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have become accustomed to nuclear research installations over the last 20 years.

There was, in the past, some public resistance to the construction of nuclear research centres, but this was overcome by carrying out the following programme before the site was purchased.

At a castle near Paris, a three-day course was given for the local mayor, chief medical officer, Rotary Club leaders, university leaders, representatives of farmers' unions and other prominent citizens. An important inclusion was leading newspapermen.

All expenses, including transport to Paris, were paid by the CEA. A typical programme for such a course was:

First day: Morning: lecture and film on basic principles of nuclear energy.
Afternoon: lectures and films (or slides) on radioactivity, waste disposal, and the programme of the CEA.

Second day: Morning: lectures on uranium, enrichment, and military applications.
Afternoon: visit to Saclay or Fontenay Research Centre.

Third Day: Morning: lecture on reactor types.
Afternoon: discussions and questions.

Films were shown in the evenings and sometimes there were informal afterdinner talks on nuclear matters.

The total number of participants was usually 40-45.

One or two months after this course, a "Nuclear Science Week" was organised in the town from which the delegates came. The programmes here consisted mainly of a series of public lectures and film shows, and also an exhibition. The CEA has three exhibitions of varying sizes that can be erected at any place they may be required. There is a fourth, small exhibit, mounted in a pantechnicon trailer which is permanently on the move.

Initially, the above campaigns were carried out only in towns where nuclear centres were being built, but when that had been completed, it was decided to start carrying them out in other centres as well. About two of the complete programmes are done each year, and major cities in 17 of the 21 French provinces have already been covered. It is not intended to do anything of this sort in Paris, but three-day courses are occasionally given for journalists.

Public information is given out by the CEA mainly through the medium of the press.

"Hot" news is released by means of short bulletins given to Agence France Press, who distribute it in the normal way to all French papers. In addition, about 20 copies are distributed to important Paris newspapers and leading scientific journals.

There is also a monthly press newsletter, called "Notes d' Information", of which 11 000 copies are distributed. It was of great interest to note that of these, 6000 copies are distributed within the CEA! Every staff member who has a degree or is in a supervisory capacity gets a copy of the newsletter.

The other 5000 are distributed to newspapers, journals, embassies, etc. - in fact a normal press distribution list.

This newsletter is done by one man, who has other responsibilities as well.

There is a correspondent in each division of the CEA, who sends information to the editor who rewrites the contribution and checks it with the originator. The item must then be approved by Mr. Chelet, by the head of the originator's division and then a member of CEA management before being released.

Mr. Chelet considers that personal contacts with newspapermen are most important. He himself interviews between 3 and 10 science correspondents per week, taking them to lunch and having general discussions with them.

In addition to the press work, the CEA also has a large library of films available on loan. These films total approximately 3000 screenings per year.

An interesting comment by Mr. Chelet was the prediction that the strong resistance to nuclear power being experienced in the U.S.A. would begin to reach Europe in the not-too-distant future. Evidence that Mr. Chelet may be right was subsequently seen by the author in Britain. (See Section 9.3 of this Appendix.)

6. OFFICE OF THE SCIENTIFIC ATTACHÉ, S.A. EMBASSY, PARIS (27th April, 1970)

Mr. O.A. van der Westhuysen - Scientific Attaché.

Methods used for arrangements for visits to Europe by AEB staff were discussed. Mr. Van der Westhuysen thought that the AEB practice of writing separately to institutes to be visited was unnecessary and in fact made his office's task of co-ordinating the visits more difficult. He would prefer it if all visit arrangements, as well as inter-country travel arrangements and hotel bookings, were left to the Scientific Offices concerned. He stressed that the

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Scientific Offices were not offices of the CSIR but constituted a service provided to the embassies for the convenience of all South African scientists.

An example of the confusion that could arise was the fact that the author's appointment with Mr. Chelet of the CEA was made for 4 p.m., whereas he had to leave Paris at 4.30 to catch the flight to London. A last-minute change in the appointment was necessary.

7. OFFICE OF THE SCIENTIFIC COUNSELLOR, S.A. EMBASSY, LONDON (28th April, 1970)

Mr. C.G. Hide - Scientific Counsellor.

Mr. Hide, in common with his counterparts in Cologne and Paris, expressed the opinion that these offices should make all arrangements for visits to Europe. One reason for this was that the European system of public holidays was complex, sometimes being specific to individual provinces or even cities.

It was an unnecessary complication for the AEB to write separately to institutes. If this was necessary for personal or technical reasons, then such letters should not also try to make detailed arrangements for the visit.

This would not apply to visits of, e.g. the President of the Board, where such arrangements would obviously be made at high level. However, it was imperative that the scientific offices be informed of such visits and be given a copy of the itinerary.

It would be useful if, for each visitor, the office could be provided with several copies of a separate sheet giving full information about the visitor, e.g. his scientific background, position, subjects to be discussed, foreign languages spoken (essential), etc.

8. UNITED KINGDOM ATOMIC ENERGY AUTHORITY, LONDON (29th April, 1970)

Mr. Eric Underwood - Director of Public Relations.
Mr. Truscott - Chief Press Officer.

In Britain, the generating authority is the Central Electricity Generating Board, a public utility coming under the Ministry of Technology. The UKAEA is the research body under the same Ministry, and the licensing authority is the Inspectorate of Nuclear Installations (INI), which is a Civil Service Department of the Ministry.

Any public relations work with regard to nuclear power is entirely the responsibility of the CEGB.

In the past, objections to nuclear power stations have been predominantly amenity objections, i.e. objections against any sort of power station which would spoil the appearance of the countryside. Such objections usually came from the landed gentry, whereas other sectors of the population welcomed the employment opportunities offered. Much of the information obtained from Mr. Underwood in this regard was discussed in more detail with the CEGB, and is reported in Section 9.

Most of the Authority's publicity is through the medium of the press. Information is given to the press by means of press releases, and also a Scientific and Technical News Service - the latter only for the technical press. Both are distributed internationally.

A press conference is held each year when the annual report is released, and special conferences are held when necessary.

All press enquiries are handled by the three Press Officers. If particular interest from the press in a certain subject is expected, then the Press Officers, in advance, compile a list of awkward questions which may be asked and get approved answers from experts. This is a "press brief" and is used to answer any press enquiries.

Many of these press briefs are kept on permanent file for reference.

The importance of good, close contact with the press was stressed. All the press officers are on very good terms with the science correspondents of the newspapers. Special visits for groups of journalists to research establishments are arranged.

The UKAEA has a library of over 60 films available on loan, and showings average about 3500 a year.

9. CENTRAL ELECTRICITY GENERATING BOARD, LONDON (30th April, 1970)

9.1 Mr. B.J. Wilson - Second Secretary (Administration)

The CEGB's Public Relations Department was closed down about three years ago, and the public relations activities are now limited to a press office and a film library.

The film library has about 50 films, averaging about 6000 showings a year. Films could be sent to South Africa on loan, and copies could, if required, be purchased for about £30 or £40.

A number of glossy brochures are also available for persons requesting them, and for distribution at exhibitions.

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Each Region of the CEGB still has a public relations department, and any public relations work required in connection with the introduction of nuclear power is done by the Regions. It is considered particularly important to establish good relations with the local authority and community leaders. It is also considered important that a very senior official of the CEGB, the Chairman if possible, address local councils no matter how small they are.

9.2 Mr. C.W. Walker - Senior Inspector, Nuclear Health and Safety Department

The activities of this department affect the public in three ways:

(i) Emergency schemes

At each nuclear power station, there is a predetermined emergency plan. Each station has an Emergency Control Centre and under emergency conditions the Emergency Controller, who is usually the Station Manager, takes charge.

He has an Emergency Control Team consisting of a health physicist, reactor physicist and similar persons, who are on permanent call in turns. The usual site emergency teams are made up of shiftmen.

In the event of off-site action being required, e.g. the distribution of potassium iodide pills or the evacuation of residents, such action would be the responsibility of the local police under the direction of the Emergency Controller.

(ii) Local liaison committees

These committees are set up at each nuclear power station in the early stages of its construction, for the purpose of keeping the local populace informed. The chairman of the Committee is usually the Station Manager, and the members are made up of leaders of the community. The Committee may meet formally only about once a year, but is a valuable medium for keeping the community informed and making it feel that its opinions are respected. The CEGB considers it important that no small community or section of a community should feel that it is being overridden by a larger community or by authority.

(iii) Siting criteria

Siting criteria for nuclear power stations were originally laid down by a Reactor Safety Committee of the then Ministry of Power, but the Committee no longer exists. Responsibility for maintaining these criteria is vested in the local authority.

The following are the criteria for Magnox reactors with steel containment vessels:

The population within $\frac{1}{3}$ mile of the reactor centre shall be "a few". (This is in fact usually within the perimeter fence of the station.)

The population within any 10^{o} segment, and within $\frac{1}{2}$ mile of the reactor centre, shall not exceed 500; within 5 miles shall not exceed 10000, and within 10 miles shall not exceed 100000. For the entire 360^{o}, the above permissible figures are multiplied by 6 to establish the population limits.

All nuclear power stations now under construction or planned have AGR reactors with stressed concrete retaining vessels. These are considered safer than steel vessels because:

(i) The cables can be inspected and, if necessary, replaced.
(ii) If a steel vessel failed under excess pressure, the rupture would remain open, whereas a stressed concrete vessel would tend to close again when the pressure had been released.

AGR stations are therefore being sited closer to urban areas than were Magnox stations, and the relevant siting criteria are as follows:

In a 30^{o} segment, and within a radius of $\frac{1}{2}$ mile of the reactor centre, "only isolated dwellings". (Again, this usually falls within the perimeter fence.)

From $\frac{1}{3}$ to $\frac{2}{3}$ mile, "a few". (Although not stated in the regulation, the criterion here was that all people in the 30^{o} segment, within $\frac{2}{3}$ mile of the reactor, could be given potassium iodide pills and evacuated within two hours.)

From $\frac{2}{3}$ to 2 miles "sufficiently small so that it is possible to readily extend emergency measures to the 2-mile radius". (It will be noted that the new criteria are not as specific as the old.)

Regulations for the control of population build-up are as follows:

(i) Magnox reactors

In a zone 0-1 mile from the reactor centre, all housing applications shall be submitted to the Ministry of Housing and Local Government, who shall vet the application in consultation with the Inspectorate of Nuclear Installations of the Ministry of Technology.

In a zone 1-2 miles from the reactor centre, any appli-

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cation involving a population increase of more than 50 persons must be submitted to the Ministry.

In a zone 2-5 miles from the reactor centre, any application involving a population increase of more than 500 shall be submitted to the Ministry.

(ii) AGR reactors

In a zone 0-$\frac{2}{3}$ mile from the reactor centre, all applications shall be submitted to the Ministry.

In a zone $\frac{2}{3}$-2 miles from the reactor centre, any application involving a population increase of more than 50 shall be submitted to the Ministry. There is no restriction on industrial development but the Ministry of Housing and Local Government must be informed of each application.

9.3 Mr. P. Williamson - Planning Department

Mr. Williamson, who is in charge of planning for the regions of Northern England and Wales, provided the following information.

By the time the AGR programme started, the CEGB already had considerable experience in the public relations aspects of nuclear power. Siting of Magnox stations had been preceded by campaigns which included the staging of exhibitions, public film shows and press campaigns. Community leaders were informed and consulted, taken on visits to existing power stations and generally made to feel "in".

In cases where the public resistance was a little higher, the Minister ordered public enquiries, although there was no statutory obligation for him to do so. At these enquiries, the chair is taken by an inspector from the Ministry of Technology, although the making of all the arrangements is the responsibility of the CEGB. The hearings are held in public and any organisation or individual can state their case. The CEGB and some other organisations usually engage an advocate to put their case. Witnesses can be called, by subpoena if necessary, and petitioners and witnesses can be cross-examined.

The inspector submits a report and his recommendations to the Minister, who then makes his decision - e.g. as to whether a licence should be granted for the proposed station.

When the AGR programme was started, public resistance was expected because of the change in the siting policy. This did not apply to the first three AGR's which were "B" stations, i.e. built on existing Magnox sites. Hartlepool and Heysham stations were sited under the new criteria, and public relations programmes were carried out in these towns as described earlier. No objections from the public were received in the case of Hartlepool, only one for Heysham, and there were some half-dozen objections from organisations who were seeking re-assurance rather than making firm objections. All objections were withdrawn when the required assurances were given. Licences were granted for these stations without public enquiries being held.

Applications were recently made for two further stations, namely Connah's Quay in Wales, and Stourport in Worcestershire. Both are sited under the new criteria.

Many objections have been received. For example, in the case of Stourport, 100 objections have been received including about 6 from local authorities, 80 from individuals, a 2000-signature petition from the residents of Stourport and a 1000-signature petition from the residents of Worcester.

In both cases, objections have come also from the County Councils, classified mainly as:

(i) Amenity objections, i.e. unsightliness of the station, particularly the cooling towers and their vapour plumes.

(ii) Limitation of development in the vicinity of the site.

Because the County Councils have objected, the Minister is under statutory obligation to hold a public enquiry. The first of these, for Connah's Quay, will be held in about September.

This experience of the CEGB is an object lession in the extreme importance of getting local authority and local residents to regard nuclear power with favour, since such enquiries cause considerable delays.

Mr. Williamson was of the opinion that the appearance in England of the American book "Perils of the Peaceful Atom" had played a considerable part in stirring up resistance.

Mr. Williamson was also asked whether there was any provision for the compensation of landowners for the fact that development around a nuclear power station was restricted. This depends on whether the owner has made any applications to the local authority in respect of development of the land. In Britain this is done in two stages, the "outline planning" stage and the "detailed planning" stage - approval must be obtained at each stage. If the owner had already received approval at either stage, and the proposed development was then disallowed because of the presence of the power station site, then the owner could institute action for damages against the planning authority who could, in turn, institute action against the CEGB.

This has not yet happened, since the CEGB now ensures

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that there are no planning applications approved in the area of a proposed site. There was one isolated case of an owner who had outline planning approved for a caravan park and had already put up some ablution blocks. However, the site was simply purchased by the CEGB from the owner at an agreed price.

9.4 Mr. P.E. Taylor - Press Officer

When the Public Relations Department of the CEGB was disbanded, the press office was retained. The Press Officer is, however, now directly responsible to the Chairman.

The task of the press office is to disseminate information to the press, answer press queries, and keep the press informed of the happenings at and the policy of the CEGB. The office serves an important function, because the generation of electricity in Britain has many political implications. The main reason for this is that the CEGB is a nationalised industry which is making a profit, and virtually carries the coal industry, which has a strong leftist parliamentary lobby. Nuclear, oil-fired and, in some areas, gas-fired stations are becoming cheaper than coal, so both the CEGB and the Ministry have to tread warily.

Mr. Taylor stressed the great importance of good relations with the press on a personal level. He and his writing staff are all ex-newspapermen and know Fleet Street intimately.

Six press luncheons are given each year. Two are for industrial correspondents, and the hosts are the Chairman, Deputy Chairman, and the Board Member for Operations.

Two are for technical editors, and the hosts are the Chairman, Deputy Chairman and the Board Member for Engineering, or perhaps the Board Member for Research.

Two are for science correspondents, the host is the Board Member for Research, and the luncheon is normally held in conjunction with a visit to one of the CEGB's research centres.

These luncheons are not press conferences and the hosts very often discuss fairly confidential matters with the guests on an "off-the-record" basis, so that the press know the background to the CEGB's operations.

In addition, frequent visits are arranged for the press to power station construction sites or other projects. (The CEGB has approximately 200 operating stations, with 15 under construction.)

Mr. Taylor considers the use of press releases to be a very poor method of releasing information to the press, and the CEGB only uses this method when it wishes to make a formal statement.

If any occurrence or policy matter is to be publicised in the press, a "Press Briefing Note" is prepared, consisting of a list of questions the press is likely to ask. The questions are drawn up by the press office and their answers provided by the appropriate experts. These notes are then kept in the press office ready to answer press queries. These queries come in so frequently, because of the good relations with the press, that it is seldom necessary for the press office to take the initiative and "float the story".

