TYSON

STATEMENT BY PAUL E. TSONGAS
ENERGY SPEECH
FEBRUARY 14, 1977

I WANT TO SPEAK TONIGHT ABOUT THE FUTURE. YOUR FUTURE AND MY FUTURE -- BUT ALSO THE FUTURE OF OUR CHILDREN. WHETHER THE PROSPECTS ARE REASSURING OR BLEAK WILL DEPEND TO A LARGE EXTENT UPON THE DECISIONS MADE IN THE NEXT FEW YEARS. I REFER NOT ONLY TO NATIONAL POLICY DECISIONS, BUT ALSO TO DECISIONS FACED BY EACH AND EVERY ONE OF US.

WITH THE POSSIBLE EXCEPTION OF NUCLEAR WAR AND WORLD POPULATION GROWTH, THERE IS SIMPLY NO ISSUE MORE PRESSING FOR THE PEOPLE OF OUR NATION THAN THE ENERGY CRISIS. WE STAND NOW AT A CRITICAL CROSSROADS. THE DECISIONS WHICH WE MAKE NOW REGARDING THE USAGE, SOURCES, TECHNOLOGIES AND ENVIRONMENTAL, ECONOMIC, AND SOCIAL IMPACTS OF ENERGY WILL HAVE A PROFOUND AFFECT ON THE QUALITY OF LIFE FOR THE NEXT HALF CENTURY, AND PERHAPS FOR THE FUTURE OF MAN ON THE EARTH.

IN 1973 WE EXPERIENCED THE ARAB OIL EMBARGO. ENERGY -- ONCE CONSIDERED CHEAP, ABUNDANT, AND HARDLY WORTH SERIOUS

CONCERN -- BECAME A NATIONAL OBSESSION -- FOR AWHILE. SIXTY-EIGHT DEGREES -- FOR AWHILE. THE CRISIS PASSED -- AND THE GOVERNMENT, FOR THE MOST PART, AND PUBLIC ATTENTION TURNED TO OTHER MATTERS.

WE CAN ALL EASILY RECALL THE DRAMATIC 1973 NIXON SPEECH PLACING "PROJECT INDEPENDENCE" -- A BROAD PROGRAM TO MAKE AMERICA ENERGY SELF-SUFFICIENT BY 1985 -- AT THE TOP OF THE PUBLIC AGENDA. LESS THAN FOUR YEARS LATER, IT IS CLEAR THAT PROJECT INDEPENDENCE IS A DISMAL FAILURE. DESPITE ONE OF THE MOST SEVERE ECONOMIC DOWNTURNS SINCE 1929, U.S. OIL CONSUMPTION HAS RISEN BY 7 PERCENT. OIL IMPORTS HAVE RISEN FROM 35 TO 44 PERCENT; AND THE SHARE OF SUCH IMPORTS FROM ARAB SUPPLIERS HAS MORE THAN DOUBLED.

ONE NEED ONLY LOOK AT AUTOMOBILE SALES TO SEE THE SLIP IN PUBLIC CONCERN. THE SALE OF SMALL, FUEL-EFFICIENT CARS HAS DECLINED EACH YEAR SINCE 1973.

AND NOW WE HAVE THE WINTER OF 1977 -- COLDEST IN DECADES -- WHICH HAS EXPOSED INADEQUACIES IN THE SUPPLY

AND DISTRIBUTION OF NATURAL GAS, CAUSING SCHOOL AND INDUSTRIAL SHUTDOWNS AND PLACING THOUSANDS OUT OF WORK.

NEITHER THE CRISIS OF 1977 NOR THE CRISIS OF 1973 WAS INESCAPABLE. MANY WOULD ARGUE THAT BOTH WERE PREDICTABLE AND CLEARLY AVOIDABLE. BUT, IF WE LOOK AHEAD BEYOND THE 65 DEGREE TEMPERATURES AND THE TEN-FOOT SNOWDRIFTS OF 1977, THERE ARE A SERIES OF CONCLUSIONS ABOUT THE FUTURE WHICH CANNOT BE ENTIRELY ESCAPED.

WHAT DO WE CONCLUDE?

FIRST, THE ENERGY CRISIS IS REAL.

SECOND, IT IS PERMANENT -- AND WILL ONLY GET WORSE.

THIRD, THE RESPONSE OF OUR GENERATION TO THIS CRISIS WILL DETERMINE THE CHANCES OF SURVIVAL FOR THE NEXT GENERATION.

