The original documents are located in Box 37, folder "Uranium Enrichment (19)" of the James M. Cannon Files at the Gerald R. Ford Presidential Library.

Jim

As of 11 P.M., we seem to have the plumbers. A follow-up call to Kirkland couldn't hurt a bit! Do you have Calendar in any other groups solicited on PP. 19 and 21?

Glenn

Lane
Kirkland
Telegram
from
Pipefitters

THE WHITE HOUSE

WASHINGTON

July 28, 1976

MEMORANDUM FOR: JIM CANNON

FROM: GLENN SCHLEEDE

SUBJECT: URGENT NEED FOR LABOR SUPPORT OF NFAA

The effort by the American Nuclear Energy Council to get an AFL-CIO letter in support of the NFAA failed. Andrew Biemiller's reasons for not sending a letter were:

-- Opposition to the bill from public power people.
-- The Oil, Chemical and Atomic Workers are opposed. The OCAW represents hourly employees in ERDA's enrichment plants.
-- Opposition to the bill from the steel workers.

Since then, the steel workers allegedly have been turned around and may send something in support of the bill.

Telegrams have this morning been sent by the rubber workers favoring the bill. Hopefully, IBEW will send a telegram this afternoon but that is not certain.

There is a critical need to get support from at least one other major union so that it is clear that organized labor is split on the bill.

LANE → The principal candidate would be the plumbers and ~~Wayne~~ Kirkland could be helpful.

I am attaching a copy of John Dunlop's testimony on the NFAA. The principal points worth noting with Kirkland appear on the following pages which are clipped:

-- Page 7 - which estimates the total number of workers required for nuclear power plant construction if uranium enrichment capacity is expanded.

-- Page 14 - table showing estimated employment associated with the construction and operation of enrichment plants.

-- Page 17 - table showing break down of labor requirements by craft for coal versus nuclear plants.

-- Page 19 - table showing construction manpower required for a nuclear plant by craft.

-- Page 21 - table showing total employment expected for nuclear plant construction by craft.

The major points on jobs to be made are:

-- Lots of construction craft people required to build enrichment plants;

-- Lots of construction craft people to build nuclear power plants which can be built only if we have uranium enrichment capacity.

Attachment

STATEMENT OF JOHN T. DUNLOP
SECRETARY OF LABOR
U.S. DEPARTMENT OF LABOR

Before the

JOINT COMMITTEE ON ATOMIC ENERGY

December 4, 1975

Mr. Chairman and Members of the Committee:

I am pleased to have the opportunity to appear before you today in connection with the President's proposal for actions that would result in expansion of the capacity to enrich uranium in the United States. This testimony prepared by the staff of the Department of Labor presents information on the employment and manpower implications in the United States associated with expanded utilization of nuclear power here and abroad.

The information presented here is pertinent to the decision of whether the capacity for enriching uranium in the U.S. is to be expanded. I recognize that you are also considering the issue of whether the expanded capacity should be financed and owned by the Federal Government or by private industry. On that question, I defer to others

from the Administration who are appearing before you who have studied the implications of that decision in greater detail than I.

Most of the data we are presenting here today is derived from studies done by or contracted for the Energy Research and Development Administration (ERDA). Economists on my staff have, however, checked the methodology underlying the projected labor demand and supply needs. The methodology on which these projections are based is consistent with the current state of the art.

The estimates of labor demand and supply in nuclear electrical power generation rest on a series of projections to the year 2000, first of total energy demand--electrical and nonelectrical--and then of demand for electrical energy powered by nuclear sources. The labor demand and supply estimates are then divided into three broad activities:

(1) The design, construction and operation of uranium enrichment plants;

(2) The construction of nuclear electrical power generating plants; and,

(3) The operation of nuclear electrical power generating plants.

An expansion in nuclear electrical power generation is expected to impact the labor market substantially. However, at the outset I should caution the Committee that the estimates which follow are gross estimates of labor market impact. That is, added demand for labor by nuclear electric power plants will be offset to some extent by declining labor demand and supply needs by non-nuclear electric power plants (e.g., fossil fuels). Unfortunately, at this time it is not possible to provide data on the net change in labor demand and supply as a result of the expected increase in nuclear power generation. Finally, let me point out that we consider these estimates as a working set of alternative projections rather than hard and fast forecasts.

Let me, then, proceed to the analysis.

Total Energy Demand Projections to the Year 2000

ERDA has estimated that total energy use has grown at a compound rate of 3.4 percent over the past 25 years.

Over the past 10 years the growth rate has averaged 3.6 percent, including the energy decline in 1974. Increasing prices for energy may reduce this to a lower figure over the next 25 years. The estimates on which labor demand were based were a growth rate of 2.75 percent per year through 1985 and 3.45 percent per year thereafter.[1/]

Electricity demand has grown at about 7 percent per year in recent history; currently, electricity constitutes nearly 27 percent of total energy demand.[2/] The estimates on which labor demand in electric power were based are 6.0 percent per year up to 1985 and 5.4 percent per year thereafter. By the year 2000, it is projected that electricity will represent 44 percent to 50 percent of total primary energy inputs.[3/] (The projections of total electrical energy production are

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1/ Roger W. A. Legassie, Testimony before the Subcommittee to Review the National Breeder Reactor Program, Joint Committee on Atomic Energy, June 10, 1975.

2/ See Appendix Figure 1 for a graphic presentation of these projections.

3/ See Appendix Figure 2 for a graphic presentation of these projections.

displayed in Appendix Figure 3.) Of this total electrical capacity, assuming no bottlenecks in the production of the required nuclear fuel, ERDA has estimated that nuclear capacity will range from 70,000 to 92,000 Megawatts (MWe) by 1980, a range of 160,000 to 245,000 MWe by 1985 and a range of 625,000 to 1,250,000 MWe by the year 2000.[4/] Note that this range of estimates becomes extremely broad as we move further out in time. These estimates are made imprecise by the absence of reliable prices on the relative costs of competing fuels, the difficulty of projecting the skill composition of labor supply by occupational skill, the uncertainties attendant to predicting improvements in the technology of designing, constructing and operating such plants, and uncertainties as to the overall rate of growth in Gross National Product and its components such as consumption, saving and investment.

[4/] See Legassie, op. cit. The point estimates on which the estimated labor demand were based are 76,000, 185,000, and 800,000 MWes for the respective years 1980, 1985 and 2000.

Projected Labor Demand

Given that we have identified a range of demand for nuclear generated electrical power, we can estimate the projected demand for labor. Nuclear electrical generating plants are human capital as well as physical capital intensive. For plants of the same capacity a nuclear electrical generating plant requires twice as much labor in the design and engineering stages as does a fossil fuel plant. In nuclear construction, 24 percent more on-site labor is required, while project management is also twice as labor using. It is only in power plant operation that labor inputs are half that of fossil fuel power generation.

