A NEW ERA IN DREDGING IN THE USA

BY

WILLIAM R. MURDEN

CHIEF, DREDGING DIVISION

WATER RESOURCES SUPPORT CENTER

U. S. ARMY CORPS OF ENGINEERS

TODAY I WILL BE DISCUSSING THE WATER RESOURCES DEVELOPMENT ACT OF 1986 AND SOME OF THE BENEFICIAL USES OF DREDGED MATERIAL WHICH I BELIEVE ARE ENVIRONMENTALLY ACCEPTABLE AND WHICH HAVE ECONOMICAL APPLICATIONS. BEFORE ADDRESSING THESE TOPICS, I WILL QUICKLY SUMMARIZE THE MAJOR FACETS OF OUR ANNUAL MAINTENANCE DREDGING PROGRAM. THE PROGRAM IS LARGE -- IT INVOLVES THE EXCAVATION OF ABOUT 285 MILLION CUBIC YARDS (MCY) OF MATERIAL AT A COST OF OVER $400 MILLION. OUR ANNUAL MAINTENANCE DREDGING ACTIVITIES ARE CONDUCTED ON PORTIONS OF THE 25,000 MILES OF WATERWAYS CONSTRUCTED BY THE CORPS OVER AN EXTENDED PERIOD.

THE DREDGING PROGRAM IS ALSO VERY IMPORTANT TO THE REGIONAL AND NATIONAL ECONOMIES. THE NAVIGATION CHANNELS WE DREDGE SERVE 400 PORTS, WHICH HANDLE ALMOST TWO BILLION TONS OF COMMERCE A YEAR, AND THE FOREIGN TRADE HANDLED THROUGH THESE PORTS ACCOUNTS FOR ONE OUT OF EVERY FIVE JOBS IN THE U. S. THE WATERWAY SYSTEM

SERVES 130 OF THE NATION'S 150 LARGEST CITIES AND IS THE CONDUIT FOR 1/6TH OF THE NATION'S INTER-CITY FREIGHT. THE WATERWAY SYSTEM IS VITAL TO THE FLOW OF DOMESTIC AND FOREIGN COMMERCE BECAUSE IT OFFERS THE CHEAPEST AND MOST ENERGY EFFICIENT TRANSPORT MODE FOR SUCH BULK CARGOES AS COAL, GRAIN, PETROLEUM PRODUCTS, CHEMICALS, IRON AND STEEL. IN ADDITION, THE WATERWAY SYSTEM HAS PROVED TO BE OF GREAT IMPORTANCE TO OUR DEFENSE EFFORTS IN THE PAST AND IS AN ESSENTIAL ELEMENT OF OUR CURRENT MOBILIZATION READINESS POSTURE.

IT HAS BEEN A LONG DRY SPELL IN THE DREDGING FIELD BECAUSE ONLY TWO LIMITED WATER RESOURCES ACTS, 1974 AND 1976, WERE PASSED BY THE CONGRESS DURING THE PAST SIXTEEN YEARS OR SO. I BELIEVE THE PRIMARY REASONS FOR THE LIMITED NUMBER OF AUTHORIZATIONS WERE APPREHENSIONS OVER POSSIBLE DETRIMENTAL EFFECTS TO THE ENVIRONMENT AND DIFFERENCES OF OPINION OVER COST SHARING FORMULAS. CONSEQUENTLY, THE ANNUAL VOLUME OF IMPROVEMENT DREDGING YARDAGE HAS BEEN QUITE SMALL FOR A LONG TIME, WHILE THE ANNUAL MAINTENANCE YARDAGE HAS BEEN RELATIVELY STATIC. THIS SITUATION HAS RESULTED IN A DIFFICULT PERIOD FOR THE DREDGING INDUSTRY DURING WHICH THE ANNUAL USAGE OF INDUSTRY PLANT HAS BEEN AT OR LESS THAN 50 PERCENT. AS A RESULT, MANY FIRMS DID NOT WEATHER THE STORM AND HAVE GONE OF BUSINESS.

