VIRGINIA RECORD

JULY 1978

Presenting . . .

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TO TELL THE VIRGINIA STORY

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Architectural Content Reviewed by
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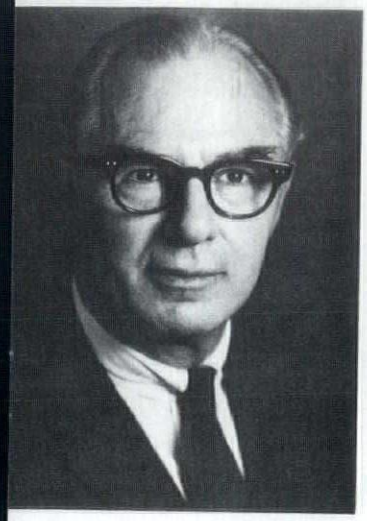
IN THIS ISSUE

ON OUR COVER is a portion of the Container Control Center for Norfolk International Terminals, presented by McGaughy, Marshall and McMillan on page 32 of this issue. (Photo by Ron Kirby)



Clifford Dowdey

'To Every Thing There is a Season . . .'

DURING THE DELUGE of (mostly deserved) brickbats assailing this administration of "good ole boys" — the peanut-grower, his kinfolks and neighbors, and sundry downhome cronies — probably a number of their fellow-statesmen regard with some satisfaction this belated "Revenge For Sherman." Doubtless not too many non-Georgian Southerners, except among politicians, find much satisfaction at the almost grotesquely inept performance of the first president from a former state of the Confederacy and of the original thirteen colonies since before the Civil War. They might experience some relief from hearing gleeful renditions of that callously cruel hymn to pillage, "When We Were Marching Through Georgia." But this would not lead to an impulse to sing a retaliatory paean to "The Rednecks March Through Washington."

For, though a strain of parochialism still runs through the denizens of the South (stronger in some areas than in others), and a sense of a Southern identity exists in most Southerners of middle-age or older (and some younger), the region as a whole is as American as, say California or New York City or the so-called "heartland" of the Midwest. Yet, in the conglomeration of diverse regions, with diverse and often conflicting interests, in which we are daily confronted with the more vocal demands of ethnic groups and the more ruthless ambitions of economic groups, The South (as the dying Calhoun said, "the poor South") seems to be the one entity that all the rest accept as unAmericanly "different."

In a long, lead article in the *Saturday Review* on "Sunbelt vs Frostbelt," Horace Sutton writes, "117 years after the outbreak of the War Between the States, we remain a nation where part of the country waves and reveres the flag of the Confederate breakaway states and still sings 'Dixie' as if it were 'Onward, Christian Soldiers' . . ." Now, the antics at Alabama and Mississippi football games might tend to confirm what the author *wishes* to believe, but in Richmond, Virginia, the capital of the Confederacy which withstood four years of attacks and siege, the Confederate Museum, housed in the former White House of the Confederate States, does *not* fly a Confederate flag. Nor can I remember when I heard "Dixie" sung. In fact, at the private school which my daughters attended, the students were taught "The Battle Hymn of the Republic." Although my daughters refrained from singing it, I've never heard them sing "Dixie" either.

In Mr. Sutton's perception, he reveals another cult-view of the South by mentioning that the Civil War broke out 117 years ago. Heaven knows that is long enough for it to be forgotten by the victorious invaders who sanctified their power struggle by slogans such as "freeing the slaves." In this delusory moral superiority, they were able to dismiss the devastation that overwhelmed the Southern people, their property and institutions, during four years of invading armies and eleven years more of the despoilization of Reconstruction. It was simpler 75 years after the war *in* the South, where whole cities were destroyed and a people impoverished, to regard the South as a poverty-stricken appendage composed to ignorance and bigotry.

Then, in 1939, F. D. Roosevelt, the Hudson River Valley patrician, said . . . "the South presents right now the nation's number one economic problem — the nation's problem, not merely the South's. For we have an economic unbalance in the nation . . . that can and must be righted for the sake of the South and of the nation."

That year the war started in Europe

(Continued on page 40)

ENGINEERING CREATES WEALTH

That engineering creates wealth is probably its most nportant *raison d'être.* It creates wealth by innovativeness, y experimentation, by decision arrived at after careful eliberation, by strict control of engineering projects.

To prove that engineering creates wealth one need only cite e outstanding feats of Charles Steinmetz, Charles ettering, Herbert Hoover, and Vannevar Bush. And we now, of course, that although these men's accomplishments ave now become history, the era of engineering ccomplishments is not closed. Future records will document e successes of those engineers who are right now working in eir laboratories, in factories, and at their drafting tables to lve today's engineering problems.

Engineering can create wealth by opening up new chnological vistas, by pointing to new methods, and by venting new products. It can also create monetary benefits saving costs, by reducing the period of completion of a oject, or by finding new ways of accomplishing a task.

To do any of this, however, engineering must have the pportunity. So, the equally important consideration is that gineering must be used properly. To derive the full benefit om the engineer's knowledge and experience it is nperative that he be called in as early as possible in the scussion stage of a project.

We find quite often that prospective engineering clients are aking too many decisions too early in approaching their ojects and not leaving enough latitude for the engineer to ake the decisions which can save money, create a better oject, or invent a new way of completion to benefit the ients. This chains the engineer to certain methods and akes it impossible for him to exercise the full extent of his ility and knowledge for the benefit of his client.

F ENGINEERING COSTS

The client may believe that by preparing much work thout the benefit of the engineer's advice he is saving oney, but that is not always so. In fact, it is quite likely that e client, attempting to save some of the engineering cost, s instead already lost money by precluding the full plication of his engineer's experience and innovativeness.

A client's concern with the costs of engineering is usually isdirected. That does not mean that the client should spend oney unnecessarily or foolishly on any part of his project. e will naturally be concerned with the economics. However, may well be that in some instances the engineering cost is gher than expected but in turn the higher engineering cost ll result in a lower total overall cost of the completed pro- t. The cost to be watched more critically is the overall cost the project, not the engineering cost which is only a small action of the total.

Let us assume that the total estimated cost of a nstruction project is one million dollars and the gineering for this project is estimated at $80,000. Let us rther assume that the engineer actually spends $100,000 of s client's money in engineering but is able thereby to reduce e cost of the total project to $920,000. The engineer has en saved his client $60,000, even though the engineering fee erran the original estimate. The saving in the total cost of e project was attained because the engineer was enabled to udy the project thoroughly, considering alternates, and was le to proceed in his design work without preconceptions. (The 8% figure, of course, is entirely arbitrary. The cost of gineering could well be entirely different and will, in fact, some projects be quite substantially higher.)

Using another assumption, one could take the design of a achine which may be estimated to cost 20% of the total mpleted prototype. Let us say that the engineer, however, after spending the allocated engineering fee decides to go further and spend an additional 50% of the amount originally set aside for engineering, thereby reducing both the cost of the prototype and its construction time. The benefit, of course, will accrue to the client.

THE PROOF IS THERE

It is difficult to prove the cost saving of a project, but it sometimes proves itself almost accidentally. These are cases where the engineer is locked in to a certain method, but the total project bid is too high to suit the client. He prevails upon the engineer now to begin reworking the entire concept. The engineer, being free to use his innovativeness, imagination, and engineering knowledge, arrives at a considerably lower cost for the project by changing specifications, materials, and/or methods of erection. Now the client knows that the additional engineering has saved him money. The engineer's fee will be higher than expected, because the engineer had to do his work twice. But the total cost is reduced through the re-design. It would, of course, have been better had the client called the engineer in sooner. This would have reduced both the engineering fee and the total project cost.

Naturally, what is true of buildings and machines is equally true of other engineering projects. We could just as well be talking of bridges, water filtration, water supply, sewage treatment plants, or any other engineering projects.

Engineering may be based on a fixed fee, percentage of construction cost, cost times a factor, or on a combination of these — depending on the nature and location of the project.

The important thing is that the fee permits the engineer to do his job thoroughly, weighing all possible alternates and costs versus gains, so that the client can look upon a satisfactorily completed project.

There must be the utmost trust and confidence between the engineer and his client. The engineer is greatly concerned with the satisfaction of his client because a galaxy of successfully completed projects and a great number of satisfied clients are the best assurance for the engineer's continued professional progress. The engineer's reputation and economic welfare depend greatly on the esteem in which he is held by his clients. *(Reprinted with permission of the Consulting Engineers Council of Oregon.)*

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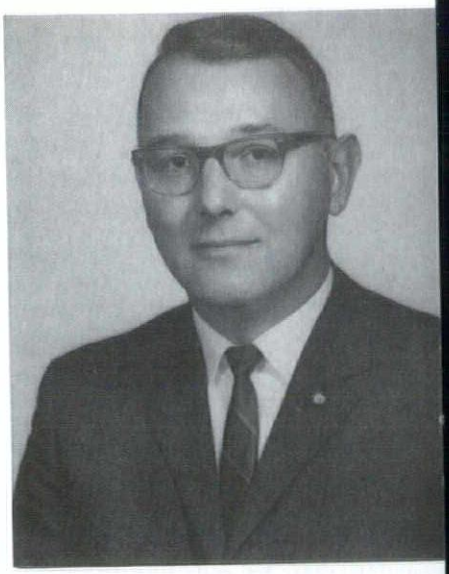
President



• James A. Limerick, Jr., is president of the Consulting Engineers Council of Virginia for 1978-1979.

A native of Richmond, Limerick holds a B.S. degree in civil engineering from VPI & SU. A former sanitary engineer for the Virginia Department of Health, he joined R. Stuart Royer & Associates in 1955, and now is a partner in the Richmond, Va., consulting engineering firm. He is a certified professional engineer in Virginia, West Virginia and North Carolina.

Limerick has been a member of CEC/V and the American Consulting Engineers Council for many years, and has served the state Council as vice president, and as chairman or member of many of its committees. He also belongs to the Virginia and National Societies of Professional Engineers, Virginia Association of Professions, American Waterworks Association, and Water Pollution Control Federation. He has served on several advisory groups and panels to the State Water Control Board.

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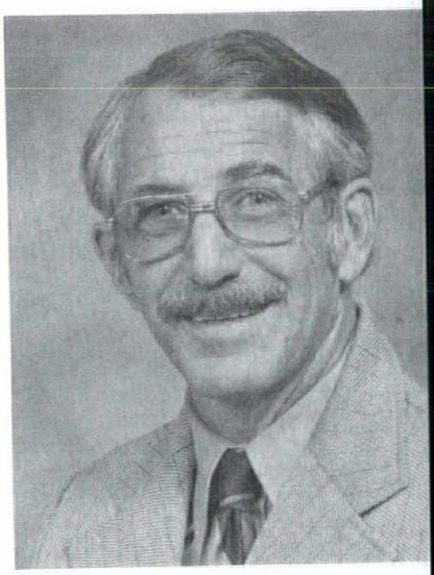
President Elect



• President Elect for the Consulting Engineers Council of Virginia for 1978-1979 is Richard L. Williams. He will automatically become president in 1979-1980.

Williams was graduated in 1959 from Virginia Polytechnic Institute and State University with a B.S. degree in civil engineering. He formed his own firm — Richard L. Williams Consulting Engineer — in 1973 in Roanoke, offering professional services in civil, structural and sanitary engineering.

He is licensed to practice in Virginia, West Virginia, North Carolina, Tennessee, Kentucky, Ohio, Pennsylvania and Maryland.

W. DOUGLAS ENSOR

Vice President — Eastern Region

• W. Douglas Ensor is vice president of Malcolm Pirnie Engineers, Inc. He joined the firm in 1964, and has been in charge of the firm's regional office in Newport News since 1971.

Ensor was graduated from Neward College of Engineering in 1968 with a B. S. degree in civil engineering. He is a registered professional engineer in Virginia, New Jersey, New York and North Carolina; a licensed land surveyor in New Jersey and New York, and a registered professional planner in New Jersey.

In addition to the Consulting Engineers Council of Virginia and the American Consulting Engineers Council, Ensor belongs to the National Society of Professional Engineers and the Virginia Society of Professional Engineers, the American Water Works Association, American Public Works Association, Water Pollution Control Federation, American Congress on Surveying and Mapping and the Virginia Association of Professions.

Honors, awards and offices held by Ensor include chairman of the VSPE Publications Committee; president of the Peninsula Chapter of VSPE; State and Peninsula Chapter of VSPE "Outstanding Service Award," and New Jersey State Society of Professional Engineers "Young Engineer of the Year Award."

Ensor, 43, is married to the former Joan Elberfeld, and they have one daughter.

ROBERT D. SAYRE

Vice President — Central Region

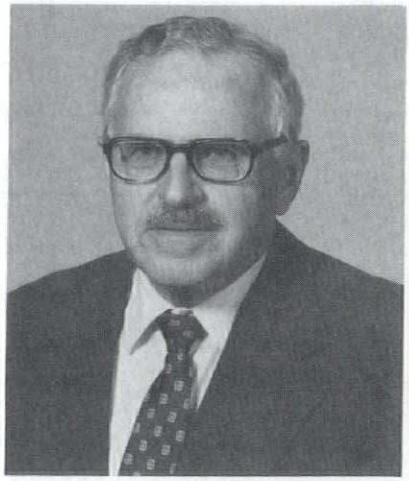
Robert D. Sayre was born in Canton, .D. He was graduated in 1950 with a .S. degree in civil engineering from the outh Dakota School of Mines and echnology, and received a Master's vil engineering in 1952 from the niversity of Virginia.

After working for E.I. duPont de emours, the Corps of Engineers and o engineering firms, Sayre opened his vn consulting engineering firm in ichmond in 1968. In 1973, he took in a artner and changed the name of the rm to Sayre & Sutherland, Inc., and ecame its president.

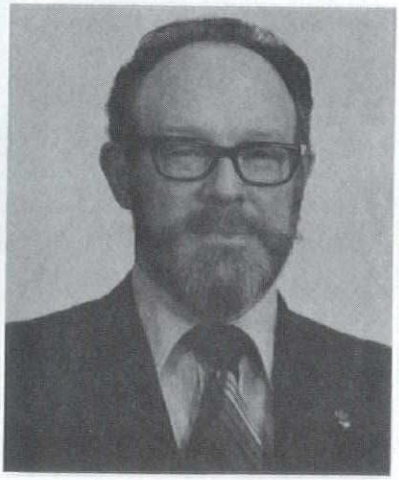
Sayre is registered in Virginia, West irginia, North Carolina, South arolina, Maryland, Ohio and the istrict of Columbia.

In addition to the Consulting ngineers Council of Virginia and the merican Consulting Engineers ouncil, Sayre is a member of the National and Virginia Societies of Professional Engineers. He received the Virginia Society's outstanding service award in 1968 and its distinguished service award in 1973. He also was president of VSPE in 1972-1973, and president of the Engineer's Club in 1970.

