

The Institution of Engineers, Australia: Sydney Division
Engineering Heritage Committee
ORAL HISTORY PROGRAM

INTERVIEWEE: **Peter ALFREDSON**

TAPE NUMBERS: IEA SYD: FH21,
FH22 & FH23

INTERVIEWER: **Frank HEIMANS**

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NUMBER OF TAPES: 3

RESTRICTIONS ON USE: Nil.

LOG PREPARATION: This log was prepared using a Sony TCM-5000 EV cassette recorder

INTERVIEW TAPE LOG

Tape: IEA SYD: FH21, Side A.

TAPE COUNTER	SUBJECT	NAMES & KEYWORDS
001	Start of Tape IEA:SYD:FH21 Side A	
007	States his date of birth (Childers, Q. 16 March 1938). Has two younger twin brothers and his parents then owned a grocery business. Remembers Childers as a fine place to grow up in - sugar was the main industry and the sugar train went past their front fence. Remembers that sugar cane was then still cut by hand and the economy of the town fluctuated according to the abundance of cane during the crushing season.	Childers, Queensland 16 March 1938

43	<p>Recounts that neither his father or mother were educated beyond 14 years- his mother was part of a farming family of six and his father started work at 14 in a grocery shop at Cooran, where his father was a Stationmaster. He worked at other grocery stores in Southern Queensland until he started his own business at Childers.</p>	<p>Cooran</p> <p>Maroochydore</p>
63	<p>Mentions that his family was a religious family and were members of the Uniting Church. He attended the local primary school, followed by Childers State High School until he was accepted at Brisbane Senior State High School after receiving 8 A-Level passes in the Junior High School examination.</p>	<p>Uniting Church</p> <p>Brisbane Senior State High School</p>
100	<p>Says that he completed a Vocational Guidance Test and the results suggested that he would be suitable to become a Chemical Engineer and that is what he decided to do. Received one of two scholarships in Chemical Engineering from the Australian Atomic Energy Commission (AAEC).</p>	<p>Vocational Guidance Test</p> <p>Australian Atomic Energy Commission.</p>
120	<p>Entered the University of Queensland in Chemical Engineering, taking subjects such as Chemistry and Geology. Recalls that there were only twelve students that year (of which six students were Colombo Plan students) and three staff. Thinks that his course in life was set early on when he accepted the scholarship, which committed him to five years with AAEC.</p>	<p>Assoc Prof Edmiston</p> <p>Ted White, junior Lecturer</p> <p>Peter Brooks, Lecturer</p>
190	<p>Remembers that the scholarship paid £5 a week and, as he boarded for £4 a week, that left him £1 a week to cover his other expenses. Says that for its day, the scholarship was about as good as one could get.</p>	

208	Confirms that he studied for four years to obtain the Degree of Bachelor of Applied Science in Industrial Chemistry and that the fifth year he received a Bachelor of Engineering in Chemical Engineering with First Class Honours.	
222	Announces that he worked in university vacations and gained work experience with AAEC and others and completed his National Service training. Gives details of his thesis subject (the thickening of sludge).	National Service training
264	Joined the AAEC in 1961, which involved a move to work at Lucas Heights in Sydney. Informs that in the early 1960s, second-generation technology in nuclear science research was already under way.	Lucas Heights
310	Mentions that the main field of research at Lucas Heights at that time was work on gas-cooled reactors, whereas most overseas reactors were water-cooled.	High-temperature gas-cooled advanced reactor systems.
323	Explains that the gases used were carbon dioxide, while others worked on helium systems. Mentions some of the key personnel in charge, or working at AAEC.	Prof Philip Baxter, Professor of Chemical Engineering, UNSW & Chairman of Australian Atomic Energy Commission. Keith Alder, Metallurgical Engineer.
359	Explains the grading and job classification system at AAEC and his own entry into the organisation as Experimental Officer	

389	<p>Recounts a typical day as an Experimental Officer, working on small-scale experimental work, such as setting up facilities to make up nuclear fuel particles and looking at ways of applying impermeable coatings to these particles of Alumina or Beryllium Oxide. Explains that later on, he had staff working on the production of uranium compounds from yellowcake.</p>	<p>Uranium fluorium oxide particles.</p> <p>Beryllium Oxide</p>
427	End of Tape IEA SYD:FH21 Side A	

Tape: IEA SYD: FH21, Side B.