THE RECENT PASSAGE OF THE WATER RESOURCES DEVELOPMENT ACT OF 1986 IS RESULTING IN A DRAMATIC AND RAPID INCREASE IN THE SCOPE OF THE NATIONAL DREDGING PROGRAM MANAGED BY THE CORPS. WHILE OUR EXPERIENCE WITH THE IMPLEMENTATION OF THE NEW LEGISLATION IS LIMITED, IT APPEARS TO ME THAT THE PORTS AND WATERWAYS ASPECTS OF PL 99-662 WILL RESULT IN AN EXPENDITURE OF ABOUT $850 MILLION FOR IMPROVEMENT DREDGING OVER THE NEXT FOUR YEARS AND AN ESTIMATED TOTAL EXPENDITURE OF ABOUT $2 BILLION OVER A 10-YEAR PERIOD. SO, WE ESTIMATE THAT IN THE NEAR TERM, THE NEXT THREE TO FIVE YEARS, THAT OUR ANNUAL DREDGING PROGRAM EXPENDITURES WILL BE INCREASED BY AT LEAST 50 PERCENT.

AFTER WAITING FOR THE NEW LEGISLATION FOR SUCH A LONG TIME, THERE IS A TENDENCY FOR OUR DISTRICTS AND THE STATE OFFICIALS TO GET THE PORT IMPROVEMENT SHOW ON THE ROAD AT ONCE AND TO SCHEDULE MOST OF THE WORK AND FUNDS UP FRONT. WE CAN UNDERSTAND THIS ATTITUDE. HOWEVER, FROM A NATIONAL VIEWPOINT, WE MUST CAREFULLY ASSESS THE AVAILABILITY OF THE FUNDING -- BOTH FEDERAL AND STATE, THE TYPES AND NUMBERS OF EQUIPMENT THAT ARE AVAILABLE VERSUS THOSE WHICH WILL BE NEEDED, AND THE ABILITIES OF THE PORTS TO FULLY UTILIZE OR BENEFIT FROM THE IMPROVED CHANNEL DIMENSIONS. IN ADDITION, WE NEED TO SCHEDULE THE WORK SO THAT WE DO NOT HAVE MULTIPLE BIDS BEING

OPENED WITHIN A FEW DAYS OF EACH OTHER, OR WORSE YET, ON THE SAME DAY AT DIFFERENT LOCATIONS. AS WE PREPARE OUR BIDDING SCHEDULES, WE ALSO CONSIDER THE NAVY HOMEPORT DREDGING REQUIREMENTS TO AVOID CONFLICTING CONSTRUCTION SCHEDULES.

WE FEEL THAT A NATIONAL MANAGEMENT PLAN FOR DREDGING IS VERY IMPORTANT BECAUSE THE IMPROVEMENT AND MAINTENANCE DREDGING PROJECTS ARE LOCATED OVER A WIDE GEOGRAPHIC REGION, PERFORMANCE BONDING FOR LARGE SCALE DEEPENING PROJECTS CAN BE A PROBLEM FOR THE DREDGING FIRMS, AND EQUIPMENT AVAILABILITY IS IMPACTED BY THE MAGNITUDE OF THE IMPROVEMENT WORK AND BY THE TIME INTERVAL BETWEEN BID SUBMISSIONS. THE ASSISTANT SECRETARY OF THE ARMY FOR CIVIL WORKS HAS REQUESTED THAT WE PREPARE A FIVE-YEAR PROGRAM FOR ALL TYPES OF DREDGING. THE PROGRAM WILL INCLUDE CORPS MAINTENANCE, IMPROVEMENT WORK UNDER PL 99-662, THE MAINTENANCE WE PERFORM FOR THE NAVY, MAINTENANCE DREDGING THE NAVY DOES ITSELF, AND LASTLY, THE LARGE DREDGING ACTIVITIES ASSOCIATED WITH THE NAVY HOMEPORTING PLAN WHICH INCLUDES PORTS ON ALL THE COASTS OF THE U. S.

TO THE SURPRISE OF MANY, INCLUDING OURSELVES, WE HAVE MOVED AHEAD RATHER QUICKLY IN GETTING THE NAVIGATION IMPROVEMENT PROJECTS UNDERWAY, KEEPING IN

MIND THAT ONLY A SMALL VOLUME OF IMPROVEMENT DREDGING HAS BEEN PERFORMED AT OUR PORTS SINCE WORLD WAR II. WE AND THE PORT OFFICIALS AROUND THE COUNTRY ARE WELL AWARE OF THE FACT THAT THE WATER RESOURCES ACT OF 1986 INCLUDES A "SUNSET" CLAUSE WHICH PROVIDES A "START ALL OVER AGAIN" STATUS FOR THE NEW STARTS AND STUDIES WHICH DO NOT GET UNDERWAY WITHIN FIVE YEARS OF THE ENACTMENT DATE (NOVEMBER 17, 1986).

