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MAY 6 1988

MEMORANDUM FOR: Chairman Zech
Commissioner Carr

Original signed by
Marvin R. Peterson

FROM: James R. Shea, Director, International Programs
Office of Governmental and Public Affairs

SUBJECT: VISIT OF JEAN-CLAUDE LENY, FRAMATOME (MAY 16, 1988)

This is to confirm your appointments with Mr. Jean-Claude Leny, Chairman and CEO of Framatome, on Monday, May 16, 1988. He will meet at 10:00 a.m. with Chairman Zech in his office followed by a 10:45 a.m. appointment with Commissioner Carr. These courtesy call appointments were arranged directly by Mr. Marcus Rowden.

Mr. Leny will be accompanied by Mr. Michel Coudray, Technical Director, and Dominique Degot, Vice President, International Operations, Framatome, and Mr. Rowden. H. Faulkner of GPA/IP will attend the meetings, also.

Enclosed as background information for the visit is a biography on Mr. Leny, an overview of the French program and Framatome, and an article by Mr. Leny on the French nuclear program.

The GPA/IP contact for this meeting is Hans Schechter (x20775).

By copy of this memorandum, the other Commissioners, the EDO, OGC, NRR, RES, NMSS, GPA, and SECY are also being advised of these arrangements.

Enclosures:
1. Biographical Resume - Jean-Claude Leny
2. Background Information
3. "French PWRs: past, present and future," J.C. Leny, Framatome, Paris, France

cc w/enclosures:
Commissioner Roberts
Commissioner Bernthal
Commissioner Rogers

cc w/o enclosures:
EDO
OGC
NRR
RES
NMSS
GPA
SECY

6/6

*SEE PREVIOUS CONCURRENCE

OFC:	GPA/IP *	GPA/IP *	GPA/IP	GPA/IP *	GPA/IP
NAME:	KDBurke:eb	DCChaney	HJFaulkner	RDHauber	JRShea
DATE:	5/ /88	5/ /88	5/ /88	5/ /88	5/6 /88

APR 2 5 1988

BIOGRAPHICAL RESUME

Jean-Claude Leny

Pronunciation: Lenē

Jean-Claude Leny is the Chairman and Chief Executive Officer of Framatome S.A., the Paris-headquartered company which designs and manufactures the light water reactors for the French nuclear power program. Mr. Leny also serves as Chairman of the Board of Novatome, the Framatome subsidiary devoted to breeder reactor development and the supplier of the Superphenix fast breeder reactor.

Mr. Leny, age 59, is a graduate of the Ecole Polytechnique. He began his professional career in nuclear science and technology and, following several years with the French Atomic Energy Commission (CEA), he served as an official of the European Atomic Energy Community (EURATOM) in Brussels and, thereafter, as Director of the European Community heavy water reactor project at Euratom's ISPRA (Italy) Research Center. On leaving Euratom, he was accorded the title of Honorary Director General.

Mr. Leny returned to France to head Framatome in 1970, a time when the country was beginning its program to construct and install a nation-wide network of pressurized water nuclear powerplants. Currently, 51 such power reactors are successfully operating or on the grid in France, with an additional 10 presently under construction. The operating plants now supply 70 percent of French electrical generating capacity.

Framatome's export activities include the supply and construction of nuclear powerplant projects in Belgium, Korea, the People's Republic of China and South Africa and the supply of nuclear products and services around the world.

Among the activities of Framatome's U.S. subsidiaries is a Virginia-based joint venture, with American subsidiaries of the French companies COGEMA and Uranium Pechiney and the Babcock and Wilcox Co., for the manufacture and supply of reactor fuel and the provision of related fuel services to nuclear powerplants in the United States and Canada. Additionally, in April of this year, Framatome's U.S. sales subsidiary, Framatome U.S. Operations Inc., entered into a marketing and support services agreement with General Atomics International Services Corporation for the supply of nuclear powerplant equipment and services to electric utilities in the United States and Canada.

