Session Two

Monday, September 19, 1960, at 1:30 P.M.

INVESTMENT PLANNING

ROBERT E. LIVINGSTON, Presiding

Scheduling Capital Improvements

DONALD R. LANG

Programing capital improvements through our company's construction program activities of necessity is both technical and complicated. It would have been far more usual for me to discuss future developments in the art of telephony which carries with it the glamour of such things as the transistor, electronic switching, direct distance dialing, memory and logic devices, new types of telephone sets and now satellite communications. But all of these are or will be just a portion of our program of capital improvements on their way to becoming a part of the communications plant.

These expenditures for communications plant have many features similar to those to those of the highway systems that are your primary interest. First, it is not just a one-time job, but goes on year after year as people's wants and needs grow and as developments permit these wants and needs to be met in better and more economical ways — and this is true of highway capital improvements. Second, with only minor exceptions, every dollar spent is committed irretrievably because it is spent for things which are of no use to anybody but us and which, therefore, cannot be sold — a telephone central office or, in your case, a highway. Furthermore, surplus capacity in our central office and your highway cannot be diverted, if needed in other localities, as can such capacity in, say, a water source or an electric generating station. We have one last important factor, the need to earn on this investment. And how well we invest these dollars is the single biggest factor in how healthy our enterprise will be not only tomorrow but for many years into the future and, also, it controls how well we will be able to meet the communication needs of the public. This requires the investment of every dollar in the framework of long-range plans. That these plans will be subject to change is axiomatic in an industry where rapid change in science and technology and in people's wants and needs is a normal course of events. This means that there is a real premium on keeping these plans up to date. This type planning, I know, is an integral part of your operations.

This entire paper could be devoted to long-range planning because it is the path along which our business progresses. But let it suffice to say that this planning fixes in time, size, and dollars, major projects such as new central offices, extension of direct distance dialing, major cable extensions — in fact, projects for all major additions and changes. In addition, this planning serves as a guide for short-term operations. This latter is of extreme importance. Otherwise we could place millions of dollars worth of plant that would either inadequately or not at all meet long-term objectives.

In general, the scheduling of capital improvements deals with what we call short-term or near-future operations — a period of five years. For example, such a review for each of the years 1960 through 1964 has just been finished. We make such a review every quarter and it deals with dollars that range between $125 and $150 million a year for the Chesapeake and Potomac group of companies and between $2 and $3 billion

for the Bell System operating companies. Such a program is a detailed list of individual projects and involves additions to or changes in every type of plant. These projects are placed in the construction program only after detailed study and serious consideration by management of the company.

There are always numerous projects that it would be desirable to do, far more in fact than money, force and even time will permit. The best way I know to exercise the very necessary management vigilance is to make every job stand up against three age-old questions: Why do it at all? Why do it now? Why do it this way?

The last question carries with it the necessary engineering cost studies to assure that the plant is placed at a minimum cost and maximum service value during its life. Such studies would include year-by-year estimates of investment and expense for the several possible plans and, using a present worth of money approach, then a determination of the most economical plan. For example, as a part of a road improvement project the city of Westville plans to widen and resurface Main Street. Along this street we have a pole line carrying several cables that will have to be disposed of in some manner to clear the new and wider street. The "Why do it at all?" and "Why do it now?" are easily answered, but the "Why do it this way?" requires determination of "How soon will future growth require us to change from aerial to underground construction?" With this determined should we (a) Reroute over a different street? (b) Place underground conduit and cable in Main Street now? or (c) Move the present aerial line to provide street clearance and defer the reroute or underground construction? This is a matter of cost study determination with the final application of good engineering judgment.