AT BALTIMORE, WE HAVE THREE CONTRACTS IN PLACE, AND THE DREDGING TO PROVIDE A 50-FOOT DEPTH RATHER THAN A 45-FOOT DEPTH HAS BEEN IN PROGRESS FOR SOME TIME. THE WORK IS BEING PERFORMED AT THE BALTIMORE INNER HARBOR CHANNEL BY BUCKET DREDGES AND HOPPER BARGES WITH ALL OF THE MATERIAL (14.7 MCY) BEING PUMPED INTO THE HART/MILLER ISLAND CONTAINED DISPOSAL FACILITY. THE CONTRACT AMOUNT FOR THIS WORK IS $53.9 MILLION. WORK IS ALSO UNDERWAY ON THE RAPPAHANNOCK (5.0 MCY) AND YORK SPIT (5.1 MCY) CHANNELS USING HOPPER DREDGES. THE CONTRACT AMOUNTS FOR THESE TWO BALTIMORE HARBOR CHANNELS, LOCATED IN THE SOUTHERN SECTION OF CHESAPEAKE BAY, ARE $4.6 MILLION AND $9.3 MILLION, RESPECTIVELY. VARIOUS CHANNEL WIDTHS, WHICH ARE LESS THAN OUR DESIGN MEMO WIDTH OF 1,000 FEET, ARE BEING USED IN THE PHASE I DEEPENING OF THE BALTIMORE HARBOR NAVIGATION PROJECT.

AT NORFOLK HARBOR, A CONTRACT HAS BEEN IN PLACE FOR THE THIMBLE SHOAL ENTRANCE CHANNEL SINCE MARCH. PHASE I OF THE NORFOLK PROJECT PROVIDES FOR DEEPENING THE OUTBOUND CHANNEL WIDTH TO 50 FEET RATHER THAN TO THE DESIGN MEMO DEPTH OF 55 FEET. 3.6 MCY ARE BEING EXCAVATED FROM THE THIMBLE SHOAL CHANNEL AT A COST OF $6.8 MILLION. THE INDUSTRY IS USING BUCKET DREDGES AND HOPPER BARGES ALONG WITH HOPPER DREDGES ON THIS PROJECT. HOPPER DREDGES ARE BEING UTILIZED SO THAT WORK CAN CONTINUE DURING PERIODS WHEN LARGE WAVES PRECLUDE THE USE OF THE BUCKET DREDGES AND HOPPER BARGES. NOW THAT THE ENTRANCE CHANNEL SECTION OF THE PROJECT IS WELL UNDERWAY, THE NORFOLK DISTRICT HAS MOVED AHEAD WITH THE NECESSARY ARRANGEMENTS TO DEEPEN THE OUTBOUND CHANNEL OF THE INNER HARBOR (ELIZABETH RIVER) SECTION OF THE PROJECT. A CONTRACT FOR THIS WORK WAS RECENTLY AWARDED IN THE AMOUNT OF $3.5 MILLION TO EXCAVATE 2.7 MCY OF MATERIAL. CUTTERHEAD EQUIPMENT WILL BE USED ON THIS WORK WITH ALL OF THE MATERIAL DEPOSITED IN THE CRANEY ISLAND DISPOSAL AREA.

AT KINGS BAY, GEORGIA, WE HAVE AWARDED THREE CONTRACTS. THE FIRST IS FOR $3.2 MILLION TO EXCAVATE 900,000 CUBIC YARDS FROM THE BAY CHANNEL SECTION OF THIS NAVIGATION PROJECT. A DEPTH OF 51 FEET IS BEING PROVIDED TO ACCOMMODATE TRIDENT SUBMARINES, WHICH ARE

SCHEDULED TO ARRIVE AT THE PROJECT ABOUT A YEAR FROM NOW. THE WORK IS BEING PERFORMED BY CUTTERHEAD DREDGES AND ALL OF THE MATERIAL IS BEING PUMPED THROUGH PIPELINES TO NOURISH LOCAL BEACHES.

THE SECOND CONTRACT AT KINGS BAY IS FOR $15.9 MILLION TO EXCAVATE 5.6 MCY FROM A SECTION OF THE ENTRANCE CHANNEL OF THE PROJECT. CUTTERHEAD DREDGES, SUPPLEMENTED BY BLASTING IF NECESSARY, WILL BE USED TO EXCAVATE THE ROCK MATERIAL. THE EXCAVATION OF THE UNCOMPACTED MATERIAL IS BEING PERFORMED BY HOPPER DREDGES AND BUCKET DREDGES. THIS MATERIAL WILL THEN BE HAULED TO AN OPEN WATER DISPOSAL AREA LOCATED IN THE ATLANTIC OCEAN. THE CHANNEL DEPTH (51 FEET) IS THE SAME AS IN THE BAY CHANNEL SECTION.