In the mid 1960's a rule-of-thumb estimate of the construction labor needed to build a nuclear power plant was estimated at 5 or 6 manhours per kilowatt hour of plant capacity. Construction of a 1,000 MWe plant was expected to involve as many as 1,200 workers during a 5 to 7 year field construction period. Today's construction necessitates a longer time span (about 8 years) and more

labor (up to 10 manhours per kilowatt). The reasons for this increase are complex; they include more sophisticated plant designs, the need for a much higher degree of quality assurance, plant modifications sometimes required by the Nuclear Regulatory Commission (NRC), tightening of licensing standards, and shortages of qualified technical management and craft skills (including inspection forces).

If we assume 8.0 manhours of labor input to construct one kilowatt of nuclear electrical power generating capacity, then the aggregate on-site construction labor force for projected nuclear power plant construction in 1980, assuming expansion of uranium enrichment capacity, will be about 87,000 workers. In 1990, this would rise to 151,000 workers. Without expansion of such capacity, the on-site construction workers thus employed would drop to zero.

For power plant operation, employment is projected at 10,000 workers in 1980, rising to about 28,000 in 1990. But without expansion of uranium enrichment

capacity, in 1990 only 18,000 workers are projected to be employed in power plant operation. (Table 4.)

Thus, we can see a major expansion of a relatively new growth industry with highly human capital intensive jobs if the required uranium enrichment capacity materializes as depicted in Table 2. Indeed, by 1990, about 33,000 good jobs with good wages would be generated in the construction and operation of uranium enrichment plants alone. (Table 3.)

Some Special Problems of Labor Supply

Although the total construction labor force is large, some skills may be in short supply. For example, 24,000 pipefitter/plumbers skilled in nuclear work would be required in 1980. Employees with such skills--one of the most demanding in nuclear plant construction activities--would comprise about five percent of the total number of pipefitter/plumbers available in 1980.[5/] A shortage of such skills as well as of the necessary

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5/ Bureau of Labor Statistics, Tomorrow's Manpower Needs: The National Industry-Occupational Matrix and Other Manpower Data, Volume IV, Revised 1971, BLS Bulletin 1737, U.S. Department of Labor, 1971.

supervisory and inspection forces, will probably be significantly more acute than at present. While it is possible that some workers engaged in ordinary construction can be retrained, this entails added time and cost.

Development of highly skilled technicians can involve training periods of several years. On this basis, it would seem that there is adequate time to develop such skills in industry, especially as we move out in time.

The number of apprentices entering skill training programs is highly dependent on the immediate and prevailing demand for skilled journeymen. Should a limited job demand exist in the short run, the number of journeymen will be curtailed in future periods. For example, if a 4-year apprenticeship is needed for proper training of a given type of skilled worker, for employment in the 1980-1985 period, and if a degree of unemployment exists well before that time, a major labor supply problem might develop.

Nuclear based utilities will have to compete for engineers and other technical people with reactor builders, component and equipment manufacturers, architect-engineers, fuel fabricators, contractors, fuel processors, government agencies, and academic institutions--all of whom are already acquiring significantly increased numbers of such personnel. Evidence of a shortage of engineers is already at hand. During 1971, approximately 28,000 bachelor-level degrees were granted in electrical, mechanical, civil and nuclear engineering. The number of freshman enrolled in engineering schools in 1971 was 18 percent below the 1970 level, and in 1972, freshmen engineers were 11 percent fewer than in 1971. Most of the nuclear engineers on utility payrolls have been recruited from the cadre of electrical, civil, and mechanical engineers already employed by the utilities and, to some added degree, from outside.

Of the various categories of nuclear-trained personnel required by utilities to staff and support plants in the expansion program, engineers seem to be most critical.

At the end of 1972 approximately 1,200 engineers were in the employ of utilities to provide technical support for nuclear power plants; by 1980 4,000 engineers will be needed.

Also during the same period, other segments of the nuclear industry and regulating agencies will be competing for the same types of skills.

A shortage of technicians who man nuclear plants is also likely to occur. Ordinarily, technicians are trained in vocational schools for a two-year period. These schools would need to expand their facilities in sufficient time to provide the training for a larger group of nuclear-oriented students. Utilities can also provide on-the-job training at their own nuclear power plants.

This concludes my statement. Thank you.

TABLE 1

An Index of Estimated Relative Labor Inputs in the Design, Construction and Operation of 1000 MWe Baseload Electricity Generating Plants

	Nuclear	Fossil
Design and Engineering.....	200	100
Construction		
Project Management.....	200	100
On-site Labor.....	124	100
Operation		
Headquarters Management and Technical Support.....	200	100
Power Plant.....	50	100

SOURCE: ERDA, Office of the Assistant Administrator for Nuclear Energy, Office of Program Planning and Budgeting.

TABLE 2

EFFECT OF DOMESTIC NUCLEAR EXPANSION AND ADDITIONAL FOREIGN SALES ON SEPARATIVE WORK DEMAND AND NEW ENRICHMENT FACILITIES

	Units	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1995	2000
DOMESTIC NUCLEAR POWER PLANTS IN OPERATION, UNDER CONSTRUCTION OR PLANNED (WITH ENRICHMENT CONTRACTS)														
Nuclear Capacity	GWe[4]	76	93	114	137	161	182	200	212	217	218	218	218	218
Power Generation	10^9 kWh	433	522	639	773	921	1072	1193	1264	1308	1324	1323	1278	1173
Separative Work[1]	10^6 SWU/YR	9.5	9.8	11.9	14.7	16.1	16.3	16.6	16.6	15.3	15.2	14.9	15.1	15.6
DOMESTIC NUCLEAR PLANTS WITH EXPECTED GROWTH														
Nuclear Capacity[2]	GWe	76	93	114	137	161	185	210	237	268	302	340	545	800
Power Generation	10^9 kWh	433	522	639	773	921	1085	1250	1392	1566	1757	1977	3173	4597
Separative Work[1]	10^6 SWU/YR	9.5	9.8	11.9	14.7	17.1	18.5	21.8	23.7	26.0	28.7	31.9	46.4	60.7
DEMAND ON NEW U.S. ENRICHMENT FACILITIES														
United States	10^6 SWU/YR					1.0	2.2	5.2	7.1	10.7	13.5	17.0	31.3	45.1
Foreign[3]	10^6 SWU/YR					.2	3.7	4.8	6.8	10.3	7.8	10.9	21.8	43.9
Total	SWU/YR					1.2	5.9	10.0	13.9	21.0	21.3	27.9	53.1	89.0
Number of New Plants in Full Operation					1	1	1	2	2	3	3	4	7	10

[1] Assume 0.30% tails assay and recycle of spent uranium and plutonium not required for breeders and research uses.