CATEGORY BREAKDOWN OF CONSTRUCTION PROGRAM

Category	Explanation
Exchange Growth	- Projects required to care for extensions of local service This would include such items as additions to central offices and cable plant to meet increased customer demand
Exchange Mechanization	- The conversion of local manual to dial service
Toll Growth	- Similar to Exchange Growth, but applicable to Toll Service
Toll Mechanization	- The conversion of toll from a manual to a mechanical basis For example, Direct Distance Dialing
Stations	- The Telephones and Private Branch Exchange Equipments required by our customers
General Equipment	- Motor Vehicles, Office Furniture, Garage Equipment and similar items
Other	- Has several subcategories 1 Public Requirements 2 Dial-with-Dial Replacements 3 Maintenance Replacements 4 Non-Equipment Buildings such as Garages and Office Buildings

Figure 1.

CLASSES OF PLANT

Land and Buildings
Central Office Equipment (All Types)
Outside Plant (Poles, Cable, Wire, etc)
Station Equipment (Telephones, Private Branch Exchanges, etc)
General Equipment (Office Equipment, Furniture, Motor Vehicles, etc)

Figure 2.

As shown in Figure 1, each view of our construction program is first broken down into seven major categories. These are categories which permit a ready analysis of the proposed expenditures.

"Public Requirements" includes all of the projects caused by public road work and it is a substantial item totaling for the Chesapeake and Potomac group of companies

about $5 million a year. But above all, it is an item requiring a great deal of early coordination between those responsible for such road work and the affected utilities. This is essential to assure that the necessary work is performed economically and that these are adequate opportunity and time to budget the costs, engineer the projects, procure materials and supplies, and fit the work into operating schedules to meet the completion dates required. This is necessary without regard to any recompense for expenditures.

TYPICAL FLOW OF INFORMATION TO THE CONSTRUCTION PROGRAM ENGINEER

DEPARTMENT ENGINEERING	TYPE OF INFORMATION	ORIGINATOR	CONTRIBUTOR
	Land Projects	Staff Engr -Fund Plans	
	Building Projects	Staff Engr -Buildings	
	C.O.E Projects such as		
	a New Centers	Staff Engr -Fund Plans	Equip. & Bldgs Engr & Gen Traffic Engr.
	b Switching	Equip & Bldgs Engr	Gen Traffic Engr
	c Toll Terminal & Trunking	Trans & Out Plt Engr	Equip & Bldgs Engr & Gen Traffic Engr
	d Power Plants	Equip & Bldgs Engr	
	Large PBX Projects	Equip & Bldgs Engr	
	Radio - Video Projects	Trans & Out Plt Engr	Equip & Bldgs Engr
	Toll Out Plt Projects	Trans & Out Plt Engr	Gen Plant Engr
	Dial C.O.E Forecasts	Equip & Bldgs Engr	
	Carrier & Repeater	Trans & Out Plt Engr	Equip & Bldgs Engr
	Net Plant Req	Gen Staff Supvr	
PLANT	Exch Out Plt Projects	Dist Plant Engr	Gen Plant Engr
	Toll Out Plt Projects	Dist Plant Engr & Trans & Out Plt Engr.	Gen Plant Engr
	Motor Vehicles and Other Work Equip	Gen Bldgs Supplies & Motor Vehicle Supt	
	Routine PBX and Sta Equip. Expend	Gen Plant Supvr	
	TWX - Tel Set Req	Gen. Bldgs Supplies & Motor Vehicle Supt	
	Main Frame Fills	Gen. Plant Engr	
	Cable Requirements	Gen Plant Engr.	
COMMERCIAL	Ests of Demand, Gain Unfilled Orders, etc.	Gen Coml Engr	
	Party Line Fills	Gen Coml Engr	
TRAFFIC	Exch & Toll Switching	Gen Traffic Engr	Equip & Bldgs Engr.
	Aux Svcs & Positions	Gen Traffic Engr	Equip & Bldgs Engr
	Ests. of Message Volumes, Intertoll Trks , Speeds, etc	Gen Traffic Engr	
	Main Sta Capacity Data	Gen Traffic Engr	
ALL	Furn & Office Equip Projects	Equip & Bldgs Engr	
	Routine Furn & Office Equip	Gen Plant Supvr	

STAFF ENGINEER → CONSTRUCTION PROGRAM

- Construction Program Summary
- Project Lists
- Material Forecasts
- Schedules
- Sequence Lists
- Various Other Reports

Figure 3.

