TESTIMONY OF ROBERT H. BINDER, ASSISTANT SECRETARY FOR POLICY, PLANS AND INTERNATIONAL AFFAIRS, U. S. DEPARTMENT OF TRANSPORTATION, BEFORE THE HOUSE SUBCOMMITTEE ON TRANSPORTATION AND COMMERCE, ON LEGISLATION CONCERNING DAYLIGHT SAVING TIME, JUNE 8, 1976.

Mr. Chairman and Members of the Committee:

I am pleased to appear before you today to discuss the results and recommendations contained in the Department's final report on daylight saving time (DST). I am accompanied by Robert I. Ross of the General Counsel's office, which has the responsibility within the Department for interpreting the various time laws; by Nancy Ebersole of my Transportation Energy Policy Staff, and by David Rubin and Eugene Darling of the Transportation Systems Center. These last three people served as Study Co-Directors for both the interim and final reports on daylight saving time.

Before discussing the findings of our final report, I would like to briefly summarize the nation's history with DST and the issues involved in future decision-making on this subject.

With the exception of the two world wars when daylight saving time was observed on a national basis, it was not until 1966 that Congress through its enactment of the Uniform Time Act provided for the general observance of nationwide DST for six months of the year (from the last Sunday in April through the last Sunday in October). This system remained in effect until 1973 when Congress enacted the Emergency Daylight Saving Time Energy Conservation Act to help conserve energy during the fuel shortage. The 1973 Act switched the nation from the

historic six-month May to October DST cycle to a year-round observance of DST for a two-year trial period. The DOT, after evaluating the effects of the first four months of the experiment from January to April 1974, reported to Congress that the public opposed DST in January and February but favored its use in March and April. We therefore recommended and Congress subsequently adopted an eight-month system of DST (March through October) for the second year's experiment under the 1973 Act, as amended. Following our second year of analysis, which focused on the operation and effects of DST in the months of March and April, we recommended to Congress that the experiment with the eight-month system of DST be continued for two more years. This recommendation was based on indications of small but beneficial savings in energy use, traffic fatalities and violent crimes and favorable public reaction as measured in public opinion pools during both years of the experiment. Furthermore, there was no evidence that DST in March and April increased the risk of school-age children fatalities.

I must say that when the results of the analysis were presented to me, it was my responsibility to decide whether to recommend that there was no point in continuing the experiment, or whether it looked as though we had sufficient evidence to recommend a continuation of the experiment. I concluded the latter, notwithstanding the fact that some of the data are not as comprehensive as I would have liked, and that the results are not as conclusive as I would have liked.

So, I would say we have done what Congress asked us to do-- we have examined the impacts of DST on a nationwide basis and have tried hard to measure the benefits and costs; we have used the best data available, but for some impact areas the data are limited to only one or two years of observations and provide an insufficient basis for final conclusions; and we have concluded that there are potential benefits that we think offset the costs. However, we would like to make sure. We are not asking Congress at this time to permanently change the six-month DST system to an eight-month DST system; we're saying, it looks as though beneficial savings exist in March and April, additional savings may be disclosed, and we think it worthwhile to validate these benefits.

One further point bears mention regarding the two months at issue in the debate over the eight-four system versus the six-six system. The sunrise and sunset times for March and April are quite similar to the months of September and October yielding approximately equal amounts of sunlight throughout these four months. This gives us the feeling that we are not moving into strange territory when we suggest that the change from the six-six system to an eight-four system may be warranted. One would think that all of the arguments raised about March and April would have been raised also about September and October since these two months have been included in the daylight saving time cycle since 1966. But objections about September and October were not raised, except by a few States who were exempted entirely from the DST system.

Therefore, we don't believe we're pushing Congress to do something that is tremendously different from what the public has experienced and accepted in the past. On the basis that March and April lighting conditions are similar to September and October, plus our impact analyses, we are asking for two more years of experimentation to confirm or deny the benefits and public acceptance of the eight-four system. Unfortunately, since no action was taken this year to continue the experiment, we have lost the opportunity to collect data this year and to preserve continuity in the experiment which is bound to cause some confusion on the part of the public in future opinion polling. Nevertheless, we are prepared to start anew and hope that the Congress will grant us a sufficient period of uninterrupted experiment in which to collect data and give the public time to readjust to the change. Until the experiment resumes and we are able to collect and analyze additional data concerning the use of DST in March and April, no final judgments by our agency of any others can be made on the merits of altering or retaining the historical May through October six-month daylight saving time system.