A similar list of questions and answers is prepared with each press statement. Fleet Street newspapers will seldom use a story that is released to them all and usually telephone the press office for additional information. The list of questions and answers is then used to give each newspaper a little extra background or information that the others do not have.

It was of interest to note the importance accorded the work of the press office by the CEGB. As mentioned earlier, the Press Officer is responsible directly to the Chairman, and he even sits in at the weekly meetings of the permanent Board Members.

10. ONTARIO HYDRO - HEAD OFFICE, TORONTO. PUBLIC RELATIONS DEPARTMENT (7th May, 1970)

10.1 Mr. Bob Smart

The Public Relations Department has a staff of about 70 and its functions include photographic services, publications, arrangements for visitors, etc. Each of the 7 regions of Ontario Hydro has a public relations officer and, in addition, there are public relations staff at Douglas Point and Pickering Information Centres.

These branch offices are responsible for all press relations (Canada has no national newspaper) answering enquiries from the public, and disseminating publicity material from Head Office.

Ontario Hydro attaches great importance to dissemination of information to the public, particularly schools. It has for many years been sending large quantities of literature to schools, giving talks, arranging visits of school parties to Information Centres, and lending films from their library.

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10.2 Mr. Ken Newton

Mr. Newton is responsible for answering queries from the public on matters concerning nuclear power. There are two other such officers, one for matters concerning hydro and coal power, and one for economic matters.

Where possible, queries are answered by sending printed material, of which a wide variety is available. Each enquiry, however, is given individual attention, and published information is supplemented by letters answering queries in detail.

Information is obtained from technical experts and also from a very large filing system kept in the office, which is subdivided in some detail. It is sometimes possible to predict that interest is going to arise in a particular subject, and information is collected in advance.

Ontario Hydro considers that answering of individual queries in this matter is of great importance. Answers are at all times factual, objective and straightforward.

10.3 Mr. John Davies

Mr. Davies is in charge of the editorial group, which is responsible, among other functions, for press relations.

Information is normally given out to the press in the form of press releases. Since Ontario Hydro is a provincial public utility, the news which it gives out is of interest to the papers, and gets fairly good coverage.

Two factors are of importance in sending out such material to the press - the material must be newsworthy and the releases must be written in newspaper style so that no rewriting is necessary.

The monthly publication "Hydro News", which contains information mainly on matters of policy and is distributed to M.P.'s, Members of the Provincial Parliaments, industry, etc., is also sent to the press.

Press conferences are held on appropriate occasions and frequent visits are arranged for press groups to construction sites at interesting stages of the work.

A type of release which is always well received by the press is a photo-feature, i.e. a story told by a series of captioned photographs.

11. ONTARIO HYDRO : PICKERING CONSTRUCTION SITE, NEAR TORONTO (8th May, 1970)

Mr. Allan Fulton - Project Public Relations Officer
Mr. A. Bellstedt - Reactor Engineer

It is the policy of Ontario Hydro, at all nuclear power station sites, to appoint a resident public relations officer as early as possible in the construction programme, and to establish an information centre. Construction at the Pickering site began in 1965 and the first unit is due to come on line in January 1971. The Pickering Information Centre was opened to the public in 1967, and already receives more than 100 000 visitors a year.

The initial cost of the Centre was $100 000, and the annual operating cost is $80 000 to $90 000. It is financed and operated entirely by Ontario Hydro, unlike the Douglas Point Information Centre, which is partly financed by Atomic Energy of Canada Ltd.

The Centre has a permanent staff of four:
The Project Public Relations Officer (who is responsible to the construction manager, and not to the Public Relations Department of Ontario Hydro), a secretary/receptionist, and two guides. The guides are of educational standard equivalent to matriculation and it takes about one month to train them. In the summer season, two university students are engaged as temporary guides, and are paid $100-$110 per week. Student guides receive the same training as permanent guides and are encouraged to come back during subsequent vacations until they graduate.

As mentioned above, the number of visitors to the Centre exceeds 100 000 per year, of which about 60 000 are in organised school parties. Visits by schools are particularly encouraged, and the Project Public Relations Officer frequently gives talks at schools, or contacts schools to encourage these visits.

Casual visitors come in their largest number mainly during the summer months and, over summer week-ends, up to 600 visitors come during the course of one day.

One of the guides acts as a "front man" and one as a "back man". The front man receives visitors in the foyer, shows them into the centre and tells them when the next film show is. The back man is in the auditorium operating the projector, sometimes giving a short talk illustrated by slides, and answering questions. As each film showing is finished, the visitors are taken through a back exit onto a bus which takes them on a tour of the site, with a guide in attend-

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ance.

The bus tour operates only in the summer season, and buses are hired for this purpose. If there is no bus tour, visitors can go out onto a terrace with a view over the site. Tables with sun umbrellas and chairs are on the terrace, and there is a vending machine for cold drinks. At the end of the terrace is an elevated platform furnished with a plan of the site.

A layout of the Information Centre is shown overleaf. The size of the display area is approximately 60 ft x 40 ft.

1. Backlit panels, with both colour and black-and-white photos and illustrations, with text, "Radiation Works for You" showing uses in medicine, agriculture and industry.
2. Backlit panels - the fission process.
3. How electricity is generated - the turbo-alternator. Three sources of energy - hydro, coal, nuclear.
4. Three small models of the three different kinds of station. Serving this display are three back-projected slide units, with automatic slide projectors, showing colour slides of actual plants in each category.
5. "Radiation has always been with us". Models showing primitive man in a cave, also a plate of food and other familiar objects, all having natural radioactivity. Ultra-violet and infra-red displays.
6. Protection and shielding in reactor stations.
7. Cut-away model of reactor core.
8. Reactor fuel. Models of a fuel element and its components.
9. A complete model of the Pickering station in transparent plastic. The model is partly animated in that one of the reactor assemblies rises from its containment building and lights in the principal components flash on and off. This model was originally built for Expo 67 at a cost of $35 000.

On the back of display 8 are large construction photographs of the Pickering site.

The exhibits are in the process of being brought up to date and it is planned to include more "audience participation". For example, in the fission process display, there will be a "rifle" with which the spectator can fire a "neutron" at an atom of uranium depicted in the display, thus initiating a fission reaction.

Among thoughts for the future is a "Careers Computer". The spectator will feed in personal details and the display will indicate a suitable career for him in the nuclear field.

A wide variety of pamphlets and brochures is available at the Centre.

12. ATOMIC ENERGY OF CANADA LTD, OTTAWA AND TORONTO (7th, 8th May, 1970)

Mr. R.C. Hayden - Chief Public Relations Officer, Ottawa

Mr. A.R. Burge - Public Relations Officer, Power Projects Division, Toronto

Power generation in Canada is the responsibility of the Provinces. In a few cases, e.g. Alberta, the power is generated by private companies but, in general, generation in each Province is in the hands of a public utility under the jurisdiction of the Provincial Government.

The nuclear research and development body is Atomic Energy of Canada Ltd, which is under the control of the Federal Government (Ministry of Energy, Mines and Resources).

The licensing authority for nuclear power stations is the Atomic Energy Control Board, also a Federal body under the same Ministry as AECL, advised by a Reactor Safety Advisory Committee.

Canada's first nuclear power station was the 20 MW Nuclear Power Demonstration Reactor (NPD) at Rolphton near Chalk River (1962). The second was the 200 MW Douglas Point plant on Lake Huron (1967). The 2000 MW Pickering station (4x500 MW) will start coming on line in 1971, and is on Lake Ontario some 20 miles west of Toronto city centre. The Bruce station (4x750 MW) on the Douglas Point site, is due to come on line in 1976. All these stations are in the province of Ontario, where the generating authority is Ontario Hydro.

In Quebec where the generating authority is Hydro Quebec, is the Gentilly nuclear power station. This is a 250 MW prototype of the boiling-water reactor design and is due to start up in 1971.

AECL has four Divisions, viz. Chalk River Nuclear Laboratories, Whiteshell Nuclear Research Establishment, Power Projects and Commercial Products.

Each Division has its own Public Relations Officer, with a Chief Public Relations Officer at Head Office in Ottawa. Each Public Relations Officer is responsible for the public relations work in his geographical area, and this includes relations with the press, since Canada has no national newspaper.

AECL believes that it is absolutely vital to keep the

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public informed on all matters pertaining to nuclear energy. It believes that the best way to achieve this is through the schools and by the establishment of information centres. It believes that the high-school pupil is far better able to understand nuclear science than his parents are, because he is taught the fundamentals at school. If he attends an interesting lecture, or visits an information centre, he is likely to tell his parents and his friends about it.

Public Relations Officers give lectures and film shows at schools, and schools are encouraged to visit information centres. AECL films are available to schools through the National Film Board. AECL also participates in science fairs, which are attended mainly by scholars.

AECL tries to take part in as many exhibitions as possible. The displays are made up from a selection of components which are transported to the various sites. There is also a display permanently mounted in a trailer and manned by students which tours small towns during the summer.

It is also considered most important that letters of enquiry from the public be answered as fully as possible. At AECL Head Office, it is the rule that such letters should be answered within 24 hours of receipt, and certainly not more than 48 hours. Printed literature is sent, with the information usually being amplified by a covering letter.

AECL do not use the press very much as a public relations medium, since they have very little real news. Only rarely is an actual press release used, e.g. when a very important statement of policy or intent is made. All other information is given to the press on a personal basis. The Public Relations Officers are on very good personal terms with newsmen and, if they wish something to be published, they select an individual newspaper which they think will give it good coverage, and give that newspaper the information verbally.

Publicity and public relations in respect of nuclear power is the responsibility of the generating authorities. There has, however, been no real public resistance to nuclear power in Canada, in fact quite the contrary. For example, when it became known that Ontario Hydro were to build the 3000 MW Bruce station, delegations from local authorities all over Ontario came to Toronto to see the Minister, requesting that the station be built in their area. A site has been purchased for a power station at Westleyville near Port Hope, and the local authority is insisting that this be a nuclear power station, to avoid air pollution which would be caused by a fossil-fuelled plant.

13. GENERAL INFORMATION GLEANED IN CANADA

The regulations for the limitation of population growth around nuclear power stations are very simple. There is an exclusion area within a radius of 3000 ft from the reactor centre. This land must be purchased and fenced by the generating authority and there is no restriction at all outside this area. The nature of this regulation is attributable to the Canadian containment concept, which is specifically designed so that reactors can be sited in populated areas. Each reactor is in a comparatively small concrete containment vessel, and all vessels vent to a single vacuum building under conditions of overpressure. This is a design which is, of course, only economical in multiple-unit stations.

Although there has been no public resistance to nuclear power, many questions are, of course, asked. The most frequent queries concern the raising of the temperature of the lakes, and the next most frequent are about heavy water. Very few questions are asked about radioactive contamination, but it is expected that these will now start arising. The reasons given are that pollution is becoming a very popular subject and it is also expected that ripples from the loud anti-nuclear voice in the USA will reach Canada soon.

All persons interviewed were asked why nuclear power was so readily accepted in Canada, yet met such active opposition in the USA. The replies are summarised as follows:

Nuclear power in Canada has evolved from a research programme which is based entirely on peaceful civil uses, whereas in the USA it was born from nuclear weaponry.

Active publicity by AECL, accentuating the peaceful applications, has built up the confidence of the public in responsible government agencies which guard their safety. The public will accept assurances from these agencies.

Nuclear power in Canada is in the hands of government-controlled utilities which also, therefore, share the confidence mentioned above. In the U.S.A., power is usually in the hands of private, profit-making utilities.

All nuclear power station sites are in areas which are, economically speaking, not really flourishing. The local population welcomes the employment opportunities offered, the local authority benefits from a levy which the power company must pay, and the community benefits by the inevitable "spin-off" of a power station in the vicinity.

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A nuclear power station is regarded as a status symbol by Canadian communities, and this attitude is the result of active publicity campaigns in the past by AECL. Canadians have been made proud of the achievements of their country, which has a comparatively small population, in the competitive field of nuclear science.

Furthermore, Canada is a huge, largely unpopulated country, and Canadians do not feel hemmed in by advancing civilisation.

14. CHALK RIVER NUCLEAR LABORATORIES (12th May, 1970)

Mr. Hal Tracey - Public Relations Officer

The main purpose of this visit was to see the Public Information Centre and to ascertain what arrangements are made for visits to the site.

The Information Centre is open to the public only during the summer vacation period, i.e. from the beginning of June to about the first week in September. During this period, the Centre is open seven days a week from 9 a.m. to 4 p.m. Casual visitors are allowed only into the Information Centre, but tours of the laboratories are arranged for visitors who give at least 24 hours notice. The tour groups are taken to the two reactors (NRX and NRU), the hot cells and the Van de Graaff tandem accelerator.

Six students are hired as guides during this period, and they are under the direction of the Chief Guide who is a permanent member of the staff. Guides are given a training course of about three weeks by the Chief Guide and the Public Relations Assistant. Apart from being taught how to demonstrate the Centre and conduct parties round the laboratories, student guides are given lectures on the AECL research programme and Canada's nuclear power programme. They are taken on visits to both conventional and nuclear power stations, and are given a radiation protection course. Other subjects covered include waste disposal, environment, pollution and other subjects on which questions are likely to be asked.

Student guides are selected from promising 3rd or 4th year students, and each is allowed to participate once only, i.e. the guides cannot come back in subsequent years. This is the opposite of the policy adopted by Ontario Hydro, who encourage students to return. AECL regards the student-guide scheme as a valuable recruiting tool, and therefore aims for as wide a coverage as possible.

Approximately 10 000 visitors are received during the summer season.

During the rest of the year, visits are restricted to school parties, which average roughly two per week, each of 40 or 50 pupils. School visitors total approximately 3000 a year.

The Information Centre is somewhat larger than the one of Ontario Hydro at Pickering. The information is given largely on ceiling-hung panels, on which text and illustrations describe the fundamentals of nuclear science. There are several models, including the two research reactors at Chalk River, the tandem accelerator, a nuclear power station, the H_2O and D_2O molecules, fuel elements, etc. Some of these models are animated. There is a film auditorium in which a film "Nuclear Energy in Canada" is projected almost continuously during the summer season. There is an observation gallery on the roof of the centre, giving a good view over the laboratoris. The cost of the Centre was $250 000.

A guide is required to show visitors round the Centre. In this respect, it is unlike the Pickering Information Centre, which is so designed that a guide is not necessary.

An interesting project planned for the future is a programme of lecture visits to all high schools within about 200 miles of Chalk River. A general film on nuclear energy will be shown to the entire school followed by a question time. Special lectures and demonstrations will then be given to the senior science classes. These will be illustrated by further films, slides, video-tapes, etc.

15. OFFICE OF THE SCIENTIFIC COUNSELLOR, S.A. EMBASSY, WASHINGTON (19th May, 1970)

Mrs. Bronwen Kimsey

Mrs. Kimsey is responsible for arranging visits by South African scientists to the U.S.A. She was of the opinion that the Board's practice of writing separately to the organisations to be visited was an unnecessary complication. The USAEC had themselves stated that it was preferable for the Counsellor's office to make all the arrangements.

It would also be of great assistance if a separate sheet containing all personal details of the visitor and the subjects to be discussed could be supplied. Usually, insufficient information was available to determine which particular people the scientists should meet.

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6. U.S. ATOMIC ENERGY COMMISSION, WASHINGTON (19th May, 1970)

16.1 Division of Public Information

Mr. John A. Harris Jr. - Director

Mr. Joseph J. Fouchard - Assistant Director for News Operations

It is considered that the most effective media for news coverage are TV and radio, because of the very large audiences. These media are, however, not very receptive to USAEC material.

Most of the Division's efforts are therefore directed at the printed media. Many press releases are distributed, but these are becoming less effective. More use is therefore being made of press conferences and press briefings.

A considerable amount of information is also given out to the press over the telephone in answer to queries. All of the Division's Information Officers, of which there are nine, are authorised to give information to the press, and all are on very good personal terms with newspaper correspondents.

When a press release is being prepared on an important or perhaps controversial subject, a list of questions which the press may ask is prepared at the same time, and answers obtained from the experts within the USAEC. These are then available to the Information Officers for answering queries from the press.