Mr. Leny is a former President of the French Society of Nuclear Energy and is a member of the American Nuclear Society.

BACKGROUND

French Nuclear Program

France is currently generating 75 percent of its electrical power from 51 nuclear power plants. Except for 4 older gas-cooled reactors, the power reactors are built from a standardized design that now includes 34 PWR 900 MWe and 10 PWR 1300 MWe units connected to the grid. To meet French electricity requirements for tomorrow, 13 units including the new 1400 MWe PWR are being constructed. All of the PWR units will have a filtered vented containment.

French Government Nuclear Organizations

Central Service for Safety of Nuclear Installations (SCSIN)
- Director: Michel Laverie (visited NRC 6/23/87)
- has regulatory licensing responsibilities

Atomic Energy Commission
- Chairman: Jean-Pierre Capron (visited NRC 1/28/87)
- has responsibility for nuclear energy research and development

Institute of Protection and Nuclear Safety (ISPN)
- Director: Francois Cogne
- under the CEA, performs safety analysis and evaluations for the SCSIN

Framatome

- Chairman: Jean-Claude Leny
- one of the world's largest PWR vendors
- activities include:
  . design of PWR cores, systems and key components
  manufacture of key NSSS components
  . general contracting, i.e., design, erection, testing, commissioning, post commissioning, maintenance
- 1986, NRC approved Framatome's QA program in accordance with 10 CFR 50, Appendix B, for use in the U.S.
- 1986, Framatome wins its first service contract (replacement of all 66 control rod guide tube split pin inserts at the Ginna Nuclear Power Plant
- signed contract with China to design and manage construction of two 900 MWe PWR units at Daya Bay, northeast of Hong Kong

Talking Points

- Success of French program
- Use of standardization

French PWRs: past, present and future

J C Leny
Framatome, Paris, France

Today nuclear power is an essential component of energy strategy. About 400 power reactors, representing a generating capacity of more than 280GWe, are currently in operation in 26 countries. Another 150 are under construction.

As nuclear power has grown in importance, its centre of activity has gradually shifted from the USA to Western Europe. Since 1984, the European Community (EC) has generated more nuclear kWh than the USA. Although America recently celebrated the start-up of its hundredth reactor, the EC has connected more than 120 units to its power grid. Of the world's 4000 reactor-years of nuclear power experience, 1450 have been accumulated by Western European utilities. Today, one-third of the electricity generated in the EC is produced by nuclear power plants.

Percentage of PWRs

Pressurised water reactors (PWRs) represent 60 per cent of the world's installed nuclear capacity, and 80 per cent of the nuclear power plants currently planned or under construction. This is not surprising, because the PWR has the advantage, among others, of being intrinsically safe. In a PWR pressure vessel, ordinary water serves as coolant and moderator. In case of water deficiency, the nuclear reaction stops, because there is no more moderator. This makes the void coefficient negative, and so prompt criticality, which occurred at Chernobyl, is not physically possible in case of loss of coolant in a PWR.

The year 1986 will remain, in the world of energy, the year of two important events : oil prices remaining throughout the year at a very low level, and, in April, the accident at the Chernobyl nuclear power plant in the USSR.

Faced with such events, public opinion and decision-makers all over the world wonder what general guidelines they should draw and what the future of nuclear energy will be. This was one of the major questions that was debated during ENC'86 at Geneva in June, and by the World Energy Conference at Cannes in October. The general conviction was that nuclear energy is and will remain a commercial, reliable, safe, and essential source of energy, now and in the next century.