IN FACT, I WISH I KNEW THE NAMES OF ALL OF THE CHILDREN OF ALL OF YOU IN THIS ROOM TONIGHT -- SO THAT I COULD POINT MY FINGER AT YOU AND SAY THAT THE DECISIONS WE MADE THIS YEAR AND NEXT AND IN THE NEAR FUTURE WILL

MOST LIKELY DETERMINE THE VERY VIABILITY OF THE WORLD THAT YOU LEAVE BEHIND FOR SALLY OR SARAH, OR JOHNNY, OR MY DAUGHTER, ASHLEY.

IN MY VIEW, THE NEXT GENERATION MAY WELL LOOK BACK ON US WITH ONE OF TWO POSSIBLE VIEWS. IT MAY CONDEMN OUR FAILURE TO HEED THE MESSAGES OF '73 AND '77. OR, HOPEFULLY, IT MAY THANK US FOR FINALLY HAVING ABANDONED OUR RELENTLESS PURSUIT OF COMFORT AND CONVENIENCE -- AND FOR HAVING TURNED INSTEAD TO A LIFESTYLE MORE IN HARMONY WITH THE FINITE RESOURCES OF OUR EARTH.

WHICH POLICY WILL WE PURSUE?

IN MY OPINION, THE ANSWER WILL DEPEND ON THE OBVIOUS -- THE DEMANDS OF THE PUBLIC AND THE COURAGE AND LEADERSHIP OF OUR ELECTED OFFICIALS.

IF THE PUBLIC DEMANDS CONSERVATION; IF IT DEMANDS SENSIBLE CHANGES IN LIFESTYLE; IF IT LOOKS TO THE LONG-TERM -- THEN THE FUTURE CAN BE FACED WITH CONFIDENCE. IF IT DOES NOT -- IF IT LOOKS ONLY TO NEXT WEEK AND NEXT MONTH --

ONLY A STRONG AND COURAGEOUS PRESIDENT AND CONGRESS CAN DO WHAT NEED BE DONE. AND IF THE POLITICAL LEADERSHIP FAILS TO RESPOND -- I AM CONVINCED THAT WE DOOM OUR CHILDREN AND THEIRS.

SO, WE MUST TRY.

ALL EXPERTS AGREE THAT WE ARE RUNNING OUT OF NATURAL GAS AND OIL -- THE VERY FOSSIL FUELS UPON WHICH WE ARE MOST DEPENDENT. IT IS A MATTER OF SIMPLE ARITHMETIC. OVER 75 PERCENT OF OUR ENERGY CONSUMPTION IS BASED ON PETROLEUM AND/OR NATURAL GAS. AND IN NEW ENGLAND, 88 PERCENT OF OUR AREA'S PETROLEUM COMES FROM IMPORTED PETROLEUM ALONE. THE NATIONAL ACADEMY OF SCIENCES ESTIMATES THAT THE ENTIRE WORLD SUPPLY WILL BE SERIOUSLY DEPLETED IN THE NEXT 25 YEARS. OTHER RESPONSIBLE STUDIES SAY 20 YEARS -- SOME SAY 40 YEARS. THE POINT IS THAT, HOPEFULLY, MOST OF US WILL STILL BE HERE.

WE, AND OUR FAMILIES, MIGHT AWAKE ONE MORNING TO THE NEWS OF A CEREMONY TO HONOR THE BURNING OF THE LAST DROP

OF OIL ON EARTH.

DOESN'T THAT SOUND RIDICULOUS?

IT WON'T SOUND RIDICULOUS TO THE PEOPLE WHO INHABIT THE EARTH WHEN IT HAPPENS.

HOW WILL I EXPLAIN TO MY GRANDCHILD, THEN, THAT THE REASON THAT SHE IS COLD -- THE REASON SHE IS HUNGRY -- IS THAT WE HAVE NO PETROLEUM PRODUCTS TO CONVERT INTO HEAT AND FERTILIZER? HOW DO YOU EXPLAIN TO THAT CHILD WHEN PETROLEUM IS ESSENTIAL FOR FERTILIZER IN A WORLD INCREASINGLY UNABLE TO FEED ITS POPULATION THAT IN 1977 WE INSISTED ON BIG, COMFORTABLE GAS-GUZZLING AUTOMOBILES WHICH BURNED UP THIS PRECIOUS RESOURCE?

THIS IS BUT ONE OF THE NUMEROUS TRULY FRIGHTENING QUESTIONS THAT I HOPE WE WILL NEVER HAVE TO ANSWER.

NO RATIONAL MAN WHO EXAMINES OUR ENERGY PROBLEM FOR THE FUTURE CAN BE ANYTHING BUT AN ADVOCATE OF CONSERVATION. HOWEVER, I AM TROUBLED BY THOSE WHO WOULD HAVE US BELIEVE THAT CONSERVATION ALONE WILL SATISFY OUR NEEDS OR PERHAPS

EVEN WORSE, THAT CONSERVATION WILL BE EASY.