There has been a substantial improvement in this early consideration within the last year or two, and Sam Houston of the company has worked actively in this field as a member of the American Right-of-Way Association, which in turn has worked cooperatively with the American Association of State Highway Officials. This problem is also recognized by the Policy and Procedure Memorandum 20-11.1, issued on this subject October 10, 1958 by the Bureau of Public Roads.

Having set up the broad categories as reviewed, a further breakdown is made into what are called "Classes of Plant" (Fig. 2). We then have the construction dollars by major reasons and by "Classes of Plant." Also included is a complete summary of all materials required.

In a construction program, we have first defined our responsibilities for all the information going into a program (Fig. 3).

It is obvious that each man listed must depend on others in his group for detailed data. For example, the district plant engineer has plant engineers and field engineers reporting to him and they do the detailed work. However, it is his responsibility to review all projects in his area and determine the need, size, cost and timing.

Figure 4 shows one page of the detailed projects. You will note at the top that it is Sheet 4 of 22 sheets and deals with central office equipment. At this stage these pro-

THE CHESAPEAKE AND POTOMAC TELEPHONE COMPANY OF MARYLAND — Sheet 4 of 22 Sheets

DATA FOR DEVELOPMENT OF 1957 CONSTRUCTION PROGRAM — Date December 1, 1957

Administrative Area

Central Office Equipment Project $50,000 & Over	Est or Proj No	Schedule * Work Start	Schedule * Work Compl	Gross Construction ($000) Total	Prior Years	This Year	This Year By Categories: Exch Growth	Exch Mech.	Toll Growth	Toll Mech.	Sta Equip.	Genl Equip.	Other	Held Orders: Beg of Year	Held Orders: End of Year	Material To Ship This Year: C. O. Equipment Type	C. O. Equipment Lines	C. O. Equipment Frames Shelves	Each Type Cable M.C.F.
Arbutus - Dial Conv - C O E	1234	8-56	A-57	1544	1386	158		158											
- 1170 Line Addn.	1738	4-58	9-58	140		5	5												
Baltimore - AAA 3rd Addn & Conv	1445	6-57	1-59	360	34	500			500							AXB		93	
- AA 4th Addn	1761	10-58	4-59	92		1			1										
- Portable Micro T V Links	1325	Comp.		51	50	1							1						
- Bel Air - Edge, Carr	1424	11-56	11-57	210	83	127			127										
- Eastern Shore V F Carr	1496	4-57	10-57	61	3	58			58										
- Fork-Bain -Edge Carrier	1747	2-58	5-58	101		5			5										
- Ft. Meade - Wash. Carrier	1628	5-57	3-58	467		300			300										
- Elkton Carrier	1760	12-57	2-58	69		30			30										
- Wash Hi Carrier	1354	8-56	5-57	197	171	26			26										
- Green Clir Carrier	1523	5-57	6-58	62	5	52			52										
Boulevard - Line Addn. & Toll Disp.	1110	Comp		664	651	13	13												
- 1400 Ln. & Toll Disp.	1546	1-57	9-57	314	6	308	308									5XB	3400	58X	
- 1470 Line Addn.	1756	5-58	9-58	157		3	3												
Brooklyn - Dial Conv - C.O.E (Curtis)	1515	8-57	3-58	1670	11	1335		1335								(1XB 1XB 1XB	15680	30 2 2	
CAMA Equipment	1363	A-56	A-57	874	750	124				124						1XB		3	

* Underscore Accomplished Steps
# If Job Were Not Done
Σ Includes 10 frames for T.D

Figure 4.

jects have been reviewed in detail as to the three "why's." The time phasing, total dollars, dollars within the particular year, category, material requirements and other pertinent data are shown. The need for projects is in most cases the result of customer demand for service. We measure these causes as accomplishments — in other words what we get for our dollars.