THE THIRD CONTRACT AT KINGS BAY PROVIDES FOR THE EXCAVATION OF 2.2 MCY AT A COST OF $9.6 MILLION. HOPPER DREDGES WILL BE USED TO PERFORM THIS WORK. MOST OF THE MATERIAL WILL BE PLACED IN THE ATLANTIC OCEAN BETWEEN THE DEPTHS OF 18 AND 30 FEET TO PROVIDE FOR A MORE GENTLE UNDERWATER SLOPE OR GRADIENT. THE REMAINING 500,000 CUBIC YARDS WILL BE PUMPED TO A LOCAL BEACH WITH THE FUNDING PROVIDED BY THE STATE OF FLORIDA AND THE NAVY.

FLORIDA IS THE SITE OF STILL ANOTHER CONTRACT AWARDED FOR $1.6 MILLION TO REMOVE 400,000 CUBIC YARDS FROM AN OFFSHORE BORROW AREA TO NOURISH KEY BISCAYNE BEACH. CUTTERHEAD DREDGES ARE BEING USED ON THIS PROJECT.

AT MOBILE HARBOR, ALABAMA, WE RECENTLY AWARDED A CONTRACT FOR THE MAINTENANCE OF THE BAY CHANNEL (10.2 MCY), THE IMPROVEMENT OF THE BAY CHANNEL (13.1 MCY), AND THE IMPROVEMENT OF THE BAR CHANNEL (5.6 MCY) FROM A DEPTH OF 40 FEET TO 45 FEET. THIS CONTRACT FOR $36.3 MILLION WILL INVOLVE THE EXCAVATION OF A TOTAL OF 29.0 MCY. CUTTERHEAD DREDGES WILL BE USED TO EXCAVATE THE MAINTENANCE MATERIAL PUMPING THROUGH RELATIVELY SHORT PIPELINES TO OPEN WATER DISPOSAL AREAS LOCATED INSIDE THE BAY AREA.

THE BAY CHANNEL IMPROVEMENT YARDAGE WILL BE EXCAVATED BY BUCKET DREDGES AND TRANSPORTED AN AVERAGE ONE-WAY HAUL DISTANCE OF 25 MILES BY HOPPER BARGES TO AN OPEN WATER DISPOSAL AREA IN THE GULF OF MEXICO. HOPPER DREDGES WILL BE USED TO EXCAVATE THE BAR CHANNEL IMPROVEMENT MATERIAL AND TRANSPORT IT ABOUT 4 MILES TO AN OPEN WATER DISPOSAL AREA IN THE GULF. ALL OF THE IMPROVEMENT YARDAGE WILL BE USED TO CONSTRUCT A STABLE UNDERWATER BERM, WHICH I WILL DISCUSS FURTHER IN A FEW

MINUTES.

AT THE KILL VAN KULL PROJECT IN NEW YORK, WE HAVE AWARDED A CONTRACT FOR THE EXCAVATION OF 3.2 MCY OF IMPROVEMENT DREDGING MATERIAL AT A COST OF $12.5 MILLION. THE WORK IS BEING PERFORMED BY HOPPER DREDGES AND BUCKET DREDGES LOADING HOPPER BARGES. ALL OF THE MATERIAL IN THIS PROJECT IS BEING TRANSPORTED TO AN OPEN WATER SITE IN THE ATLANTIC OCEAN, WHICH INVOLVES A ONE-WAY HAUL DISTANCE OF 28 MILES.

WE HAVE ALSO AWARDED A CONTRACT FOR DEEPENING THE SOUTHWEST PASS OF THE MISSISSIPPI RIVER SERVING THE PORTS OF NEW ORLEANS AND BATON ROUGE. SOME 9.0 MCY ARE INVOLVED AT A COST OF $5.9 MILLION. THE MAJORITY OF THIS WORK WILL BE PERFORMED BY CUTTERHEAD DREDGES AND THE REMAINDER WILL BE PERFORMED BY HOPPER DREDGE EQUIPMENT. SOME OF THIS MATERIAL WILL BE USED FOR MARSH DEVELOPMENT AND SOME FOR BANK STABILIZATION.