Information Officers are usually men with a newspaper background. It is considered more important for them to have a knowledge of the press and the ability to write well, than to have a technical background. Technical information and clarification are easy to obtain within the USAEC.

The Division holds the view that the public should be kept informed, fully and frankly, on all unclassified activities of the Commission. It is considered particularly important that adverse information should not be suppressed, because when it inevitably comes to the surface, the confidence of the media - and the public - is considerably weakened. Particular efforts are made to get as much information as possible to the press at the earliest possible time in cases where accidents occur.

As far as nuclear power is concerned, public relations is the responsibility of the power companies. The author gathered the impression that many of the power companies in the U.S.A. had not, until recently, been sufficiently active in this field, probably because they were unaware of the necessity for it. This could be an important factor in the public resistance to nuclear power now being experienced.

The gentlemen interviewed considered it important for any power company contemplating the introduction of nuclear power to build up the confidence of the public over the years. It is also essential for the research and licensing authority to have the confidence of the public, although the opinion was expressed that it was undesirable for these two functions to be combined in the same organisation.

16.2 Division of Technical Information

Mr. E. Brunenkant - Director

Mr. Charles W. Pelzer* - Deputy Director

Dr. Burrell I. Wood - Assistant Director for Exhibits

The Division is responsible, among other things, for publications, exhibitions, conferences, educational programmes, nuclear demonstration units, travelling school demonstration units, etc.

It is considered that the most effective contact with the public is made through displays at science museums. There are, for example, 20 million high school students in the U.S.A., only one sixth of whom are reached by the school demonstration units each year. By comparison, the attendance at science museums totals approximately 250 million a year!

Exhibits at science museums are permanently manned by people who also have other duties within the community, such as educational programmes. The school demonstration units are nevertheless an effective educational tool. (These were seen and discussed in detail at Oak Ridge, where they are headquartered.)

The Division handles a huge volume of enquiries from the public. These are usually answered by sending copies of the relevant booklet in the "Understanding the Atom" series. These booklets are distributed at the rate of approximately six million a year. Over the last three or four years, the maximum number of booklets allowed per enquiry has been reduced from five to two in order to maintain the growth rate at 20% p.a.

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*Mr. Pelzer has since gone to Vienna to succeed Mr. Woolston as Director of the IAEA Division of Scientific and Technical Information.

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The USAEC actively encourages the annual Science Fairs. It makes ten awards to the ten best student projects which have a bearing on any of the nuclear sciences (see Appendix D).

At the USAEC offices, the author also had the privilege of meeting Dr. Friedman, Deputy Director of the Division of International Affairs (Deputy to Mr. Kratzer) and Mr. Yeomans, Assistant Director for Agreements and Contracts.

17. AMERICAN PUBLIC POWER ASSOCIATION, WASHINGTON (20th May, 1970)

Mr. Lawrence Hobart - Assistant General Manager
Mr. Jim Webster - Public Relations Director

In the U.S.A., there are approximately 2000 public utility companies, most of them city-owned. They do not all generate power, some of them only distribute. Of these, about 1400 are either directly or indirectly members of the APPA.

The objects of the Association are to act as a voice for their members at, e.g., Congressional hearings, to keep members informed on matters relating to power generation, to conduct training programmes, etc.

The Association also makes members aware of the importance of public relations, and provides them with information and advice.

The monthly "Nuclear Power Newsletter" is sent to members and outside subscribers, while the "APPA Weekly Newsletter" goes only to members.

The opinion was expressed that a valuable lesson to be learnt from experience in the U.S.A. was that all public opinions and queries on nuclear power must be listened to and answered seriously and honestly, no matter how ill-informed or "cranky". Opposition groups should be "drawn into the debate" and consulted.

18. GENERAL INFORMATION GATHERED IN WASHINGTON ON U.S. NUCLEAR POWER

There are in the U.S.A. at present 17 operating nuclear power stations (5000 MW total), 49 under construction (39 000 MW total) and 37 on order (34 000 MW total).

There has therefore been widespread acceptance of nuclear power in the U.S.A., whereas it is the opposition, admittedly strong and effective where it occurs, which has enjoyed the publicity.

Early opposition to nuclear power was based on its association with "the bomb", because people feared that a nuclear power station might blow up. This fear has now largely been replaced by concern over environmental pollution - a subject as popular in the U.S.A. today as Vietnam and student unrest. The concern is not only about the pollution which a large nuclear power station can cause, but also about possible heavy industry which a large power source can bring with it - industries which are also polluters. Thermal pollution is as big a problem as any other - in some cases bigger. The city authorities of Los Angeles, where there is a serious smog problem, realise that nuclear power is a factor in the prevention of atmospheric pollution, and intend to build only nuclear stations in the future.

Concern over environmental pollution is beginning to override acceptance of nuclear power on economic grounds.

Some private power companies have a poor public image, and this is possibly one of the major factors in the opposition now being experienced.

Some of the opposition to nuclear power is political. Sixteen states, led by Minnesota, claim the right to impose limits on radioactivity content of effluents which are more restrictive than those imposed by the federal agency (USAEC). The level they propose is 1% of the present limit.

19. ATOMIC INDUSTRIAL FORUM, NEW YORK (22nd May, 1970)

Mr. Charles Robbins - Manager
Mr. Paul Turner - Public Affairs and Conference Projects Manager

The Forum, in common with its counterparts in other parts of the world, has a wide spectrum of membership, including generating companies, research institutes, legal and insurance companies, manufacturing industry, etc. Individuals can also become members.

It is one of the few Forums - there are 18 in the world - which concerns itself directly with publicity and public relations. This it does principally through its publications in the "INFO" series. These comprise:

"INFO" - A monthly publication, circulation 2000, intended mainly for senior public affairs people.

"PRESS INFO" - A digest of INFO, intended for press distribution.

"BACKGROUND INFO" - Prepared to give information on specific subjects or occurrences.

"NEWS RELEASE INFO" - Straight press releases.

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In addition, the Forum distributes duplicated copies of important speeches given by prominent persons in the nuclear field. Selected speeches of lasting importance are printed in folder form.

Permanent staff numbers about 30 and the annual budget is of the order of $700 000.

The author considered it more important to discuss public relations policy in the nuclear field than details of the Forum's operations. The following is a summary of the points which the Forum considers to be vital elements of public relations in the nuclear energy field:

1. All persons in the nuclear industry or research who are likely to be asked for information, should be fully informed on all aspects of nuclear energy. Internal publicity in such organisations is vital.
2. It is important to educate people from the news media in the implications of nuclear power.
3. There must be early, exhaustive briefings among local authorities and citizen groups - particularly in the area in which it is intended to build a nuclear power station. Such briefings should include sponsored visits to research centres and even, if considered necessary, a sponsored visit for a few to, say, a site such as the Pickering site in Canada.
4. Opposition to nuclear power usually comes from very small groups, even individuals, but these are vociferous enough to influence others. It is therefore vital to recognise and identify such people at an early stage, approach them, consult them and ask their advice. They can be included in the visits mentioned above. The important thing is to get the potential opposition on your side before they express public opinions which they would afterwards be reluctant to withdraw.
5. Printed matter is an important tool for dissemination of knowledge. Pamphlets and booklets should be produced for mass distribution and those of a general nature should be at two levels - one a very simple, almost comic-book form for the general public, and one in a more informative style for the educated layman.
6. It is essential to have a public information centre in operation at the power station site before construction work commences.

Asked to comment on the advisability of creating a similar Forum in South Africa, the gentlemen interviewed replied that this would depend on the contemplated objectives of such a Forum. They did not think it could adequately fulfil a public relations rôle in South Africa, but might serve a very useful purpose as a platform for discussion and exchange of information.

20. EDISON ELECTRIC INSTITUTE, NEW YORK (22nd May, 1970)

Mr. Edward Kuhn
Mr. William Brown
Mr. John Best

Membership of the Institute is confined to investor-owned (as opposed to public) utilities. They have 181 members, representing approximately 90% of the power generated by such utilities in the U.S.A.

The Institute is very conscious of the importance of public information, and produces a large number of publications for this purpose. The actual public relations work is, however, carried out by member companies.

Again, it was considered more instructive to discuss matters of principle, and the following points summarise the essentials of a public relations programme as put forward by the gentlemen interviewed:

1. People are afraid of nuclear power only when they are ignorant of the facts. The public must be kept fully informed as to why nuclear power must be used, how you ensure that it is safe, and what you are going to do with waste products, particularly those in permanent storage. They must be convinced that it is impossible for a nuclear power plant to explode like a bomb. The object is to build up an initial comfort in the project, by giving the public knowledge of the subject. Of particular importance, are long-term effects of irradiation.
2. Potential opposition groups, particularly those concerned with environmental conservation must, at an early stage, be invited into discussions and asked for opinions. They must be made to feel that they are partaking in the decision to go nuclear.
3. Make locals feel proud that nuclear power is coming to their area.
4. It is essential to build up good relationships with the press, so that they will consult you before publishing controversial matter.
5. Get as much knowledge as possible to the young at all school levels and through university. It is important that persons giving lectures or instruction to the young are themselves young, so that the audience feels that he (or

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she) is almost "one of them".

21. OAK RIDGE ASSOCIATED UNIVERSITIES, OAK RIDGE, TENNESSEE (25th May, 1970)

Mr. Courtland S. Randall - Chairman, Information and Exhibits Division

21.1 General

Among other things, this Division is responsible for the high-school lecture demonstration programme "This Atomic World", and for operating the American Museum of Atomic Energy at Oak Ridge.

Mr. Randall obviously does a great deal of thinking and study in public information, and thoughts expressed by him in discussions can be summarised as follows:

1. Americans are becoming sceptical of the opinions expressed by experts, because the mass media have made them aware that experts can have diametrically opposed views of the same subject.
2. Too many people who are thought of by the public as experts but are not, make public statements about nuclear power which are misleading. An example of this could be power company management, many of whom are not fully conversant with the fundamentals of nuclear power.
3. The nuclear controversy, unlike others, is being publicly discussed in complex terms that the layman cannot understand, and this has contributed to public suspicion of nuclear power.
4. Any public information programme in nuclear energy should start off by telling people about energy in general - what it is, why we need it, how we get it.
5. Any communications system should, from the beginning, have allowance made in the budget for evaluation and feedback. The effectiveness of the programme should be tested at the receiving end and the findings used to correct faults in the system. This would, for example, make an excellent project for a student doing a Master's degree in sociology. This would be a cheap and unbiased method of evaluation.

21.2 High-School Lecture Demonstration Programme

Twenty-three mobile units are used to give lecture-demonstrations to high schools throughout the U.S.A. There are about 18 000 high schools in the country, and the 23 units cover about 3000 of them each year. About 20 million American scholars have attended demonstrations since the programme started.

The full set of equipment (see Appendix C) costs $18 000, (although it has recently been possible to cut this to about $14 000) and the truck $2000. The USAEC provides this equipment, trains the demonstrators, and also pays the operating cost of six units. The operating costs of the remaining seventeen are paid by the electric utility industry. Budget cuts will necessitate the number of units being reduced next year.

Demonstrators are recruited from high-school science teachers who have had at least three years teaching experience. They receive an eight-week training course, commencing on 1st July each year, and are given refresher courses each winter. Apart from technical training, demonstrators are carefully coached in methods of presentation and dramatisation of the story.

It is considered important to choose young men because of readier acceptance by young audiences and also because the work is physically exacting.

The demonstration is given to senior scholars only, but this is usually preceded by a general interest film and a short discussion with the whole school (see Appendix C for programme).

21.3 American Museum of Atomic Energy

Only a short time was available to visit the Museum, which is an excellent exhibition, efficiently run. There are innumerable exhibits, models and mobile displays. Many of the displays can be operated by the viewer, for example in a tank of goldfish, one is radioactively labelled and a geiger counter is used to trace it. There is an auditorium where the film "A is for Atom" is shown, and there are four lecture-demonstration units. These are:

Introduction and fundamentals.
Reactors and power generation.
Radioisotopes.
Medical applications and product improvement.

Visitors are conducted through the museum in groups.

Mr. Randall is of the opinion that no exhibit can communicate without a demonstrator and he has in fact shown by experiment that the presence of a demonstrator increases the effectiveness of an exhibit tenfold.

The number of visitors to the Museum each year is 170 000 to 200 000.

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23.3 Dr. Francois Kertesz - Information Centre Co-ordinator

The 15 Information Centres at ORNL serve specific technical divisions. Their task is to collect and evaluate published information on specific subjects and make it known and available to scientists, using computer techniques.

Time did not permit a detailed study of these functions, nor a visit to an information centre.

However, since Dr. Kertesz is an accomplished linguist and translator, a most interesting discussion on translation problems took place. Translations from Russian can now be done by computer at Oak Ridge, and some examples of such translations were seen.

24. TENNESSEE VALLEY AUTHORITY, KNOXVILLE, TENNESSEE (27th May, 1970)

24.1 Mr. Larry Calvert - Information Officer

The TVA was created by the U.S. Federal Government in May 1933 to save the area from economic ruin by controlling and harnessing the Tennessee River and its tributaries. The river system was dammed in many places, thereby controlling flooding, providing irrigation water, generating electrical power and opening the river for navigation all the way to Knoxville.

A few large coal-fired power plants were subsequently built. Two nuclear power stations are under construction, Brown's Ferry (3×1100 MW BWR, start-up end 1971) and Sequoyah (2×1200 MW PWR, start-up 1974).

Present installed capacity is 18000 MW of which 4000 is hydro. The TVA serves an area of 80000 square miles covering seven states and having a population of 7 million.

At the time of its creation, TVA experienced strong resistance and suspicion from the poor, essentially rural population. This was dealt with at the time by addressing public meetings, by door-to-door canvassing and by setting up demonstration farms. The people were eventually convinced that TVA was there to serve them, and this policy is pursued to this day. Such public confidence has been built up over the years, that any assurance given by TVA will be accepted. This is why there has been no adverse public reaction to TVA's announcement that they intended installing nuclear power stations.

A constant stream of information is fed to the public via the news media, mostly by way of press releases (average two per day). Good coverage is obtained, and this is ascribed to the basic newsworthiness of TVA activities and to their reputation for honest, accurate and factual material. Perhaps the most important factor is that their releases are written in newpaper style and do not require rewriting by the papers.

TVA considers publicity and public relations so important that the Director of Information attends all meetings of the Board of Directors and plays an active part in policy formulation. Mr. Calvert considers this to be the key to the success of the public relations activities.

The Information Department, consisting of a Director and four Information Officers, also replies to queries received from the public. Enquiries from school children alone amount to about 1000 per month. These are answered by sending out printed brochures or by letter.

24.2 Mr. Charles A. Key - Head, Public Safety Service, Division of Reservoir Properties

TVA goes to considerable trouble to encourage visitors to their projects. As a result, the annual number of visitors to the 35 projects is an astounding 12 to 15 million! A single project has been known to receive almost two million visitors in a year.

The Public Safety Service has a staff of about 300 uniformed Public Safety Officers, who are stationed at the projects on round-the-clock shifts. Their duties include those of security officer, fireman, traffic controller, tour guide and public relations officer. The men are chosen for outgoing personality and a love of people. They receive rigorous training in police work, fire fighting, and public speaking. They are given all the facts about all TVA operations and, when on station, are kept informed of developments by regular newsletters. Although training in public speaking is given, the men are encouraged to be informal and to use their own style.

The author was taken to visit the Fort Loudroun hydro-electric scheme, and saw TVA public relations at first hand. The first thing to impress the visitor is that TVA had purchased a large area of land in the vicinity of the dam wall and works. This is beautifully laid out as a park, with picnic sites and access roads. A marina dock and restaurant building is provided (operated by private enterprise) as well as other recreational facilities.

Visitors to the project proper enter an air-conditioned

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reception room having a panoramic view of the dam wall, lake and workings. Against the opposite wall is an artistic display of photographs and, above this panel, in large letters, is the motto which is the secret of TVA's success in public relations, "Built for the people of the United States".

The author was then taken on a tour of the generating station by the Public Safety Officer and was most impressed by his wide knowledge of TVA activities. His manner was relaxed and informal and there was no suggestion of delivering a "set piece" to the visitors. He loved his work and he loved people.