THE TRUTH OF THE MATTER IS THAT CONSERVATION WILL BE PAINFUL. IT WILL AFFECT OUR LIFESTYLES, OUR STANDARDS OF LIVING -- AND IN A SENSE -- OUR FREEDOMS. IT'S ALREADY DOING SO THIS WINTER.

PERHAPS THE MOST OPTIMISTIC RESPONSIBLE ESTIMATE OF THE EFFECT OF A VIGOROUS CONSERVATION PROGRAM IS THE FORD FOUNDATION REPORT, "A TIME TO CHOOSE". IT'S ZERO ENERGY GROWTH SCENARIO PROJECTS THAT WE CAN IN THE NEXT TEN YEARS REDUCE OUR ENERGY REQUIREMENTS BY 25 PERCENT. THIS STILL LEAVES US WITH AN INCREASED ENERGY NEED OF 17 PERCENT. THIS IS DUE TO THE IMPACT OF THE POST WORLD WAR II "BABY BOOM". IN THE NEXT TEN YEARS, OUR SOCIETY MUST ACCOMMODATE AN INCREASE IN OUR LABOR FORCE OF 15 MILLION, A 20 PERCENT INCREASE IN HOUSEHOLDS, AND A 30 PERCENT INCREASE IN THE 25-34 YEAR OLD FAMILY-FORMING, HOME-BUYING GROUP. THIS IS ON TOP OF OUR NEED TO CLEAN OUR CITIES, IMPROVE THE LOT OF THE DISADVANTAGED, AND CONTINUE TO REDUCE POLLUTION

OF THE ENVIRONMENT; ALL OF WHICH WILL REQUIRE ENERGY.

THE STARK FACTS REGARDING OUR PHYSICAL RESOURCES DEMAND CONSERVATION; THE POLITICAL DYNAMICS OF A WORLD IN WHICH WE, ONLY 6 PERCENT OF THE WORLD'S POPULATION, ACCOUNT FOR 35 PERCENT OF ITS ENERGY CONSUMPTION DEMAND CONSERVATION; AND THE COMPLEX REALITIES OF THE IMPACT OF OUR ENERGY USE ON THE ENVIRONMENT AROUND US (IN THE 30 YEAR PERIOD FROM 1970 TO 2000, ACCORDING TO SOME REPORTS, THE WORLD WILL USE MORE ENERGY THAN IN THE ENTIRE PRIOR HISTORY OF MANKIND) DEMAND CONSERVATION.

BUT, CONSERVATION ALONE WILL NOT MEET OUR ENERGY NEEDS DURING THE REST OF THIS CENTURY. WITHOUT A SERIOUS CONSERVATION PROGRAM, AS I HAVE ALREADY INDICATED, I BELIEVE WE CAST A LONG AND DARK SHADOW UPON OUR CHILDREN AND THEIR GENERATION. WITH A SERIOUS ENERGY CONSERVATION PROGRAM, I BELIEVE WE STILL NEED A COMPREHENSIVE NATIONAL ENERGY PLAN TO MEET OUR BASIC NEEDS.

WHAT ARE THE ALTERNATIVE POTENTIAL SOURCES AND

TECHNOLOGIES TO MEET THSE REQUIREMENTS?

As a member of the Energy and Environment Subcommittee, over the past two years, I have confronted expert after expert with this question. The answer is nearly always the same. Only coal and nuclear energy are sufficient significant energy sources available to replace dwindling oil and gas supplies.

What about fusion, wind, photovoltaic, solar thermal, ocean thermal, geothermal, biomass conversion, and other sources prominently discussed in recent years?

Witness after witness has praised the <u>potential</u> of each of these sources. Some, fusion and solar, particularly, hold great promise for the future. However, they cannot be relied upon as significant energy sources in <u>this</u> century. The most optimistic responsible projections which I have heard for solar energy before the year 2000 is 10 percent of our energy need.

RECENTLY, I HAD A CONSERVATION WITH PROFESSOR NORMAN RASMUSSEN OF MIT WHO ADMITTED THAT FUSION, WITH ALL OF ITS PROMISE, MIGHT NEVER BE COMMERCIALLY VIABLE. THE PROMISE IS GREAT, BUT THE RISKS OF RELYING UPON THE USE OF A FUTURE TECHNOLOGY IS FAR TOO GREAT.