[2] Breeders are introduced late in the century, representing 10% of installed capacity in 2000.

[3] Assume the U.S. captures about 30% of foreign market.

[4] One Gigawatt (GWe) = 1000 megawatts.

SOURCE: Wong, Dennis, et al., "Energy and Economic Impacts of a Private Uranium Enrichment Industry," Energy Research and Development Administration, Office of the Assistant Administrator for Nuclear Energy, Office of Program Planning and Budgeting, July 30, 1975.

TABLE 3

EMPLOYMENT ASSOCIATED WITH THE CONSTRUCTION AND OPERATION OF ENRICHMENT PLANTS
(0.3% U-235 Tails Operation)

	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Job-years 1980-90 Incl.
Design and Engineering	700	700	400	850	850	1250	1000	1250	1000	1400	1000	1400	1700	2100	2100	17,700
Project Management	80	100	100	180	200	280	300	380	400	480	500	580	680	780	880	5,920
Onsite Construction		2000	4000	6000	9000	8000	10000	11000	12000	13000	12000	13000	12000	15000	18000	145,000
Operation		60	150	300	600	1150	1800	2750	3500	4560	5080	6130	6650	7800	8500	49,100
Offsite Centrifuge Manufacturing					50	200	650	1230	1680	2250	2080	2660	2480	3110	3080	19,470
ERDA Support	80	110	110	190	220	300	330	360	330	410	390	410	470	410	580	4,700
Total Employment (in-year)	860	2970	4760	7520	10920	11180	14080	16970	18910	22100	21050	24180	23980	29200	33210	

Notes:
1. Assumption has been made that first new plant is a gaseous diffusion plant, and that all succeeding plants are centrifuge plants.
2. Operating labor is hired in advance of plant operations for purposes of training and familiarization.
3. ERDA support personnel are for the purpose of monitoring Government assistance programs, technical support, etc.

SOURCE: See Table 2.

TABLE 4

IMPLICATIONS OF NUCLEAR EXPANSION ON EMPLOYMENT IN POWER PLANT DESIGN, CONSTRUCTION & OPERATION

WITH EXPANSION	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Design and Engineering	8185	10050	11960	13530	14580	15240	15800	16530	17555	18875	20155	21245	22015	22455	22805	23330
Construction																
Project Management	3050	3900	4910	5860	6500	6790	6960	7130	7520	8090	8780	9450	9900	10110	10230	10330
Onsite Labor	30320	37181	48693	63592	77166	86698	91191	94260	98426	105683	115928	127258	137441	144300	148549	151119
Operation																
Headquarter Management and Technical Support	1810	2003	2208	2424	2647	2906	3183	3483	3790	4105	4428	4758	5107	5467	5845	6241
Power Plant	5524	6106	6776	7684	8813	10222	11720	13273	14821	16385	18085	19872	21873	23999	26248	28487
Total	48889	59240	74547	93090	109706	121856	128854	134676	142112	153138	167376	182583	196336	206331	213677	219507
WITHOUT EXPANSION																
Design and Engineering	8185	10050	11890	13145	13485	12680	10865	8430	5800	3440	1725	690	190	30	-	-
Construction																
Project Management	3050	3900	4910	5860	6420	6390	5800	4730	3380	2080	1040	380	90	10	-	-
Onsite Labor	30320	37181	48693	63592	77166	85609	85550	78278	63470	44556	25736	11571	3428	622	-	-
Operation																
Headquarter Management and Technical Support	1810	2003	2199	2380	2551	2701	2832	2949	3043	3119	3173	3209	3223	3224	3224	3224
Power Plant	5524	6106	6776	7684	8813	10278	11716	13198	14598	15769	16651	17218	17494	17597	17597	17597
Total	48889	59240	74468	92661	108435	117658	116763	107585	90291	68964	48325	33068	24425	21483	20821	20821
Net Increase	-	-	79	429	1271	4198	12091	27091	51821	84174	119051	149515	171911	184848	192856	198686

Assumption

1. Plant design & construction period is 8 years.

SOURCE: SEE Table 2.

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7. U.S. Atomic Energy Commission, Projections of Labor Requirements for Electrical Power Plant Construction, 1974-2000, WASH-1334, Prepared by Studies and Evaluations Program, under the Direction of Planning Division of the USAEC Oak Ridge Operations and Division of Reactor Research and Development, August 1974.

8. Wong, Dennis, et al., "Energy and Economic Impacts of a Private Uranium Enrichment Industry," Energy Research and Development Administration, Office of the Assistant Administrator for Nuclear Energy, Office of Program Planning and Budgeting, July 30, 1975.

A P P E N D I X

Appendix Table 1. Field Labor Requirements for Building 1000-MW(e) Power Plants

Craft	LWR Nuclear Plant		Coal-Fired Plant	
	Thousands Man Hours	Percent of Total	Thousands Man Hours	Percent of Total
Pipe/Steam Fitters	2,295	27.3	1,220	17.9
Laborers	1,430	17.0	970	14.2
Electricians	1,035	12.3	825	12.1
Carpenters	765	9.1	475	7.0
Ironworkers	700	8.3	640	9.5
Operating Engineers	690	8.2	535	7.8
Boilermakers	555	6.6	1,270	18.7
Teamsters	285	3.4	185	2.7
Insulators	225	2.7	240	3.6
Millwrights	185	2.2	150	2.2
Painters	120	1.4	90	1.3
Sheetmetal Workers	75	0.9	130	1.9
Concrete Finishers	50	0.6	75	1.1
Totals	8,410	100.0	6,805	100.0

SOURCE: Atomic Energy Commission, Projections of Labor Requirements for Electrical Power Plant Construction, 1974-200(WASH-1334, Prepared by Studies and Evaluations Program under the Direction of the Planning Division of the USAEC Oak Ridge Operations and Division of Reactor Research and Development, August 1974.