To summarise - TVA is the supreme example of an organisation which is dedicated to the people it serves - and makes sure they know it.

25. CALIFORNIA MUSEUM OF SCIENCE AND INDUSTRY, LOS ANGELES (3rd June, 1970)

Mr. Jack G. Springer - Director of Education

The Museum runs two-week vacation science courses for school children ranging from pre-school age to tenth grade (equivalent to Standard 8 in South Africa).

Teachers are recruited from school science teachers, and are given a fairly free hand in the choice of subjects and method of teaching.

Children in a typical pre-school class will each stake out a square foot in the museum garden, and will spend the fortnight studying everything they find there.

Unfortunately, insufficient time was available to ascertain further details of this and other courses, but they are in any case informal, and their nature depends on the teacher.

Approximately 4000 children can be accommodated during the summer vacation period.

26. ATOMIC ENERGY BUREAU OF THE SCIENCE AND TECHNOLOGY AGENCY, TOKYO (8th June, 1970)

Mr. Tsukado - Deputy Head of International Co-operation Division

Mr. Takaoka - Research Division

Mr. Kuga - International Co-operation Division

Mr. Takayama - Interpreter, I.S.S. Language Bureau

The Science and Technology Agency is directly responsible to the Prime Minister's Office, and its Atomic Energy Bureau is responsible for nuclear research and development, international co-operation, etc. The Atomic Energy Commission is the licensing authority separately responsible to the Prime Minister's Office.

Electricity is generated by nine regional private utilities, but they must conform with Government planning, which is the responsibility of the Public Utilities Bureau of the Ministry of International Trade and Industry.

Because the Japanese are the only people who have experienced nuclear weapons, public sensitivity and strong resistance to nuclear power would be expected. Resistance was, in fact, experienced when research operations at Tokai-Mura were planned. These were, however, overcome by a campaign of public lectures and meetings, and by direct approaches to local authority. Ten years of safe operation, in both research and power generation, is now used as a powerful tool in all public relations activities.

There are at present two nuclear power stations in operation in Japan (Tokai-Mura, 165 MW Calder Hall type, and Tsuruga, 350 MW PWR). Two further stations are under construction (total 900 MW), one on order (700 MW) and five awaiting government approval (total 2900 MW).

The gentlemen interviewed considered the following to be the main factors behind the successful overcoming of public resistance to nuclear power:

1. Intensive briefing of local authorities and local community leaders. This is supplemented by public lecture meetings and film shows in the area under consideration for a nuclear installation. Once the Tokai research facilities were in operation, local community leaders, always including representatives of the press, were taken there on informative visits.

2. The public in general and local communities in particular are made aware of the very strict standards imposed by the Government for approval of nuclear sites. For example, permitted activity levels for all effluents are only 10% of those recommended by the ICRP. The public is also made aware of the strictness of the approval procedure, which is:

(i) Applications are studied by a special ad hoc committee of experts appointed by the Atomic Energy Commission, and permission to start construction is granted if the committee is satisfied that the design is in accordance with the safety criteria.

(ii) Continual Government inspection during construction ensures that the design is followed.

(iii) Pre-operation tests are done under Government supervision to ensure that operating conditions meet design conditions.

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(iv) The safety manual, drafted by the utility and submitted to the AEC for vetting, is released to the utility only after all the preceding conditions have been met.

3. Pollution monitoring is basically a government function, but local authorities now also share this responsibility. This gives local inhabitants further confidence in the effectiveness of the control.

4. Particular attention is paid to population groups who are apprehensive. For example, representatives of fishing co-operatives were sent at government expense on a tour of fuel reprocessing plants in Europe and the U.S.A. to give them a full understanding of the process.

5. The key to all nuclear public relations activities is the safe operation of all nuclear installations in Japan. The government and all organisations concerned with any nuclear activity are determined that no nuclear accident shall occur, and have therefore imposed extremely strict operating standards and procedures at all installations.

Although there is increasing public acceptance of nuclear power in Japan, both the government and the utilities realise that resistance may be experienced when, in 10 to 15 years time, it becomes necessary to site nuclear power stations nearer to population centres. In order to forestall this, an education programme aimed at the junior and senior high schools is under way. This programme includes vacation seminars in nuclear energy for science teachers. The school programme is considered to be a most vital aspect of public education, because not only does it educate those who will be the future deciders, but high-school students are also the educators of their parents.

The Atomic Energy Bureau also organises an annual essay contest for high-school students. Background material is sent to the schools in brochure form. The Bureau adjudicates the entries, and the winners are given prizes which include visits to nuclear establishments.

27. TOKYO (8th June, 1970)

Mr. F. Sekine - Chief, Public Relations Office, Power Reactor and Nuclear Fuel Development Corp. (Formerly PRO for the Japan Atomic Industrial Forum)

Mr. K. Kanai - Chief PRO, Japan Atomic Energy Research Inst. (JAERI)

Mr. Y. Nogamoto, Information Officer, Japan Nuclear Ship Development Agency

Mr. Y. Yamawake - Secretary General, Japan Atomic Energy Relations Organisation (JAERO) (which has taken over the public relations functions of the Japanese Atomic Industrial Forum)

Mr. K. Ito - Office of International Affairs, JAERI

Mr. Takayama - Interpreter, I.S.S. Language Bureau

This gathering was rather unwieldy, but an interesting discussion on the general principles of nuclear public relations ensued. In general, the opinions expressed in the morning interview were confirmed, and the following additional comments are worth recording.

The importance of good relations between local communities and the utilities was stressed. It is the custom in Japan for the President of the utility to visit villages near existing or proposed nuclear power station sites to meet community leaders and address meetings.

It is vital to have pressmen well informed on the fundamentals of nuclear energy, and to keep them supplied with newsworthy material. The JAERO sends a monthly newsletter to 107 major newspaper, radio and TV organisations. This newsletter contains not only news items, but also background information. Press groups are frequently invited to JAERI establishments to acquaint them with nuclear science. The necessity for, and the safety of, nuclear electrical power is stressed.

Nuclear public relations activities climax twice a year. April 18th is the start of the annual, nation-wide Science and Technology Week, featuring exhibitions, film shows, lecture meetings, etc., in which nuclear energy is always prominently featured. October 26th is Atomic Energy Day throughout Japan, and exhibits, film shows and lectures are again on a nation-wide basis. The objective is to make the Japanese people proud of their country's achievements in nuclear science.

28. TOKAI-MURA (9th June, 1970)

Dr. M. Kawasaki - Deputy Director, Tokai Research Establishment (TRE)

Mr. K. Chiba - Deputy Director, Tokai Research Establishment

Dr. I. Amanuma - Vice Director, Tokai Works, Power Reactor and Nuclear Fuel Development Corporation

Mr. Y. Imai - Station Superintendent, Tokai-Mura Nuclear Power Station, Japan Atomic Power Company

Mr. Takayama - Interpreter, I.S.S. Language Bureau

The author was given an outline of the activities at the three establishments, and visited several laboratories, including the locally designed and built JRR-3 research

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reactor.

Visits by members of the public are encouraged, particularly to TRE and the power station, both of which have public information centres. The information centre at the power station is particularly impressive being equipped with many beautifully made models, most of them animated in some way. This centre was completed in the early stages of construction, and now receives about 80 000 visitors a year.

In discussing public relations matters with the gentlemen interviewed, opinions similar to those voiced by other Japanese officials were expressed. The following additional points are of interest:

At all Japanese nuclear establishments, approximately 10% of the staff are engaged solely on safety activities. JAERI insist that all staff work strictly in accordance with the safety manual. There is a special safety school at Tokai which all staff must attend. The course given depends on occupation category.

Mr. Imai considers it essential to pay particular attention to vociferous individual opponents who have public influence. Two such persons were sent singly on special factfinding visits to Britain. One of these, an influential newspaper editor, was in Britain with Mr. Imai at the time of the Windscale accident. Mr. Imai took advantage of this by arranging a meeting for the editor with eight leading British newspapermen who were covering the incident.

The Japan Atomic Power Company has formed a panel of about 20 community leaders from surrounding towns. Members include seven town mayors, press leaders, doctors, teachers, the local MP, as well as representatives from the power company and the other two Tokai nuclear establishments. The purpose of the panel is to co-ordinate the requirements of the three organisations and the public. The whole panel meets once a year, while an eight-member "executive" meets three times a year. The panel has only an advisory function, but the local participation in policy making is considered essential.

The cost of the power station was 46.5×10^9 Yen (R93 million) and pays 170 million Yen (R340 000) per annum in property tax to the village of Tokai-Mura (population 15 000), which has virtually no other industry. This may, in part, account for the public acceptance of the presence of the power station!)

29. AUSTRALIAN ATOMIC ENERGY COMMISSION, COOGEE, N.S.W. (16th June, 1970)

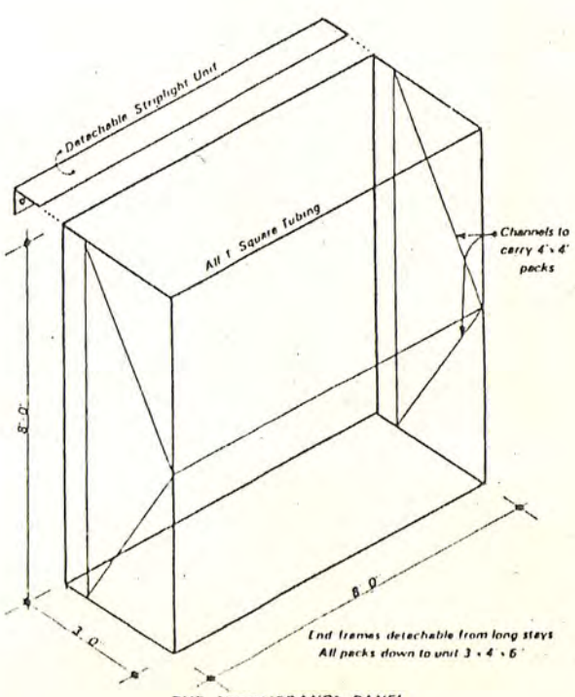
Mr. Roger Crivelli - Director of Information Services

Mr. Ted Lane - Deputy Director of Information Services

Mr. John Bray - Chief Exhibitions Officer

The AAEC conveys information to the public in three basic ways, viz. exhibitions, publications and the news media.

Two or three times a year, large exhibitions are staged in major cities at trade fairs or engineering exhibitions. Lesser exhibitions are also staged frequently at, for example, schools or small-town fairs. The exhibition material, consisting mainly of photographs and models mounted on special "boomerang panel" units, are so designed that exhibits of different sizes can be made up from individual units. More recently a large exhibit, covering 4000 to 5000 sq ft has been built. The subject is nuclear energy, and the exhibit is intended for special display



THE 'BOOMERANG' PANEL

EXHIBIT H: (COPY OF EXHIBIT G)

COPY OF REPORT BY D.C.R. HURLIN ON AN OVERSEAS STUDY TOUR

PIN 83 (BR) - 36

in big cities - i.e. not necessarily in association with trade fairs, etc.

A 34-foot caravan has now been fitted out as a travelling exhibit. This consists basically of a series of panels giving basic information on nuclear energy in popular style. Special panels are devoted to the need for nuclear power and safety measures.

Publications are aimed at different levels of readership. Pamphlets are available on various topics for mass distribution (at exhibitions, for example), while more elaborate and more detailed brochures are given on request to the genuinely interested enquirer. The quarterly "Atomic Energy in Australia" contains technical articles aimed at readers who have a technical background but who are laymen in the nuclear field.

Press releases on policy matters usually come from the Office of the Minister of National Development in Canberra. The AAEC often duplicates additional copies of these for wider distribution, i.e. to technical journals and overseas press. Sometimes, the AAEC will release an amplifying press statement at the same time.

Press men are frequently invited to Lucas Heights Research Establishment to obtain background information about nuclear energy. This is usually done on an individual basis as the need arises.

When there is an official opening ceremony of, e.g. an exhibition or perhaps a new building at Lucas Heights, the press is invited out the previous day for a press preview. Thes are given drinks and snacks, and very senior officials of the Commission are on hand to answer questions. It has been found that more than double the publicity is obtained from such a method than by inviting the press to the actual opening.

An important facet of publicity activities is films. The AAEC has built up a substantial library of films, most of them from the USA and UK. They also have a few of their own films in the library, and these have been well received. They have been shown several times on all Australian TV stations. The most popular film is Walt Disney's "Our Friend the Atom", of which they have worn out several copies.

Electrical power in Australia is generated by separate, State-controlled utilities in each of the six States. Only two States, New South Wales and Victoria could, in the foreseeable future, support a large baseload station. Both of these states have ample supplies of very cheap coal, and indications are that nuclear power will not be an economical proposition until the 1980's.

It has nevertheless been decided that the AAEC will build a nuclear station of about 500 MW at Jervis Bay, some 85 miles south of Sydney. The purpose of this station is to enable Australia to become familiar with all aspects of nuclear power - contracting, construction, operating, fuel fabrication, etc., as well as to establish suitable siting criteria and licensing procedures. (The author's visit co-incided with the official opening of the fourteen tenders received, on Monday, 15th June.)

When the AAEC selected Jervis Bay as the site of the station, senior public relations staff visited local authorities in order to inform them on all the implications of the project. Civic leaders were subsequently brought to Lucas Heights, entertained by the Chairman of the Commission (Sir Philip Baxter) and shown all relevant aspects of the Commission's programme.

30. LUCAS HEIGHTS RESEARCH ESTABLISHMENT (17th June, 1970)

A very interesting tour of the research facilities at Lucas Heights was undertaken. The author had the privilege of meeting the Director, Mr. K.F. Alder, the Deputy Director, Dr. R.C. Cairns, and many of the leading scientists at the Research Establishment.

The visit programme was arranged by the Public Relations Officer of Lucas Heights, Mr. D. Coleby.

EXHIBIT H: (COPY OF EXHIBIT G)

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ON AN OVERSEAS STUDY TOUR

APPENDIX B (Reprinted from "Applied Atomics" of July 1, 1970)

US Environmental Policy

Growing pre-occupation with environmental policy is indicated by amendments proposed by the U.S. Atomic Energy Commission (AEC) to a recently adopted statement on implementation of the National Environmental Policy Act (1969).

The amendments or new provisions proposed by the AEC are concerned with nuclear power plants and nuclear fuel reprocessing plants.

Highlights of the amended or new provisions are:

"Applicants for construction permits for nuclear power reactors and fuel reprocessing plants would be required to submit with the application a separate report on specified environmental considerations. The Commission intends to provide appropriate guidance as to the scope and content of the report.

"Copies of these reports would be transmitted with a request for comments to appropriate Federal Agencies designated by the Council on Environmental Quality which have jurisdiction by law or special expertise with respect to any environmental impact involved, or which are authorised to develop and enforce environmental standards.

"After receipt of the comments, the Commission's Director of Regulation would prepare a detailed statement on the environmental considerations, including a discussion of problems and objections raised by such agencies. The applicant's environmental report submitted with application for an operating licence would incorporate by reference information submitted earlier with the application for a construction permit. The detailed statement for the operating licence stage would cover only those environmental considerations which differ significantly from those discussed at the construction permit stage".

In addition, similar procedures would be used for some types of licences for the use of radioactive materials which are not specifically covered by the present policy statement. These would ordinarily include:

(i) licences for possession and use of special nuclear material for fuel element fabrication, scrap recovery and conversion of uranium hexafluoride;

(ii) use of source material for uranium milling and production of uranium hexafluoride; and

(iii) licences authorizing commercial radioactive waste disposal by land burial.

The AEC believes that the added amendments and provisions could contribute significantly to the protection of the environment which has now become a major industrial and ecological concern.

EXHIBIT H: (COPY OF EXHIBIT G)

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ON AN OVERSEAS STUDY TOUR

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APPENDIX C

OUTLINE

"THIS ATOMIC WORLD"

USAEC LECTURE-DEMONSTRATION PROGRAMME

Topic

A. INTRODUCTION

An opening that can vary with each Teacher-Demonstrator's presentation.

B. BASIC ATOMIC ENERGY

A review of the size and basic parts of the atom. A demonstration of the concepts of isotopes, radioisotopes, and transmutation.