001	Continuation of an interview with Peter Alfredson	
014	<p>Thinks that the expectation during the 1950s and 1960s was that there would be nuclear power reactors built in South Australia, but that this did not happen due to the discovery of natural gas which could be burnt in gas-fired power stations. This became a more attractive economic proposition.</p>	
031	<p>Adds that in the late 1960s a review of where the Australian Atomic Energy Program was headed was held and a decision was made to terminate work on advanced gas reactor systems. Continues that it was then decided to plan for the introduction of water-cooled nuclear reactors in Australia for the 1970s. Tenders were called for the construction of such a reactor at Jervis Bay. Mentions that he was one of the people who were called in to assess tenders from a technical viewpoint. Concludes that the ultimate decision was made not to proceed with that reactor because of costs, infrastructure and the time scale needed for other reactors to follow.</p>	<p>Water-cooled reactors</p> <p>Jervis Bay</p>

053	Says that with the discovery of uranium in Australia and the demand for it from overseas, the way it impacted on him was in terms of the development of the uranium mining industry. Became involved in chemical engineering studies on the waste implications of uranium mining on the environment and the process of producing enriched uranium fuels.	Yellowcake Enriched Uranium Hexafluoride Zirconium or stainless steel clad Uranium Dioxide pellets.
072	Is convinced that the storage of air or water-cooled radioactive waste can be performed in a safe manner with enough precautions in place until it could be buried in an inaccessible and irretrievable place in a solid geological formation.	
094	Confirms that general improvements in coal-fired power stations and the huge new coal deposits discovered in Australia meant that the economics of coal-fired power stations killed off any chance of nuclear power stations being built.	
106	Is sceptical of the 'greenhouse effect' warming of the atmosphere. Thinks that if governments were to tax CO2 emissions and if that doubled or trebled the cost of operating conventional coal-fired power stations, this would make a big difference to the potential for nuclear power stations.	Carbon Dioxide greenhouse gases
135	Talks about his research work at AAEC, which involved the coating of nuclear particles by chemical vapour deposition- usually high-density alumina or beryllium oxide. Mentions that when the plans for gas-cooled reactors was shelved, his research was also terminated.	Alumina Beryllium Oxide
162	Talks about having been selected for overseas study as a 'guest scientist' at the Argonne National Laboratory in the US for a two-year posting in the Chemical Engineering Division in 1964.	Argonne National Laboratory, US.

196	Points out that at Argonne, scientists were looking at new ways to reprocess radiated fuels, after reactor use, extracting uranium, plutonium and separating the fission products other than by dissolving the fuels and reacting it with gaseous reactors through a solid vapour process at high temperatures.	Uranium plutonium
220	States that the technology being used at Argonne was relevant to the AAEC programs. Gives the location of the Argonne Laboratory and the number of employees (about 5,000). Confirms that at Argonne, scientists were not involved with research or production of nuclear fuels for military use.	Uranium Hexafluoride Chicago
247	Recalls that he took his wife and two small children to live in America and travelled extensively throughout the US.	
269	Mentions that he returned to Australia in 1966 at the time when research into gas-cooled reactors was terminated and at the start of uranium mining. He was Group Leader in charge of half of the chemical engineering research of how to turn yellowcake into Uranium Dioxide powder for the fabrication of fuel for the then proposed reactor at Jervis Bay. Says that he subsequently became Leader of the Chemical Engineering Section of AAEC (1969-1974).	Uranium Dioxide Jervis Bay
289	Describes his work at AAEC as being related to the nuclear fuel cycle – the fabrication and reprocessing of nuclear fuels. Mentions that the 'Oil Shock' of the early 1970s spurred great interest in the development of alternative fuels.	
360	Clarifies that the Government decided in the late 1970s that research into nuclear fuels should be transferred from AAEC and become part of CSIRO research and his whole Division was then transferred in 1981 to CSIRO.	CSIRO
414	End of Tape IEA SYD:FH21 Side B	

Tape: IEA SYD: FH22, Side A.