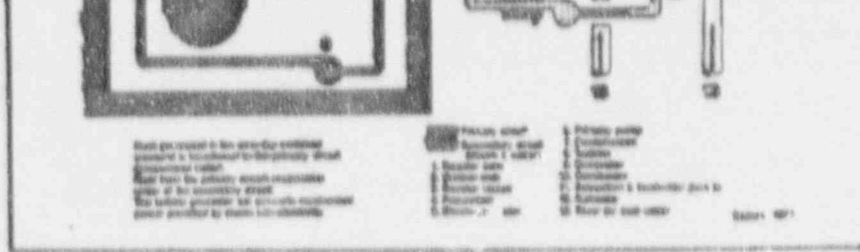
About 13 years ago, to safeguard its energy independence, France decided on an intensive nuclear energy development programme. Today, this programme is leading to gratifying results; 43 large PWR nuclear power units are in operation. With four graphite-gas units and two FBRs, they produce nearly 70 per cent of French electricity, compared with only 8 per cent in 1974. Fourteen other units are at different stages of construction.

There has been talk of a future short-lived overcapacity of the French nuclear power programme, but any such overcapacity is entirely explained by the extremely high availability factors of the French PWR units. Their average energy availability has been more than 83 per cent for three years running, far beyond the forecast 71 per cent (the latter figure corresponding, moreover, to the average world availability factor for this type of reactor).

At present, France is the only country in the world to have carried out such a massive and uninterrupted nuclear power programme which is continuing to go forward, albeit at a slower rate. Development of nuclear energy has been so conducted as to ensure full French control of all its aspects, including the entire fuel cycle and the design, construction, and operation of nuclear power plants. The result is a coherent and dynamic nuclear power industry.

One of the major reasons for the success of France's nuclear power programme can be summed up in one word : standardisation. In 1973, the French authorities layed down the basis for this programme in four key points :

- A large number of plants would be built, but only one technology would be employed. After experimenting with several types of reactors (gas-graphite, heavy water, light water), Electricité de France selected PWR technology
- The necessary industrial capabilities would be mobilised and concentrated in the hands of only a few companies. These companies, assured of programme continuity and a stable market, would be encouraged to make the necessary investments in human resources and industrial plant to ensure the success of the programme
- A complete and consistent set of codes and standards would be established, to facilitate regulation and ensure safety
- Finally, the programme would include large series of identical units, so that standardisation could provide the best compromise between the following two objectives: first, technical stabilisation over as long a period as necessary to obtain the expected be-



A basic flow diagram of a PWR nuclear power station.

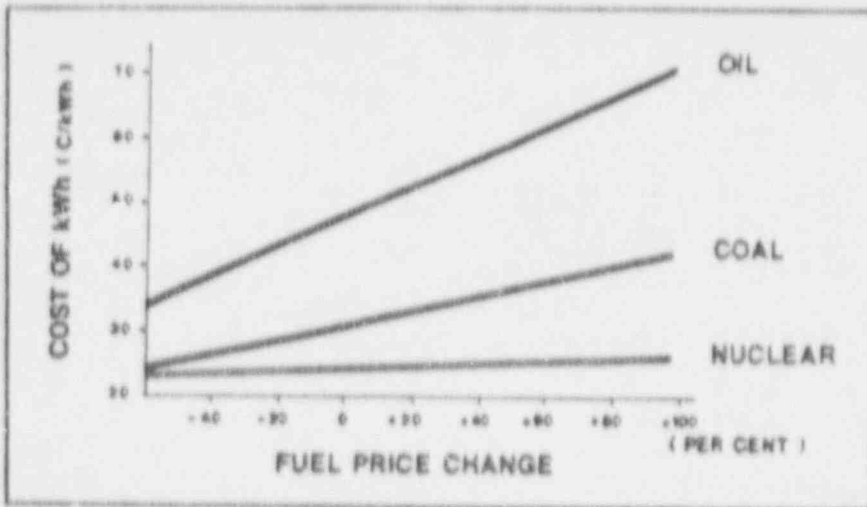
nefits from the series effect; second, remaining open to improvements due to technical progress and experience feedback. Standardisation does not mean a frozen technology.

To achieve this last objective, and to avoid the risk of successive and not always fully justified changes, France has chosen discontinuous evolution. This is done by means of successive plant series, each of which corresponds to an updated standard. Therefore, each series represents one step forward in a smooth technical evolution, and benefits from the experience gained during the previous step.