Concepts included:

- Atom size
- Atomic number
- Atomic weight
- Isotope
- Radioisotope
- Transmutation
- Proton
- Neutron
- Electron
- Nuclear forces
- Source of chemical energy
- Source of nuclear energy

C. PARTICLE ACCELERATOR

A demonstration of the principles involved in a particle accelerator and the use of such instruments in nuclear research.

Concepts included:

- Static electricity
- Like charges repel
- Acceleration of sub-atomic particles

D. CHAIN REACTION

An explanation of how uranium will fission, including an analysis of the products of this fission reaction and its importance.

Concepts included:

- ^{235}U and ^{239}Pu
- Instability of uranium
- Neutron absorption
- Fission
- Fission products: Neutron
  - Kinetic energy (heat)
  - Radioisotopes
- Neutron loss
- Critical mass
- Uncontrolled chain reaction

E. REACTOR

An explanation of reactor components and its operation

Concepts included:

- Shielding
- Fuel
- Fuel element
- Enriched uranium
- Moderator
- Control rods
- Coolant
- Containment dome
- Controlled chain reaction

F. REACTOR USES

A demonstration of the use of reactors. First, for production of electricity and radioisotopes; second, as a means of propulsion in ships and rockets.

Concepts included:

- Heat transfer
- Production of electricity
- Propulsion
- Safety considerations
- Production of radioisotopes

G. RADIOACTIVITY

A demonstration using radioactive material to show the characteristics of atomic radiation and how and where it can be found.

Concepts included:

EXHIBIT H: (COPY OF EXHIBIT G)

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ON AN OVERSEAS STUDY TOUR

Invisible rays and particles
Alpha
Beta
Gamma
Neutron
Penetrating ability of radiation
Ionizing characteristics of radiation
Detection of radiation
Natural sources of radiation
Background radiation
Manmade sources of radiation

H. APPLICATION OF RADIOISOTOPES

A review of radioisotopes as tracers and as a source of direct radiation in medicine, agriculture, industry and research.

Concepts included:

Tracers
Source of direct radiation
Half-life
Radioisotope handling
Medical uses: Thyroid diagnosis
Tumor location
Teletherapy
Agricultural uses: Fertilizer uptake
Mutations
Foliar feeding
Industrial uses: Food preservation
Radiography
Molecular changes

I. FUSION

An explanation of a possible fusion reaction and its potential as a source of energy.

Concepts included:

Hydrogen isotopes
Magnetic bottle
Fusion products: Heat
Neutron
Helium
Availability of fusion fuel

J. CONCLUSION

The importance of atomic energy in the lives of each member of the audience is stressed.

EXHIBIT H: (COPY OF EXHIBIT G)

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ON AN OVERSEAS STUDY TOUR

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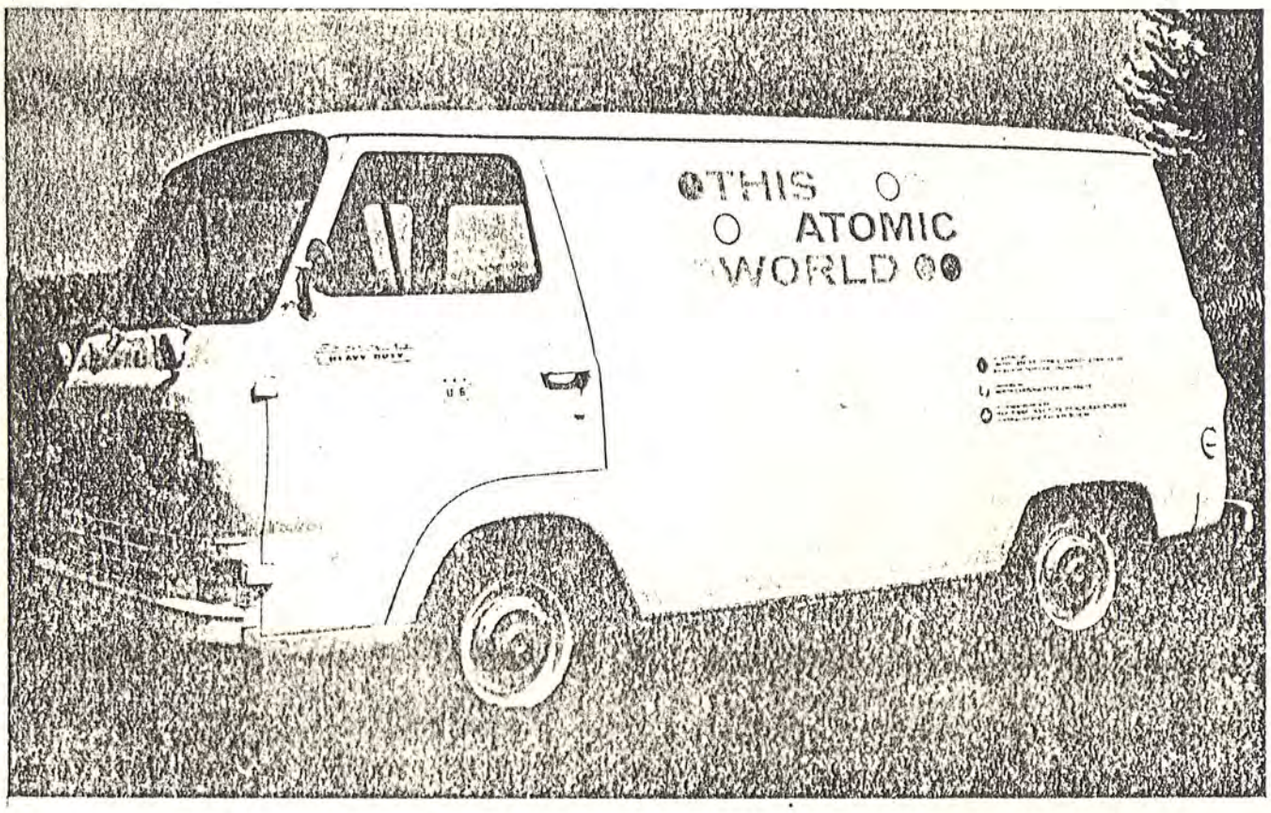

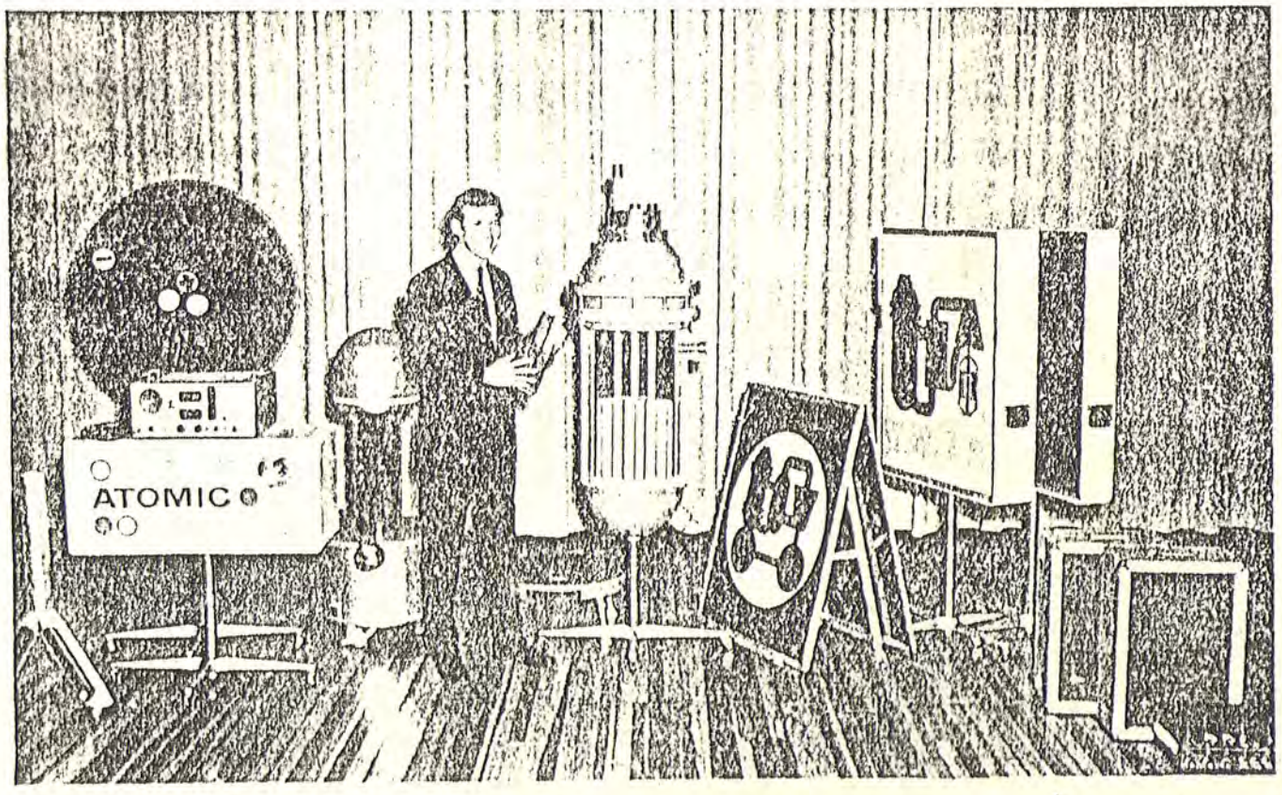

EXHIBIT H: (COPY OF EXHIBIT G)

COPY OF REPORT BY D.C.R. HURLIN

ON AN OVERSEAS STUDY TOUR

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APPENDIX D

USAEC PRESS RELEASE NO. N-75 DATED 15th MAY, 1970

10 INTERNATIONAL SCIENCE FAIR EXHIBITORS WIN TRIP TO

AEC'S ARGONNE NATIONAL LABORATORY

Ten high school science students have won Atomic Energy Commission Special Awards for their outstanding nuclear-related exhibits in the 21st International Science Fair at Baltimore, Maryland.

Each received an AEC Certificate of Achievement at this morning's Special Awards Convocation which, with tonight's awards banquet, climaxes the week-long fair in the Baltimore Civic Centre.

With the AEC certificate goes an invitation for each winner and his science teacher to attend an expense-paid "Nuclear Research Orientation Week" in mid-August at the Commission's Argonne National Laboratory near Chicago. Ten other student exhibitors, who won honorable mention and certificates, will be alternates for the Argonne study tour if any winners are unable to attend.

Dr. Paul W. McDaniel, Director of the AEC's Division of Research, presented the certificates. The AEC Special Award winners and alternates, and the project upon which they based their exhibits are:

WINNERS

Mark S. Donnell, 17 (Sr.), Blackford High School, San Jose, California - Nuclear Reactions with 17 MeV Gamma Rays.

Brenda M. Cox, 17 (Jr.), Terry Parker Senior High School, Jacksonville, Florida - Effects of X-Irradiation on the Optical Absorption of Doped Fluorite.

Earl F. Glynn, 17 (Jr.), Wamego High School, Wamego, Kansas - Determining the Charge and Mass of an Electron Using Homemade Apparatus.

Davis Bartnicki, 16 (Sr.), Cass Tech High School, Detroit, Michigan - Electron Linear Accelerator.

James M. Caruthers, 16 (Jr.), Grandview Senior High School, Grandview, Missouri - Mechanism of Electrical Discharge in Gases.

David S. Adams, 16 (Sr.), Miami High School, Miami, Oklahoma - Exploring Subnuclear Physics.

Christopher R. Ellis, 15 (Soph.), Upper Dublin Senior High School, Ft. Washington, Pennsylvania - Light Production by Euglena.

John W. Amuedo, 17 (Jr.), Ross Sterling Senior High School, Houston Texas - Anti-polar Particle Acceleration Theory.

Robert Bismuth, 16 (Jr.), Sir Winston Churchill Secondary School, St. Catharines, Ontario, Canada - Linac IV: Probing the Nucleus.

George A. Zdasiuk, 18 (Sr.), Silverthorn Collegiate School, Toronto, Canada - Plasma Physics.

ALTERNATES

Thaddeus P. Kochanski, 18 (Sr.), F.U. Conard High School, West Hartford, Connecticut - Confinement of Hydrogen Plasma.

Bruce M. Lovelace III, 17 (Sr.), Plaquemine High School, Plaquemine, Louisiana - Effects of X-Irradiation on Antibody Formation in Rats.

Timothy J. Di Laura, 16 (Soph.), Lakeview Senior High School, St. Clair Shores, Michigan - Effects of Radiation on Neoblasts in Dugesia tigrana.

Paul T. Kolen, 18 (Sr.), Grand Rapids Union High School, Grand Rapids, Michigan - Sectional Magnetic Focusing in a Six-Inch Cyclotron.

Jeffrey S. Braden, 17 (Sr.), Biloxi Senior High School, Biloxi, Mississippi - The Proton Cyclotron.

Ann M. Avitabile, 16 (Jr.), St. Helena High School, New York, New York - Euglena gracilis Mutation Induced by Far Ultraviolet Radiation.

Richard Zimmerman, 15 (Soph.), The Bronx High School of Science, Bronx, New York - RNA and the Memory Factor.

Linda Siconolfi, 18 (Sr.), St. Joseph Hill Academy, Staten Island, New York - Effect of Chemical Protectors on the Red Blood Cells of Irradiated Mice.

Rosina M. Bierbaum, 17 (Sr.), Bethlehem Catholic High School, Bethlehem, Pennsylvania - Ultraviolet-Chlorella Interaction as a Bacterial Radiation Shield.

Mark Massie, 16 (Jr.), Spearman High School, Spearman, Texas - Laser Initiated Photochemical Reaction.

Among the more than 400 finalists at Baltimore 41 were considered for the AEC awards because the science projects either dealt directly with some aspect of nuclear science or employed nuclear research tools such as radioisotopes.

Exhibits were evaluated by 12 judges selected from the AEC Headquarters and other AEC offices and installations in the U.S. atomic energy program. Each winner was determined by the scientific excellence of his project and its relationship to nuclear science, the effectiveness of the exhibit in providing information to the general public, and

EXHIBIT J:

LEFT OUT BY CONSENT

PLAN OF KOEBERG NUCLEAR POWER STATION

BASIC OUTLAY

EXHIBIT K

NOTES MADE BY ACCUSED DURING HIS DISCUSSIONS WITH MR. VAN DEN BERG AT DUVHA POWER STATION AND MR. BROWN OF MATLA POWER STATION

DUVHA 19 September and Kriel 20 September.

Barlow Rand Opencast

4½ km away.

No coal used yet.

Stockpile - 6 months ahead.

Staithes - 12 days supply. (10

Surge(?) bunkers 12 hours.

Primary crushing at mine.

Low grade - ± 21 MJ/kg

Ash content boilers cope up to 30%

Stores and workshops hangar.

Water Komati Scheme

Dump ash, decant water, reuse it.

Ashdam.

One-through boilers - no storage drums.

Advantage of less material in boiler - more flexible. But (20

no buffer - critical operation.

Turbines - combined reaction impulse turbine.

Team of engineers of Escom - site work.

+ HO project engineers.

Then hand over to ETU

Pipe Ash. Safety of ash dams now O.K.

S.A. has developed own ash technology.

Crane is biggest of type in world.

Scotch Derrick crane 100+ capacity, 40 m radius.

Towers rather than one continuous building. (30

Means crane rest(?) more ahead of building.

Construction/..

EXHIBIT K

NOTES MADE BY ACCUSED DURING HIS DISCUSSIONS WITH MR. VAN DEN BERG AT DUVHA POWER STATION AND MR. BROWN OF MATLA POWER STATION

Construction periods much better than UK, or Canada.

Were better off than Germany. They stopped building.

No. 3 block completed.

Generate at 22 kv, transfer to 400 kv.

100% Standby Feedpumps

Steam Turbine Feedpump, + 213 MW pumps - GEC - SA (10

Progressive for 12 months.

3.5 lost time. Injuries per million manhours worked.

Construction industry NOSA $\pm$ 18.

ESCOM 1969 Safety of persons in plants will be paramount.

Very difficult with subcontractors, but Escom has been successful.