Figure 5 shows these accomplishments in total. We have similar information for each central office and each outside plant project. Such items as gain in telephones, increase in subscriber lines, long distance message increase are a part of these accomplishments. Unit costs to gain our estimated accomplishments are shown. Here are just a few of the measurements we make on every program. At the top is a summary of the categories discussed previously. Here the total dollars in each year are summarized.

July 7, 1960

Table I
Company

CONSTRUCTION PROGRAM SUMMARY

				D. C.	1960	1961	1962
$ MILLIONS	CONST. EXPEND.	101	Total Construction Expenditures	1			
		102	Exchange Growth Projects	1			
		103	Exchange Mechanization Projects	1			
		104	Long Distance Growth Projects	1			
		105	Long Distance Mechanization Projects	1			
		106	Station Equipment	1			
		107	General Equipment	1			
		108	Other Projects	1			
		109	Net Additions	1			
		110	Net Plant Requirements	1			
EXCHANGE	DEMAND & GAIN (000)	111	Net New Demand Less Melt-Main Tels.	1			
		112	Gain - Main Telephones	1			
		113	Reserved for future use	1	-	-	-
		114	Gain - Total Telephones	1			
		115	Increase in P.B.X. Trunks	1			
		116	Reserved for future use	1	-	-	-
		117	Outward Movement - Total Telephones	1			
		118	Increase in Subscriber Lines	1			
		119	Total C.O. Cap. Added - Main Tels.	1			
		120	Total C.O. Equipped Lines Added	1			
		121	Increase in Subs. Pairs Term. - MDF	1			
		122	Increase in Subs. Pairs in Use	1			
	BACKLOG	123	Reserved for future use	1	-	-	-
		124	Unfilled Regrade Requests - Yr.End(000)	1			
	ACCOMP.	125	% Res.Ext.of Res.Main Tels.-Yr.End	1			
		126	% Dial of Total Telephones-Yr.End	1			
		127	% 4-Party Res. Main Tels.-Yr.End	1			
LONG DISTANCE		128	% Long Distance Message Increase *	1			
		129	% Incr.I.T.Trks. 25 Mi.or More-Yr.End	1			
		130	% Dial I.T.Trks. 25 Mi.or More-Yr.End	1			
UNIT COSTS CONST.EXP.		131	Exch. Gr. - $ Per Main Tel. L. & B.	0			
		132	Gained (Incl. P.B.X.Trks) C.O.E.	0			
		133	- $ Per Sub. Line Incr: O.P.	0			

* On 1-1-60 transfer base.

Figure 5.

July 7, 1960

Table IA
Company

CONSTRUCTION PROGRAM SUMMARY

				D. C.	1960	1961	1962
		151	Long Distance Message Increase-Millions*	1			
INTERTOLL TRUNKS 25 MILES OR MORE		152	Trunks Added During Year	0			
		153	Trunks Added by Busy Season	0			
		154	Dial Trunks Added During Year	0			
	IN SVC.-BUSY SEASON	155	Trks.Engd. by T Tables (Except Finals)	0			
		156	High Usage Trunks	0			
		157	Final Trunks	0			
		158	Reserved for Future Use	0	-	-	-
		159	Other Trks.Engd. by Probability Tables	0			
		160	Total	0			
		161	Busy Season-Busy Hour % NC Encountered	1			
		162	Reserved for Future Use	0	-	-	-
MISC. TEL. INFO.	(000)	163	1-Party Res. Main Tels. - Year End	1			
		164	2-Party Res. Main Tels. - Year End	1			
		165	4-Party Res. Main Tels. - Year End	1			
		166	Rural Main Tels. in Service - Year End	1			
		167	Res. Extension Tels. - Year End	1			
		168	Subscriber Line Incr. in Dial Offices	1			
		169	Main Telephone Incr. in Dial Offices	1			
		170	Total Dial Telephones - Year End	1			
		171	Dial C.O. Capacity Added-Main Tels.	1			
		172	Dial C.O. Equipped Lines Added	1			
FILL DATA		173	2-Party Line Fill-Res. Main-Year End	2			
		174	4-Party Line Fill-Res. Main-Year End	2			
		175	% Main Frame Fill-Subs. Cable-Year End	1			
		176	* On 1-1-60 transfer base. On this basis 1959 volume was	1			
			Intertoll Trunks over 25 Miles in Service 12-31-60 - Total Dial				

Figure 6.