Appendix Table 2. Projection of Nuclear and Fossil Plant Construction Manpower Needs

Year	Nuclear Plants	Fossil Plants	Total
1974	43,000	104,000	147,000
1975	49,000	120,000	169,000
1976	70,000	124,000	194,000
1977	102,000	112,000	214,000
1978	125,000	96,000	221,000
1979	137,000	97,000	234,000
1980	142,000	109,000	251,000
1981	150,000	120,000	270,000
1982	165,000	123,000	288,000
1983	186,000	125,000	311,000
1984	207,000	127,000	334,000
1985	230,000	130,000	360,000
1990	353,000	156,000	509,000
1995	505,000	212,000	717,000
2000	724,000	286,000	1,010,000

SOURCE: See Appendix Table 1

Appendix Table 3. Construction Manpower Requirements for a 1000-MW(e) LWR Nuclear Plant Equipped with Natural-Draft Evaporative Cooling Tower

Craft	Total Payroll Manhours*	Percent of Total	Number of Workers Employed (By Quarter-Year Intervals)																			
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Pipe/Steam Fitters	2,295,000	27.3	40	60	80	105	125	200	230	290	345	345	345	345	345	345	345	345	271	150	90	45
Laborers	1,429,000	17.0	70	70	205	205	205	205	205	205	205	205	205	205	124	100	80	70	70	56	45	34
Electricians	1,034,000	12.3	20	30	40	50	60	70	80	115	140	150	150	150	150	150	150	140	115	104	70	70
Carpenters	765,000	9.1	35	70	90	90	95	95	95	95	95	95	90	90	77	70	70	60	50	50	35	35
Ironworkers	698,000	8.3		30	70	100	110	110	110	110	110	110	110	110	110	100	20	17	10	5	5	5
Operating Engineers	689,000	8.2	15	30	115	115	115	115	115	115	115	115	115	66	45	35	25	25	20	20	10	10
Boilermakers	555,000	6.6			25	25	60	60	60	60	80	80	80	80	80	80	80	65	50	40	40	30
Teamsters	286,000	3.4	27	27	28	28	28	28	28	28	28	28	28	28	28	28	28	28	27	27	27	27
Insulators	227,000	2.7												25	30	45	45	45	45	45	80	80
Millwrights	185,000	2.2					10	14	30	30	30	30	30	30	30	30	20	20	15	15	12	12
Painters	118,000	1.4					14	14	14	14	14	15	15	15	15	14	14	14	14	14	14	14
Sheetmetal Workers	76,000	0.9									11	11	11	11	12	13	13	13	13	13	13	13
Concrete Finishers	50,000	0.6			9	9	9	9	9	9	9	9	9	6	2	2	1	1	1	1	1	1
Totals	8,407,000	100.0	207	317	662	727	831	920	976	1071	1182	1193	1188	1161	1048	1012	891	843	701	540	442	376

*Based on 2080 payroll manhours per man-year.

SOURCE: See Appendix Table 1.

Appendix Table 4. Requirements for Nuclear-Qualified Welders in LWR Plant Construction

Craft Classification	This Craft's Percentage of Total Site Labor	Percenter of This Craft That Are Qualified Welders
Pipe/Steam Fitters	27.3	33
Laborers	17.0	0
Electricians	12.3	8
Carpenters	9.1	5
Ironworkers	8.3	34
Operating Engineers	8.2	8
Boilermakers	6.6	29
Teamsters	3.4	8
Insulators	2.7	3
Millwrights	2.2	25
Painters	1.4	0
Sheetmetal Workers	0.9	33
Concrete Finishers	0.6	0
	Total 100.0	Percent of Total 17

SOURCE: See Appendix Table 1.

Appendix Table 5. Individual Craft Requirements for Construction of Nuclear Power Plants

Craft	Workers Employed in Nuclear Plant Construction			
	1974	1980	1990	2000
Pipe/Steam Fitters	12,000	39,000	95,000	194,000
Laborers	7,000	24,000	62,000	127,000
Electricians	6,000	17,000	42,000	87,000
Carpenters	4,000	13,000	33,000	67,000
Ironworkers	3,000	12,000	30,000	62,000
Operating Engineers	3,000	12,000	30,000	62,000
Boilermakers	3,000	19,000	23,000	47,000
Teamsters	2,000	5,000	12,000	25,000
Insulators	2,000	4,000	8,000	17,000
Millwrights	1,000	3,000	8,000	16,000
Painters	650	2,000	5,000	10,000
Sheetmetal Workers	500	1,000	3,000	6,000
Concrete Finishers	200		2,000	4,000
Total*	43,000	142,000	353,000	724,000