002	Continuation of interview with Peter Alfredson	
006	Summarises his career with AAEC from beginning as an Experimental Officer to becoming Head of the Chemical Engineering Section and leading to becoming Chief of the Chemical Technology Division in 1978. Talks about the direction that the AAEC was headed during the 1970s.	
065	Mentions that in the late 1970s when Ranger and the Nabarlek plants were under way, the AAEC had some joint projects with the operators of those mines.	Ranger Uranium Mines Nabarlek Uranium Mine
081	Recalls a sense of disappointment when staff realised that the nuclear reactor program was to be scrapped. Recalls that he was happy to be transferred to CSIRO because new opportunities for research would arise.	Radio Isotopes for medical use
101	Remembers that Prof Butler sought to broaden AAEC's activities into non-nuclear fields: solar energy and hydrogen fuel projects and research activities on lead, copper and coal mining.	Prof Stewart Butler, Director of AAEC
130	Mentions some of the people who encouraged him at AAEC and from whom he learned a great deal.	Dr Bob Cairns, Head of Chemical Engineering Section, AAEC, 1960s Dr Bob Smith, Chief of Materials Division AAEC. Dr Terry Walker, Deputy Director and Director of Research Establishment, AAEC, 1980s and 1990s.

153	Discusses the subject of his thesis for his PhD in Chemical Engineering.	Pulsed Fluoridation
173	Believes that he may not be the first PhD graduate that Childers has produced as his brother got his first. Thinks that Childers now has 3 PhD's.	
183	Mentions that after the changeover to CSIRO, he continued working at the Lucas Heights Laboratories. Identified areas of research that added to and complimented existing CSIRO research, particularly energy research related to liquid fuels. Looked at ways to produce synthetic liquid fuels from coal, oil shale and solar energy research.	Synthetic liquid fuels Oil shale
236	Concedes that there was a loss of morale among some scientists when they discovered that their research on nuclear power generation was no longer useful because of changes in Government policy, but that others embraced the concept of working on other research projects with CSIRO.	
270	Predicts that it is now unlikely that Australia will ever have nuclear power stations. Thinks that this could only occur if the 'Greenhouse Effect' would become a reality and penalties associated with Carbon Dioxide emissions were to be so great that prospects for competing technologies like nuclear or solar might have a major impact on power generation. Thinks that the costs of power generation in Australia would have to treble for this to happen.	
286	Does not believe that informed decision-makers were influenced away from nuclear power generation by events such as Chernobyl and Three Mile Island in the Eastern USA.	Chernobyl Three Mile Island

300	Remembers responding to and rebutting arguments of anti-uranium mine protesters of the 1970s and 80s whose motivation, he believes was based more on emotion than on facts.	Uranium mine protests
340	States that although the nuclear accident at Three Mile Island destroyed the reactor within the contained building, no evidence exists that any single person was harmed in the surrounding area.	Three Mile Island accident
360	Recalls that after the changeover to CSIRO he set up a new research program which included the production of synthetic transport fuels from oil shale and coal and included environmental research related to air and water pollution and solar-related research.	Process Technology at North Ryde Synthetic transport fuels Oil shale Solar research
414	End of Tape IEA SYD:FH22 Side A	

Tape: IEA SYD: FH22, Side B.