Figure 6 shows the basic data for toll, telephone and outside plant used for other unit cost and efficiency of use measurements. Figure 7 is a summary of dollars by categories and classes of plant; Figure 8 is one part of a material summary; and Figure 9 is a comparison between previous and new views, which inevitably carries with it the need to explain the individual differences.

Although the steps in the preparation of our construction program have been shown,

_____ Company

CONSTRUCTION PROGRAM SUMMARY Sheet ___

19 Construction Expenditures

			Dollars - Millions						Plt. in Service 12-31
			Exchange		Long Distance				
		D. C.	Growth a	Mech. b	Growth c	Mech. d	Other e	Total f	g
201	Land and Bldgs.	1							
202	C.O. Eqpt.	1							
203	Res. for Fut. Use	1	-	-	-	-	-	-	-
204	Exch. Lines	1							
205	Toll Lines	1							
206	Subtotal	1							-
207	Station Eqpt.*	1	-	-	-	-	-		
208	General Eqpt.	1	-	-	-	-	-		
209	Total	1	-	-	-	-	-		

	Details of "Other"	D. C.	Dollars - Thousands L. & B. a	C.O. Eqpt. b	Exch Lines c	Toll Lines d	Total e
210	Non-Equipment Buildings	0					
211	Public Reqmts.(H'way Moves,etc.)	0					
212	Reserved for future use.	0	-	-	-	-	-
213	Replacement - Dial with Dial	0					
214	Misc. Replacements	0					
215	Extended Area Plans	0					
216	ZL-5N Numbering Plans	0					
217	Television	0					
218	Toll Dispersion & Def.(ex.SAGE)	0					
219	SAGE	0					
220	Other Identified Items	0					
221	Miscellaneous	0					
222	Total "Other"	0					

	Details of "General Equipment"		Dollars- Millions				
223	Furniture & Office Eqpt.	1					
224	Vehicles & Other Work Eqpt.	1					
225	Total "General Equipment"	1					
226	Repl.of Motor Veh.(Incl. in 224)	1					
227	Reserved for future use	1	-	-	-	-	-
228	Reserved for future use	1	-	-	-	-	-

* Plant Retired-Station Equipment ____

Figure 7.

_____ Company

ESTIMATED NEW MATERIAL SHIPMENTS

			D. C.	1960	1961	1962
CABLE	301	Exchange - M.C.F.	0			
	302	Toll - M.C.F.	0			
	303	Coaxial - Thousand Unit Feet	0			
CARRIER, REPEATERS AND MISCELLANEOUS	304	Broad Band Terminals - Total	0			
	305	Type N Terminals - 12-channel*	0			
	306	Type N Channel Terminal Units*	0			
	307	Type O Terminals - 4-channel	0			
	308	Type O Channel Terminal Units	0			
	309	Type P Channel Terminal Units	0			
	310	Type V Telephone Repeaters	0			
	311	Type 43A - Carrier Teleg. Chan. Terms.	0			
	312	Type E Telephone Repeaters (Other than E6)	0			
	313	Type E6 Telephone Repeaters	0			
	314	TD-2 Amplifier Bays	0			
	315	TJ Amplifier Bays	0			
	316	Manual Large Multiple Positions	0			
	317	Single Frequency Signalling Units-Type E	0			
	318	Reserved for Future Use	0	-	-	-
STATION EQUIPMENT	319	Telephone Sets - Total (000)	1			
	320	- Full Color (000)	1			
	321	701B P.B.X. - Lines	0			
	322	- Shelves	0			
	323	740-Type P.B.X. - Frames	0			
	324	756A P.B.X. Cabinets	0			
	325	No. 28 TTY Typing Units (incl. ASR's)	0			
	-	701A P.B.X. - Lines	0			
	-	- Shelves	0			
		*Exchange Use of Line 305 - Terminals	0			
		Line 306 - Chan. Terms.	0			

Figure 8.

there is associated with each step a review of the projects in the light of the three questions: Why do it at all? Why do it now? Why do it this way?