THE MOST RECENT AWARD OF A CONTRACT IS FOR THE DEEPENING OF THE NEWPORT NEWS CHANNEL IN THE HAMPTON ROADS REGION OF NORFOLK, VIRGINIA. 4.7 MCY ARE INVOLVED AT A COST OF $7.9 MILLION.

THE TOTAL YARDAGE FOR THE ABOVE PROJECTS IS 86.1 MCY AND THE TOTAL FEDERAL AND LOCAL SPONSOR FUNDING INVOLVED IS $171.0 MILLION. THIS REPRESENTS A VERY IMPRESSIVE START SINCE THE WATER RESOURCES DEVELOPMENT ACT WAS ENACTED ON NOVEMBER 17, 1987. FOLLOWING ENACTMENT, IT WAS NECESSARY TO EXECUTE LOCAL COOPERATION AGREEMENTS BETWEEN THE CORPS AND THE LOCAL SPONSORS DEFINING FUNDING AND PROCEDURAL ARRANGEMENTS. OTHER PROJECTS WHICH SHOULD BE UNDER CONTRACT THIS FISCAL YEAR OR IN FY 88 INCLUDE COMPLETION OF ADDITIONAL PHASE I DREDGING FOR BALTIMORE HARBOR --INNER HARBOR (14.9 MCY), YORK SPIT (11.4 MCY), AND CAPE HENRY (3.2 MCY); AS WELL AS THE SAVANNAH RIVER WIDENING FROM 400 FEET TO 500 FEET; (1.8 MCY).

THAT IS PROBABLY MORE THAN ENOUGH OF STATISTICS, AND THE PROBLEMS WE FACE IN ADJUSTING TO A RAPIDLY EXPANDING DREDGING PROGRAM. LET ME TURN NOW TO SOME NEW AND EXCITING IDEAS, SUCH AS THE CONSTRUCTION OF UNDERWATER BERMS AND OTHER BENEFICIAL USES OF DREDGED MATERIAL. AT THIS POINT, I WANT TO EMPHASIZE THAT THESE CONCEPTS ARE NOT INTENDED TO ELIMINATE BEACH NOURISHMENT AS A VIABLE OPTION. BEACH NOURISHMENT PROCEDURES HAVE BEEN IMPLEMENTED SUCCESSFULLY MANY TIMES IN THE PAST BY THE CORPS AND OTHERS AND SHOULD BE CONSIDERED IN THE FUTURE. THE BERM CONCEPTS ARE ADDITIONAL OPTIONS AND

ARE NOT TO BE CONSIDERED AS REPLACEMENTS FOR THE BEACH NOURISHMENT OPTION.

BECAUSE THE NATIONAL DREDGING PROGRAM INVOLVES THE EXCAVATION OF SUCH A LARGE VOLUME OF MATERIAL EACH YEAR, WE ARE CONSTANTLY SEEKING NEW AND INNOVATIVE WAYS TO ACCOMPLISH OUR MISSION MORE COST EFFECTIVELY AND IN AN ENVIRONMENTALLY RESPONSIBLE MANNER. THE UNDERWATER BERM CONCEPT PROVIDES A UNIQUE AND BENEFICIAL ALTERNATIVE TO THE TRADITIONAL DISPOSAL OF DREDGED MATERIAL BECAUSE ABOUT 90 TO 95 PERCENT OF THE YARDAGE WE EXCAVATE EACH YEAR IS NOT CONTAMINATED.

I BELIEVE THERE ARE TWO VIABLE APPROACHES TO THE CONSTRUCTION OF UNDERWATER BERMS. THE FEEDER BEACH CONCEPT INVOLVES THE PLACEMENT OF BEACH QUALITY SAND IN RELATIVELY SHALLOW WATER, WITH THE EXPECTATION THAT THE MATERIAL WILL MOVE DOWNDRIFT BUT REMAIN IN THE NEARSHORE COASTAL REGIME, THAT IS, IN THE AREA BETWEEN THE SURF ZONE AND THE 30- TO 35-FOOT DEPTH CONTOURS.

THE STABLE BERM CONCEPT INVOLVES THE PLACEMENT OF DREDGED MATERIAL IN DEEPER WATER AREAS, WHICH ARE LESS SUBJECT TO THE EFFECTS OF WAVES AND CURRENTS. THEREFORE, THERE IS THE EXPECTATION THAT MOST OF THE MATERIAL WILL REMAIN IN-PLACE. IN CONTRAST TO THE

FEEDER BERM, A WIDE VARIETY OF DREDGED MATERIAL (SILTS AND FINE GRAINED SAND) CAN BE USED IN THE CONSTRUCTION OF STABLE BERMS.