I AM EMPHATICALLY NOT SAYING THAT GOVERNMENT AND INDUSTRY SHOULD NOT STEP UP ITS RESEARCH AND DEVELOPMENT IN THESE AREAS. IN FACT, I HAVE REPEATEDLY CALLED FOR GREAT EFFORTS TOWARD TAPPING THE EARTH'S RICHEST RESOURCE -- SOLAR ENERGY.

EACH YEAR THE SUN POURS 3600 QUINTILLION BTU'S OF ENERGY UPON THE EARTH OR 18,000 TIMES THE AMOUNT NEEDED TO MEET THE WORLD'S ANNUAL DEMAND FOR MECHANICAL ENERGY AND HEATING. AS IT APPROACHES THE EARTH, THIS ENERGY STIRS THE ATMOSPHERE, CAUSING WINDS. IT STRIKES THE EARTH'S SURFACE, WARMS IT AND MADES PLANTS GROW, ENERGIZING THE CYCLE OF LIVING, DYING, AND DECAYING THAT SUPPORTS MAN'S EXISTENCE. AT MANY POINTS IN THAT PROCESS, THE ENERGY CAN BE TAPPED TO FUEL OUR ELECTRIC POWER SYSTEMS, WARM AND COOL OUR HOMES,

AND DRIVE OUR INDUSTRIES.

I WOULD WANT NOTHING I SAY TONIGHT ABOUT THE HARD REALITIES OF THE ENERGY CRISIS TO BE UNDERSTOOD AS A LACK OF RESOLVE ABOUT ALTERNATIVE ENERGY SOURCES. I BELIEVE THAT OUR GOVERNMENT HAS BEEN LAX IN ITS COMMITMENT TO BRINGING SIGNIFICANT AMOUNTS OF SOLAR ENERGY "ON-LINE". HOWEVER, IN THE LAST SEVERAL YEARS -- AND THIS IS AN IMPORTANT PREREQUISITE OF ACTION BY OUR POLITICAL INSTITUTIONS -- SOLAR POWER HAS SUDDENLY BECOME RESPECTABLE. AS MICHAEL HARWOOD HAS WRITTEN: "ONLY A FEW YEARS AGO IT WAS TREATED IN THE UNITED STATES AS A SUBJECT FOR ECO-FREAKS, TOO FUTURISTIC TO DESERVE MORE THAN A POLITE SMILE; NOW THOUSANDS OF PEOPLE IN UNIVERSITIES, INDUSTRIES AND GOVERNMENT ARE INVESTIGATING SUCH SCHEMES AS COVERING LARGE SECTIONS OF THE SOUTHWEST DESERT WITH HEAT COLLECTORS, BUILDING STRINGS OF ENORMOUS WINDMILLS ON THE GREAT PLAINS OR OFFSHORE, AND GENERATING ELECTRICITY IN SPACE AT ORBITING STATIONS WHOSE SIZE WOULD BE MEASURED IN SQUARE MILES."

By the late 1990's, solar central power stations, on earth and in orbit, around the earth, could begin to supply electrical power to supplement daily requirements from conventional nuclear and fossil fuel plants. Some solar applications are available and in use NOW, and others will be commercially available by the mid 1980's. Solar systems that supply domestic hot water are used commercially in Australia, Japan, Israel, India, and the Soviet Union. In this country, we have the technology and have had it for years. We need to work toward a production scale which would make solar heating and economics competitive.

In the 94th Congress, I introduced legislation to increase the ERDA budget for solar energy by $50 million. This legislation passed in the authorization package but failed in the final appropriations bill.

At my request and Senator Kennedy's, the New England delegation approved a plan aimed at locating the Solar Energy Research Institute in our area. Further, I have asked ERDA

TO CONSIDER ESTABLISHING A CONSERVATION INSTITUTE IN MASSACHUSETTS.

I CONTINUE TO BELIEVE THAT THESE ALTERNATIVES AND OTHERS ARE CRITICAL TO AMERICA'S LONG-RANGE ENERGY FUTURE AND THAT NEW ENGLAND HAS A PARTICULARLY WELL-SUITED TECHNOLOGICAL BASE TO PLAY A MAJOR ROLE IN THEIR DEVELOPMENT.

HOWEVER, RETURNING TO THE SHORTER-TERM, THE NEXT 25-50 YEARS, AS I HAVE SAID, THE SIGNIFICANT ALTERNATIVES ARE TWO: COAL AND NUCLEAR ENERGY.

IT IS CLEAR THAT NEITHER IS A HAPPY ALTERNATIVE. IT IS ALSO CLEAR TO ME THAT BOTH ARE A NECESSARY PART OF OUR ENERGY MIX FOR THE REST OF THIS CENTURY.