Sayre is a Fellow of the American Society of Civil Engineers, and belongs to the International Society of Soil Mechanics and Foundation Engineering, the Virginia Association of Professions and the American Arbitration Association. He also is a member of the board of directors and is on the executive committee of Terra Insurance, Ltd., Hamilton, Bermuda.



He is a Mason, member of Lions International, and an Elder in the Tuckahoe Presbyterian Church in Richmond.



OLIVER P. STRAWN, JR.

Vice President — Western Region

• Oliver P. Strawn, Jr., 52, is a partner in the CEC/V member firm of Scott & Scott, Inc.

A native of Martinsville, Virginia, Strawn received his B.S. and M.S. degrees in Mechanical Engineering in 1950 and 1965, respectively, from Virginia Polytechnic Institute.

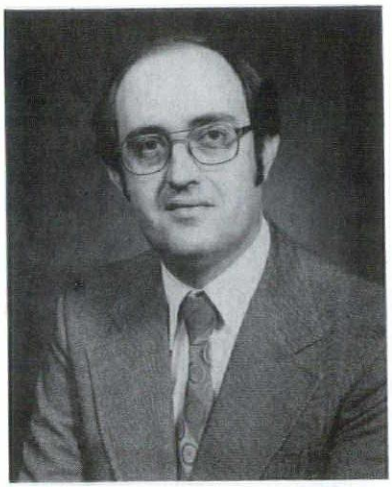
Before joining his present firm in 1976, Strawn operated his own consulting office in Blacksburg from 1972 to 1975. He was assistant professor of engineering at VPI from 1957 until 1972.

In addition to his many activities in the Consulting Engineers Council of Virginia and The American Consulting Engineers Council, Strawn is a member of the Virginia and National Societies of Professional Engineers; American Society of Mechanical Engineers and the American Society of Heating, Refrigeration and Air Conditioning Engineers.

Strawn belongs to the Southern Baptist Church in Blacksburg where he has served as Deacon and Sunday School Superintendent.

He also was chairman of the Montgomery County Republican Party from 1969 until 1976, and has been a member of the Party's state Central Committee since 1976.

Strawn is active in the PTA, the Lions Club and Boy Scout work.



DANIEL J. DeYOUNG
Secretary

• Daniel J. DeYoung received his early education in public schools in different parts of the country, and was graduated from high school in Kaiserslautern, Germany.

He attended Hope College in Holland, Mich., before transferring to VPI & SU in his junior year. He was graduated from VPI & SU in 1961 with a B.S. degree in civil engineering.

DeYoung has worked as bridge design engineer for the Kentucky Department of Highways, in the bridg division of the Virginia Department Highways and as an estimator/reside engineer with a Maryland gener building contractor. He then spent s years as a structural engineer wi Torrence, Dreelin, Farthing a Buford, followed by a position as ch staff structural engineer for R. Stua Royer & Associates.

In 1973, DeYoung became a vi president with Architects a Engineers, Inc. (formerly Woodso Littlepage and DeYoung, Inc.) Williamsburg. He is registered Virginia, Maryland and Alabama.

DeYoung is a member of the Virgin and American Consulting Enginee councils, the National Society Professional Engineers, and was 197 1978 president of the Williamsbu chapter of the Virginia Society Professional Engineers. He also belon to the Society of Marketing Professio al Services, the American Concrete stitute, Westgate Lodge #352, AF AM of Richmond, and the Willian burg Kiwanis Club.

DeYoung is married to the form Jackie Weatherman, of Patrick Coun and they have two sons.

HENRY P. SADLER
Treasurer

• Henry P. Sadler is a charter member of the Consulting Engineers Council of Virginia, and has served that organization in many capacities over the years. Last year he received the CEC/V Past Presidents' award for outstanding service.

He is president of Henry P. Sadler & Associates, Inc., Consulting Engineers, of Richmond, and is a registered civil engineer in Virginia, North and South Carolina and Florida.

Sadler is a member of the American Society of Civil Engineers, American Arbitration Association, American Public Works Association, American Railway Engineering Association, American Water Works Association, National and Virginia Societies of Professional Engineers.

WILLIAM L. GIBSON

Director

William L. Gibson, partner in the onsulting engineering firm of handler and Gibson, Norfolk, is a irector of the Consulting Engineers ouncil of Virginia (CEC/V) for 1978-979.

Before he became a partner in his resent firm in 1964, Gibson was a artner in the Norfolk firm of John A. offman & Associates, and a upervising engineer with the U.S. rmy Corps of Engineers. A graduate Virginia Polytechnic Institute and State University, Gibson has been a registered professional engineer in Virginia since 1953.

He is a long-time member of CEC/V, and has served that organization as eastern regional vice president and chairman or member of many of its committees. He also belongs to the Virginia and National Societies of Professional Engineers; American Society of Mechanical Engineers; the American Society of Heating, Refrigerating and Air Conditioning Engineers; Virginia Association of Professions; American Waterworks Association; National Fire Protection Association, and many other state and national professional organizations.

Gibson is a member of the alumni associations of Old Dominion University and VPI & SU; the Cosmopolitan Club of America; the Norfolk and Virginia Chambers of Commerce; the Norfolk Yacht and Country Club; the Harbor Club; the Norfolk Chapter, Va. Society of the American Revolution; the Virginia Museum; The Bull & Bear Club of Richmond; and the Virginia Beach Society of the Arts.

He is married to the former Doris Robbins, and they have a daughter, Linda, who is a graduate of Duke University. The family are members of Royster Memorial Presbyterian Church.

HARRY W. KINCAID

Executive Director

Harry W. Kincaid, 48, has been xecutive director of CEC/V since May 976. A native of Morgantown, West irginia, Kincaid was in the U.S. Navy om 1951 to 1954.

In September 1954, he enrolled at Vest Virginia University and was raduated in 1957 with a B.S. degree in urnalism. While a student at WVU, e worked part time as an nnouncer/copy writer for a local radio ation.

Following graduation, he moved to ichmond and became a reporter for he Richmond News Leader. In 1959, e joined the public relations epartment of A.H. Robins Co., Inc., n international pharmaceutical anufacturing firm headquartered in ichmond.

In 1964, Kincaid moved to ashington, D.C., and joined the ublic relations staff of the harmaceutical Manufacturers Asso-ation. Three years later he was named assistant association manager of the Washington-based Institute of Industrial Launderers, the trade association for the rental work uniform and career apparel industry.

Kincaid is a member of the Virginia Society of Association Executives and the American Society of Association Executives.

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THE IMPACT OF SURFACE MINING AND CONTROL RECLAMATION ACTION OF 1977 ON VIRGINIA COAL

By: **Dennis D. Willis, P.E.**
Thompson & Litton, Inc.

ON AUGUST 3, 1977, President Carter signed into law the Surface Mining and Control Reclamation Act of 1977, Public Law 95-87. This law covers all coal mining, surface operations as well as surface indentures created by underground mining. The law has a very real effect upon one of Virginia's great natural resources and the position of this resource in the competitive market. Subsequent rules promulgated by the law will obviously affect the economy of virtually every citizen of the Commonwealth. Several of the more important aspects of the law are discussed below.

Complete restoration of the highwalls and depressions are conceded to be the most costly factors. Virginia coal is mined in the Appalachian region, an area where the terrain is naturally composed of steep slopes and narrow valleys. According to Kenneth Englund, US Geological Survey, 95 percent of Virginia's recoverable strippable coal reserves are located on slopes steeper than 20 degrees.

Complete restoration as required by the new law is estimated to increase the price of coal in Virginia from $3.00 to $6.00 per ton. Figure 1 attempts to diagrammatically indicate required restoration under the law at several typical slope variations. Conventional mining equipment such as crawler tractors can safely work on a slope of 2:1 or 27 degrees. Once the slope exceeds 27 degrees, it becomes difficult to cover the highwall, requiring additional equipment such as hydraulic excavators to restore the last 15 feet of material against the highwall.

There appear to be some areas where interpretation of the law can reduce the economic impact of complete restoration in steeper sloped areas and still fulfill the intent. Figure 2 relates one approach which would leave some highwall exposure but would obscure most of it and at the same time offer better control of runoff from above the working area. This method would allow equipment working areas on which to work at some point in the future, if it should become necessary.

Current thinking by the federal enforcement agency (Office of Surface Mining in Washington, D. C.) appears to put an additional penalty for mining in previously surface mined areas. Figure 3 represents an area where mining of this nature was proposed. According to the Office of Surface Mining, complete restoration of the old and new highwall is a requirement. Considerable economic relief could be realized and at the same time an improvement made to the existing situation by allowing the second cut to take place which would also allow partial restoration of the highway. In the example shown, the old highwall could be reduced from 75 feet to 25 feet while at the same time allowing additional coal to be recovered. If complete restoration of the highwall is required, then mining areas as shown by Figure 3 would not be possible and these coal reserves lost.

Another very costly area of the law is requirements for water quality standards and effluent limitations. The mine operator must provide a water monitoring program which gives adequate data to describe the likely