*Total may not equal sum of column due to roundoff

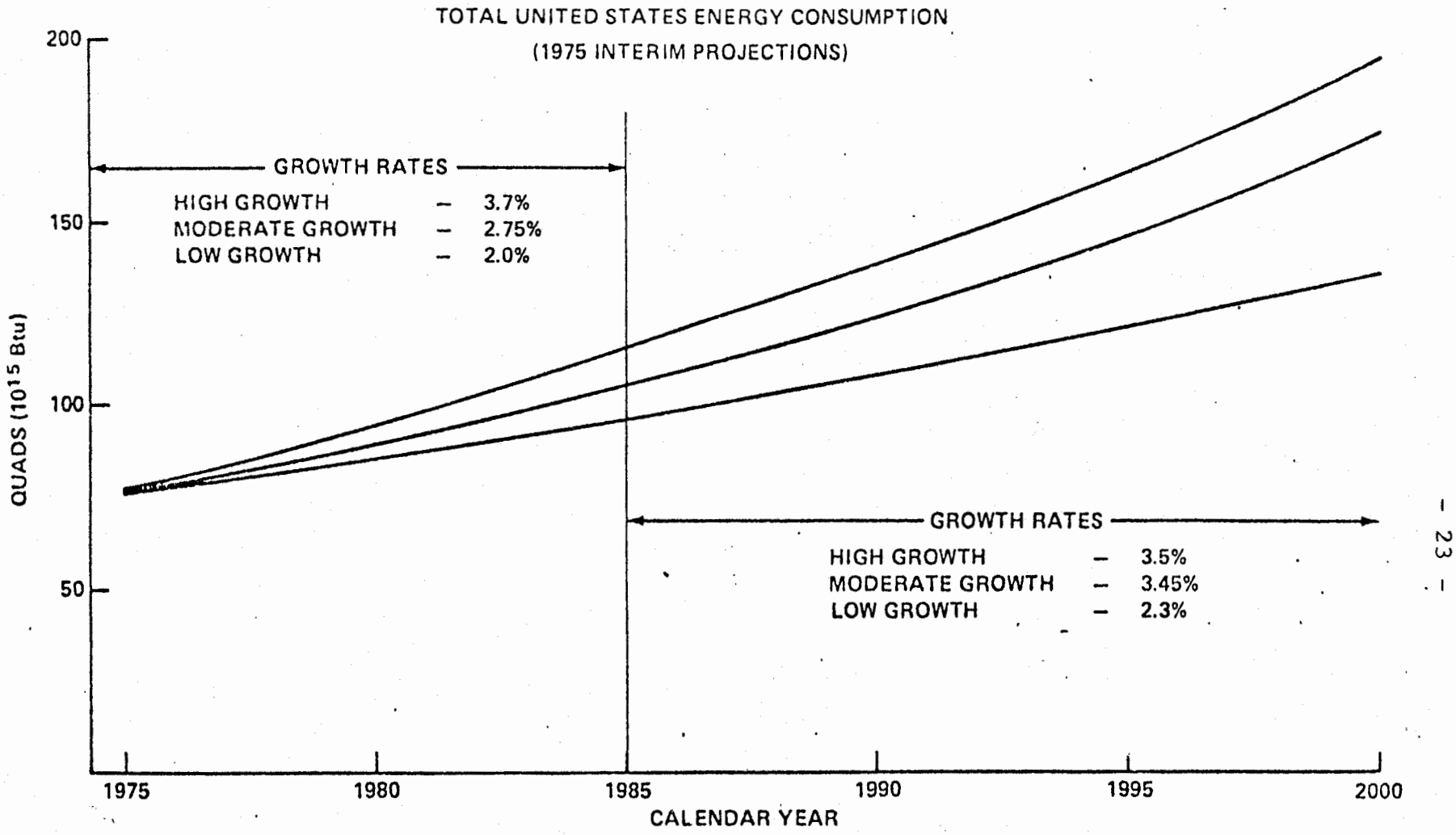
SOURCE: See Appendix Table 1

Appendix Table 6. Projected Requirements for Nuclear-Qualified Welders in Nuclear Plant Construction

General Craft Category	Percent of This Craft That Are Qualified Welders	Number of Qualified Welders			
		1974	1980	1990	2000
Pipe/Steam Fitters	33	4,000	13,000	31,000	64,000
Electricians	8	450	1,400	3,400	7,000
Carpenters	5	200	700	1,600	3,400
Ironworkers	34	1,100	4,000	10,000	21,000
Operating Engineers	8	250	1,000	2,400	5,000
Boilermakers	29	850	3,000	7,000	14,000
Teamsters	8	150	400	1,000	2,000
Insulators	3	50	100	300	500
Millwrights	25	250	800	2,000	4,000
Sheetmetal Workers	33	150	400	1,000	2,000
Total Welders	----	7,500	25,000	60,000	123,000

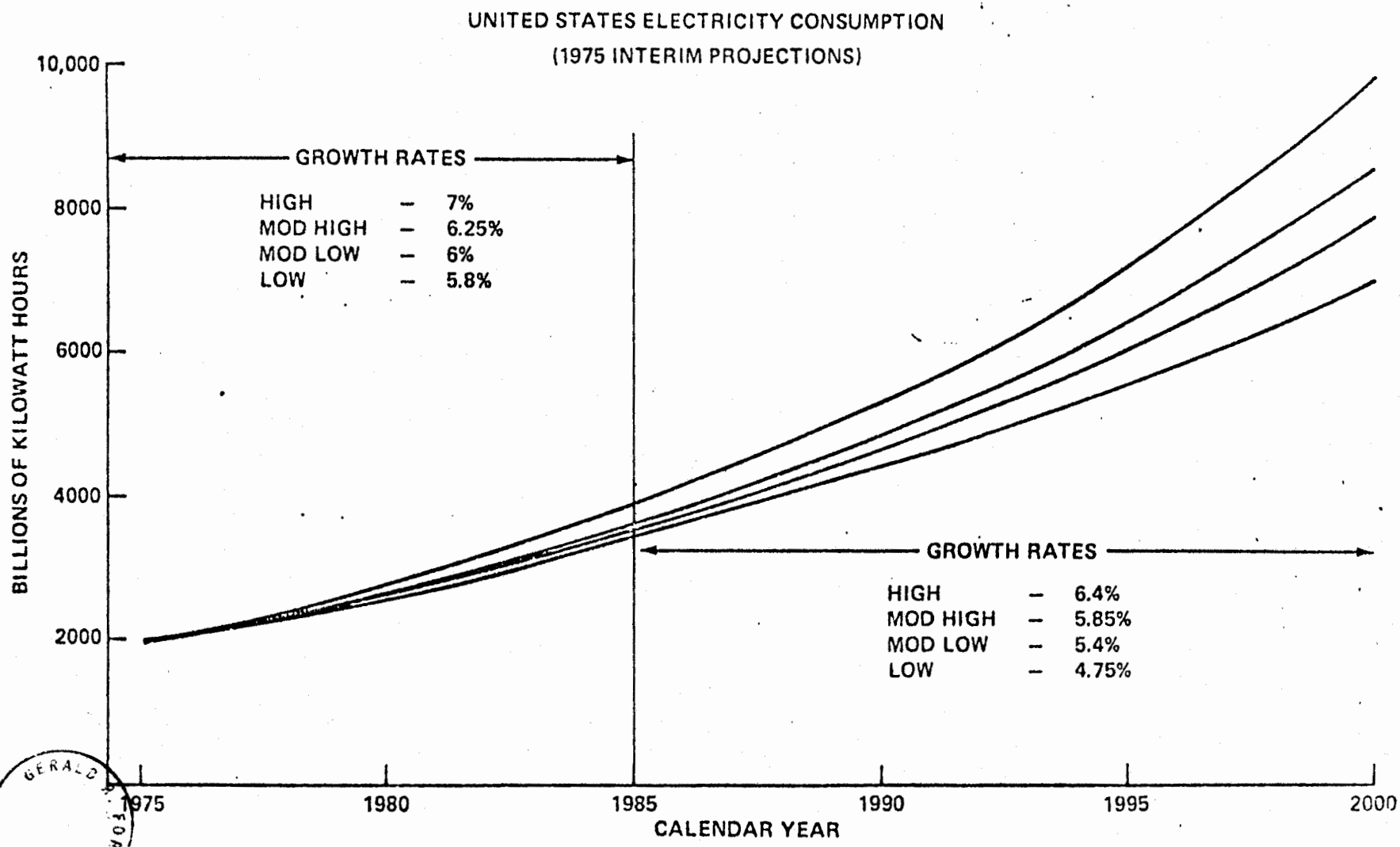
SOURCE: See Appendix Table 1.

Appendix Figure 1



SOURCE: Roger W. A. Legassie, Assistant Administrator for Planning and Analysis, Energy Research and Development Administration, Testimony before the Subcommittee to Review the National Breeder Reactor Program, Joint Committee on Atomic Energy, June 10, 1975.