Having stated the issues and our position, I will turn now to a discussion of the findings in our final report concerning the main impact areas.

Energy Savings

The final report concluded that daylight saving time results in probable electricity savings of 1% in March and April, equivalent to roughly 100,000 barrels of oil per day over the two months. Approximately one-half of this savings is in coal. These savings were computed from Federal Power Commission data for DST transitions in the Winter, Spring and Fall. Furthermore, even larger savings due to DST would be expected in the Summer for the light sensitive portion of the load because of the reduced demand for lighting in both the morning and evening.

Evidence of peak shaving for electric power companies was found in the DST weeks preceding the Fall transition, but not at the Spring transition.

Savings in home heating fuel consumption due to DST were found to be minimal. Also, DST appears to have no discernible effect on either travel demand or gasoline use.

Motor Vehicle Fatalities, Total Population

In the interim report, we were unable to isolate the influence of DST on motor vehicle fatalities from other causal factors such as reduced speed limits and the reduced trip-making associated with gasoline supply constraints during the 1974 DST experiment. Most

of the available data covered only a single year; thus comparisons between two successive years were not possible. Furthermore, the time of day data required to detect a DST influence was only available for a limited number of states. However, in 1975 we were able to obtain 1973 and 1974 fatality data which were approximately 80% complete for the entire U.S. Also, the additional time available for the 1975 study made it possible to apply more sophisticated techniques which are capable of removing long-term seasonal trends and other effects, such as the reduced speed limit, which mask the small DST effect.

A comparison between national motor vehicle fatal accidents in March and April 1974 (a period with DST) and March and April 1973 (the corresponding period without DST) revealed a reduction in traffic fatalities of 0.7% during DST, which corresponds to a savings of about 50 lives and 2,000 injuries. Moreover, an analysis of fatalities before and after the Spring and Fall transitions in 1973 revealed an approximate net reduction in fatalities of 1% during DST. I should add that our analysts believe that these results are conservative and that further study may reveal reductions in fatalities of 1.5% to 2% due to DST.

School-age Children Safety

The interim report findings regarding DST effects on school children fatalities were inconclusive, due primarily to lack of data. As a result of public apprehension over the safety of

children traveling to school on dark mornings, we recommended the elimination of the four darkest winter months from the second year's experiment. Our recommendation to retain March and April in the second year's experiment was based on our belief that sunrises in those months occurred early enough to alleviate concern about school children safety. Judging from the substantial decline in public correspondence on this issue during the second year, we feel that public concern has subsided. Our conclusion is supported by the results of the 1975 public opinion poll in which only 7% of the respondents expressed concern for school-age children safety, a substantial reduction from the 38% who expressed concern for school-age children in the 1974 poll.

Two studies of school-age children traffic fatalities are contained in the final report: A DOT study and a study conducted by the National Safety Council at DOT's request. The theory underlying both studies was that if daylight saving time had a special effect on the number of school-age children fatalities, then the change in school-age children fatalities would be significantly different from the change observed in the total pedestrian/pedalcyclist and motor vehicle fatalities. DOT's study indicated that for the daylight saving time period of January through April 1974, school-age children were not subject to a greater involvement in fatal accidents than the general population at any period of the day. The National Safety Council

reported that the inclusion of March and April in the DST period would not have an appreciable effect on the number of school-age children killed while traveling to and from school.

Thus, we conclude that there is no statistically apparent DST impact on fatal accidents involving school-age children.

Changes in School Hours

The Department of Health, Education and Welfare advised us that only a small number of schools in two Midwest and Western States adjusted school hours during March and April 1975 as a consequence of DST.