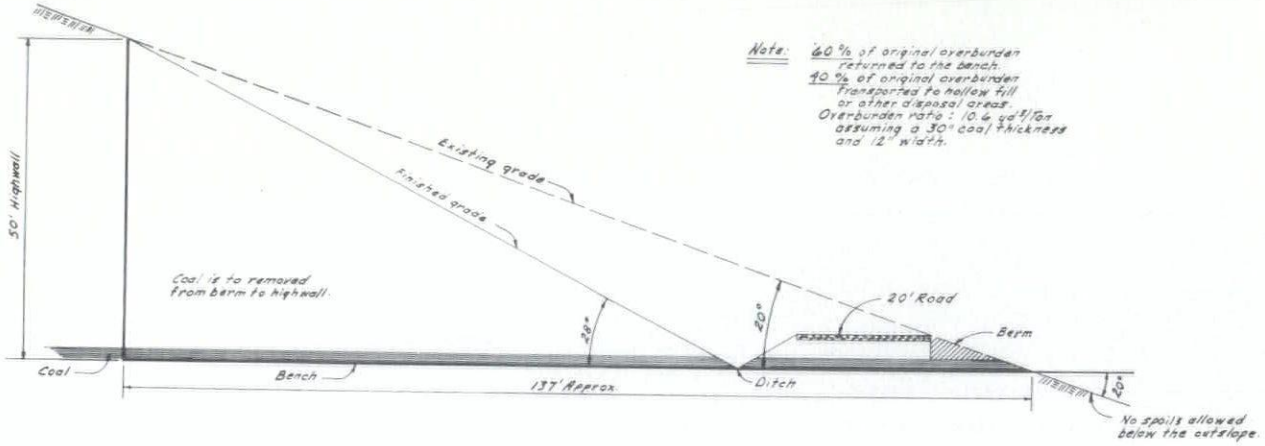


Figure 1a

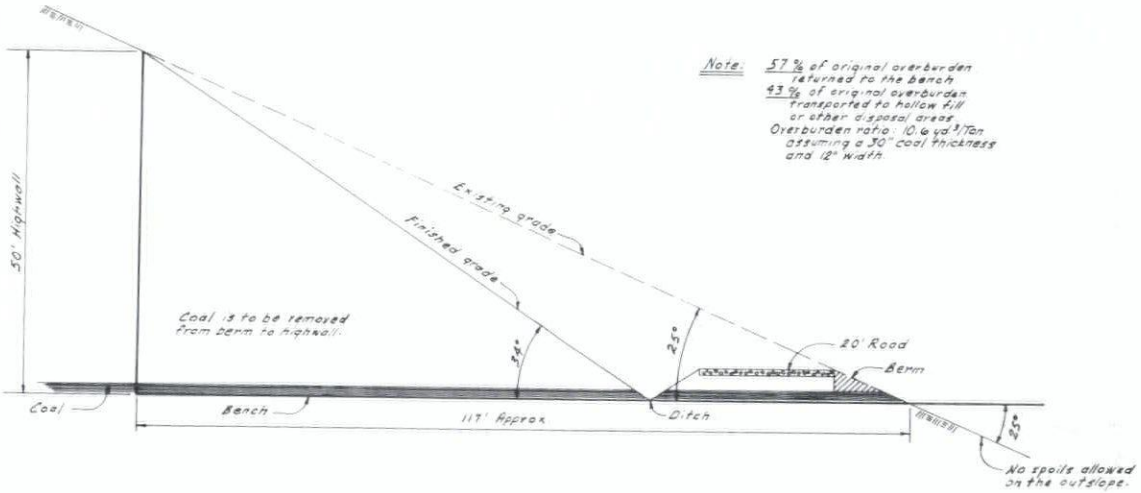


Figure 1b

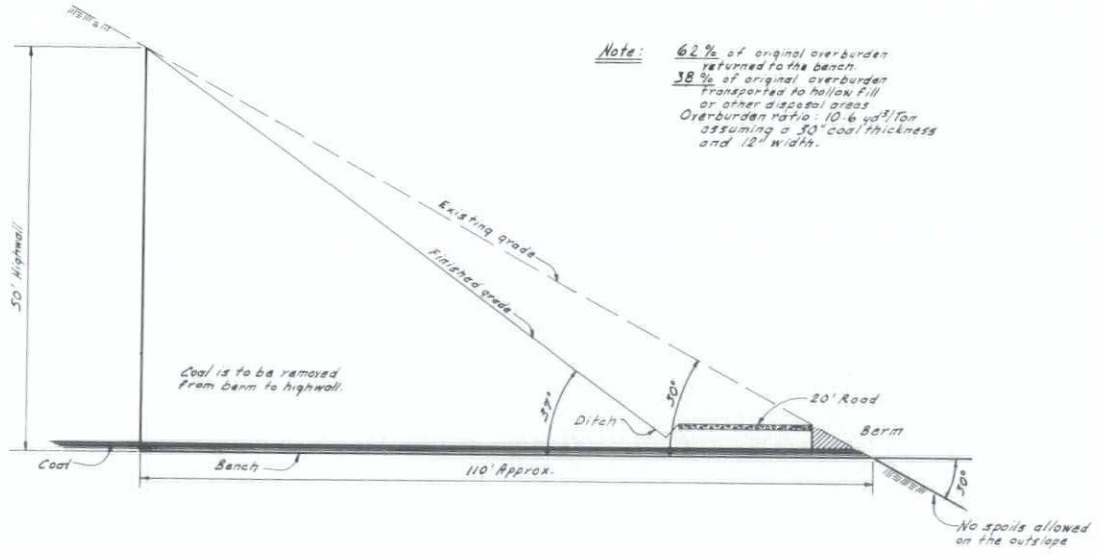


Figure 1c

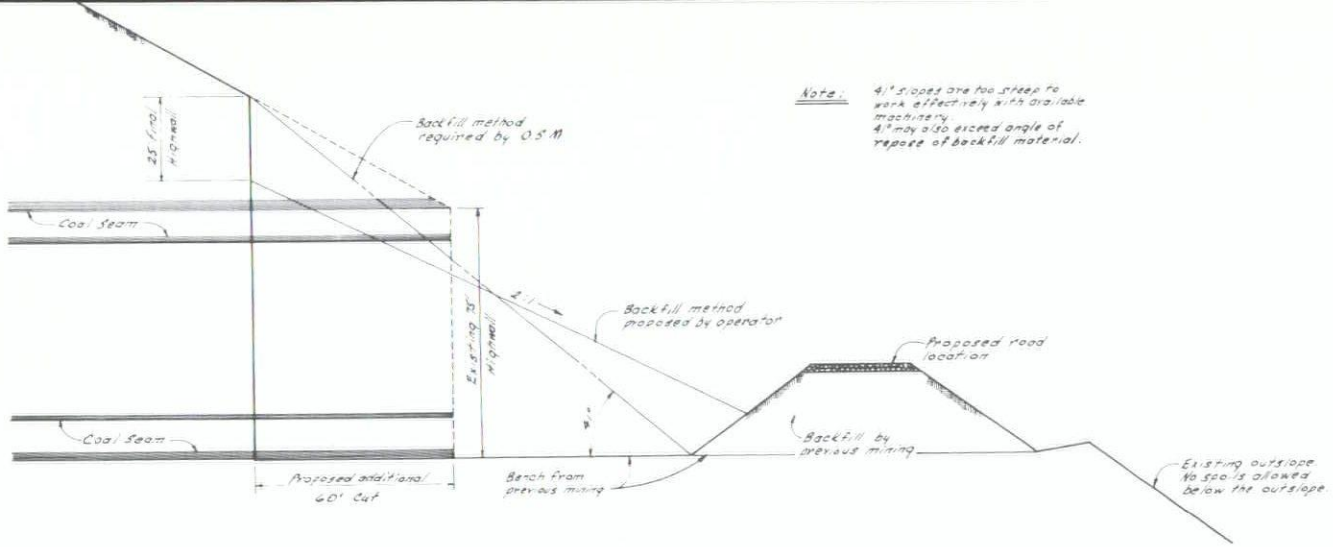


Figure 2

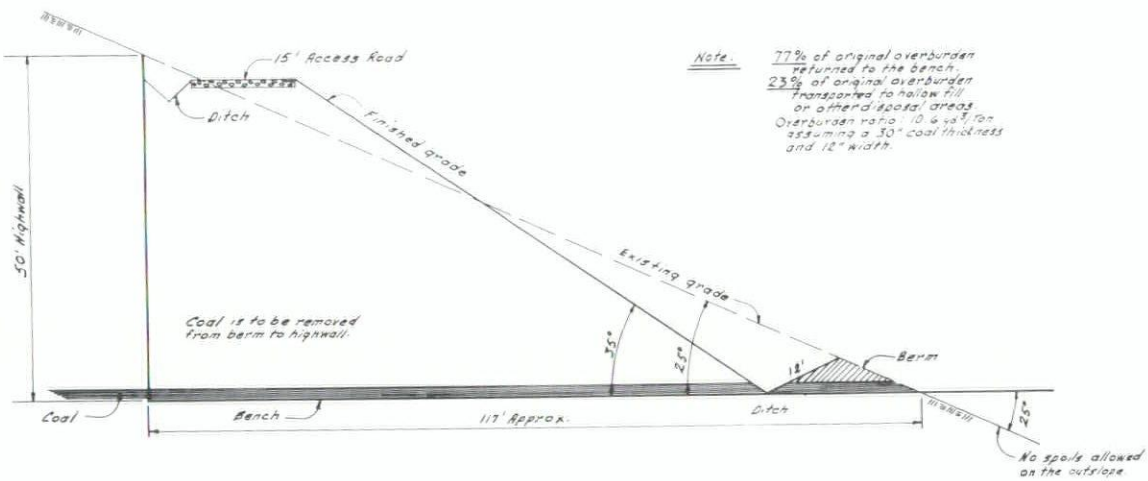


Figure 3a

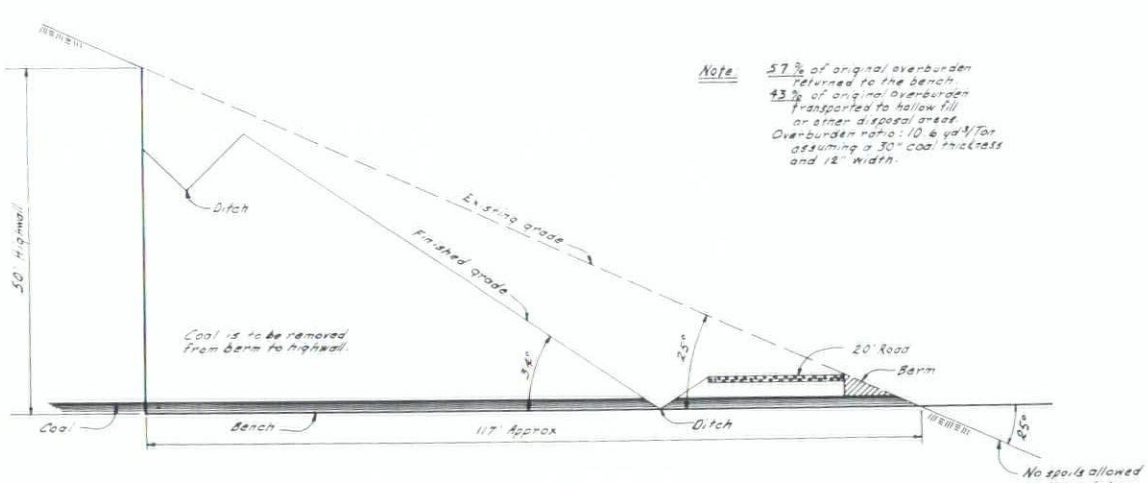


Figure 3b

daily and seasonal variations in discharge from the disturbed area in terms of flow, pH, total iron, total manganese, and total suspended solids and if requested by the regulatory authority, any additional parameter characteristics of the discharge. In Virginia it is almost impossible to obtain enough capacity in sediment ponds to allow the suspended solids to settle out. Although effluent limitations which are to average 35 mg/l do not apply to a precipitation event greater than 10-year, 24-hour frequency, this effluent limitation points out the necessity of treating or controlling the discharge from the mining operation as soon as possible, as is observed in the example in Figure 2.

The facilities to accomplish these requirements are akin to sewage treatment plants required to serve many communities across the state of Virginia. Approximately the same quality of discharge must be maintained at the mine site. However, municipal and community sewage facilities are largely financed by federal grants and are depreciated over 30 to 40 years. Similar facilities at a mine site may have an average life of only three to five years.

There are some other areas of the law which simply increase the red tape and do not appear to accomplish much. The operator is required to make public a blasting schedule ten days prior, (but not more than 20 days prior) to initiating such operation along with the dates and time when explosives are to be used. These schedules are to be published in local newspapers, sent to local governments and public utilities as well as to residents within one-half mile of the site. Maintaining the records and correspondence related to this work will probably require an increase in the labor force at each job site. Signs and markers are also required to distinguish between top soil and other soil. Although not a significant requirement, the necessity of such a regulation is questionable.

According to OSM personnel, haul roads will have to meet federal grade requirements even though they are existing and have been in use for several years. If roads are brought up to the lower grade requirements, additional areas will be disturbed, thus causing more runoff and subsequently more erosion.

After completion of underground mining, surface work areas are to be regraded to approximate original contours. It appears that it would be better to seed the bench area of an underground mine than to redisturb the material that was initially removed to create the surface area for an underground mine, especially if this material has been stabilized for several years.

Also, PL 95-87 grants the regulatory authority the right to place a lien on orphan land that has not been reclaimed whether or not the surface owner wants this area reclaimed.

It is anticipated that these and other requirements will result in substantially increased cost in operation and affect the total price of coal taken from the mine site. At the same time, the increased complexity of operation, the higher manpower, and initial equipment outlay requirements will no doubt, discourage or even eliminate the smaller operator who has traditionally been a factor in maintaining competitiveness in the open market.

There is a provision for small operators, which would exempt them from the law until January 1979, but there are several requirements that many operators will be unable to meet by that time. This exemption is not as advantageous as it sounds once it is considered that initial equipment such as off-the-road haulers cost from $200,000 to $250,000 each.

No doubt, we will see the effect in our monthly power bill, in the increased cost of steel, automobiles and in other goods requiring substantial energy input to bring about the finished product. The extent of the increase will to a large degree be determined by those in the federal and state governments who promulgate the rules, interpret and enforce the laws established by our legislators.

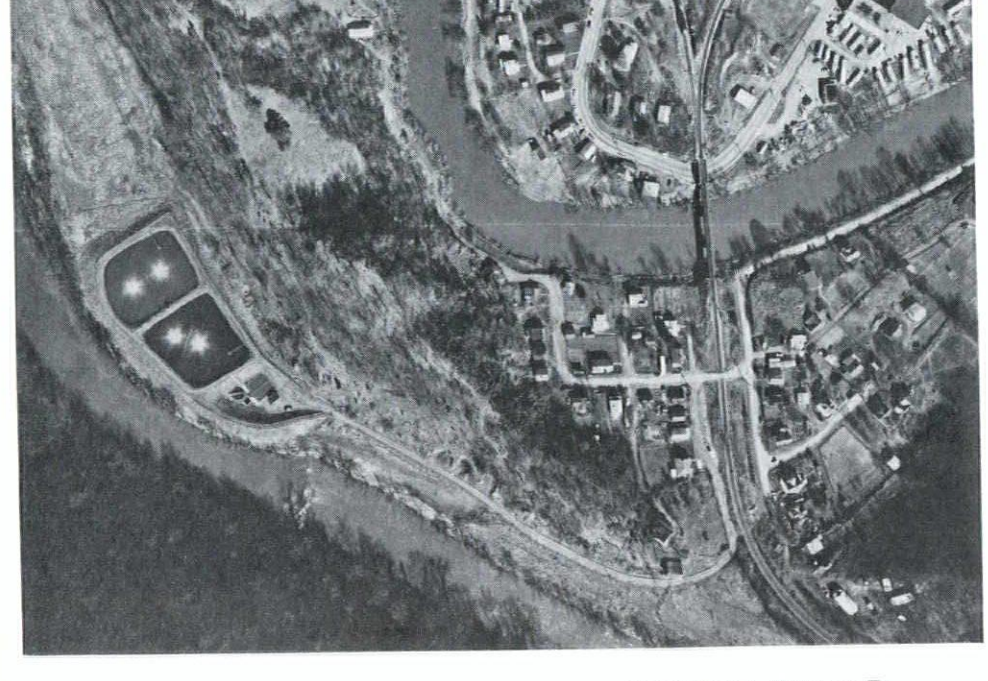
RIVER REROUTING AND URBAN REDEVELOPMENT DREAM NEARING REALITY

By Edwin M. Phillips, P.E.
Project Engineer
Thompson & Litton, Inc.

• THE ST. PAUL Neighborhood Redevelopment Program is a cooperative project involving several federal, state and local agencies. The project is in St. Paul, Virginia, a town of approximately 1000 people, located on the Clinch River in Wise County in Southwest Virginia. The work involves rerouting a portion of the Clinch River, relocating and four-laning Route 58A and leveling a mountain, known as St. Paul Hill. It will provide, in addition to the highway, approximately 80 acres of gently rolling land to be used for establishment of an industrial park, recreation area, residential development and commercial zone.

The project, originally proposed over eight years ago, has moved one step closer to reality with the recent completion of the engineering plans and specifications for the redevelopment work by Thompson & Litton, Inc. Plans for the river relocation were completed in 1974 and the highway plans are nearing completion.

The land necessary for the project was acquired through efforts of the Wise County Redevelopment and Housing Authority (project agent for the Town of St. Paul) and the Virginia Department of Highways and Transportation, in accordance with guidelines set forth in the Federal Uniform Relocations Act of 1971. This acquisition was substantially complete in 1977. Funding for the redevelopment portion of the project is being made available through the U. S. Department of Housing and Urban Development. The acquired land lies adjacent to the Clinch River and on the mountain bounded by a horseshoe-shaped portion of the river. One major problem in land aquisition was that a large part of the property lies in Russell County with the remainder in Wise County. This problem was solved in 1972 when Russell County allowed the Town of St. Paul to annex the area.