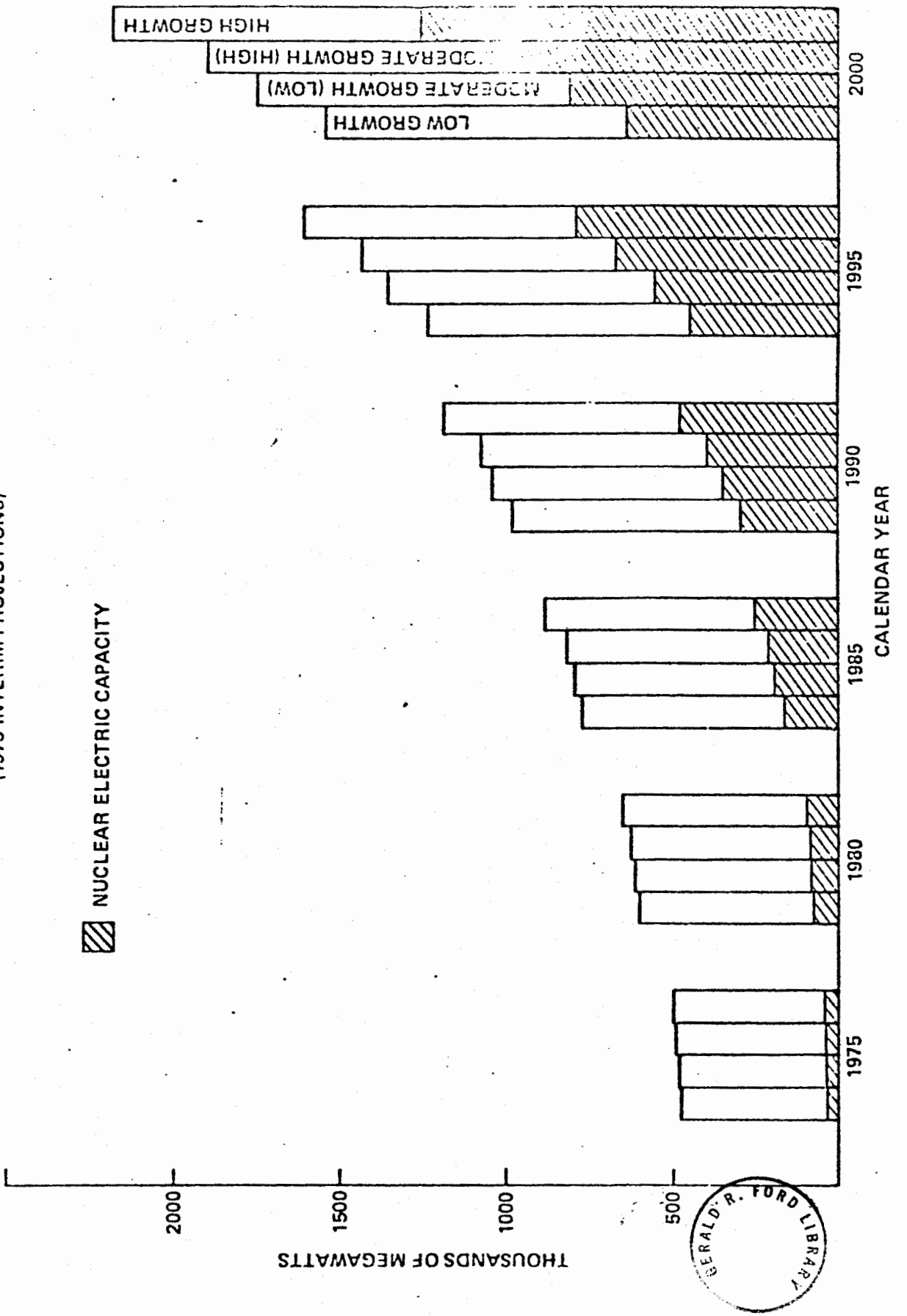
Appendix Figure 2



SOURCE: See Appendix Figure 1

Appendix Figure 3

UNITED STATES ELECTRICAL SYSTEM CAPACITY
(1975 INTERIM PROJECTIONS)



NFAA
7/30/76

1: PROGRESS: ROLL NO. 576 RECORDED VOTE TIME REMAINING F
MJ.HORTS.:BINGHAM
ON AGREEING TO THE AMENDMENT DELETES ALL SECTIONS OF THE BILL EXCEPT SEC

--: WHICH WOULD DIRECT ERDA TO EXPAND AN EXISTING FEDERAL GOVERNMENT ENRICHM
PLANT NEAR PORTSMOUTH, OHIO.

H R 8401 A01

	YEA	NAY	PRES	NOT VOTING
DEMOCRATIC	148	69		71
REPUBLICAN	22	99		24
OTHER				
TOTALS	170	168		95

Y	ABNOR/RONG	Y	PAUL
Y	DIESTER	Y	QUIE
Y	BROOKHILL	Y	RAILSBACK
Y	COHEN —	Y	RINALDO
Y	COWTE	Y	SCHULZE
Y	COUGHLIN	Y	SKUBITZ
Y	DU PONT	Y	WHALEN
Y	FENWICK		
Y	FISH		
Y	GILMAN — true		
Y	GRADISON		
Y	GUDE		
Y	JEFFORDS		
Y	KEMP/EN		
Y	KOSHER		

FINAL REPUBLICAN - YEAS — 3

1) Big Gov
2) Low Income
3) Unions for it
4) Jobs
4:30

One page fact sheet

The Report

STATE AND PARTY REPORT 30 JULY 1976 1:22 PM PAGE

ROLL NO. 576

H - 6401 A01 RECORDED VOTE CLOSED 30 JULY 1976 1:16 PM

AUTHOR(S):SINGHAM

ON AGREEING TO THE AMENDMENT DELETES ALL SECTIONS OF THE BILL EXCEPT SECTION 4, WHICH WOULD DIRECT ERDA TO EXPAND AN EXISTING FEDERAL GOVERNMENT ENRICHMENT PLANT NEAR PORTSMOUTH, OHIO.

