office. We approached the Army department and asked would they please consider that proposal. However, they would not agree to this. One of the conditions of the land being made available was that the house should be removed and made available to the Army in a new location. It would appear that the Army are not overendowed with houses and they were very reluctant to give any impression that they could afford to wipe a house off their books. But we did make the approach and make the suggestion that it would, as far as we are concerned, be economical for the Department to use it as a site office.

**Mr KEOGH**—Do you mean to say that you are committed now, to the extent that the Army has been told that this will be done? The very decision of the Army to allow the use of the site, hinges—amongst other things, I would imagine—on this one condition being accepted, and it has been accepted.

**Mr Bickerstaff**—The Department of the Army agreed to the transfer of the site, subject to satisfactory removal and re-siting of an existing Army house. This was a negotiation which took place between, I would say,

the Departments of Health, Army and Services and Property. It was a condition that they laid down despite the fact that we did suggest that it would be more economically used by us as a site office.

**Mr KEOGH**—If the house is moved and re-sited, and it is acceptable that it does not cost you very much more than this estimate of \$6,500, could you give a calculated guess as to what future life this house would have?

**Mr Bickerstaff**—In re-siting it it would be given a certain amount of repairs and maintenance. For a weatherboard house, it appears to be in reasonable condition. It could have at least another ten years' life.

**Mr KEOGH**—Would that \$6,500 include the repairs and maintenance?

**Mr Bickerstaff**—It includes getting it back into a reasonable condition and connecting it to services.

**Mr KEOGH**—Has a site for its removal been determined?

**Mr Bickerstaff**—Yes a site has been nominated by Army at the top end of the property. It is within the Watsonia Army Camp area and is only a very small distance to take it.

**Mr KEOGH**—I would just like to comment on that I am grateful that you did take the opportunity, Mr Parker, to make those comments on the Environmental Impact Statement. I would add, of course, that I was very well satisfied with what Mr Stevens did say to me. But I am sure that it did need elaborating from the point of view of the role your Department played. I am grateful that you did add that information for the benefit of the Committee. I think one of the great problems that many people in an area like this, possibly face, would be that there is not going to be any danger to them from the operations of this laboratory. There would still exist a real concern that they are to have sited in their midst, an industrial type building, despite the fact that your architects are competent to handle a situation like this in the design of the building. I feel that no matter how well-designed and how appropriately finished, industrial or semi-industrial type buildings are, there is always a little bit of reluctance on the part of people in established residential areas to have a large building of this nature in their midst—set down in their midst after they have been there for many,

many years. I am going to ask you if you could give me reassurances that the type of building that you people are going to erect for the Department of Health, if in fact it is erected here, is it not going to have any of those distasteful industrial complex points of view or ideas, or appearance about it in any shape or form. We have talked about the landscaping and I will ask you questions about that later, but could you give us assurances that the people are not going to be able to drive past this or look at it from up above or wherever they might be, that visitors will not drive past and say: 'Look at that cursed looking industrial thing over the road'.

**Mr Parker**—Mr Keogh, within the limitations of the brief provided by the Department of Health, we propose to make that building as domestic in scale and character as we possibly can. If I might say at this stage, Mr Chairman, in my capacity in the hospital field—I think members of the Committee know my responsibilities in that field—over the past 25 years or so whenever we have had any problems whatsoever regarding radiation and advice on X-ray equipment, Mr Stevens' Department has always been our adviser. Mr Stevens' decisions have been accepted by all the hospital advisers in Australia and I would like to put on record as the person in the Department of Housing and Construction who has to bear certain responsibilities for the design of this laboratory, that I am perfectly satisfied that the advice we have received from Mr Stevens in this instance regarding radiation hazards and so forth are quite satisfactory to us, and I believe they should be quite satisfactory and accepted by the people in the surrounding areas in this district.

**Mr KEOGH**—Could you tell me whether in your opinion a building such as this, on your experience over the years as an architect, is going to materially affect the land or home values in the area?

**Mr Parker**—In my considered opinion it is going to enhance the value. This may sound surprising to some of the audience but I think one has to be quite fair and honest. The Department of Army could have erected on that site buildings to a value of which it does not have to put to this Committee that would be less enhancing to the site than this. There is nothing to stop the Department of Army, should it so desire, putting galvanised iron buildings on that site; it could put up a tented

camp, so in my humble opinion the residents should be grateful that a building of this character is going up and not some army building.

**Mr KEOGH**—Getting back to the question of landscaping—I asked Mr Stevens, you will recall, questions about that—are you able to give me an opinion as to whether the type of landscaping that is proposed there will, within a reasonable space of time—2 or 3 years—start to present some reasonable appearance of shielding this type of structure from the passing traffic and from the bulk of the people in the residential areas surrounding it?

**Mr Parker**—Yes, Mr Keogh.

**Mr KEOGH**—Might I extract from you an undertaking also that you would not be party to any proposal to do anything less than what has been proposed here, and I see it has been noted to some extent in the evidence you have given. Is there anything at all that you could add to that to indicate the work that has been involved in preparing the style and design of landscaping that you propose to add to the environmental aspects of that particular site?

**Mr Parker**—The drawing which is illustrated on the wall to my left is an illustration of the minimum landscaping that will go on that site.

**Mr Bickerstaff**—Might I also say that the Department has engaged a specialist landscape architect to complete the documentation, the selection of plants, and the documentation of this landscaping proposal and that work will commence on the landscaping immediately after the completion of the first site preparation, the benching out of the site. It will go on concurrently with the construction of the building in all areas adjacent to the boundary of the site. It cannot, of course, be commenced in the area immediately adjacent to the building, but the landscaping of the creek and all boundary work will be undertaken at a very early stage to enable the trees to grow as much as possible before the occupation of the building. The work will then be finished just after or concurrently with the building itself.

**Mr KEOGH**—I see it is done by commercial enterprises and I think it is a good idea if it is done that way. There are various references made in the environmental statement to the disposal of the wastes on pages 11 and 12

if you might refer to them. Is it appropriate at the moment if I direct questions to Mr Parker in relation to that, Mr Chairman?

**CHAIRMAN**—Yes.

**Mr KEOGH**—I have had assurances from Mr Stevens in this regard but from the technical point of view that I am asking you to approach it, I would like you to give me, if you can, assurances about how this is going to be handled into the sewerage system and also, if it is possible, for you to give me any information on the extent of risks that may be involved in this disposal into the sewerage system, or to give me assurances that there will not be any risks involved.

**Mr Bickerstaff**—The Department has worked out proposals for disposal of effluent into the sewerage system in conjunction with the Melbourne and Metropolitan Board of Works. This discharge will be made under a normal trade waste agreement and will be subject to surveillance, and the acceptance of the Melbourne and Metropolitan Board of Works. It has already reviewed our proposals and given its general acceptance subject to a formal application being made, if and when the project should proceed. The Board, of course, is mainly concerned at the risk to its own men working in sewerage lines into which we will be discharging, and it will be ensured—they have been given satisfactory guarantees from Mr Stevens—of the level of quality of the effluent before it is pumped from the holding tanks into the sewerage system.

**Mr KEOGH**—This will apply to any waste at all that might find its way into the sea.

**Mr Bickerstaff**—All wastes from any radioactive area must be discharged into one of three holding tanks; one is filled and held while the second is being filled, the third is available should there be the need to use it because there has been some delay or some unsatisfactory result in the first tank which is due to discharge. If it is not ready for discharge it can be pumped into the third tank. There will be three 5,000-gallon tanks which will be in constant use, and no waste can be pumped from these tanks until it has been proven by tests to be within the limits the Board has laid down.

**Mr KEOGH**—Mr Parker, the precast concrete components that are going to be used on the job, will these be brought to the job in sizes ready for erection? Will there be any

precasting on the job and could you give an idea to what extent you will have cranes or other heavy equipment on the site during the construction of the building?

**Mr Walters**—All panels will be built in a precasting factory at Holmesglen which is run by the Housing Commission of Victoria and will be brought to the site on low-loaders. This is the standard procedure. I understand that they will have at least two cranes on the site so they can erect these panels as they are required.

**Mr KEOGH**—This will be in the early stages of construction of the building?

**Mr Parker**—While they are putting the frame up and the panels in and the roof on.

**Mr KEOGH**—Extending through a fair amount of the time of the contract, then?

**Mr Parker**—Oh, yes, a considerable amount. Mr Bickerstaff said for the first 8 months of the contract.

**Mr KEOGH**—The change from aluminium windows to PVC-coated steel ones seems to be a departure from the normal trends today of aluminium windows everywhere. Why has this been decided upon; has it got anything to do with the particular purposes of the building, or for what reason?

**Mr Rodis**—No, I think it is longer lasting. I think the PVC windows have now proved themselves in this country. They have been used to my knowledge for at least 12 years and they have stood up better than anodised aluminium because anodised aluminium has had many failures in the past, and we think PVC is now a better product for long use.

**Mr KEOGH**—Finally, the air-conditioning: It is noted there that it is not providing for the future expansion of the building and yet indications are that within 6 years there could be some expansion required. Why is this?

**Mr Parker**—Science is like medicine; it is advancing so quickly that I think it would be a very brave man who could predict now what is going to go into the extension and it is a very simple matter for the extension to have its own air-conditioning plant.

**Mr KEOGH**—I see. It will not mean, then, that of necessity your air-conditioning equipment or the ducting or any of these things in the existing equipment would have to be altered. You would just come in afresh and start with new equipment for the extensions.

**Mr Parker**—That is so. As a matter of fact by using this system the laboratory can continue working.

**Mr KEOGH**—I see. No further questions.

**Senator MELZER**—Mr Parker, on that very pretty drawing up there, that large expanse of blue that looks like a lake. Is it a lake or is it just where the creek comes out of the barrel drain?

**Mr Rodis**—No, this design is the pondage area. The reason for this is that early in the piece the Yallambie Association objected that the creek was being barrelled over. We had heard that the Board had complained because we wanted to do this so we consulted the Board but the Board told us that this work was essential in order to ensure that the flooding, as far as practicable, would not be caused again in the area because flooding had happened. The Yallambie Association and the Warringal Conservation Society—but mainly the Warringal Conservation Society—said that if we provided permanent water in the area we would attract many more species of birds than are now in the area, such as some of the water birds, so we thought, well let us look into this area of use of the land; let us form a water area to attract these birds.

**Senator MELZER**—Is that where the stormwater is now going to go, or is that quite separate? You have changed the provisions for the stormwater; you were going to feed it into the creek and now you are going to collect it and discharge it to an underground stream.

**Mr Rodis**—The creek is being barrelled over.

**Senator MELZER**—Then it is going to be right through?

**Mr Rodis**—No, this is why we did not circulate it. If the work is being finished it is up to that top or just below it. That is this point there; that is where it finishes it now.

**Senator MELZER**—The barrel?

**Mr Rodis**—The barrel. Normally we would not be emptying anything into the barrel with that stormwater.

**Senator MELZER**—And that area of water will just collect naturally itself, will it?

**Mr Rodis**—That is right. This section will do this, through this level of fall, this rise and fall at certain times. In flood levels, it could flood over the wall and act as a waterfall down into the barrel.

**Senator MELZER**—A pretty boring sort of building. Is the inside courtyard going to have any tall shrubbery or trees growing in it or is it all going to be low-lying?

**Mr Rodis**—That drawing is an indication; at this stage it is a proposal. It is our landscape architect's work—how she considers future development. Certainly, we will have large trees in that—

**Senator MELZER**—In the courtyard?

**Mr Rodis**—Yes.

**Senator MELZER**—This then will tend to break up that large roof area, will it?

**Mr Rodis**—Yes.

**Senator MELZER**—In the fire protection, you talk about a 4-hour fire rating. Is this what Mr Stevens was referring to when he said that in the high security section, in the case of fire it could, in a sense, finish up as a concrete box?

**Mr Rodis**—It is a concrete box.

**Senator MELZER**—That is what the 4-hour fire rating is?

**Mr Rodis**—Yes.

**CHAIRMAN**—Mr Parker, I have a few questions for you and your colleagues: In the evidence, or the submission, the Yallambie Progress Association expressed concern that the traffic generated by the laboratory would increase traffic hazards in the area. Could you give me your reaction to that?

**Mr Rodis**—We agree with the Heidelberg Council in this. In the last paragraph if I may read it: 'The Council sees no major objection to the proposed laboratory in respect of traffic generation.' We agree with this.

**CHAIRMAN**—For the information of the Committee, could you inform us as to the number of trees to be retained on the site?

**Mr Rodis**—We have a survey done of what trees are on site and we could do a count but—

**CHAIRMAN**—I think the answer given by Mr Bickerstaff is a matter of addition and subtraction. Further, does the Australian

Government normally comply with State and local regulations regarding discharge of wastes to water, air and land?

**Mr Bickerstaff**—Discharge to the Melbourne and Metropolitan Board of Works sewer, yes, definitely. We are required to obtain approvals. With the State Electricity Authority, for example, we also must comply with their requirements because we are using one of the State's services. In the case of discharges to the air, the Department invariably attempts to meet the requirements of the authorities, the appropriate authorities. It does not normally seek approval by licence, such as the Environmental Protection Authority. But it takes a responsibility to meet the requirements of all local authorities, State building authorities. Any authority which lays down standards for general use by the public, we take note of. We discuss the proposals with local councils, with local authorities, and we endeavour to meet their requirements. It is only in some very unusual, specific case that, for some reason, we do not meet their requirements. But we do everything possible to meet their requirements. In the case of a service, however, we have to make application; we have to comply fully with their requirements.

**CHAIRMAN**—So even though you are not bound—because you are Australian Government departments—you do make every effort to comply with every regulation and ordinance that exists?

**Mr Bickerstaff**—We do.

**CHAIRMAN**—On the question of the sewerage system. There is a letter to this Committee dated 8 July 1974 from the Council of the City of Heidelberg, wherein they say: 'Council is concerned that radioactive or chemical waste may be discharged into the sewerage, which is not connected to the main Melbourne sewerage system but locally treated at the end of Martins Lane and then discharged into the Plenty River.' It seems to me from your evidence that you are talking about discharge into the Melbourne and Metropolitan Water Board's main sewer. There seems to be some conflict. Would you please comment on that?

**Mr Bickerstaff**—The discharge through the Yallambie Estate is under MMBW control; at the moment it goes to the Martins Lane sewerage treatment plant and from there it is discharged into the Lower Plenty River. The Board of Works has under construction at the

moment a by-pass sewer which will connect sewerage from the Yallambie area directly into the south-eastern sewerage system. It is not completed as yet; it is anticipated that it will be completed well before the completion of this radiation laboratory. When the by-pass is completed, the Board of Works intends to maintain the existing sewage treatment plant for use in emergency. There are a lot of illegal connections to the existing system which have been put in without sufficient controls. As a result, in times of high rainfall, the discharge into the sewer is excessive; there is concern by the Board that this will overflow their by-pass sewer. They have stated that they intend to maintain the sewage treatment plant so that in times of peak flood it could be put back into operation to relieve the south-eastern sewer. At such times, if it is necessary, we can make arrangements—we have commenced negotiations with the Board on this—for some control system to be installed that will advise the radiation laboratory at those times when the sewage treatment plant is back in operation. We can then desist from actually discharging any effluent from the holding tanks until the by-pass comes back into operation.

**CHAIRMAN**—While you are on this subject of drains and the like, has your department considered the effect on the laboratory of possible flooding of the creek on the eastern boundary? Supplementary to that, will the run-off from the laboratory increase the likelihood of flooding in that area?

**Mr Bickerstaff**—Yes, we have investigated—the Board of Works again—the levels of flood along this creek. The calculations indicate that the highest known flood levels to date would still be at least 10 feet below the invert of the lowest connection to the stormwater system. So that we still have 10 feet from the maximum flood levels. We would hope it would not reach this level very frequently because some of the housing would be in dire straits if that happens. The run-off from the building—there is a large roofed area—would be a very quick time of concentration. I would anticipate that in most instances—it would be very close, it is a very short line—the run-off from the roof of this building will be long gone before any peak flood comes down the creek.

**CHAIRMAN**—In the Environmental Impact Statement prepared by Mr O'Connor,

in Appendix 3 of paragraph 6.4.2, recommendation 7, speaking on the question of fire protection it says: 'That the installed sprinkler system be of an automatically activated type and the sprinkler run-off should be directed to the holding tanks used for liquid radioactive waste. Are you able to comment on that?'

**Mr Bickerstaff**—We comply with that requirement.

**CHAIRMAN**—You do comply with that?

**Mr Bickerstaff**—It is an automatic sprinkler system and the run-off from the floor will be collected through floor traps into the holding tanks.

**CHAIRMAN**—I am not sure that your evidence was quite clear on that; but it is quite clear now. Will you be installing the very early warning detection apparatus that has recently been developed by CSIRO?

**Mr Walters**—If, and when, it becomes recognised, and established, they will be considered.

**CHAIRMAN**—Mr Parker, can you explain why the State Electricity Commission will be requested to supply power from 2 separate supply zones?

**Mr Parker**—In case of an accident where say, a pole was knocked down, you would have alternate means of supplying electricity to the site.

**CHAIRMAN**—It is an added safety device in other words? Did your Department, Mr Parker, carry out any studies of the meteorological characteristics of the Yallambie site and determine its air pollution potential?

**Mr Rodis**—We have some data on the file.

**CHAIRMAN**—I thought you might. You are generally prepared.

**Mr Rodis**—The Health Department had a discussion with the Commonwealth Bureau of Meteorology and we have a report dated 22 July 1974. There are, I think four or five pages of this report. It basically states that its theory is that there are problems of temperate versions in hilly country such as this. Where water exists there is usually more fog than on open clime. This is something we already thought. It also states in the last paragraph in that letter that the actual concentration of movements in the valley depends, of course, not only on the meteorological conditions but

also on the rate and condition of the pollutants, the temperature of the emission, and the density of the pollutants. Where one is dispensing pollutants into the atmosphere, in winter time, they tend to act as the sun does and to heat up the insulating air. This helps to dispense and disperse the problem. From this report, the only real facts that have been studied relate to the other side of the city. I think it is Avalon, from memory, that they have studied—just a basic look at most indexes.

**CHAIRMAN**—There is nothing peculiar about that area?

**Mr Rodis**—There are no particular problems peculiar to this area.

**CHAIRMAN**—You get the same conditions in any other sort of topography as you get in that area?

**Mr Rodis**—Of this type, yes.

**CHAIRMAN**—Is your Department aware, Mr Parker, of any proposals to further develop Watsonia Military Base?

**Mr Parker**—I cannot answer that, Mr Chairman, on behalf of my Department because as you know I have a number of colleagues and quite often we are not fully acquainted with what is going on in other sections. As far as I know, the answer is, 'No'. I could be wrong. I will ascertain for you, and if possible, have the answer by tomorrow.

**CHAIRMAN**—Thank you, Mr Parker. I am sure that information will be of interest to the Committee if it is available and will help them in their deliberations. We will do a quick round of supplementary questions. The Committee will adjourn as soon as our supplementary questioning is completed or if not before 5.30 the Committee will adjourn at 5.30. The hearing will resume at 9 a.m. tomorrow when I believe the Yallambie Progress Association will be the first witnesses.

**Mr KEOGH**—With regard to the power supply referred to in answer to a question by the Chairman a few moments ago, is there any emergency power intended to be available on the building site?

**Mr Bickerstaff**—No, there is no proposal to install emergency generators. There will be emergency lighting available for egress from the building in the event of a complete breakdown in light but, as Mr Parker said, the intention is to have supplies from 2 separate

zones and if one fails there will be an automatic changeover to a supply from the other zone.

**Mr KEOGH**—Of course this could mean that in extreme cases you would have a breakdown in 2 zones at once, or an overall breakdown. Was any indication received from the Department that it would present any difficulties to them or any problems for them in the operations of the laboratory if there was no emergency source of supply for any of their equipment?

**Mr Bickerstaff**—As far as we can ascertain from the radiation laboratory, the answer is no. They have stated that if the power fails, then a batch which is being processed would come to a stop. They would not attempt to carry on under a complete power failure.

**Mr KEOGH**—They have not at any time considered it necessary to have an emergency power supply incorporated?

**Mr Bickerstaff**—They have not considered it necessary.

**Mr KEOGH**—To get back to a rather contentious question, perhaps, that I asked, Mr Parker, would you have any statistics on record at the Department of instances in the past where buildings have been erected in areas such as this or of a similar nature where you have been able to ascertain over a period of time after the construction of the building that the land values of the values of the homes in the area have not deteriorated but have, in fact, shown no marked effect by the advent of the building? What I am looking for is some sort of information. Not that I doubt you, but you rather gave me an opinion which I would like to have confirmed if possible to satisfy myself that what you have said is in fact correct, and I accept the fact that your opinion would be based on a lot of experience. I am wondering if you have any statistics which would support that.

**Mr Parker**—The first one that comes to mind is the Department of Social Security Rehabilitation Centre at Glen Waverley. I do not have the precise statistics at the time, but in discussions with some of my colleagues in that Department a few weeks ago when I was introducing another colleague to the hierarchy that job was mentioned and a remark was made that the Rehabilitation Centre had enhanced the property values surrounding it. I do not know precisely what percentage the values had gone up. My colleagues had

thought that a rehabilitation centre in the middle of a residential area would have depressed the market, but from what I can gather from them that has not been so.

**Mr KEOGH**—I gain the impression that Mr Rodis might want to add something.

**Mr Rodis**—We did ask Property and Services for an appraisal and the Australian Taxation Office sent out a valuer to do some kerbside valuations, and it goes for 3 pages.

**Mr KEOGH**—There is some information there. Could you make it available to the Committee?

**Mr Parker**—We can make that available.

**CHAIRMAN**—Thank you.

**Senator MELZER**—I meant earlier to ask one question about sewerage. The authority that looks after sewerage in Melbourne has not got any great track record. Although they say they will have this trunk sewer up to scratch by the time you need it, I am wondering what you will do if they do not. I would have thought from the evidence we had that even if the effluent from the tanks had to feed into their sewerage treatment and into the Lower Plenty it would not have done anybody any harm anyway.

**Mr Bickerstaff**—That is quite correct.

**Senator MELZER**—So if, say, in the very odd circumstance that they are not there when they should be, will you go ahead and connect the sewerage to the system and then through the Martins Lane treatment works and into the river?

**Mr Bickerstaff**—If the board agree to it, yes.

**Mr BONNETT**—I have a brief question. Does each laboratory have a separate sprinkler system?

**Mr Bickerstaff**—The system is designed to have a certain number of heads on a line. Each head operates entirely independently, and I mentioned the automatic control system for the door. All the sprinkler heads in one room would have to be on either one or two specific lines so that the control mechanism would not shut the doors everywhere, but only in that section.

**CHAIRMAN**—We have apparently exhausted ourselves on you gentlemen.

**Mr Bickerstaff**—There is one more thing I would like to say. Mr Stevens made mention of the fact that he had appreciated the assistance that Housing and Construction had given him. I would also like to put on record the assistance that Mr Stevens and his staff have given to us in all of the problems of this project, one not normally experienced by the Department. He and his staff co-operated in every way to assist us when we made some mention that we did not like an incinerator on site, for example. He was most co-operative to consider the problem and to look at alternative solutions, and we have had extremely good relationships.

**CHAIRMAN**—Thank you, Mr Bickerstaff, I am sure that that will be appreciated.

The Committee adjourned

(Taken at Lower Plenty, Victoria)

FRIDAY, 13 SEPTEMBER 1974

Present

Mr Keith Johnston (Chairman)

Senator Jessop | Mr Bonnett  
Senator Melzer | Mr Garrick

Mr David Douglas McConville, President, Yallambie Progress Association,

Mr Christopher Charles Lavender, Vice-President, Yallambie Progress Association,  
Mr Graeme Alexander Kelly, member, Yallambie Progress Association, were sworn and examined.

**CHAIRMAN**—You will be presenting the evidence Mr McConville?

**Mr McConville**—Yes, Mr Chairman.

**CHAIRMAN**—Even though the witness will read only portion of the submission, the whole submission will be incorporated in the evidence. Mr McConville, will you read pages 1-7 of your submission and Appendices A and H as agreed?

**Mr McConville**—This is a statement of opinion on behalf of the residents of Yallambie on the proposed premises for the Australian Radiation Laboratory. Our submission reads:

#### A STATEMENT OF OPINION ON BEHALF OF RESIDENTS OF YALLAMBIE ON PROPOSED PREMISES FOR THE AUSTRALIAN RADIATION LABORATORY

##### 1 INTRODUCTION

This submission is prepared by, and presented on behalf of the Yallambie Progress Association. This Association represents the residents of Yallambie, all of whom occupy properties in the vicinity of the Watsonia Army Camp. The members of the Association have unanimously expressed their opposition to the construction of the laboratory on the proposed site. They consider that insufficient attention has been paid to the detrimental effects the proposed development will have on the area of Yallambie and also, that insufficient consideration has been given to the examination of more suitable sites.

##### 2 SPECIFIC OBJECTIONS TO THE PROPOSAL

###### 2.1 Possible Danger Due to Emissions of Radio-Active Material and Chemicals

- (a) **General Statement about the Site:** The proposed site of the laboratory is located near the bottom of a valley. This site is subject to many fogs which indicate that very stable

atmospheric conditions often exist in the valley. Under these conditions the dispersal of any chemical or radio-active wastes would be very slow. (Refer Appendix A) Note that there are residential blocks approximately 50 metres from the proposed laboratory in the valley floor. In view of the atmospheric conditions which often prevail in the valley, it is considered that an alternate site on a hilltop or on a flat plain would be more suitable.

- (b) **General Statement about Levels of Radiation:** Contained in the report to the Prime Minister on 'The Biological Effects of Nuclear Explosion Fall-Out' is the statement that it is not yet clear whether there is a threshold below which the levels of radiation are not harmful to man and the environment. (Refer Appendix B) The first general principle of the BEIR Report (Refer Appendix C) state that 'No exposure to ionizing radiation should be permitted without the expectation of commensurate benefit.' The proposed laboratory will not directly benefit the residents and will not compensate for possible exposure.
- (c) **Chemical Emissions from Laboratory and Incinerator:**

I believe the Incinerator has been deleted. My submission continues:

In view of the atmospheric conditions as described in 2.1 (a) above, it is considered that the fumes will not be dispersed without the inclusion of costly and unsightly chimney stacks. These problems would be avoided by the selection of a suitable site.

- (d) **Emergency Procedures:** In view of the laboratory usually being occupied in office hours, no mention has been made of:
- (i) Monitoring of radiation or chemical wastes  
(ii) Provision of emergency procedures e.g. in the case of fire. A fire in the building may cause a serious radiation problem to the nearby residents  
(iii) Protection in the case of vandalism or break in.
- (e) **Rapid Expansion of Activities:** With the reference to the Annual Report of the Australian Radiation Laboratory for the year ending June 30th, 1972, (Refer Appendix D) the use of radiopharmaceuticals is expanding at an increasing rate. In the light of this fact and of future research, it would appear that no one could accurately predict:
- (i) The future role of the laboratory  
(ii) The materials that will be processed and used  
(iii) The levels of activity and hence of emissions in years to come.

###### 2.2 Damage to the Environment and Reduction in the Amenity of the Area

- (a) **Rural/Residential Area:** The general area is mostly rural and residential; there is no industry in the region. The establishment of a 'semi-industry' such as the laboratory is not in keeping with this environment. The planned factory-type building, despite efforts to make it attractive, does not fit into the landscape. The Statement of Evidence from the Department



of Housing and Construction describes the building as a 'bush hammered precast concrete frame and fascia panels with exposed aggregate infill panels. Windows were originally coloured aluminium with a reflective double glass unit to reduce solar heat load. The roofing is a precoloured steel decking insulated to reduce heat gain or loss through the roof.' This factory-style building has no place in such an area.

- (b) Long Range Visibility: The building will dominate the view of surrounding residents and be clearly visible from a considerable distance. The area is quite hilly and the laboratory is planned for the lower portion of a hillside. While efforts have apparently been made to plan attractive walls and surroundings, many residents will look out on a very large roof area and paved car park; visual environment will be adversely affected. Planned mounding around car park areas, while muffling noise, will not in any way hide it from most houses. Even the largest or densest trees will never screen the area effectively. Again, because of the hilly nature of the district, the site is visible from quite large distances. Appendix E will show by the use of a map and photographs how clearly the site stands out as an undesirable and unnecessary landmark.
- (c) Destruction of Trees: The construction of such a large building and the paving of such a large car park must require the destruction of many native trees which cover part of the proposed site. The Department of Health's Environmental Impact Statement states that 'as many trees as possible' will be retained. This is an imprecise statement that could in practice mean that no trees are in fact retained. There are many large eucalypts on the site and many others, although smaller, that have been growing for a number of years and should not be removed. Some idea of the density of native flora on the site can be gained by the study of photographs in Appendix E. By using a site plan we have determined the 95 per cent of eucalypts on the site will be destroyed. Approximately half will be removed for a car park and the other half for the building.
- (d) Native Bird Life: There is already extensive native bird life in the area (See Appendix F for a list of some of the birds commonly seen in the area). The existence of this bird life would be severely threatened by extensive site works which included the destruction of flora, large scale excavation and the coming and going of large trucks and heavy machinery. Replanting may mean the return of bird life in the long term. However, trees and shrubs need some years to grow and become attractive to birds. Many birds are unlikely to return to an area which will have such a high degree of human and mechanized activity.
- (e) Traffic Problems: The already busy intersection of Yallambie Road and Lower Plenty Road will become a more serious traffic hazard as some eighty or more employees arrive and depart from work.

The presence of heavy vehicles both during construction and for transport of radio-active materials will also increase congestion on Lower Plenty Road.

We realise that the entrance to the laboratory is not now planned through the Yallambie Road/Lower Plenty Road intersection. However, Yallambie Road forms part of a through road network and is carrying a rapidly increasing volume of traffic. (See Appendix G).

This traffic congestion will not only be aggravated by the increase caused by the presence of the laboratory, but will also be an inconvenience to the laboratory and may in fact hinder the operation of the laboratory's delivery service and reception of supplies. The evidence prepared by the Department of Housing and Construction mentions the extension of the service road as facilitating access to the laboratory and further development to the west of the site. We believe that this will increase traffic through the Yallambie/Lower Plenty Road intersection. The service road should not be extended; it is neither wide enough nor constructed to carry a large quantity of traffic or heavy vehicles.

- (f) Car Parking Arrangements: The siting of the ninety vehicle carpark next to the fences of the adjoining houses will seriously inconvenience the occupants and will present hazards which they could not reasonably accept without protest. Noise and exhaust fumes beginning at early hours of the day will be a great annoyance to nearby residents. A planned two metre mounding of soil planted with shrubs will do little to disguise the existence of a car park, and will do nothing to hide it from homes that overlook the area.

### 2.3 Alleged Advantages and Inattention to Disadvantages of the Yallambie Site

- (a) Access to Tullamarine Airport and City Hospitals: Tullamarine Airport is approximately 19 miles distant, and this trip takes at least 45 minutes, and up to one hour at peak times. The city hospitals, whilst only about 11 miles away, would require a crowded road trip of approximately 35-40 minutes during peak hours (when we understand most deliveries would be made).

The Environmental Impact Statement states that the future freeway networks will facilitate communications with the airport and hospitals. We contend that in a time when freeway plans are being questioned, scrapped or altered, the proposals should not depend on this. The freeway plans mentioned are long term and if they are realised at all, will not be constructed for many years. It is our opinion that realistic transport plans can only be made on the basis of existing road systems or at most, depend on road works planned for the near future.

- (b) Places of Residence of Employees: The Statement of Evidence by the Department of Health includes a map showing places of residence of employees.

We believe that this should not be an issue in the determination of the location of the

laboratory. Employees change and people move their place of residence from time to time in our mobile society. New employment which must occur in long term expansion or the replacement of departing staff may well be related to whatever area the laboratory occupies.

- (c) Drainage: We note that the Environmental Impact Statement states that the slope of the site will enable good drainage of the area. We draw the attention of the Committee to the fact that there have been severe floods in the area in recent years. All adjacent properties have been flooded twice. (See photograph in Appendix E.)

Any large development that entails a large paved section interferes with the natural drainage of the area. In this case the problem could be aggravated.

- (d) Inattention to Disadvantages: We consider that there are many disadvantages of the present proposed site that have not been thoroughly investigated by the Department of Health. (See 2.1 and 2.2 above for detailed evidence.) There are some disadvantages for the laboratory itself and many serious effects on the environment and the quality of life of surrounding residents.

## 3 COMMENTS ON THE DEPARTMENT OF HEALTH'S ENVIRONMENTAL IMPACT STATEMENT AND EVALUATION OF SITES

### 3.1 General Comments on the Findings of the Environmental Impact Statement.

The Environmental Impact Statement is not, in our opinion, a comprehensive study of the effects of the construction and operation of the laboratory.

It mentions the emission and disposal of waste products, radio-active materials and chemical vapours. We consider that it is totally inadequate at this point as:

- (a) it takes no account of local meteorological conditions with important implications. (refer to Appendix A prepared by a Meteorologist of the Commonwealth Meteorological Research Centre, for details.)
- (b) it gives no detailed information about types of emissions of radio-active material or chemicals.

The levels of emissions, while conforming to Victorian Standards (set in 1959) do not conform to current International standards (refer Appendix H).

Consequently, it presents no evaluation of any possible long term health hazards to surrounding residents, flora or fauna. Expert opinion has been obtained from the Radiation Protection Officer at Melbourne University. Details of unanswered questions and comments appear in Appendix H.

People are part of the environment and when the quality of their life may be under some kind of threat they should be consulted. No opinions or evidence from local residents was considered in the compilation of the Environmental Impact Statement. Little evaluation has been made of the effect of the proposed development on the landscape. Consideration has not been given to such things as the destruction of trees or the visual impact of the development.

Existing road systems and transport facilities are inadequate; no evaluation has been made of the effect of the laboratory on this.

The Environmental Impact Statement does not examine the effect of the construction of the Laboratory on this particular environment but concentrates on general points that are not backed up with particular evidence.

### 3.2 What is an Ideal Site?

We believe that an ideal site should have the following characteristics:

- (a) a large, flat, open area or a hilltop,  
(b) no nearby houses,  
(c) a windy site.

These characteristics would allow maximum dispersal of chemicals and radio-active materials, would minimize danger to people and would not damage the environment.

### 3.3 Alternative Sites

We consider that it is important that the factors mentioned in 3.2 above are taken into account in the selection of the site for this laboratory; this is more important than the finding of land presently owned by the Australian Government.

Only one of the general areas (Campbellfield) considered in the Environmental Impact Statement comes close to meeting all of these conditions. This was found to be unsatisfactory because access could be gained only through a residential area and then only via a road that would have to be constructed. We agree that the proximity of a residential area is a difficulty—that is one of our objections to the present site.

The cost of construction of an access road would surely be minimal when compared with a total building cost of \$3.25m. There are many acres of open land in the area that would be suitable.