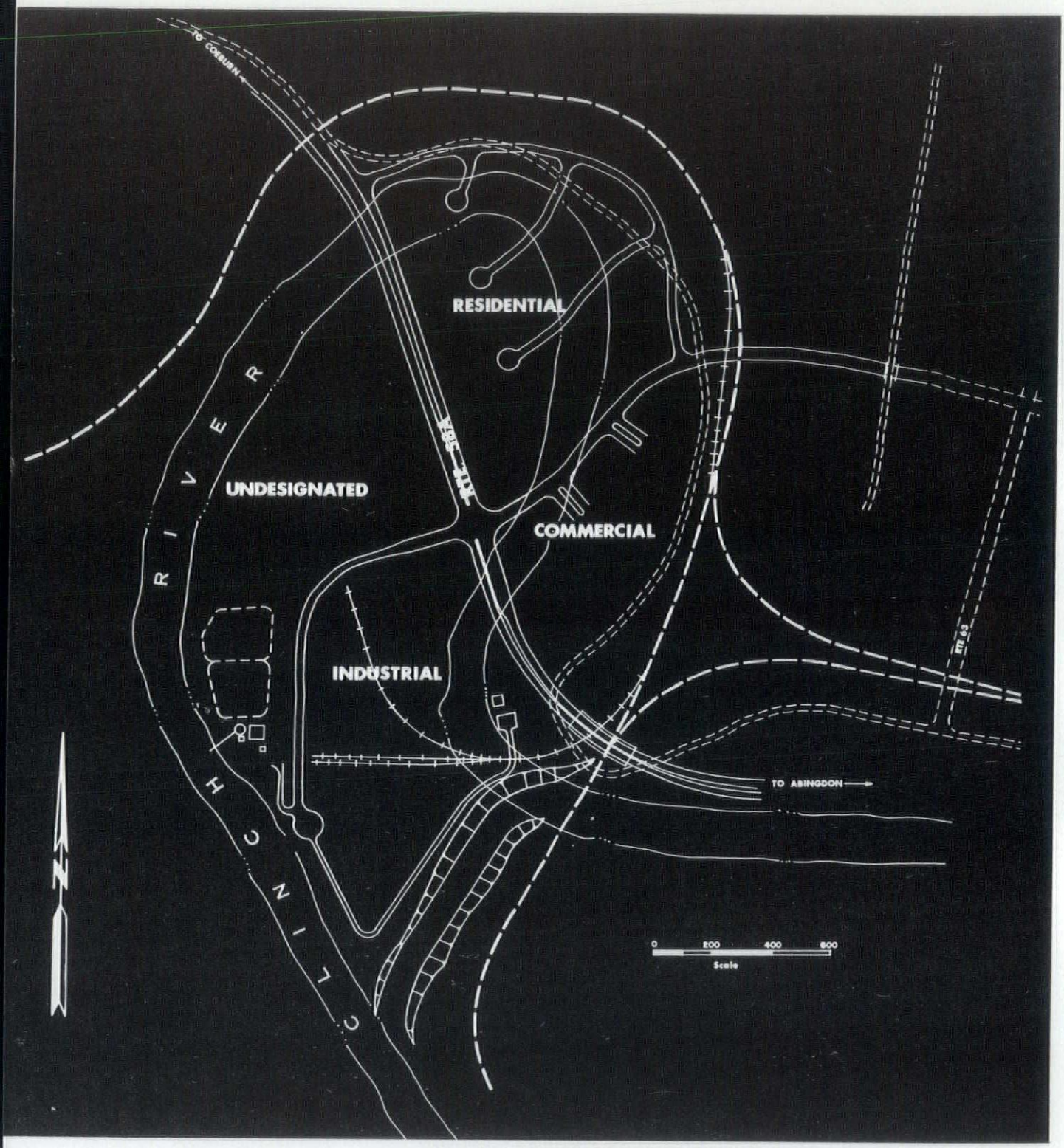


The total project involves moving approximately 2.2 million cubic yards of earth and rock. First order of the construction phase will be the river relocation. This relocation will serve a two-fold purpose: first, a new channel will cut through the hill at the base of the horseshoe, thereby creating approximately 1500 feet of dry river bed which will be filled to provide useable land. Second, the new channel will improve the hydraulics of the river, thus lowering the 100-year flood stage in the town. Thompson & Litton's hydraulic studies associated with the design of the proposed channel change were coordinated with the Tennessee Valley Authority, who in turn will provide financial assistance for the channel change construction. To meet requirements of the Virginia Water Control Board, certain modifications to the existing Town of St. Paul sewage treatment plant will need to be made. These include rerouting a force main presently located in the area of the proposed channel and constructing an effluent outfall line from the present effluent discharge point to the rerouted river.

The next portion of construction centers around the removal of the mountain and relocation of Route 58A. This work, and the channel change will be accomplished by a contractor for the Virginia Department of Highways and Transportation. During this phase monies from TVA, HUD and the Highway Department will be used. Funding from the various agencies will be proportioned according to the percent of work done for each agency's segment of the project. The highway portion of the project will complete one of the three remaining sections of Route 58A between Abingdon and Norton that have not been four-laned.

Most of the material removed from the mountain will be used to fill the old river bed and its adjacent flood plain. The remainder will be used for highway construction extending eastward from the project area. The old river bed and the adjacent area will be raised with fill material to a level higher than the 100 year flood stage of the relocated river. This, along with the proximity of a four lane arterial highway and two railroads will enhance the value of the land within the project area.

The third portion of the project consists of the construction of the streets, storm drainage system and utilities within the area. This phase will be funded by HUD through the Wise County Redevelopment and Housing Authority. At present, three of four areas within the project limits have



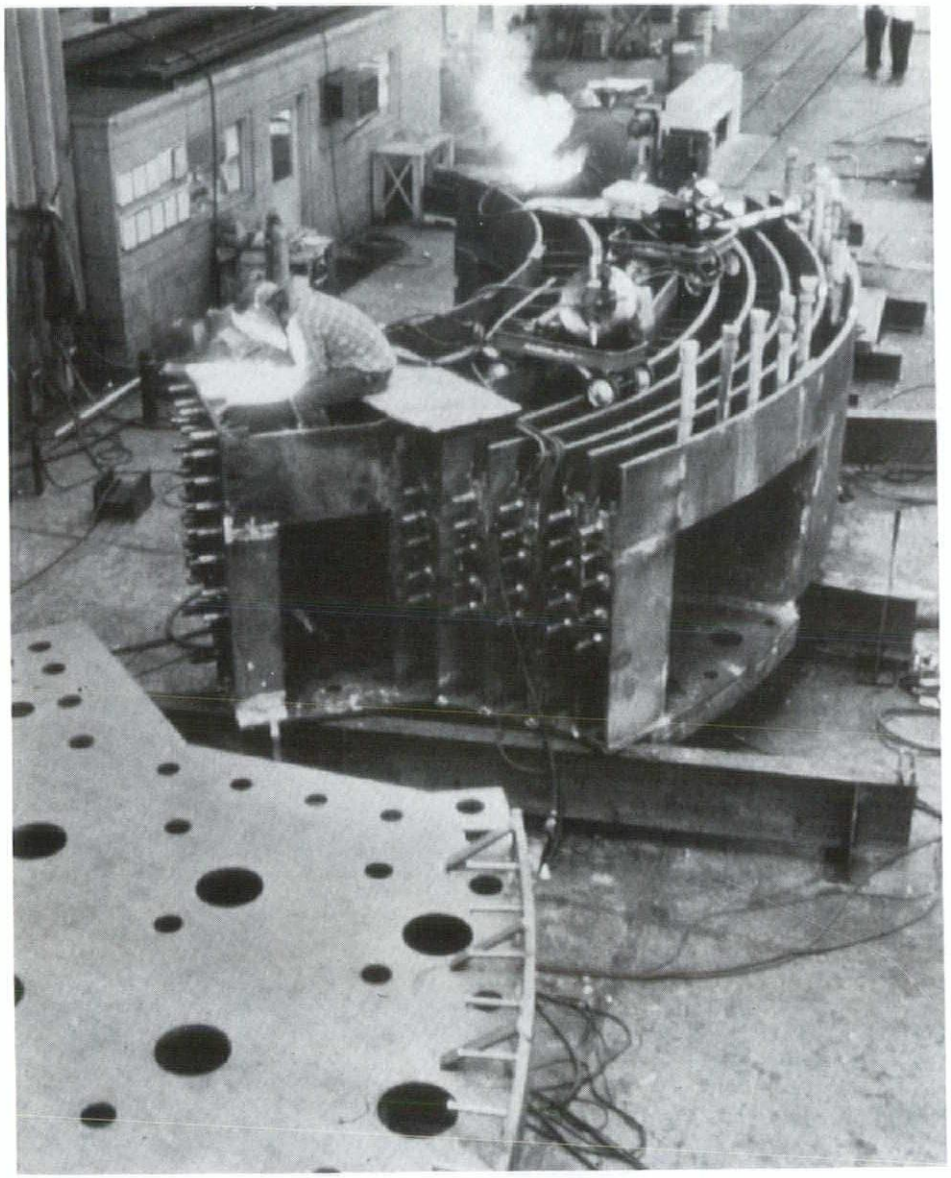
en designated for specific land uses. pproximately 27 acres are designated r single family residential units, nsisting of 41 lots of at least 10,000 uare feet each. Residential lots will be olated from Route 58A by a noise ppressing earth berm and from the ilroad by a "green" area which will so be used as a linear park. All ilities in this area will be underground us maintaining desirable aesthetic alities.

The commercial area, which adjoins the residential area, and through which Wise Street Extension will pass, contains an area for small shops and an area for a larger enterprise such as a shopping center or automobile dealership. The commercial area occupies approximately 15 acres.

The 20-acre industrial park area is served by a wide street suitable for large truck traffic, and has provisions for three rail sidings, making it ideal for rail-truck oriented industry.

At present, an area containing approximately 14 acres has been left undesignated. This parcel is situated so that it can be developed for multi-unit dwellings; industrial or institutional use.

The probable construction cost for the redevelopment portion of the project is estimated at 4.97 million dollars.



NUCLEAR KNOW-HOW.... is one of our talents.

At Bristol Steel we are becoming increasingly involved in projects that will help assure energy for our nation's future. Nuclear quality steel fabrication, such as the complex weldment pictured above for Mississippi Power & Light's Grand Gulf Nuclear Station, is complemented by our continuing involvement in furnishing steel components for fossil-fueled power plants and many coal industry applications. This broad based energy-related capability combines with our well known expertise in structural steel buildings and bridges to assure our position as one of the nation's largest and most capable steel fabricators.

Bristol Steel and Iron Works, Inc.

King and Piedmont Sts., Bristol, Virginia
Fourth St. and Gordon Ave., Richmond, Virginia
2100 8th Ave. N., Bessemer, Ala.

MALCOLM PIRNIE ENGINEERS, INC. present . . .

LITTLE CREEK PROJECT

NEW RESERVOIR SUPPLY FOR THE CITY OF NEWPORT NEWS

ROBERT C. DOLECKI & W. DOUGLAS ENSOR
PROJECT MANAGERS

THE DEVELOPMENT of a new reservoir supply for the ity of Newport News, has not been without its problems.

The project, being built by the Department of Public tilities of the City of Newport News, will increase the safe eld of its system to 60 mgd, adequate to meet projected emands through the year 2000.

The site is in a remote area of James City County, pproximately 35 miles from downtown Newport News. The oject includes a homogeneous earthfill dam, about 1700 ft. ng, with a crest height of 67 ft., a raw water pumping ation, which will ultimately have a firm pumping capacity 60 mgd, 5200 ft of 54-in reinforced concrete raw water ain, and the reconstruction of about 3 miles of Virginia ate Highway.

The reservoir created will impound water pumped from hind a tidal exclusion dam on the Chickahominy River ring the high flow periods for use during dry periods. orage capacity is approximately 6700 mil. gal. at a normal w line of Elev. 60. When full, the impoundment will have a rface area of about 860 acres, an average depth of about 25 , and a shoreline length of about 39 miles.

ttle Creek Dam and Reservoir nder Construction

The project is subdivided into six separate contracts (see companying Table 1);

Clearing and Grading Roadways
Earthfill Dam
54-in. Pipeline and Access Road
Raw Water Pumping Station
Reservoir Clearing
Paving Roadways

The project was first considered in 1956, but was not udied in detail until late 1968 when Malcolm Pirnie, Inc. epared a memorandum on the subject of additional water pply and pipeline capacity for Newport News.

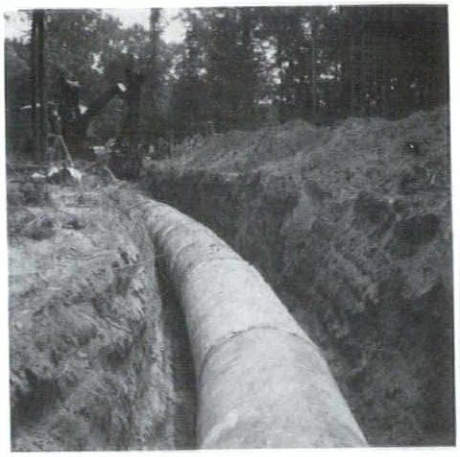
At that time the average daily water demand of the ewport News system was approaching 29 mgd. With the ssibility that the city would reach the system's safe yield of 35 mgd by the year 1976, the need for increased supply was obvious.

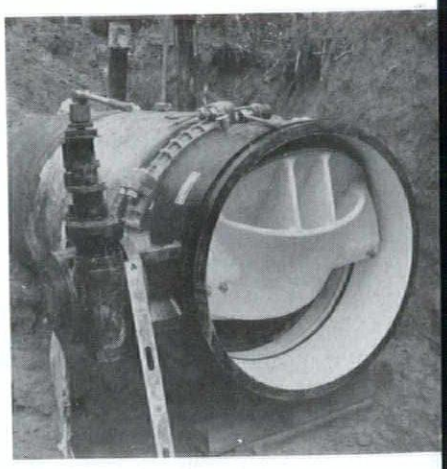
Investigations were made of runoff, evaporation, pumping and pipeline capacity, and system demands to determine the volume of storage required to develop various system yields. Several sites were investigated with the Little Creek site proving to be the most advantageous based on its location relative to the existing raw water mains, topography, and its relatively undeveloped nature. In 1970, the capacity of the Chickahominy Pumping Station was increased to 40 mgd as recommended in the study.

Little was done about Little Creek itself until late in 1970 when the city authorized MPI to prepare a report on the project, including preliminary designs and cost estimates. Topographic maps of the site were prepared from aerial photography and soil borings taken at the proposed dam site. Based on this data, the dam was relocated about 1000 ft. upstream from its original location in order to reduce its length from 2400 ft. to 1700 ft. That move would also reduce from 1200 to 400 in ft. the length of dam that would be founded on the dewatered sands of recent geological origin and the silty sands of the Calvert formation, Miocene Age. The relocation resulted in a reduction of unsuitable materials requiring excavation. The report recommended

TABLE 1
LITTLE CREEK RESERVOIR CONTRACTS

Contract	Contractor	Amount
Clearing & Roadway Grading	Dal-Ray Contractors, Williamsburg	$ 77,650
Dam	Excavation-Construction Inc., Bladensburg, Md.	3,487,600
Pipeline & Access Road	A. Stanley Mundy & Co. Woodbridge, N.J.	626,640
Pumping Station	Norcarva Construction Clarksville	2,105,200
Reservoir Clearing	To Be Bid	
Roadway Paving	To Be Bid	





that the project be in service by mid-1974 in order to ensure that the system would be adequate for projected demands.

In September 1971, the city authorized design to begin on all phases of the project. Copies of the design report were submitted to various state and federal agencies for review and comment and the Corps of Engineers informed the city that Little Creek had been determined to be a navigable waterway and hence construction of the dam required both approval of the Secretary of the Army and preparation, by the Corps, of an environmental impact statement in accordance with the provisions of NEPA, P1 91-190. The application and supporting documentation were filed on February 29, 1972.

To make a long story short, it was many months before the city would be able to proceed with the project. A detailed environmental assessment was prepared which formed the basis for the EIS developed by the Corps of Engineers.

Questions and comments on the EIS were received during the review period from the following agencies:

U.S. Department of Commerce
U.S. Environmental Protection Agency
U.S. Department of Interior
Virginia Institute of Marine Science
Virginia State Water Control Board
Virginia Marine Resources Commission
State Department of Health
State Commission of Game and Inland Fisheries
State Air Pollution Control Board
Department of Conservation and Economic Development
Commission of Outdoor Recreation
Governor's Council on the Environment.

The Corps permit was finally issued December 5, 197 three years, nine months and five days after the applicati was filed. The approval of the governor and that of the sta attorney general, both required by state statute, were grante twelve and fourteen days later, respectively.