The 900MWe series of nuclear units, based on a twin-unit configuration, began with the two units of the Fessenheim plant, contracted for in 1970, and the four units of the Bugey plant, contracted for in 1970 and 1971. The experience gained in designing these six units led EDF to then launch two large series of standardised 900MWe class units. The CP1 series, comprising 16 units, was ordered in 1974. A turbine hall and nuclear auxiliaries building are common to both units. The CP2 series, comprising 12 units, was ordered in 1977. These units are similar to the CP1, but have a radial turbine hall, specific to each unit.

The 1300MWe series, launched in 1976, is made up of 20 units of a larger size, more suited to the evolving French power grid. It comprises two standard subseries: the P4, including 8 units, and the P'4, with 12 units, similar to the P4 but with a reduction in the size of the buildings as a result of civil works optimisation.

Two units of the 1500MWe (or N4) series of four-loop nuclear steam supply system (NSSS) design have already been ordered. They correspond to the latest developments of French technology, with a new steam generator model, new reactor coolant pump, new turbine, and advanced instrumentation and control.



A graph to show power generating costs.

Industrial capabilities

To build so many nuclear power plants so quickly, Framatome, its affiliates, and its subcontractors, had to build up and adapt their industrial capabilities. In 1974, Framatome invested in a new heavy component factory at Chalon-sur-Saône. With this new factory, in addition to the plant operational at Le Creusot, Framatome acquired the potential to produce key components for up to eight nuclear units a year: eight finished reactor vessels, 18 to 24 steam generators (depending on the unit model), and eight pressurisers.

Aided by the powerful research and development capabilities of the CEA (French Atomic Energy Commission), Framatome's own research and development programme enabled the company to achieve full technical and technological independence by 1981. That year, the licensing agreement with Westinghouse was terminated. Between 1 January 1980 and 30 September 1986, a total of 44 nuclear power units was ordered world-wide. Framatome won 22 of these orders. The last one, formally signed on 23 September 1986, was for two 1000MWe units for the Daya Bay site in China.

Performance in the field of nuclear island or NSSS construction can be best appreciated by examining erection and start-up lead times and unit availability. Total construction time is under six years in France; in the USA it is an average of [illegible] years. In 1978, it took more than 4[illegible] months from the start of piping erection to the commissioning of Fessenheim 1. Since 1983, this period has been reduced to 31 or 3[illegible] months. Quality has been improved at the same time.

Framatome PWR units now have more than 220 reactor-years of operation. The availability of these units has regularly increased. Overall energy availability factor for French PWR units was 83.2 per cent in 1984 and 84.3 per cent in 1985. In 1986, this performance indicator remained about 83 per cent. These factors take the refuelling time into account; unscheduled outages account for less than 5 per cent of the total unavailability. In the summer, operators take advantage of refuelling outages to make the regulatory inspections of primary equipment which are required by the safety authorities, and to accomplish useful preventive maintenance.

It must be emphasised that these results necessitate constant effort, and that a great deal depends on people's attitudes. The importance of effective organisation and methods must not be stressed at the expense of the human factor in nuclear power plant design, manufacturing, and construction.

Design of the fuel assemblies that constitute the reactor core and the conception of the nuclear steam supply system are interdependent. Fuel assembly quality, reliability, structure, and layout are basic reactor characteristics, and have an effect on plant operating margins. Moreover, fuel assemblies have a strong impact on power plant economics (due to different fuel management strategies used), plant safety (since the zirconium fuel cladding is the first of the three fission product barriers), and plant operational flexibility (for example, load follow can be limited by the capacity of fuel to withstand thermal cycling).

This is why Framatome designs, sells, and guarantees nuclear fuel assemblies for PWR first cores. Reloads are sold through Fragema, a joint venture with Cogema. Framatome joint subsidiaries with Pechiney and Cogema manufacture 2500 fuel assemblies every year and ship them to customers in France and abroad.