## 4 CONCLUSIONS

- (a) We believe that the building of a Radiation Laboratory on the proposed site is detrimental to the environment of the area. We do not wish to give other residential areas similar problems but contend that there are other more suitable sites not sufficiently investigated in which there would be far less effect on the surrounding area. We have pointed to a feasible alternative.
- (b) It is a generally accepted principle that we, as private landowners, do not develop our land in any way we please, but are restricted for the good of the surrounding residents. We ought not to build any buildings or engage in any activity that will affect the well-being of the people around us. Therefore, we feel that the Australian Government, while not bound by regulation, ought not to use its land in any way that will adversely affect the quality of life of local residents.
- (c) Expanding urban areas require increased lands for recreation and relaxation. The approval for a large government enterprise on an area of land suitable for a park or sanctuary would be environmentally irresponsible. (See Appendix I.)
- (d) Whether or not there is a danger from radiation the name 'Radiation Laboratory' creates for the layman pictures of Hiroshima and

Nagasaki. Wherever this building is eventually located, the name should be changed to something less offensive, e.g. Health Standards Laboratory.

- (e) We submit that this Laboratory must be sited so that there is no aesthetic or environmental damage and the quality of life of the surrounding citizens is not impaired.
- (f) Because the effects of low levels of radiation on people are unknown and the level of activity of the laboratory is increasing exponentially, we contend that the siting of the laboratory near a residential area is potentially dangerous.

#### Appendix A

##### METEOROLOGICAL CONDITIONS OF THE PROPOSED SITE

The proposed site is located in the bottom of a valley with an existing creek flowing through the property. This creek is approximately 7 km. in length, with the site located 3 km. from its source, and ultimately flows into the Plenty River.

The area is surrounded by a number of ridges and valleys and the ridges are usually above the 80 metre contour level (refer to map on following page.) The site is located on the 30 metre contour and is on a hillside with a fall of 1 in 10 to the creek. Hence the site is located in a very protected area with respect to the prevailing atmospheric flow.

In regions such as described above, the lower atmosphere (i.e. less than 200 metres) often decouples from the gradient flow. This effect occurs most evenings and also during the day when the gradient wind is low, and is clearly evident to the residents of Yallambie by the large number of local fogs which occur in the creek and on the proposed site. Further evidence is shown by the extreme pollution that is caused to the area when a resident burns his or her incinerator. In fact, some residents have found other methods of disposing of their inflammable wastes.

Under these very stable atmospheric conditions and dispersal of radioactive materials or chemical substances would be a minimum and residential block located approximately 50 metres from the proposed laboratory would be exposed the full strength of the waste emissions.

G. A. M. KELLY (B.Sc)  
Meteorologist

Commonwealth Meteorological Research Centre

#### Appendix B

##### EXTRACTS FROM 'THE BIOLOGICAL EFFECTS OF NUCLEAR EXPLOSION FALL-OUT', REPORT TO THE PRIME MINISTER, APRIL 1973—AUSTRALIAN ACADEMY OF SCIENCE

'At low doses of radiation on animals or on man, it is not known whether the effects are proportional to dose. There may be a threshold below which lower levels of radiation have no effect. Current work on repair by living cells, of damage they have suffered at high doses of radiation, suggests that low doses may not cause cancer or genetic defects at a rate proportional to dose'.

'Though the average levels of radiation due to the French explosions are unlikely to make a statistically detectable increase in the cancer or genetic effects in Australia, we emphasise that there should be no unwarranted exposure to radiation'.

#### Appendix C

##### EXTRACTS FROM 'THE EFFECTS ON POPULATION OF EXPOSURE TO LOW LEVELS OF IONIZING RADIATION, BEIR COMMITTEE, NOVEMBER 1972, NATIONAL ACADEMY OF SCIENCES, WASHINGTON, U.S.A.'

##### Summary and Recommendations

We can state some general principles, many of which are well recognized and in use, and some of which may represent a departure from present practice.

- (a) No exposure to ionizing radiation should be permitted without the expectation of a commensurate benefit.
- (c) There should be an upper limit of man-made non-medical exposure for individuals in the general population such that the risk of serious injury from somatic effects in such individuals is very small relative to risks that are normally accepted. Exceptions to this limit in specific cases should be allowable only if it can be demonstrated that meeting it would cause individuals to be exposed to other risks greater than those from the radiation avoided
- (d) There should be an upper limit of man-made non-medical exposure for the general population. The average exposure permitted for the population should be considerably lower than the upper limit permitted for individuals.
- (i) In regard to possible effects of radiation on the environment, it is felt that if the guidelines and standards are accepted as adequate for man then it is highly unlikely that populations of other living organisms would be perceptibly harmed. Nevertheless, ecological studies should be improved and strengthened and programs put in force to answer the following questions about release of radioactivity to the environment:
1. how much, where, and what type of radioactivity is released;
  2. how are these materials moved through the environment;
  3. where are they concentrated in natural systems;
  4. how long might it take for them to move through these systems to a position of contact with man;
  5. what is their effect on the environment itself;
  6. how can this information be used as an early warning system to prevent potential problems from developing?
- (j) Every effort should be made to assure accurate estimates and predictions of radiation equivalent dosages from all existing and planned sources. This requires use of present knowledge on transport in the environment, on metabolism, and on relative biological efficiencies of radiation as well as further research on many aspects.

#### Appendix D

##### EXTRACTS FROM 'ANNUAL REPORT OF COMMONWEALTH RADIATION LABORATORY FOR THE YEAR ENDED JUNE 30TH, 1972'

'In the twelve months ended 30 June 1972, 12,341 shipments of radiopharmaceuticals, including 38 different radio-nuclides in a large number of compounds, were procured by the Laboratory. (The corresponding numbers for the previous year were 4,502 and 46 respectively).'

'In the year 1971-72, a total number of 246,467 issues was made from or through this Laboratory. This represents an increase of 22 per cent over the corresponding number of 202,566 issues for the year 1970-71. The increase in the number of such issues since 1960-61 is shown graphically.'

(Graph unable to be reproduced)

'Studies of radiopharmaceuticals indicate increases in the rate of administrations of between 15 and 20 per cent per year in the mid 1960s. More recent information based on sales of radiopharmaceuticals indicated an annual increase of 25 per cent per year. It appears judicious to estimate that in the 1960s the use of radiopharmaceuticals increased fivefold during the 10-year period and that an increase of sevenfold may be experienced in the next 10 years.'—Extract from BEIR Report on trends in United States of America.

#### Appendix F

##### BIRDS COMMONLY SEEN IN THE AREA

##### Australian Native Birds:

Cockatoo, white  
Crow  
Cuckoo, pallid  
Cuckoo-shrike, black faced  
Duck, black (also called brown duck and grey duck)  
Galah  
Honeyeater, noisy miner  
Honeyeater, red wattle bird  
Honeyeater, greenie, or white plumed honeyeater  
Honeyeater, white plumed  
Kookaburra  
Magpie  
Magpielark or mudlark  
Plover  
Parrot, green grass  
Robin  
Shrikethrush, grey  
Silver eye  
Sparrowhawk  
Swallow  
Thornbill  
Willie wagtail  
Wren, blue

##### Introduced Birds:

Blackbird  
Goldfinch  
Myna, Indian  
Thrush  
Spotted dove, or Indian turtle dove  
Sparrow  
Starling

The Bell-miner or Bellbird, is found around the Plenty River in the vicinity of the old bridge, and extending along the creek towards Yallambie Road. The habitation of bellbirds in this area is one of the few remaining known colonies within such close proximity to the city. The habitat of these birds requiring water, food, nesting places etc. is easily disturbed, e.g. barrel draining of creeks, clearing banks, too close settlement and destruction of trees.

#### Appendix G

The Deputy City Engineer, City of Heidelberg, Mr Ladd, supplied the following information:

Traffic count for Lower Plenty Road near Bannockburn Road:

1965—4,651 vehicles between 7 a.m. to 7 p.m.  
1971—8,687 vehicles between 7 a.m. to 7 p.m.  
1972—9,853 vehicles between 7 a.m. to 7 p.m.  
21.3.1973—10,846 vehicles between 7 a.m. to 7 p.m.  
This is an increase of 133 per cent since 1965.

Results of traffic count carried out by Mrs French, Messrs Harris and Kelly, on Friday, 1 March 1974, between 7 a.m. and 9 a.m.

Vehicles travelling to Heidelberg ..	2,080
Vehicles travelling from Heidelberg	581
Vehicles entering or leaving Yallambie Road .. .. .	987

#### Appendix H

##### DETAILED CRITICISM AND QUESTIONS ARISING FROM THE ENVIRONMENTAL IMPACT STATEMENT

Index numbers refer to corresponding Index numbers in the Environmental Impact Statement.

##### 1 INTRODUCTION

The residents of Yallambie do not agree with the statement.

##### 3 FUTURE SITUATION

With reference to 'The Annual Report of the Commonwealth Radiation Laboratory 30 June 1972', what estimates can be made of the rapid expansion in the radiopharmaceuticals in the next 20 years and beyond?

What future activities are planned?

What types of radioactive substances are likely to be used?

What form e.g. powder, liquid, gases, etc.?

What quantities are likely to be involved?

##### 6 IMPACT ISSUES

##### 6.2 Environmental Protection

What studies have been conducted at the proposed site concerning the micro-climate and the dispersing properties of the atmosphere at this site.

Note the proposed site is near the bottom of a valley which often decouples from the atmospheric flow. A quite low inversion often forms less than two hundred metres above the site.

##### 6.3 Building Functions

##### 6.3.2 Technical Services Section:

In view of the above statement of the local atmospheric conditions, what special arrangements have been made to ensure a high degree of air dilution—especially lead fumes?

What type of monitoring will ensure that clean air standards are maintained?

Will the volume of this work increase with the rapid expansion of future activities? (Refer Appendix D.)

#### 6.3.4 Dosimetry and Sealed Sources Sub-section:

Does this statement really mean 5 millirem per year and if so, how do they propose to measure it?

Natural background radiation is at least 50 millirem per year  $\pm$  10 per cent so to say they will monitor to ensure the dose rate is less than 5 millirem per year is rather optimistic and throws some doubt on their statement.

#### 6.3.7 Radionuclide Metrology Sub-section:

In what forms are the unsealed radio-active sources—liquid, solid or powder?

Which radionuclide will be involved, and will they be handled in fume cupboards with monitored filtered exhausts?

What is the monitoring method?

What precautions will be taken in the case of accidents (e.g. fire) for monitoring failures?

#### 6.3.8 Environmental Radiation Sub-section:

With reference to the emissions from the proposed Chemistry laboratory:

Are they aware of the micro-climate of the area and if so, what special precautions have been taken to ensure the correct dilution of output wastes?

What are the amounts, frequency of substances to be emitted into the atmosphere?

Will any of the substances that are emitted have any odour, and therefore affect the residents of Yallambie? (Note that the nearest residential site is approximately 50 metres from the Radiation building.)

#### 6.3.9 Radiopharmaceutical Sub-section:

In what form are the unsealed radio-active sources—liquid, solid or powder?

What is the control procedure?

How is the amount of radio-active material going out the exhaust actually limited?

Which radionuclide will be involved and will they be handled in fume cupboards with filtered exhausts?

Will the glove box and the fume cupboards be monitored near the discharge point?

How frequently will the monitor be checked if installed?

Will it be a filter paper type sampler for particulate material or an ionization chamber for gamma active isotopes only?

If so will it be connected to an alarm system to give warning of untoward releases of radio-active material?

The Victorian Regulations were compiled in 1959 and are based on permissible concentrations at the discharge point. In many cases these regulations are much greater than the recommendation of the International Commission on Radiological Protection (ICRP).

#### Some isotopes picked at random

Radioisotope	*ICRP (mpc) air	Vic. Reg. (mpc) air
Hydrogen 3	$2 \times 10^{-7}$ , u Ci/cc	$2 \times 10^{-8}$ , u Ci/cc
Phosphorous 32	$2 \times 10^{-8}$ , u Ci/cc	$1 \times 10^{-7}$ , u Ci/cc
Carbon 14	$1 \times 10^{-7}$ , u Ci/cc	$5 \times 10^{-7}$ , u Ci/cc
Iodine 131	$3 \times 10^{-10}$ , u Ci/cc	$5 \times 10^{-9}$ , u Ci/cc
Ra 222	$1 \times 10^{-9}$ , u Ci/cc	$1 \times 10^{-7}$ , u Ci/cc

\*Maximum permissible concentration—air, for non-occupationally exposed person.

Is it reasonable to assume these dilution factors (i.e. 100) under inversion conditions with no stack, and negligible thermal lift at houses only 50 metres away?

#### 7.2 Acids

In the event of cracks and subsequent leaks, can the contents of these holding tanks get into the nearby residential land or watercourses?

Are the holding tanks fitted with sumps to hold overflow or leaks?

#### 7.7 Products emitted to the atmosphere

Chemical wastes (see comments 6.3.2.)

How is it proposed to control radio-active gases, e.g. radon or iodine?

How are the outlets monitored to ensure the correct levels?

#### 7.8 Incineration

In view of local atmospheric conditions, how will the emission of air impurities from the incinerator be adequately controlled?

Prepared by: G. A. M. Kelly  
in collaboration with  
Mr F. P. J. Robotham, Radiation  
Protection Officer, University  
of Melbourne.

### Appendix I

#### THE NEED FOR OPEN AREAS IN SUBURBIA

The present government has shown great interest in the conservation of large areas of Commonwealth land for National Parks and recreation areas, particularly where there are no such areas in the region. Any area not immediately required by the Army could be designated in such a way. This Appendix contains a media report on a precedent for this. A map of the City of Heidelberg shows that there are very few large green areas or 'breathing spaces' (see Appendix E). Professor Ellis, when delivering his Meredith lecture on 12 March, 1974 said that every Australian suburb should have its own animal park for native animals and birds (included in this Appendix). The area in the eastern segment of the Army land could provide such a sanctuary (especially for birds). It is the only large area of open land in the district, and is possibly a 'never-to-be-repeated' opportunity for such a development.

The report of the Land Conservation Council for the Melbourne Area pointed to a shortage of recreational land within the urban area. The report emphasised that such land is reaching saturation point and more land will need to be set aside. We have studied the report carefully and include a newspaper article about it in this Appendix. In talking of the shortage of land designated for recreational purposes, the Report notes that 'the spread of urban areas will lengthen the time that many resident in the inner city will take to reach recreational sites in non-urban areas' (Vol. 1, page 127). After taking population

growth and the wide variety of recreational pursuits into account the Report concludes that 'the noticeable growth in recreational activities requiring near natural surroundings will make public land increasingly significant for outdoor recreation' (Vol. 1, page 147).

We realise that this matter is not the direct concern of this particular hearing, but we urge the Committee not to approve a project that will jeopardise such a sanctuary or recreational area being developed.

#### EXTRACT FROM 'THE HERALD' DATED 12 MARCH, 1974

'Bring Animals to People', says Prof.

'Every Australian suburb should have its own animal park for native animals and birds', Prof. Ellis said in his Meredith lecture.

He said last night: 'If we want people to care about what happens to kangaroos, possums and other Australian animals and birds, we must bring them into the environments in which most of us live—the cities'.

'We must be able to talk to them, as it were, and get to know them, so that they are not just bush or plains animals that we have read about in books, but animals we know and love'.

In the lecture he discussed: 'To what degree is man the product of his environment, and to what extent can he act independently of it?'

Professor Ellis said that we could not assume that our environment was irrelevant to the kind of person we are or could become.

'Most people live in large cities. Australia is, I believe, the most urbanised country in the world', he said.

'The attitudes towards conservation and preservation of the countryside, which the vast majority of Australians have, are likely to be determined by the city environments in which they live'.

'Any serious conservation program must begin in the cities'.

'It must be aimed at providing a city environment which will give the city dwellers an appreciation of the magnificence of the Australian countryside'.

#### ARTICLE FROM 'THE AGE' DATED 10 MARCH, 1974

'City Needs More Land for People to Relax'—Problem Acute report warns, by Tim Colebatch.

A report to the State Government has warned that recreational land around Melbourne is fast reaching saturation point.

In its report on the Melbourne area, released today, the Land Conservation Council makes it clear that far more land will have to be set aside for recreation around Melbourne, Geelong and the Latrobe Valley over the next 30 years.

Only 1 per cent of the area around Melbourne is now specifically reserved for recreation, the council says, while people's demand for such areas is increasing rapidly.

The report is particularly significant since it is the council itself that effectively decides what public land should be set aside for recreation and other uses.

Its report indicates clearly that the council will propose a major expansion of National and State parks around Melbourne, Geelong and the Latrobe Valley in its official recommendations to Cabinet later this year.

On past experience, its recommendations will almost certainly be accepted.

The Melbourne report, a massive 450 page volume with an accompanying second book of maps, discusses possible uses for 3350 square miles of public-owned land in a vast area reaching from Moe to Dayesford, from Lake Eildon to Lorne.

It points out that public land is now particularly scarce in areas like the Dandenongs and the Mornington Peninsula which are the most popular with recreational day trippers.

Already, it says 'intensive recreation pressures at such sites have resulted in the deterioration of many of the features that originally made them attractive'.

As well as these areas, the You Yangs, the south-west coastline, Kinglake and the Yarra Valley are listed as recreational areas which are being used to or beyond saturation point at peak periods.

Far greater areas will have to be set aside, the report suggests, to meet the very rapid increase in city people's demand for recreational areas in the surrounding countryside.

Apart from population growth, the near-certain rises in people's incomes, car ownership and interest in nature suggest that individuals are likely to make far more use of the country in future than they do now.

#### ARTICLE FROM 'THE SUN' DATED 20, 1974

Army's Land at Portsea to Be a Park—from John Lombard.

Canberra—More than 1300 acres of land at Portsea are likely to become a national park.

The move is expected after the Army moves its Officer Cadet Training School from Point Nepean in about 1980.

The cadet school will be transferred to the new three service academy to be set up in Canberra in 1979.

Federal Cabinet decided on Monday to set up a \$17m academy to provide tertiary education for officer cadets of all 3 services.

About 150 students go to the cadet school at Portsea.

There are about 130 military staff and 50 civilians.

The Victorian Premier, Mr Hamer, is keen on the national park idea.

The Federal Government is sympathetic but will insist that Point Nepean remains part of the national estate and will not be used for building.

The Defence Minister, Mr Barnard, last night hinted at the Federal Government's feelings when he pointed out that the school had been at Portsea since 1951.

'However, it is in an area remote from any other major military activity, and it occupies attractive land on the Peninsula', he said.

There is also a 181 acre quarantine station on the peninsula. The school covers 1119 acres.

(The headland was the beach from which the then Prime Minister, Mr Harold Holt, drowned in December, 1967).

Mr Hamer last night welcomed the move. 'We are extremely pleased that the long campaign by the Victorian Government to have this beautiful area handed over to the public has met with success', he said.

'It will enable the national park along the ocean coast from Cape Schanck to Point Nepean to go ahead'.

'We will gladly negotiate on how best to guarantee that this area of land can be handed back to the people of Victoria. This does not mean the whole area will be open to the public'. The area is one of the most prized pieces of land in Australia. Conservationists regard it as an area of great scientific importance.

**CHAIRMAN**—You will realise, of course, that Appendix H poses questions of which this Committee has no knowledge, except what is has gained from witnesses, and it needs that information to make its determination, and therefore it is unable to answer your questions. But I understand that you have a written copy from the Department of Health with some of the questions posed. The Department of Health witnesses will be back later today and will verbally answer the questions that you have posed. Are there further questions, if I can put it that way, Mr McConville, that bother you or are there additions that you wish to make to your submission?

**Mr McConville**—Yes, there are further questions which arise from the answers they gave us. Would you like us to read the questions and answers?

**CHAIRMAN**—Yes.

**Mr McConville**—I will ask Mr Kelly to do that. We consider this to be fairly technical.

**CHAIRMAN**—Does the Committee have a copy of this?

**Mr Kelly**—The Department of Health have spare copies of the answers to the questions.

**Mr McConville**—Mr Chairman, I think you said that you did have the Department of Health answers.

**CHAIRMAN**—Yes, we have the answers of the Department of Health to your questions originally posed, but I do not think we have a copy of your answers to these answers.

**Mr McConville**—Would you like us to read the questions and answers we received from the Department of Health, or will you take them as read since you have a copy?

**CHAIRMAN**—No. Those answers supplied to you by the Health are their evidence and they will be presenting that later today. What I put to you is: Do you have any further questions crossing your mind in relation to the evidence that you have just submitted to us?

**Mr McConville**—Yes, there are a few other questions I would like to bring up which have arisen from alterations to the plans and things like that. I refer to various points in our statement I have just read, and I will start again at page 1. Under paragraph 2.1, possible danger due to emissions of radioactive materials and chemicals and a general statement about the site, the Department of Housing and Construction did mention yesterday that they do have evidence from the Bureau of Meteorology, but I believe this was not presented. We would like to see this. Turning to page 2, emergency procedures, we were very pleased to hear that Mr Stevens has offered to make the monitoring levels available for the public. Under 2.1(e), in which we say it would appear that no one could accurately predict the future role of the laboratory, Mr Stevens did admit that they cannot predict this and Mr Parker confirmed it. So there is still a rather big question there, I think.

Referring to paragraph 2.2(a), Rural/Residential Area, I think it was compared yesterday with the building of a rehabilitation centre in Glen Waverley. I believe that this type of construction would be very much different from the type of building which exists as a rehabilitation centre at present in Glen Waverley. I do not think it was a very good comparison. Our concern about long range visibility, paragraph 2.2(b), increased further when we heard of the outside lighting, and surely this will stand out at night time as well as daytime with this highly illuminated building and will be a continual reminder to residents.

We refer in paragraph 2.2(c) to destruction of trees. Since we wrote this, and up until yesterday, we had no idea that they had altered the siting of the building. They have moved it forward. They now claim that they would only have to remove 40 trees. We find

that rather hard to believe, but still we will count the trees as they come down if it ever gets to that stage.

**CHAIRMAN**—Are you going to count them as they are replanted too?

**Mr McConville**—They also mentioned banking up the creek to form a pond for native birdlife. We consider this to be undesirable. The creek is at present a drain, the water in it is fairly polluted, in fact extremely polluted, and any water that does lie there after a heavy rainfall becomes stagnated very quickly and does create an odour. So I would hope that they have some means of purifying this water before they allow it to pond up. Paragraph 2.2(e) refers to traffic problems. They did state at one stage that the Heidelberg City Council had no objection, but I believe that the Heidelberg City Council in later evidence may have objections to the traffic problems. If they do consider that the Heidelberg City Council's ones are OK, we are not happy with it. We did our own count and we consider that the traffic is much higher than even the City of Heidelberg realises.

There are a few other items which came up yesterday and I would like to pose some questions. It was mentioned that high level solid wastes are at present stored in ammunition huts on the other side of the city, probably at Deer Park or out past Brooklyn in the Werribee area. Surely then the siting of the laboratory on that side of town would decrease the transport risk of this solid high level waste. Mr Stevens did outline yesterday details of the help given to the groups. I think he did neglect to say some things, that we did not obtain even the site plan. We asked for it on 27 March at a meeting with the Director of the Australian Department of Health, Dr Webb. These arrived on 9 April and we believe only after phone calls from the Press, but we did eventually receive site plans. It was also stated that they meet all the requirements of the local and State authorities, but they do not heed the Melbourne and Metropolitan Board of Works planning, being right next to a residential area, or the EPA licensing requirements. In fact we believe they have not even applied to the EPA for licensing. We know they are not obliged to but we consider they should.

In a statement in reply to questions our Association raised, the Department of Health said yesterday:

Copies of the Environmental Impact Statement and Addendum No. 1, prepared in relation to this project, have been forwarded to the Department of Environment and Conservation and the Department of Urban and Regional Development. At the request of these two Australian Government Departments copies of the Environmental Impact Statement and Addendum No. 1 have been forwarded to the Victorian Ministry of Conservation and through that body to the Environmental Protection Authority, the State Department of Health and the Melbourne and Metropolitan Board of Works. Advice has been received that none of these bodies has any objection to the proposal.

We received a letter dated 14 August from the Environmental Protection Authority. It reads as follows:

I refer to your letters of 15 May and 20 June 1974, regarding the Australian Radiation Laboratory at Yallambie.

The Environment Protection Authority has not undertaken a study of the Environmental Impact Statement prepared by the Australian Department of Health relating to the abovementioned laboratory.

With reference to your enquiry as to whether the Australian Department of Health has applied for a licence to discharge waste for this laboratory, I have to advise that a licence application has not been received and, therefore, no licence conditions have been assessed. However, if and when an application for a licence to discharge waste to the environment is received, an assessment will be made and licence conditions will be set to ensure that the proposed discharges of waste would not create a condition of pollution.

A State Environment Protection Policy has not been declared for this area.

I am forwarding copies of your letters to the Ministry for Conservation, which is concerned with environmental studies, with a request that a reply be directed to you.

No reply has yet been received. I think the Department of Health indicated in their first answers from him. Mr Stevens' letter con- that they would answer this question at the inquiry, in a letter to us. I think Mr O'Connor handles that part of it in his report. We also found that they were not entirely co-operative. Mr Stevens said yesterday that they were. We received a letter from Mr Stevens, dated 3 June 1974, in which he thanks us for our letter dated 15 May, with which we enclosed a list of questions to which we sought answers from him. Mr Steven's letter continues as follows:

Your letter indicates that those questions were included in your submission to the Parliamentary Standing Committee on Public Works, Appendix H. You say that the Department of Health has received from the Secretary of the above Committee the questions in Appendix H of your submission, together with a request that the Department prepare for the

information of the Parliamentary Standing Committee on Public Works answers to the question posed. Further, the Department has been advised by Secretary of the Committee that, because the matter of the proposed new premises for this laboratory has been referred by Parliament to the above Committee, explanations, answers to questions and the like should now be part of the evidence presented and considered by the Committee. You will understand that it would not be appropriate for me to reply direct to you with answers to your questions. However, you may be assured that answers will be provided at the public hearing of evidence.

After a bit of negotiation with our local member, and I believe a Minister, 2 months later we did receive the answers to those questions, as we mentioned earlier, but we do not think they were as extremely co-operative as Mr Stevens pointed out.

**CHAIRMAN**—Mr Stevens was quite correct when he said that those questions are the property of this Committee and not the property of your Association. I must point out to you again that this Committee is here to inquire into the project, to inform itself on the project, and to make a report to the Australian Parliament. As such, the documents are the property of this Committee and not necessarily the property of other organisations. So Mr Stevens was quite correct in the advice that he gave to you.

**Mr McConville**—So that we were not really correct in asking him for answers, individually? We sent them to him separately.

**CHAIRMAN**—That is a matter of negotiation between you and Mr Stevens. The Secretary of this Committee requested Mr Stevens to prepare answers so that they could be presented to this Committee in the form of public evidence at this inquiry. Those answers were the property of this Committee.

**Mr McConville**—Yes. We also requested the answers separately. I think it was also stated yesterday, to do with the flooding, that no flooding has occurred within 10 feet of sewer inlets. I think you will find that if water goes 6 inches through a home, it is well within 6 feet of sewer inlets. In fact there is one inlet which it covered 2 feet over, and that is an inlet which is in the Army area itself. The only other thing which I would like to mention at the moment is that the only mention that has been made of the provisions for the Pony Club on the site is that they would demolish their buildings, and that as far as we know is—

**CHAIRMAN**—The Pony Club will be giving evidence later today.

**Mr McConville**—Could I now pass over to Mr Kelly, who will deal with the more technical aspects of the submission?

**CHAIRMAN**—The Committee does not have a copy of that evidence. I do not have a copy of it, and I am unsure of the value of it until I have seen it. You must remember that we are on a pretty limited time scale. We are doing this as expeditiously as we can, as the Parliament has charged us to do it. Might I suggest that the Committee now engage in its cross-questioning of yourself, and if the Committee feels that it is desirable that further evidence be admitted we will take that decision then.

**Mr McConville**—They are mainly answers to questions posed yesterday but maybe they will come out in the cross-questioning here today.

**CHAIRMAN**—Frankly, again it is this Committee's function to satisfy its mind on these subjects. Its deliberations and final recommendation to the Parliament may not be in line with your own thinking or the thinking of a number of members of the community, but it will make its mind up and determine on the basis of the evidence that is placed before it, and if we continue to have answers to answers then this inquiry will never be completed as people engaged in cross-answering. It is essential that this Committee follow a practice that has been followed for the last 60 years. For the last 60 years the Committee has adhered to a procedure and as a rather new Chairman it is not my intention to depart from that procedure, because it has worked very well in the past. So I would suggest that we now move into questioning of yourself on the evidence that you have submitted and we will make a decision about the later evidence, and as I say I have not had the benefit of reading it to determine whether it is in fact admissible evidence or not. I am not in a position as Chairman to make a decision on that until I have in fact seen the evidence.

**Mr McConville**—Thank you, Mr Chairman.

**Senator JESSOP**—First of all, I would like to know what your occupation is, Mr McConville? We have a meteorologist among us but I would like to know what both your occupations are as a matter of interest.

**Mr McConville**—I am a school teacher.

**Mr Lavender**—So am I.

**Senator JESSOP**—You are representing the Yallambie Progress Association. How many members have you in your organisation?

**Mr McConville**—I cannot give you exact figures but it would be of the order of 300 members.

**Senator JESSOP**—Do they all live in the immediate vicinity?

**Mr McConville**—Yes, we are defined by a boundary which is mainly Yallambie Estate and residences which are close to it.

**Senator JESSOP**—Where do you live yourselves?

**Mr McConville**—My back fence backs onto the Army camp, but I believe it will not back onto the radiation laboratory.

**Senator JESSOP**—What is your personal prime objection to the erection of this laboratory?

**Mr McConville**—My personal objection is that I think the Government Department have not fully investigated what they are doing. They did not consider residents. They did not consider me, being adjacent to or very close to the area that it will be on. And the fact that it is a very large building which I do not consider I should have to live near. When I bought the land I thought it would be purely residential land and Army development out the back.

**Senator JESSOP**—You attended the hearing yesterday, did you not?

**Mr McConville**—Yes.

**Senator JESSOP**—And you were able to determine that this Committee is very anxious to question the Department on matters of concern to the residents, and I think you will notice that yesterday a lot of our questioning was directed along the lines of concern that you have just displayed. You probably heard the Department of Health witness say that the Army could build iron buildings on that area adjacent to your place without reference to our Committee. How would you react to that? Would you think that iron buildings would be preferable to a building such as this?

**Mr McConville**—I suppose that is possible, but I think previous development at the Army camp has been excellent. Any development that the Army have done for the last 5½ years since I have been there has been well up with

the rest of their buildings, it has been in the centre of their site, and it has been barely visible to anyone living nearby.

**Senator JESSOP**—I think most of the questions that you raised here have been answered in part yesterday during the evidence, because I remember asking questions myself with respect to, for example, the fire protection. I think that was answered fairly well. Other questions here obviously will have to be answered by the Department. However, you expressed some concern about possible damage to the property due to vandalism, did you not?

**Mr McConville**—Yes, that was mentioned.

**Senator JESSOP**—I asked a question about external lighting of this area and I think that the main reason for that lighting would be to protect the building against possible vandalism, and you may recall that I asked whether this was going to cause any undue disturbance to the residents due to direct glare. I think the answer was that they believe that with the growth of the surrounding trees and so on, it would not be a problem. You must have been encouraged by the fact that the Department has engaged a landscape specialist and that they intend to plant a lot more trees there than they intend removing. I think they said something like a thousand trees, so that ought to meet with your approval in that regard.

**Mr McConville**—Are you asking me in particular, or Mr Lavender?

**Senator JESSOP**—It does not matter. I am just asking you whether you believe that with respect to the environment itself the Department is doing its best to improve the growth of trees in the area and generally try to overcome any objections.

**Mr McConville**—Yes, I am certain they have listened to our objections and have taken note of them and they have done a bit about it. Mr Lavender wants to comment too.

**Mr Lavender**—We agree that they have taken note of our objections; and they have stated a large number for the trees and shrubs they intend to plant. I still envisage problems with that. Firstly, trees do take some time to grow. The mounding is barely above fence height and would have no blocking out effect for houses that overlook the site, and most houses do overlook the site. As was stated yesterday 13 houses immediately are adjacent to it and this may have some effect

on those houses but not on others. There is a very large roof area, something like 50,000 square feet which is roughly equivalent to something between 30 and 40 houses. It would take a lot of trees to blank that out because a lot of houses would be overlooking that roof area and it would, I think, take many many years before that effect was lost. The car park does seem to be landscaped imaginatively but I still find it hard to envisage an 80-vehicle car park hidden from sight even though it is in and out of trees.

**Senator JESSOP**—You give some attention to the emission of radioactive effluent into the air. I thought yesterday the Department answered that question fairly well when they said that they are capable of measuring the emission. Have you ever been to the laboratory incidentally?

**Mr McConville**—No, not the present laboratory.

**Senator JESSOP**—It would probably be a good idea if you could because it would give you an idea of the scientific expertise that is available there to determine these very minute measurements that are concerned with emission.

**Mr McConville**—Yes. We would have to wait for an invitation, I suppose.

**Senator JESSOP**—You do not have to do that. You can ask the Chairman and I am sure that Mr Stevens would be happy to take you through. I suggest that you do that anyway. In answer to my question on this—and this worries me just as much as it worries you, of course—I was told that the emission ranges from about one-twentieth to one-hundred-and-fifteen-thousandth—I can be corrected later by the appropriate witness—less than the standard—that is the fraction laid down by the international body to which you referred. Does that not give you some confidence that the Department is looking after that particular aspect?

**Mr McConville**—If those figures are entirely correct in all ways but I think Mr Kelly has covered this side in much more detail than I have.

**Mr Kelly**—I majored in nuclear physics which was my main subject at University, however I am not a radiation expert at all. I also work in a very narrow field but I have considered some of your questions and I think that I am assured by what Mr Stevens

is doing in the laboratory now that he will probably meet the standards set. In the literature there is a lot of discussion about these standards. There is considerable questioning in the United States that these standards are set too high and questions arise for you, if you are a resident in an area in which a government department is putting out some radioactivity.

I do not want to elaborate on these points but there was a lot of confusion about things—like looking at colour television sets and radium in watches and how this affects the body. Mr Stevens knows that the most serious effect of low level radiation may not be the effect from the luminous watch; it may be the effect when you breathe radioactive substances it gets into the thyroid glands or into the genetic areas, or the reproductive areas. These are the areas in which it might take three or four generations to work out the possible effects. I am a little concerned that the lack of scientific planning of such an establishment and perhaps the limitations of the establishment for future activities. This could mean that either they have to do other work elsewhere or they have to put out higher levels of radiation. These low level levels may not be serious until after the first, or second or third generation, perhaps. But I say that in the literature there are doubts. And these doubts are the arguments of the Prime Minister's Department against the French tests. I do not think that the French tests are harmful but lots of people have raised doubts. This is where I come back to say that in future Mr Stevens may need to do other activities in other areas, but if he put this building in a better area, he could do these activities. This is where the doubts on radiation occur. They are very small levels, I admit. I am not being over critical but, I am seriously worried—there is a doubt. When there is a doubt, I think that it should be raised. I am a scientist and I have agreed to go on record as saying that all precautions should be taken. It is quite amazing the extra detail that Mr Stevens has displayed in precautions, in filtering—this is admirable—but I still say there could be better scientific planning for such an establishment rather than 50 metres from the houses.

**Senator JESSOP**—Would you agree as a scientist that in the present situation in which the laboratory finds itself, working in 8 buildings remotely situated from each other and having to communicate between them,

would give rise to far greater risk over the last 40 years than it would in a scientifically planned building located in the one area?