COAL IS OUR MOST ABUNDANT DOMESTIC RESOURCE AVAILABLE TO FUEL-NEEDED GENERATING FACILITIES. THE U.S. GEOLOGICAL SURVEY AND THE U.S. BUREAU OF MINES HAVE MEASURED MORE THAN 1.5 TRILLION TONS OF COAL. NEW TECHNOLOGIES ALLOW COAL TO BE CONVERTED INTO SYNTHETIC GAS AND LIQUID STEAM BOILER AND HEATING OIL FUEL. COAL DEPOSITS ARE FOUND IN 36 STATES AND

MINED IN 26 OF THOSE STATES. U.S. SUPPLIES OF COAL COULD SATISFY ENERGY NEEDS FOR HUNDREDS OF YEARS EVEN AT CONSIDERABLY EXPANDED RATES OF PRODUCTION. (ACCORDING TO A 1972 DEPARTMENT OF INTERIOR REPORT, 8.5 BILLION TONS OF COAL WOULD HAVE TO BE BURNED IN THE YEAR 2000 IN ORDER TO MEET TOTAL U.S. ENERGY DEMAND. TO PUT IT ANOTHER WAY, IF COAL WERE TO TOTALLY FUEL OUR ENERGY NEEDS IN THE YEAR 2000, IT WOULD TAKE 15 TIMES THE NATION'S 1972 COAL PRODUCTION).

ALTHOUGH IT IS CLEAR THAT INCREASES IN THE USE OF COAL TO REPLACE PETROLEUM AS A SOURCE OF ENERGY WILL BE AN IMPORTANT PART OF THE ENERGY MIX FOR THE NEAR FUTURE, THE USE OF COAL TO ELIMINATE PROJECTED USAGE OF NUCLEAR POWER RAISES PROFOUND DIFFICULTIES. ASIDE FROM SERIOUS OCCUPATIONAL HAZARDS ASSOCIATED WITH COAL (150,000 COAL MINERS NOW HAVE BLACK LUNG DISEASE AND 3000 OF THEM DIE PREMATURELY EVERY YEAR) AND OBVIOUS ENVIRONMENTAL POLLUTION DANGERS RELATED TO THE BURNING OF COAL. THE NATIONAL ACADEMY OF SCIENCES CONCLUDES THAT

THERE IS EVIDENCE OF A POTENTIAL PULMONARY EFFECT OF AIR POLLUTION FROM COAL BURNING ON THE PUBLIC AND DAMAGING IMPACTS ON THE ECOLOGICAL SYSTEM AS A WHOLE. COAL, LIKE ALL FOSSIL FUELS, INCLUDING OIL AND GAS, PUTS CARBON DIOXIDE INTO THE ATMOSPHERE. IN THIS CENTURY, THE CARBON DIOXIDE CONTENT OF THE ATMOSPHERE HAS INCREASED 10 PERCENT FROM FOSSIL FUEL BURNING, AND IS PREDICTED TO INCREASE ANOTHER 15 PERCENT BY THE END OF THE CENTURY. CONTINUED ADDITION OF CARBON DIOXIDE INTO THE ATMOSPHERE CAN, BECAUSE OF THE SO-CALLED "GREENHOUSE EFFECT" CAUSE A WARMING OF THE EARTH. SOME SCIENTISTS HAVE ARGUED THAT THIS COULD IN TURN CAUSE PARTIAL MELTING OF THE POLAR ICECAPS SO AS TO FLOOD COASTAL AREAS TO A DEPTH OF 200 FEET. THERE ARE THEORIES THAT CORRELATE THE PRESENT DROUGHTS IN AFRICA WITH THE INCREASED ATMOSPHERIC CARBON DIOXIDE AND OTHER EMISSIONS FROM FOSSIL BURNING.

IT TAKES A 100-CAR FREIGHT TRAIN <u>EACH DAY</u> TO FUEL A LARGE COAL BURNING PLANT, AND A 40-CAR FREIGHT TRAIN <u>EACH</u>

DAY TO TAKE AWAY THE ASHES, OR THE NOXIOUS SLUDGE IN THE CASE OF A PLANT WITH WET SCRUBBERS.

IN ADDITION, 100 MILLION POUNDS OF SULFUR DIOXIDE ARE PRODUCED YEARLY AS WELL AS THOUSANDS OF POUNDS OF MERCURY, ARSENIC AND LEAD; WITH PRESENT TECHNOLOGY, MUCH OF THIS MATERIAL IS EMITTED DIRECTLY INTO THE ATMOSPHERE. (INCIDENTALLY, A GEOTHERMAL PLANT EMITS AS MUCH OF THIS POLLUTANT).