Among the conditions of the permit were three stipulate by the Department of the Interior and the Virgin Commission of Game and Inland Fisheries:

- Withdrawal of water from the Chickahominy to f Little Creek Reservoir will cease when the reading o the Chickahominy Reservoir gauge is at 3.0 ft.; (cre of tidal exclusion dam).
- A minimum of 10 cfs flow downstream fro Chickahominy Reservoir must be provided at times.
- A plan of intensive wildlife management for t Little Creek Area must be implemented for t approximately 1200 acres not inundated.

The city had earlier agreed to monitor the dissolved oxyg and temperature of the estuary prior to construction in ord to establish base data for future water releases from Lit Creek Reservoir. This information would make it possible f the City to release water from one or more of the three slui gates provided to approximate the ambient temperatur downstream of the dam and thus lessen the impact anadromous fish during the spawning period.

And so, by 1979, the City of Newport News will have a ne water supply that it contemplated and began work towar nine years previously. Truly, today, environment engineering projects have become involved in environme more than in engineering.

. T. TOMLIN, CONSULTING ENGINEER presents . . .

URTAIN WALL REPAIRS

800 OCEANFRONT CONDOMINIUM

L. HOWARD, INC.
eneral Contractor

AS MAN evolved from caves he built shelter, then the rains came and the elter leaked. He has been building ore and more sophisticated shelters er since, but he is still trying to stop e leaks with varying degrees of ccess. The last 20 years have seen a amatic change in construction aterials and methods used throughout e world; one notable example has en the use of curtain wall nstruction which was made possible the development of a whole new mily of high performance sealing compounds and caulking. The success of the curtain wall requires understanding of the materials used both for the panels and the sealant as well as the movement of all the related component parts that can be expected when the building is finished. Once the designer has selected the materials, the details of all the joints and connections must be meticulously shown and followed in order for the system to work.

In January 1977 our firm was employed by the owners of 3800 Oceanfront, Virginia Beach, to design a remedial scheme to stop the wall leaks of their building. Inspection revealed a 14-story building of curtain wall construction; the walls being Cement Asbestos Board (C.A.B.) panels fastened to weather resistant gypsum board which was attached to steel studs framed between the concrete structural slabs. Waterproofing was accomplished by sealant applied in the joints and around the aluminum window frames which penetrated the walls at each level. The cement asbestos panels were sealed to a concrete beam at the bottom, no expansion joints or weep holes were provided. Water had penetrated the wall causing the interior sheet rock to be damaged throughout the wall face.

The worst damage was observed on the first and second floors which had become uninhabitable. The sheet rock and the insulation were removed in order to observe the interior of the "skin" of the building, this revealed evidence of water penetration over the entire wall of the building without any particular concentration. Observations were made of the exterior wall with infra-red optical equipment to ascertain if any "hot spots" were present that would indicate a local failure or break in the wall, but none were found.

Design of a scheme to remedy the problem had to consider: protection from the weather for the inside of the building at all times since the building was occupied; and the location of the building, which was on the oceanfront and subjected to almost continual wind. Before a design scheme was attempted, a search was made to determine if other buildings had been constructed of similar materials and methods. This search was confined to oceanfront areas because we felt this location created special conditions. The research also was aided by reports obtained from American Society for Testing and Materials and from the National Research Council Building Research Advisory Board. Buildings of similar construction were located in Florida and Maryland. We visited several of these buildings and in talking to people who were involved discovered that similar problems existed. Remedial work that had been done had not completely solved the wall leaking problems and work was continuing. Our research revealed that extensive study had been done in England and Norway on curtain wall systems. The Norway studies had concluded that the "skin" of high rise buildings required three elements to be successful, these being: an air seal on the inside of the panel; a rain deflector on the outside; and an air chamber vented to the

outside (this balances the pressure
the sides of the panel when rain
driven against the face during hi
winds). These studies also revealed th
design of joint width was essential
assure that the sealant used wou
remain within its limits of elasticity a
yet never be completely squeezed out
the joint. Tolerances had to
permitted since the panels and windo
involved would not be perfect, and t
actual construction would be perform
by men working on scaffolds many fe
above the ground.

"Our final design attempted
accomplish a method which took in
account all the essentials and wou
still be practical. The existing C.A.
panels were removed in sections a
weatherproof membrane was applied
the exterior gypsum board with glu
This provided the protection fr
weather needed during constructi
and ultimately became the "air-seal"
the completed wall. The existing C.A.
panels were removed in order to reve
deterioration of the underlying gypsu
board in order that heavily damag
sections could be replaced.

Furring strips of galvanized me
were then applied over the membra
and screwed through the gypsum to t
existing studs. (A wide furring strip w
used because the studs did not alwa
line-up exactly.) A rubber strip w
adhesive backing was then applied
the furring strips to act as a gasket
the joints and provide backing for t
sealant. The depth of the furring str
provided the necessary "air-chambe
for the completed wall. We divided t
wall into sections with flashing wh
extended behind the membrane, t
provided the vent necessary to equal
the pressure and provided a we
trough for the exterior face. N
cement asbestos board panels were th
attached to the furring strips, care w
taken to see that all joints occurred o
the gaskets. The joints were ma
having widths of not less than ¼" n
more than ½". The minimum wi
was assured by the use of dowe
Aluminum sub-frames were applied
order to extend the window fra
through the new wall and provide
"lip" around the opening where
sealant would be applied. This "l
insured the caulking would be stress
to prevent cohesive failure that of
occurs when the sealant is applied a
"fillet." Two sealants were selected
having the required elasticity,
sealant to be used for the panel joi
and the other for the windows. This w
done to assure proper adhesion. T
joint sealant completed the design.

Our experience with 3800 Oceanfr
has created the opinion that man n
yet stop his cave from leaking if pro
attention is given to all the details.

. STUART ROYER AND ASSOCIATES presents . . .

VATER FILTRATION PLANT
OWN OF FARMVILLE

DACHE, MERCER & FAISON
onsulting Engineer,
echanical

RCHITECTS & ENGINEERS, INC.
onsulting Engineer,
ructural

STUART ROYER AND
SSOCIATES
ime Professional,
vil Engineering

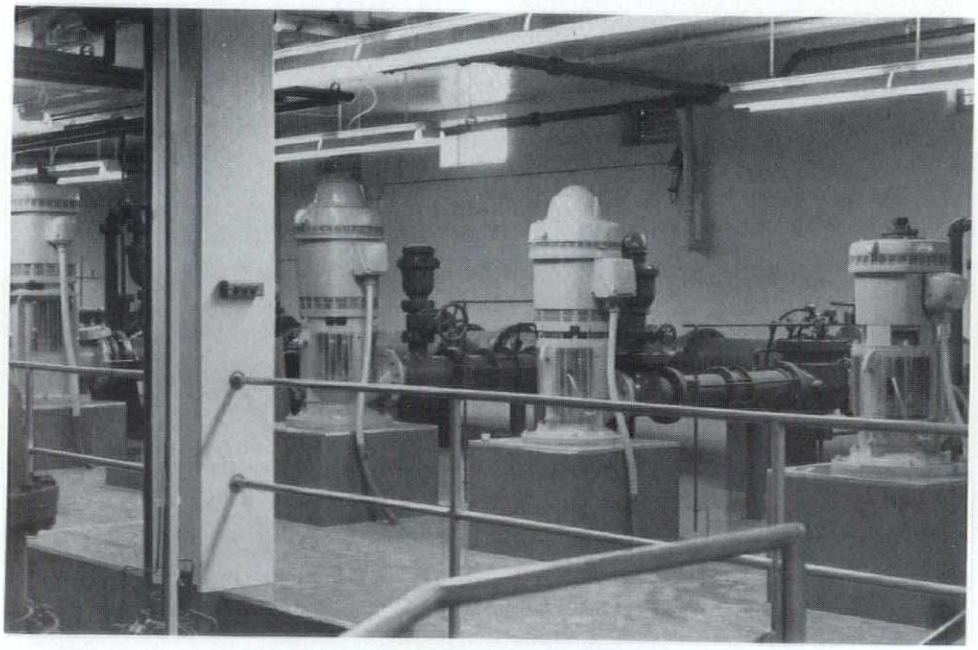
NDREWS LARGE & WHIDDEN, INC.
eneral Contractor

Water Plant Building containing office, laboratory, kitchenette, chlorination facilities, chemical storage and handling facilities, filters, and pumping facilities for the finished water. Portion of Settling Basins is shown at right.

THE TOWN of Farmville located in rince Edward County has experienced eady growth. Longwood college and veral large industries which have panded in recent years have ntributed to increased water usage.
The water plant supplying the town th water was built in the early 1930s. his plant had a capacity of one million llons per day (MGD) and drew its raw ter from Buffalo Creek.
In 1970 the engineering firm of R. uart Royer & Associates submitted a port concerning proposed water stem improvements for the Town of rmville. In this report it was commended that a new water eatment plant be built to replace the rty year old existing plant. It was oposed that the new plant have a pacity of 3 MGD to satisfy the future eds of this growing community. The ojected site for the facility was on the ppomattox River. This change in urce was necessary to obtain the 3 GD of raw water during periods of olonged drought.
In June of 1972, the Buffalo River se to flood stage. Water production s curtailed while the old water plant s inundated.
The Town of Farmville commissioned Stuart Royer & Associates, Con- lting Engineers, to prepare construc- n drawings for a new water treatment cility in 1973.
Virginia State Department of Health gineers and Engineers from R. uart Royer & Associates ran tests on w water from the point on the river ere the raw water would be thdrawn.

A site high on a ridge overlooking the Appomattox River was selected and acquired by the Town of Farmville. Preliminary financial arrangements were made with Farmers Home Administration for a loan and a grant. Site surveys and soil investigations were accomplished and detailed design began.

It was decided to design the proposed plant to treat 3 MGD. A conventional raw water treatment process consisting of a raw water pump station, flash mixing (chemical addition), flocculation (assembling of coagulated particles in preparation for settling), sedementation (settling out of settleable solids), sand filtration, disinfection and pumping of finished water. A raw water pump station and a diversion structure (low water dam) was placed in the Appomattox River which would

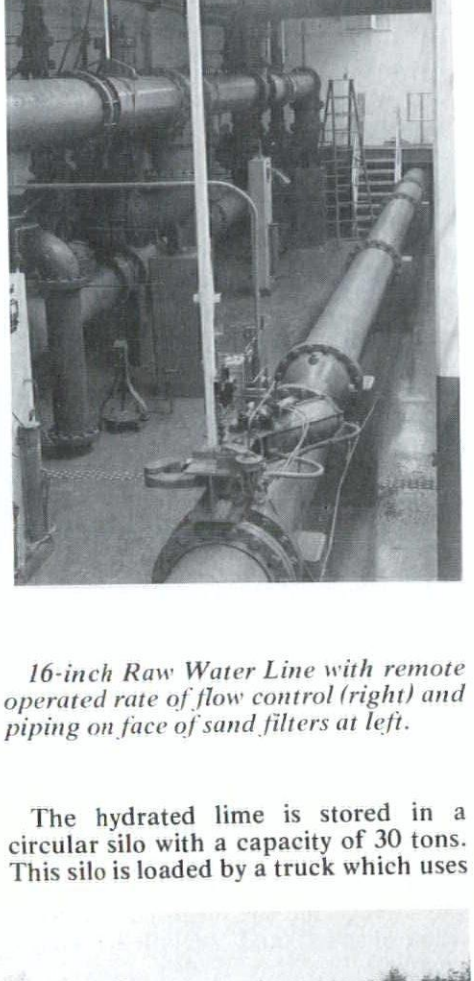


Finished Water Pumps and Backwash Pump (left) are located in pipe gallery level.

channel all flow on the river to a point where it could be withdrawn even during periods of extremely low flow.

The raw water pump station contains three raw water pumps which will raise the water from the river to the plant site. This station also contains a traveling screen which will remove larger solids from the raw water.

The new plant itself is attached to the settling basins, flash mix and flocculation basin which makes for a more centralized operation. The building contains an operator's office with instrumentation which allows him to monitor all systems within the plant as well as three water storage tanks serving the Town of Farmville at scattered locations. A modern well equipped laboratory capable of performing all tests needed to maintain water of good quality is adjacent to the operator's office. It will not be necessary for the operator to leave the plant unattended since shower and kitchen facilities have been provided. A chlorinator room with hydraulic scales and power hoist houses two one-ton cylinders which provide the chlorine for disinfection. The chemicals which are fed to the water for coagulation, pH adjustment, taste and odor control, fluoride addition, and iron and manganese removal include hydrated lime, soda ash, activated carbon, liquid alum, hydrofluosilicic acid, and potassium permanganate.



16-inch Raw Water Line with remote operated rate of flow control (right) and piping on face of sand filters at left.

The hydrated lime is stored in a circular silo with a capacity of 30 tons. This silo is loaded by a truck which uses air pressure to "blow" the lime up an into the bin. The lime is stored in th bin until needed and then blown int the chemical feeders inside the plant b compressed air. By purchasing lime i this form, the Town of Farmville ca save greatly over the cost of bagge lime, air pollution is reduced, th problem of disposing of old bags eliminated and a much cleaner facili can be maintained. The alum an hydrofluosilicic acid is stored in a tan and pumped into the water as neede Other chemicals are fed by d chemical feeders.

Bagged chemicals such as soda as and activated carbon are conveyed the chemical storage floor by means of hydraulic elevator. This elevator als doubles as a hoist since it was designe to carry the heaviest individual piece mechanical equipment in the plant.

In conjunction with the new wat treatment plant, approximately on mile of road and an 18" wat transmission line was designed convey the finished water to an existin 1 MGD storage tank.

The design allows expansion of th plant to a 6 MGD by changing the filt media, addition of instrumentatio and the addition of two 6 MGD pump One mile of 16" water line has been la to further aid the transmission of wat to the town.

The total cost of the new wat treatment plant with related road an 18" transmission line was approx mately 2.5 million dollars.

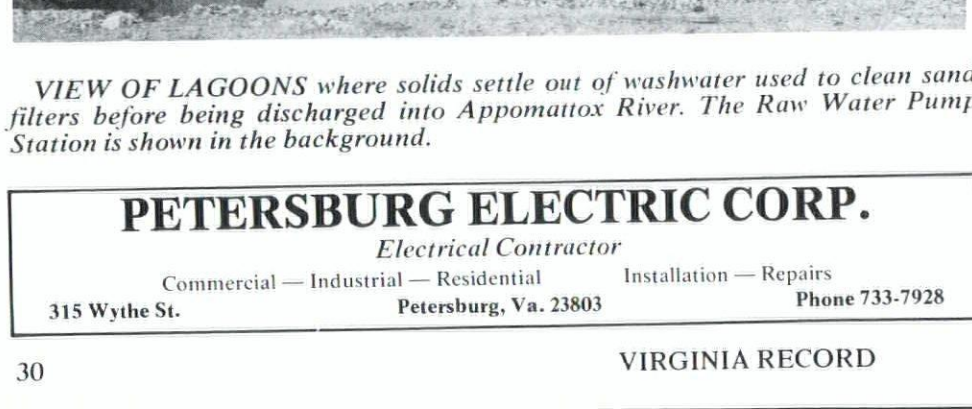
When this plant goes into operati the water needs for the people of t Town of Farmville, Virginia will fulfilled for many years to come.