001	Continuation of interview with Peter Alfredson	
003	Says that regrettably, no one was interested in financially supporting solar energy research in the 1980s, so that within a few years, that research was terminated. Adds that CSIRO could not justify any research that was not going to pay dividends in the foreseeable future, no matter how attractive that research might seem to be.	Solar Energy research.
066	Is sure that the CSIRO is now expanding their research into alternative energy areas such as solar and wind energy.	Solar and wind energy

071	Gives a definition of 'ultraclean' coal as containing only half of one percent of mineral matter as a possible replacement for petroleum fuels if costs of those fuels were to rise, as was forecast in the 1970s and 1980s. Adds that because of the relatively high cost of producing fuels from ultraclean coal through chemical leaching processes, this policy does not presently make economic sense, due to low world oil prices.	Ultraclean coal
108	Confirms that the research on ultraclean coal fuels is still being pursued because some people believe that in the long term, low oil prices cannot be sustained. Also states that there is a \$100 million fuel plant being built in Queensland to produce shale oils for transport and that this initiative is through private investment.	
131	Makes it known that Queensland has very large oil shale reserves and that it is ultimately a question of what the competition offers and what is available. Says that as more oil is discovered each year, companies will not invest funds in non-fossil fuels because they will not get a return for perhaps 100 years.	Oil shale reserves
180	Talks about research that has produced such inventions as photovoltaic arrays, powering telephones in the outback which are much more economical than running diesel engines. Sees the only way of changing mankind's dependence on fossil fuels as legislation by politicians against it.	Phot-voltaic arrays
211	Lists the projects that he was involved in at CSIRO as Chief of the Division of Energy Chemistry between 1981 and 1990. They included the oil shale project, with a database on Australian oil shale properties, used by the companies going ahead with oil shale development.	

232	Accumulated the first comprehensive data on the emission of trace elements from coal combustion and carried out research on Sydney smog formation and pollution.	Cadmium Mercury Lead
260	Thinks that the work done by CSIRO on oil shale was the most exciting.	
271	Talks about having been made a member of a number of advisory committees, including being Chairman of the Visiting Committee for the School of Chemical Engineering and Industrial Chemistry at UNSW, a member of the Prime Minister's Ecologically Sustainable Development Group on Energy Production, a member of a Research Advisory Committee for the NSW Office of Energy and for Pacific Power.	Prime Minister's Ecologically Sustainable Development Group on Energy Production.
290	Talks about DITAC (Department of Industry, Technology, and Commerce) who were funding research projects proposed for industry in an advanced stage of development. Mentions a Laser Photochemistry project put forward by UNSW which proposed using specific wavelength lasers to make chemical reactions take place in a selective way to apply coatings to materials, using lasers. Says that he was an adviser to DITAC on these proposed research projects. Adds that the DITAC projects were not as successful as people had hoped and that at the end of 2-3 years, it folded. Expands on the laser-coating proposal and why it failed to get off the ground.	DITAC Laser Photochemistry project
375	Explains that when, in 1990 the Division of Fuel Technology at Lucas Heights and the Division of Coal Technology at North Ryde were combined within CSIRO, he became the Chief of the new Division of Coal and Energy Technology., with responsibility for a staff of 90 at Lucas Heights and 140 at North Ryde.	

404	Mentions that the scope of the new Division covered six areas, including Coal Preparation and Quality, Coal Utilisation (particularly in Power Generation), Oil Shale, Natural Gas Conversion to Liquid Fuels, Environmental Analytical Chemistry and Environmental Protection.	
425	End of Tape IEA SYD:FH25 Side B	

Tape: IEA SYD: FH23, Side A.