IMPORTANT STEPS HAVE BEEN TAKEN TO REDUCE SULFUR RELEASED INTO THE ATMOSPHERE BY COAL BURNING PLANTS. THE ECONOMICAL COMMERCIAL USE OF NUMEROUS NEW PROCESSES INCLUDING FORMS OF COAL GASIFICATION, COAL LIQUIFICATION AND FLUIDIZED BED COAL COMBUSTION (BURNING OF COAL IN PRESENCE OF CRUSHED LIMESTONE). HOWEVER, IT SEEMS CLEAR THAT SUFFICIENT LEVELS OF COAL COMBUSTION TO MEET ENERGY NEEDS WITHOUT OTHER SOURCES, EVEN IF ECONOMICALLY AND SOCIALLY ACCEPTABLE, WOULD NOT BE ACCEPTABLE IN TERMS OF THE ENVIRONMENT.

I HAVE ALREADY STATED THAT I CONSIDER THE OTHER ENERGY SOURCE -- NUCLEAR ENERGY -- BOTH AN UNHAPPY OPTION AND

NECESSARY. EVEN PUTTING ASIDE FOR THE MOMENT THE SAFEGUARD AND WASTE MANAGEMENT PROBLEMS ASSOCIATED WITH NUCLEAR ENERGY, MEETING THE FEDERAL ENERGY ADMINISTRATION'S PROJECTIONS FOR 1985 WILL REQUIRE THAT URANIUM PRODUCTION AND ENRICHMENT FACILITIES KEEP PACE WITH THE EXPANSION WITH ENOUGH LEAD TIME TO INSURE THE AVAILABILITY OF NUCLEAR FUEL WHEN THE PLANTS COME ON LINE.

THE ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION ESTIMATES THAT AS MANY AS 165 NUCLEAR PLANTS WILL BE PRODUCING ELECTRICITY IN THE UNITED STATES BY 1985 -- PROVIDING 155.8 MILLION KWE -- OR ABOUT 21 PERCENT OF TOTAL ENERGY CAPACITY. BY 1984, THE FULL CAPACITY OF GOVERNMENT-OWNED URANIUM ENRICHMENT PLANTS WILL BE REACHED. IN FACT, IN MID-1974, CONTRACTING FOR NEW ENRICHING SERVICES WERE CUT OFF. SINCE THEN IT HAS BEEN CLEAR THAT NEW ENRICHING CAPACITY WILL HAVE TO BE BUILD AND BROUGHT ON LINE BY THE 1983-84 DEADLINE. FAILURE TO INSTALL NEW ENRICHING CAPACITY WOULD DENY FUEL TO NEW PLANTS AND THEREFORE PRECLUDE FURTHER NUCLEAR EXPANSION.

WHILE THERE ARE SERIOUS POLITICAL QUESTIONS ABOUT WHO SHOULD FINANCE AND OPERATE NEW ENRICHING FACILITIES, THESE ARE ONLY THE MORE IMMEDIATE PROBLEMS FACING THE NUCLEAR OPTION -- THERE ARE OTHERS FAR MORE DIFFICULT.

ACCORDING TO CURRENT GOVERNMENT ESTIMATES, THE U.S. HAS ABOUT 700,000 TONS OF PROVEN URANIUM ORE RESERVES (ORE DEPOSITS THAT CAN BE RECOVERED WITHIN A STATED COST USING CURRENT MINING AND PROCESSING TECHNIQUES). A FAIR ESTIMATE OF "POSSIBLE" U.S. RESERVES MIGHT BE ERDA'S FIGURE OF 3.7 MILLION TONS.

ADVANCE FUEL COMMITMENT IS NECESSARY BECAUSE NO UTILITY WOULD UNDERTAKE THE LARGE CAPITAL INVESTMENT TO BUILD A NUCLEAR POWER PLANT WITHOUT AN INSURED FUEL SUPPLY. ALL POTENTIAL URANIUM RESOURCES WILL HAVE BEEN COMMITTED APPROXIMATELY BY 1992 AND CONSUMED (IF THEY EXIST) BY THE YEAR 2032.

ONE WAY TO EXTEND THE LIFETIME OF THE PRESENT TYPE OF REACTOR, THE LIGHT WATER REACTOR, SO CALLED BECAUSE IT IS

COOLED BY WATER, IS BY THE USE OF PLUTONIUM AND URANIUM RECYCLE. THIS PROCESS OF REMOVING PLUTONIUM CREATED AND URANIUM UNEXPENDED IN THE SPENT FUEL OF LIGHT WATER REACTORS COULD INCREASE THE FUEL SUPPLY BY 25 PERCENT, ACCORDING TO SOME ESTIMATES. THIS WOULD EXTEND THE OPERATION OF LIGHT WATER REACTORS BY ABOUT EIGHT YEARS. THIS ADDED ENERGY AVAILABLE IS THE EQUIVALENT OF OVER 50 BILLION BARRELS OF OIL, GREATER THAN THE SIZE OF OUR PRESENT PROVEN OIL RESOURCES.