	AYES	NOES	PRES	NV
DEMOCRATIC	148	69		71
REPUBLICAN	22	99		24
OTHER				
TOTAL	170	168		95

ROLL NO. 576

DEMOCRATIC	**OTHER**	REPUBLICAN	
ALABAMA			
BEVILL	NAY	BUCHANAN	NAY
FLOWERS	NAY	DICKINSON	NAY
JONES (AL)	NAY	EDWARDS (AL)	NAY
NICHOLS	NAY		
ALASKA			
		YOUNG (AK)	NAY
ARIZONA			
UDALL	YEA	CONLAN	NV
		RHODES	NAY
		STEIGER (AZ)	NV
ARKANSAS			
ALEXANDER	NV	HAMMERSCHMIDT	NAY
MILLS	NAY		
THORNTON	NAY		
CALIFORNIA			
ANDERSON (CA)	NAY	BELL	NAY
BROWN (CA)	YEA	BURGENER	NAY
BURKE (CA)	YEA	CLAUSEN, DON H.	NAY
BURTON, JOHN	NV	CLAWSON, DEL	NAY
BURTON, PHILLIP	YEA	GOLDWATER	NAY
COHAN	YEA	HINSHAW	NV
DANIELSON	NV	KETCHUM	NAY
DELLUMS	YEA	LAGOMARSINO	NAY
EDWARDS (CA)	YEA	MC CLOSKEY	NAY
HANNAFORD	YEA	MOORHEAD (CA)	NAY
HAWKINS	NV	PETTIS	NAY
JOHNSON (CA)	NAY	ROUSSELOT	NAY
KREBS	YEA	TALCOTT	NAY
LEGGETT	NV	WIGGINS	NAY
LLOYD (CA)	NAY	WILSON, BOB	NAY
MC FALL	YEA		
MILLER (CA)	YEA		
MINETA	YEA		
MOSS	YEA		
PATTERSON (CA)	YEA		
PEES	YEA		
ROYBAL	YEA		
RYAN	YEA		
SISK	NV		
STARK	YEA		
VAN DEERLIN	YEA		
WAXMAN	YEA		
WILSON, C. H.	NAY		
COLORADO			
EVANS (CO)	YEA	ARMSTRONG	YEA
SCHROEDER	YEA	JOHNSON (CO)	NV
SMITH	NV		

POLL NO. 576

DEMOCRATIC	**OTHER**	REPUBLICAN
CONNECTICUT		
COTTER	NV	MC KINNEY NAY
DODD	YEA	SARASIN NAY
GIAIMO	NAY	
MOFFETT	NV	
DELAWARE		
		DU PONT YEA
FLORIDA		
BENNETT	NAY	BAFALIS NAY
CHAPPELL	NAY	BURKE (FL) NAY
FASCELL	YEA	FREY NV
FUQUA	NAY	KELLY NAY
GIBBONS	YEA	YOUNG (FL) NAY
HALEY	NAY	
LEHMAN	NV	
PEPPER	YEA	
ROGERS	YEA	
SIKES	NV	
GEORGIA		
BLANCHARD	NAY	
FLYNT	NV	
GINN	NAY	
LANDRUM	NV	
LEVITAS	YEA	
MATHIS	NAY	
MC DONALD	NAY	
STEPHENS	NV	
STUCKEY	NAY	
YOUNG (GA)	NV	
HAWAII		
MATSUNAGA	NV	
MINK	YEA	
IDAHO		
		HANSEN NV
		SYMMS NAY

ROLL NO. 576

DEMOCRATIC	**OTHER**	REPUBLICAN	
ILLINOIS			
ANNUNZIO	NAY	ANDERSON (IL)	NAY
COLLINS (IL)	YEA	CRANE	NV
FARY	NAY	DERWINSKI	NAY
HALL (IL)	NAY	ERLENBORN	NAY
METCALFE	YEA	FINDLEY	NV
MIKVA	YEA	HYDE	NAY
MURPHY (IL)	NAY	MADIGAN	NAY
PRICE	NAY	MC CLORY	NAY
ROSTENKOWSKI	YEA	MICHEL	NAY
RUSSO	YEA	O'BRIEN	NAY
SHIPLEY	NV	RAILSBACK	YEA
SIMON	YEA		
YATES	YEA		
INDIANA			
BRADEMAS	YEA	HILLIS	NV
EVANS (IN)	NV	MYERS (IN)	NAY
FITHIAN	YEA		
HAMILTON	YEA		
HAYES (IN)	NV		
JACOBS	YEA		
MADDEN	NAY		
ROUSH	YEA		
SHARP	YEA		
IOWA			
BEDELL	YEA	GRASSLEY	NAY
BLOUIN	YEA		
HARKIN	YEA		
MEZVINSKY	YEA		
SMITH (IA)	YEA		
KANSAS			
KEYS	NV	SEBELIUS	NV
		SHRIVER	NAY
		SKUBITZ	YEA
		WINN	NAY
KENTUCKY			
BRECKINRIDGE	YEA	CARTER	NAY
HUBBARD	YEA	SNYDER	NAY
MAZZOLI	NV		
NATCHER	YEA		
PERKINS	NAY		
LOUISIANA			
BOGGS	NV	MOORE	NAY
HEBERT	NV	TREEN	NAY
HOLT	NV		
LONG (LA)	NV		
PASSMAN	NV		
WAGGONNER	NAY		

POLL NO. 576

DEMOCRATIC	***CT-E***	REPUBLICAN	
MAINE			
		COHEN	YEA
		EMERY	NAY
MARYLAND			
BYRON	YEA	BAUMAN	NAY
LONG (MD)	YEA	GUDE	YEA
MITCHELL (MD)	YEA	HOLT	NAY
SARBANES	YEA		
SPELLMAN	YEA		
MASSACHUSETTS			
BOLAND	YEA	CONTE	YEA
BURKE (MA)	NAY	HECKLER (MA)	NAY
DRINAN	YEA		
EARLY	YEA		
HARRINGTON	YEA		
MOAKLEY	YEA		
O'NEILL	NAY		
STUDDS	YEA		
TSONGAS	YEA		
MICHIGAN			
BLANCHARD	YEA	BROOMFIELD	NAY
BROOMEAD	YEA	BROWN (MI)	NAY
CARR	YEA	CEDERBERG	NAY
CONYERS	NV	ESCH	NV
DIGGS	YEA	HUTCHINSON	NAY
DINGELL	YEA	RUPPE	NV
FORD (MI)	NV	VANDER JAGT	NAY
NEDZI	YEA		
O'HARA	NV		
RIEGLE	NV		
TRAXLER	NV		
VANDER VEEN	YEA		
MINNESOTA			
BERGLAND	NV	FRENZEL	NA
FRASER	YEA	HAGEDORN	NA
KARTH	NV	QUIE	YE
NOLAN	NV		
OBERSTAR	YEA		
MISSISSIPPI			
BOWEN	NAY	COCHRAN	NV
MONTGOMERY	NAY	LOTT	NA
WHITTEN	YEA		