Pursuing nuclear power plant construction programmes, Framatome is also dedicated to maintaining and upgrading the existing plants. The maintenance division has made strong progress in the field of nuclear services and associated products by applying the latest advances in robotics, computerised project management, metallurgy, decontamination, and personnel training. It has become an innovator and pacesetter, active in Belgium, Spain, South Africa, South Korea, Sweden, Switzerland, the USA, Yugoslavia, and other countries.

Like the aerospace business, the nuclear power industry emphasises reliability and safety. In Western countries, stringent nuclear requirements have been applied. This is certainly the reason why nuclear accidents have been so rare, and why through three and a half decades and 4000 reactor-years of industrial operation, not one fatality or environmental disaster was recorded anywhere in the world.

This model safety record has unfortunately been tarnished by Chernobyl. It should be remembered, however, that the Soviet plant belongs to a technology entirely different from that of the PWR, and was neither built nor operated to the standards that govern Western nuclear plants. Their rules for design, manufacturing, construction, start-up, and operation of light water reactors, and the corresponding quality assurance, are a model for all industries where reliability and safety are the main concerns.

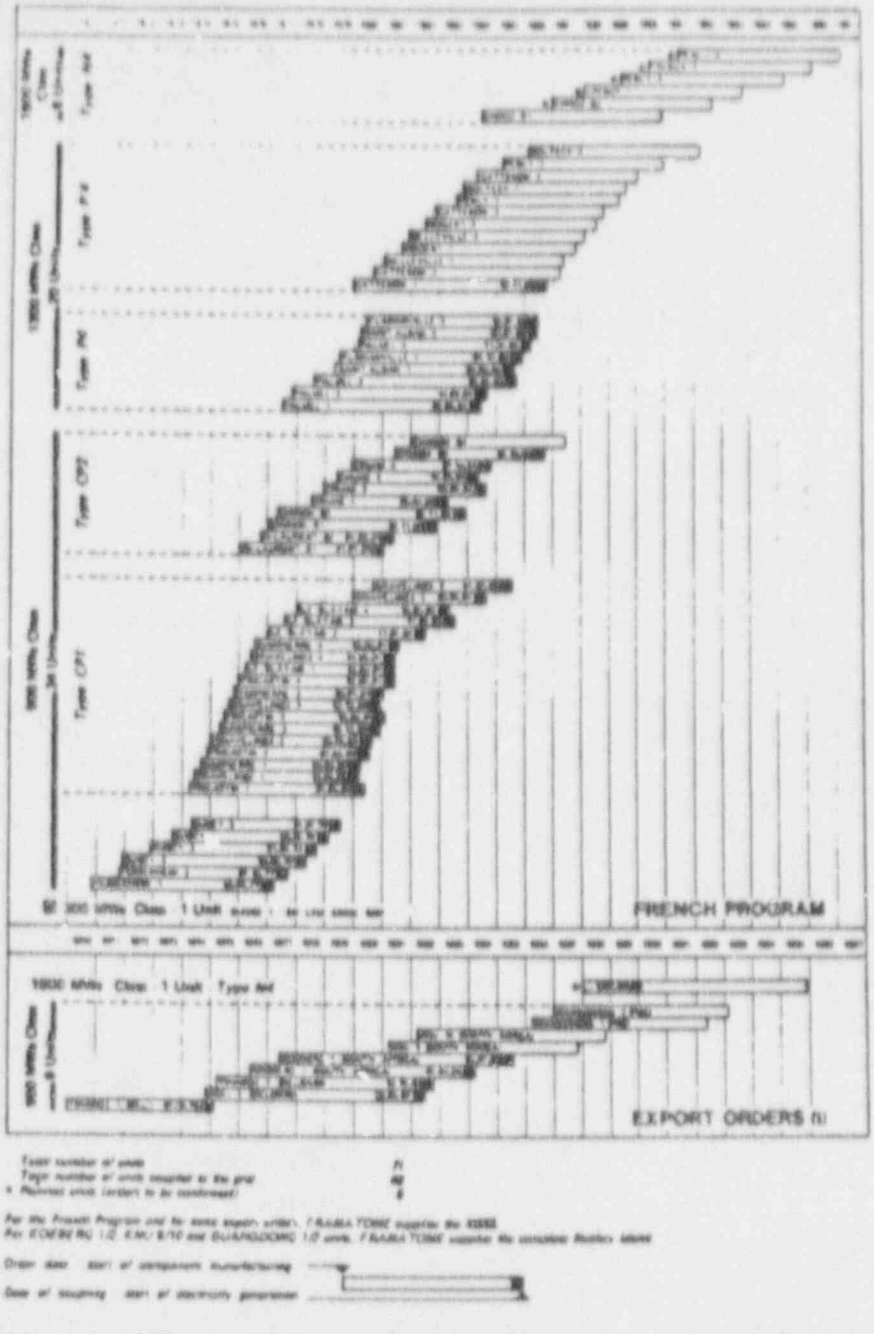
Electricity cost advantages

Quality assurance is fundamental, because it provides safety authorities with full confidence that everything has been done to guarantee safe and reliable power plants. It makes it possible to analyse incidents and take advantage of feedback from operating experience. Last but not least, it maximises equipment operability and leads to high factors of availability.