Public Preference

Public opinion was mixed in two polls conducted during the 1974 experiment with year-round DST. In a February 1974 poll, 50% of the public opposed year-round DST and 42% favored it. A reversal of opinion was evidenced in a March 1974 poll where 54% of the public favored year-round daylight saving time, while 38% opposed it. Also, a national opinion poll conducted during the 1975 eight-four DST experiment indicated that a majority of the public approved of DST for the eight months of March through October. In fact, the ratio of favorable to unfavorable opinion was nearly 2 to 1.

Crime

The Law Enforcement Assistance Administration (LEAA) of the

Justice Department conducted a study of the impact of DST on the incidence of crime. Because of time constraints, only data for Los Angeles and Washington, D. C. were obtained. Their analysis of the Washington, D. C. data showed reductions in violent crime of 10 to 13% during DST periods compared to standard time periods from January 1, 1973 to March 31, 1975. No impact was found in Los Angeles because the data were not sufficiently detailed by hour of the day to reveal a DST effect. LEAA cautions against any generalizations from the limited data base of this study.

Other Effects

There were no measurable effects of DST reported by Federal agencies in the areas of agriculture, labor and Federal park and recreational activities. Neither were there any reported effects on domestic or international commerce, with the exception of opposition to year-round DST by the construction industry, which favors an April through October DST period.

The Federal Communications Commission (FCC) reported that DST caused audience losses of 2.5% of AM daytime radio stations from January through April 1974 and 1.5% during March and April 1975. Revenue losses were experienced by 500 of the 2,300 AM daytime stations with an estimated average station loss of $1,500 for the 1974 winter and $464 for March and April 1975. Since the FCC's prime concern is the curtailment under DST of AM morning radio

service to listeners in certain areas of the country served by approximately 500 daytime stations operating on U.S., Canadian and Mexican clear channels, the Commission supports a return to the historic six-month DST system.

With respect to time zone boundaries, Governors of the 25 States bordering or divided by time zone boundaries were queried regarding the need to change existing boundaries. Every response favored the present time zone boundaries, except one which advocated only two continental time zones. Based on this survey, we do not recommend any change in the existing time zone boundaries.

Finally, extending daylight saving time in the Fall to include Election Day would increase the amount of daylight during existing polling hours in thirty four states. However, an eight month and one week system of daylight saving time, with a Fall transition on the second Sunday in November, would be required to include all Election Days.

Reviews of the DOT Final Report on DST

During the past several months, the DOT final report has been reviewed, independently, by a number of individuals and groups. The entire report was scrutinized by Dr. Marvin Kahn of the MITRE Corp. and by the Congressional Research Service -- both reviews being conducted at the request of the Senate Commerce Committee. DOT's motor vehicle fatality analysis which employed the techniques

of Fourier analysis was studied in depth by Dr. Douglas Scott of GSA at the request of DOT. Finally, a portion of the DOT report was analyzed by the National Bureau of Standards (NBS) at the request of this Subcommittee. Except for NBS, all reviewers in general approved of our analytical methods and agreed with our conclusions -- the few points of disagreement being due to minor misunderstandings of our approach.

Let me now turn to a discussion of the NBS review of our report so that we can better understand the basis for their findings.

The NBS Review

First of all, it must be noted that you did not request NBS to review our entire report, but rather you asked them to consider only four of the study areas in which DST impacts were measured. Particularly notable among the areas omitted were crime, where we found evidence of potential reductions in violent crime due to DST; and public opinion, which favored DST in March and April in two separate polls (1974 and 1975). Thus, two factors favoring DST in March and April were not reviewed by NBS since these areas were not part of their charge.

The areas which NBS did consider, at your request, were regional effects of proposed DST periods, electricity, motor vehicle fatalities and school-age children fatalities. It is significant

that NBS found no disbenefits of DST with respect to either electricity usage or motor vehicle fatalities. Furthermore, in agreement with us, they found no adverse impact of DST on school-age children in March or April. The issue between NBS and DOT can thus be simply stated: we found small benefits of DST in both electricity usage and motor vehicle fatalities; NBS found no DST effect in either area. Why this difference? To answer this question, we must examine the general character of DST effects and see what this tells us about how such effects must be analyzed.