**Mr Kelly**—I agree. I think the conditions they work under are dreadful. I have worked in some of the same buildings myself. In fact the great monitoring and filtering that Mr Stevens is putting in this new building is just unheard of in the buildings he is in. I have not seen the actual laboratories but I know that none of these absolute filters etc. exist. But I still go back to basic scientific planning, particularly as in 20 years time he may not be really sure what he is doing. Scientific people know this. I am a scientist, and 10 years ago I did not know what I was doing. I think that activities could expand to such an extent where he has to do other activities in another building. I think that is what he will need to do. He will not, for instance, put radium sources in Yallambie. Probably radium will not be used in the radio-pharmaceutical world much longer. It is a very dangerous substance and it emits a gas which is very difficult to filter. Mr Stevens has said that they are not going to use it in Yallambie. What worries me is: Why build an establishment where there could be problems with substance like radium. The meteorological conditions were not considered at all at the site, and in fact that was an issue that I wanted to take up. I am not going to go into it at length but I discussed it at length with the meteorologist who prepared the meteorological summary for Mr Stevens after I prepared mine and we both agree. We say that to look at the area properly we should take measurements for 5 years or so. You do not rush in and build something when you do not know what is going on. This is another bit of evidence that worries me—lack of good planning.

**Mr Lavender**—On the question you have raised I think we ought to go on record as stating categorically that we do not oppose the building of any radiation laboratory. We quite admit that this needs to be done. All that we are saying is that a more suitable site should be chosen.

**Senator JESSOP**—You are quite right in pointing to doubts. I think we have doubts in almost every sphere of activity but I could also say that perhaps in 20 years time radium may not be required to treat cancer. Who knows? There may be some scientists who will come out with a better idea. I think Mr

Stevens will probably be in a position to answer, perhaps in greater detail, some of the concern you express and I hope to your satisfaction we will find that out later. You say the proposed laboratory will not directly benefit the residents, but I am inclined to disagree because I think it is providing a service, not only to the residents living around it but for every other resident in Australia. It will perform some fairly important life-saving functions.

**Mr McConville**—We realise this. This is why we said it does not directly benefit us. We realise that most residents will probably have some use for radio-pharmaceuticals within their lifetime but we are saying it does not directly benefit them by being there.

**Mr Lavender**—The construction of the building does not directly benefit them. The work they do does, and this is what I said before: We do not oppose the building as a building; we oppose its location.

**Senator MELZER**—Mr McConville, can you tell me how many people live in the Yallambie area?

**Mr McConville**—It would be hard to tell you the number of people, but there are about 460 houses. If you take, say, three to four people per house that is well over 1,000 people.

**Senator MELZER**—These photographs you gave us: The photograph in Appendix E showing views of the site taken from point A. Is that the view that most of you who are backing on to this area get?

**Mr McConville**—No, that view is taken from an area near the Lower Plenty Bridge; it is from the top of a hill on Lower Plenty Road looking west.

**Senator MELZER**—What did you want that photograph to convey to us?

**Mr McConville**—Mainly the traffic. It was taken, I think, on a Sunday morning; the treed nature of the site; the hilly site and its long-range visibility. It was taken from nearly one-quarter of a mile away.

**Mr Lavender**—Some of us do get a view fairly similar to that, though.

**Senator MELZER**—How long have you lived in that area?

**Mr McConville**—It will be six years in November.

**Senator MELZER**—How old are the trees on the site?

**Mr McConville**—They have been there longer than I have. We have not had any estimate of this. Some were planted by the riding school and I believe some were there before it came there. The riding school would have a better idea of their ages.

**Senator MELZER**—Apart from the eucalypts on the site, what other native flora is there?

**Mr McConville**—I do not know that there is much other than the gums or eucalypts. There is an ecological statement prepared—it is part of the Preston Institute submission—which could be dealt with in more detail there, but by far the majority are gum trees.

**Senator MELZER**—When you built your house, did you have to remove trees and bushes to build it?

**Mr McConville**—I had one tree in the very centre of my block and there was no way I could build around it; mind you, we tried.

**Senator MELZER**—That area is still being built on, is it, the Yallambie Estate?

**Mr McConville**—Yes, but it would be 90 per cent filled; there would be no more than twenty to thirty vacant blocks.

**Senator MELZER**—How much building is going on in the area apart from the Yallambie Estate?

**Mr McConville**—We are bordered on one side by the Plenty River and the other side by the Army camp, and on the north by a similar sort of estate in the Greensborough area, and the nearest further building would be over in Viewbank, more than a mile away.

**Senator MELZER**—The traffic then is obviously going to increase on the road whether that laboratory is there or not?

**Mr McConville**—Yes.

**Senator MELZER**—What views do you have as to how that traffic should be dealt with?

**Mr McConville**—We have been having quite a lot of discussion with the Heidelberg City Council over the past 2½ years that our Association has been in existence. That intersection of the Yallambie Road and Lower Plenty Road has always been a bone of contention with every resident. It is extremely dangerous and there has been one fatality since I have been there: two further up the hill. We have found that since the Heidelberg

City Council has closed some roads off that the traffic on Yallambie Road has now increased even more. There are a lot more people too coming from this Eltham side turning to go up through the Yallambie Estate to reach areas like La Trobe University, and so forth.

**Senator MELZER**—Have you any ideas yourselves on what should be done about the general traffic in Lower Plenty Road?

**Mr McConville**—Yes. Heidelberg Council at the present is doing a survey of road traffic problems in the area, and it was brought up at a meeting a couple of weeks ago that it would be preferred if there was some road which linked Lower Plenty Road directly across through the Army area with Greensborough Road, and across eventually to Kingsbury Drive, which goes to La Trobe University. A lot of the traffic cuts through side streets to get across towards La Trobe.

**Senator MELZER**—The Greensborough Road is not any bigger or wider than Lower Plenty Road, is it?

**Mr McConville**—Yes, it is much wider and it is intended to widen that much further as part of one of the freeway links through Greensborough.

**Senator MELZER**—Are there plans to widen Lower Plenty Road?

**Mr McConville**—We heard yesterday there are verbal agreements with the Country Roads Board. We have been asking the council for years and it has been asking about this, but it is always next year or the year after.

**Senator MELZER**—But there are plans to widen it eventually, no matter what.

**Mr McConville**—I have never seen them. We heard of a verbal agreement yesterday.

**Senator MELZER**—I see. How many people go to the pony club?

**Mr McConville**—You would have to ask the pony club that. I think there are roughly seventy horses stabled there.

**Senator MELZER**—You back on to it. How many people are there over a weekend? How many cars are parked about?

**Mr McConville**—No cars, because they are all children. The cars come and go.

**Senator MELZER**—To drop them off?

**Mr McConville**—Yes, to drop them off. There have been quite a few near accidents because there is very difficult access into there coming down the hill, because you have to brake very sharply to turn left into the pony club, and there is no room to pass that slowing down car, but I would say every weekend, Saturday and Sunday, there would be in the order of thirty or forty children there riding horses.

**Senator MELZER**—The flooding that occurred in that area; to what depth was your property flooded?

**Mr McConville**—Mine was not flooded. Down further, there was only one house built on it at that stage. Roughly three years ago it was flooded twice in one year.

**Senator MELZER**—Was that closer to Lower Plenty Road than you are?

**Mr McConville**—Yes. Further down. Backing on to the site.

**Senator MELZER**—Do you know how badly it was flooded at the time?

**Mr McConville**—Yes, we went down and knocked the fence down. It did go through his house, I think, about 6 inches. The local doctor would tell you the details.

**Senator MELZER**—That picture that we have. When was that taken?

**Mr McConville**—That was taken at one of those 2 floods, I cannot remember which one, from my backyard.

**Senator MELZER**—Was that before or after the barrelling of the drain?

**Mr McConville**—The drains have always been barrelled under the road and under the estate, but it stopped right on the border of the estate with the Army, where it took a right-angled turn. Now, after much backwards and forwards with the Board of Works, I believe, the Council did commence it in May, and it has now added 200 feet to that barrelling of the drain. Now, whether this is going to alleviate the flooding, I do not know.

**Senator MELZER**—That has just been completed.

**Mr McConville**—It is the same sized drain as it was before.

**Mr Lavender**—The problem with barrel drains, or one of the problems that happened there, was that barrel drains are easily blocked, and I believe an SEC reel was

washed down and blocked the barrel drain which partly caused the flooding, or certainly aggravated the flooding problem.

**Senator MELZER**—The barrelling came under the road.

**Mr Lavender**—It takes a right-angle turn and goes under the properties. The right-angled turn itself is a problem. Then it goes under the road.

**Senator MELZER**—What are the particular characteristics of Campbellfield that make you feel that it would be an ideal place for this laboratory?

**Mr McConville**—We are not very familiar with the site. Being Government property we have not got access to it, but it is a much larger area, according to the street directories. It is in a much more windy area. I work over in that area and I know it is always much more windy than it is here. It is a large open site. And I would imagine they could build it further away from residences.

**Senator MELZER**—What is the advantage of building it further away from the residences?

**Mr McConville**—They would not have to look at it every time they looked out their windows, look on top of a large roof. The other advantage, of course, is it is only within minutes, say, 10-15 minutes of Tullamarine and the freeway into the City hospitals.

**Senator MELZER**—You talk about other more suitable sites. Do you have any other sites in mind besides Campbellfield?

**Mr McConville**—Well, possibly the one area, as I mentioned before, on the Deer Park side of town. We were not actually given the name of the area, but they store the solid waste in ammunition huts. I know there are two or three areas of ammunition huts over on that side of town. It is much more open. I think the Government owns much larger tracts of land over there which are at present not used.

**Senator MELZER**—What happens now when residents in the area use their backyard incinerators, or when they light fires, or when oil heating appliances are lit in the homes? What happens down there?

**Mr McConville**—You can notice this particularly in winter time. On a still afternoon in winter the smoke will go up, perhaps 50 feet, and then it just spreads out and hangs in

the valley, along the top of the creek. We consider that any gases or radioactive dust or something like that that comes out of this laboratory will also stay in that sort of place and then settle overnight.

**Senator MELZER**—Is your Association proposing to the residents of Yallambie, for instance, that they stop using backyard incinerators and such heating appliances that will give off this sort of gas, because of that?

**Mr McConville**—No, we have not actually asked them to do that, but we do pose, at our various meetings, that the problem of waste disposal is a big one. We have discussed this at various times.

**Mr Lavender**—The lighting of incinerators is also rather different from emissions from a building of this nature. Those emissions would go on presumably all the time. They could not decide that one day they will put out emissions and the next day they will not. We can, with incinerators; we can save it up for a windy day, when dispersal will take place.

**Mr McConville**—It does demonstrate the fact that air does hang in the area, that particles do hang in the air in the area.

**Senator MELZER**—How often do you notice it?

**Mr Kelly**—I have not got an accurate assessment. My colleague in the Bureau of Meteorology and I agree that we need measurements. In the winter time, in some years, because Melbourne's climate varies slightly from year to year, I would estimate that periods of a whole week have gone on in that valley since I have been there, where dispersal in the area has not occurred. I am not saying this occurs every year, but I could go on record as saying it has occurred. Three or four days are common in the winter time. Normally what happens, is that at night you get the inversion. The wind drops and the inversion comes down. In the morning, up comes the wind and it blows away. On this site, because of the valleys, occasionally in the winter time it just does not blow away in the daytime, and you can get periods of days.

**Senator MELZER**—In your opinion, as a scientist, what harm does that do to the residents there?

**Mr Kelly**—As it is at the moment very little, I think that any development of that land for industrial type use or—

**Senator MELZER**—What harm does it do at present?

**Mr Kelly**—At the moment? I do not think there is anything serious. There would be a slight problem from exhaust fumes from Lower Plenty Road. I must admit there would be a slight increase in carbon monoxide.

**Senator MELZER**—You talked about radiation having a cumulative effect on people, so that, say, the third generation could perhaps suffer some disability, but we do not know how bad or how little the effect will be. Presumably you mean if the whole 3 generations had lived in the one area?

**Mr Kelly**—That is not exactly true. Genetic effects are funny like that. They often take a couple of generations to come out, genetically.

**Senator MELZER**—Damage that is done today, may not appear for 3 generations, whether or not the people went on living in that area. Is that what you are saying?

**Mr Kelly**—Yes.

**Senator MELZER**—You live there. You are a scientist. You know that the laboratory is a necessity. Where would you put it?

**Mr Kelly**—Obviously, as was pointed out in the submission, this sort of building should be kept away from a residential area, at least half a mile, for a start, and it should be on flat land or on top of a hill where it is windy. As I pointed out before when I was speaking to Senator Jessop, I am very worried. It is not so much from the point of view of what they are doing now—I think that Mr Stevens has probably got reasonable answers—but not for future activities.

**Senator MELZER**—I understand all that. You have said it, and I know what you said and I believe you. But I want to know where you would put it. If, for instance, you consider Campbellfield suitable, would you then suggest that there be a buffer zone round the laboratory?

**Mr Kelly**—Of course I would. That is why I said it ought to be at least half a mile or so away, and that is what I would suggest. For instance, if they had to put it on the Watsonia Army barracks, well, I could suggest a much better site in the area than where it is at the moment, in relation to housing. I definitely think there should be a buffer zone.

**Senator MELZER**—How big a buffer zone?

**Mr Kelly**—I am at a disadvantage here, and so is Mr Stevens. He does not know what they are going to do in the future. At the moment I have not the figures which the Radiation Laboratory obviously prepared, or said they prepared, for their Environmental Impact Statement in working out pollution levels. They are talking about the low levels, but I yet have not seen their calculations.

**Senator MELZER**—So you would work out the size of the buffer zone on the calculated costs of—

**Mr Kelly**—Meteorological conditions plus, yes, that is right.

**Senator MELZER**—Mr McConville, when you bought your block and built your house, did you consider that the Army might build on the land behind you?

**Mr McConville**—Yes, but at that stage they were not even in sight. I think it was roughly 500 acres or of that order, and they had built on roughly the top hundred, right up in the far corner, near the entrance. I did consider that they might build there in a time of national emergency or something like that.

**Senator MELZER**—Did they ever lead you to believe that they would or they would not build behind you?

**Mr McConville**—No, we never had any sort of consultation with the Army one way or another.

**Senator MELZER**—From where you are now can you see the buildings that are there?

**Mr McConville**—I can just see the flat roof of one end of the latest building they have built.

**Senator MELZER**—There are houses, I believe, across the road from where those Army buildings are now. Is that right?

**Mr McConville**—Across the road? This would be at the other end of Yallambie Road? Yes, there are ones across there but those buildings also are built well back from the road. There is a football oval in between their newest building and the road. Further up, where their transport depot is—which has been there for years—it is close, but then again maybe the houses were built after the Army built there.

**Senator MELZER**—Has the Army taken any sort of steps to prevent you seeing those

buildings, to camouflage them in any way, to make them more acceptable to people who must live there.

**Mr McConville**—I do not know whether they did it purposely, but they have left the trees there. There is a bank of trees—I think it is mentioned in Mr O'Connor's report—up on that top side, and they have built as much as possible in behind the trees in the centre of their area, I do not know whether they did it intentionally or whether it was just their planning, the way they wanted it. They do have open days. We have been up there and had a look around, and it is well designed for them.

**Senator MELZER**—Is the area up there fenced?

**Mr McConville**—The Army barracks, the Army Camp?

**Senator MELZER**—Yes.

**Mr McConville**—No. My back fence is the original strand wire fence.

**Senator MELZER**—But is the area fenced where there are the majority of Army buildings?

**Mr McConville**—No. The paddocks which the riding school lease are all fenced and gated off.

**Senator MELZER**—I do not mean that. I mean the area where the Army is in occupation, where they have got buildings.

**Mr McConville**—That is only a strand wire fence. There is not a 10 foot security fence or anything like that.

**Mr Kelly**—I would just like to correct that. They have a high security communications area, which is fenced and lighted, similar to the Radiation Laboratory, but in the main it is as Mr McConville said.

**Mr BONNETT**—After hearing all the evidence yesterday, do you still wholly agree with this Association submission as you presented it this morning?

**Mr McConville**—No. There are some points. I think I pointed out that certain things were conceded by the Housing and Construction Department and the Department of Health. I would not say that we wholly agree. I still believe that we have a case for not having it sited in such a position. Might I remind you that this was prepared back in May when we were first asked to prepare submissions within 10 days.



**Mr GARRICK**—I do not want to clutter up the evidence with matters that are completely irrelevant, because it appears to me that most of the submissions by these gentlemen either have been answered or should be answered by people like Mr Stevens. Most of it is scientific or technical, so it would be a complete waste of time for me to question or attempt to answer your submission, but I can ask you about one or two simple facts. Basically, is your opposition—because that is what it is—on aesthetic grounds, or is it because of the fear of emissions from the laboratory?

**Mr McConville**—If you want to put it down to one issue only, it would be on aesthetic grounds. The emissions question is a very minor one which we wanted answers to.

**Mr Lavender**—The emissions is an unknown one. We cannot evaluate that. We are laymen—well, I am, anyway—and I cannot judge it personally for myself. I have got to take the word of the experts, which I do not mind doing. If the question of property values is raised, I know very well that anyone who might want to buy my house if I am shifted in my job, which is quite likely, will also want to find out. This may well be a problem. So that also does enter into it, apart from the aesthetics.

**Mr GARRICK**—Well that resolves that—you are prepared to take the word of the experts about the emissions. Mr Kelly did mention—which seems to me somewhat irrelevant or strange—that it would be better if you put it half a mile away from the residences because the emissions would be more readily dispersed by prevailing winds. You know, that sounds: 'I do not want it. I do not accept the fact that this is so. I would accept the word of the experts.' In fact it reminds me that once when I was in San Francisco I said to the Mayor 'Do you get a lot of pollution in this area?' and he said: 'Oh no, boy, we do not get pollution. The winds blow it all down the next bay.' The fact remains that there was pollution, except he was dodging it, so he thought, but the next man was getting it. I am not meaning to be facetious. If there is this emission, then all that would happen, if it were sited half a mile away, is that the wind would blow it to someone else, some other person. That is the way it appears to me.

**Mr Kelly**—Excuse me. I am sure Mr Stevens would not agree with that. That sort of

meteorological condition does not exist in the valley. The atmosphere stratifies—it is a bit like water running down a hill. The air just runs—it does not spread out. You have not got this low level mixing—this type of thing. I have to correct you, very much so; the meteorological conditions in the valley under strong inversion conditions are quite different to what exists on a normal hill outside, where the air is mixing and turning.

**Mr GARRICK**—The only point I was making there, Mr Kelly, was that if what you said is true then it should be 20 miles away.

**Mr Kelly**—No, I am not arguing that. Half a mile on a flat windy site is quite different to 50 metres in a tight bottomed valley.

**Mr GARRICK**—Well, probably Mr Stevens will have the answer to that. As to the aesthetic angle, I have inspected the site, and it is not a pleasing view to me. You mentioned a number; 40 houses. Looking down on that, it would take the space of 40 houses. I was wondering whether you consider the view of 40 houses and 40 backyards more pleasing than that layout?

**Mr McConville**—If you put the whole 40 houses together, not on blocks of land, it is about equivalent to, I think, the roof area, about 13 blocks of land, which would be 13 houses. But just to give you an idea of the size of that white in-filled area there, it is about 30 or 40 houses in roof area, which is a vast area. Although it may be broken up in the centre, it is a large area which by far the majority of houses on the estate will overlook. You mentioned also that the site at present is not very nice. I think the Riding School will tell you it is like that because part of the terms of their lease provides that they are not allowed to put anything permanent there. They are not allowed to put in concrete paths or brick buildings—they have all got to be makeshift type buildings, and that is why it is like that. That is part of their lease of the land from the Army, so that they can be moved out at a moment's notice.

**Mr Lavender**—Also Mr Stevens talked about the outlook of the area as it is at the moment, and talked about flies that breed because of the presence of horses. I am sure the Riding School will have something to say about that. I would also point out that the residents of Yallambie bought their blocks of land and built their houses knowing that that

was there and obviously preferred that to any other development that might occur. They chose that, whereas they cannot choose this.

**Mr Kelly**—I would like to support this from a planning idea. In the past we have talked about not having a say in the development of the area. The Yallambie Progress Association has considered an application of some of these areas for parklands because we consider that there is no open type parkland existing. We have an oval down near the creek which frequently floods. The point is once you build a radiation laboratory and once the Commonwealth steps in and builds other things, perhaps the present open area will completely disappear.

**Mr GARRICK**—I would agree with you there, but the real purpose is that what you would prefer would be to see an open parkland.

**Mr Kelly**—That is right, and that is our aim through the Association.

Short adjournment

**CHAIRMAN**—The hearing is now resumed. I have a few questions of my own, Mr McConville. During the questioning I thought I understood you to say that you had lived almost six years on the site where you now are and that when you purchased that site you were well aware that there was an Army establishment at your back fence. Knowing that armies do not always occupy broad acres but do in fact erect buildings, did it cross your mind that they may, in fact, erect a building along your back fence when you bought the land?

**Mr McConville**—Yes, it crossed my mind but as I said previously the previous development of the Army has been all up in their area and I would not imagine that they would make a special road right down to the back, unless it was for some special transmitter where they did not want interference. This of course is still possible. If they do erect a transmitter I would assume it would affect instruments in the laboratory. That of course is up to future planning.

**CHAIRMAN**—I am not sure that you are aware, Mr McConville, that this Committee only considers works of value in excess of \$2m. Had the Army or the Department of Defence decided to erect, say, a transmitter

shed or a vehicle maintenance depot that cost less than \$2m it would not receive a public hearing like this. Did you know that?

**Mr McConville**—I did not know that.

**CHAIRMAN**—The point I am putting to you is that had the Army decided to erect a corrugated iron shed there that cost \$100,000 you would have had no right to object. Did you know that?

**Mr McConville**—No, I did not know. We probably would have contacted the Army and lodged the objections.

**CHAIRMAN**—You realise though that they would not have received a public hearing?

**Mr McConville**—No, I did not actually know that they would not.

**CHAIRMAN**—That is the mere fact of the matter. I thought I also heard you say that you were not unhappy with the standard of the development that the Army had done on that area already. Did you say that?

**Mr McConville**—Yes. As far as residents are concerned they are not visible very much at all.

**CHAIRMAN**—Have you any reason to believe that the Department of Housing and Construction would show any less attention to detail with the project that is now proposed?

**Mr McConville**—We are not quibbling about their attention to detail. We realise they have taken a lot of our points into consideration. It is the actual siting, the fact that the whole building is going to be there.

**CHAIRMAN**—You regard it—and I do not mean this to be derogatory—as unsightly in that it will be there and that makes it unsightly.

**Mr McConville**—Yes that is the main reason.

**CHAIRMAN**—I refer to the photographs that you have submitted to the Committee as your appendage E, and I have numbered them 1, 2, 3, 4, 5 and 6 so they can be identified. Could I ask what sort of camera was used to take those photographs.

**Mr McConville**—It depends which one. They were all taken by various people. The ones of the flooding and the—

**CHAIRMAN**—Shall we start with 1 and 2.

**Mr McConville**—I do not think I have them in the same order, I am sorry.

**CHAIRMAN**—These are the views of the site taken from point A.

**Mr McConville**—They would have all been taken by a 35mm camera probably with a telephoto lens by the look of them and in fact the person who took them is here today if you wish to ask him some questions about them.

**CHAIRMAN**—We move on to those taken from Point B and particularly the one from Point C. Would you know what sort of camera was used to take those photographs?

**Mr McConville**—Could I ask Mr Harris what sort of camera he used?

**CHAIRMAN**—He may tell you and you can tell me.

**Mr McConville**—A Pentax 35mm single lens reflex camera. The lens was a 55mm and the telephoto a 300mm lens.

**CHAIRMAN**—The only point that I make there is that it is clearly a telephoto lens. Mr McConville, would you agree that the telephoto lens on the camera would see things rather a little bit differently to the naked eye from any of those vantage points?

**Mr McConville**—Yes, well obviously he does see things differently with the naked eye. The main reason for taking the photographs was to show the large open area of land and the treed nature of the area. The first one was taken from point A, while the other two were taken further up the road near the Lower Plenty Primary School.

**CHAIRMAN**—The point I am trying to make is the unsightliness of the mass of the building and I thought that that was what the photographs were intended to convey to me. The point that I am trying to make is that the area is already unsightly.

**Mr McConville**—I would not agree that it is unsightly.

**CHAIRMAN**—Well then, let me ask you from what height above the ground was that photograph taken?

**Mr McConville**—I would say he was standing on the ground. Is it the one with the roof in the foreground?

**CHAIRMAN**—No, the one after that; the one that looks as if it is taken about half way up a telegraph pole.

**Mr McConville**—They were all taken from ground level.

**CHAIRMAN**—Taken from point C; it was taken from approximately this area, I gather from the map.

**Mr McConville**—They are all taken from ground level standing somewhere in Lower Plenty Road.

**CHAIRMAN**—Of course I am not in a position to dispute that but the fellow who has taken this one must have legs about 15 feet long. But it seems to me that the foreground of that photograph is a jumble of telegraph poles and overhanging cantilever electric street lights and right in the centre of the photograph there appears to be a tank of some description standing on a lattice-work steel tower.

**Mr Lavender**—While we are looking at that, might I point out that the residents do not exactly have a love affair with SEC wires and poles, nor do they have a love affair with the house that is there.

**Mr McConville**—The thing that looks like a tank in the middle there is actually a street light. Lower Plenty Road or Main Road, as you know, is about here and is a divided road. Those street lights are in the centre of the road. It just happens to coincide with the large SEC power pylon which goes up above it, if you look very closely at that photograph.

**CHAIRMAN**—It is pretty clear then that the photographs do not clearly portray what the naked eye would see.

**Mr Lavender**—They portray the site and the naked eye would see a large building on that site as being fairly obtrusive.

**CHAIRMAN**—That is provided it is not surrounded with trees, one thousand trees, I believe.

**Mr Lavender**—As you pointed out, the photographs seem to be taken from a great height. I think that indicates the hilly nature of the area and if you are looking down on the roof area and perhaps over the top of a lot of those trees for a number of years—

**CHAIRMAN**—It seems to me, after listening to what you have had to say to us and the questioning of the Committee, that your main concern is the depreciation of the value of your properties, and I think Mr Stevens has clearly said that the danger of radiation emission from the laboratory is negligible.

**Mr McConville**—I do not think we actually claimed any depreciation in value but a valuer who was engaged by Mr O'Connor, actually Mr Gray, president of the RESI, claims that, or his expert opinion is that while our properties will not devalue they will not increase in value at the same rate as other houses in the area or further away from the site. I would regard his as very expert opinion, being a prominent estate agent.

**Mr Lavender**—I would not agree that it is our main concern either. We have only mentioned it once in answer to a question. We are more concerned about living in the area. We are not concerned so much about selling our houses as we do not envisage doing that in the near future; we are concerned about our outlook; we are concerned about the effect that this building will have on our outlook and hence the quality of life that we enjoy.

**CHAIRMAN**—I am sorry, Mr Lavender, I must have misunderstood you earlier. I thought you said that in your job you were liable to be moved away and it worried you whether you would be able to dispose of your property.

**Mr Lavender**—It is possible, it is certainly possible, and I may be up for sale of property but that is not our main concern. I am not looking for a move.

**CHAIRMAN**—You are concerned then about the effect on the environment and you can see that people are part of the environment. I am very pleased to hear you say that. Well now, the effect on the environment, I suppose, is the radiation emissions and the gas and water emissions from the laboratory.

**Mr McConville**—As you say, the environment covers a lot of things, birdlife and things like that as well, but yes, the emissions. Not necessarily the main effect on the environment would be the emissions and I think Mr Stevens pointed out that with the inclusion of these particular filters there will not be a great deal but there could be some. It could affect the residents, as Mr Kelly pointed out, but also there is the effect of destroying the trees, of visually ruining the environment and the effect on the birdlife and native life that is there.

**CHAIRMAN**—Do you believe that the building of your house had some effect or no effect on the birdlife in that area?

**Mr McConville**—I would say it must have had some effect.

**CHAIRMAN**—But you built your house?

**Mr McConville**—Yes, well there was a tree there. It was an estate; there were houses on both sides, but I do not think my house chased many birds away.

**Mr Lavender**—The subdivision had already occurred.

**Mr McConville**—Yes.

**CHAIRMAN**—The problem is which comes first: The chicken or the egg.

**Mr Lavender**—Well, the subdivision had already occurred.

**CHAIRMAN**—Well, that was an Army site too, I suppose we can say that. Now, on the question of the emissions; we first of all talk about radiation emissions and I think it must be clear from the evidence that has been presented to us that this laboratory is more concerned with measuring—certainly from samples taken all over Australia—the radiation of those, and as the emissions from those is lower than the natural radiation in the community, they have to keep out radiation emissions rather than emit them.

**Mr McConville**—May I ask Mr Kelly to comment on that, Mr Chairman?

**CHAIRMAN**—Yes.

**Mr Kelly**—That is not strictly true. There are very careful technical methods of measuring radioactive substances. The ones that occur in nuclear fall-out are often different substances to the radioactive materials that a laboratory handles—different radioactive atoms—and they can actually separate them out. For instance, if the laboratory has got a higher background of certain substances which is in the radiopharmaceutical section, these are often quite different substances than occur in nuclear fall-out. Mr Stevens argued very strongly that they had to keep the levels down because of these very critical measurements, but I cannot think that is the whole truth. They can still conduct these fall-out measurements under, you might say, higher activities from other substances.

**CHAIRMAN**—I am afraid that is something I will have to accept the word of the radiologist on, Mr Kelly, but that is a matter for us to determine in our deliberations. Did you know that there was a Radiation Laboratory in existence. I think your evidence suggested that you had read its reports over the years?

**Mr McConville**—Yes, we did know it was in existence.

**CHAIRMAN**—Did you know where it was?

**Mr McConville**—Well, it is in eight different spots.

**CHAIRMAN**—But did you know exactly where it was?

**Mr McConville**—No, but Mr Kelly, I think, does.

**Mr Kelly**—Yes, I do because they use the Bureau of Meteorology's computers. I also know of the people at Melbourne University and I know a little of the background; I have used radioactive substances myself; they are used during my physics career studies.

**CHAIRMAN**—Well then, you know where it is, Mr Kelly, would you agree that where it is now located there is a greater concentration of people at any given time than there would be in its proposed location?

**Mr Kelly**—I am not sure that that is true. In Spring Street there are very few residents; they are usually quite a long way away, but there are some residential flats in this neighbourhood.

**CHAIRMAN**—But there are people working in neighbouring buildings with only a wall separating them.

**Mr Kelly**—But they are there by choice too to some extent; they are employees of the laboratory.

**CHAIRMAN**—No, I am speaking of people working in neighbouring buildings with only a wall separating them from the existing laboratory.

**Mr Kelly**—You might say they might not even know about the possible hazards.

**CHAIRMAN**—It is a simple question, Mr Kelly. I want to know whether you would agree that there is a higher concentration of people around the existing laboratory through the course of the day than there would be at Yallambie in its proposed site.

**Mr Kelly**—That is an unfair question, I do not know—

**CHAIRMAN**—Well, you told me you knew the place; you told me you knew the area.

**Mr Kelly**—I do not know how many people work in the area.

**CHAIRMAN**—You know there are buildings next door to it. You know the buildings are not vacant.

**Mr Kelly**—A lot of them are; a lot of them are being demolished. In fact there are large car parks in that area.

**CHAIRMAN**—But there are people working only 4 inches or 10 inches or whatever the width of the wall is away from the existing laboratory.

**Mr Kelly**—In fairness, I am quite unhappy that the current laboratory is where it is etc. This is borne out by the very large increase in filters and precautions that are going to be taken in the new building. I ask that if these are important in the new building, why did they not exist in the old premises?

**CHAIRMAN**—To the best of my knowledge they do.

**Mr Kelly**—Not to the extent.

**CHAIRMAN**—Not to the extent. That is correct, so they improved their safety measures.

**Mr McConville**—Do we know the sort of emissions they are putting out now and the effects they are having on people working there now. Do they go in next door and take measurements of the radiation coming through. We do not know that they are not being affected now.

**CHAIRMAN**—Well that is a question—

**Mr McConville**—We were there 24 hours a day, but as Mr Kelly said, these people might work only six to eight hours a day.

**CHAIRMAN**—I suppose apart from a housewife, who is nothing other than a housewife, and even she would not be in the building. Children go to school.

**Mr McConville**—I have one young one that does not. And there are a lot of others.

**CHAIRMAN**—I would rather doubt that they were there 24 hours a day, 7 days a week. However, we are not here to belabor that question. The question that you have posed Mr McConville certainly will be put to Mr Stevens when he comes back before the Committee. On the question of the emissions—there was some talk Mr Kelly because you are a meteorologist about the low movement of air, if I can put it that way, in that area because of the topography. I also understand that there are 450 homes in the area—I think this answer was given roughly. I suppose if we had 450 homes each with an incinerator, and each burning garden rubbish on the one day, each of those emissions uncontrolled, I put it to you that you would have a

worse condition in that area from the household incinerator than you would from the controlled emissions from the fume cupboards of the laboratory.

**Mr Kelly**—As I said before there are not 450 homes in the bottom of the Valley; there are probably 50 or less.

**CHAIRMAN**—Well, could I say that one incinerator burning with the emission uncontrolled would create a worse problem than the controlled emissions coming from the fume cupboards of the laboratory?

**Mr Kelly**—Residents have become responsible; and in fact when a resident does not, the residents in the whole area are quite responsive. And I think you will find, as was mentioned before, that residents are tending to burn their incinerators on windy days; how often do you burn an incinerator?

**CHAIRMAN**—You are not suggesting, of course—and I know that you are not—that the radiation laboratory people are irresponsible?

**Mr Kelly**—No.

**CHAIRMAN**—They would take every precaution to ensure that the emissions were reduced to a minimum.

**Mr Kelly**—But some of their emissions are going on every day.

**CHAIRMAN**—But they are not uncontrolled emissions.

**Mr Kelly**—But they are still emitting substances, are they not?

**CHAIRMAN**—Would you have the technical knowledge to tell me whether the emissions from the fume cupboards would in fact cause a problem?

**Mr Kelly**—I do not even know what they are proposing to emit.

**CHAIRMAN**—There is just one point: After you have read your evidence Mr McConville, on 2.1., this question of meteorology was raised. It is recorded in the evidence, although I cannot recall it word for word, of course. It was rather a lengthy answer given and that will be recorded in the evidence. We will have the written transcript of the evidence. Coming back to 2.2 of your submission you say: 'It is a rural residential area'. Is that in the Shire of Diamond Valley or the City of Heidelberg?

**Mr McConville**—We are in the City of Heidelberg. Half a mile south is the rural area of the City of Heidelberg. There are farms

there. Then that takes you into the Yarra Valley. The Army camp, or our end of the Army camp, does to us appear rural. As well as horses, there are cows and calves and so forth there, so we consider it to be rural and residential estates as much as a rural area.

**CHAIRMAN**—I do not want you to go into a lengthy explanation of this one because we do have a representative of the Heidelberg Council coming forward. Have you any knowledge of the planning scheme of the City of Heidelberg for the area in which you live?

**Mr McConville**—I think it is all governed by the Melbourne Metropolitan Board of Works planning scheme.

**CHAIRMAN**—Well, whichever. It is certainly that part of the planning scheme, and it probably will be a Board of Works planning scheme. You are correct. Do you have any idea or have you seen the plan to know what the exact zoning for the area in which you live is, and the area surrounding.