Quality assurance also maximises profit. Supplementary to the recovery of France's energy independence, the nuclear option turned out to be profitable in terms of cost per kWh. Economic studies have shown time and time again that nuclear plants are much cheaper to run than fossil-fired ones. In France, electrical energy generated from coal costs 50 per cent more than nuclear power, while the oil/nuclear energy cost multiplier ranges from two to three. Unlike the price of energy from fossil fuels, that of nuclear power is relatively insensitive to variations in the price of the fuel used (uranium).

Sooner or later, fossil-fuel prices will go up again, and the benefits for France will again increase, confirming the long-term validity of the choices made in 1973. These conclusions are also valid for other countries. [illegible] for those where coal may appear more attractive or competitive today, a big increase of its price would not be necessary for the trends to be quickly reversed, with nuclear energy again becoming more attractive in the long term.

Electricity generated from nuclear power plants has thus become an industrial and business reality, characterised by its reliability, competitiveness, and lack of resulting pollution. For the PWR significant progress is still possible. Careful analysis of the available experimental data will allow the teams of researchers and technicians to increase plant availability factors, cut the number of unscheduled outages, and shorten the duration of maintenance and repair operations. Other improvements being studied include reducing the cost of components (steam generators, heat exchangers, pumps, and so on), increasing fuel burn-up, lengthening the useful operating life of the plants, and enhancing operating flexibility. All will contribute to reinforcing the competivity of the nuclear kWh with respect to that produced from other energy sources.



A table of nuclear power plants equipped with Framatome PWRs — construction programme with coupling dates.

Another step forward will be the recycling of plutonium. This requires both industrial and commercial mastery of mixed-oxide fuel production. Beyond that step, research is in progress on new core designs (using spectral shift and undermoderation) that will lead to PWR evolution, aimed at capital investment and fuel cycle cost savings.