ON THE OTHER HAND, IF WE ARE LOOKING TO NUCLEAR POWER AS A CONTINUING ENERGY SOURCE TO AUGMENT DWINDLING SUPPLIES OF FOSSIL FUELS AND TO PROVIDE THE TIME FOR THE DEVELOPMENT OF NEWER ENERGY TECHNOLOGY, THE PLUTONIUM RECYCLE IN LIGHT WATER REACTORS MAY NOT BE ENOUGH. WE MAY HAVE TO TURN TO THE BREEDER.

RESEARCH AND DEVELOPMENT IS CURRENTLY IN PROGRESS FOR THE LIQUID METAL FAST BREEDER REACTOR. A BREEDER REACTOR IS A NUCLEAR REACTOR WHICH PRODUCES ELECTRICITY, BUT AT THE

SAME TIME HAS THE PROPERTY OF PRODUCING PLUTONIUM. THE PLUTONIUM, IN TURN, IS ITSELF A FUEL FOR THE REACTOR. THE USE OF THE BREEDER REACTOR WOULD MAKE POSSIBLE THE USE OF NUCLEAR FUEL FOR THOUSANDS OF YEARS TO COME.

THERE ARE CURRENTLY NO COMMERCIAL REPROCESSING PLANTS OPERATING IN THE UNITED STATES AND THE ERDA ENERGY PLAN DEFERS THE DECISION ON THE DEPLOYMENT OF THE BREEDER UNTIL 1986.

SOME CRITICS ARGUE THAT IF ECONOMICALLY AND ENVIRONMENTALLY ACCEPTABLE URANIUM IS LIMITED TO ABOUT THREE MILLION TONS, IT WILL REQUIRE A NATIONAL COMMITMENT TO RECYCLE PLANTS ON A SCALE NECESSARY TO PERMIT COMMERCIAL USE OF THE BREEDER BY THE TURN OF THE CENTURY. IT IS ARGUED THAT UNLESS PLUTONIUM RECOVERY PLANTS ARE ON-LINE AND THEIR TECHNOLOGY WELL ESTABLISHED BY THE TIME THE BREEDER REACHES ECONOMICAL STATUS, THERE WOULD BE INSUFFICIENT PLUTONIUM RESOURCES TO MEET THE ENERGY NEEDS OF THE NATION.

THERE ARE, HOWEVER, A NUMBER OF CRITICAL PROBLEMS

WITH PLUTONIUM RECYCLE AND THE BREEDER -- THE SO-CALLED "PLUTONIUM ECONOMY". THESE QUESTIONS ARE SO LARGE IN THEIR IMPLICATIONS FOR OUR FUTURE THAT THEY DEMAND THE MOST DELIBERATIVE AND CAREFUL EVALUATION OF THE NEED FOR THESE PROCESSES. PRESIDENT FORD THIS PAST OCTOBER PLACED CONSTRAINTS ON THE FUTURE USE OF PLUTONIUM AND FOR REPROCESSING OF RADIOACTIVE FUEL. THE NUCLEAR REGULATORY COMMISSION IS CARRYING OUT A SPECIAL "GENERIC ENVIRONMENTAL STATEMENT ON THE USE OF RECYCLE PLUTONIUM IN MIXED OXIDE FUEL," KNOWN AS GESMO. PRESIDENT CARTER RECENTLY ANNOUNCED A RESTUDY OF THE BREEDER PROGRAM.

IN SPITE OF ITS ENORMOUS POTENTIAL AS A VIRTUALLY INEXHAUSTIBLE MAN-MADE FUEL, SEVERAL DOUBTS HAVE ARISEN ABOUT THE ECONOMICS, SAFEGUARDS AND WASTE MANAGEMENT ASSOCIATED WITH PLUTONIUM AND THE TECHNOLOGIES ASSOCIATED WITH IT.