Andrews Large & Whidden, Inc. Farmville was general contractor for t plant.

Subcontractors & Suppliers

Frank S. Black, Staunton, piping mechanical; Rogers Masonry, In Orange, masonry; Catlett-Johns Corp., Richmond, HVAC; Wa Contractors, Inc., Keysville, grading seeding; Chapman & Martin, In Richmond, floor covering; L. Wingfield, Roofing & Metal C Kenbridge, roofing; The Floor Sho Farmville, floor covering; Brinkl Ward Electric, Inc., Farmvil electrical; and W. C. Newnam C Farmville, concrete.

Also, Rexnoid, sludge collection fla mix & flocculation equipment; Car Day, lime handling - CEA; Kawn Co., Inc., windows & doors; The Ce Co., doors; Wallace & Tierna Wheaton, Md., chlorination; B chemical feeders, instrumentation, fl controls; Economy Cast Stone C Richmond, cast stone; Bethlehem St Corp., Bethlehem, Pa., steel; and All Chalmers Corp., pumps.



VIEW OF LAGOONS where solids settle out of washwater used to clean sand filters before being discharged into Appomattox River. The Raw Water Pump Station is shown in the background.

McGAUGHY, MARSHALL & McMILLAN, ARCHITECTS & CONSULTING ENGINEE
present . . .

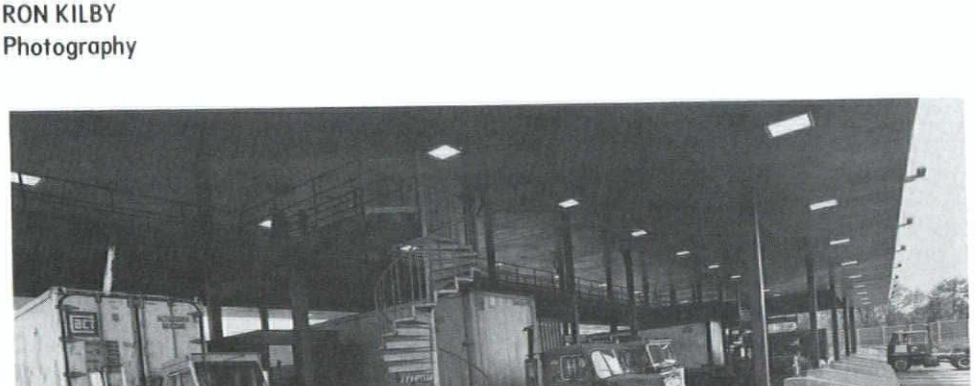
CONTAINER CONTROL CENTER FOR NORFOLK INTERNATIONAL TERMINALS

Container Control Facility, with Inspection Stations on the left. Weigh Stations on the right, and Control Building in t center.

McGAUGHY, MARSHALL & McMILLAN and ED CARSON ASSOCIATES
LANDSCAPE ARCHITECT

Contractors:
H. L. TEMPLE, INC.
W. B. MEREDITH II, INC.
AMES & WEBB, INC.
CENTURY CONCRETE

RON KILBY
Photography



Inspection Stations, with spiral staircase to catwalk.

THE $2,150,000 Container Contr Facility for Norfolk Internation Terminals is the result of a long peri of planning and programming Maritime Terminals, Incorporate operators of the port, and McGaugh Marshall & McMillan, a Norfolk-bas architecture and engineering firm.

Norfolk International Termina (NIT) is located in Norfolk, Virginia, the port of Hampton Roads at t mouth of the Elizabeth River. T largest of four general cargo facilities Tidewater Virginia, NIT provid container, break bulk and spec commodities handling facilities f import/export cargo.

NIT is served by the intersta highway system through a dire connection to I-64 via Internatior Terminal Boulevard. It is served major southern railroads with feed service to and from Baltimor Philadelphia, Charleston, and W mington.

The original facility, completed 1922, included two large finger pi mounted with cargo transit sheds, r delivery and back-up rail yards, a warehouses of concreted bri

nstruction, and was used as an Army rminal. During World War II, the rminal was used for troop barkation and shipment of tanks, uipment and cargo.

After the war, the U. S. Navy erated the port for a short period til it was declared obsolete by the eneral Services Administration, and 1966 the port was obtained by the rfolk Port Authority. Work was mediately begun to construct the first ntainer port in Hampton Roads. The rginal wharf supporting the finger rs was converted to a container rth, and warehouses were removed to ovide a container storage area. A cond container berth and back-up ea were initiated soon after.

n 1972, NIT was acquired by the rginia Port and Industrial Authority, ich organized a quasi-public agency, aritime Terminals, Incorporated, to erate the port. Under the direction of nes N. Crumbley, General Manager, d William J. Thompson, Director of gineering and Maintenance, Mari- e Terminals initiated plans for fur- r development of its container ilities. In conjunction with Gaughy, Marshall & McMillan, a n was formulated for construction of litional container berths and back- areas, and development of the en- nce and container flow control areas.

The Container Control Center sented unique problems. In addition studies and industrial engineering plications of container flow and pection facilities, McGaughy, rshall & McMillan studied potential oblems involving protection of acent residential areas from visual d aural disturbances.

The first phase of the project cerned the entrance roadway. The sting two-lane concrete roadway had n built in 1922 and included no dscaping or entrance vistas. A new -mile roadway was designed to ndle three types of vehicles: normal o traffic for office workers and gshoremen; break bulk tractor-trail- traffic; and container-on-chassis ffic. In addition, this phase included dscaping, street lighting, gate con- for security purposes, and other ele- nts of a very important heavily- veled industrial entrance.

The second phase of the project luded preparation of the container za area comprising over 60,000 uare yards of pavement. This plaza ves as a key-up area for both ound and outbound containers prior weighing, inspection and release m or acceptance into the terminal. o included in this phase of work was 6-foot high earth berm separating container plaza from the residential ghborhood to the south.

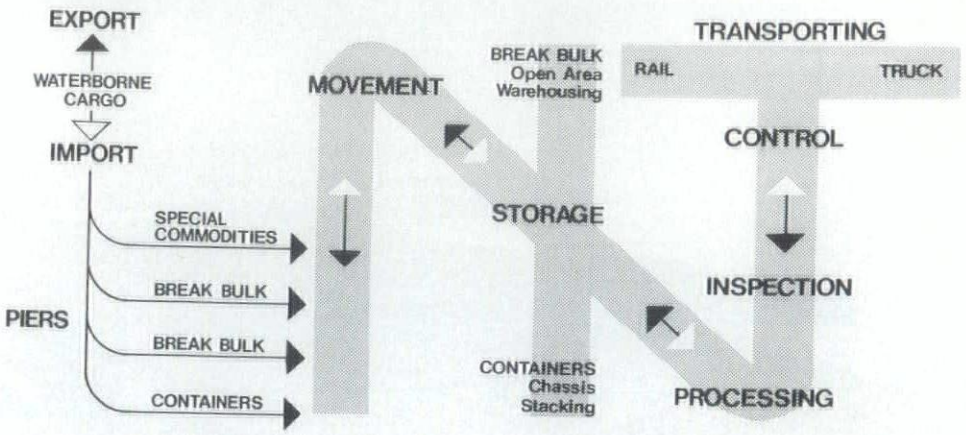


Chart showing the flow of materials through NIT.

During the grading, drainage, and paving work, construction began on the 40 to 50-foot long container inspection slabs, which were supported on wood pilings over an existing creek. Built into the slabs was a utility trench for installment of pneumatic tubes during the next phase of construction. The approach slabs and structural support slabs included over 20,000 square feet of support surface.

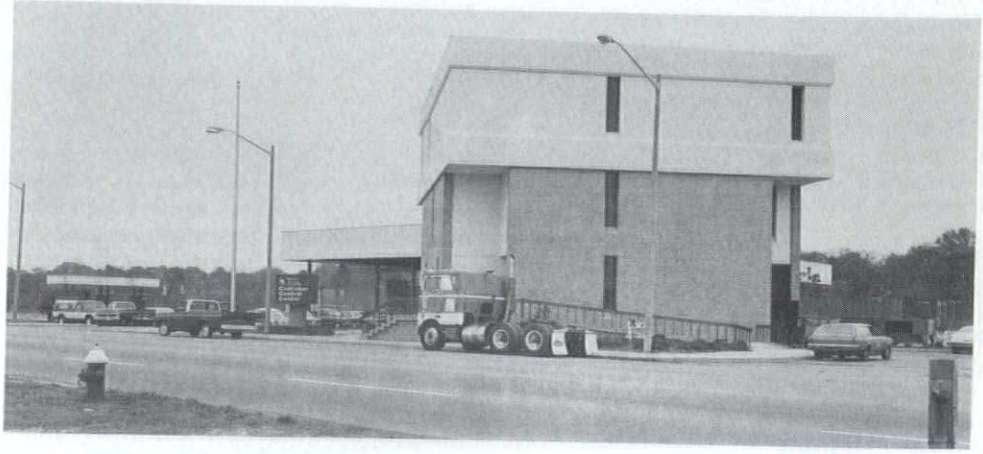
The next phase of construction included the construction of the 10,000 square foot, 3-story control building. The buildings was situated at the north end of the inspection slabs and was placed at a 45-degree angle in order to afford a vista of all areas of the container plaza for manpower and truck control. The first floor of the control building houses the operations officer for container placement, loading and handling manager, security office, lunch room and mechanical rooms.

The second floor of the control building is unique in that it provides centralized control of all container movement through the terminal. The pneumatic tube system, linked with computer-connected CRT's for logging-in and logging-out of container boxes, supplies direct contact with the nine inspection stations at the truck level. A tenth tube station contacts the container manager on the first floor.

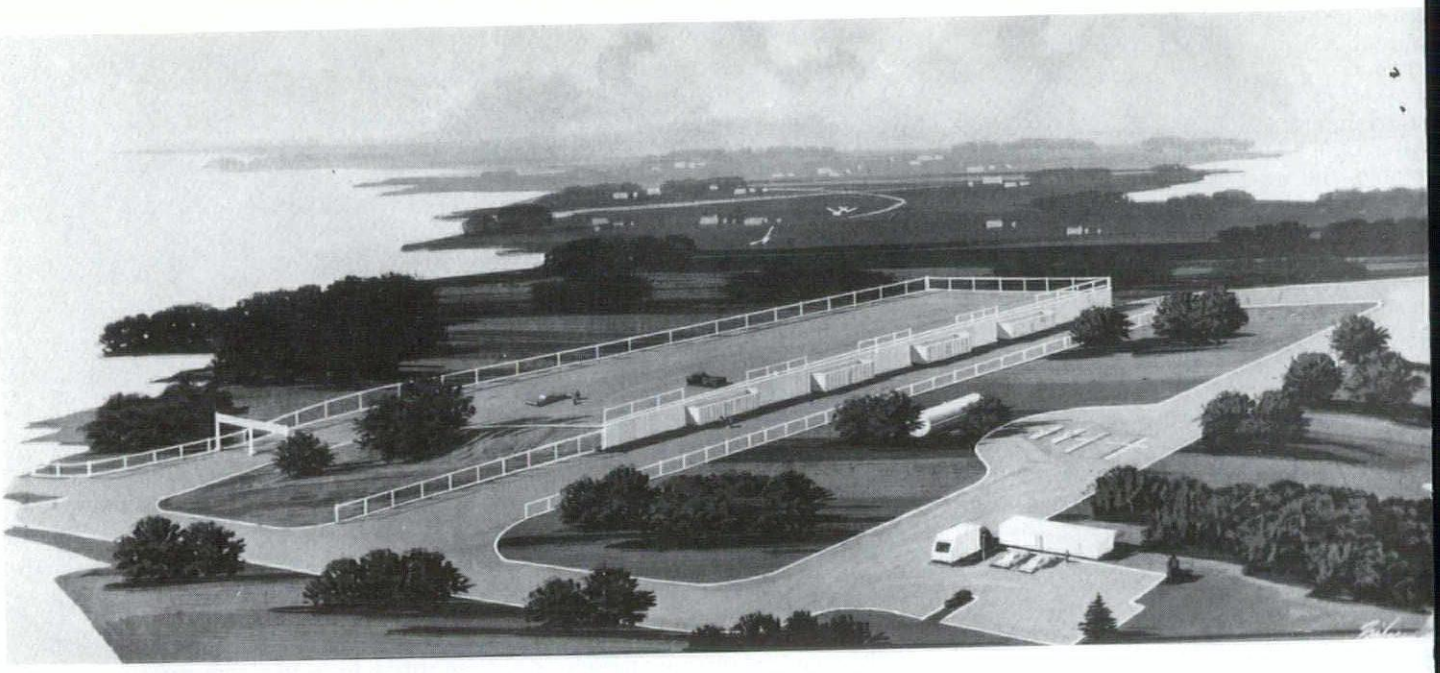
The third floor includes over 1,000 square feet of raised floor system for a complete in-house computer operation. The master computer for the center controls movement and location as well as billing of every box and chassis on the terminal. Control entry includes the outbound computer terminal at the gates as well as the inbound terminal.

The installation and covering of the container truck inspection stations constituted the next phase of construction. Included in this phase was the erection of a 200 by 80-foot canopy over nine inspection booths. The canopy has clearance in excess of 20 feet with a central catwalk along the 200-foot length so that each container can be inspected from above with a minimum of stairway climbing. Access to the catwalk is provided by two spiral staircases located a third of the way from either end of the canopy. Below the canopy, each of the nine inspection booths has a dual capacity, with the ability to handle both incoming and outgoing traffic. A tenth booth on the

(Continued on page 39)



View of Control Building from the north.



ROY F. WESTON presents . . .

INNOVATION IN SANITARY LANDFILL DESIGN
SANITARY LANDFILL #3 — HENRICO COUNTY

JOHN L. COMBS, P.E.
Project Manager, Virginia Office

LEADBETTER CONSTRUCTION COMPANY
General Contractor

Story by
John L. Combs, P. E.
Project Manager
Virginia Office

Everyone's heard the saying: "Water, water, everywhere and not a drop to drink." In a similar vein, the same might be said for solid waste: "Garbage, garbage, everywhere, but what are we going to do with it?" Resource recovery and solid waste disposal are two of the hottest topics currently being discussed by government and industry professionals.

Henrico County, Virginia is actively supporting and participating in the Richmond Area Metropolitan Resource Recovery Program to develop long-term solutions to its waste disposal problems. The time span between now and the anticipated availability of the resource recovery facilities is such that the county had to employ an interim solid waste disposal site.