**Mr McConville**—Yes, I have a knowledge of it, and I have seen what they envisage.

**CHAIRMAN**—And you have seen on that planning scheme, in your vicinity, some of the area zoned as rural. Now, I am talking about it being zoned as distinct from its present use.

**Mr McConville**—Yes, the area which I was talking about down near the river, which is zoned rural at the moment, is in the process I believe of—

**CHAIRMAN**—Sorry, you said down near the river—

**Mr McConville**—Sorry, down towards the Yarra River, about one mile south, that area past Martin's Lane is at present zoned rural. But I believe the Council is in the process of acquiring it to be zoned as reserved open space, or something to this effect—park planning type of thing.

**CHAIRMAN**—Moving north from Lower Plenty Road along Yallambie Road, taking in that area and coming to the east to where we are now situated, do you know any of the area being zoned as rural, or in your view is it all zoned residential C?

**Mr McConville**—No, as far as I know all the part that is zoned residential has been developed, at least the developer has put the roads in. It is not all built on. The area, the flood plain if you like, along the Plenty River

which is our eastern border of the estate, has been zoned public open space or to that effect.

**CHAIRMAN**—The reason that I was asking about the photographs before, is that you say in 2.2 sub-paragraph (b) Long Range Visibility, that the building will dominate the view of surrounding residents. As I understand it, it is partly excavated into a hill. It is not a high-rise building. It is of two floors, some parts three storeys. It will be surrounded by a two metre earth bank in places and surrounded by more than a thousand trees. Now taking that into account, do you still believe that it dominates the view of surrounding residents?

**Mr McConville**—Yes, well let us say it will not dominate the view of immediate residents—people in the dozen or so houses which are near it—but it will dominate all the other houses that are higher up than it will be. As Mr Kelly pointed out in referring to contour levels, probably two thirds of the houses on Yallambie will be higher. They will look down on it. In fact as far away as Watsonia, probably two miles away, you could look down on it and even further up Lower Plenty, as we have pointed out, they would look down on it. I do not think any planting of trees will fully hide the huge roof area which will be there.

**CHAIRMAN**—Do you remember what sort of roofing material was to be used on the building?

**Mr McConville**—From memory it was pre-coloured steel decking or something. It may have been changed I am not sure.

**CHAIRMAN**—If that was coloured green, would it be as obvious as zinc?

**Mr McConville**—It would not be so obvious but I think it would be a flat area and any flat metal area whether it is coloured or not is still obvious. It would not be broken up with trees.

**CHAIRMAN**—What about if it were a playing field? It would be a large green area, this time grass rather than green steel.

**Mr Lavender**—You would not put a playing area in that kind of location.

**CHAIRMAN**—I did not say I would, I asked you.

**Mr Lavender**—No one would because it—

**CHAIRMAN**—I am not suggesting that anybody would. I am simply asking, and I

would like an answer as to whether you would believe it would be obvious if it were a large playing field or a large bare area.

**Mr McConville**—It would be. It is obvious now. You can see the tracks where the horses practice. It is obvious but I do not think it is detrimental to the eye.

**CHAIRMAN**—I see.

**Mr Kelly**—I would like to elaborate on this point because a lot of that area is open, as you know. There is the forest at the back and I think it is particularly attractive, especially from the estate. You might not have looked at it from the estate but that large green open area with horses and cattle which often graze there, is probably the vision which most residents cherish most.

**CHAIRMAN**—Yes. There is only one final question which I have. I understood from the earlier questions that you were somewhat concerned as to what might happen to the laboratory in the future—say 20 years perhaps. Now Mr McConville, are you satisfied that the people who are designing the laboratory, and the people who are going to work in it, and the people who will be responsible for its management, have taken every conceivable precaution now to protect the residents from such things as radiation—and I think that is what we are talking about now—from any danger at all? I am not a physicist, but I understood Mr Stevens to say that this radiation reduces in a square equal to the distance travelled, that is how I understood it anyway.

**Mr McConville**—In a free open space area I think that would be right.

**Mr Kelly**—That is not true. The emission of radioactive substances like small particles and gases do not disperse in a square equal to the distance in these inversion conditions.

**CHAIRMAN**—I am talking about the radiation.

**Mr Kelly**—There are two types of radiation sources.

**CHAIRMAN**—I appreciate that and I understand that the rays themselves—

**Mr Kelly**—We are not really concerned about the rays.

**CHAIRMAN**—You are concerned about the emissions.

**Mr Kelly**—Particles or gases, and any accident situation.

**CHAIRMAN**—Right. We have been told that the filters applied to the emission are I think, 99.5 per cent effective. It seems that the people responsible for the laboratory have taken every conceivable precaution—precautions greater than they have in their existing premises—for protection in this area of the community from their activities. Having said that, can you explain to me why you then express fear about the future? Why are you satisfied that they are taking every precaution now but will not be satisfied in 20 years time?

**Mr Kelly**—What worries me in particular—and this might not be a present radiation worry; it is more a worry as a member of the community—is if the laboratory carries out other activities about which Mr Stevens has said he is not sure. Look at the expansion and collection of things that have gone on. I consider that this building is in a bad situation for expansion of future scientific activities because it is very close to a residential area. This is my basic argument; I am not particularly worried, I do not think Mr Stevens has to carry out a dangerous process; if so he will then have to build another building and this is again what I am concerned about, money-wise, and you end up asking why not pick a site originally which you know has all the future capacity for scientific work. There are other considerations besides the radiation that concern me in the area because there are things like very strong radio transmitters and this type of thing, and I am sure that having regard to the very delicate scientific instruments involved a better site would allow Mr Stevens more future expansion of activities rather than have to build another radiation laboratory. I am also concerned about the very low radiation levels, but I am more concerned, you might say, about the planning of the whole concept.

**CHAIRMAN**—You appreciate, I am sure that this Committee is a watchdog of the community and will protect the interests of the community. It is a watchdog also on the spending of Australian Government funds so it becomes a buffer between the bureaucracy and the community. Mr Stevens would not dare place before this Committee, and indeed not before the Cabinet, and this Committee would not dare place before the Parliament a submission to spend public money, that is your money and my money, on something that might happen in 20 years time. We can only deal with the facts as we know them at the time and that is what Mr Stevens and the

Department of Housing and Construction have placed before us. If Mr Stevens were to ask for a larger laboratory and show us that he could not use it, he would find his laboratory cut in half.

**Mr Kelly**—Yes, but I am not suggesting that. I am suggesting that perhaps another site might be just as advantageous and cost perhaps just the same amount of money, but will allow for any future activities that may go on. I am not suggesting at all that he spend any more money; I am suggesting that perhaps in the future he might have to spend less.

**CHAIRMAN**—That is an unknown quantity. Of the sites that have been mentioned—and I know all of them—there is not one of them very different in many respects from the one at Yallambie.

**Mr Kelly**—I basically expect they are different. I disagree completely with you that a site like Cambellfield is not quite different.

**CHAIRMAN**—Do you know where it is in Cambellfield?

**Mr Kelly**—No, because I am not at liberty to know what government land is available; I just know there is government land there and it could be placed at quite a distance from residential areas.

**CHAIRMAN**—I live in the area, and I can assure you it cannot.

**Mr Kelly**—Fifty metres from the nearest house?

**Mr McConville**—The street directory shows the huge area of land available on the north side of Camp Road.

**CHAIRMAN**—The street directory also shows a large area of the land available of what is only a military camp.

**Mr McConville**—Why not build it further away then, if they have a large area of land? Why put it in one corner?

**CHAIRMAN**—Mr Stevens will answer that when he comes forward, but remember the land is in use by the Department of Defence and they may have plans and this may be the reason for the development of that area.

**Mr McConville**—That will come forward too; I think you asked that yesterday.

**CHAIRMAN**—It will be made available to us.

**Mr McConville**—I would like to mention the co-operation we have had from the

Department of the Environment and Conservation which made available to us the sum of \$1,000 to enable the Preston Institute to prepare the impact statement you will hear in a minute and we are very grateful to them for that. I would also ask the Secretary to accept this petition which contains the signatures of 342 residents in the area who object to this laboratory.

**CHAIRMAN**—Thank you for the way in which you have presented your evidence, gentlemen; it has been excellently presented.

Mr John Augustine O'Conner, Lecturer in Environmental Studies, Preston Institute of Technology, was sworn and examined.

**CHAIRMAN**—The Committee has received your submission.

**Mr O'Connor**—The Institute has been briefed to undertake an environmental impact statement by the Yallambie Progress Association.

**CHAIRMAN**—The Committee, as is normal practice, has read your submission and with your concurrence we will take the appendices, as from Appendix 4, as having been read; also Appendix 2. These are part of the evidence and will be incorporated into the transcript. You will be questioned on them, but in order to save time we will take Appendix 2 and Appendices 4 onwards as having been read.

**Mr O'Connor**—Yes.

**CHAIRMAN**—Would you like now to read your submission?

**Mr O'Connor**—I present the Environmental Impact Statement:

## 1 INTRODUCTION

### 1.1 Summary of Findings and Recommendations

This statement assesses planning and environmental impacts associated with a proposal to construct new premises for the Australian Radiation Laboratory, on Government-owned land adjoining residential areas at Yallambie, South Watsonia, Victoria.

It appears that significant detrimental effects would follow construction of the proposed premises at Yallambie, due mainly to the following:

- probable reduction in the rate of appreciation of surrounding property values, resulting in an estimated loss of \$250,000 to surrounding residents during the forthcoming 5 to 10 year period.
- failure to comply with existing residential planning patterns within the Yallambie area.
- exposure of residents to low levels of radiation, of comparable significance to fall-out from atomic weapons testing in the Pacific Ocean.

- loss of alternative potential uses of the proposed site, probably more suited to surrounding residential land use.

These objections could be overcome by locating the proposed radiation laboratory at a suitable site:

- in an area zoned for light industry.
- having ready access to Tullamarine Airport, to the Tullamarine Freeway, and hence to the majority of Melbourne hospitals.

The major arguments against these recommendations appear to be the possible cost of procurement of such a site, and the possible need for re-location of some ARL staff from their homes in the South-Eastern suburbs of Melbourne. Inconvenience to ARL staff would be particularly regrettable.

It is doubtful whether such considerations should take precedence over the reasonable wishes of a large number of established Yallambie residents, who consider the proposed Radiation Laboratory project to be on a scale, and of a nature, unsuited to their district.

From a procedural point of view, an assessment of environmental and other impacts by the authority responsible for a given project, could lead to omission of issues which should receive consideration by bodies representing Australian, State and local governments. It is also considered that affected residents should be consulted in the early planning stages of Australian Government projects; the presentation of a fully-planned project as a fait accompli usually intensifies any opposition which may arise.

### 1.2 Objectives of Proposal to Construct a Radiation Laboratory at Yallambie

Premises currently occupied by the Australian Radiation Laboratory are sub-standard, of inadequate area, and are scattered throughout Melbourne in eight separate buildings.

The main objective of the proposal is to provide the Laboratory with a single adequate, suitably located building in which its combined functions can be fully discharged. These include:

- supply and quality assurance of radio-pharmaceuticals
- standardising of radiation sources
- environmental radiation monitoring
- development and maintenance of a range of associated mechanical and electronic equipment

The necessity for adequate premises for the Laboratory, and the importance of its functions to the community, are not at issue. The only matter in question is the relative suitability of the site selected for the proposed new premises.

### 1.3 Nature of Proposal

This is fully described elsewhere. In summary, it is proposed to construct a two-level administrative block, flanked by two wings housing scientific and technical laboratories.

Total anticipated staff upon completion of the building would be approximately 90.

Cost of the project in early 1974 was estimated at \$3.25 million.

Parking on site for 90 vehicles would be provided, with accommodation for 30 additional vehicles if needed.

Gross area of the proposed building complex is 7850m<sup>2</sup> (84500 ft<sup>2</sup>), plus 930m<sup>2</sup> (1000 ft<sup>2</sup>) of under-floor access space this represents approximately 15% of the site area.

Future building expansion, proposed to cater for anticipated growth between 1980 and 2000, would add an additional 7400m<sup>2</sup> (80,000 ft<sup>2</sup>); approximately 27% of the 8-acre site area would then be occupied by buildings, with much of the remainder under bitumen-surfaced car parks and road pavement.

External finish to the building would consist of exposed aggregate infill panels, coloured aluminium framed windows, and precoloured steel deck roofing.

Landscaping works would include development of the building surroundings as a natural parkland, with a wide strip of impenetrable Australian shrubs in lieu of security fencing along the site frontage. Car parking would be screened by a 2m high planted mound. Perimeter fencing, although not specified, appears to consist of a high wire-mesh security fence (refer dwg. no. 7, reference no. 2), which appears to run along the boundary of residential properties in the adjoining Yallambie estate.

### 1.4 Site Location

The proposed site, of approximately 3 hectares (330,000 sq. ft., or approximately 8 acres) is located at Yallambie, south Watsonia, 16 km (10 miles) north east from Melbourne.

The site is bounded on the south side by Lower Plenty Road; along its eastern boundary lies Yallambie residential estate, with several hundred homes.

A horse-riding school currently uses the site, which occupies the south east corner of the 440 acre Watsonia Army Camp property.

### 1.5 Reasons for Impact Statement

Preston Institute of Technology has been briefed to prepare an Environmental Impact Statement (E.I.S.) by the Yallambie Progress Association, representing residents concerned at the proposal to construct premises for the Australian Radiation Laboratory in close proximity to their homes.

An E.I.S.<sup>(9)</sup> has already been prepared by the Australian Department of Health, which is the requesting authority for the new Radiation Laboratory. The Department's assessment of its proposal is as follows:

'As a result of investigations made, the Australian Department of Health and the Australian Department of Works believe that the establishment of the proposed laboratories will provide services of benefit to the community and will not have any detrimental effects on the environment.'<sup>(9)</sup>

The following bodies<sup>(9)</sup> have viewed the above E.I.S., and have no objection to the proposal:

That is as I understand the situation, and these are—

- Australian Department of Environment and Conservation
- Australian Department of Urban and Regional Development
- Victorian Ministry of Conservation
- Victorian Environment Protection Authority

although that statement is now the subject of a letter that was read out by Mr McConville this morning.

- Victorian Department of Health

- Melbourne and Metropolitan Board of Works

Yallambie residents, however, have requested that an independent study be made of the proposal. A grant has been made available by the Department of Environment and Conservation for this purpose.

The Councils of the Shire of Diamond Valley, Shire of Eltham and the City of Heidelberg have also requested further information on certain aspects of the proposal.

I must at this stage refer back to paragraph 1.2 which I feel is most important:

The necessity for adequate premises for the laboratory and the importance of its functions to the Community, are not at issue. The only matter in question is the relative suitability of the site selected for the proposed new premises.

### 1.6 Reasons for Residents' Concern at Possibility of Radiation Exposure

Both within and without Australia, the issue of radiation safety has received wide publicity. Public concern at small additions of ionising radiation to the environment has generally been proven to be well founded.

In the United States, for example Lewis (1973)<sup>(10)</sup> reports that the Atomic Energy Commission (AEC) had adopted as its permissible radiation emission standards, the recommendations of the Radiation Protection Guide (1960) of the now-defunct U.S. Federal Radiation Council. Based on risk-benefit judgments of that time, the Guide established a maximum annual exposure of 500 millirems (mr) for individuals, and 170mr for the average per capita dose to a population. (For comparison, the annual background per capita radiation exposure is approximately 100mr). Since 1969, E. J. Sternglass, J. W. Gofman, A. R. Tamplin and other radiation experts had argued that these levels were too permissive. However, the AEC generally resisted attempts to reduce radioactive pollution emission levels. In December 1972 the National Research Council on the Biological Effects of Ionising Radiation (BEIR) issued a Report<sup>(11)</sup> which found, inter alia, that an additional 6000 cancer deaths through the U.S.A. could result if the 'safe level' of 170 mr/year were reached. In June 1971 the AEC, under public pressure, had proposed a reduction of radiological discharges to about 1 per cent of those contained in the Radiation Protection Guide.

In Australia, much publicity has been given to health hazards arising from radioactive fallout due to atmospheric nuclear weapons testing in the South Pacific Ocean. The Australian Government has accepted and acted on the findings of a Report (1973)<sup>(12)</sup> by the Australian Academy of Science, dealing with the biological effects of fallout over Australia from French atomic testing. Using official figures for radiation dose levels in Australia due to French tests up to and including 1972, members of the Academy in discussion with French scientists have stressed that 'despite the uncertainties outlined in their discussion of biological effects, the only prudent course in attempting to assess the overall risk to the Australian population was to assume direct proportionality of all biological effects to radiation dosage. Such a linear relationship with the dose received would suggest, using maximum published figures for radiation risks, that past French

atomic tests could (I stress, could) produce a final figure of 26 cases of thyroid cancer and 14 cases of leukemia and other cancers in the Australian population. Further, as a result of French tests that have already taken place, there could be approximately one death or serious disability in Australia from genetic causes during the first generation, and up to 18 deaths in all subsequent generations'. (Robertson, 1974)<sup>(9)</sup>

The Australian Government clearly does not accept this small per capita maximum risk to the Australian population, and has strongly opposed the continuation of such testing in the atmosphere. As a result, the French Government has recently undertaken to conduct future atomic weapons testing underground. Consequently, the climate of public opinion generated within Australia is one of strong antipathy to any exposure to low levels of ionising radiation.

## 2 OBJECTIVES OF IMPACT STATEMENT

### 2.1 Terms of Brief

The objectives of this EIS are to estimate, where possible quantitatively, a number of effects which could be associated with the proposal to construct premises for the Australian Radiation Laboratory at Yallambie. These are as follows:<sup>(10)</sup>

1. Possible risks to adjoining residential areas from routine liquid, solid, gaseous and particulate airborne emissions. Assessment of the effects of non-radioactive routine emissions (solid, liquid, airborne, and noise).
2. Possible risks arising from accidental release of radioactive materials to the environment.
3. Possible risks involved in transportation of hazardous radioactive materials, products and solid/liquid effluents to or from the proposed site. Possible traffic increases—effect on surrounding district.
4. Ecological significance of the proposed land: does its proposed use involve the avoidable loss of significant vegetation, birdlife or related resources?
5. Aesthetic and valuation impact of a large industrial facility on surrounding residential areas. Possibility of future extension of the proposed facility, or addition of other industrial plants.
6. The possibility of contravention, at least in spirit, of prevailing urban planning zones within the district.
7. Possible disposal of hazardous liquid or solid wastes to tips within the area.
8. Assessment of seismic risk at the proposed site.
9. Possible contravention of the reasonable wishes of residents who do not wish to live in proximity to potentially hazardous industrial undertakings.
10. Possible alternative locations for the proposed facility.
11. Any further matters relevant to the establishment of a radioisotope facility at or near the proposed site.

### 2.2 Attainment of Objectives

The various terms of the Centre's brief have been entrusted to appropriate specialist staff within the Institute, and to a number of expert consultants outside the Institute (refer Appendix 1).

These persons have inspected the proposed site, and, where appropriate, have visited existing Australian Radiation Laboratory Premises. Discussions have been held with its Director (Mr D. J. Stevens) and senior staff. A list of questions has been submitted to the Laboratory, and detailed replies obtained (refer Appendix 2).

The Centre wishes to acknowledge the full and complete co-operation accorded its representatives by the Director and staff of the Laboratory.

## 3 ASSESSMENTS OF IMPACT

### 3.1 Risk of Radiation Exposure (Refer Appendix 3.)

In estimating this potential risk at Yallambie, it seems reasonable to examine, and compare, other examples of risk estimates for exposure to low levels of ionizing radiation in Australia. The best-known example is perhaps the public health hazard arising from radioactive fallout over Australia since 1967, following testing of fission and fusion weapons by France in the South Pacific Ocean.

#### 3.1.1 Comparison between maximum health hazard at Yallambie, and maximum health hazard from atmospheric weapons testing fallout.

The maximum genetic risk to Australians from French fallout up to and including 1972, is one death or severely defective birth per generation per 14 million persons,<sup>9</sup> i.e. a per capita risk of  $7 \times 10^{-8}$  in the first generation. The maximum risk of thyroid cancer from the same cause<sup>9</sup> is estimated at 26 cases in 14 million persons, or a risk of  $1.8 \times 10^{-6}$  per person. The maximum risk of all cancers is 40 in 14 million persons, or  $2.8 \times 10^{-6}$  per person, during the 7-year period 1965-1972, this is a cancer risk of  $4.0 \times 10^{-7}$ /year/person, which is, of course, extremely small. In one estimate of risk at Yallambie (refer Appendix 3, S.3.3) it is assumed that a population of 1000 persons in the Yallambie district could be exposed to a dose rate not exceeding 5 millirems/year (1 per cent of the NHMRC recommended level of 500 mr/yr for non-occupationally exposed personnel, this being the proposed upper limit of exposure for persons at the site boundary, adopted by Australian Health Department in its EIS<sup>(9)</sup>), which is approximately 5 per cent of background radiation. The Yallambie population exposure could then be 5 man-rem/yr, leading to a cancer risk of  $10^{-8}$ /yr per person, which is about an order of magnitude greater than the per capita risk due to French fallout.

However, there are large uncertainties inherent in risk estimates based on the most pessimistic assumptions, which cumulatively maximise the hazards arising from extremely small radiation exposure levels. The most reasonable comparison between hazards due to atmospheric fallout, and to a Radiation Laboratory at the proposed site, would therefore be:

- That the public health risk to the Yallambie population, due to Radiation Laboratory activities, would be of a similar order of magnitude to the public health risk arising from atmospheric nuclear testing in the South Pacific Ocean.

#### 3.1.2 Upper estimates of population exposure to radiation at Yallambie

Appropriate Sections are quoted from the Australian Health Department's Environmental Impact Statement<sup>(9)</sup>:

S.6.3.4 Dosimetry and Sealed Sources Sub-section: Exposure to persons 'at the boundary of the site' due to X-ray equipments and seal radioactive sources

will not exceed .01 of dose limits recommended by ANHMRC (See also p. 2. of Appendix 2). Assume maximum dose to residents—1 mr/year.

S.6.3.5 Health Physics Sub-section: Maximum exposure to 'members of the public and lower forms of life in the area' due to X-ray equipment, sealed and unsealed radioactive sources, sources of microwaves and of lasers' . . . will result in . . . 'an even greater reduction of any potential exposure'. Assume maximum exposure to residents . . . 1 mr/year.

S.6.3.9 Radiopharmaceutical Sub-section: 'In this sub-section, bulk supplies of radioactive materials in and unsealed form are used' . . . 'The amount of radioactivity involved and its nature both pose potential problems as an external source of radiation exposure and also as a source of environmental release of radioactivity'.

Also, radioactive emissions to atmosphere from exhaust flues 'will be reduced to below the levels prescribed in the Victorian Radioactive Substances Regulations by the use of appropriate filter systems . . . .'

Also: . . . 'Any radioactivity that might be released to the atmosphere would therefore be only at a minute fraction of the maximum permissible concentrations in air set either by the Victorian Regulations, or the Recommendations of the ICRP'. (refer p. 7. Appendix 2).

Also: . . . 'With the use of filters in the exhaust system in the proposed laboratory premises at Yallambie, the concentration (of radioactive contaminants exhausted to atmosphere) would be only a minute fraction of any levels laid down by either the Victorian Regulations or the ICRP Recommendations'. (refer Appendix 2, p. 8.)

Assume maximum exposure to resident 3 mr/year.

### 3.1.3 Conclusions

It appears that, despite all shielding, filtering and other measures, there would be some small exposure of nearby Yallambie residents to radiation and radioactive emissions from the proposed laboratory.

For the purpose of locating the laboratory at Yallambie, it is assumed by the Australian Departments of Health, Works and Housing, Urban Affairs\* and Environment and Conservation, that this exposure is negligibly small, and would cause negligible risk to residents' health within the district.

However, as Yallambie residents point out:<sup>(10)</sup> 'No exposure to ionizing radiation should be permitted without the expectation of commensurate benefit'.<sup>(10)</sup>

Also: . . . 'it should be emphasized that, in our opinion, there should be no unwarranted exposure to radiation'.<sup>(10)</sup> This recommendation, quoted from the Australian Academy of Science Report to the Prime Minister, has been accepted, and acted on, by the Australian Government.

The functions of the Australian Radiation Laboratory are unquestionably resulting in 'commensurate benefit' to the Australian population at large. However, it does not necessarily follow that any single residential community should experience the extremely small hazard, and considerable public anxiety, now associated with exposure to low levels of ionizing radiation.

The main points in the radiation issue may therefore be summed up as follows:

- (i) The public health hazard associated with exposure to the low levels of radiation which would accompany the operations of the Australian Radiation Laboratory at its proposed site at Yallambie, may be assessed either as negligible, or as significant. Considerable expert published opinion may be marshalled in support of either point of view.
- (ii) Widespread and strong public concern undoubtedly exists, where any long-term exposure to low levels of ionizing radiation either exists or may arise.
- (iii) The Australian Government has, to date, strongly supported the view that any avoidable exposure to low levels of ionizing radiation, even though a minute fraction of natural background radiation, constitutes a significant hazard to public health and should be prevented by all means available.
- (iv) It therefore appears unwise that the Australian Government should plan for the construction of a major Radiation Laboratory at a site within, or adjoining, any residential area.

\* Erratum for 'Urban Affairs' read 'Urban and Regional Development'.

## 3.2 Planning Considerations

Refer Appendix 4.

### 3.2.1 Departure from existing planning scheme

Although not legally obliged to comply with planning controls, the Australian Government could reasonably be expected to develop its properties in ways consistent with adjacent land users' expectations for the overall development of their area, as implied by the existing planning scheme (M.M.B.W. Melbourne Metropolitan Planning Scheme—refer Map No. 53 in Appendix 4).

At Yallambie, the pattern of development is clearly residential. Purchasers of properties at Yallambie would have every reason to assume that the Army's land at Watsonia would eventually be used for residential development, or for associated uses (public open space, schools, shopping, etc.). All undeveloped lands adjoining the Watsonia Military Camp are zoned 'Residential C' or 'Reserved Living' (ref. MMBW Map No. 53), and will undergo residential development.

The proposed Radiation Laboratory would represent a radical first departure from the existing planning scheme, for the following reasons:

- visual intrusion: scale of development, type of construction, difficulty of landscape screening (Appendix 4, s.3).
- traffic considerations: inadequate public transport and road facilities, and increasing traffic volumes (Appendix 4, s.4). There is much doubt that proposed road improvements will occur on the scale, or to the timetable suggested in References 1, 2 and 3.
- possibility of repetition of flooding to homes along the nearby creek, due to rapid runoff from the large proposed roof area at times of heavy rain (Appendix 4, s.5). Extensive paved areas (roads, car parking) would tend to increase this problem.

An estimate of the total or 'real' cost of the proposed laboratory to the community must include:

- Loss of potential valuation appreciation (refer s.3.4, and Appendix 5).
- Loss of opportunity for alternative site uses of a residential character, including open space.

### 3.2.2 Possible Alternative Use for Site

The only open space within ready walking access for children of the Yallambie district, is a strip of land along the Plenty River, zoned 'Proposed Public Open Space'. The proposed A.R.L. site includes portion of a small watercourse which, if replanted and restored, could provide a focus for a most attractive and valuable parkland belt, leading to the relatively undisturbed area of *Eucalyptus/Themeda* grassy woodland\* (see Map No. 53). Conservation of watercourses, rather than their destruction by barrel draining, has become a major aim of prominent landscape planners, including I. McHarg,<sup>(11)</sup> W. Whyte,<sup>(12)</sup> P. Lewis,<sup>(13)</sup> in the United States, and, on the local scene, Ellis Stone.<sup>(14)</sup>

The Land Conservation Council has supported widespread public opinion in calling for the setting aside of additional recreational land in and around Melbourne.

As Yallambie residents point out,<sup>(15)</sup> the Australian Government has a responsibility to the community to ensure that land held in trust for the community is put to the most appropriate use, with regard to the needs of the surrounding community.

It is doubtful whether the construction of a Radiation Laboratory, employing 90 staff members, on the site in question, when there is no shortage of land zoned 'light industrial', represents the most appropriate use for the subject land.

It should also be noted that the sale of the proposed site (approx. 8 acres) for housing development, would realise perhaps \$100,000 for the unsubdivided land. Presumably this could offset the cost of obtaining an alternative site in an area zoned for light industry, should Government-owned land be unavailable.

\* It would appear that this has been done, the restoration of the watercourse has been included in the plans for the laboratory.

### 3.2.3 Precedent

It is also considered likely that the proposed Australian Radiation Laboratory would establish a precedent which could be used by the Australian Government as justification for locating other technical or light industrial developments, on a similar or larger scale, within the southern portion of the Watsonia Military Base. It seems possible that this entire area could ultimately be developed by the Australian Government as a major scientific/technical/administrative complex, with associated large work force, heavy traffic, large buildings and a high degree of activity, all normally foreign to a residential district.

A statement of intention from the Australian Government regarding future development of the Watsonia Military Base seems appropriate, in view of the present 'open government' policy, and in view of Yallambie residents' concern with the future development of their district.

### 3.2.4 Loss of amenity due to location in residential areas elsewhere.

Consideration has been given by the Australian Health Department to alternative sites at Bundoora, Keilor, Campbellfield and Essendon Airport.

The most favourable of three sites at Essendon Airport is bounded by the Tullamarine Freeway, First Avenue, and Carnarvon Road. This site has been considered unsuitable because 'the site is at present used as parkland and is in a built-up residential area. It is anticipated that a laboratory may be considered an unsuitable amenity to the area'.<sup>(16)</sup>

Similar considerations may apply with equal force to the proposed Yallambie site, which is in use for community recreational education (horse-riding), and abuts directly upon the Yallambie residential estate. At Yallambie, however, no street or other buffer area exists to provide a degree of isolation from the proposed Radiation Laboratory site.

It must be emphasized that the Yalambie residential population, includes a high proportion of young children, who are at greatest risk due to any possible release of thyroid-concentrating radio-iodine isotopes; also, persons below 30 years of age (the pre-reproductive and reproductive age groups), whose radiation protection requirements are greatest.

### 3.3 Effect on Property Valuations

Refer Appendix 5.

The services of a highly qualified and experienced consultant have been obtained to estimate the impact of the proposed Radiation Laboratory on surrounding property values.

It is considered that surrounding property values would be detrimentally affected within a radius of one-half mile (800 metres of the Radiation Laboratory, for two reasons:

- (i) The proposed building is of 'a semi-industrial research and development nature', which would lessen the visual appeal of the area, cause higher traffic densities, and result in loss of buyer appeal among surrounding properties.
- (ii) In the climate of public opinion following considerable adverse publicity given to the hazards of low-level radioactive fallout from nuclear weapons testing, the presence of the Australian Radiation Laboratory would detract from the desirability of the area for prospective buyers of homes or land.

The result would be 'that the surrounding properties will not increase in value to the same extent as they would in the future if the present use was maintained on the site'. Also, 'any increase in value will be not as great as comparable residential property in other locations'. (vide Appendix 5, pp. 3-4).

There are several hundred homes within the specified zone of diminished valuation appreciation. Assuming 500 properties to be affected, with an average \$500 loss of appreciation per property, it may be estimated that construction of the Radiation Laboratory at the proposed site could result in \$250,000 loss in potential property valuation. This could further result in considerable loss of rating revenue to the City of Heidelberg and the Melbourne and Metropolitan Board of Works.

It is doubtful whether the cost of locating the Radiation Laboratory at an alternative site would exceed the estimated reduction in Yallambie resident property values.

### 3.4 Ecological Impact

Refer Appendix 6.

The proposed site is of no particular ecological merit, although plantings of *Eucalyptus camaldulensis* (red gum) are worthy of preservation, where possible.

It is noteworthy, however, that the few acres of elevated woodland immediately north of the proposed site contains a reasonably intact remnant of the original overstorey and ground flora. This area would, if conserved, be of great value as public open space to the surrounding residential district.

### 3.5 Seismic Risk Assessment

Refer Appendix 7.

It was felt that the presence of holding tanks, to contain radioactive liquids, warranted an estimate of the low probability of an earthquake capable of breaching such tanks.

Records suggest that earthquakes of intensity greater than 6.5 may be anticipated 'at average intervals greater than 50 years', at any point within the Melbourne/Westernport Bay zone.

On a modified Mercalli scale, the effects of an earthquake of intensity 7 include the dislodgment of plaster and roof tiles, falling of chimneys, and difficulty in standing.

Design of radioactive liquid holding tanks, and radioactive storage areas, could allow for the small probability of seismic damage.

In view of what was said yesterday, Mr Chairman, about this matter I feel this deserves consideration.

### 3.6 Meteorological considerations

Refer Appendix 8.

The opinion of a meteorologist resident in the Yalambie area (see Appendix 8), is that local atmospheric conditions commonly result in a low level inversion across the site, often visible due to the trapping of a layer of fog across the proposed site, and along a local valley system containing many residents' homes.

The Commonwealth Bureau of Meteorology has confirmed<sup>(22)</sup> that air pollution problems in valleys are aggravated by two factors:

- valleys are sheltered from winds
- pooling of cold air in valleys intensifies atmospheric stratification, preventing vertical dispersion of pollutants.

It can be assumed, therefore, that Air Pollution Potential (APP) in the valley system of the Yallambie District is considerably greater than the only APP values published for the Melbourne area as a whole, based on measurements taken at Laverton.<sup>(23)</sup>

An extended meteorological survey would be required at Yallambie, to obtain sufficient data concerning mixing depth (vertical depth of the atmosphere through which pollutants disperse), ventilation wind speed within that layer, and related data. This would permit a reasonable estimate of APP factors, which should be taken into account when planning the location of industrial or semi-industrial projects within a residential district.

This type of "air pollution planning" is now commonly carried out in the United States.

### 3.7 Other Considerations

#### 3.7.1 Risk of Fire Outbreak

There is an additional very small but finite risk of exposure to radioactive isotopes (in particular Iodine 131—refer Appendix 3, S.6.4), which would be volatilised and released to atmosphere in the unlikely

event of a major fire in the Laboratory. It is possible that a Yallambie resident could be exposed to about 10 to 100 times the maximum permissible concentration in air of iodine 131, alone, during the hour following a major outbreak of fire in the proposed laboratory.

I must say that in view of the 4-hour fire restrictions which were quoted yesterday that the estimate of one hour also may require amendment.

This risk would be additional to that due to routine emissions, discussed in S.3.1.

#### 3.7.2 Disposal of Radioactive Liquid Wastes

Dilute solutions of relatively short half-life radio-nuclides are to be discharged to the M.M.B.W. sewer from the proposed site. Any possible reconcentration in river biota, or bottom muds, is unlikely to result in measurable radiation exposure to persons taking water, fish or bottom sediments from the Plenty River below the Lower Plenty Purification Plant outfall. (Refer Appendix 3; S.5.3).

Again, it was yesterday stated that the main trunk sewer will be taking the discharge from these tanks. This information was not available at the time when the EIS was drawn up.

#### 3.7.3 Disposal of Radioactive Solid Wastes

No definite information is available regarding methods of disposal or storage of low level and high level radioactive wastes "at a site remote from Yalambie." (Refer Appendix 3, S.5.1).