Kriel won cup last year.

Compares very favourably with overseas - Cor. NOSA.

S.A. leads world with exception of USA.

Battery Standby. (20

Control is all solid state - analogue and ??

Monitoring computer.

Turbine mostly imported - only two places in world UK, France

Switzerland can forge shafts of right diameter.

Special steel imported.

Generator GEC UK

Seafarer - everybody had stuff on it when it sank.

Most heavy loads Richards Bay.

95 m high boiler house.

Boiler expands downwards 350 mm on heating. (30

Light burns with oil.

Now/..

EXHIBIT K

NOTES MADE BY ACCUSED DURING HIS DISCUSSIONS WITH MR. VAN DEN BERG AT DUVHA POWER STATION AND MR. BROWN OF MATLA POWER STATION.

Now using mix of 70/30 heavy furnace/??

Boiler tubes, German.

First generator Dec. 1979.

A year between sets - 6 years in all.

Safety = speed of erection.

(10

Johan v.d. Berg
P.O. Box 1148
WITBANK 1035
01351 - 70027

Thanked 15 Oct 79

(20

EXHIBIT K

NOTES MADE BY ACCUSED DURING HIS DISCUSSIONS WITH MR. VAN DEN BERG AT DUVHA POWER STATION AND MR. BROWN OF MATLA POWER STATION

Mr. and Mrs. Brown

19 Sept. 1979.

Production Assets Manager

21.8 MJ/kg Uground

Kriel

Private Bag X09

KRIEL. 2271

18.8 - 19.9 Opencast - different seam.

On load Jan '76

Last Dec '79

1000 600 b 400 W

Compound

Kriel Village 2300 houses

Matla Kriel

Kriel Mine AAC

Matla Mine GMSA

only underground

Base load. Load factor August 85%

July 89%

90%

Higher than anticipated because Matla a bit behind schedule.

Boiler problems.

One set out every three months.

Kriel biggest and best at present.

Problems:

Quality originally - Slag.

Steinmuller - once through boilers - widely used in Germany.

More flexible than drum.

EXHIBIT K

NOTES MADE BY ACCUSED DURING HIS DISCUSSIONS WITH MR. VAN DEN BERG AT DUVHA POWER STATION AND MR. BROWN OF MATLA POWER STATION

12 Months 34.6 - 34.3, 34.9

August thermal efficiency.

Safety 4 acc per million man

Most problems people

Failure to use safety equipment, e.g. gloves.

Station 10 a.m. ——→ 2 p.m. Coal mine. (10

8 a.m. Myburgh

Operations

Regionalised Oct. '78 Manager ETR

(20

EXHIBIT K

NOTES MADE BY ACCUSED DURING HIS DISCUSSIONS WITH MR. VAN DEN BERG AT DUVHA POWER STATION AND MR. BROWN OF MATLA POWER STATION.

B.C.W. Clynick - Township Superintendent.

1971 Kriel Township for Kriel p.s. and coll.

Then Matla.

Tied(?) cottages - 3 months' notice.

The Villagers type township.

Clique geography - try to avoid.

?? Build his house next to power station because want power fresh.

Kriel Township built away from p.s. on otherwise un-usable land.

No rail link. 30 mi. from anywhere.

Hardships initially were school.

(No doctor, pub, etc. at first).

Landing strip - can take Dakota.

Coloured quarters up to 180.

Bantu black single quarters NOT compound.

Initially 20 to a room down to 8 to a room.

We do not ???

No strike, etc.

Much better than mines - they give a bloke -

Clean.

Permanent Quarters. With Africans obv getting more and more.

Don't want wives - "What about my girlfriend".

Sorghum beer

Bicycle sheds

Laundrette, coin-op.

At - Education.

Some education but "not enough".

EXHIBIT K

NOTES MADE BY ACCUSED DURING HIS DISCUSSIONS WITH MR. V.D. BERG AT DUVHA POWER STATION AND MR. BROWN OF MATLA POWER STATION

Capil heaters replace coal stoves in rooms.

Taken tops off bunks to 10 per room.

Locker.

Asbestos temporary building - prefab.

Eventually brick, 8 to room and lounge.

Much damage to lockers. "no respect". (10

Mirrors - they pinch mirrors.

Transkei Baccha Boy(?) - cleans latrines - filthy.

Showers hot water.

Big concrete ones preferred. Underfloor heating.

Lapa - cook meat themselves every now and again.

Hard liquor outlet - only sell cans & minatures.

Swimming Pool - large. Not much used yet.

Doctor twice a week, 2 med. orderlies 24 hrs. and ambulance.

Bruce Lee movies.

Soccer big thing. Kriel won. (20

Brick.

Small brick ablution blocks coming.

Telephone - PA system.

Tribal dancing - always won by Amazulu.

Eventually entrance, church and Rec. Hall.

Shop run by Frasers - (no credit hassles).

Prices high - but quality goods.

Tennis courts for blacks. Clerks.

11 Married qu. for senior staff.

Eventually tar roads and fence. (30

Only one way to motivate - give money for work done.

EXHIBIT K

NOTES MADE BY ACCUSED DURING HIS DISCUSSIONS WITH MR. V.D. BERG AT DUVHA POWER STATION AND MR. BROWN OF MATLA POWER STATION

Four sleeping on side of dam. Escom boys at work.

M A T L A

Matla precipitation so good construction supervisor cannot tell till he gets to station that units are working.

Matla concrete construction - sliding shutter.

Coloured quarters.

Married black quarters - more black trainees.

Full black car park.

5200 Blacks at Matla (with construction).

Full dentist room.

Matla - much improved.

4 to room.

Or 3 in room.

Cleaner, better, bigger.

Heavy smokers, cig. sales.

Milk - heavy sales - sour and fresh.

Beer Hall - NO FEMALES ALLOWED.

Kitchen, Dining Hall.

"FEEDING TIMES"

KB Stools.

Contractors.

2 Week - week work now to next F.

Get Sat, Sun, and half Fri. off.

Mainly from local homelands.

Get none.

Bus service not used. Taxis used.

Free/..

EXHIBIT K

NOTES MADE BY ACCUSED DURING HIS DISCUSSIONS WITH MR. V.D. BERG AT DUVHA POWER STATION AND MR. BROWN OF MATLA POWER STATION

Free med., pensions, overalls.

?? cash at beginning of month could live happily to next pay day. Unless smoking or drinking.

Until he asks for something don't give it to him.

Don't force it on you.

"Must be change in feeding habits, to serving themselves. (10

Must be their idea.

Whites ?? Flats to be built.

4 levels of housing.

Anglo have 13 levels.

All levels intermingled.

Not as at Rietspruit, where classes are segregated.

At Anglo, number of carpets was grading there.

Mixed artisan.

Children grow up. (20

Two of those big draglines together cost more than Megawatt Park.

Kriel used to be a horse changing post.

Coal by wagon to Johburg.

?? and pub used to be at Kinross.

Construction - big families.

Operations smaller families.

110 km travelled per day by English schoolkids.

Shop prices high.

4-bed house for 4 child family.

Afrikaans school 1000 - grades to Std. 5 (30

English Primary 350 - 40 grades to Std. 5

Agitating/..

EXHIBIT K

NOTES MADE BY ACCUSED DURING HIS DISCUSSIONS WITH MR. V.D. BERG AT DUVHA POWER STATION AND MR. BROWN OF MATLA POWER STATION

Agitating for high school.

If we got 3rd power station.

Everyone has a car - got to have one.

One bioscope 4 x a week

Club

12 Tennis courts, olympic swimming pool, 3 bowling greens. (10

KRIEL - C. BROWN 20 SEPT.

Hydrogen cooling of generator.

40W 40b per shift on full operat.

2 Elec. feed pumps, standby.

1 steam feed pump, normal.

Separate control for each set.

Std. Siemens Control System.

Computer to give alarm readings, and historical record.

S/Pan only has output reading.

One man in turbine side. (20

One man in boiler side.

All rest maintenance normally self-sustaining.

All planned maintenance.

Sep. turbine houses near sep. cranes, but Duvha Matla have one house, one crane.

Kriel 6 separate little 500 mw power stations, but ?? coalfeed, overheads, etc.

Coal mill 328 kw per mill _____ 100 MW coal output.

8 Hours bunker at top of boiler

Stathes a week. (30

20 Sept. 1979 AMCOAL Kriel Mine 16 x 100+ Cat. diesels.

EXHIBIT L:
VISITOR'S INFORMATION BROCHURE
OF DUVHA POWER STATION, PUBLISHED
BY ESCOM

13
Dew. L.

DUVHA POWER STATION

VISITOR'S INFORMATION BROCHURE

EXHIBIT L:

VISITOR'S INFORMATION BROCHURE OF DUVHA POWER STATION, PUBLISHED BY ESCOM

I N D E X

HIERDIE BROSJURE IS OOK IN AFRIKAANS BESKIKBAAR

EXHIBIT L:

VISITOR'S INFORMATION BROCHURE OF DUVHA POWER STATION, PUBLISHED BY ESCOM

INTRODUCTION

Duvha Power Station is situated about 20km South-East of Witbank in the Eatern Transvaal. Duvha and Matla (also in the Eastern Transvaal) are the two largest coal-fired power stations in the world. Each will eventually have a total installed capacity of 3600MW.

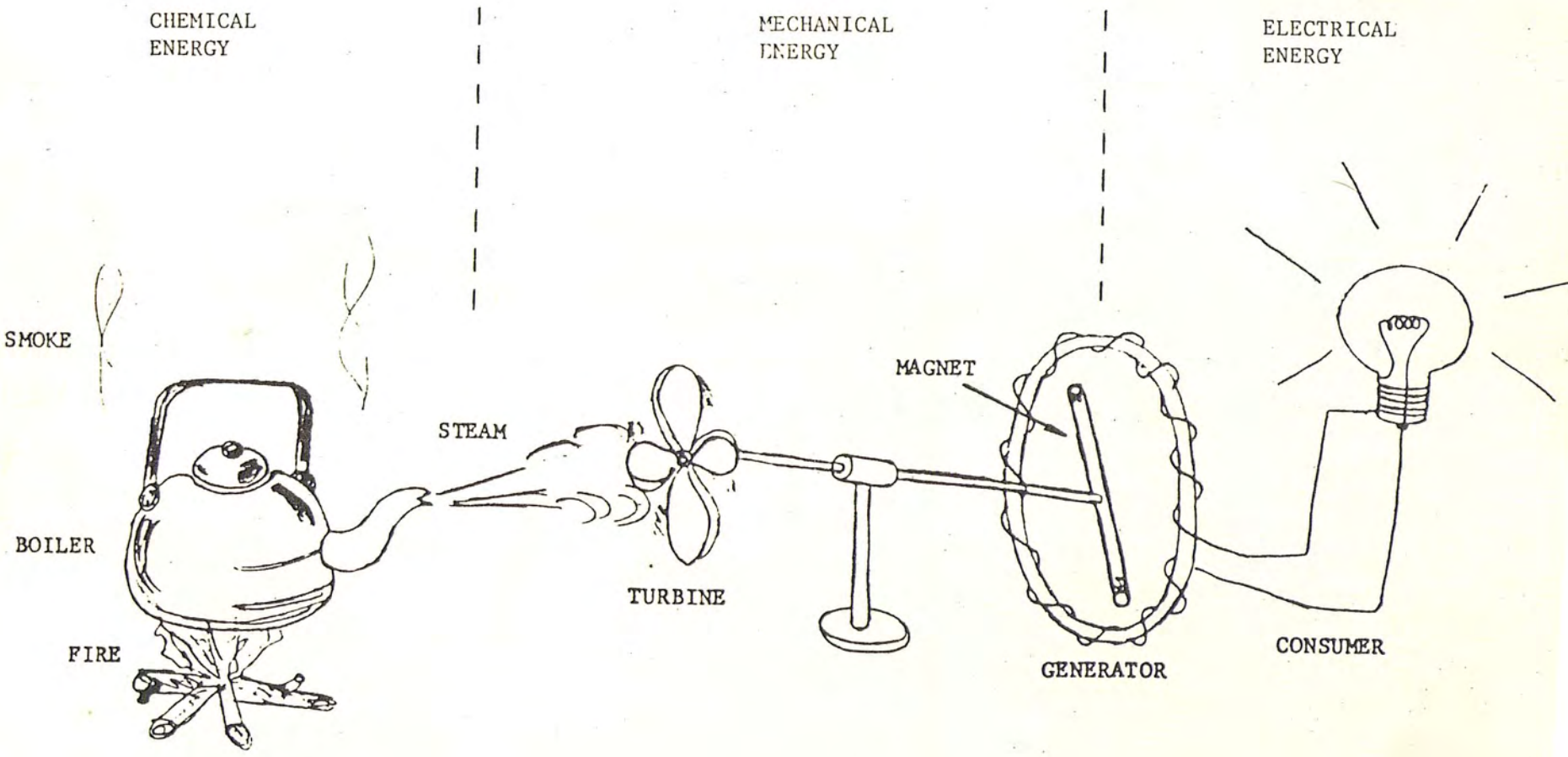
"Duvha" is a Venda word, meaning "Sun"

Duvha will have six generating sets, each rated at 600MW.

Construction started with earthworks in November 1975 and the last of the six units will be put into service in September 1984, a total construction period of 9 years. The first 600MW unit will go into service in September 1979.

EXHIBIT L:

VISITOR'S INFORMATION BROCHURE OF DUVHA POWER STATION, PUBLISHED BY ESCOM



ENERGY CONVERSION IN A POWER STATION

EXHIBIT L:

VISITOR'S INFORMATION BROCHURE OF DUVHA POWER STATION, PUBLISHED BY ESCOM

HOW A POWER STATION WORKS

1. The Furnace and Boiler

The furnace is fed by pulverised coal from the mills i.e. coal that has been ground to a very fine powder to ensure easy and quick combustion.

An air stream from the Primary Air Fans transports the coal from the mills to the furnace. Additional air is necessary for combustion and is supplied by the Forced Draught Fans. The coal is then burned, producing the heat necessary for boiling the water in the tubes surrounding the furnace i.e. the Boiler. The steam produced is heated even further in the Superheaters before leaving the boiler for the turbine.

Coarse ash which is formed in the furnace, falls into the Ash Hopper and is pumped to the ash dams after having been crushed and mixed with water.

The gasses formed by combustion are extracted from the furnace by the Induced Draught Fans and expelled via the chimneys. A fine ash carried by these gasses is extracted by means of Electrostatic Precipitators and is also flushed to the ash dams. The efficiency of the Electrostatic Precipitator is in excess of 99%.