THE OBJECTIVE OF THE FEEDER PLACEMENT CONCEPT IS TO ADD SAND, WHICH WILL RESULT IN A MORE GENTLE UNDERWATER SLOPE AND, IN TURN, CONTRIBUTE TO A REDUCTION IN THE EROSION EFFECTS ON THE SHORELINE. IN MANY CASES, DREDGING COSTS CAN BE REDUCED USING THE BERM APPROACH BECAUSE THE NEARSHORE DISPOSAL SITES ARE GENERALLY CLOSER TO THE NAVIGATION CHANNELS THAN THE HISTORICAL OFFSHORE SITES.

WE EXPECT THE STABLE UNDERWATER BERM TO BE A RELATIVELY PERMANENT BOTTOM FEATURE THAT WILL TRIP THE INCOMING STORM WAVES AND DISSIPATE THE MAJORITY OF THE WAVE ENERGY -- THUS CONTRIBUTING TO A REDUCTION IN SHORELINE EROSION RATES.

WHY DO WE THINK THAT AN UNDERWATER BERM WILL BE A RELATIVELY PERMANENT BOTTOM FEATURE? IT IS BECAUSE OF A DEMONSTRATION PROJECT WE CONDUCTED SEVERAL YEARS AGO. IN 1982, THE NORFOLK DISTRICT CONDUCTED A PILOT STUDY TO DETERMINE WHETHER MOUNDING COULD BE ACHIEVED BY PLACING MAINTENANCE MATERIAL IN AN OCEAN DISPOSAL SITE. THIS STUDY CLEARLY INDICATED THAT THE HOPPER DREDGES AND

POSITIONING EQUIPMENT ROUTINELY USED BY THE INDUSTRY ARE CAPABLE OF CONSTRUCTING SIGNIFICANT MOUNDS, EVEN WHEN THE MATERIAL IS A MIXTURE OF FIND SAND AND SILT PARTICLES. FURTHERMORE, THE MOUNDS HAVE REMAINED STABLE, DESPITE THREE HURRICANES WHICH HAVE STRUCK THE AREA SINCE THEIR CREATION IN 1982.

BASED ON THE POSITIVE RESULTS OF THE NORFOLK EFFORT, A NATIONAL DEMONSTRATION PROJECT WAS APPROVED IN CONNECTION WITH THE DREDGING OF MOBILE HARBOR. ABOUT 450,000 CY OF MAINTENANCE MATERIAL (SAND) WAS REMOVED FROM THE BAR CHANNEL OF THE MOBILE HARBOR NAVIGATION PROJECT AND PLACED IN 18-19 FEET OF WATER, OFFSHORE OF DAUPHIN ISLAND, TO FORM A FEEDER BERM ABOUT 6 FEET HIGH AND 1 MILE LONG. THE PLACEMENT OF THIS MATERIAL WAS COMPLETED IN FEBRUARY OF THIS YEAR, AND TO DATE, THERE HAS NOT BEEN ANY NEGATIVE REACTION TO THIS FAIRLY LARGE SCALE OPERATION.

I ATTRIBUTE THIS TO THE EXTENSIVE COORDINATION OF THE PLANS TO IMPLEMENT THE BERM CONCEPTS BY THE MOBILE DISTRICT, OUR SOUTH ATLANTIC DIVISION, AND OUR EFFORTS IN WASHINGTON. THE MOBILE HARBOR NAVIGATION PROJECT DOES NOT OFFER THE OPPORTUNITY FOR LARGE SCALE COST SAVINGS THAT EXIST AT SOME OF THE OTHER COASTAL PROJECTS. HOWEVER, THE DISTRICT AND DIVISION STAFF HAVE

SHOWN GREAT ENTHUSIASM AND COMPETENCE IN THE IMPLEMENTATION OF THE PROGRAM, TWO VERY IMPORTANT MANAGEMENT ASPECTS WHEN ADDRESSING NEW CONCEPTS.