Again, that is not quite applicable any longer, in view of previous statements at this hearing.

It is assumed that such disposal or storage is carried out under proper supervision, according to prescribed techniques, in areas where no accidental recovery of the wastes is possible. There should then be no risks to Yallambie residents or to other members of the public.

#### 3.7.4 Transport of Radioactive Materials

At the present scale of operations, it is estimated that 12 vehicle movements per day involving radioactive materials would occur (refer Appendix 2, Question 9.1).

It is considered that the daily transport of radioactive materials through the Yallambie area, and along heavily-trafficked roads (Bell Street, Heidelberg Road), would be somewhat inappropriate, when sites with ready access to the Tullamarine Freeway<sup>(18)</sup> are available to the Australian Government.

However, provided that transport of such materials at all times complies with the prescribed codes (refer Appendix 3, S.6.2), there should be negligible risk to Yallambie residents and other road users.

#### 3.7.5 Noise

The present functions of the proposed Laboratory do not appear likely to expose surrounding areas to noise of a non-residential character.

However, during periods of construction and extension of the proposed buildings, there would presumably be some periods during which noise due to jackhammers, excavators and other heavy machinery would occur.

No estimates of noise arising from developments subsequent to the Radiation Laboratory is possible, as nothing is known regarding the nature of such developments.

#### 3.7.6 Licensing of Emissions

No information is available concerning licensing requirements (refer Appendix 2, Question 1).

The Victorian Environment Protection Authority appears to have no legal powers over Australian Government projects in Victoria, although it would be expected that emissions from Australian Government projects would comply with existing regulations governing these matters.

However, there appears to be no requirement for Australian Government Departments to submit detailed applications for Licences to discharge wastes to water, air, and land. Such licence applications are the only safeguard available to ensure that types and quantities of emissions are properly controlled.

I could add there, 'licence applications to a higher authority other than the authority which is making the discharges.'

### 4 CONCLUSIONS AND RECOMMENDATIONS

#### 4.1 Exposure of Residents to Radioactivity

Residents within areas adjacent to the proposed site would be exposed to additional low levels of ionizing radiation, of similar order of magnitude to radioactive fallout from nuclear weapons testing in the Southern Hemisphere atmosphere. Much expert opinion can be cited to support either the view that the resultant health hazard is negligible, or that it is significant. The Australian Government has to date supported the latter position.

#### 4.2 Planning Considerations

The scale and nature of the proposed Radiation Laboratory are such that it would be out of character with existing and pending residential development of the district. The resultant loss of amenity would reduce the rate of appreciation of property valuations in surrounding areas.

#### 4.3 Precedent

It seems likely that this first intrusion of a non-residential character into the southern portion of the Watsonia Military Base, would be followed by similar developments, quite possibly on an even larger scale.

#### 4.4 Alternative Uses of Site

The proposal would involve the barrel-draining of a small watercourse, and poses a threat by precedent to a surviving area of *Eucalyptus-Thameda* grassy woodland to the north of the proposed site. Such community resources should be retained as public open space, and restored where necessary.

#### 4.5 Extraordinary Hazards

It is considered undesirable to build the proposed laboratory near Tullamarine Airport due to the low probability of an aircraft crashing onto the laboratory. The Watsonia Army Base could well become a military target in the remote event of war. Likewise, either the Army installation or the radiation laboratory itself could become a target for sabotage. It is possible that such extraordinary hazards should be taken into consideration when proposing a site for the laboratory.

#### 4.5 Recommendations

4.5.1 The Australian Radiation Laboratory should be built at a site in an area zoned for light industry or similar activities. The site should be separated from residential areas, and should have closer and safer access to Tullamarine Airport and Melbourne hospitals; the Tullamarine Freeway would appear to provide such access. The area chosen should have low APP.

4.5.2 The Australian Government should provide a statement of intentions to Yallambie residents, setting out its plans for future development of the Watsonia Military Base.

4.5.3 The Australian Government should enter into early consultation with residents likely to be affected by plans to construct large-scale developments in close proximity to their homes. It should not carry out expensive planning to final stages, and obtain approval from State and local instrumentalities, without prior consultation with those who must bear any adverse effects of the proposal.

4.5.4 Should the Australian Radiation Laboratory be constructed at the proposed site at Yallambie, despite all of the above considerations, the various Recommendations regarding additional radiation safety measures (included in Appendix 3) should be observed.

4.5.5 Where Australian Government projects emit wastes to air, water or land, such emissions should be subject to the same licencing requirements as are all State and private industrial and semi-industrial undertakings. This would avoid the situation where an Australian Government project sets, monitors and guarantees its own levels of emissions, subject to no external check.

4.5.6 Where an Australian Government Department is the proponent authority for any project which may have significant environmental consequences, that Department should be required to obtain an EIS from an independent organisation, in addition to (or in lieu of) the mandatory EIS submitted to the Australian Government by the proponent authority. Amending legislation to this effect should be introduced into Parliament at the earliest opportunity.

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#### Appendix 1

#### CONTRIBUTORS TO IMPACT STATEMENT

##### Staff at Preston Institute of Technology

- G. Gibson, B.Sc. (Melb.), A.A.I.P., A.A.S.E.G., Lecture in Geophysics, Department of Applied Physics.
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#### Appendix 2

COMMENTS ON INFORMATION REQUESTED BY MR J. A. O'CONNOR, LECTURER IN ENVIRONMENTAL STUDIES, CENTRE FOR ENVIRONMENTAL STUDIES, PRESTON INSTITUTE OF TECHNOLOGY IN APPENDIX 1 ATTACHED TO A LETTER DATER, 17 JUNE 1974 ADDRESSED TO THE DIRECTOR, AUSTRALIAN RADIATION LABORATORY

QUESTIONS PERTAINING TO THE PROPOSED SITE FOR THE AUSTRALIAN RADIATION LABORATORY AT YALLAMBIE, VICTORIA

#### 1. Licensing Requirements

**Question** Will licencing approval be sought from the Victorian Environment Protection Authority, covering proposed discharges to air, water and land? If so, could details be furnished, as required on the appropriate E.P.A. licence application forms?  
**Comment** Advice will be forwarded on this matter at a later date.

#### 2. Technical Services Section

**Question** Could estimates of composition, quantities involved, and details of proposed control devices (collection efficiency, supplier, model) be supplied for the following:

**Question 2.1** Fumes emitted in welding/spray painting activities.

**Question 2.2** Molten lead fumes.

**Question 2.3** Sawdust and wood/metal shavings and fine particles.

The welding and spray painting carried out in the Technical Services Section of the Laboratory will involve a very small and an occasional workload e.g. the welding and painting of small one-off instruments which have been constructed in the Laboratory. Exhaust air from the welding/spray painting area will pass through filters with a minimum efficiency of 95 per cent (B.S. 2831—No. 2 Dust).

The Technical Services Section of the Laboratory is not committed to a heavy workload of lead casting. The bulk of the lead casting requirements of the Laboratory is now, and in the future will be, purchased from private firms. The Laboratory will only engage in the construction of small lead castings of special character and this only at infrequent intervals.

Minimal generation of fumes from lead pouring area can be expected due to the fact that temperatures only sufficient to melt the material (less than 400°C.) are employed. To protect against release of lead fumes, exhaust air from hoods over lead melting pots will be passed through a fabric type filter/collector system with an efficiency of 99 per cent on a particulate basis and emissions will be below the limits set by the Victorian Environmental Protection Authority. Under these conditions it is unlikely that any significant release of fumes will occur. It is proposed that monitoring for lead vapour will be undertaken using conventional methods such as those used by the Industrial Hygiene Division of the Department of Health, Victoria.

The supplier and model information requested will not be available until finalisation of tenders.

The Technical Services Section does not provide a heavy engineering type workshop, but acts as an instrument workshop for the provision of mechanical construction and repair to laboratory type equipment. Accordingly, waste materials are small.



Sawdust and Wood Shavings—Less than half of one four gallon drum of sawdust and wood shavings will be collected in any week (but not every week).

Swarf—Less than half of one four gallon drum of swarf will be collected in any week (but not every week).

Non-ferrous metal waste—Less than half of one four gallon drum of non-ferrous metal waste will be collected in any week (but not every week).

As these volumes are small, no provision has been made for filters or for special collection facilities.

### 3. Dosimetry and Sealed Sources Sub-section

**Question 3.1** Could details be supplied for shielding, work procedures, monitoring and other means intended to ensure that no person at the site boundary could receive X or gamma irradiation dose in excess of .01 of A.N.H.M.R.C. dose limits?

**Comment** Shielding materials, in the form of thick concrete walls and earth have been incorporated in the design of the building to reduce the radiation levels both to staff within the Laboratory and to members of the public outside the boundaries. The calculations for these shielding materials have been based on the maximum use to be made of radiation sources in the Sub-section and on extensive detailed information published on absorption of radiation in various materials. It is proposed to carry out monitoring to ensure this will be so. Such monitoring will not be at the boundary and thus it will not be necessary to measure levels which would be a fraction of the natural background level. The monitoring will be carried out at points inside and in close proximity to the outside of the building. From these measurements it will be possible to calculate the levels at the boundaries and ensure that these levels are below the stated value of 5 millirem per year.

The radiation beams used in the Cobalt-60 Laboratory, Comet Laboratory and AEG 50 Laboratory are so arranged that they never point towards the closest boundary (i.e. east boundary). On rare occasions, the X-ray beams in the Maximar Laboratory may point towards the east wall but the radiation shielding provided by that wall will ensure that no person at the boundary of the site could receive a radiation dose in excess of one-hundredth of the dose limits established by the Australian National Health and Medical Research Council for such persons. The above sources of radiation used in this Sub-section of the Laboratory are typical of those used in radiotherapy departments of hospitals.

The Comet, A.E.G. 50 and Maximar equipments are all X-ray units which emit radiation only when electrically energised. In general, the X rays are confined to narrow beams of fixed direction. The Cobalt 60 source, a radio-active source, is housed in a steel clad lead filled container (approximately 25 cm of lead wall thickness). The housing is fitted with a 'fail-safe' shutter. The gamma-ray beam from this equipment is also a narrow beam which can be orientated either horizontally towards the west wall or vertically downwards. The present activity of the source is 300 Ci.

In using and storing sealed radioactive sources concrete walls and lead shielding will be employed to ensure that no person at the boundary of the site could receive a radiation dose in excess of one-hundredth of the dose limits established by the Australian National Health and Medical Research Council for such persons.

**Question 3.2** What testing or monitoring procedures are proposed for site boundary and off site radiation measurements? Will results be publicly available on request, or published at regular intervals?

**Comment** Measurements will be made both within the Laboratory and immediately outside the building at a number of positions. The levels at the boundaries of the site will be calculated from these measurements and their positions relative to the boundaries. The monitoring will be made by means of suitable calibrated instruments.

The results of this monitoring will, by arrangement with the Laboratory, be available for inspection.

**Question 3.3** Could details of sealed sources be supplied—identity, strength, numbers in use?

**Comment** The Laboratory is responsible for the radium which is issued on loan to approved hospitals for the treatment of patients. Most of this radium is on long-term loan to those hospitals and only a small proportion is retained at the Laboratory itself to meet the changing requirements. The radium at the Laboratory will be held in a strong-room. The radium holding in the Laboratory fluctuates from time to time, but at present some 370 sources, containing approximately 1200 mg are held. It is anticipated that there will be a much smaller holding at the time of the proposed transfer to the new Laboratory premises.

The radium is mounted in medical type containers of varying activity and construction. In addition, a number of strontium 90 medical applicators has been purchased and issued like the radium, on long-term loan to hospitals. Those not on loan will be kept in the strong-room.

No repair of radium containers or of strontium-90 applicators will be undertaken at the Laboratory.

It is proposed to replace the Radon Service operated by this Laboratory in the near future. Such a Service will not operate in the proposed premises at Yallambie. As an alternative to radon there will be sealed solid radioactive sources made available for medical treatment purposes. Consideration is still being given to the most suitable type of source that might be used and it is therefore not possible to give any further indication on this at the present stage.

A few low activity sealed solid sources are used from time to time for calibration and test purposes.

Because of the fluctuations in requirements of hospitals for the use of sealed sources, it is not possible to give details of the sources which may be in the Laboratory at a particular time.

### 4. Radionuclide Metrology Sub-Section

**Question 4.1** Identity and quantities of unsealed sources.

**Comment** The unsealed radionuclides which will be handled will be the following:

<sup>99m</sup>Tc, <sup>99</sup>Mo, <sup>32</sup>P, <sup>131</sup>I, <sup>125</sup>I, <sup>51</sup>Cr, <sup>59</sup>Fe, <sup>60</sup>Co, <sup>190</sup>Au, <sup>47</sup>Ca, <sup>57</sup>Co, <sup>131</sup>Cs, <sup>67</sup>Ga, <sup>197</sup>Hg, <sup>125</sup>I, <sup>113m</sup>In, <sup>75</sup>Se, <sup>87m</sup>Sr.

The activities will normally be less than 1 microcurie and only occasionally will the activity be as high as 10 microcuries.

**Question 4.2** What possibility exists for formation of radioactive particulates, in particular alpha-emitters?

**Comment** All unsealed radioactivity sources used in this Sub-section will be in liquid form. Only one type of unsealed radionuclide will be used at any one time and all operations will be simple wet operations until

the final step which will consist of preparation of a thin solid source on a sample holder. The activity of each such source will be less than 0.1  $\mu$ Ci. All the above operations except for weighings will be carried out in the fume cupboard. The exhausted air from this fume cupboard will be filtered with HEPA filters (99.97% efficiency hot DOP test or equivalent). No alpha-emitters will be handled in this sub-section.

**Question 4.3** Details of work procedures and monitoring procedures which will ensure a safe environment for members of the public?

**Comment** Refer also to comment in reply to Question 4.1 and 4.2. Conventional procedures and precautions as outlined in IAEA Safety Series No. 1, "Safe Handling of Radionuclides", 1973 edition, will be used. With the very low activities in use in this Sub-section and the work procedures employed, there is considered to be no justification for monitoring the filtered exhausted air from the fume cupboard.

**Question 4.4** Types and retention efficiencies, in particular for respirable particles, of glove boxes and absolute filters used.

**Question 4.5** Numbers of absolute filters involved—method and frequency of disposal. Radioactive activity of filters at time of disposal.

**Question 4.6** Details of trapping and monitoring techniques used for iodine radioisotopes.

**Question 4.7** Methods used to prevent escape of particulates and vapours from work area.

**Comment** The activities of isotopes used in this Sub-section are all very low and only a Type C laboratory (IAEA Safety Series No. 1 "Safe Handling of Radionuclides", 1973 edition) is necessary. A Type C laboratory is a good quality chemical laboratory. The exhaust air from its fume cupboard should be carried outside the building but need not be filtered. Nevertheless, it is proposed for the air to be filtered through a HEPA filter (99.97% efficiency hot DOP test or equivalent). It is not proposed to install any other filters to trap iodine vapour because of the small amounts of iodine handled in the Sub-section. The activity of the filter would be low even over a long period of time, and it will be necessary to change it due to its blocking or reducing the air flow, rather than due to its radioactivity. Disposal of filters will be discussed under comment in reply to Question 8.4.

### 5. Environmental Radiation Sub-section

**Question 5.1** Will atmospheric fallout samples be collected in the vicinity of the proposed ARL premises?

**Question 5.2** Is this being done at or near present ARL facilities?

**Question 5.3** If so, can the result of such sampling be made available?

**Comment** The Laboratory will be sampling atmospheric fallout in the vicinity of its premises. However, this will be a developmental programme rather than one of the Australian Government fallout monitoring stations.

Monitoring of the type described above is being carried out now at the premises of the Laboratory at Maribyrnong.

The results of that developmental programme are not relevant to the present location of the major part of the Laboratory. In terms of the proposed new Laboratory, data from the monitoring which might be identified with the activities within the Laboratory will, by arrangement with the Laboratory, be available for inspection.

**Question 5.4** Could details of air emission control equipment to be installed on ashing furnaces, be supplied.

**Comment** Flue gases from ashing furnaces will be collected and passed through a direct gas fired after burner systems to effectively break down any odorous substances which may be present. Anticipated flue gas treatment temperature is expected to be of the order of 850°C with retention time of 0.5 seconds.

### 6. Radiopharmaceutical Sub-section

**Question 6.1** Could details be supplied for radiation shielding, work procedures and monitoring to ensure that no person at the site boundary can receive a radiation dose in excess of 0.01 of ANHMRC prescribed limits. What provisions are made for radiation monitoring/recording along site boundaries?

**Comment** Shielding will be provided in the form of concrete walls and lead barriers. The calculations for these shielding materials have been based on the activities of radionuclides to be handled in the Sub-section and on extensive detailed information published on absorption of radiation in various materials. Should an increase occur in the activities of these radionuclides handled, the radiation protection design will be re-assessed and if indicated, further lead shielding will be provided. The comments on monitoring made in reply to question 3.2 apply to this Sub-section also. The work procedures will be in accordance with the provisions of the IAEA Safety Series No. 1 "Safe Handling of Radionuclides" 1973 edition.

**Question 6.2** Could details of precautions against fire, large spillages and possible transfer of materials outside working area by contaminated personnel be supplied?

**Comment** A sprinkler system is being installed throughout the building and would be activated in the event of fire. At the same time the Metropolitan Fire Brigade would be automatically warned. In addition, fire hoses and hand extinguishers are located at strategic points in the building.

Work procedures will be in accordance with the provisions of the IAEA Safety Series No. 1 "Safe Handling of Radionuclides" 1973 edition. In the case of any spillage cleaning and decontamination procedures would be put into effect immediately. Materials used for these procedures would be stored separately and disposed of as solid radioactive waste, if necessary. Monitoring of materials for disposal and of areas in which the spillage occurred would be made after the procedures had been completed. All persons and materials leaving the area would be monitored for contamination. Any radionuclide likely to be involved in a large spillage would have a relatively short half-life.

Care will be taken to ensure that contamination cannot be spread outside the immediate working area by personnel. Special protective clothing will be supplied and this will be worn only in the area where

unsealed radiopharmaceuticals are being prepared. Changing areas and showers are being provided at the exit to the working area. Monitors for checking that contamination cannot be spread from the working area will be provided. Staff will be required to use these before leaving the area.

The transfer of radioactive contamination from the Radiopharmaceutical Sub-section to other parts of the Laboratory would prejudice the precision of measurement made herein.

**Question 6.3** How will the release of radioactivity into the outside environment be controlled?

**Question 6.4** Could details be provided for types and collection efficiencies of traps, filters etc., to be fitted to exhaust flues from glove boxes and fume hoods? What is the frequency and method of disposal of such filters/traps?

**Question 6.5** Why are the relatively permissive Victorian Radioactive Substances Regulations to be applied rather than ICRP recommended mpc's? A few examples are given:

Radioisotope	ICRP mpc (air)	Vic. Reg. mpc (air)
<sup>3</sup> H	2 x 10 <sup>-7</sup> μCi/cc	2 x 10 <sup>-5</sup> μCi/cc
<sup>32</sup> P	2 x 10 <sup>-9</sup> μCi/cc	1 x 10 <sup>-7</sup> μCi/cc
<sup>14</sup> C <sup>6</sup>	1 x 10 <sup>-7</sup> μCi/cc	5 x 10 <sup>-7</sup> μCi/cc
<sup>131</sup> I	3 x 10 <sup>-10</sup> μCi/cc	5 x 10 <sup>-9</sup> μCi/cc
<sup>222</sup> Ra	1 x 10 <sup>-9</sup> μCi/cc	1 x 10 <sup>-7</sup> μCi/cc

**Comment** One of the functions of this Laboratory is to carry out assays on a wide range of environmental samples, foodstuffs, water etc. to determine the radioactivity in them due to naturally occurring radioactive materials and to man-made sources, such as fallout from nuclear weapons tests. It is therefore imperative that any radioactive contaminants which could be emitted to the environment be reduced to as close to zero levels as possible to avoid their introduction into that Section of the Laboratory where such determinations are made. Any such contaminants could be easily detected by the highly sensitive apparatus used for the environmental monitoring programmes and they could then throw into doubt the results of all such monitoring.

The radioactive materials used in this Sub-section are mainly in liquid form, although a small number

of solid sources pass through this Sub-section for distribution to users. These latter sources are sealed at all times and not dispensed as is a number of the liquid sources. A large variety of liquid sources pass through the Laboratory, unopened, to fill the requirements of users. Other liquid sources are obtained frequently in bulk quantities and these are dispensed regularly for distribution to the users. The radiopharmaceuticals dispensed regularly are iodine-131, technetium-99m, phosphorus-32, chromium-51, indium-113m and iron-59. In the production of technetium-99m, molybdenum-99 is used. (Refer also to comment in reply to question 10.3 below).

At all times the dispensing of these radiopharmaceuticals is carried out behind protective barriers. The air behind these barriers is continuously extracted (24 hours per day) even though the containers holding the materials are kept sealed, except at the time of dispensing. Monitoring of the air exhausted from the present dispensing area shows that, even without the use of filters, the concentrations of radioactivity are below the levels set down in the Victorian Regulations for these radioisotopes and also below the levels recommended by the International Commission on Radiological Protection (ICRP).

In the proposed Laboratory premises at Yallambie, the dispensing will be carried out in fume cupboards and the exhaust from these will be filtered with HEPA filters (99.97% efficiency not DOP test or equivalent). Activated carbon filters will be also included in addition to these HEPA filters to remove iodine-131 vapour from the air which is exhausted from the Laboratory. Any radioactivity that might be released to the atmosphere would therefore be only at a minute fraction of the maximum permissible concentrations in air set by either the Victorian Regulations or the Recommendations of the ICRP.

It is proposed that continuous sampling of the exhausted air will take place along the duct leading to the point of discharge. The samples will be measured regularly at least once each week. Sampling will be by means of filter paper backed by activated carbon granules. The samples will be assayed by conventional means for β- and γ-emitting isotopes. All sampling and monitoring equipments used in the Laboratory are checked regularly to ensure that they are in satisfactory working condition and are correctly calibrated.

TABLE  
MAXIMUM PERMISSIBLE CONCENTRATIONS IN AIR OF REPRESENTATIVE RADIOISOTOPES

Radioisotope	ICRP Values*		Vic. Reg. Values**	Ratio Col. (3)/Col. (2)
	Microcurie per cubic centremeter			
Phosphorus 32	..	7 x 10 <sup>-10</sup>	1 x 10 <sup>-7</sup>	150
Iodine 131	..	1 x 10 <sup>-10</sup>	5 x 10 <sup>-9</sup>	50
Technetium 99m	..	3 x 10 <sup>-7</sup>	1 x 10 <sup>-9***</sup>	0.003
Chromium 51	..	1 x 10 <sup>-7</sup>	8 x 10 <sup>-6</sup>	80
Indium 113m	..	1 x 10 <sup>-7</sup>	1 x 10 <sup>-9***</sup>	0.01
Iron 59	..	2 x 10 <sup>-9</sup>	1.5 x 10 <sup>-8</sup>	8

\* Recommendations of the International Commission on Radiological Protection. ICRP Publication 2. Report of Committee II on Permissible Dose for International Radiation. (Section 11.4 and Table 1.)

\*\* Department of Health, Victorian Commission of Public Health, Health Act (1958): Regulations Relating to Irradiating Apparatus and Radioactive Substances. Victoria Government Gazette No. 56, 29.6.1959. (Amended 24.10.59 and 7.3.72.)

\*\*\* Levels for these isotopes are not listed separately in the Victorian Regulations and would therefore come under the heading 'all other beta or gamma emitters'.

Filter banks will be monitored continuously to ensure that static pressure drop is maintained between upper and lower limits, this will ensure efficiency of operation. Alarms will register should filters approach either limit. Out of controls will halt operation of the exhaust system before limits are reached.

With regard to the comparison of Victorian Regulations and Recommendations of the ICRP for maximum permissible concentrations, the following comments are made:

- (a) Hydrogen-3 and carbon-14 are not dispensed in the Sub-section and the figures quoted are therefore irrelevant. 'Ra-222' is referred to and it is assumed that radon-222 is meant. Although the Laboratory operates a Radon Service at present, it is proposed that this Service shall not be continued at Yallambie. The service will be replaced by the use of other sealed radioactive sources, which are not gaseous and would not produce any release to air as would radon-222. The values for this isotope are therefore also irrelevant. It is therefore suggested that a comparison of the maximum permissible concentration for the isotopes listed in the Table below would be more appropriate.
- (b) The Victorian Regulations do not indicate if the levels are based on concentrations for occupationally exposed persons or non-occupationally exposed persons. If they are for occupationally exposed persons, then the figures above should be divided by 30 to obtain a proper comparison with the ICRP levels which are for non-occupationally exposed persons. If the Victorian Regulations are for non-occupationally exposed persons, then the levels can be compared directly.
- (c) The levels set by the ICRP are based on the doses which would be received by critical organs of non-occupationally exposed persons for continuous breathing of air containing the radioactive contaminants listed in its Recommendations. On the other hand, the Victorian Regulations specifically relate to the radioactive concentration at the point of discharge. The air at this point is not that normally breathed by the population. It would be diluted, even under adverse conditions, before being inhaled by the population.
- (d) The concentrations of radioactive contaminants at present exhausted from the Sub-section are below the levels given in the Table above for both ICRP and Victorian Regulations. With the use of filters in the exhaust system in the proposed Laboratory premises at Yallambie, the concentration would be only a minute fraction of any levels laid down by either the Regulations or the ICRP Recommendations. In other words no reliance is being placed on reduction of concentration levels due to atmospheric dilution.
- (e) While there is at present a discrepancy between the concentrations recommended by ICRP and those currently prescribed in the Victorian Regulations, the statement in the Environmental Impact Statement commits the Laboratory to complying with the levels prescribed in the Victorian Regulations at any future time.

(f) The reason for referring to the Victorian Regulations in the Environmental Impact Statement is that they are the only legal levels laid down for Victoria and it is therefore appropriate that they be complied with.

**Question 6.6** Could details of methods to be used for entrapping any gaseous radionuclide emissions, in particular radon-222 be given?

**Comment** Radon-222 will not be used in the proposed premises at Yallambie and methods for entrapping iodine vapour have been covered in comments in reply to questions 6.3, 6.4 and 6.5.

#### 7. Liquid Radioactive Wastes

**Question 7.1** Could quantities, identities and half-lives be given for radioisotopes expected to be discharged into the MMBW sewer? What evaluation of effluent concentrations will be made?

**Comment** The half-lives and maximum quantities of waste radioisotopes resulting from washing of glassware, hands, etc, which are expected to be discharged into holding tanks are as follows:

Radionuclide	Half-life	Maximum discharge per week
<sup>131</sup> I	8 d	1 μCi
<sup>32</sup> P	14 d	1 μCi
<sup>51</sup> Cr	28 d	1 μCi
<sup>59</sup> Fe	45 d	1 μCi
<sup>113m</sup> In	1.7 h	10 μCi
<sup>99m</sup> Tc	2.8 d	10 μCi
	6 h	100 μCi

All liquid radioactive effluent will be stored in holding tanks above the ground within the building confines and will be monitored to ensure that its concentration meets the requirements of the Victorian Regulations before being discharged by pumping into the sewerage system. The concentration of radioactive substances used, will be very low, due to the copious amounts of water used to wash these substances into the holding tanks.

Two holding tanks normally will be used alternately. Whilst one tank is being used, the other will be monitored and then emptied by pumping to the Melbourne and Metropolitan Board of Works sewerage system if the radioactive concentration is below prescribed levels. If the levels are not sufficiently low, the radioactive waste will be pumped through an ion exchanger into a third holding tank, where it will be further stored or diluted. Any spillage or leakage from a holding tank will be channelled by way of graded concrete floor to a sump, whence it will be pumped to a reserve holding tank and the defective tank is attended to.

No liquid radioactive waste will be released to the Melbourne and Metropolitan Sewerage system until the concentration of radioactivity has been reduced to the prescribed levels or below.

Output wastes from radioactive laboratories will be reduced to below the permissible levels set by the Victorian Regulations by the following means:

All wastes, from laboratories in which radiopharmaceuticals will be used, will pass into neutralising tanks where they will be mixed with clean water and calcium carbonate (Ca CO<sub>3</sub>) chips. The effluent from

the radioactive laboratories will then pass into holding tanks where it will be detained and further diluted before reaching the sewer from the building.

All the effluents will be further diluted with domestic waste from the Laboratory prior to travelling at least 60 metres by way of a 225 millimetre pipe into the Melbourne and Metropolitan Board of Works sewer of 375 millimetre diameter.

**Question 7.2** Could details be supplied for construction of holding tanks, provision of overflow sumps, and other precautions to be taken against accidental release of radioactive liquids into local watercourses?

**Comment** Holding tanks are to be constructed of mild steel with an internal bitumen lining. They are above a graded concrete apron with a 150 millimetre clearance. The apron is at least 150 millimetres thick and its dimensions are 670 millimetres greater than the dimensions of the tanks. The apron rests upon a floor slab 150 millimetres thick and has a sump pump situated on it.

If a pipe outside the building cracks then the effluent which leaks out will be below the maximum permissible concentrations (see answer to 7.1 above) since measurements are made before discharge to these pipes. Further dilution will arise due to other non-radioactive discharges from the Laboratory. Any leaks would thus be highly diluted.

**Question 7.3** What assessment has been made of the possibility of reconcentration of radioisotopes in stream biota, or in river muds, downstream from the Lower Plenty sewerage purification plant?

**Comment** No assessment has been made of the reconcentration of radioisotopes in stream biota, or in river muds downstream from the Lower Plenty sewerage purification plant because of the considerations given above in the Comments in reply to question 7.1.

## 8. Other Waste Disposals

**Question 8.1** What are the identities and estimated daily quantities of chemical solvent fumes to be emitted to atmosphere?

**Comment** The identities and estimated annual quantities of chemical solvents purchased for use in the Laboratory will be:

- Methyl ethyl ketone, 1 gallon
- Chloroform, 1 gallon
- Ethanol, 3 gallons
- Methanol, 4 gallons
- Benzene, 1 gallon
- Acetone, 5 gallons

Scrubbers will be installed to remove water soluble solvent vapours exhausted through fume cupboards.

**Question 8.2** What quantities of non-water soluble solvents will be incinerated daily?

**Question 8.3** What emission controls will be fitted to the proposed industrial incinerator?

**Comment** Although it was proposed to incinerate some readily burnable material, mostly cardboard boxes, it has since been decided that this material shall be disposed of by means other than incineration and preferably by re-cycling. These questions are therefore not relevant.

**Question 8.4** Could quantities, nature and methods of disposal be provided for radioactive solid wastes.

There is a range of materials collected for disposal and it is not practical to list the quantities and their nature. Basically the materials are divided into two

groups, according to the half-lives of radionuclides present. The materials will be stored on the premises under controlled conditions until the arrangements for their disposal can be made. All materials are placed in suitable bags or steel drums for disposal.

Materials contaminated with short half-life radionuclides are stored until such time as their radioactive content has decayed to extremely low levels. They are then buried in their bags under the supervision of a Physicist at a site remote from Yallambie. This disposal is carried out with the approval of the State Department of Health and of the Officers of the City in which the disposal takes place. The State Department of Health is always informed of the details relating to the disposal.

**Long half-life radionuclides** are periodically transferred, in suitable transport containers, to a special storage area owned by the Australian Government; The area is far removed from Yallambie.

## 9. Transport of Radioactive Substances

**Question 9.1** Could estimates be given for the number of daily movements of radioactive materials into and from the proposed ARL premises:

- (i) upon completion
- (ii) by 1980.

**Comment** The estimated number of daily movements of radioactive materials into and from the proposed Laboratory premises are:

- Vehicles into the proposed premises—3 per day
- Vehicles out from the proposed premises—9 per day
- Total—12 per day

It is not anticipated the number of schedule vehicular deliveries of radioactive materials to and from the Laboratory will alter between completion of the premises and 1980.

**Question 9.2** Could the relative percentage of movements of radioactive materials along the major traffic outlets from the proposed site be estimated?

**Comment** Of the 12 vehicular movements daily it is anticipated that movements will be predominantly west along Lower Plenty Road to the Greensborough Road, Rosanna Road or Lower Heidelberg Road, and a smaller number east along Lower Plenty Road to Templestowe Road and Fitzsimons Lane.

## 10. Future Expansion

Could an estimate be given for the following over the next 10 years:

**Question 10.1** What additional functions could be carried out at the proposed premises at Yallambie?

**Comment** The functions of the Laboratory are those established under the Commonwealth Radiation Laboratory Order made under Section 9 of the National Health Act 1953-1971. There is no known reason why these functions should be changed and no change is envisaged.

**Question 10.2** What extensions to the proposed buildings are envisaged?

**Comment** Provision has been made for possible future expansion of the building should the need arise but the proposed premises will provide ample accommodation to at least 1980.

**Question 10.3** What quantities of radio-pharmaceutical materials are anticipated to pass through A.R.L. premises, by 1985?

**Comment** Examination of the Annual Reports of the Laboratory over the past twenty years shows that the use of radiopharmaceuticals in Australia has been continually increasing over that time and particularly over the last ten years. No doubt it will continue to increase for a few years but it is impossible to say how long the increase will continue or to predict the rate of increase. These radiopharmaceuticals are used throughout Australia by Medical Institutions.

The recent increase in the *in vivo* use of radiopharmaceuticals has been largely due to the development of technetium-99m labelled materials. Technetium 99-m has a 6 hour half-life and decays with the emission of 140 kV gamma rays which are more easily absorbed than the gamma rays from iodine-131, gold-198, iron-59, chromium-51 etc. Future developments could involve the use of radioisotopes with shorter half-lives and more satisfactory decay characteristics than technetium-99m. It is quite possible that some of the present techniques may be replaced by procedures which do not involve the administration of radiopharmaceuticals to the patient e.g. ultrasound scanning, X-ray fluorescence scanning and EMI X-ray computer scanning.

All radiopharmaceuticals currently dispensed in the Laboratory are in liquid form. Most others that are obtained from overseas suppliers and then distributed from the Laboratory are also in liquid form. A few are obtained in freeze-dried form or as capsules. The freeze dried materials are obtained from overseas and then supplied to users as single dose ampoules which are reconstituted to solution form by the user before administration to patients. The capsules are distributed from the Laboratory to users for administration to patients. There is no dispensing of these materials at the Laboratory. One development that is being pursued vigorously is the preparation of non-radioactive freeze dried reagents which are re-constituted by the user, generally with 99mTc solution, before use. Preparation of the reagents does not involve the use by the Australian Radiation Laboratory of radioactive material.

Because of likely variations in supply and demand it is impossible to estimate the quantities and types of radioactive substances that are likely to be distributed by the Laboratory in the next 10 years and beyond.

**Question 10.4** What other Australian Government activities are planned to be located in land adjoining or near to the proposed site at Yallambie?

**Comment** This is a matter of Government policy and as it goes beyond the responsibility of the Australian Department of Health, the Laboratory is not in a position to comment on this question.

## Appendix 3

### AUSTRALIAN RADIATION LABORATORY: PROPOSED WATSONIA SITE ASSESSMENT OF POTENTIAL RADIATION RISKS TO YALLAMBIE DISTRICT RESIDENTS

The report attached herewith has been prepared by F. P. J. Robotham, M. Inst. P., A.A.I.P.; Radiation Protection Officer, University of Melbourne.