PLUTONIUM IS A MATERIAL FROM WHICH NUCLEAR WEAPONS CAN BE MADE. WITH HUNDREDS OF TONS OF PLUTONIUM PRODUCED

ANNUALLY AND ONLY AN AMOUNT THE SIZE OF A GRAPEFRUIT NEEDED TO PRODUCE A NUCLEAR WEAPON, IT IS CLEAR THAT EXTRAORDINARY SAFEGUARDS WILL BE REQUIRED. IN ADDITION, A PARTICLE OF PLUTONIUM THE SIZE OF A GRAN OF SAND, IF INHALED, CAN PRODUCE LUNG CANCER. WITH LARGE AMOUNTS OF THIS SUBSTANCE HANDLED NOT ONLY AT REPROCESSING PLANTS, BUT ALSO IN TRANSIT, THE RISK OF DIVERSION INVOLVED IN SUCH A "PLUTONIUM ECONOMY" MIGHT INDEED BE VERY LARGE. BOTH THE ACCELERATION OF WORLDWIDE NUCLEAR PROLIFERATION AND THE POSSIBLE DIVERSION OF NUCLEAR MATERIALS TO SUB-NATIONAL TERRORIST GROUPS CANNOT BE IGNORED AS A FACTOR IN THE ULTIMATE PLUTONIUM CYCLE DECISION.

PLUTONIUM RECYCLE ALSO, UNFORTUNATELY, PRODUCES NOT ONLY PLUTONIUM AND SPENT URANIUM -- IT ALSO PRODUCES A STREAM OF CONCENTRATED HIGH-LEVEL RADIOACTIVE WASTE. PRESENT NRC REGULATIONS REQUIRE THAT COMMERCIAL LIQUID HIGH LEVEL WASTE BE CONVERTED TO A DRY, SOLID FORM WITHIN FIVE YEARS, AND WITHIN TEN YEARS THESE SOLID WASTES MUST

BE TRANSFERRED TO THE CUSTODY OF THE FEDERAL GOVERNMENT. NO DECISIONS HAVE BEEN MADE AS TO THE FORM OR METHOD OF FINAL WASTE STORAGE. THESE WASTES ARE HIGHLY RADIOACTIVE AND MUST BE KEPT OUT OF THE ENVIRONMENT FOR GENERATIONS.

I AM AFRAID THAT I HAVE PAINTED A BLEAK PICTURE, TONIGHT, OF OUR FUTURE. I PARTIALLY INTENDED TO DO SO. I HOPE I HAVE MADE SEVERAL POINTS CLEAR:

ONE -- THE ENERGY CRISIS IS REAL AND PERMANENT.

TWO -- THERE ARE NO SIMPLE ANSWERS TO OUR ENERGY PROBLEMS. ALL OF THE REALISTIC ALTERNATIVES ARE UNHAPPY.

THREE -- CONSERVATION, INVOLVING CHANGES IN OUR LIFESTYLES IS ABSOLUTELY NECESSARY. THE ERA OF THE ELECTRIC TOOTHBRUSH, CAN OPENER, POPCORN POPPER, AND GARBAGE COMPACTER IS OVER.

FOUR -- WE MUST PUSH FORWARD VERY VIGOROUSLY TOWARD THE DEVELOPMENT OF ENERGY ALTERNATIVES, PARTICULARLY SOLAR.

FIVE -- ALTHOUGH COAL IS ABUNDANT, IT, TOO, HAS SEVERE ENVIRONMENTAL HAZARDS.

AND SIX -- NUCLEAR ENERGY HAS GREAT POTENTIAL, PERHAPS UNACCEPTABLE LEVELS OF RISK, BUT MOST IMPORTANTLY, CANNOT BE DEBATED IN A VACUUM. IF WE ARE TO MAKE AN INTELLIGENT JUDGMENT FOR OUR FUTURE AND THE FUTURE OF OUR CHILDREN, IT MUST BE MADE IN THE CONTEXT OF THE FULL ENERGY PICTURE.

HOWEVER, HAVING SAID ALL OF THAT -- AT GREAT LENGTH I'M AFRAID -- I WANT TO CONCLUDE ON A HOPEFUL NOTE. IF WE APPROACH THESE PROBLEMS NOT BY A HEADLONG SURGE INTO MORE AND MORE, BUT BY CAREFUL CONSIDERATION OF WHAT OUR PRIORITIES ARE. HOW MUCH? HOW FAST? WHAT DO WE REALLY NEED? IF WE REFUSE TO BE STAMPEDED IN PANIC INTO UNWISE, EXPENSIVE OR DANGEROUS TECHNOLOGIES. IF WE FACE THE CRISIS SQUARELY AND DO NOT RESORT TO FANTASY. IF WE DEMAND LEADERSHIP FROM THE GOVERNMENT AND IF WE AS CITIZENS RESPOND, WE CAN LOOK FORWARD INTO THE FUTURE WITH CONFIDENCE.