There is, of course, a broad review to assure that service to customers is maintained at a high level with a continuing modernization of this service, that the impact on force is a reasonable one in that work load does not fluctuate widely and require

		1960			1961		
		July	April	Diff.	July	April	Diff.
DOLLARS - MILLIONS	Construction Expenditures - Total						
	Exchange Growth Projects						
	Exchange Mechanization Projects						
	Long Distance Growth Projects						
	Long Distance Mechanization Projects						
	Station Equipment						
	General Equipment						
	Other Projects						
THOUSANDS	Net New Demand - Less Melt - Main Telephones						
	Gain - Main Telephones						
	- Total Telephones						
	Increase in Subscriber Lines						
	Total C.O. Capacity Added - Main Telephones						
	Total C.O. Equipped Lines Added						
	Unfilled Regrade Requests - Year End						
PER CENT	Res. Ext. of Res. Main Tels. - Year End						
	Dial of Total Telephones - Year End						
	4-Pty.of 1-,2- & 4-Pty.Res.Main Tels.-Year End						
	Long Distance Message Increase						
	I.T. Trunk Increase - 25 Miles or More-Year End						

Figure 9. Comparison of July 1960 and April 1960 views.

rapid expansion and contraction of the force, and that the total dollars required are at a reasonable level. This latter requires a broad appraisal of the three components that exist in all business — the interrelation of revenues, expenses and investment to assure that the over-all operations resulting from this program are in the best interests of the customer and the company.

That variations will occur in projects is inevitable, first, because the program is based on estimates of cost before engineering work is completed; and, second, because projects vary in size, when required, and unit costs with the rapid change in public needs and wants and developments in the industry. It is this variation that causes us to review our program on a quarterly basis.

Our level of approval for projects may be of interest. When construction expenditures for an individual project are $10,000 or more, final approval of the specific estimate for the project rests in the hands of the board of directors. For projects under $10,000 a quarterly routine estimate is approved by the board of directors and individual projects within this limit approved at first to fifth level of management, depending upon the dollars involved.

For each specific and routine estimate a final completion report showing differences between estimated and actual amounts and the reasons for these differences is required.

In all cases unit costs and variations between estimated and actual costs are analyzed in complete detail, not only to explain why but also as a guide for the future.

The few figures shown represent just nine pages of a two-volume edition of each quarterly program review, but I hope they have given you some insight into our capital improvement scheduling.

Discussion

Burnes. — Mr. Lang, who initiates the projects that finally wind up in the capital expenditure budget?

Lang. — Projects are initiated at different levels, depending upon the time. Generally, they start in our engineering groups.

For instance, the district plant engineers originate the projects that have to do with outside planning. Those that have to do with central office equipment originate in the traffic engineering department. But again, these projects all get brought into being well down the line in our organization. Generally it is either first or second level of supervision.

Livingston. — You said that those projects above $10,000 in total value required a specific estimate; those below did not. Is there a total amount in authorizations on those under $10,000 that may be approved prior to a subsequent meeting of the board of directors? In other words, do they give you a top figure of, say, $100,000?

Lang. — No, because we run into emergencies, just as you all have and will. We carry along with us what is called an advance approval. We have the right, within each of our companies, to write a letter saying that because of the urgency of this project there are certain work operations that must be performed before the board of directors' approval.