The writer has worked in the field of Radiation Protection for 17 years, including 9 years as an Operational Health Physicist at the Atomic Energy Research Establishment Harwell, England. Two years

were spent working in Health and Safety Division at the Australian Atomic Energy Commission Research Establishment, Lucas Heights, the last 6 years as Radiation Protection Officer, Melbourne University.

In addition the writer is a member of the ad-hoc Sub-Committee on the Safe Disposal of Radioactive Wastes, established by the National Health and Medical Research Council, and Secretary of the currently forming Australian Radiation Protection Association.

## 1 INTRODUCTION

1.1 This report reviews the ionising radiation hazards to which residents of the Yallambie area may be exposed if the Australian Radiation Laboratory (ARL) is built on the proposed site at Lower Plenty Road, Watsonia, Victoria.

1.2 Throughout the report references will be made to the Environmental Impact Statement prepared by the Australian Department of Health dated August 1973<sup>(1)</sup> (hereinafter referred to as the EIS), and to an unsigned, undated document entitled 'Comments on Information requested by Mr J. A. O'Connor, . . . Questions Pertaining to the Proposed Site for the Australian Radiation Laboratory at Yallambie, Victoria<sup>(2)</sup>' (referred to hereinafter as ARLC, to avoid confusion with references to the Australian Radiation Laboratory itself which will be abbreviated to ARL). Other references are listed at the end of this report.

## 2 POTENTIAL RADIATION HAZARDS

2.1 Residents of the Yallambie district could be exposed to an ionising radiation hazard from one or more of the following sources:

- (a) use of irradiating apparatus (X-ray units, sealed gamma ray sources) giving rise to radiation beams outside the laboratory walls,
- (b) release of radioactive material to the environment during:
  - (i) normal work
  - (ii) waste disposal operations
  - (iii) accident conditions

2.2 The external radiation hazard is usually controlled by using the irradiating apparatus in a shielded area, monitoring the radiation levels and ensuring that people cannot be exposed to radiation levels above the prescribed limits.

2.3 The problem with unsealed radioactive materials is to prevent them getting into people. This can occur via 3 main routes. Radioactive particles or gases can be breathed in directly, radioactive materials can be absorbed in water and subsequently drunk, or they can be incorporated in foodstuffs and thereby eaten. Control procedures must guard all three routes.

3 EXTERNAL RADIATION HAZARD ARISING FROM THE USE OF X-RAY UNITS AND SEALED RADIATION SOURCES (REFERENCE EIS 6.3.4 and ARLC3.)

3.1 In both EIS and ARLC it is stated that the design of the laboratory, associated shielding and control procedures to be adopted whilst using irradiating apparatus will be such that the dose rate at the site boundary will not exceed 5 millirem/year. This is 1 per cent of the National Health and

Medical Research Council's (NHMRC) recommended level of 500 millirem/year for non-occupationally exposed personnel.<sup>(6)</sup> This figure was derived from the recommendations of the International Commission on Radiological Protection (ICRP).<sup>(4)</sup>

3.2 Doubt has been cast on the validity of the ICRP figures by, amongst others, Drs Gofman and Tamplin<sup>(6)</sup> who have suggested that the levels have been set too high. However, by adopting a figure of 1 per cent of the ICRP recommendation ARL are being conservative even by Gofman and Tamplin's standards.

3.3 Recent reports<sup>(6)(7)</sup> have made quantitative estimates of radiation risks at low levels of exposure assuming that the response is proportional to dose and that there is no threshold below which lower levels of radiation have no effect. The BEIR report<sup>(6)</sup> suggests that there will be 200 deaths each year due to cancer for a population exposure of  $10^8$  man-rem. Assuming that in the Yallambie district 1,000 people will be exposed to external radiation at the rate of 5 millirem/year, the population exposure will be:  $1,000 \times 5 \times 10^{-3}$  man-rem/year = 5 man-rem/year. So that the number of additional cancer deaths per year will be  $\frac{200 \times 5}{10^8} = 10^{-5}$ /year

or one every 1,000 years.

3.4 An estimate of the genetic risk can be derived from figures quoted by the Australian Academy of Science in their 1973 report on the Biological Effects of Nuclear Explosion Fallout<sup>(8)</sup>. A level of 1 millirem/year to each member of the Australian population ( $10^7$  people) would correspond to one mutation every 10 years leading to death or disability in the first generation. The total genetic damage to future generations would be larger than this because it will include mutations which do not become obvious in the first generation. A uniform dose of 1 millirem to the Australian population could give rise to a total of between 50 and 100 genetic deaths and disabilities over all subsequent generations. Thus for a population of 1,000 persons exposed to 5 millirem/year there would be a genetic burden of less than one additional mutation (genetic death) every 10 generations.

3.5 The risk estimates derived above must be treated with some caution as they are based on very doubtful extrapolations of data. Because the possible effects, expressed quantitatively, are so low as to be almost meaningless, it may be more appropriate to compare the possible radiation dose i.e. 5 millirem/year with the average annual natural background radiation of 100 millirem/year, received by all members of the population. However the derived figures do represent upper estimates of risk and indicate the extremely low hazard arising from the use of irradiating apparatus at the proposed laboratory.

3.6 In ARLC, answer to question 3.1 the statement is made 'monitoring will be carried out at points inside and in close proximity to the outside of the building. From these measurements it will be possible to calculate the levels at the boundaries . . .'. Where collimated beams of radiation are being used inverse square law calculations are not applicable nor is air attenuation likely to be significant and it would be more appropriate to make some attempt to measure the radiation levels.

### 3.7 Recommendation One.

If the building is erected at the proposed site, when monitoring checks are being made of the effectiveness of the concrete shielding some type of integrating dosimeter should be installed at several carefully selected points around the boundary fence. These could be left for a period of say 1 to 3 months to see if there is any radiation above the natural background level. The results from these dosimeters should be submitted to the Environmental Protection Authority (EPA) or the Victorian Health Department (VHD) who could then notify a representative of the Yallambie residents to reassure them that the radiation levels do not exceed those quoted in the EIS.

### 3.8 Conclusion

If the dose rates are kept below the levels suggested by ARL there will not be an external radiation risk to people living in the locality.

## 4 RELEASE OF RADIOACTIVE MATERIAL TO THE ENVIRONMENT UNDER NORMAL WORKING CONDITIONS (REFERENCE EIS 6.3.9 and ARLC6)

4.1 The potential hazard arises from the possible discharge of particulate radioactive materials and radioactive gases from the dispensing laboratories. However the ARL state that they will be installing extract filters with a high collection efficiency for respirable size particles coupled with activated charcoal filters to remove radioactive iodine vapour. These should effectively prevent release of radioactive materials into the environment.

4.2 The recommendations made by ICRP<sup>(9)</sup> for the various maximum permissible concentrations in air [(mpc) air] for non-occupationally exposed personnel are in most cases more restrictive than the recommendations made by the Victorian Health Department<sup>(10)</sup>, as shown in the following table.

TABLE I

### MAXIMUM PERMISSIBLE CONCENTRATIONS IN AIR OF REPRESENTATIVE RADIONUCLIDES

Radionuclide	ICRP Value	Victorian Regulations Value
	Microcurie per cc ( $\mu\text{Ci/cc}$ )	Microcurie per cc ( $\mu\text{Ci/cc}$ )
Phosphorous 32	$7 \times 10^{-10}$	$1 \times 10^{-7}$
Iodine 131	$1 \times 10^{-10}$	$5 \times 10^{-9}$
Technicium 99m	$3 \times 10^{-7}$	$1 \times 10^{-9}$
Chromium 51	$1 \times 10^{-7}$	$8 \times 10^{-6}$
Indium 113m	$1 \times 10^{-7}$	$1 \times 10^{-9}$
Iron 59	$2 \times 10^{-9}$	$1.5 \times 10^{-8}$

The Victorian figures are based on levels at a discharge point whilst the ICRP figures are based on a continuous breathing level leading to a maximum permissible intake of a particular radionuclide.

4.3 Data published by Bryant<sup>(11)</sup> suggests that under adverse weather conditions (atmospheric inversion) with little or no thermal lift and no elevated exhaust, atmospheric dilution could be less than a factor of 100 at the site boundary. Therefore it would be appropriate to adopt the more restrictive ICRP values when monitoring the exhaust effluent. (Note: The

figures quoted for Technicium 99m and Indium 113m are lower in the Victorian Regulations only because those radionuclides were not considered when the Regulations were issued over 15 years ago, they thus come under the heading of 'all other beta and gamma emitters'. The ICRP figures are therefore the more valid levels.) Use of the ICRP figures would mean that the local residents are unlikely to be exposed to more than 1 per cent of the recommended (mpc) air for non-occupationally exposed personnel—a level comparable to the external radiation level proposed by ARL.

4.4 The risk estimates discussed in section 3.4, 3.5 and 3.6 are applicable to internal irradiation and if ARL adopt the ICRP figures and keep environmental releases to those levels the comments made in section 3.6 are applicable.

#### 4.5.1 Recommendation Two

That the ICRP levels of (mpc) air for non-occupationally exposed personnel be adopted as the upper limit for release of radioactive exhausts.

#### 4.5.2. Recommendation Three

That the monitoring results from the exhaust sampler be submitted to either the EPA or the VHD on either a quarterly or annual basis so that these bodies can ensure that no untoward quantities of radioactive materials are being released to the environment and can advise the Yallambie residents accordingly.

## 4.6 Conclusion

Under normal working conditions there should be no significant risk to people living near the proposed laboratory from the release of radioactive materials.

## 5 RELEASE OF RADIOACTIVE MATERIAL TO THE ENVIRONMENT DURING WASTE DISPOSAL OPERATIONS (REFERENCE EIS 7 and ARLC 7; 8.4)

### 5.1 Solid Waste

Both low level and high level solid radioactive wastes are to be disposed of at a site remote from Yallambie and do not present a hazard to local residents.

### 5.2 Gaseous Waste

The disposal of gaseous and particulate wastes was effectively discussed in section 4 of this report.

### 5.3 Liquid Wastes

Discharge of radioactive materials are of especial concern if the discharged material can enter water courses and be concentrated in stream biota, river mud etc. Most of the radionuclides that ARL propose to discharge are of such short half-life that by the time any concentration in fish and subsequent human consumption could take place the radioactivity would have decayed to negligible levels.

5.3.1. The longer lived isotopes listed in Table II are of interest however.

TABLE II

Radionuclide	Half-life	ARL Max. Discharge	ICRP (mpc) water*	Vic. Regs.
		Per week Microcurie	Microcurie per cc	Microcurie per cc
I <sup>131</sup>	8 d	1	$2 \times 10^{-6}$	$3 \times 10^{-5}$
P <sup>32</sup>	14 d	1	$2 \times 10^{-5}$	$2 \times 10^{-4}$
C <sup>51</sup>	28 d	1	$2 \times 10^{-3}$	0.5
Fe <sup>59</sup>	45 d	1	$6 \times 10^{-5}$	$1 \times 10^{-4}$

\* Maximum permissible concentration in water for continuous exposure of non-occupationally exposed persons (9).

Adapting methods used elsewhere (12,13) for determining discharge limits for Nuclear Power stations the following estimates can be made of possible radiation exposure from the discharge of the longest half-lived radionuclide Iron 59.

5.3.2 The discharge rate from the Lower Plenty sewerage treatment plant is approximately  $5 \times 10^9$  cc/day ( $\approx 10^9$  gallons per day). The proposed discharge of Fe 59 from ARL is 0.2 microcurie per day. Assuming uniform mixing at the Lower Plenty discharge point this would lead to an average concentration of

$$\frac{0.2}{5 \times 10^9} = 4 \times 10^{-11} \text{ microcurie/cc.}$$

Assuming that Red Fin fish concentrate Fe 59 by a factor of  $10^6$  (no data is available on the concentration factor and a pessimistic upper figure has been assumed i.e. the concentration of Zinc 65 in Oyster flesh), and that an enthusiastic fisherman ate 200 g. of Red Fin per day, the average daily intake of Iron 59 would be  $4 \times 10^{-11} \times 10^6 \times 2 \times 10^2 = 8 \times 10^{-4}$  microcuries/day.

5.3.3 The ICRP recommend (mpc)water for members of the public is  $6 \times 10^{-5}$  microcuries/cc. The daily drinking water consumption of the ICRP

'standard man' is 2.2 litres/day, thus the maximum permissible intake of Iron 59 is  $6 \times 10^{-5} \times 2.2 \times 10^3 = 1.3 \times 10^{-1}$  microcuries/day (i.e. approximately  $10^{-1} \mu\text{Ci/day}$ ) c.f. estimated maximum daily intake of  $8 \times 10^{-4}$  microcuries/day (i.e. approximately  $10^{-3} \mu\text{Ci/day}$ ) thus the maximum intake of radioactive Iron through eating contaminated fish is unlikely to exceed 1% of the ICRP recommended maximum permissible figure.

5.3.4 It must be emphasised that the figure of  $8 \times 10^{-4}$  microcuries/day has been derived using extremely doubtful assumptions regarding concentration factors and possible fish consumption. The figure however gives an upper estimate of possible Fe 59 ingestion and without data on concentration factors etc. it is doubtful if a more accurate estimate can be made.

5.3.5 A fracture in either a pipe or holding tank is unlikely to lead to any significant release of radioactive material to the environment. The tanks will be situated on a graded concrete apron complete with sump pump to control any leakages. Any radioactive liquid escaping from a leaking pipe will already be below the appropriate (mpc)water and reconcentration is unlikely in the stream running along the site boundary fence.

### 5.3.6 Recommendation Four

The ICRP recommendations for (mpc)water which are more restrictive than the levels given in the Victorian Regulations (see Table II), should be adopted as the upper limits for the discharge of radioactive liquids.

### 5.3.7 Recommendation Five

Results of pre-discharge effluent sampling should be submitted periodically to the EPA or the VHD.

### 5.3.8 Recommendation Six

If the laboratory is built at the proposed site and either longer half life, more toxic or greater quantities of radionuclides are likely to be discharged, assessments of reconcentration factors in the Lower Plenty River should be made to determine critical exposure groups, exposure pathways, and critical radionuclides.

### 5.3.9 Conclusion

Provided the proposed discharge levels quoted in ARLC (Table II this report) are not exceeded, there should not be a significant hazard to local residents or other groups of people likely to be exposed to the effluent either directly or indirectly.

## 6 RELEASE OF RADIOACTIVE MATERIALS TO THE ENVIRONMENT UNDER ACCIDENT CONDITIONS

6.1 Three types of emergencies must be considered:

- (a) an accident involving a vehicle carrying radioactive materials
- (b) a major spillage of radioactive material within the laboratory
- (c) a fire involving radioactive materials.

These possibilities are considered in some detail below.

6.2 An Accident involving a Vehicle Carrying Radioactive Materials (Reference EIS 8, ARLC 9)

6.2.1 In EIS 8 it is stated that materials will be transported in a manner that complies with the Victorian Radioactive Substances Regulations<sup>(9)</sup> and the International Atomic Energy Code of Practice<sup>(10)</sup>. This latter Code states that materials must be carried in carefully designed fire-proof, impact-proof containers such that a release of radioactive material is extremely unlikely following even a severe motor vehicle accident.

6.2.2 Conclusion

The transport of radioactive materials presents a negligible risk to both Yallambie residents and other road users.

6.3 Spillage of Radioactive Material within the Laboratory leading to release of Radioactivity outside the Building (Ref. ARLC 6.2)

6.3.1 By using standard control procedures<sup>(11)</sup> the probability of any significant levels of radioactive material being transferred outside the building is extremely small.

6.3.2 Conclusion

The procedures outlined in reply to question 6.2 ARLC are more than adequate to prevent the release of radioactive substances to the immediate environment.

6.4 A Fire in the Laboratory involving Radioactive Materials (Reference ARLC 6.2)

6.4.1 Very little information is available in the literature on the frequency or extent of fires in radioisotope laboratories that have given rise to the release of radioactive materials. A sprinkler system that dampens a fire before it reaches major proportions must substantially reduce the possibility of the vapourisation and dispersion of radioactive substances. Although not stated in ARLC it is assumed that the sprinkler will be activated automatically by either smoke or temperature rise.

6.4.1.1 In an attempt to assess the maximum credible accident and its impact on the surrounding area the following (pessimistic) assumptions have been made. A major fire occurs in the Laboratory releasing one millicurie (1,000 microcuries) of Iodine 131 (the most volatile and toxic radionuclide in regular use in an unsealed form). The release occurs over a period of one hour adverse meteorological conditions (atmospheric inversion).

6.4.1.2 Exhaust gases, smoke, steam-etc. would be equivalent to at least  $10^8$  cubic meters of air i.e.  $10^6$ cc, giving an effective release concentration of  $10^{-8}$  microcuries/cc. Atmospheric dilution should further reduce this to  $10^{-9}$  microcuries/cc at the nearest house. Now the (mpc) air of Iodine 131 is  $10^{-10}$  microcuries/cc for non-occupationally exposed persons. Thus a resident could be exposed to about 10 times the permissible continuous (mpc) air for say 1 hour. There are approximately 9,000 hours in a year so a major fire could give rise to about 1 year's permissible exposure to radioactive Iodine.

6.4.1.3 Radioactive Iodine inhaled or ingested concentrates in the Thyroid gland where it can lead to cancer of that organ. Published data<sup>(12)</sup> indicate that there could be about 4 Thyroid cancer cases in one million people irradiated by 1 rem from Iodine 131 in the Thyroid. One year's permissible intake of Iodine 131 is equivalent to a dose commitment of about 3 rem, thus leading to about .01 cases of Thyroid cancer per  $10^6$  persons irradiated, i.e. 0.0001 cases in a Yallambie population of 1,000. This figure like others derived in sections 3.3 and 3.4 is so small as to be almost meaningless.

6.4.1.4 It must be emphasised most strongly that the above calculation is based on some extremely pessimistic assumptions, and it represents a most unlikely eventuality. It does however give some indication of the possible affect on the district, of a large fire in the laboratory.

6.4.2 Recommendation Seven

That the installed sprinkler system be of an automatically activated type, and the sprinkler run-off should be directed to the holding tanks used for liquid radioactive wastes.

6.4.3 Conclusion

A major fire could lead to residents in the Yallambie area being exposed to some low levels of airborne radioactive contamination, particularly Iodine. Insufficient information is available to assess the true probability of such a fire and the subsequent quantities of radioactive materials likely to be released to the atmosphere. The installation of a sprinkler system in the laboratory reduces the possibility of any fire reaching major proportions, the fire hazard thus represents an extremely small risk to the residents of the Yallambie district.

## 7 SUMMARY OF RECOMMENDATIONS

7.1 With two exceptions (6 and 7 q.v.) the recommendations made are;

- (a) where there are differences between ICRP and the Victorian Regulations in recommended maximum permissible levels the more recent ICRP figures should be adopted as the criteria for determining permissible releases of radioactive substances;
- (b) where monitoring is being carried out to determine radiation and surface and air contamination levels the results of such monitoring should be submitted to a competent Authority. Thus ensuring that ARLC would not be placed in the difficult position of being both the operating and regulatory body and would be seen to be complying with its own recommendations and Codes of Practice.

7.2 If implemented, none of the recommendations should detract from the efficient operation of the laboratory.

## 8 CONCLUSIONS

8.1 Normal laboratory operating procedures should not give rise to any significant radiation hazard to residents of the Yallambie district.

8.2 A major fire releasing radioactive material could possibly lead to a slight radiation dose being received by people living near the laboratory. The fire risk is an extremely small one however, no realistic estimate of the probability of such a fire nor its affect on the district can be made with any degree of accuracy.

8.3 The siting of the Australia Radiation Laboratory at the proposed location in Watsonia could lead to an extremely small radiation exposure to the residents of the area. Although of no biological significance this slight hazard could be removed by relocating the laboratory in a less densely populated area.

F. P. J. ROBOTHAM  
M. Inst. P., A.A.I.P.

Melbourne, Victoria.  
August, 1974.

### References

<sup>(9)</sup> Australian Department of Health—Environmental Impact Statement, Proposed premises for the Australian Radiation Laboratory at Lower Plenty Road, Watsonia, Victoria, August 1973.

<sup>(10)</sup> Australian Radiation Laboratory—Comments on Information Requested by Mr J. A. O'Connor . . . Questions Pertaining to the Proposed Site for the Australian Radiation Laboratory at Yallambie, Victoria.

<sup>(11)</sup> National Health and Medical Research Council—Revised Radiation Protection Standards for Individuals exposed to Ionising Radiations, Canberra, October 1967.

<sup>(12)</sup> International Commission on Radiological Protection—Publication 6 Recommendations of ICRP (as Amended 1959 and revised 1962).

<sup>(13)</sup> Gofman, J. W. and Tamplin, A. P.—Population control through Nuclear Pollution, Chatto and Windus, 1971.

<sup>(14)</sup> National Research Council, National Academy of Science—Effects in Populations of exposure to Low Levels of Ionising Radiation; Report of the Advisory Committee on the Biological Effects of Ionising Radiation, Washington D.C., November 1972.

<sup>(15)</sup> United Nations—Ionising Radiations: Levels and Effects, A report of the United Nations Scientific Committee on the Effects of Atomic Radiation to the General Assembly, with annexes, New York 1972.

<sup>(16)</sup> Australian Academy of Science: The Biological Effects of Nuclear Explosion Fallout, Report to the Prime Minister, April 1973.

<sup>(17)</sup> International Commission on Radiological Protection—Report of Committee II on Permissible Doses for Internal Radiation (1959) (and amendments and additions).

<sup>(18)</sup> Victorian Government Gazette: Regulations Relating to Irradiating Apparatus and Radioactive Substances. Department of Health, Victoria, June 1959.

<sup>(19)</sup> Bryant, P. M.—Methods of Estimation of the Dispersion of Windborne Material and Data to assist in their application. UKAEA AHSB(RP) R42 1964.

<sup>(20)</sup> International Atomic Energy Agency—Safety Series No. 12 The Management of Radioactive Wastes produced by Isotope Users, Vienna, 1965.

<sup>(21)</sup> International Atomic Energy Agency—Safety Series No. 36, Disposal of Radioactive Wastes into Rivers, Lakes and Estuaries, Vienna, 1971.

<sup>(22)</sup> International Atomic Energy Agency—Safety Series No. 6, Regulations for the Safe Transport of Radioactive Materials, Vienna, 1961.

<sup>(23)</sup> International Atomic Energy Agency—Safety Series No. 1, Safe Handling of Radionuclides, Vienna, 1973.

### Appendix 4

#### PLANNING ISSUES

Jeffrey A. Porter, B.T.R.P. (Melb.), M.I.E. (Aust.),  
C.E., E.W.S., Dip. C.E., M.B.S., A.A.I.B.S.

### 1 GENERAL

Although it is probable that the Australian Government is not legally bound to comply with planning controls, it would appear reasonable that the Government should, before constructing a development in an area which is subject to planning controls, consider the general planning issues involved, and the effects on adjacent land use. Such considerations could ensure that 'uncontrollable' developments are consistent with the adjacent land users' expectations for the future development of their area, as implied by an existing planning scheme.

The present Government has an outstanding record in initiating planning objectives. The submission of this report is direct evidence of the Government's willingness to consider the planning issues involved in normal Government activities.

### 2. ZONING

The present zoning of the proposed ARL Scheme is 'Public purposes—Commonwealth Government' (see zoning map attached).

Referring to land reserved for public purposes, the ordinance<sup>(2)</sup> states: 'where a purpose is described by reference to the Commonwealth Government it shall be deemed to mean and include the exercise of any of the powers of such governments'.

However, as stated earlier, it would be desirable to consider what the use of the land should be to ensure proper and orderly development of the area, if the overall planning scheme was not inhibited by lack of control over the Federal Government's activities.

The whole of the Watsonia Military Camp is surrounded by residential development. The Heidelberg City Council have pre-empted future residential development of the area by insisting that roads be provided in adjacent subdivisions at Yallambie (see map No. 53 M.M.B.W. Scheme)<sup>(2)</sup>, and the possibility of residential development at Watsonia was suggested in Australian Government policy speeches. For these reasons, it seems logical that the area should be used for residential development or for uses associated with residential development (open space, schools, local shopping, etc.). The proposed ARL development closely resembles a first industrial/commercial intrusion into an area which is predominantly residential in character.

### 3 VISUAL INTRUSION

The proposed development is not residential in character because:

1. the scale of development is too large (occupying approx. 3 hectares<sup>(2)</sup>)
2. the proposed buildings and car parks are of a type of construction which does not blend with the existing residential development (see architects' sketches).
3. The materials of construction (concrete and exposed aggregate) are normally associated with commercial buildings.
4. The 3-storey east wing<sup>(4)</sup> can be readily seen from adjacent residential developments. The topography of the adjacent area makes landscape screening very difficult, and it is doubtful whether a critical analysis as to the effectiveness of the proposed landscaping has been carried out. In the future, if the building area is doubled<sup>(5)</sup> and the east wing is extended northwards, the detrimental visual aspects will be increased.

### 4 TRAFFIC CONSIDERATION

The proposed site has very few transportation advantages over other areas within the Metropolitan Region. At present there are no special road transport facilities, and public transport services are poor.

The same argument can be applied for future transportation. The proposed site has no great advantage over many other areas. With the future of freeways at present undecided, it is premature to make predictions regarding their future construction.

At the site itself, further local problems may arise. Lower Plenty road traffic volumes are approaching saturation flows at peak hours (1200-1300 cars/lane/hour<sup>(6)</sup>), and the movement of an additional 68-90 cars will cause further congestion. When the proposed ARL development doubles in the future, the problem will be further aggravated.

### 5 DRAINAGE

Although the land falls 1:10 to a creek, and 'this will ensure good drainage of the site at all times'<sup>(7)</sup>, no consideration has been given to the effect on

adjacent residential areas, of the increased volume of water in the nearby creek. The run-off from the proposed ARL development will be at least 3 to 4 times as great as at present, and the ramifications of this should be fully explored. Flooding of homes built along the course of the creek has already occurred.

### 6 CONCLUSION

In making its decision to locate at Yallambie, the Australian Department of Health has failed to consider the proper and orderly development of the area as a whole. A rational decision must consider the total ('real') cost to the whole community—not only the cost to the Department of Health. External costs of possible pollution and risks (discussed in detail in other sections of this submission), visual intrusion, drainage, services and possible traffic congestion must be considered in the overall evaluation. Opportunities for alternative uses, to be lost if the proposed utilisation proceeds, should also be considered. Before other sites are dismissed because the 'cost of commercial land in these areas is expensive',<sup>(8)</sup> an economic comparison must be made between the 'real' cost at alternative sites within areas zoned for uses similar to those proposed by the Australian Department of Health.

It would appear that existing industrial zones in the vicinity of Tullamarine Airport and freeway would provide more suitable sites for the proposed development.

### References

- <sup>(1)</sup> M.M.B.W.: Melbourne Metropolitan Planning Scheme, Map No. 53.
- <sup>(2)</sup> M.M.B.W.: Melbourne Metropolitan Planning Scheme Ordinance, p. 75.
- <sup>(3)</sup> Australian Department of Health: Statement of Evidence to be submitted to the Parliamentary Standing Committee on Public Works, p. 2.
- <sup>(4)</sup> OP CIT Australian Department of Health, p. 9.
- <sup>(5)</sup> *Ibid*, p. 6.
- <sup>(6)</sup> C.R.B. Traffic Counts 21 March, 1973
- <sup>(7)</sup> Australian Department of Health: Environmental Impact Statement, p. 22.
- <sup>(8)</sup> *Ibid*, p. 18.

### Appendix 5

#### GRAY & JOHNSON

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#### Statement of Opinion Re Valuation Impact Proposed Premises for Australian Radiation Laboratory, Lower Plenty Road, Yallambie, Victoria

by

#### MALCOLM GRAY

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Mr John O'Connor,  
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Bundoora 3083

Dear Sir,

Pursuant to your instructions of 13 June 1974, to provide a statement of opinion to evaluate the valuation impact of the proposed premises for the Australian Radiation Laboratory situate Lower Plenty Road, Yallambie, Victoria on surrounding residential areas, I have personally inspected the site and the surrounding areas, aerial photographs, plans, and elevation drawings of the proposed premises and report as follows:

### PROPOSED USE

I understand that various activities will be carried out in the proposed premises including procures, processes and issues of quantities of radioactive materials under conditions carefully designed to minimise escape of these substances into the environment.

### SITE

The site for the proposed premises is approximately 7 acres (approx. 3 Hectares) in the South-East corner of land now occupied by the Watsonia Army Barracks and the particular land is now used for grazing and the conduct of a horse riding school. The site has a frontage to Lower Plenty Road and is approximately 10 miles (16 Kilometres) in a direct line and approximately 14 (22.5 Kilometres) by major roads from the centre of Melbourne.

### LOCATION

To the East and South of the proposed site there is extensive, solid, attractive residential development areas consisting of brick veneer houses constructed within the last decade. The area is now almost fully developed, is well planned and laid out with attractive street architecture and is well provided for by community and other services.

### PROPOSED BUILDING

From an inspection of the plans and elevations the proposed building will be a laboratory of a semi-light industrial nature similar to other Government and private enterprise Research and Development centres.

It will be a two storey, airconditioned building having an area of 84,500 square feet (7,850 square metres) and the surrounding land will consist of landscape gardening and car parking for 60 cars plus areas for future extensions and future car parking.

### OPINION

1 It is my opinion that the value of surrounding property shall be detrimentally affected if the proposed Australian Radiation Laboratory is erected on the proposed site. The property values will be detrimentally affected for two reasons:

- (a) A building as outlined in the proposal and being of a semi-industrial research and development nature will detract from the visual appeal of the area and will cause higher traffic densities in the adjoining areas in comparison with the present land useage and therefore the surrounding properties will lose some buyer appeal.

- (b) The building will be known as the Australian Radiation Laboratory and there will be some public knowledge of the type of work being carried out in the building which, whether this knowledge is accurate or inaccurate, will detract from the desirability of the area and cause a diminishing of buyer appeal.

2 It is my belief that the detrimental effect of the proposal will not be in absolute terms in that the value of surrounding homes will not actually decrease, however, because of the building and the nature of the work being carried out. I am of the opinion that the surrounding properties will not increase in value to the same extent as they would in the future if the present use was maintained on the site and furthermore, any increase in value will be not as great as comparable residential property in other locations.

3 The greatest detrimental effect to the value of surrounding property will be within a radius of  $\frac{1}{4}$  mile (400 metres) from the proposed Australian Radiation Laboratory and the detrimental effect on value will progressively diminish to nil on properties situated more than  $\frac{1}{2}$  mile (800 metres) from the proposed Laboratory.

4 I have been requested to comment on the impact on valuations if the site for the proposed Laboratory were to be on the wooded hill top behind the existing proposed site or on another site somewhere within the Watsonia Army Barracks land and I am of the opinion that any detrimental effect would decrease proportionately to the distance from any residential area.

Yours faithfully,

MALCOLM GRAY, B.Comm., D.D.A.,  
F.R.E.I., A.C.I.V.

### Appendix 6

#### ECOLOGICAL REPORT

On 25 and 28 June 1974, I visited the site of the proposed Australian Radiation Laboratory on Lower Plenty Road, Watsonia. The purpose of my visit was to make an assessment of the ecological significance of the site.

The proposed site has no particular ecological merit. The native flora has long since been removed and what area has not been built over or used for stockyards is now a degraded pasture dominated by introduced species. Around the house and yards plantings of the original red gums (*Euc. camaldulensis*) have been made. In the event that the site is used for the proposed purpose these remnants of the natural flora could be advantageously incorporated into the overall design of buildings and ancillary areas.

To the north of the site and almost contiguous with it a significant area of relatively undisturbed grassy woodland (*Euc. melliodora* *Euc. gonicalyx*, *Euc. camaldulensis*—*Themeda australis*) remains. A few trees have been removed and the area does suffer from some unnecessary vehicular tracks. However, the ground flora is fairly intact and still dominated by the native grasses and herbs. With relatively little effort this remnant of natural vegetation could make a valuable scientific and aesthetic contribution to the local environment.

D. J. Connor, B.Agr.Sci., Ph.D.

Senior Lecturer in Agriculture, La Trobe University.

## SEISMIC RISK ASSESSMENT

G. Gibson, B.Sc. (Melb.), A.A.I.P., A.A.S.E.G.,  
Lecturer in geology/geophysics, Preston Institute  
of Technology

## 1 INTRODUCTION

There are two approaches to the problem of seismic risk. One is statistical in nature, where it is assumed that earthquakes occur at a steady rate, so that study of past seismic activity will enable prediction of future activity. The other is to monitor properties of the earth, such as water table level, electrical resistivity, seismic velocities, or magnetic fields, in order to determine changes which precede earthquakes. The first method gives an average seismic risk for an area, while the second gives the risk at a particular time. Both methods are only in developmental stages, especially when applied to areas of low seismicity. For the area under discussion, lack of seismicity data would make any estimates using the statistical method unreliable, and there is nobody working locally in the monitoring method. It is thus impossible to give a positive statement, or quantitative seismic risk figures, for the area concerned.

Australia as a whole has quite low seismicity with few earthquakes of large magnitude. However, a high proportion of Australian earthquakes are near the surface, and thus lead to high intensities over limited areas.

Although poor structures may be damaged by earthquake intensities of 6 on the modified Mercalli scale, it is quite possible to design structures that will not be damaged by intensity 8. In the past seventy years, Central Victoria has experienced a number of earthquakes with maximum intensities of 6 or 7. The most recent were at Mirboo North in 1969 (Wilkie, 1970), and in Westernport Bay in 1971 (Bishop & Cresswell, 1972).

## 2 ASSESSMENT OF SEISMIC RISK

Although no detailed seismic risk statistics exist for the area concerned, an idea of the order of magnitude to be expected may be gained by the study of preliminary figures produced for the Westernport Bay area (Underwood, 1969). These show that an intensity of 5 may be expected every 10 years, and of 7 every 100 years. An extrapolation giving an intensity 9 every 1000 years is probably not valid.

A preliminary earthquake intensity zone map presented to a National Committee on Earthquake Engineering seminar (Adelaide, 1974) places the entire area around Melbourne and Westernport Bay in zone zero, a zone which should experience intensities of greater than 6.5 at average intervals of greater than 50 years. It must be noted that, due to lack of seismicity data, these preliminary estimates may be quite unreliable.

The building site is on folded Palaeozoic sedimentary rocks which do not have any particular significant response to seismic waves. The nearest major fault that is known to be active is the Selwyn Fault to the east of Port Phillip Bay from Cape Schanck through Frankston and on to the north. This is about 20 km from the site.

There is a marked difference in elevation between the flat western suburbs of Melbourne and hilly eastern suburbs, and it has been postulated that the western area has been downfaulted along a secondary fault parallel to the Selwyn Fault. Such movement will have occurred in comparatively recent geological time, in a position which may be near to the Janefield syncline which is about 4 km from the site (Whiting, 1959).

## 3 CONCLUSION

The site has had a reasonably quiet recent seismic history, but it is quite possible that it will experience an intensity 7 earthquake during the life of the building. The design of any critical structures must take into account the lower, but non-zero, probability that higher intensities will occur.