First of all, it is important to understand that DST impacts are likely to be small because DST affects at most one hour in the morning and one hour in the evening. Furthermore, the DST impact is often masked by other larger effects (e.g., the energy crisis, the 55 mph speed limit, energy conservation practices). Since the DST effect is expected to be small, it has the character of what statisticians call "noise" superimposed upon the trend of any parameter being studied. It was thus apparent to the DOT investigators from the beginning that conventional statistical methods which smooth out noise in the course of discovering trends could not be used to analyze the DST effect because such techniques would actually remove the DST component.

We thus adopted methods that had the potential for ferreting out the small DST effect. These techniques are Fourier analysis

and filtering, and equivalent day normalization, both of which can remove trends and prove for the DST influence. Using these methods, we found small but consistently favorable impacts of DST on electricity usage and motor vehicle fatalities. As stated in our report, these results should be considered as indications of a beneficial DST effect. These indications are not conclusive. That is why we recommended a further experimental period.

NBS was given the task of reviewing the analyses contained in certain sections of the DOT DST Study. Rather than conducting such a review, NBS indicated their belief that the DOT methods used to analyze electricity and motor vehicle fatalities were not acceptable and then conducted a separate analysis, using the conventional statistical techniques. Unfortunately, NBS, using these statistical techniques, actually removed the DST effects. In our view, the conventional techniques used by NBS lacked the sensitivity required to discern the presence of small DST effects.

We have attached to our statement detailed comments discussing the NBS treatment of our study. We believe that the NBS findings throw no light on the DST impacts on electricity usage or motor vehicle fatalities because of the different analytical methods they used to study

these areas. Thus, we believe that the DOT report provides the only valid basis for decision-making even though the findings are admittedly inconclusive. Therefore, DOT stands by its initial position.

Summary

Let me close now by summarizing our arguments favoring the extension of DST into March and April:

(1) No disbenefits of DST in these months were found in any impact area studies.

(2) Two separate public opinion polls in 1974 and 1975 indicated a favorable reaction to the observance of DST in March and April.

(3) In the key impact areas of electricity usage, motor vehicle fatalities and crime, we found a consistent pattern of small, favorable DST effects. Furthermore, we found no adverse impact of DST on school-age children pedestrian/pedalcyclist or motor vehicle fatalities in March or April.

(4) DST has been generally accepted throughout the U.S. in September and October since 1966 when the Uniform Time Act went into effect. Because sunrise and sunset times in March are similar to those in October and sunrise and sunset times in April are similar to those in September, symmetry considerations suggest why there is public acceptance of DST in March and April.

Recommendations

Since our key findings of DST benefits are based on the analysis of relatively small data samples, these findings cannot be considered conclusive, as stated in our final report. Nonethe less, we believe the consistent pattern of small DST benefits which we found in several key impact areas is sufficient evidence to support a return to the eight-four system for two more years to permit further analysis and more effective measurement of public opinion. Unless the experiment is resumed, it will not be possible to gather additional data needed to improve our confidence in our knowledge of the impacts of DST in March and April, particularly in the areas of crime, traffic fatalities, school children accidents and electricity use. Furthermore, under the renewal of the experiment which we propose, the public will have the opportunity to experience a two-year uninterupted exposure to an eight-month DST System, and therefore should be in a position to state a more informed and reliable preference among alternative permanent time systems.

We do recommend a change from the transition days which were in effect during the eight-four system used in 1975. Since the best transition days to minimize late sunrises in the entire conterminous United States under an eight-four system are close to the first Sunday in March and the first Sunday in November, we recommend that these days be adopted as the starting and ending

days of the DST period.

We further recommend that the eight-four system by put into effect during the current calendar year before the proposed fall transition date of November 7 (i.e., the first Sunday in November). This action would cause Election Day to occur in the DST period with the favorable result that the amount of daylight during polling hours will be greater in 34 states than would be the case under standard time, which would be in effect on Election Day under the present six-six system.

Due to the long lead times involved in collecting data, we request that an interim report requirement be waived and that the final report date be set for August 31, 1978.

This concludes my prepared statement, Mr. Chairman. I and my colleagues will be happy to answer any questions you or other members of the Committee may have.