EXHIBIT L:

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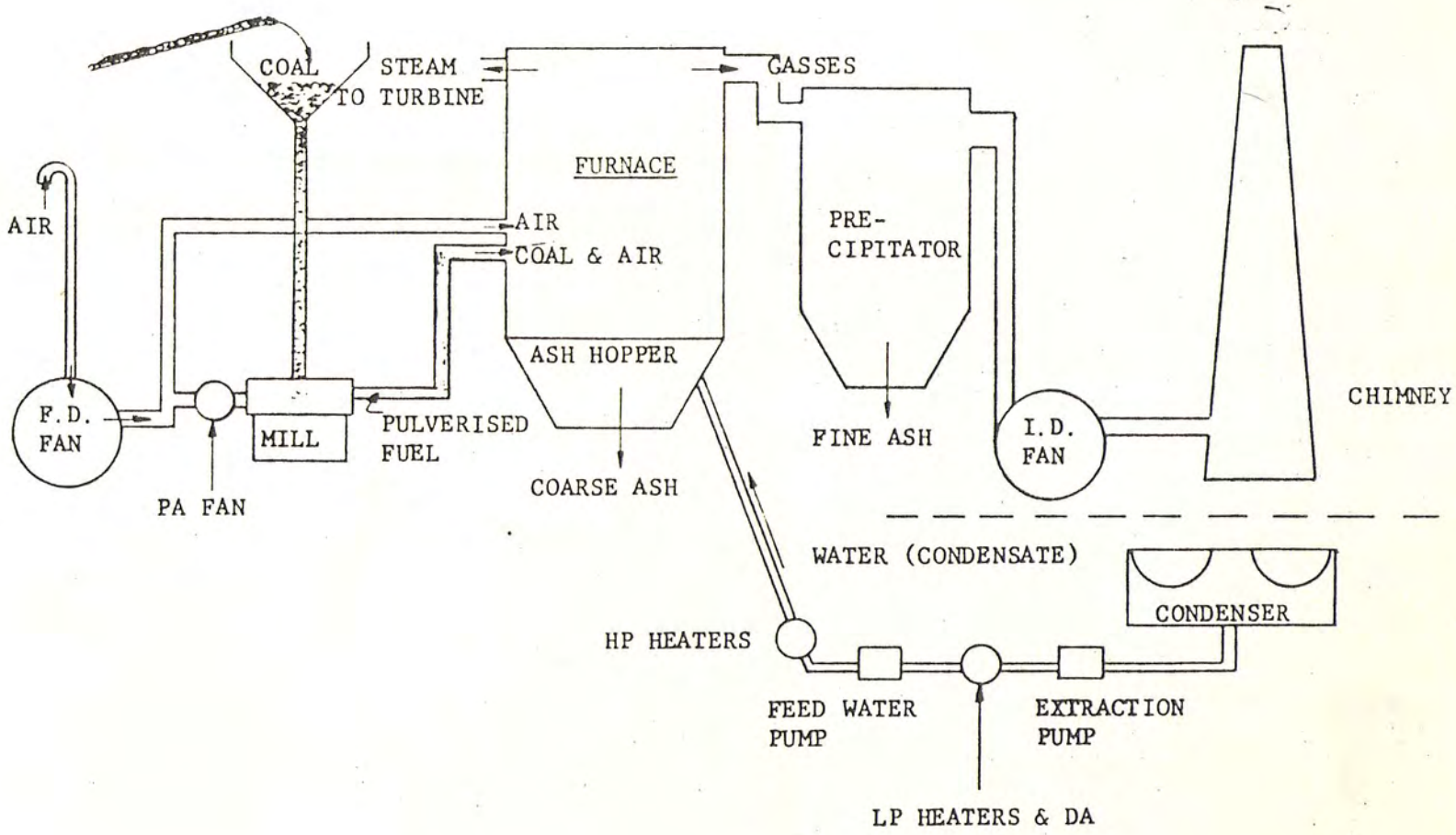

FURNACE AND BOILER OPERATION

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2. The Steam Turbine

The turbine transforms the energy in the steam into mechanical energy (rotating). Steam with a high temperature (535 °C) and under a high pressure (16,1 MPa abs) enters the turbine and imparts its energy onto the blades which are fixed to a rotating shaft.

The turbine consists of three "sections" i.e. the high pressure intermediate pressure and low pressure turbines.

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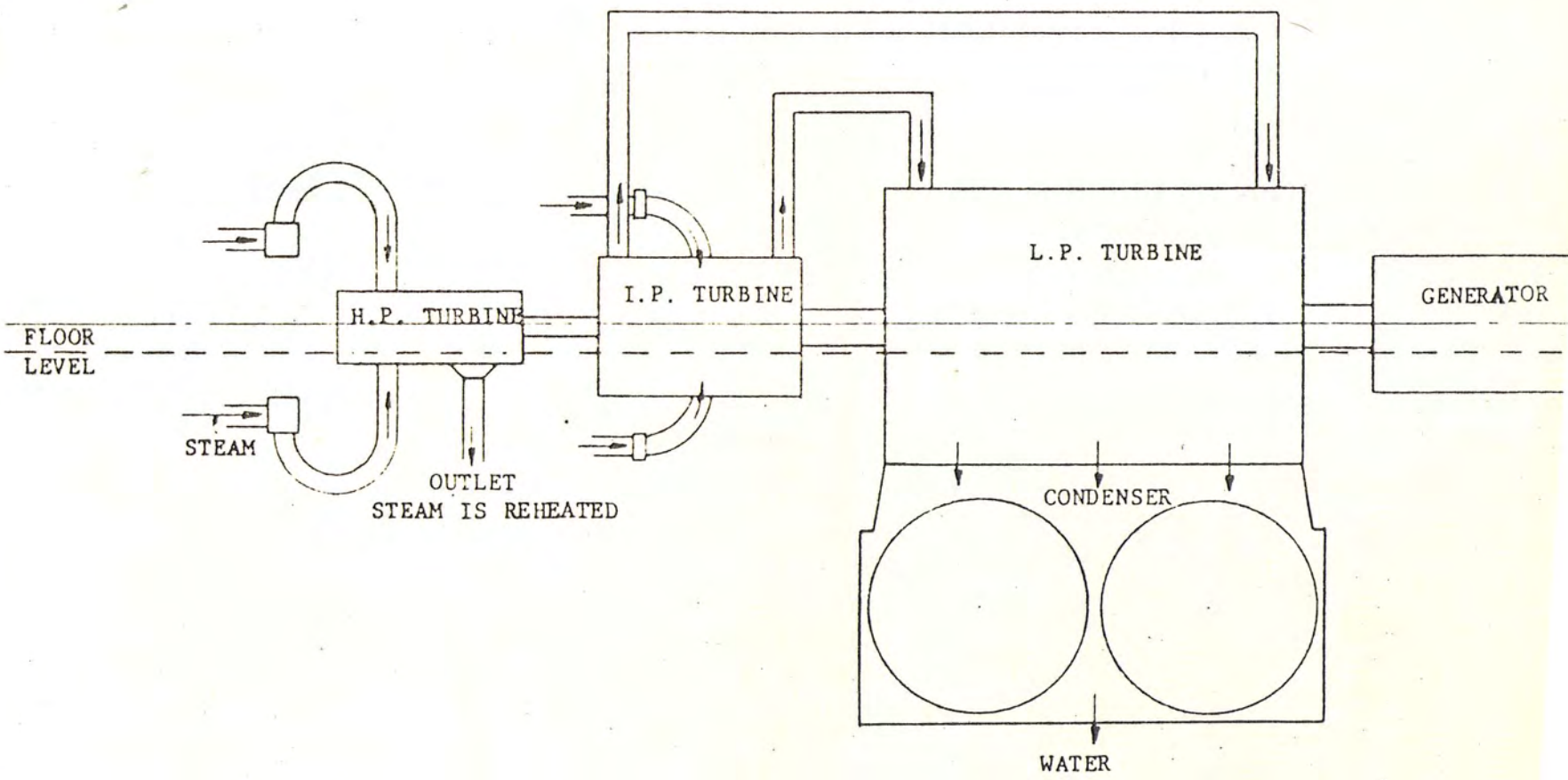

THE STEAM TURBINE

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3. The Cooling Water Circuit

The exhaust steam from the L.P. turbine, which has had all the usable energy extracted, is then condensed into water by the condensers. This is achieved by letting the steam pass over tubes containing cold water.

The condensed water is then pumped back to the boiler by means of extraction pumps and feedwater pumps, via a series of feed heaters and a deaerator.

Each of the two condensers has 22 552 tubes. The cooling water in these tubes gains heat in the process and in turn must be cooled down before re-use. This is what Cooling Towers are for.

The C.W. (Cooling Water) is pumped up into the Cooling Towers through a series of pipes and sprays. The C.W. cascades back down inside the tower, passing through a natural up-draught of cold air and is thus cooled. A certain amount of unwanted evaporation takes place.

It is important in a Power Station that the Cooling Water and the Condensate Water should not come into contact with each other as the condensate being returned to the boiler must be of a very high degree of purity, whereas the C.W. water is ordinary raw water.

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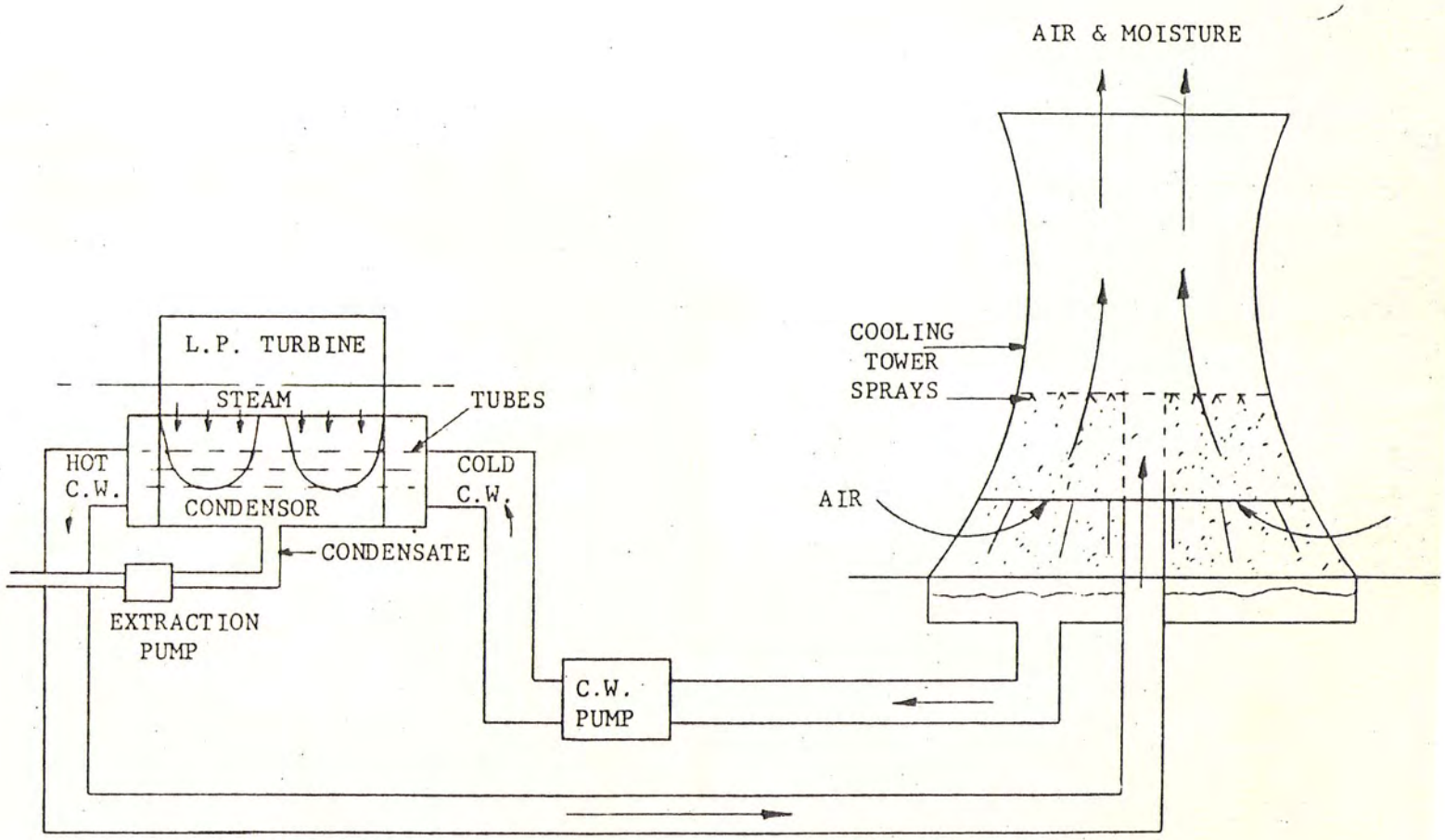

THE COOLING WATER CIRCUIT

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4. Electricity Generation

A generator (driven by the steam turbine at 3000 rpm) generates the electric power. The electricity is transformed to a high voltage by a transformer and is then fed into the national high voltage grid which distributes the power to the consumers.

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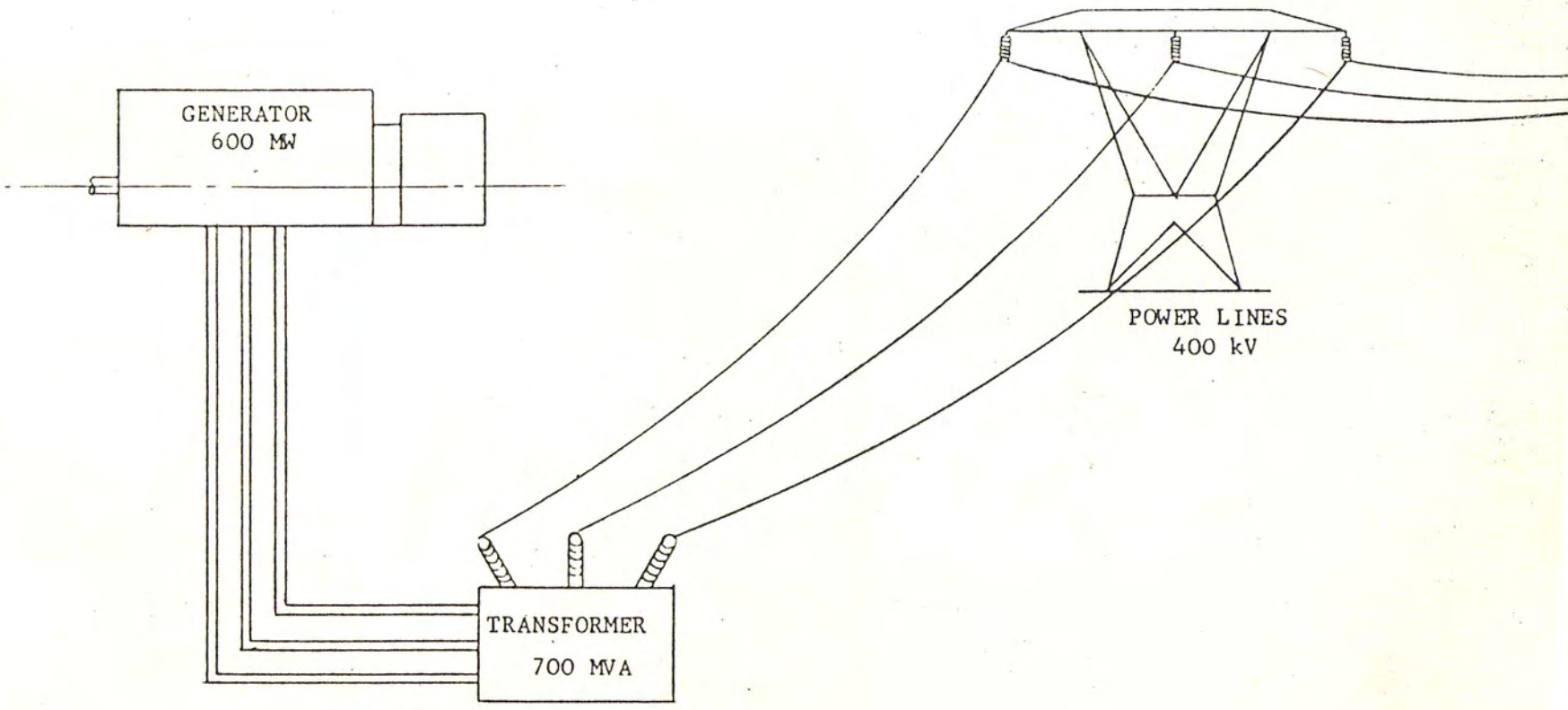

ELECTRICITY GENERATION

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SOME FACTS AND FIGURES

1. Turbo-Generator

Make :	G.E.C.
Output :	600MW
Superheater steam inlet conditions:	16,1 MPa (abs) 535 °C
Steam flow (at 600MW) :	500 kg/s
Total mass (turbine) :	700 tonne
Speed :	3000 rpm
Heat consumption:	8220 kJ/kWh
Number of brass tubes in condenser :	22552
Turbine efficiency:	43,8% cycle eff.
Generator :	666,67 MVA 22 kV