As an example, the Bureau of Public Roads was doing work here on Annapolis Boulevard. At that time I was in charge of operations. They suddenly decided to drop our conduit about 40 ft below its operating level. This had not been anticipated. The amount of dollars involved was critical. We had advance approval to go ahead with that project in about 15 minutes. It was well under way the next morning.

Granum. — Your company has a tentative pool of desirable projects to be developed. Assuming that you might make some savings in your estimates, is such advance approval given in case you are able to save funds?

Lang. — Yes, we surely do. We do our outside plant engineering on districts, and our central office engineering is done on a state basis. There are always backlogs of jobs that are desirable to do at both levels.

I have been working with construction programs since 1928. Since that time I can honestly say that I have seen no more than two or three that I would call bad jobs. There is bound to be one in a lifetime; but the rest of them are desirable to do. It is just a case of when do you do them?

Granum. — How many years ahead do you actually schedule in the detail that you showed here?

Lang. — Five years. We will take the jobs that are immediately desirable and prepare to do them in 1960. There are other jobs that we could do in either 1960 or 1961. There

are still others that there is no need to do until 1961.

For example, we would like to go ahead with direct distance dialing as fast as possible. It is categorized as an improvement. There is a limit to how much money you can put into improvements in any year. If there is an opportunity in 1961, for instance, to bring some projects on direct distance dialing forward, we will. It cannot be done this year because of the hurricane; and the dollars that were spent on the hurricane have caused us to push some jobs ahead into next year's program.

A construction program is fluid. It has to be. There is no other way you can operate it. It cannot be a rigid thing — and it has to be fluid, I believe, within the limits of long-range plans. If you do not stay within the limits of your long-range plans, you find you have put your dollars down a rat hole. It does not tie in with what you want in the future.

R. Johnson. — You mentioned your long-range programs as going up to 20 years. I am going to ask a question pertinent to what we perhaps should be doing in the highway industry. In your long-range programs, your 20 year programs, or even your 10 year programs, are you not interested in setting the broad objectives in terms of whole systems and whole plants, rather than trying to identify specific projects in that long period of time? And are the costs that you apply to these plants and systems that you were going to develop as objectives in this period statistical costs?

Lang. — I am going to simplify this. Let us assume that we have an area that we are studying, and that at the present time that area is served by a central office right here. We have cables that radiate from that central office.

We take a look at this 20 years in the futre. We go to our commercial people and say: "We want an estimate from you for this area for 20 years in the future."

Our commercial people can make a better estimate of what is going to happen 20 years from now than they can as to next year. They are frequently wrong on what is going to happen next year, but they can iron out the up's and down's when it comes to 20 years from now.

We make an assumption that we have no telephone plant at all in this area. And then we make a theoretical layout of the telephone plant in that area, using the very latest telephone plant, the very latest techniques, that we can use. We lay that out in the area, and perhaps it appears tha we need three offices in the area, on a theoretical basis.

That is a cross-section study, and the cross-section used is 20 years from now. Then we make what we call a program study, which is a year-by-year study.

In this year-by-year study, we in essence say, "Aren't we silly to assume that we don't have any telephone plant in that area?"

We start and assume that we do have this telephone plant, and tie in this one, right here. Then we make a year-by-year study to find out when office 1 proves in, when office 2 proves in, and when office 3 proves in.

That year-by-year study has to have in it some of the things you talk about. For instance, we are interested in differences between plants, we say, "We will compare this to continuing to serve it the way it is." Therefore, we are interested in incrementals. And because we are interested in incrementals, we are able to go to some broad estimating and we do not have to get this done on a really detailed basis for every piece of cable that goes into it.

We use, as we call them, broad gage costs.

R. Johnson. — This long-range process is more of a broad process, and when you get to specific identification and analysis, it is down in this five-year period.

Lang. — Here is where we get specific. In that first five-year approach, we do of necessity use broad estimates because the projects are not engineered. You have to use some broad gage unit costs to get over-all costs.

I have talked to our highway people, and they tell me they do much the same thing.