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## Appendix 8

## ASSESSMENT OF METEOROLOGICAL CONDITIONS AT PROPOSED SITE

G. A. M. Kelly, B.Sc. (Melb.), Meteorologist,  
Commonwealth Meteorological Research Centre

The proposed site is located in hilly terrain near the bottom of a valley where meteorological conditions often vary considerably from those which prevail in open areas (see attached photograph). It is difficult to apply to the site routine meteorological measurements which are taken by the Bureau of Meteorology at Melbourne or Laverton. Hence it is considered that there should be a series of meteorological measurements taken at the site for a period of three to five years to assess the air pollution potential of the area.

An example of the local conditions which do commonly occur is shown by a series of photographs (see attached) taken on Sunday, 30 June 1974 at approximately 10 a.m. The photographs are taken across the proposed site and show a low level inversion which traps a shallow layer of fog across the site. These conditions normally are not found on the top of ridges or in the open areas towards Melbourne. This type of small scale stable weather condition often occurs in the valley.

Constant examples of the inversion conditions which occur are shown when local residents burn household incinerators. The smoke often fills the bottom of the valley at the proposed site and does not disperse for hours. In fact many residents dispose of their refuse material by other means.

In summary, the Air Pollution Potential (APP) of the proposed site is considered to be much higher than APP at an open site or at the top of a ridge. Any emission of pollutants from heating plant or from work activities, would have to be controlled to a very high degree. However it is important to study the micro climate of the area in much more detail before any conclusions are made.

**CHAIRMAN**—Mr O'Connor, I would like to take this opportunity on behalf of the Committee to thank you for the way in which you co-operated with the Committee in preparing this submission in a shorter time than you wished. I understand from the secretary that there were negotiations with you. The Committee wished to hold the hearing as expeditiously as possible, as charged by the Parliament. We are very grateful to you for your co-operation in preparing your submission as quickly as you did, and we hope we did not cause you too much inconvenience.

**Mr O'Connor**—In reply, I wish to say it was never the intention of the Institute or the residents, I believe, to delay the decision in this project.

**CHAIRMAN**—I understand. We thank you for that, Mr O'Connor. Is there anything you wish to add to that evidence before the Committee questions you?

**Mr O'Connor**—I do not think so.

**Senator MELZER**—When you talk about this laboratory being an industrial facility, on what do you base that word 'industrial'?

**Mr O'Connor**—Industrial, or semi-industrial, I think I said. I base it on the opinion that it is a production facility. It produced, according to the laboratory's own annual report in the year ended 30 June 1972, about 240,000 doses of isotopes. Some of those were dispensed from the Lucas Height authority. I am not quite sure whether those figures refer to production within the laboratory. But it is a production or semi-industrial facility in those terms, in addition, of course, to a scientific and testing facility.

**Senator MELZER**—Under the assessments of impact, the genetic risk which you work out there—what is that based on? Whose figures are those? They appear on page 9.

**Mr O'Connor**—Those figures are those of the committee of the Australian Academy of

Science which was set up by the Prime Minister to study French fallout and the risks arising therefrom.

**Senator MELZER**—On page 13—existing planning schemes—the second paragraph reads: 'At Yallambie the pattern of development is clearly residential. Purchasers of properties at Yallambie would have every reason to assume that the Army's land at Watsonia would eventually be used for residential development'. On what do you base that statement?

**Mr O'Connor**—I suppose it is based on the fact that after many years of occupation by the Army, development had been kept up in the northern area of this site; in fact it is out of sight from the Yallambie area. Also, if you look at map No. 53 of the Melbourne and Metropolitan Board of Works Planning Scheme which I happen to have here with me—you will find it in the relevant Appendix 4—you will see that the area is zoned Reserved Living right around 3 sides of this area; this is the proposed site area down here. Now, although this does not show all the subdivisions, you can see that new subdivisions, for example in the Yallambie area, all have streets pointing directly at the A.R.L. site. I would imagine that from the point of view of a home buyer in this area, when you see streets pointing straight at vacant land, you would have every reason to believe that that land is about to be subdivided.

**Senator MELZER**—Apart from the fact that it is owned by the Department of Defence?

**Mr O'Connor**—That is, if the residents were aware at the time. You go into a new subdivision and see unsubdivided land with all the streets pointing straight at it—normally that land is about to come up for subdivision.

**Senator MELZER**—Or if you do not investigate and it is zoned Light Industrial you might have a biscuit factory behind you?

**Mr O'Connor**—You could, although normally residential streets would not be planned pointing straight at and terminating at the boundary of land which is—

**Senator MELZER**—But as I would put it, Yallambie Road does not point straight at the boundary, because houses back onto that piece of land, do they not?

**Mr O'Connor**—I think if you refer to Appendix 4—

**Senator MELZER**—But in any case that is what you are basing that statement on?

**Mr O'Connor**—Yes, that plus what I would call the reasonable expectation that open space land of the rather special character, having ecological value, particularly with woodland at the top of the hill, would not just be used for any old purpose.

**Senator MELZER**—Why do you mention the woodland at the top of the hill, because that is not part of the site?

**Mr O'Connor**—No, that is true; but the creek leading from the woodland does lead across the site.

**Senator MELZER**—Is your report suggesting that this development, this laboratory, would endanger that woodland?

**Mr O'Connor**—By precedent, yes.

**Senator MELZER**—What do you mean by precedent?

**Mr O'Connor**—If the Australian Radiation Laboratory is built on this site, as the report points out, it could well be used for the introduction of any number of quite large scale projects. This is a large scale project—

**Senator MELZER**—You are not suggesting that this development may be the forerunner of future development?

**Mr O'Connor**—That is what I am saying.

**Senator MELZER**—You speak of the increasing traffic volumes and yet if that particular piece of land was used for housing development, as you suggest it might very well be and that that would be preferable to this development, would that not increase the traffic volume even more?

**Mr O'Connor**—I doubt it. I would have to ask our town planner who made that estimate.

**Senator MELZER**—How many houses did you suggest could be built on this land?

**Mr O'Connor**—On the 8 acres?

**Senator MELZER**—You do mention it in this report somewhere but I cannot remember the place.

**Mr O'Connor**—Appendix 4.

**Senator MELZER**—You do suggest that this land could be developed for so many—

**Mr O'Connor**—Yes. It could also be used for public open space or kept for—

**Senator MELZER**—What you are suggesting is that the land could be sold and that

this would compensate for buying land in other places?

**Mr O'Connor**—That is one possibility, yes.

**Senator MELZER**—If that land was sold and houses were built there, presumably that would, at least to the same extent, increase the traffic flow?

**Mr O'Connor**—It would be similar although there are 90 staff at present with expansion for, presumably, something like twice that number. I am estimating now, but there are 12 daily movements of vehicles with radioactive materials, and I imagine there would be a fair bit of coming and going with visitors and that sort of thing from local authorities.

**Senator MELZER**—In a world where people tend to have at least one car and sometimes two, and once your children turn 18 years, three and four.

**Mr O'Connor**—Under the present unfortunate conditions that is so.

**Senator MELZER**—And it is a fair distance from public transport.

**Mr O'Connor**—I think it is 3.5 miles to the nearest railway station; there is a very irregular bus service; there are, of course, no trams.

**Senator MELZER**—So the residents would be forced to have motor cars?

**Mr O'Connor**—As would the staff of the Radiation Laboratory, yes.

**Senator MELZER**—Exactly. So when we are talking about heavy traffic we are not really talking about anything very different, are we?

**Mr O'Connor**—I do not necessarily agree.

**Senator MELZER**—I am getting a bit confused about this watercourse. It is barrelled to a certain extent and then it is running free. The Housing and Construction people have suggested that because one area was low-lying, that some lake, some open water be built up to bring water fowl, because they thought that that would be pleasant for the area. The residents have objected and said that any water lying there—the creek itself—is polluted and rather unpleasant and they would rather have the water removed than lie there. And yet your report tends to take it back and in a sense unbarrel it and have the water running again in the creek. Is that what your report is saying?

**Mr O'Connor**—Yes. I am in a bit of a cross-fire here obviously, but the report urges

the preservation of small watercourses in line with current thinking. It is true that the watercourse is polluted at present. For example, the area which drains into that creek is unsewered but the MMBW has on the way a very rapid expansion program for sewerage and once it has picked up all the material which is currently finding its way into that creek, then this water would no longer be polluted. So the nuisance due to water in that pond being polluted would be of a temporary nature and in any case La Trobe University, with a creek that accepts drainage from a very large residential area, has eight or ten dams along the course of that creek and the consequent ponds are muddy and polluted but they are still there and when the pollution stops the stream will run clear and the lakes will be very pleasant.

**Senator MELZER**—When the Melbourne Metropolitan Board of Works gets the storm-water out of the sewerage and back into that creek it is going to run rather freely too, is it not?

**Mr O'Connor**—Yes, that is a point made in view of flooding; that is very true indeed.

**Senator MELZER**—Then where do we get with the flooding when the creek is running?

**Mr O'Connor**—That is one of the points that is really against the site because flooding on that site has already taken place. The trouble is that as you have development such as the Radiation Laboratory along the course of a river or a stream, you increase the rate of run-off and the flood peaks much more rapidly. This has apparently happened twice already and it has flooded homes in the area.

**Senator MELZER**—When you got a report from a consultant on the effect on property valuations, did you only use one consultant?

**Mr O'Connor**—The grant provided by the Department of Environment and Conservation did not enable us to use more than one consultant.

**Senator MELZER**—Yes. But you did only use one?

**Mr O'Connor**—He is a rather eminent consultant, if I may say so. He is president of the Real Estate and Stock Institute of Victoria, and very highly qualified in the field; he is the best we could get.

**Senator MELZER**—I accept your word. In the course of either talking to him or in drawing up the report, could you tell me whether all those blocks of land in that area

of Yallambie were of a similar value when they were subdivided? Were they all bought for much the same price or were some blocks of land cheaper than others to buy?

**Mr O'Connor**—To my knowledge, the blocks would be of roughly the same price but I am guessing.

**Mr McConville**—I might be able to help you here.

**CHAIRMAN**—All right, Mr McConville. You are still under oath, you appreciate.

**Mr McConville**—Yallambie Estate was divided into, I think, 3 stages over possibly 4 years, so obviously the land values did increase over that time. The original blocks near the Radiation Laboratory would have cost in the order of \$4,000; the ones in the latest development at the other end of the Estate would probably be in the order of \$7,000 to \$8,000, over the four or five years that the development took place.

**Senator MELZER**—Do you mean that the blocks on the higher land were of the same value as those which were subject to flooding?

**Mr McConville**—No, because the higher land was developed later.

**Senator MELZER**—Mr McConville, perhaps you could answer this or Mr O'Connor: When you were considering whether the building of this Laboratory would increase or decrease the value of land, did you at any time take into consideration the movement in values that had happened around Carlton, around Melbourne University, and around Monash University?

**Mr O'Connor**—I would say the valuer certainly did not. He considered only the impact on the valuations of the construction of the proposed Radiation Laboratory in this district.

**Senator MELZER**—I thought we were taking it that it was matter of light industrial, or that the building itself was of some disadvantage. When you were considering the effect on property valuations, did you only take into account that it was a Radiation Laboratory or did you take into account the fact that there it was a large building?

**Mr O'Connor**—Both those points, or all 3 of those points were taken into consideration. If you care to refer to Appendix 5—

**Senator MELZER**—Do not worry about that. I can do that.



**Mr O'Connor**—Those 3 points were taken into consideration.

**Senator MELZER**—Would you agree that in the days when Melbourne University was a rather pleasant little place set in lawns and lakes, the values of properties around what we now take to be that square—it was not even that square in those days—were low. Now that Melbourne University is a large very complex and from some angles a very ugly complex of buildings, the values in the area have gone up enormously. When Monash University was set in a large open space with paddocks and was a very pleasant place to run in or graze cows in, you could buy the properties around it for a song. Now the properties in that immediate area are very expensive to buy. All I ask is would you agree with that or not?

**Mr O'Connor**—I am not sure that I agree with it. I would say that the rise in land values around Melbourne University is due to restoration within the City area. It is an entirely different proposition.

**Senator MELZER**—You would say the rise in value is due only to that, would you?

**Mr O'Connor**—Yes, mainly at any rate.

**Mr BONNETT**—I want to clarify a point in my own mind, Mr O'Connor. Did you hear all the evidence taken yesterday?

**Mr O'Connor**—Yes, and I read Appendix 2.

**Mr BONNETT**—How long did it take you to prepare this?

**Mr O'Connor**—The impact statement?

**Mr BONNETT**—Yes.

**Mr O'Connor**—It was started about 3 months ago. Of course, quite a few of these sections could not be written until we had received Appendix 2, which I think was about eighteen or nineteen days prior to the date of despatch to Mr Fenton, so that much of the summary had to be written very quickly. We had already been working on it, but the actual writing of it had to be done in about a week.

**Mr BONNETT**—About 3 months?

**Mr O'Connor**—Three months for the entire study.

**Mr GARRICK**—I have just one question. I think most of it is answered by, or is in opposition to, the evidence which we were given yesterday. Mr O'Connor, what you are generally saying is based on the premise not

that emission of radiation will occur, but on if it did occur?

**Mr O'Connor**—No, I am saying that with an installation of this nature it is not possible to comply with the Academy of Science's recommendation that no additional exposure to ionising radiation could occur. Shielding, for example, of a radiation source cuts off—it absorbs the radiation exponentially, but a very small amount gets through. It is quite true that at the boundary, this would be only a minute fraction of background, but I feel this is comparable with the radiation exposure which the Australian population at large receive from nuclear fall-out. And likewise these high efficiency air particulate filters that will be used will release to the environment very small amounts of particulates which will be available for inhalation in the air of the district by the people. Now these are very small amounts and many will assert, as Mr Stevens has done, that there is no biological consequence. In fact Mr Robotham says the same in his appendix. On the other hand, it can be asserted and has been so asserted by the Academy of Science, that any additional minute exposure to ionising radiation is of biological consequence.

**Mr GARRICK**—But you agree with Mr Stevens, as stated here, that the emissions from this Laboratory would be of no biological consequence?

**Mr O'Connor**—I would agree that they would be minute. It is unknown whether they are of any biological consequence, and the cautious attitude taken by the Academy of Science on the question of fall-out is to assume that any minute increments in exposure to ionising radiation are of some biological consequence.

**Mr GARRICK**—But that would occur, of course, wherever the laboratory was located?

**Mr O'Connor**—Yes, but any exposure to surrounding population, of course, would affect the immediate population in the case of a radiation laboratory. The point is that the population immediately surrounding a laboratory, which in the case of Yallambie incidentally is a residential-type population, not a working-type population—

**Mr GARRICK**—Earlier on in your statement you mention that it should be located in a light industrial area?

**Mr O'Connor**—Preferably to a residential area, yes.

**Mr GARRICK**—But that would be much the same. When all is said and done, probably there would be as great or a greater concentration of people in an industrial area as there would be in this open area.

**Mr O'Connor**—I think you really just put your finger on this, Mr Garrick. The point is here that the area is open residential. The air is to be extracted, say, 24 hours a day from the laboratory. Minute amounts of particulates will escape into the environment through these high efficiency filters, but certainly very minute amounts. Radiation sources that will be kept within the laboratory too, although on a very minute scale, will be affecting women and children who, for example, on adjoining properties, would be out in the yard or at play. It is not really comparable here because we are talking about a residential population, whereas with a working population certainly it could be more concentrated, but they tend to be older people, they contain generally fewer pregnant women, and also, of course, they are working in buildings and each wall successfully shields them from the laboratory.

**Mr GARRICK**—And basically it is a discussion between the experts to enlighten the Committee as to whether it is serious.

**CHAIRMAN**—Mr O'Connor, again there are 2 matters. I suppose the first is the effect on the property values or the development of that land; and the second, the possible effect on the community of any 'fallout', if we can use that expression, from this laboratory. Let me deal with the first one. Did you start your impact statement on the premise that the land on which it is proposed to site the proposed laboratory would always remain in the state that it is in now, or did you consider that it may be used by the Department of Defence or the Department of the Army for other purposes?

**Mr O'Connor**—I took the land as it is at the moment, looked at it in its present state. Of course, it is true that it could be used by the Army for some other purpose.

**CHAIRMAN**—It seemed to me, Mr O'Connor, that your submission was based on the fact that the land would remain in the state in which it now is, when of course that is not true. The land was owned by somebody?

**Mr O'Connor**—That is true.

**CHAIRMAN**—And everybody who owns land does something with it, at some time or another?

**Mr O'Connor**—Yes.

**CHAIRMAN**—They choose to leave it as it is, or they choose to graze cattle on it?

**Mr O'Connor**—Yes.

**CHAIRMAN**—Grazing cattle, I suppose, can destroy the flora more than would the putting up of a building?

**Mr O'Connor**—Cattle are a bit severe on the understorey.

**CHAIRMAN**—They are a little bit savage on trees too, when they are hungry?

**Mr O'Connor**—Yes.

**CHAIRMAN**—Therefore could I suggest to you that perhaps that was not a true premise on which to start?

**Mr O'Connor**—That was the starting premise, but in the course of the impact statement constant reference is made to alternative uses of the land, not only a radiation laboratory but residential uses such as open space or housing. A school, I think, gets a mention somewhere. So we have attempted to look at a range of possible uses other than the proposed use of the land.

**CHAIRMAN**—Recognising all of the time that the land belonged to the Australian Government and not to the State Government or to the local council?

**Mr O'Connor**—That is right.

**CHAIRMAN**—It has been clearly understood, I think, that the land is there for military purposes or Army purposes?

**Mr O'Connor**—It is for military purposes. I think the planner, in his report, said that although the Government is not obliged to comply with, say, the City of Heidelberg's planning scheme in the area, it would appear to be reasonable that it would consider general planning issues involved. To answer this I will have to quote from page one of Appendix 4, Planning Issues:

Although it is probable that the Australian Government is not legally bound to comply with planning controls, it would appear reasonable that the Government should, before constructing a development in an area which is subject to planning controls, consider the general planning issues involved, and the effects on adjacent land use. Such considerations could ensure that 'uncontrollable' developments are consistent with the adjacent land users' expectations for the future development of their area, as implied by an existing planning scheme.

**CHAIRMAN**—Did you hear Mr Bickerstaff of the Department of Housing and Construction yesterday?

**Mr O'Connor**—Yes.

**CHAIRMAN**—Did you hear him in answer to a question say 'although it is true that there is no obligation on Australian Government departments to comply with local requirements. . .?' If I recall his words correctly, he seemed to be rather positive. Well, he was certainly positive that full consultation took place and it seemed to me that he was also very certain that, where local ordinances and regulations applied, they were complied with.

**Mr O'Connor**—I think full consultation has taken place here. At the later stage of planning, at any rate, consultations with local instrumentalities have taken place, but I would say that the residents, who are after all the ones who will be affected by adverse consequences, if any, have been as it were kept in the dark until the final stages, which is perhaps a bit unfortunate.

**CHAIRMAN**—Do you know what happens when somebody builds a house next door to you?

**Mr O'Connor**—Yes.

**CHAIRMAN**—Do you know the procedure that is followed there?

**Mr O'Connor**—The onus just falls on the builder?

**CHAIRMAN**—He must get a building permit, and comply with all regulations. Do you think they necessarily consult their neighbours as to the type of house that they are going to build?

**Mr O'Connor**—Very rarely.

**CHAIRMAN**—Then do you not think that the Australian Government is going a little bit further than the average citizen goes when he constructs a building?

**Mr O'Connor**—This is an abnormal use of land next to a residential area. Your reasonable expectation would be that your neighbour would build a house on his block of land; he is not likely to build a radiation laboratory on it—in fact, he could not get permission to do so.

**CHAIRMAN**—But again I return to say that it is land that is set aside for Army use, therefore any use that is Army use, apart from a tent—and that could be erected there—but any use for Army use generally

requires a building; and therefore, because the land is set aside for Army use, the Army could erect a building exactly where that laboratory is.

**Mr O'Connor**—Yes, it certainly could; and one would anticipate that they would take due cognisance of the surrounding areas—which in this case is a residential area—and erect a building which fitted in.

**CHAIRMAN**—Can we move into the private enterprise sector of the community? You talked about Government. Suppose that somebody buys a residential block of land abutting a light industrial zone. The same circumstances exist. People have bought blocks of land in Yallambie estate, abutting land that is set aside for Army use. If you buy a block of land abutting a light industrial zone, really you know that that zone is set aside for light industrial use?

**Mr O'Connor**—Yes.

**CHAIRMAN**—To your knowledge would any builder or designer or owner of any factory consult with their surrounding residents as to the type of building that he was going to erect on his land?

**Mr O'Connor**—No.

**CHAIRMAN**—Or do you think he would be responsible enough to try to make it compatible with the surrounding community?

**Mr O'Connor**—I would hope he would be responsible enough. I feel consultations with residents certainly would not hurt. Finally, if you buy land next to an area which is definitely zoned light industrial, you must of course expect a factory of some kind to go on to that land.

**CHAIRMAN**—And would not people buying land abutting land set aside for military purposes reasonably expect it to be used for that purpose?

**Mr O'Connor**—All the existing development is up in the northern area and out of sight of this land here. One of the reasons why people would have bought here was the appeal of open space. In my opinion their reasonable expectations would be that the development of buildings, transmitters, and that sort of thing, would be kept to the existing area. And this in fact has been the case.

**CHAIRMAN**—But again let us consider a private individual buying a block of land—and we are only speaking about relativities now—50 feet by 100 feet or 50 feet by 150 feet. Generally the only obligation on him is

that he shall not come any closer than 25 feet to the building line, and shall not come any closer than 4 feet to the side fence, and, if he is on a corner, he shall not encroach, on one side, more than 6 feet from the side street?

**Mr O'Connor**—Yes.

**CHAIRMAN**—He may want to build his house at the back of the land. There is no guarantee that he is going to build it at the front of the land, is there, in the same way as there was no guarantee with this land that development was going to continue where it started?

**Mr O'Connor**—No, although I would point out that this is not an Army development. The Army would not normally put a radiation laboratory on land—

**CHAIRMAN**—But they may build a maintenance depot for their trucks.

**Mr O'Connor**—They could have put an ammunition store there, I suppose.

**CHAIRMAN**—Exactly.

**Mr O'Connor**—I would imagine though that they would not do this, because this would not be the type of building they would put next to a residential area.

**CHAIRMAN**—Yes. With the greatest respects to your qualifications, Mr O'Connor, we are not interested in imaginations; we are trying to elicit facts, so that we can make up our minds. You did suggest, and Senator Melzer touched on this, that that land could be subdivided into housing 'flogged off', to use a colloquialism, and the money gained for it, and I think you mentioned roughly \$100,000—used to purchase land elsewhere. You spoke about the flooding of the creek as being detrimental. There is some conflict, of course, about the ponding. There is some conflict of evidence about the desirability of the ponding of the creek. It was said to us yesterday that a large run off such as this is a concentrated run off of water and would reach the creek, because it is a short lead, quicker than any flood water could come downstream and bring the stream to a stage where it could not cater for the volume of water. Do you still believe that that is a factor, and that this would increase flooding of the creek?

**Mr O'Connor**—I thought that was rather an odd statement because it assumes that you have a sudden cloudburst that lasts 5 minutes and causes flooding along the length of the creek. Then, true, the major run-off would be ahead of the following flood peak but the

abnormal sort of rains which flood watercourses last 5 days at a time, and the creek is well and truly in flood and being continually added to by excess run-off from say a large roof area.

**CHAIRMAN**—I speak from personal experience. I live quite near a creek, the Moonee Ponds Creek, and I have found that it does only flood when there are flash rains. But that aside, stream control is a matter for the Melbourne and Metropolitan Board of Works?

**Mr O'Connor**—Yes.

**CHAIRMAN**—Did the stream continuously flood and cause a hazard to surrounding property owners? Do you believe that the MMBW would do what they have done upon other streams and put in retarding basins? Or would they have a responsibility in this area of stream control?

**Mr O'Connor**—You ask for a comment on the MMBW policy. From the environmental point of view it is bad news because their policy has been to barrel drain stream after stream. Many of Melbourne's small watercourses are underground. I might add that in America they have the process of deburying streams going. They are actually ripping up the barrel drains and using scour resistant vegetation to stabilise the watercourse.

**CHAIRMAN**—I agree with that, but large barrel drains are only one method of controlling stream flow. Along the Moonee Ponds Creek and the Milston Creek they have constructed retarding basins. They are not dams, but they do hold the water back in an area where it can be held when it floods until it gives a control flow downstream. Would you believe that they would be interested enough in this area, if it floods to the extent it has been suggested, to do something like that to control the stream flow?

**Mr O'Connor**—To actually construct a retarding basin?

**CHAIRMAN**—Or to take some other method of controlling the stream flow?

**Mr O'Connor**—The best method is minimal interference with natural drainage—to forget such things as barrel draining, development and filling of bends. The flood plains themselves are natural retarding basins. The thing to do is to leave the stream alone as much as possible.

**CHAIRMAN**—The building itself does not cover all of the seven or eight acres that is

set aside as the site. The run-off area there is the roof of the building and the paved areas. Were that land sub-divided into house lots and with roughly 4 house lots to the acre, would you not have a larger roof area and a larger paved area with a road to serve it, than in fact you would have with the proposed building?

**Mr O'Connor**—You would have some 32 houses, their driveways, and the streets, if it were residentially sub-divided into a comparable drainage area.

**CHAIRMAN**—So by sub-dividing you would aggravate the problem of flooding of the creek rather than by the proposed building?

**Mr O'Connor**—To about the same extent, I would say, yes.

**CHAIRMAN**—And, of course, you would also destroy the trees because there is no guarantee that people are going to plant trees on their lots. And when they sub-divide, as they did with the Yallambie Estate originally, they put a bulldozer through and take everything out and build roads and hope that things will grow back again.

**Mr O'Connor**—Ten years ago that sort of thing was done. It is less prevalent today.

**CHAIRMAN**—In your opinion in the department's proposal it was recognised that in some respects they must destroy some of the environment and they are doing their utmost to replace, in fact to a far larger extent, that which they are going to destroy.

**Mr O'Connor**—I must say that if the proposal goes ahead on the proposed site, the degree of care etc. taken in landscaping and the preservation of the site, I think, does great credit to the Australian Radiation Laboratory.

**CHAIRMAN**—Finally, I come to the question that seems to be bothering us all—the emissions. As I indicated earlier, I am no physicist, but by the time this hearing is finished I think I might major in the subject. Mr Robotham, in appendage 3 to your report—that in his conclusion—says: 'Normal laboratory operating procedures should not give rise to any significant radiation hazard to residents of the Yallambie district'. I take the point that any, no matter how minimal, above that existing is a hazard. This is what I gleaned from what you were telling us—no matter how small, it is still something extra to what is already there, so therefore, in that context, it is a hazard.

**Mr O'Connor**—Yes, with even a very minor increase in radiation, even a fraction of background radiation, there is a chance that it could induce leukemia or bone cancer or a genetic mutation which could be recessive. The chance is very small, and also there is some evidence of cellular repair mechanisms at low doses of radiation which can actually repair damage to cells faster than it accumulates at low radiation doses. But this is not proven, and this is why the Academy of Science has taken the very conservative point of view—I think it had to—that any, even a very small, increase in background radiation, such as that due to fall-out, represented a measurable health hazard.

**CHAIRMAN**—Your point is well taken, and I am sure the Committee will go to great lengths to satisfy itself on that point before it comes to a conclusion. Finally, it seems that your major concern is not so much the daily, or regular, or whatever they are, emissions from the laboratory, although you are concerned about them, but what would happen at time of crisis if the building caught fire. Is this one of the major areas of concern?

**Mr O'Connor**—No, it is not a major area of concern; it is a possibility to be considered. In times of, say, civil strife or warfare a building like this could become, I suppose, a target for sabotage. Who can calculate the probability? But what does follow though is that the building contains very large quantities of materials which, if released, would be a hazard to their immediate surroundings. For example, the Watsonia Military Base, I suppose, would become a military target in time of war. And I point out that the environmental impact statement of the Australian Radiation Laboratory points out that it did not want to erect the laboratory near Tullamarine in case of the possibility of an aircraft crashing on the laboratory and releasing its contents. Presumably that is of the same order of significance as these other possibilities that I have suggested.

**CHAIRMAN**—For the continued maintenance of man and life on this planet we hope that both possibilities are so remote that they do not require to be considered. I think you have satisfied me anyway.

**Senator MELZER**—How many houses would there be within a radius of a quarter of a mile of where it is proposed this laboratory be built?

**Mr O'Connor**—At the moment, say, 200 to 250 houses.

**Senator MELZER**—Within a quarter of a mile?

**Mr O'Connor**—I am sorry, I am not sure of that. Probably 150 houses would be a better estimate. It is done on the basis of present and all future sub-divisions.

**Senator MELZER**—There are about 500 in the area altogether, about 150 within a quarter of a mile. How many would there be more than half a mile away from the laboratory?

**Mr O'Connor**—More than half a mile? The number of homes in Melbourne is in the order of—

**Senator MELZER**—Half a mile?

**Mr O'Connor**—Oh, within half a mile. We have made an estimate of about 500 homes.

**Senator MELZER**—Within that half a mile? That is the Langby subdivision.

**Mr O'Connor**—And one—I think it is called Viewbank. Here, if you look on the map. This is provided in Appendix 4. It takes in the area, the reserved living area north of the base, roughly in that radius, about five hundred homes.

**Senator MELZER**—In Mr Gray's submission he points out that the greatest detrimental effect to the value of the surrounding property would be within a radius of a quarter of a mile. The detrimental effect on value would progressively diminish to nil on properties situated more than half a mile from the proposed laboratory.

**Mr O'Connor**—That is so.

**Senator MELZER**—Well, in discussing the effect on property valuations, you have assessed the loss in potential property valuation on the entire five hundred.

**Mr O'Connor**—We have taken an average value; we have assumed—

**Senator MELZER**—An average of \$500 on each?

**Mr O'Connor**—Yes, because you see, you base your assumption over 5 to 10 years. I think that this is rather conservative, with regard to the present scale of rise in property valuation.

**Senator MELZER**—You take the 500 properties with an average of \$500 loss on each?

**Mr O'Connor**—With zero at the half mile radius and \$1,000 at the inner boundary and that—

**Senator MELZER**—That is not a \$250,000 loss in potential property valuation is it?

**Mr O'Connor**—Yes.

**Senator MELZER**—If we take the word of your expert that the value is diminished to nil at a half a mile distance?

**Mr O'Connor**—We have assumed a valuation effect of nil at half a mile. Coming in along the radius to the Australian Radiation Laboratory, by the time you arrive at the boundary—the site boundary—the valuation loss shall be \$1,000 over the next, say 5 years. Then at the half-way mark, the average value is \$500, which applies to the 500 homes. There is maximum loss at the site boundary and minimum loss at the half-mile mark. This is pretty speculative, I might add, but it is the only way in which one is able to estimate.

**Senator MELZER**—I agree with you.

**Mr BONNETT**—Mr O'Connor has answered the only question that I was going to ask.

**CHAIRMAN**—Well, it seems that you have satisfied the Committee. We thank you very much for your attendance.

Mr John Mellors of the Heidelberg City Council was sworn and examined.

**CHAIRMAN**—Welcome to the Committee hearing. Could you please give us the capacity in which you appear before the Committee.

**Mr Mellors**—I am appearing on behalf of the City of Heidelberg in lieu of the person who was to appear, namely Mr McInerney.

**CHAIRMAN**—Thank you. You will be presenting the written evidence on behalf of the City of Heidelberg?

**Mr Mellors**—I do.

**CHAIRMAN**—Would you like to read that to the Committee please?

**Mr Mellors**—My submission reads:

#### INTRODUCTION

The Development and Building Committee of the Council first considered the submission of the Department of Works on the proposed Radiation Laboratory and Dental Standards Laboratory on 15 October, 1973 and subsequently Council on 22 October, 1973 resolved that it had 'no objection in principle' to the proposal. Since that first approach Council received more detailed information including revised plans, an Impact Statement, and Statement of Evidence from the Department of Health. Also, Council has received more background on the proposal from its recently formed Town Planning Department (this Department was formed in April, 1974), and has discussed the proposal with representatives of the Community. All the additional informa-

tion was considered at a Committee Meeting on 24 June and the full Council meeting on 1 July. The recommendation of that Council which was forwarded to the Secretary of the Committee on 8 July is as follows:

That Council advise the Australian Government that—

1 Council would oppose a private development of this nature on this location on the ground that is an intrusion of an industrial use into a residential area, and however well landscaped, would still be better located in an area zoned for light industry.

2 Council is concerned that radio-active or chemical waste may be discharged into the sewage, which is not connected to the main Melbourne sewerage system but locally treated at the end of Martins Lane, and then discharged into the Plenty River.

3 Council is greatly concerned over the possibility of a leak or long term build-up of radio-activity in the area, and sees the need for some form of monitoring or testing body to safeguard against such a possibility. Further, if such a leak did occur, its potential effect in a residential area could be of major significance as opposed to the less damaging effect of the laboratory if sited in an industrial zone.

#### SUBMISSION

Council of the City of Heidelberg requests the Standing Parliamentary Committee to consider fully the Council recommendation of 1 July as above, and in addition the following points:

1 Council is aware of the Impact Statement prepared by Preston Institute of Technology and is particularly concerned with the following possibilities—

- (a) the anticipated adverse effect of the proposal on surrounding property values,
- (b) the situation, if true, of the surrounding residential areas being subjected to a level of radiation comparable to fall-out from atomic weapons testing in the Pacific Ocean, and
- (c) the possibility of an accident, such as a major fire, exposing the Yallambie residents to about 10,000 times the maximum permissible concentration in air of Iodine 131, alone, during the hour following a major outbreak of fire in the proposed laboratory.

2 The Council would respectfully suggest to the Committee that apart from the question of radiation the major issue is one of a town planning nature, related to the most appropriate use of an area of land. Any decision made should therefore be seen as a planning decision to be made on planning grounds.

Under the Melbourne Metropolitan Planning Scheme Ordinance an industrial use is in part defined as 'carrying out of any process of manufacture whether or not a finished article results'. We submit therefore that the proposed Radiation Laboratory is in fact an Industrial Use under the Melbourne Metropolitan Planning Scheme. It can also be defined, as pointed out to the Council by the Department of Housing and Construction in a letter of 8 August 1974, as a Utility Installation, meaning 'any building or works used or intended to be used by a public authority, government department or local government authority, but does not include the building used wholly or principally as administrative or business premises or as a show room'.

Irrespective of each of the above two classifications the proposed laboratory must be seen in relation to the present zoning of the area; 'Public Purposes 1, Commonwealth Use (Watsonia Military Camp)'. This

notation has been consistent since the implementation of the Melbourne Metropolitan Planning Scheme in 1954. The 1954 Scheme showed the areas adjacent to the eastern and southern boundary of the camp zoned rural.

Subsequent re-zoning of that rural land to residential development was approved by Council and the Melbourne and Metropolitan Board of Works in the belief that the camp area would continue to be used for the purposes as defined in the zoning plan, that is 'Watsonia Military Camp'. If the Council and other responsible authorities had at the time of re-zoning known that the use of the land would be different to the commonly accepted understanding of a modern military camp, it is almost certain that either—

- (a) re-zoning would not have been approved or
- (b) certain restrictions and conditions would have been placed on the sub-division. For instance, a buffer zone around it—around this barracks.