Total mass of generator (stator and rotor): 471 tonne

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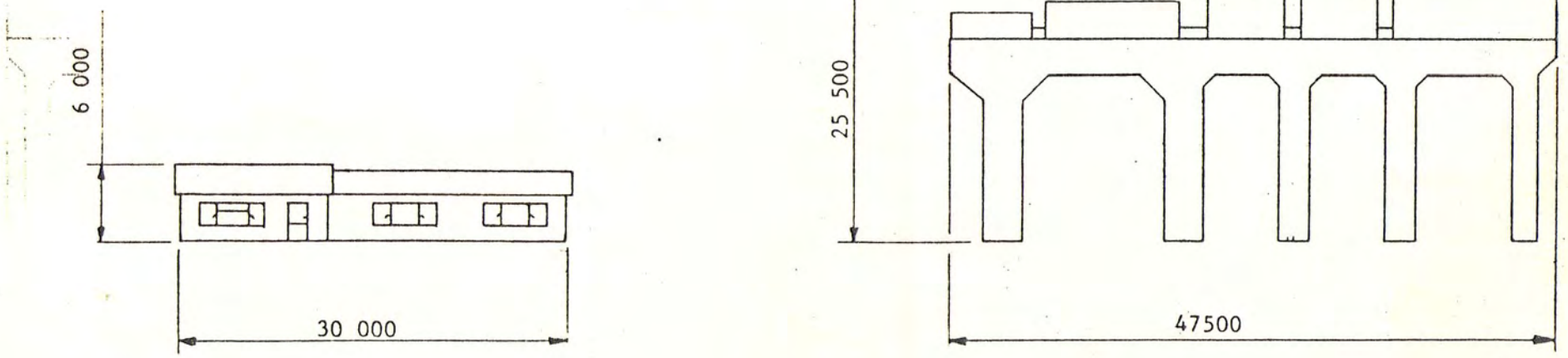

THREE BEDROOM-HOUSE COMPARED TO TURBO-GENERATOR AND BLOCK

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2. BOILER

Manufacturer:		Steinmüller (Africa)(Pty) Ltd
Maximum continuous rating:		507 kg/s
Final steam conditions:		17,44 MPa 545 ^{o}C
Coal consumption at full load:		+- 250 ton/hour
Dimensions :	Height:	95,5 m
	Width:	20,2 m
	Length:	23,5 m
Total mass of boiler and supporting structure:		9800 tonne
Furnace heating area:		73 978 m^2
Total water content (cold):		185 000 kg
Efficiency:		At max. continuous rating 93,91%

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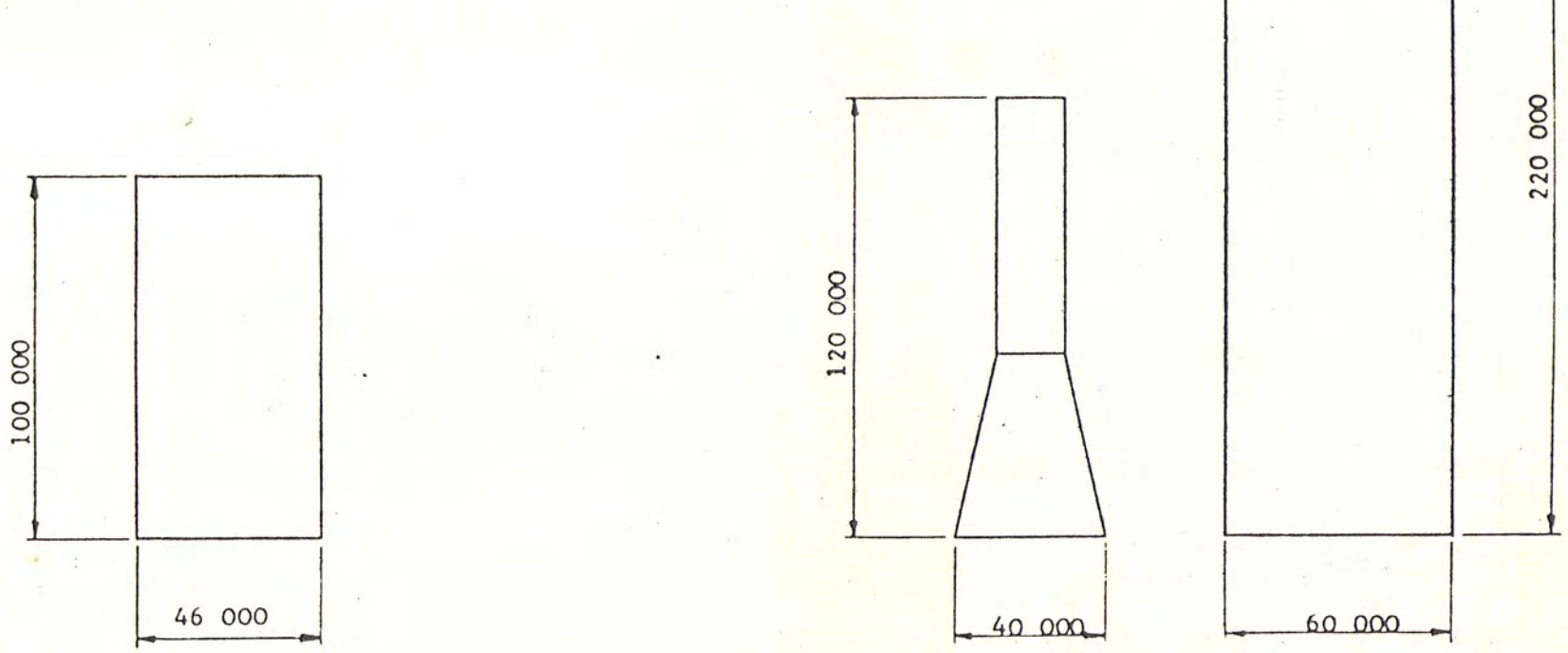

COMPARISON: BOILER TO CARLTON HOTEL

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3. FEED PUMPS

Steam feed pump turbine (100%):	20 MW
" " " make:	Sulzer
" " " flow at duty point:	507 kg/s
" " " pressure at duty point:	24 MPa (abs)
Electric feed pumps motor (50%):	9,92MW required
" " " make:	Sulzer
" " " flow at duty point:	254 kg/s
" " " pressure at duty point:	24 MPa

4. COOLING TOWERS

Six cooling towers will be built, each rated at 600MW.

Height : 127 m
Dia at bottom : 95 m

Minimum shell thickness : 750 mm

Evaporation per tower per day at 600MW : 30 Ml/day

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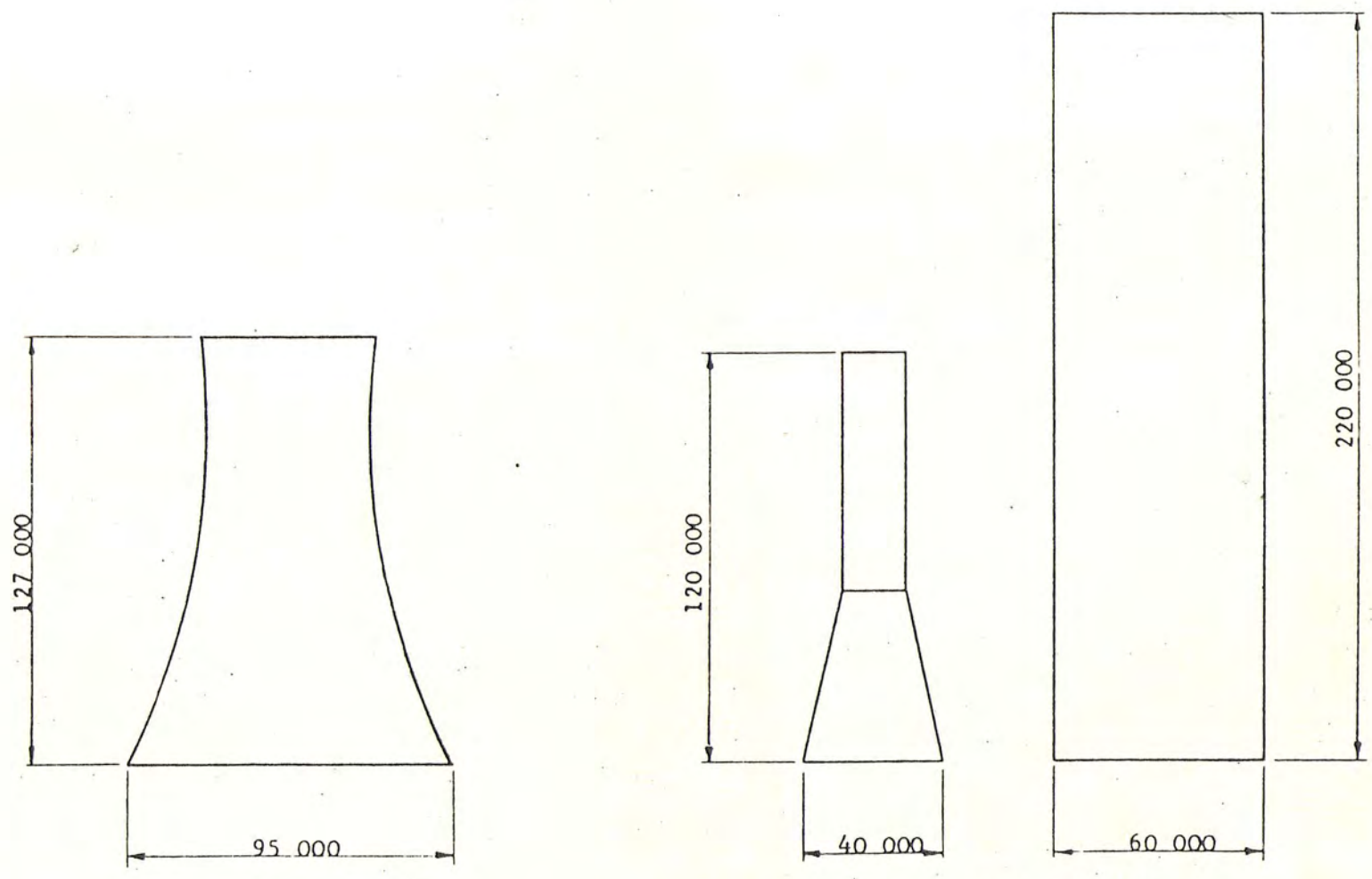

COOLING TOWER

CARLTON HOTEL AND CENTRE

COMPARISON: COOLING TOWER TO CARLTON HOTEL AND CENTRE

EXHIBIT L:

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OF DUVHA POWER STATION, PUBLISHED

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5. CHIMNEY

Two chimneys will be built, each serving 3 boilers.

Height	:	300 m
Dia. at bottom	:	22 m

Each chimney is in fact three chimneys enclosed by a concrete wind shield.

A passenger lift will operate inside each chimney to allow for maintaining air warning beacons and maintenance of the chimneys.

The chimneys will be the tallest free standing concrete structures in the southern hemisphere.

EXHIBIT L:

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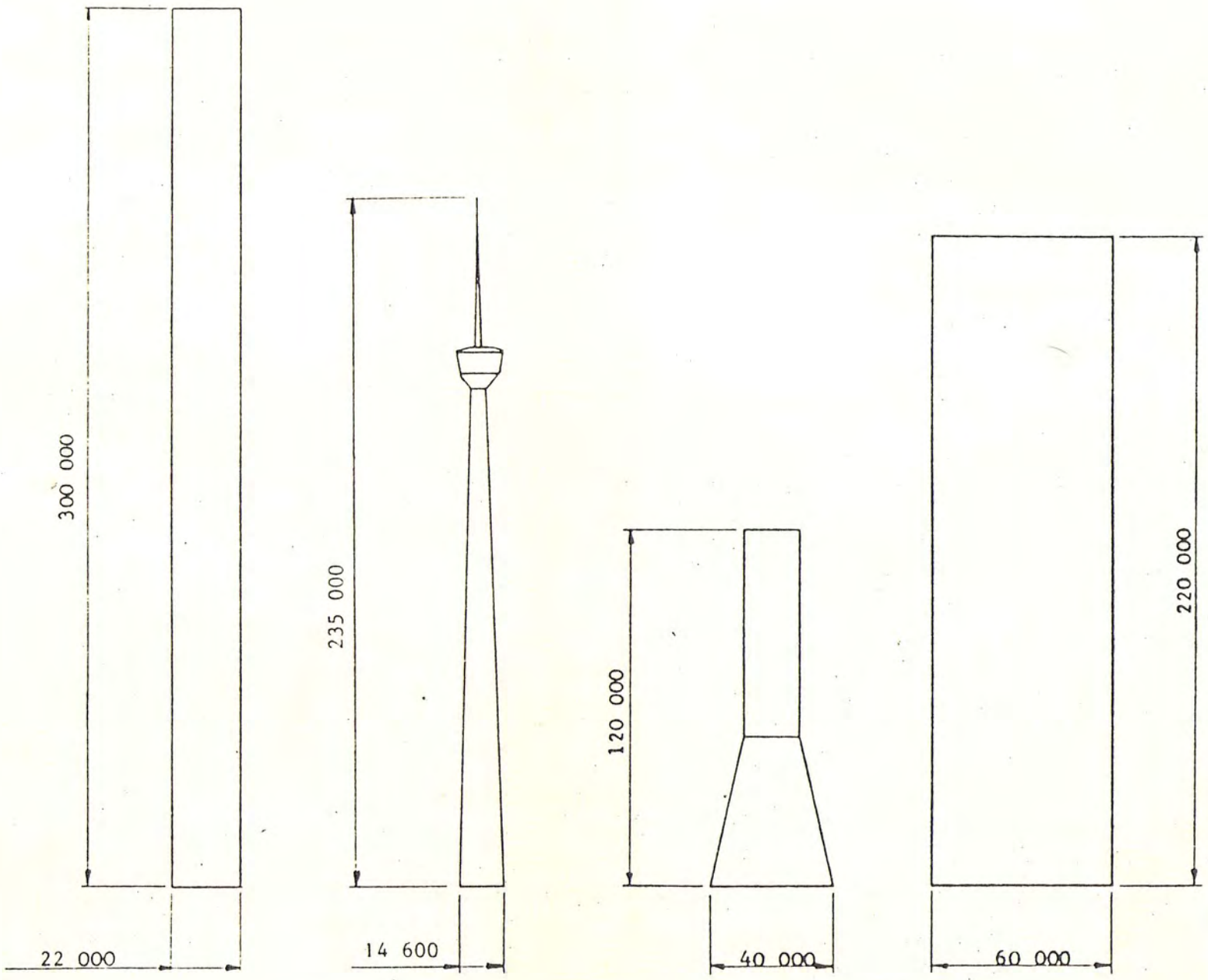

COMPARISON OF CHIMNEY TO CARLTON HOTEL AND CENTRE AND BRIXTON TOWER

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6. COAL AND ASH HANDLING

Coal is supplied by the DUVHA mine via an overland conveyor system.

Mining is by the open-cast method.

Daily production of the mine will be approximately 26 000 t/daily in 1985.

A stockpile if 1 000 000 tons will be built up for emergency use.

The ash from the boilers and precipitators is transported to ash dams by water. About 10 000 tons of ash is produced every day.

7. DUVHA COAL MINE

The coal mine is known as Duvha Open Cast Services and is part of the Barlow Rand Group. As far as known this will be the largest open cast mine in the southern hemisphere.

One of the largest nerseries for plants and trees in the Eastern Transvaal will be established at the mine. The trees and shrubs will be used to re-landscape the area after mining operations have been completed.

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MAIN CONTRACTORS

Boilers	Steinmüller (Africa)(Pty) Ltd
Turbines	G.E.C. Engineering (Pty) Ltd
Civil Works	L.T.A. Construction
Earthworks	Grinaker Construction (Pty) Ltd
Cooling Towers	L.T.A. Construction (Sub-contractor to Hamon Sobelco)
Chimney	Monahan & Frost (Pty) Ltd
Generator Transformers	Reunert and Lenz
Cabling : Construction	Hubert Davies (Pty) Ltd
Station	Hubert Davies (Pty) Ltd
Instrumentation : Control Room	Siemens Limited
Process Computers	Honeywell
Coal Handling (Staiths)	High Structures (Pty) Ltd
Conveyors	Spencer Melksham (Pty) Ltd
Ash Plant	D.B. Thermal
Construction Water Ring	Hall Longmore & Co.
C.W. Pumps	Amalgamated Power Engineering S.A.(Pty)Ltd
Sewage Plant	Satec Hudamec
Steelwork (sub-contractor)	Dorman Long Vanderbijl Corporation Ltd
Fire Control System	Mather and Platt (Pty) Ltd