THE ENVIRONMENTAL ADVISORY BOARD AND THE COASTAL ENGINEERING RESEARCH BOARD OF THE CHIEF OF ENGINEERS HAVE PREVIOUSLY ENDORSED THE CONCEPTS. IN ADDITION, THE CONCEPTS HAVE BEEN ENDORSED, IN PRINCIPLE, BY THE HEADQUARTERS STAFF OF THE NATIONAL MARINE FISHERIES SERVICE BECAUSE THE STABLE BERM CONFIGURATION WILL BE SIMILAR TO NATURAL UNDERWATER FEATURES THAT ARE ATTRACTIVE TO THE FISH POPULATION. WE HAVE ALSO COORDINATED EXTENSIVELY WITH CONGRESSIONAL INTERESTS, THE LOCAL SPONSOR, AND ENVIRONMENTAL GROUPS TO ENSURE THAT THE CONCEPT IS FULLY UNDERSTOOD. DURING THE COURSE OF THIS COORDINATION, WE HAVE EMPHASIZED THAT THERE IS NO GUARANTEE THAT THE CONCEPTS WILL PROVIDE THE POTENTIAL BENEFITS THAT WE ENVISION. HOWEVER, WE HAVE PROMISED TO THOROUGHLY MONITOR THE CONDITIONS RELATIVE TO BOTH THE FEEDER AND STABLE BERM DEMONSTRATION PROJECTS IN ALABAMA SO THAT, FOR THE FIRST TIME, THE CIRCUMSTANCES RELATIVE TO THE LARGE SCALE IMPLEMENTATION OF THE CONCEPT WILL BE COMPLETELY DOCUMENTED.

THE PLANS AND SPECIFICATIONS FOR PHASE I OF THE DEEPENING OF THE MOBILE HARBOR NAVIGATION PROJECT

PROVIDE FOR THE CONSTRUCTION OF A STABLE BERM ABOUT 3 MILES OFFSHORE OF DAUPHIN ISLAND. THIS WORK WILL BEGIN IN NOVEMBER 1987. THE QUANTITY OF MATERIAL INVOLVED IS 18.7 MCY. THE STABLE BERM WILL BE LOCATED IN 40 TO 42 FEET OF WATER NEAR THE EASTERN LIMIT OF THE EPA DESIGNATED DISPOSAL AREA LOCATED IN THE GULF OF MEXICO. THE COMPLETED BERM WILL BE ABOUT 1/2 MILE WIDE AND 2 1/2 MILES LONG.

PHASE I OF THE DEEPENING PROJECT CONSISTS OF DEEPENING THE EXISTING CHANNEL THROUGH THE BAY AND THE BAR CHANNEL FROM 42 TO 45 FEET OVER A TOTAL DISTANCE OF 36 MILES.

IN ORDER TO VERIFY THE POTENTIAL BENEFITS OF THE BERM CONCEPT, IT IS NECESSARY TO FULLY DOCUMENT THE PHYSICAL AND BIOLOGICAL ENVIRONMENTAL CONDITIONS BEFORE, DURING, AND AFTER CONSTRUCTION OF THE BERMS. WE SPECIFICALLY WANT TO KNOW WHAT HAPPENS TO THE BERMS, WHY DOES IT HAPPEN, AND DOES IT PRODUCE BENEFITS?

THE MONITORING IS A JOINT EFFORT BETWEEN THE MOBILE DISTRICT AND THE COASTAL ENGINEERING RESEARCH CENTER. MONITORING OF BASE LINE CONDITIONS FOR THE FEEDER BERM WAS INITIATED IN DECEMBER 1986, AND MONITORING WILL CONTINUE THROUGH DECEMBER 1988. BASE LINE DATA

COLLECTION FOR THE STABLE BERM WAS INITIATED IN MAY OF THIS YEAR, AND IS SCHEDULED TO CONTINUE THROUGH FY 90.

THE MONITORING TECHNIQUES APPLY, IN GENERAL, TO BOTH THE FEEDER AND STABLE BERMS. IN THE CASE OF THE FEEDER BERM, WE EXPECT THE MATERIAL TO MOVE DOWNDRIFT, AND WE WILL BE MONITORING THE EXTENT OF ITS MOVEMENT. WE EXPECT THE OFFSHORE BERM TO REMAIN STABLE, AND WE WILL BE DOCUMENTING WHETHER THIS IS THE CASE OR NOT.

WE WILL USE A VARIETY OF MONITORING TECHNIQUES TO DOCUMENT THE BEHAVIOR OF THE BERMS. FATHOMETER SURVEYS WILL BE USED TO MEASURE BERM ELEVATIONS AND SIDE SCAN SONAR WILL BE USED TO HELP DEFINE THE BOUNDARIES OF THE BERMS.