001	Continuation of interview with Peter Alfredson	
008	Gives some details of his role as Chief, Division of Coal and Energy Technology. Adds that Technology Transfer and Utilisation became a bigger part of his 'empire'.	CSIRO Division of Coal, Energy and Technology.
026	Retired from CSIRO in 1994 at the age of 56 at the top of his career because he admired the fact that his father had retired at 53, young enough to be able to do things that he had always wanted to do.	
040	Relates that since his retirement, he has carried out consulting work for a number of cooperative research centres. Was Founding Interim Executive Director of the Cooperative Research Centre for Coal Utilisation in 1995 and gives details of some of his other activities since retirement, including private consultancy work and taking part in reviews. Travelled overseas in 1995 and 1997 and around Australia	Dept of Industry, Science and Resources Cooperative Research Centre for Coal Utilisation
076	Plays tennis, walks regularly and reads novels and non-fiction books.	

082	Gives a brief history of his personal life - meeting his wife (also from Childers), courtship, marriage, and having 3 children (2 boys, one girl). Explains his children's professions: David, the eldest son at 37 is a Microbiologist completing his PhD, the second son is a Civil Engineer with Maroochy Shire Council and his daughter, 30 lives in Sydney and is having her family. He presently has five grandchildren.	
111	Says that he always enjoyed his working life, with some of the highlights of his career having been the two years spent at Argonne Laboratories and the period at CSIRO.	
127	Mentions three people who influenced him in his career and gave him opportunities to carry out jobs of responsibility.	Dr Bob Cairns Dr Bob Smith Ivan Newnham, CSIRO
145	Enjoyed working on the establishment of the Cooperative Research Centre for Black Coal Utilisation which was six intensive months of work and thinks that the initial period at CSIRO setting up new research projects was very effective. Adds that setting up the oil shale project for the oil company was another achievement.	Cooperative Research Centre for Black Coal Utilisation
172	Thinks that his greatest disappointment would have been working at AAEC when research into the use of nuclear energy was terminated. Says that he doesn't agonise over things he could not possibly change.	

201	Is unwilling to speculate on what Australia's future energy needs might be. Thinks that the world is changing too fast to predict what might happen. Refers back to the introduction of computers and their phenomenal advance. Thinks that it is easier to predict small incremental improvements in technology rather than areas of radical change. Says that in coal-fired power stations there are a number of changes under way to improve efficiency and reduce the amount of Carbon Dioxide emissions. Confirms that he would be very surprised if at the end of the 21 st century, all energy would be supplied from renewable resources.	
245	Does not think that the Greenhouse Effect is going to be as substantial as some people estimate. Believes that the earth can cope with the changes, as it would still be within the natural processes of past ages.	Greenhouse Effect.
264	Is not concerned with the gradual deterioration of air and water quality because he believes that if one is prepared to pay for it, or legislate for it, technology can give you what you want. Thinks that the smog problem in Sydney can be fixed by banning motor vehicles, and if this is not done that would be a way of saying that people would put up with pollution. Explains that the general population would have to make these choices and that the effects on the environment are determined by what we do as individuals.	
338	Is not concerned about the depletion of natural resources as there are more resources yet to be found and in the case of some costly resources, that these could substituted by lower grades or alternatives.	
358	Thinks that the food supply and resources problem is potentially a greater one than finding technological solutions to environmental problems.	

388	Concedes that in the short term, environmental problems will get worse, but that the means exist to improve them if the will is there among the people to pay for the costs involved or to change lifestyle.	
430	End of Tape IEA:FH23 Side A	

Tape: IEA SYD: FH23, Side B.

001	Continuation of interview with Peter Alfredson.	
005	Stresses that all changes in technology can be developed but that these have to be paid for and that the big challenge for governments is to sell that message. Gives the example of waste disposal in Sydney and the way in which individuals must change their habits to accommodate to new waste disposal requirements.	
049	Thinks it interesting that two of his children have moved out of Sydney to other, less populated areas. Proposes that there are some disadvantages in living in large metropolitan areas, such as housing costs and increased traffic density.	
097	Is optimistic about the future life and prospects of his grandchildren.	
125	End of interview with Peter Alfredson and end of Tape IEA SYD:FH 23 Side B	