What resulted is believed to be a first in Virginia since the present, stringent sanitary landfill design requirements became effective. Basically, no artificial leachate collection mechanisms are employed, no artificial leachate treatment is provided, nor are artificial, impervious bottom liners or top covers employed. Yet the landfill, which will handle municipal refuse, will not contaminate offsite areas with leachate, gas or erosion sediments.

In the design of sanitary landfills, the control of water is critical. All rainfall entering, all runoff or percolation to ground water leaving, and any surface or ground water approaching the site must be controlled. Accordingly, Weston's Earth Sciences Department made a thorough investigation of the site and surrounding area, evaluating soils and substrata conditions and the nature of the ground water in the area. At the same time, Weston's Virginia office analyzed site topography and surface water drainage. One of Weston's findings in the evaluation was that surface water drainage and ground water movement in the area is in a southerly direction. The ground water moving toward the site from the north will be intercepted at the northern edge of the fill area by a perforated pipe and gravel-packed trench. This will divert the ground water to the surface water on the east side of the fill. Surface water north of the landfill will follow the natural drainage in a souther direction and do one of two things:

1. Some of the water will infiltra the ground surface north of t ground water interceptor a flow to the perforated pi which will discharge it to t drainage channel borderi the east side of the fill. T north ground water intercept will be placed a sufficie distance from the north toe the fill to prevent leachate fr contaminating the intercept ground water.
2. Some of the water will beco surface runoff. In this case t water will run into a draina channel paralleling the no ground water interceptor a will also discharge to t surface water on the east si of the fill.

A sequence of drainage chann berms and leachate collection pipes v be constructed along the Eastern a Western boundaries of the site. T channels and berms will be used prevent surface water from entering fill area from either side. The leach collection pipes will intercept a

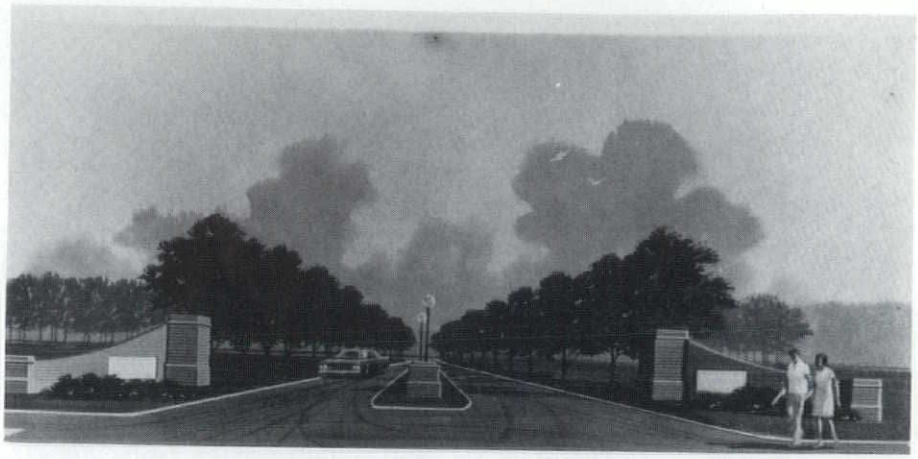
eachate that may move toward the east r west boundaries of the landfill.

The gravel-packed leachate collectors nd north ground water interceptor will lso serve to intercept methane gas to revent off-site migration. An almost 00 ft. thick clay layer that lies nderneath the site virtually eliminates ny vertical ground water movement. dditionally, an approximately 600 ft. rip along the south edge of the roperty contains a blend of sand, silts nd clays that will be used for leachate enovation. All leachate that is enerated in the site will flow in a outherly direction through the renovation zone'' where various hemical, physical and biological rocesses will "naturally treat'' the achate to an acceptable quality.

Just south of the landfill site is a small ream fed by the ground water ovement. The renovated leachate will efuse into the stream which eventually ows to the James River. During the enovation process, pollutant characteristics of the leachate will be reduced to etter than acceptable standards for desion into the surface water courses.

Weston's design concept employs ading state-of-the-art technology in anitary landfill design, while ptimizing resource conservation. The tter is evident by the absence of rtificial liners, tops, collection/treatent systems, and the energy-intensive ature of the leachate treatment proesses.

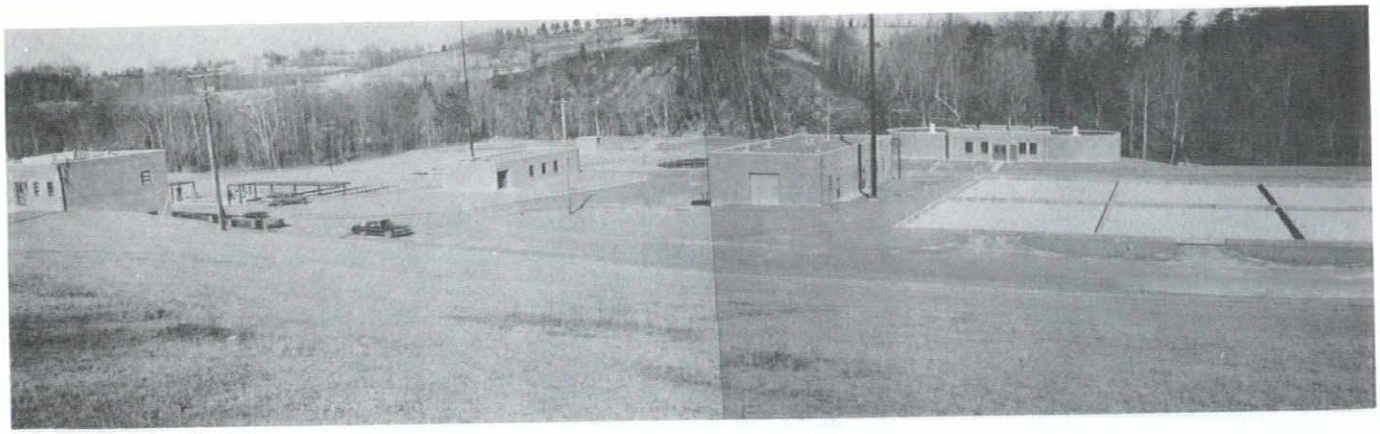
The facilities provide for a 'round-e-clock, seven-days-per-week use by e general public. The public area is



well lighted and only requires the user to drop refuse into any of four trailers used simultaneously, the tops of which will be at ground level. When full, the trailers are taken into the landfill and unloaded by the county operations personnel without affecting the public use area. Commercial and Department of Public Utility carriers will have regularly set hours of operations. They will proceed to a separate area from the public use area for weighing going in, and tire washing coming out during inclement weather.

In addition to the many technical aspects, the landfill will also offer a number of aesthetic features that will allow it to blend in almost unobtrusively with the surrounding neighborhood.

The entrance is framed by colonial brick work and proceeds down a 600 ft. grassed median separated roadway, lined by ornamental pear trees. The operating area of the landfill will be visually screened from the road traffic, blocking public view of the actual landfill site.



Photos above give overall view of wastewater treatment plant site.

R. STUART ROYER & ASSOCIATES presents . . .

WASTEWATER TREATMENT FACILITIES FOR WYTHEVILLE, VIRGINIA

CONSULTING ENGINEERS:
ROACHE, MERCER & FAISON, Mechanical/Electrical
ARCHITECTS & ENGINEERS, INC., Structural
R. STUART ROYER & ASSOCIATES, Civil
SAYRE & SUTHERLAND, Soils

RAHMAN CONSTRUCTION CORP. and
ROUSE INTERNATIONAL
Prime Contractors — A Joint Venture

WITH THE advent of PL 92-500, the Town of Wytheville initiated planning studies directed toward a cost effective solution to meet the more stringent standards for discharging municipal wastewater to state waters.

R. Stuart Royer & Associates was commissioned to prepare a report detailing the alternatives and presenting recommendations for the type of facility, its size, location and financial aspects of a plant to meet the present and future needs of the area.

Extensive testing of the wastewater was conducted during the study stage of the project to determine design parameters. The final recommendation was to construct an activated sludge type plant with capacity for an average daily hydraulic flow of 2.6 million gallons per day and biologic capacity for 20,000 persons.

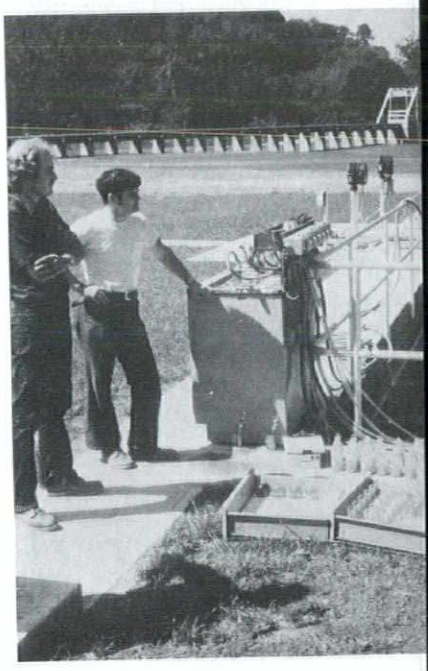
The project included several interesting facets including available land, emergency power sources, and industrial dischargers.

Industry in the area produces a significant wastewater flow; however no single source alone produces a significant amount. Therefore, work was started early to develop a cooperative spirit with industrial dischargers recognized as having potentially harmful wastes. The cooperation received has been excellent and where necessary pre-treatment units are being installed by industry. The town as well as industry have installed extensive monitoring for quantative and qualitative analysis of flow received as well as that discharged, and communication systems have been established to allow each to warn the other of any impending problems.

Subsurface exploration of the site revealed a weathered shale vertically inclined with a ground water table approximately two feet above bedrock. Several units would be subjected to hydraulic up-lift in the event of dewatering and therefore a system of rock anchors was installed to prevent flotation.

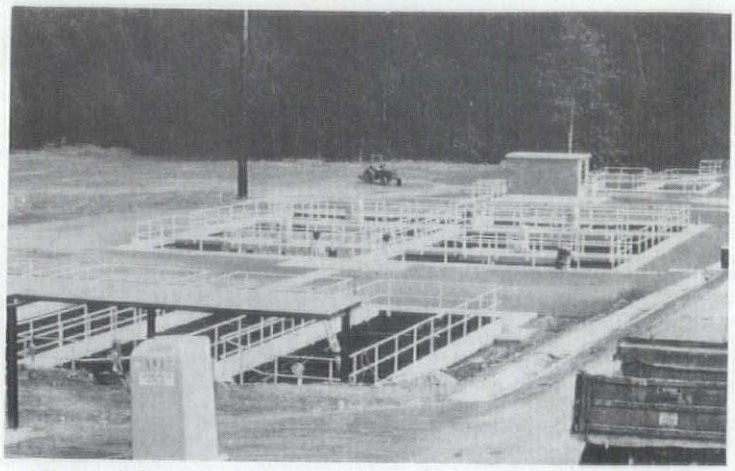
In order to maintain continuous operation, it was essential that standby electric service be available. The site chosen for construction had two separate sources of power within easy access. An economic evaluation indicated that two separate sources should be brought to the plant rather than to construct and maintain an on-site generating facility.

The existing primary treatment plant is situated on a small parcel of land on the north bank of Reed Creek. The only suitable site for a new facility whi could be found was across the riv Generally, construction of a pumpi station would be necessary to conv wastewater to the new site. Su facilities are costly to construct a operate. During design it was fou that by relaying several hundred feet the main truck sewer, an invert syphon could be employed to conv wastewater across the river to the pla which will lead to considerable savin in the future operation.



Performing on-site tests of aerat equipment to verify oxygen trans efficiency and mixing capabil Visible in top of picture is the ae influent sewer which receives f through inverted syphon under river.

Modern laboratory facilities allow the operator to termine the chemical and physical properties of the waste.



View of liquid waste section of plant showing primary settling, aeration and chlorine contact tanks.

The plant was designed as a conven-onal activated sludge process with ovision for expansion to twice its pre-nt capacity. Process units include mminution, grit removal, primary arification, aeration, final arification, disinfection, and re-eration. Solids handling facilities clude flotation thickening, complete ix anerobic digestion, and vacuum tration. Flow instrumentation is ovided at all points necessary to ntrol the treatment process. Sludge is tomatically recirculated in direct oportion to plant flow in order to lieve the operator of time consuming justments and to optimize plant ficiency.

The plant also includes an attractive ntrol building with modern oratory, office, and garage workshop uated on a hillside overlooking the tire plant. The operator can monitor e entire process from the control ilding, and if necessary make some justments without leaving the build-g.

Flow enters the plant through a single it housing a barminutor, grit collector, and an influent measuring Parshall flume. This is followed by four rectangular primary clarifiers.

Plant piping allows raw waste to be diverted past the primary clarifiers to the aeration basin in order to increase the solids load to the reactor. The aeration basin is followed by dual centerfeed circular clarifiers with vacuum sludge drawoff.

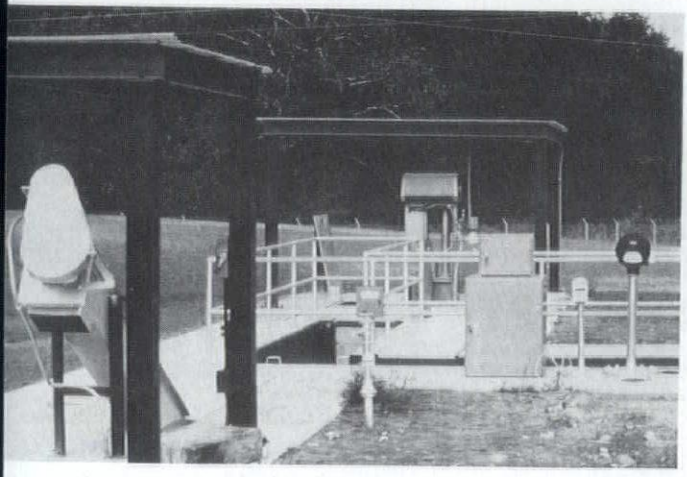
Waste activated sludge is pumped to the aeration basin through variable speed centrifugal pumps. The speed of these pumps is manually controlled to recirculate the return sludge flow in direct proportion to influent flow to the plant.

Clarified effluent from final settling is used for all non-potable water within the plant including fire protection, chlorination, and high pressure water for air flotation of waste activated solids. The air flotation process is used for thickening sludge prior to digestion.