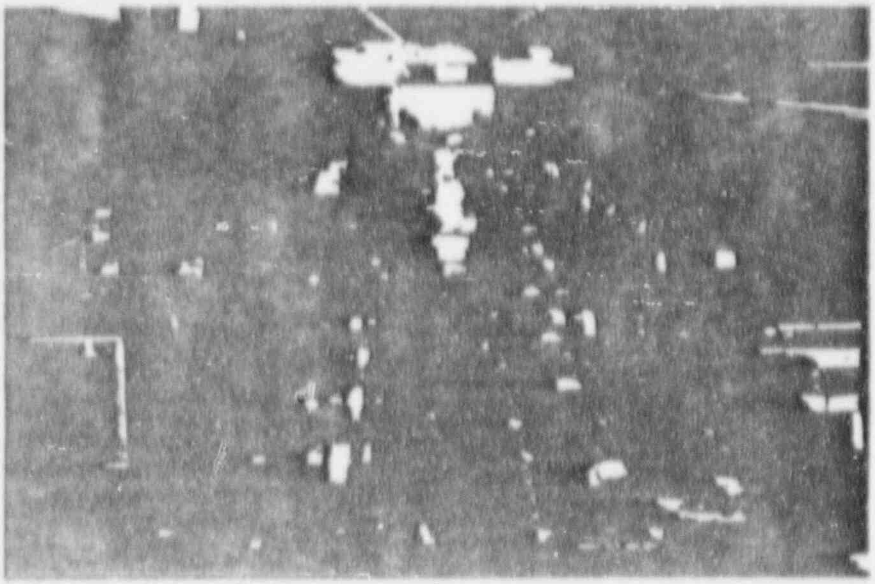
The long-term advantages of fast breeder reactor (FBR) technology, in an environment in which uranium could become rarer and thus more expensive, make it necessary to continue the effort of R and D on these reactors. Superphenix is one step along the path to their full development. The construction of other prototypes should make it possible to attain the industrial level and approach cost competitiveness with PWRs. The year 1986 saw the start-up of the 1200MWe Superphenix FBR installed at Creys-Malville in France; it attained full power operation on 9 December 1986.

To meet man's growing needs for electrical energy in the next century, industrial scale FBRs will be absolutely necessary. FBRs, of course, require a suitable supply of plutonium for their operation and can therefore be built only in countries that have had a number of other reactors in operation for some time.

New technical developments and economies of scale should gradually reduce the cost per kWh of this technology, which is already competitive with oil and will soon have a cost advantage over coal as well. Now is the time to get ready to handle the power needs of the twenty-first century, and Europe should show the way. If future energy demand is to be met and oil-fired plants are to continue to be retired, the contribution of nuclear power to the overall energy picture must be sharply increased.

This is a major international political problem. The main effort must come from the developed countries. If they fail to make this effort, the result will be a return to high energy prices. Expensive energy will be most harmful to the third world countries which can least afford it. Furthermore, if we intend to conserve our fossil fuel resources for uses where no substitute is likely to be found, it is essential that the bulk of the world's energy requirements in the twenty-first century be met by nuclear power.

Nuclear power is a reality today. It is also the energy of the future. Provided the necessary effort of explanation and confidence-building is made, public opinion, which is lucid and adult, can only rally quickly to the opinion of the experts and leaders in this field. The countries having this source of energy available at the turn of the century will possess a precious asset and will become the leaders of the world of tomorrow. □



A Framatome factory at Chalon

Jean-Claude Marcel Leny, a graduate of the French National Higher Telecommunications School, was an engineer with the French Atomic Energy Commission from 1955 to 1960, when he became a manager with Euratom. He joined Framatome in 1970 as general manager and subsequently became managing director and then chairman and chief executive officer. Mr Leny is a member of the American Nuclear Society and the Scientific and Technical Committee of the European Community, and a former president of the French Nuclear Energy Society.

copies to:
Heinrich, info
Hans, action

and R Hauber

THE NUCLEAR REGULATORY COMMISSION

(Claude) ? Jean Leny of FRAMATOME
Chairman/Pres. & CEO - Framatome
ae?
to see Chairman + Comm Carr
May 16 at 10 AM

(Arranged directly by > Mark Rowden for one of his clients)

[Do Background paper]
- Prob. total of 3 Visitors
Rowden prob. to come too

~~[illegible]~~

[illegible]

courtesy call
+ MR
San Francisco [illegible]

(10:00 LZ)
10:45 Carr

michel Coudray
~~[illegible]~~

background

RH talked w/ Gerry 4/5 -

- She'll call Rowden and try to identify any specific topics or points to be brought up by the French -- also who the 3 visitors will be.

- generally it seems to be a courtesy call on Carr (who visited France in October 1987 as a Framatome invitee) and the Chairman

at a minimum. IP should provide a background notes on the French program and Framatome.