POLL NO. 576

	DEMOCRATIC	**OTHER**	REPUBLICAN	
MISSOURI				
	BOLLING	YEA	TAYLOR (MO)	NAY
	BURLISON (MO)	NAY		
	CLAY	NV		
	HUNGATE	YEA		
	ICHORD	NAY		
	LITTON	NV		
	RANDALL	NAY		
	SULLIVAN	NV		
	SYMINGTON	NV		
MONTANA				
	BAUCUS	NV		
	MELCHER	NV		
NEBRASKA				
			MC COLLISTER	NV
			SMITH (NB)	NAY
			THONE	NAY
NEVADA				
	SANTINI	NAY		
NEW HAMPSHIRE				
	D'AMOURS	YEA	CLEVELAND	NAY
NEW JERSEY				
	DANIELS (NJ)	YEA	FENWICK	YEA
	FLORIO	YEA	FORSYTHE	NAY
	HELSTOSKI	NV	RINALDO	YEA
	HOWARD	NV		
	HUGHES	YEA		
	MAGUIRE	NV		
	MEYNER	YEA		
	MINISH	YEA		
	PATTEN (NJ)	YEA		
	ROE	YEA		
	ROSE	YEA		
	THOMPSON	YEA		
NEW MEXICO				
	ROYBAL	NAY	LUJAN	NV

ROLL NO. 576

DEMOCRATIC	**OTHER**	REPUBLICAN
NEW YORK		
ABZUG	NV	CONABLE NAY
ADDABBO	NV	FISH YEA
AMBRO	YEA	GILMAN YEA
BADILLO	YEA	HORTON NAY
BIAGGI	NAY	KEMP NV
BINGHAM	YEA	LENT NAY
CHISHOLM	YEA	MC EWEN NAY
DELANEY	YEA	MITCHELL (NY) NAY
DOWNEY (NY)	YEA	PEYSER NV
FARLEY	YEA	WALSH NAY
HOLTZMAN	YEA	WYDLER NAY
KOCH	NV	
LAFALCE	NV	
LUNDINE	YEA	
MC HUGH	YEA	
MURPHY (NY)	NV	
NOWAK	NAY	
OTTINGER	YEA	
PATTISON (NY)	YEA	
PIKE	YEA	
RANGEL	YEA	
RICHMOND	NV	
ROSENTHAL	YEA	
SCHEUER	YEA	
SOLARZ	YEA	
STRATTON	NAY	
WOLFF	YEA	
ZEFERETTI	NV	
NORTH CAROLINA		
ANDREWS (NC)	YEA	BROYHILL YEA
FOUNTAIN	NV	MARTIN NAY
HEFNER	YEA	
HENDERSON	NAY	
JONES (NC)	NAY	
NEAL	YEA	
PREYER	YEA	
ROSE	NAY	
TAYLOR (NC)	YEA	
NORTH DAKOTA		
		ANDREWS (ND) NV

ROLL NO. 676

DEMOCRATIC	**OTHER**	REPUBLICAN	
OHIO			
ASHLEY	YEA	ASHBROOK	NAY
CARNEY	NV	BROWN (OH)	NAY
HAYS (OH)	NV	CLANCY	NV
MOTTL	YEA	DEVINE	NAY
SEIBERLING	YEA	GRADISON	YEA
STANTON, JAMES V.	NV	GUYER	NAY
STOKES	YEA	HARSHA	NAY
VANIK	NV	KINDNESS	NAY
		LATTA	NAY
		MILLER (OH)	NAY
		MOSHER	YEA
		REGULA	NAY
		STANTON, J. WILLIAM	NAY
		WHALEN	YEA
		WYLIE	NAY
OKLAHOMA			
ALBERT	NAY	JARMAN	NAY
ENGLISH	NAY		
JONES (OK)	YEA		
RISENHOOVER	NAY		
STEED	NV		
OREGON			
AUCOIN	NV		
DUNCAN (OR)	YEA		
ULLMAN	NV		
WEAVER	YEA		
PENNSYLVANIA			
DENT	NV	BIESTER	YEA
EDGAR	YEA	COUGHLIN	YEA
EILBERG	YEA	ESHLEMAN	NV
FLOOD	NV	GOODLING	NAY
GAYDOS	NAY	HEINZ	NV
GREEN	NV	JOHNSON (PA)	NAY
MOORHEAD (PA)	YEA	MC DADE	NAY
MORGAN	NV	MYERS (PA)	NAY
MURTHA	NAY	SCHNEEBELI	NV
NIX	YEA	SCHULZE	YEA
RODINO	NAY	SHUSTER	NAY
WIDNALL	NV		
YATRON	NAY		
RHODE ISLAND			
BEARD (RI)	YEA		
ST GERMAIN	NV		

ROLL NO. 576

DEMOCRATIC	**OTHER**	REPUBLICAN	
SOUTH CAROLINA			
DAVIS	YEA	SPENCE	NA
DERRICK	YEA		
HOLLAND	NV		
JENRETTE	YEA		
MANN	YEA		
SOUTH DAKOTA			
		ABDNOR	NA
		PRESSLER	NA
TENNESSEE			
ALLEN	YEA	BEARD (TN)	NA
EVINS (TN)	YEA	DUNCAN (TN)	NA
FORD (TN)	YEA	QUILLEN	NA
JONES (TN)	NV		
LLOYD (TN)	NAY		
TEXAS			
BROOKS	YEA	ARCHER	NA
BURLESON (TX)	NAY	COLLINS (TX)	NA
DE LA GARZA	YEA	PAUL	YE
ECKHARDT	YEA	STEELMAN	NA
GONZALEZ	NAY		
HALL (TX)	NAY		
HIGHTOWER	NV		
JORDAN	YEA		
KAZEN	NAY		
KRUEGER	YEA		
MAHON	NAY		
MILFORD	NAY		
PICKLE	NV		
POAGE	NAY		
ROBERTS	NAY		
TEAGUE	NAY		
WHITE	NAY		
WILSON, (TX)	YEA		
WRIGHT	NAY		
YOUNG (TX)	NAY		
UTAH			
HOAE	YEA		
MC KAY	YEA		
VERMONT			
		JEFFORDS	yea
VIRGINIA			
DANIEL, DAN	NAY	BUTLER	nay
JOHNSON (VA)	NAY	DANIEL, R. W.	nay
FISHER	YEA	ROBINSON	nay
HARRIS	YEA	WAMPLER	nr
SMITH, H.EL.	NAY	WHITEHURST	nr

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DEMOCRATIC		**OTHER**		REPUBLICAN	
WASHINGTON					
ADAMS	NV			PRITCHARD	NAY
BOLKER	YEA				
FOLEY	NAY				
HICKS	YEA				
MC CORMACK	NAY				
MEEDS	YEA				
WEST VIRGINIA					
HECHLER (WV)	YEA				
MOLLOHAN	YEA				
SLACK	NAY				
STAGGERS	YEA				
WISCONSIN					
ASPIN	YEA			KASTEN	YEA
BALDUS	YEA			STEIGER (WI)	NAY
CORNELL	YEA				
KASTENMEIER	YEA				
OBEY	NV				
REUSS	YEA				
ZABLOCKI	YEA				
WYOMING					
RONCALIO	NV				

* * * * * * * END OF REPORT * * * * * * *