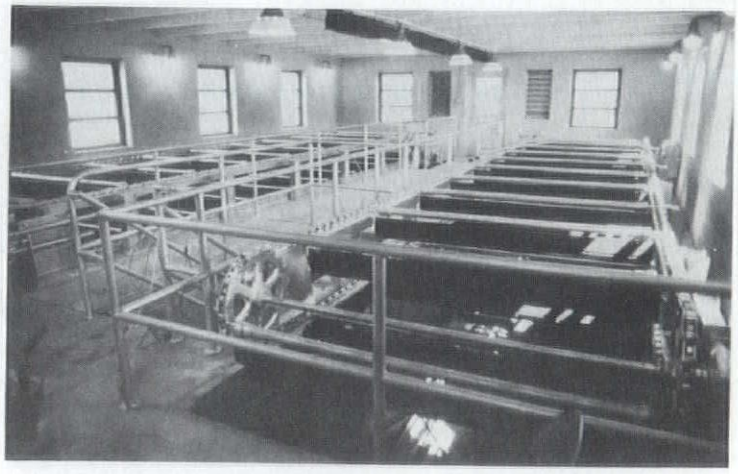
The anaerobic digester produces methane gas in sufficient quantities not only to burn and heat the building but also to maintain the digester contents at 90°Fahrenheit. Digested sludge is dewatered through vacuum filtration and the solids are disposed in an approved landfill. Sand drying beds are provided as a back up for vacuum dewatering.

The practice of backup facilities is followed throughout the plant. All tanks and major equipment are provided with backup either through dual units or through alternate pipe arrangements which allow multiple use of various units. Therefore, it is highly unlikely that the plant will malfunction due to electric power failure, normal equipment outage or by maintenance.

Flow was diverted to the plant in February 1978 and final testing as well as completion of the plant is expected in late spring of the same year, at which time the total facility should present a pleasing atmosphere which will instill a sense of pride in operating personnel. All structures are spaced apart for ease of future expansion and grassed areas surround the facilities. A paved roadway circles through the plant



Preliminary treatment unit includes shredding, grit moval, flow monitoring and sampling of raw wastes.



Interior view of flotation thickener building.

providing easy access to maintenanc vehicles and delivery trucks, an concrete walkways connect the variou units. The entire plant layout is a attempt to assist plant personnel i maintenance as well as operatin functions and to provide a environment which encourages goo housekeeping and efficient operation.

The total construction cost of th plant was approximately $3,750,000 which three-quarters was paid by gra from the Environmental Protectio Agency. The cost to the Town Wytheville was approximate $800,000.

Rahman Construction Corporatio of Richmond, and Rouse Internationa of Marlowe Heights, Md., joint submitted the low bid and we awarded the job as prime contractor.

Suppliers of major equipment wer Barminutor - Chicago Pump; Gr Collector, Primary Clarifier and Fin Clarifier - Link-Belt; Mechanic Aerators - Envirex; Digester Cover Sludge Heater and complete mixin system- P.F.T.; Vacuum Filter, Flot tion Thickener - Envirex; Instrument tion and Chlorination - Wallace Tiernan.

Subcontractors & Suppliers

Armco Steel Corp., Richmond, sluic gates; Pomona Pipe Product Greensboro, N.C., clay pipe; Lynchbu Foundry, Lynchburg, cast iron pip Falwell Excavating Co., Inc Lynchburg, clearing, grading excavation; Pendleton Constructio Corp., Wytheville, ready mix concret Rowland Electric Co., Inc., Mario electrical work; Montague-Betts Co Lynchburg, reinforcing steel; Norther Iron Works, Bethayres, Pa., misce laneous metal; Trimble Co., doors; W liamson & Wilmer, Richmond, hoist DeZurick, plug valves; Valley Air Co ditioning Corp., Roanoke, HVA Allis-Chalmers (through American P lution Control, Richmond), centrifug wastewater pumps; Marlow (throu Haywood Inc., Charlotte, N.C.), positi displacement sludge pumps; Moyn progressive cavity sludge pumps; a Borg-Warner, variable speed drives.

Container Control Center

(From page 33)

orth side provides police protection nd inspection of empty containers. etween the entrance roadway and the spection booths are three 70-ton cales with scale houses for recording he weights of the container boxes and rucks as they move into the area. Tare eights are made at the point of entry nd this information is moved through he inspection area with the truck.

The next phase of construction cluded removal of the temporary olice gate house and the installation of new gate house for break bulk ontrol. Included in this phase was a ilet facility for the truckers adjacent the inspection area.

The final phase of construction cluded landscaping of the berm, sing over 3,000 wax myrtles, and the anting of trees along the terminal oulevard main entrance.

The terminal is thus supplied with a pleasing and impressive entrance, and a Container Control Center which expedites the smooth flow of an extremely complex system of traffic and paper work, enabling NIT to maintain the rapid pace established for its pier and storage areas.

Subcontractors & Suppliers
(Norfolk firms unless noted)

Ames & Webb, Inc., excavating & paving; Welch Pile Driving Corp., Suffolk, piling; Greenbrier Farms, Ltd., Chesapeake, landscaping contractor; Century Conctrete, Va. Beach, foundations & concrete contractor; Lone Star Industries, Inc., concrete supplier; Hudson Masonry Co., Va. Beach, mortar; Chesapeake Steel, Inc., steel erection; Elliot & Co., Inc., millwork; and Fett Roofing, Va. Beach, built-up roof, other roofing & roof insulation.

Also, Walker & Laberge Co., Inc., glazing contractor, metal doors & frames, windows, window wall & storefront; Door Engineering Corp., hardware supplier; A. C. Gordon & Co., Inc., Va. Beach, plaster contractor; Ferrell Linoleum & Tile Co., Inc., structural (glazed) tile; Manson & Utley, Inc., acoustical treatment; Grover L. White, Inc., resilient tile; J. H. Steen & Sons, Inc., Portsmouth, painting contractor; E. Caligari & Son, Inc., specialties; Dover Elevator Co., elevators; Aircon Ltd., plumbing fixture supplier/contractor; Sheet Metal Specialty Co., Va. Beach, heating/ventilating/air conditioning contractor; and Austin Electric Co., electrical contractor.

Travelers' Guide

'To Everything There is a Season'

(From page 5)

and, when we were drawn in 2½ years later, American industry was converted into a gigantic effort for producing the materiels of war at a cost of $300,000,000,000 which raised the national debt to $247,000,000,000. It was with this spread of national wealth that the South *began* to partake of U. S. prosperity. Wages and per capita wealth were still lower than in other sections, less was spent on education and pockets remained of sub-sustinance livelihoods. But the people as a whole began to look ahead in a drift away from "the war" as an excuse for all regional shortcomings.

Some while after World War II, the shift began of populations and industries to what became called the "Sunbelt." This new belt of growth, which began in the West with Southern California and Arizona, contained regions which had never been a part of the Confederacy or The South, and swinging along the lower South and up the Atlantic to about North Carolina, did not contain such a state as Virginia, the battleground in the Civil War and the first Southern state as well as the first English-speaking settlement in North America.

The reasons for the migration to the sunshine states are fairly obvious. The most obvious and the least mentioned was the coming of air conditioning. This not only removed lassitude from workers during the long, hot summers, but gave inhabitants a pleasant relief from the smothering and frequently damp heat. Also, for industries specifically, the labor was cheaper and freer from the demands and disruptions of unions. As an intangible, Americans have always been a migratory people, moving first west of the Alleghenies, and then successive waves westward ended at the Pacific Ocean.

As part of this, Americans as a whole care little for old places, though the love to drive around in new cars t purchase antiques from old houses houses converted into antique shops places passed by time and ceasele movement. The country is so litter with abandoned, decaying building that societies for the preservation America's past seek to reclaim tho that are reclaimable, more as reli than for serving any useful prese purpose.

Now, in the *Saturday Review* articl Mr. Sutton writes of efforts in t Northeast and Midwest to see government aid in halting th newfound Sunbelt prosperity, whic they claim comes at a cost to t prosperity to which these on dominant regions have long bee accustomed. In a large conferen called in Washington, a major face-o occurred between New York Senat Daniel Patrick Moynihan and Georg Governor George Busbee, both whom warned of the dangers politicizing regional growth and ea declared himself "agin" it.

Moynihan, who is justly admired f his brilliant mind and off-the-cu rhetoric, made the point that t Northeastern states' traditional "eth of collective provisionism . . . which our time is associated with the activi national liberalism of the New Dea . . . resulted in a "considerable transf of resources from [Roosevelt's regio . . . to the South and West." Then propounds the question: "Wh happens to this tradition of nation liberalism if it turns out, t generations later, that while the Sou was willing to accept the resources the North to get it going, it has intention to reciprocate now that t Northeast is in need?"

I suppose a Southerner's honest re would be that since the "resources the North" were used to devastate a impoverish the region more than century ago, and that during its years of scorned neglect it saw nothi of the Northeastern "ethic of collect provisionism," the Northeast shou now struggle along as the South h struggled. But that would be the kind regional confrontation of which over we already have too much in the wh conglomerate of regions and separ interests.

I do think the rim of the Sunbelt (necessarily the South) has benefit from the transfer of milit installations, about which Moynihan quite bitter; but I'm not sure he's i sound position in predicting calamity that would follow the loss "the liberalism that the Northeast g the nation." For that liberalism is least in part responsible for the pligh

loynihan's native New York City hose impending bankruptcy he feels would be to the Northeast what herman's march was to the South."

For the Senator's sadness over the ecay and approaching collapse of New ork, I have only sympathy. Although I xperienced the magic of New York in y young and early middle years when was the world's greatest city, such are s changes that I've not visited there for n years and never expect or desire to o again. The same is true of countless hers, including many native-born ew Yorkers. With never a though of nbelts, they simply got *out*. Many ent no further than nearby counties in ew York state or Connecticut or rthern New Jersey.

In the many reasons for the passing of wer from a community, the Liberals d their part in the decline of New ork (as with other cities) by nouncing the lot of blacks in the cist-bound South, and by implication ld out promises of a land of milk and oney. In New York, vast areas of the y once occupied by middle-class and pper middle-class families have come ever-spreading ghettoes of acks and Hispanics, most of whom ve no marketable skills in an tensely competitive metropolis. Since ey came with high expectations, any, thoroughly dislocated in an alien rld to which they have neither loyalty r responsibility, turned to street-imes against persons. Many more bsisted on welfare, whose financial t-go replaced the incomes of the rmer occupants who have fled.

Yet the Liberals, abetted by greedy, nscrupulous fellow-townsmen, have in tdoing even the lunatic practices of e economically retarded members of ngress, spent prodigiously of what ey did not have. In the early wild days stock manipulation, "Uncle" Dan'l rew lost heavily when he sold short ck that he did not own. Of his saster he wrote, "He who sells what n't his'n, must make it up or go to ison." This can be changed to read, Those who spend what isn't theirs, ust take the consequences — or their irs."

What is happening in New York and any other old cities, not all in the rtheast or Midwest, is not caused rtainly not directly) by the rise of the -called Sunbelt. In a probably reversible drift, the great, old cities as have known them belong to the past do the once thriving mining towns, or e once boisterous "cowtowns" where e trail drives met the new railroads, or en some of the railroad towns emselves. What Senator Moynihan is ally talking about is power. The oud Northeast, never considering wer's concentrations and shifts, its transient glory and its decline, never conceived of the possible transitoriness of its own power. They want the clock turned back.

Going back 2,400 years, Athens in its brief glory introduced philosophers who are unsurpassed for their influence on Western thought, produced three of the four world's greatest writers of dramatic tragedy and, in Thucydides, one of the world's first and most enduring military-social historians: these few of Athens' many artists and thinkers achieved in an atmosphere of physical beauty which is still revered, whose city-state boasted a powerful navy and whose army, surprisingly, defeated the Persians. And with all this achievement, the human spirit rose as high as ever in history, with any differences amongst the people far in the background, and it could be truly said, "Joy was it at that season but to live."

What could happen in little more than one century to bring down this paradise? Athens was brought down by the human trait which the Greeks most hated: the arrogance of the consciousness of power. Observing this change in the Athenians, with their new will to impose their power on a weaker people whom they might injure or ruin, Thucydides, himself a former soldier, wrote, "the cause of all these evils was the desire for power which agreed and ambition inspire." Among these evils was the change in the meaning of

words, where deceit was praised as shrewdness and such traits as moderation and generosity were regarded as weakness. "That good will which is the chief element in a noble nature was laughed out of court and vanished. Every man distrusted every other man."

Edith Hamilton, in her *The Greek Way*, sums this up: "That was where the race for power brought the Athenians in the end."

Now, it seems to me, America is heading in the same direction. It probably started with the *hubris* following the power ruthlessly applied by Sherman (who had no interest in slavery one way or the other and rather disliked Negroes) and others in bringing ruin to a weaker people. The "good ole boys" from Georgia did not need come to Washington for any revenge for Sherman. Sherman and those like him (such as Sheridan the proud devastator of personal property in Virginia) carried with them the seeds of nature's revenge for power cruelly used in callous arrogance.

Because the country was so rich in natural resources and so advanced in the technologies of mass industrial production, the nation became an international power — for one brief moment *the* international power — despite the erosion of its character and the declining caliber of persons running the government. By the time Carter came along as candidate for the Democratic presidential nominee, he got the jump and the early publicity on a generally uninspiring field of rivals. In the presidential election he squeezed by poor, bumbling Ford about whom the best that could be said was that he was a decent man and whose own campaign suffered from the goring inflicted by Reagan's power-driven slashings.

However, as in a poor year of 3-year-old thoroughbreds, the winner of the big stake races becomes the "champion," so Carter and his cohorts became the "leaders." He might not have fared so badly except for the empty, and empty-headed, promises delivered in the piety of his "born again" Christianity. (Who were his heroes before his resurrection? — Attilla the Hun and Al Capone?) Then, in his jump from Cabbageville, he essayed to lead the world, or manipulate it, while palming off his ailing country with the incoherant variety of verbal programs.

For the moral leadership a president should give in contrast to the Trading Post of Congress — votes exchanged for favorite projects and all possible protection given to cheaters, liars, thieves, and blatant grabbers of power for their sakes — Carter should not b seen as a Georgian in an alien worl Truly he is the product of a nati which, founded on the arrogance power and ignorance of itself, is n fumbling along, like New York Cit with apparently unmanageab problems. The difference is that t U.S. can print money — at least for time.

Wars are bad things, as t Athenians discovered in the 5th centu B.C. and as the South discovered a lit more than one century ago. Now, 1 years later, the U.S. has discovered t subtler, long-range meaning Sherman's famous, "War is hell." Vietnam, the U.S. not only failed of objective at the cost of fateful nation divisiveness, not only suffered in wo prestige, but, more ominously, suffer in confidence and the image of invin ble power.

What is happening now in t Sunbelt-Frostbelt controversy, is a m tick in time to all that can happen in t U.S. and to its position in the world. one can foresee what America will b physically and spiritually, in the ye 2,000, but even to last that long in a semblance of the nation we ha known, there'll have to be some chang made.

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