The accepted understanding of the general zone 'Commonwealth Purposes', has been that a specific use by the Commonwealth had been and would continue to be carried out in the area. For instance, the Williamstown Rifle Range was zoned under the 1954 Metropolitan Planning Scheme for Reserved Living and Open Space. These proposals which are indicated on the plan are different from the existing use which is for Rifle Range purposes; however the Australian Government have indicated that the Rifle Range will, when a suitable alternative site is found for the Rifle Range, be turned over to local and State governments to be used for the purposes as shown on the Metropolitan Planning Scheme.

On the other hand areas such as the Laverton RAAF Base have remained and presumably will continue. This existing use must have been taken into consideration when the planning authority re-zoned the rural land around the periphery to urban uses, e.g. housing, industry and leaving certain areas rural to accord with the existing and presumably continuing use of the Commonwealth land. Similarly with the Commonwealth land around Avalon Airport the Minister Mr Jones has pointed out (July 1973) that the noise level around this airport would be detrimental to any residential development and the information and advice have been acted on by the State and Regional Planning Authority re any zoning proposals for the land around this Commonwealth Use. There has however been no important change of land use (to the writer's own knowledge) of any land zoned for Commonwealth purposes, and if there had been such a proposal made known, the Planning Authority would have taken note of this and made appropriate modification to the re-zoning proposals which have been carried out without any objection from the Commonwealth. Surely if re-zoning proposals around areas like Avalon and Laverton air fields are commented on by the Australian Government, it is equally required for the Watsonia Military Camp area.

3 Council accepts the continued operation of the military camp in the form that it now takes, that is, concentration of barracks, facilities and stores in the north-west corner and the use of the remaining area for manoeuvres and training purposes. The development plan of the Army Camp (1963) which I produce for the information of the Committee continues to implement the approach to military camp design which is consistent throughout Australia.

The Australian Government has access to the most experienced legal and professional advice and in the normal course of planning objections and appeals, could be expected to receive the fullest representation and consideration. In the present case, the Standing Committee has been substituted within the planning objections procedure, and therefore the Council submits that your Committee should take extreme care to ensure that the normally accepted rights of the community in planning matters are fully considered.

4 Council sees no major objection to the proposed laboratory in respect to traffic generation or the actual design of the structure.

**CHAIRMAN**—Thank you, Mr Mellors. If I could give you the opportunity, at page 2, your sub-paragraph c, Mr O'Connor has amended his evidence, and where your evidence reads:

The possibility of an accident, such as major fire, exposing the Yallambie residents to about 10,000 times the maximum permissible concentration in air of iodine 131. . . .

I presume this was taken from Mr O'Connor's evidence?

**Mr Mellors**—Yes, it was.

**CHAIRMAN**—Today he amended that to read 10 times and not 10,000 times.

**Mr Mellors**—Ten to 100 times.

**Mr GARRICK**—It does say 10 times there but he amended it again in his evidence.

**Mr Mellors**—You mean 10 to the power of 100, do you?

**Mr O'Connor**—No, 10 times.

**Mr Mellors**—Yes, I see.

**CHAIRMAN**—That brings the 2 pieces of evidence into line, Mr Mellors. The matter you have mentioned, do you want that appended as part of your evidence?

**Mr Mellors**—Yes, it is for the information of the Committee. It is an Australian Government plan or map, the reference of which is HA 63/68417, and it is master planning, for the Department of the Army, Master Plan, Watsonia, Victoria.

**CHAIRMAN**—Is there a date on that map, Mr Mellors?

**Mr Mellors**—October 1963.

**CHAIRMAN**—We might want you to display that presently, but is there anything you wish to add to your evidence before the Committee question you on it?

**Mr Mellors**—Just to point out, this map does show a considerable variation to the map which is now on display.

**Mr BONNETT**—Did you or any member of the Council hear the evidence taken yesterday?

**Mr Mellors**—I was not here. Mr McInerney was here. I got the papers secondhand.

**Mr BONNETT**—You mention the impact study that Council read. Did the Council read the impact study submitted by the Department of Health?

**Mr Mellors**—I cannot comment on that because I was not with the Council at that time.

**Mr BONNETT**—One final question: On page 2 of B and C, I take it that the information you give in this submission is taken from the Press releases that you have studied.

**Mr Mellors**—That is correct.

**Mr BONNETT**—That is all.

**Senator MELZER**—On page 2 you refer to 'the commonly accepted understanding of a modern military camp'. What is that?

**Mr Mellors**—Military camp. Well, you would be familiar I would think with Puckapunyal, Holsworthy and places of that sort, would you not? Holsworthy is perhaps more relevant in this context because at Holsworthy a new town is proposed, Lucas Heights is not very far away, yet the Commonwealth hopes to keep a buffer zone between the Lucas Heights atomic energy centre and Holsworthy town, about a half-mile buffer zone, that is what I mean.

**Senator MELZER**—You mean when you were referring to a commonly accepted understanding of a military camp, you were referring to what, a buffer zone around it?

**Mr Mellors**—No, the commonly accepted understanding of a military camp is barracks, parade grounds, married quarters for the personnel, areas of training.

**Senator MELZER**—Thank you. You did refer on page 3 to something about a buffer zone, you added something but I could not quite hear what you said. Would you mind telling me what you said? On page 3, at the top, you say:

- a. re-zoning would not have been approved or
- b. certain restrictions and conditions would have been placed on the sub-division.

**Mr Mellors**—Yes. Certain restrictions and conditions would have been placed on the sub-division, such as requiring a buffer zone. An area of land which would remain, say, for public open space or rural activities, or something of that nature.

**Senator MELZER**—Thank you very much.

**CHAIRMAN**—I have no questions, Mr Mellors. You seem to have satisfied the Committee and we thank you very much for your appearance.

Mrs Jocelyn Reynolds, representing the Lower Plenty Pony Club, was sworn and examined.

**CHAIRMAN**—You have a written submission. Would you like to read that to the Committee?

**Mrs Reynolds**—It is only a small submission submitted by the Pony Club in connection with the proposed Australian Radiation Laboratory. It reads:

**PROPOSED AUSTRALIAN RADIATION LABORATORY AND LOWER PLENTY PONY CLUB**

The Lower Plenty Pony Club was established approximately fifteen years ago, at a time when there was little if any residential development in the area.

Over the period of fifteen years it has catered for a yearly membership of approximately 70 people from the local and surrounding suburbs.

The Lower Plenty Pony Club is a non-profit club offering membership to the public.

Over a period the leased area has been developed specifically for Pony Club activities. The broad acres have been fenced into paddocks suitable for horse agistment.

Water reticulation with drinking troughs have been provided in paddocks.

Special facilities have been created by the membership:

- (i) Toilet facilities
- (ii) Locker and tack room for members
- (iii) Instructors lunchroom and office
- (iv) Workshop and caretaker's quarters
- (v) Fodder storage shed
- (vi) Stables for sick horses
- (vii) Blacksmiths shop
- (viii) Hay storage shed
- (ix) Jump equipment storage shed
- (x) Paved washing area for horses
- (xi) Loading ramp for floats
- (xii) Fenced dressage areas
- (xiii) Fenced sanded jumping ring
- (xiv) Tie up rails and feed bins for approx. 100 horses
- (xv) Various small fenced areas for treating sick or lame horses

The proposed location of the Radiation Laboratory is such that all the above facilities will require demolition and replacement.

The Lower Plenty Pony Club, a non-profit club, is faced with considerable financial burden, together with hours of voluntary work to organise re-siting of facilities.

It is extremely unfortunate that the Government should have selected precisely the Pony Club site when so many alternative areas were available.

Preliminary discussions with the Department of Army have indicated that a suitable site for relocation of Pony Club facilities is in the centre of our leased area. Other locations closer to access roads and services were not favourably considered by the Department of Army.

At this point in time the Lower Plenty Pony Club is faced with considerable expense in re-siting their facilities in a remote location. Roads, electric and water services are very expensive items.

The Pony Club is concerned that they may not have sufficient time in which to make the move to a new site before building operations take place.

Morally, the Club members feel that the Australian Government have an obligation to assist the Lower Plenty Pony Club in relocation of their facilities, in having selected the site which disrupts completely our facilities.

The Club has built up these facilities over a fifteen year period to service the youth in the community interested in equestrian activities.

President, Lower Plenty Pony Club

Mr P. I. Ungar,  
20 Fairlea Avenue,  
MACLEOD 3085.

**CHAIRMAN**—Thank you, Mrs Reynolds. Is there anything you wish to add to that?

**Mrs Reynolds**—I do not think I have. I am here only as a representative of the Pony Club and not as a private person.

**CHAIRMAN**—The Committee will question you on the evidence that you have submitted so they can satisfy their minds about the matter.

**Mr GARRICK**—How long is the lease you have from the Army?

**Mrs Reynolds**—At the moment we only have a month-to-month lease.

**Mr GARRICK**—In other words, the Army at any time, month by month, could ask you to vacate the premises?

**Mrs Reynolds**—They could ask us to vacate.

**Mr GARRICK**—Then you would be in exactly the same situation, or not in as good a situation as this because you have not been even asked to vacate yet?

**Mrs Reynolds**—We have not been officially asked, no.

**Mr GARRICK**—Do I read this correctly? 'Preliminary discussions with the Department of the Army have indicated that a suitable site for relocation of the Pony Club facilities is in the centre of our leased area.'

**Mrs Reynolds**—Sure. It was given to us last Tuesday.

**Mr GARRICK**—Another area?

**Mrs Reynolds**—Another area in the centre of the leased area.

**Mr GARRICK**—I see. So you can relocate it in there by—

**Mrs Reynolds**—We have not been given permission to move in yet.

**Mr GARRICK**—That would be satisfactory?

**Mrs Reynolds**—Not really, not the allocation.

**Mr GARRICK**—The area.

**Mrs Reynolds**—No, the area is not satisfactory because we are away from power; from water; from sewerage and we have no access road to get in there which means that we would have to make an access road to get to this area; and we would have to put up power poles which is not at all an inexpensive item.

**Mr GARRICK**—In short, then, you are more or less requesting some sort of compensation.

**Mrs Reynolds**—I may stand to be corrected here as I was not here yesterday afternoon for the evidence but I believe there was something said to the effect that the buildings would be demolished on the present site. This is not what we want at all; we want those buildings shifted to the site that has been allocated to us by the Army.

**Mr GARRICK**—There is still a chance that you will not have to shift.

**Mrs Reynolds**—It is a very slim chance but it is a big, hopeful wish.

**Senator MELZER**—How long has that land been used by the Pony Club?

**Mrs Reynolds**—As an affiliated Pony Club it has been used for 15 years. Prior to this it was used as a riding school for something like 45 years.

**Senator MELZER**—How large is your lease area?

**Mrs Reynolds**—It is 201 acres.

**Senator MELZER**—How far from where you have that concentration at the moment would you have to move to what you refer to as the centre of your leased area?

**Mrs Reynolds**—I would think approximately a quarter of a mile.

**Senator MELZER**—What are the terms of your lease? What sort of rent do you pay for it?

**Mrs Reynolds**—We pay—I cannot give you the annual one but I know we pay \$315 per month and we are under obligation to super and fertilise the ground; to keep the fences in order; the water reticulation system has to be kept in order; we are to remove the rubbish; we are not allowed to cut down the trees without permission of the Army; and we are not permitted to construct permanent buildings.

**Senator MELZER**—How long have been paying that sort of rent?

**Mrs Reynolds**—We have paid that rent since the inception of the Pony Club, as far as I know.

**Senator MELZER**—What is it?

**Mrs Reynolds**—\$315 per month.

**Senator MELZER**—You have paid that for the last 15 years?

**Mrs Reynolds**—I would not say that would be the amount. That amount, so far as I know, would have been paid over the past 3 years.

**Senator MELZER**—What do your members pay as a membership fee?

**Mrs Reynolds**—As a membership fee they pay \$15 per year.

**Senator MELZER**—What sort of membership have you got?

**Mrs Reynolds**—An affiliation with the Pony Club of Victoria membership.

**Senator MELZER**—No, I mean what is the membership of that particular pony club, your establishment?

**Mrs Reynolds**—The membership is for children interested in riding.

**Senator MELZER**—No, I mean in number?

**Mrs Reynolds**—Seventy, an average of 70 per year.

**Senator MELZER**—Do you only have child members? Do you not have adult members?

**Mrs Reynolds**—No, we do not have adult members; we have children from the age of 4 years up to seniors of around the 18 years mark.

**Senator MELZER**—Do you stable horses for them?

**Mrs Reynolds**—Only if they are sick. We have three stables in which we stable sick horses.

**Senator MELZER**—How many horses do you run yourselves?

**Mrs Reynolds**—Myself or the Pony Club?

**Senator MELZER**—Well, there are horses on it, do they belong to—

**Mrs Reynolds**—Approximately seventy.

**Senator MELZER**—Are they there all the time?

**Mrs Reynolds**—Yes, they are agisted in all the paddocks.

**Senator MELZER**—Well, they do belong to the members?

**Mrs Reynolds**—Yes.

**Senator MELZER**—Well, that is what I asked you. Does that \$15 a year membership cover those horses too?

**Mrs Reynolds**—No, it does not cover the horses. The membership for the horses is approximately \$8 per week per member.

**Senator MELZER**—For 70 horses?

**Mrs Reynolds**—Yes.

**Mr BONNETT**—Just a check question, Mr Chairman. Mrs Reynolds, did you say for the lease you pay \$315 a month?

**Mrs Reynolds**—That is correct. To the Department of the Interior.

**Mr BONNETT**—Thank you, Mrs Reynolds.

**Mr GARRICK**—Mrs Reynolds, what is your function within the Lower Plenty Pony Club? Do you have any office in the Club?

**Mrs Reynolds**—I do have an office. I was previously treasurer, I am now social secretary of the Lower Plenty Pony Club.

**CHAIRMAN**—The amount of rental that you pay a month is \$315, I think you said. I have been doing some arithmetic here and my arithmetic is always suspect. You tell me that you have 70 members who pay \$15 a year in

fees and my arithmetic makes that about \$1,050 a year. Your rental works out to something like \$4,000 a year.

**Mrs Reynolds**—The rental is paid by the money received for the agistment of the horses—approximately 70 horses for \$8 per week each.

**CHAIRMAN**—That is a bit better; that works out to about, say, \$28,000 a year.

**Mrs Reynolds**—We employ a full time manager. His wages are around \$160 a week.

**CHAIRMAN**—I thought my arithmetic was up the spout, but it seems it has worked out all right. Thank you very much, Mrs Reynolds, you seem to have satisfied the Committee and we thank you for coming before it.

Mr Donald James Stevens, Director, Australian Radiation Laboratory, Australian Department of Health, and

Mr David George Dunlop, First Assistant Director-General, Australian Department of Health were recalled and further examined.

**CHAIRMAN**—Gentlemen, you have heard all of the evidence submitted by all witnesses since giving your own. There are undoubtedly questions raised in that evidence and the opportunity now exists for you to answer any questions or to elaborate on any matter. Would you like to take the floor, Mr Stevens?

**Mr Stevens**—Yes, Mr Chairman. It would be my intention to be brief, to indicate a couple of areas in which observations might be made. Firstly, I would like to make it quite clear from a radiation physicist's point of view, and I think this would be supported by other people in the area, that whether one ingests radioactive material or whether one is subject to exposure to ionising radiation from an external source—and I refer particularly to a comment made by Mr Kelly representing the Yallambie Progress Association who made some comment about watches vis a vis intake of material; I know he spoke about thyroids and gonads—fundamentally and basically from a radiation point of view one does not talk in terms of intake. One talks in terms of radiation dose. Now there has been mention made by me and in the documents which will be before you, in some of the appendices, of maximum permissible concentrations of various radioactive materials in air and water. I bend, sir, to the fact that you hope shortly to

to take out a degree in Physics. We are dealing with those derived factors, but the derivation is from radiation dose. You start with the dose, not I but the International Commission on Radiological Protection, starts and says: 'We lay down a certain dose'. And if that certain intake occurs continuously over 40 hours or 168 hours of drinking water and so on, you arrive at a certain dose. So one has to be careful, as I tried to explain the other day, that while one talks about radiation and radioactivity, dose is the thing that matters in that area. With regard to a submission made by Mr O'Connor, I thank him for his comments of co-operation by the laboratory. He did come to the laboratory and I think he stayed longer than he intended to. He stayed and went round the laboratory, including all the areas that you saw yesterday. We have had a brief discussion, just after lunch, with Mr Robotham who prepared Appendix 3 to the report. I think there is no disagreement that in addition to an amendment to section 6.4.1.2 referred to in the amendments which were put out under the heading of Preston Institute of Technology—this amendment due to the thousand time factor which was a factor which I drew among other minor ones to Mr O'Connor's attention by telephone earlier this week, prior to the hearing—there is a consequential change still to be made in paragraph 6.4.1.3. It is over the page from where it starts in Appendix 3 and is in the second line. Instead of reading 0.01 cases in a Yallambie population of 1,000 it should be divided by 1,000 and that would become 0.00001 of a case. I would not wish to take the time of the Committee by involving myself in a debate in the matter of whether it was appropriate in Appendix 3, which has been referred to and I understood read into the evidence, to make an assumption of 1,000 persons exposed to these doses in various places throughout that appendix. That is a matter of judgment. I would recall to you that I was making the point yesterday that the dose limit which the Department of Health imposed on itself is at the boundary of this site. I think this tends to be an overestimate, but we are only talking of a small factor.

I noted that in paragraph 3.7.1, when Mr O'Connor amended 10,000 on the basis of his reference to Appendix 3, S.6.4, instead of making it 10 which I would have thought as a scientist would be the correct amendment, instead of just a 10 he puts in a range of 10 to 100.

Referring to the report, again I appreciate and stress that this has been prepared very much to our consideration. We greatly appreciate it, and the Chairman has expressed the Committee's appreciation. There are one or two points in the report that I would like to make an observation about, and if you wish me to follow them up I am prepared to. In section 1.1 of the report of the Preston Institute of Technology environmental impact statement, paragraph 2 states:

It appears that significant detrimental effects would follow construction of the proposed premises at Yallambie, due mainly to exposure of residents to low levels of radiation, of comparable significance to fall-out from atomic weapons testing in the Pacific Ocean.

There are several points that I am not willing to accept. I would ask the Committee to read 1.1 and that particular point I made having regard for the statements which appear in Appendix 3, prepared by a competent radiation health physicist. Appendix 3 makes the following conclusion, paragraph 4.6:

Under normal working conditions there should be no significant risk to people living near the proposed laboratory from the release of radioactive materials.

You would find a number of this type of conclusions. There is another in paragraph 3.8 along these lines. I am only just making a contrast between what has appeared as 'significant detrimental effects' and those conclusions which are provided elsewhere. Perhaps I am more concerned about the phrase in the report: 'Exposure of residents to levels of radiation . . . comparable in significance to fall-out from atomic weapons tests'. I am not prepared to accept that one can make any comparability to the significance of fall-out from nuclear weapons tests in the Pacific, which is an uncontrolled source of ionizing radiation. I would draw the attention of the Committee to page 12 of the report, where a statement is given which as I understand it is a statement of what is to an extent Australian Government policy. It says:

The Australian Government has, to date, strongly supported the view that any avoidable exposure to low levels of ionizing radiation, even though a minute fraction of natural background radiation, constitutes a significant hazard to public health and should be prevented by all means available.

It is not my responsibility, of course, to defend the Australian Government's policy in these matters. I would say that that is, as far as I know it, a completely incorrect statement of Australian Government policy because if

you take it, it could be read then, contrary-wise, that the Australian Government does not support the view that any unavoidable exposure to low levels of radiation constitutes a significant hazard. My experience in this area brings me to have some knowledge of the views of the Australian Government in this. I believe, in short, that paragraph (iii) on page 12 might be, by a very quick modification, that the Australian Government has, to date, strongly supported the view that any radiation exposure without benefit is of significance, is of concern, to the Australian Government because it may involve a lack of balance between benefit and risk. I think it is probably undesirable that I should go on and point up any or many other points on which I might like to comment. I am grateful to Mr O'Connor, as I have said, for his taking into account what I described when I rang him earlier this week when I had had time to look at this report, and as the Department of Housing and Construction did when they suggested to me also by telephone that there were some unfortunate errors.

**CHAIRMAN**—I think perhaps we may now question you again. The Committee has heard a good deal of evidence and as you will appreciate, in any inquiry there comes a time when replies, questions, evidence begin to be repetitive and repetitive evidence only consumes time. It does not help the Committee and the Committee is only here to inform itself. So, Mr Stevens, with your concurrence, I will ask Senator Melzer if she has any questions for you.

**Senator MELZER**—Only 2 questions, and I feel I am asking you to reiterate them, but I will. One is for your reply to the allegation that exposure of residents to low levels of radiation is of comparable significance to fallout from atomic weapons testing in the Pacific Ocean. I want your comment on that and if it is so, then what exactly is its effect?

**Mr Stevens**—Mr Chairman and Senator Melzer, I think I indicated yesterday that I have a philosophical problem here and it is not only just because I am being obtuse about this, but I would not put it in the same ball park, to use a colloquialism. I would not compare with fallout the radiation doses which arise for any group of people from an activity, whether it be from operation in a hospital—I am talking about members of the public now—members of the public who are

university students in an arts course or an economics course who are not involved with use of ionising radiation because they have their lunch and move around a university campus, and people who might live in close proximity to other sources of ionising radiation. These are controlled sources; where there are laid-down disciplines, where there are responsible people trying to deal with an operation which has benefits be what it may, including might I add, the Australian Radiation Laboratory. I would not compare those with the exposure of the whole population to the uncontrolled radiation exposure arising from nuclear weapons tests, a situation in that case where, if we want to pick up the point which has been raised or suggested or inferred, the only action available to the Australian Government was to go to the highest court of responsibility—the International Court of Justice. Whereas with regard to controllable sources there is action which is available at the State level which the Department of Health has given an undertaking to comply with. It, the Department, is not going to be in a situation, for reasons which are government policy, of taking out licences. It is going to be in a position to apply those standards not only as they exist now, because we did not, as I recall, specify the date, quite deliberately. We said: 'The Victorian Radioactive Substances Regulations'. But we were not satisfied with that. We are going to go further. That is the point I find myself in difficulty about and it is the matter of—what we might say quite definitely, categorically government policy. This is the matter which is being argued: Benefit versus risk; controllable versus uncontrolled; government action on specifying levels which should be exceeded in the one case and not in the other.

Senator Melzer, as far as I can go, that is the answer that I would give you on that. Could I just say one thing: I am in no dispute—this is a fundamental point with me—with the philosophy and the basis for radiation protection design, in assuming that there is a direct proportionality of dose right down to the lowest levels of dose. I subscribe to this because it is a philosophy with regard to radiation protection of the International Commission of Radiological Protection, and of the Australian National Health and Medical Research Council. Both of those bodies say: 'We believe that this is a conservative approach.' But I am willing, the laboratory is willing and does accept that approach. I have

no option, in fact, because the advice to the National Health and Medical Research Council, to some degree in this area—maybe to a major degree—arises through me or the laboratory, and also I am party to the International Commission recommendations.

**Senator MELZER**—The other question has been raised on the method of metering, and the quality of the metering of radiation from the laboratory, or inside the laboratory.

**Mr Stevens**—The method of measuring the quality?

**Senator MELZER**—The quality and the method of measuring it.

**Mr Stevens**—I have quite categorically stated over my signature—and I have confidence that the Department of Health accepts that, I suppose, since I have signed it as Director of a laboratory of the Department of Health, working in the public health area—that the Department is committed. I have said that the results of the monitoring we will undertake, which are many and varied—except those which relate to staff and personnel, because they are types of medical records which I am not willing to make available—that I am willing to make the results of monitoring available for inspection after appropriate approach. I think one has to be reasonable about this. I hope that the laboratory's work, should it be built on the proposed site, would not be impaired to the extent that every day or every second day someone came in to look at the results. I will go further and say that the laboratory would be pleased to make those results available for inspection, should it be interested, by the Melbourne and Metropolitan Board of Works. The Board might even require us under the waste agreement to do that. We would make them available to the Environmental Protection Authority. We would make them available to the Victorian Department of Public Health for their inspection. Those latter two bodies have scientific people. I think I would be not misrepresenting the situation, if I said to them now: 'Here are some samples'—that is to the State Health Department and the Victorian Environmental Protection Authority—'of effluent. Would you measure these and identify the particular radioactive nuclides'. I think they would have trouble with their present set-up. But I am willing to have their scientists come in and make any assessment that they wish to make, and are able to make, of our own measurement methods. Of

course, if they want to measure the levels of radiation beyond our boundary fence, if they want to measure the concentrations of air beyond our boundary fence, they can do what sampling they like.

**Mr GARRICK**—I have no questions. Mr Stevens satisfied my question yesterday. I do not think I could enlarge upon it.

**CHAIRMAN**—My own attitude towards inquiries, I suppose, is to establish the bona fides of those who give evidence—their qualifications. I realise your qualifications must be high to be the Director of an Australian Radiation Laboratory. In your recent address to us you mentioned, page 12 of Mr O'Connor's report, the paragraph about the Australian Government. It prompts a question to my mind: Why were you so certain as to the attitude of the Australian Government on this matter? Have you been involved at a greater level than the Director of the Australian Radiation Laboratory?

**Mr Stevens**—One becomes reluctant to give this sort of comment which you invite me to make. In terms of absolute academic qualifications my academic qualifications are: A graduate in physics and mathematics as major subjects, for reasons which do not matter at this time. I would think one would have to say that since then my qualifications are those acquired by experience in the field of radiological physics in general, but particularly in the field of radiation protection. You inquire specifically what is my relationship in the Australian Government overall area here. Primarily, of course, I am an officer of the Australian Department of Health and therefore I am responsible to the Director-General of Health and through him to the Minister for Health. I suppose it is fair comment to say that I am the Department's adviser in matters of ionising radiation. I have already indicated that we do provide advisory services as a matter of intergovernmental arrangement and assistance to the State authorities. Extramurally from the Department, if you like, the Department of Health has been pleased to make me available to the Department of Foreign Affairs to be the Australian representative since 1956 for 22 sessions—all but one, the first—of the United Nations Scientific Committee on the Effects of Atomic Radiation. I have been Chairman of that Committee for 2 sessions of those twenty-two, and Chairman of the physical sub-group dealing with the physical aspects of most of the

others. The Minister for Health of the time approved of my acceptance of 2 invitations extended to me to be on a World Health Organisation Expert Panel on Radiation and, perhaps even more important, to be a member of a Committee of the International Commission on Radiological Protection, to which reference has been made both in my submission and others. I could add—and I say this with some embarrassment—that one finds such members are invited by the International Commission, not because they happen to come from country 'XYZPQR', but because the rules of the Commission are that its members shall be eminent in the field of radiological protection or allied fields, and they go through a whole range of disciplines without regard to country.

More recently, when the Government decided to consider possible action before the International Court of Justice, I was made available to the Solicitor-General within the Attorney-General's Department—if that is the precise description—as a scientific adviser on the matter of preparing the Australian case, the application, and the various submissions, to the International Court of Justice on the matter of Australia versus France in the nuclear weapons test case. It was my privilege to be a member of the 2 Australian delegations as scientific adviser which participated in the first hearing which resulted in an interim injunction in general terms granted by the Court following a hearing in May 1973, and more recently in July 1974 at the second stage of the hearing dealing with the question of jurisdiction and admissibility. I think one could point to other areas. Perhaps this one would be additional since you are looking for this type of thing too. I have been appointed to the Australian Ionising Radiation Advisory Council by the Australian Government which is established to advise it on matters of ionising radiation affecting the Australian population. This was appointed as a nucleus last year and there were 3 appointees, one a Dean of Medicine at a university, another a Professor of Biology at another university and myself as the third member. The Government is considering appointing additional members to that nucleus. In terms of radiation safety, some years ago the Minister for Health at the time acceded to a request that I should accept an appointment not as a departmental representative but as a private person, as a member of the Australian Atomic Energy Safety Review Committee to review the safety of the practices of the Australian Atomic

Energy Commission. This is a 3-member Committee; one was another Dean of Medicine at that time of a university in Australia, another was a Director-General of Health of a State Department of Health at that time. That is the situation.

**CHAIRMAN**—Probably in the understatement of the century it would be fair to say that you have had some experience in the field of radiation.

**Mr Stevens**—It is the only thing that makes me old.

**CHAIRMAN**—Mr Stevens, I have only one other question for you and again it is on Mr O'Connor's report. It appears at page 11 paragraph 3.1 (3) and I would be very interested in your comments on the statement that appears there, and I quote:

It appears that despite all shielding, filtering and other measures, there would be some small exposure of nearby Yallambie residents to radiation and radioactive emissions from the proposed Laboratory.

**Mr Stevens**—As a scientist, I could not disagree with that statement. As a person who is interested in the English language, I would be reluctant to apply the qualifying words 'very, very', because I do not like them used as such. But there can be no doubt that no matter what source of ionising radiation there is, unless it is a source which emits such easily absorbed radiation such as alpha rays and beta rays alone, there will be some small emission of radiation beyond the confines of walls or protective shielding. In literal fact, as Mr O'Connor himself—and I think I can almost quote his words—would say, shielding would exponentially reduce the radiation dose through a barrier. Now, an exponential curve is one which comes down and never ever, ever, ever goes to zero. So, yes, there will be a small—and I will permit myself at this stage to say—a very, very small exposure of radiation. I would stress that what we are talking about in terms of very, very small, is, since it has now been read into the evidence, something from Appendix 3, where a comment is made in section 3.2 where reference is made to this one-hundredth factor which relates not to non-occupational exposure as was mentioned in 3.1. More correctly, if you quote reference No. 3 the NHMRC says: 'members of the public', not non-occupationally exposed persons, and one likes to see these quotes right. The next quote is the one which I would like to draw attention to. It is in 3.2. You may recall it because you may have read it in the newspapers and Mr

O'Connor referred to it in the early part of his report, of the criticism of Gofman and Tamplin and I note here the last sentence, which says: 'However, by adopting the figure of one per cent of ICR Recommendations'—and of course NHMRC Recommendations'— . . . ARL are being conservative even by Gofman and Tamplin standards, who are the great critics of the US Atomic Energy Commission situation.'

When we come to emissions—and Senator Jessop was playing with my number of 1/20th and 1/15,000th of concentrations in the holding tanks before they are released—these are fractions of the International Commission's recommendations for drinking water levels for members of the public. Any emissions which go up through the absolute filters—99.97 per cent efficient—and the activated carbon filters are going to be a miniscule amount of the concentrations which the International Commission has recommended for breathing level air for members of the public. Now, once you can get the impression—and I think it was conveyed some time today; I forget who it was, because it has been for you, as well as us, a rather long day, or two days; one tends to forget the source—that a reference was made to the fact of this extraction going on 24 hours a day. No. If there is no radioactive material being dispensed in the radio-pharmaceutical laboratory—and you yourselves saw complete inactivity to a large degree in the radio-pharmaceutical laboratory—then we are not dispensing something. So it is not going on 24 hours a day. I have been trying to be scientifically honest with you; I hope I have answered your question.

**CHAIRMAN**—I am sure you have. Your evidence, along with all others, will be considered by the Committee at a later stage of their deliberations. Before adjourning the hearing *sine die*, because the Shire of Eltham was not represented, there is a letter in the form of a submission. I will ask the secretary to read that letter and it will then be incorporated as part of the evidence.

(The document read as follows)—

Shire of Eltham  
6th May, 1974.

Dear Mr Fenton,

Re: Proposed Australian Radiation Laboratory at Yallambie

I thank you for your letter of 16 April 1974 enclosing various submissions to the Parliamentary Standing Committee on Public Works about the proposed construction of an Australian Radiation Laboratory at Yallambie, Victoria.

Your letter and documents have been considered by the Council and at its meeting on 29 April 1974 some concern was expressed about the proposed laboratory. Some of the main reasons for the concern were:

- (a) The grounds of the Laboratory are to be used to absorb radiation including that from Cobalt 60. The natural drainage from the area is towards the Plenty River and therefore there would be a likelihood of contaminated river water. (The Plenty River forms the boundary between the City of Heidelberg and the Shire of Eltham).
- (b) Certain lead activities are to occur but there are no indications of public protection.
- (c) Mention is made of an 'absolute' filter. It is doubtful whether it is possible to have such a filter.
- (d) No mention could be found of any external radiation monitoring on the outlets from the Laboratory.
- (e) There appears to be no evidence concerning precautions in the case of accidents.
- (f) All wrappings were to be burnt which could lead to an air pollution problem.

Because of its concern the Council resolved that:

- (a) It objects in principle to the establishment of an Australian Radiation Laboratory at Yallambie on the grounds that it is an unsuitable establishment to be next to residential areas.
- (b) A written submission be made to the Parliamentary Standing Committee on Public Works pointing out the apparent lack of control on storm water and air borne pollution.
- (c) The Yallambie Progress Association and the City of Heidelberg and the Shire of Diamond Valley be informed of the Council's action.

I ask you therefore to accept this letter as the Council's submission to the Parliamentary Standing Committee on Public Works.

Yours faithfully,  
(Sgd.) COLIN J. BOCK  
Chief Administrator

**CHAIRMAN**—That letter, of course, cannot be regarded as evidence because we are unable to question the writer. But it will be included with the written evidence and become part of it. We thank you very much for your attendance, gentlemen.

**Mr Stevens**—Yesterday afternoon we promised to make available to the Committee some correspondence which related (to use a broader term) to approvals provided by the Department of Urban and Regional Development and the Department of the Environment and Conservation. These papers have been supplied to the Secretary, Mr Fenton, and with your permission I would just—because of an observation made this morning—refer to the letter received, minuted to us from the Director of Conservation, the Victorian Ministry of Conservation and written to Dr D. F.



McMichael, Secretary, Department of Environment and Conservation, Canberra. May I read this please?

**CHAIRMAN**—Yes, Mr Stevens.

**Mr Stevens**—The letter reads as follows:

Ref. 33-3-21  
1st November, 1973.

Dr D. F. McMichael,  
Secretary,  
Department of the Environment and Conservation,  
P.O. Box 1937,  
Canberra City, A.C.T. 2601.  
Attention: Mr R. G. Calvert, Assistant Secretary

Dear Dr McMichael,

I refer to your letter of 2nd October regarding the proposed accommodation for the Australian Radiation Laboratory and the Australian Dental Standards Laboratory.

**Mr Stevens**—I interpolate, the Australian Dental Standards Laboratory was later withdrawn.

The matter has been discussed with officers from both Laboratories and the impact statements have been considered by the Victorian Department of Health, the Environment Protection Authority and the Melbourne and Metropolitan Board of Works.

The proposal as outlined is quite acceptable. The Melbourne and Metropolitan Board of Works will permit discharge into their sewerage system under certain conditions which have been discussed with appropriate officers of the Radiation and Dental Standards Laboratory who have assured the MMBW that the conditions can be quite easily met.

Yours sincerely,  
R. G. DOWNES  
Director of Conservation

I have read this letter because in some evidence today, I forget from which authority, there was some doubt expressed whether the Victorian Environment Protection Authority was aware of the situation. We did not deal directly with it. I have the letter on file from one Department to another.

**CHAIRMAN**—The Secretary assures me that he has a copy of that correspondence and it is on file. May I thank you for the way in which you have presented your evidence and for the way in which your brief has been prepared and this public hearing now stands adjourned, *sine die*.

The Committee adjourned