WE WILL BE TAKING GRAB SAMPLES OF THE MATERIAL WE PLACE IN THE BERMS IN ORDER TO TRACK SEDIMENT MOVEMENT. IN ADDITION, DIVERS WILL BE TAKING CORE SAMPLES, SO THAT WE CAN ASSESS THE DEGREE OF CONSOLIDATION OF THE STABLE BERM MATERIAL.

WE WILL BE MEASURING THE PHYSICAL FORCES SUCH AS WAVES AND CURRENTS THAT ACT ON THE BERMS. THE BOTTOM CURRENTS WILL BE TRACKED USING SEA BED DRIFTERS. WE

WILL ALSO MEASURE THE WAVE CLIMATE IN THE VICINITY OF THE BERMS, SINCE WAVES ARE THE PRINCIPAL FORCE AFFECTING SEDIMENT MOVEMENT IN THE COASTAL ZONE.

WE PLAN TO USE BOTH AERIAL PHOTOGRAPHY AND SATELLITE IMAGERY TO MEASURE ANY LARGE-SCALE MOVEMENT OF THE BERM MATERIAL CAUSED BY STORMS, AND TO DETECT ANY TURBIDITY PLUMES THAT MAY DEVELOP ON THE STABLE BERM.

FINALLY, WE WILL BE EVALUATING THE EFFECTS OF THE STABLE BERM ON FISHERIES BY CONDUCTING DIVER INVENTORIES OF KEY FISH SPECIES. TRAWLING WILL ALSO BE CONDUCTED TO INVENTORY JUVENILES OF THESE SPECIES.

KNOWLEDGE GAINED THROUGH THE NATIONAL DEMONSTRATION AT MOBILE WILL BE TRANSFERRED TO OTHER DREDGING PROJECTS THROUGH OUR NEW DREDGING RESEARCH PROGRAM SCHEDULED TO BE INITIATED IN FY 88. THIS IS AN APPLIED R&D PROGRAM THAT ADDRESSES THE EFFICIENCY OF DREDGING OPERATIONS AND EQUIPMENT AND THEREBY RESULT IN SOME COST REDUCTIONS.

MAINTENANCE DREDGING FUNDS IN THE AMOUNT OF $495.000 ARE BEING PROVIDED TO SUPPORT MONITORING OF THE FEEDER BERM.

MONITORING OF THE STABLE BERM WILL OCCUR OVER

FISCAL YEARS 1987 THROUGH 1990 AT A TOTAL ESTIMATED COST OF $1,450,000. THE MAJORITY OF THE BERM MONITORING COSTS, $1,050,000, WILL BE PROVIDED FROM CONSTRUCTION FUNDING. $400,000 WILL BE FUNDED UNDER OUR MAINTENANCE DREDGING APPROPRIATION. THE BASIS FOR THIS FUNDING DISTRIBUTION IS THAT THIS CONCEPT WILL RESULT IN FUTURE BENEFITS TO BOTH THE DEEPENING AND MAINTENANCE DREDGING PROJECTS.

AS WITH ANY BENEFICIAL USE CONCEPT, UNCONTAMINATED DREDGED MATERIAL SHOULD BE CONSIDERED A VALUABLE RESOURCE RATHER THAN A WASTE PRODUCT. IN SUMMARY, THE POTENTIAL BENEFITS OF THE UNDERWATER BERM CONCEPTS INCLUDE -- DECREASED COSTS, DECREASED SHORELINE EROSION, AND AN ENHANCED FISHERY HABITAT. WE BELIEVE THAT THE RESULTS FROM THE NATIONAL DEMONSTRATION AT MOBILE WILL APPLY TO MANY NAVIGATION PROJECTS ACROSS THE USA.

LET ME TURN NOW TO TWO OTHER TYPES OF BENEFICIAL USES OF DREDGED MATERIAL WHICH I BELIEVE ARE APPLICABLE TO THE TIDEWATER AREA.

THERE ARE MANY DESIGNATED OYSTER GROUND AREAS IN CHESAPEAKE BAY WHICH HAVE BECOME UNPRODUCTIVE. IT APPEARS TO US THAT ONE OF THE REASONS THAT THESE OYSTER GROUNDS ARE NOT PRODUCTIVE IS THAT WHEN THE OYSTER

SHELLS OR CULCHES ARE SEEDED THEY SINK THROUGH A SILT LAYER AND ARE BURIED TO A DEPTH WHICH PRECLUDES THE SPATS REACHING THE SHELLS. IN ORDER TO CORRECT THIS PROBLEM, OUR BALTIMORE DISTRICT, IN CONJUNCTION WITH THE DEPARTMENT OF NATURAL RESOURCES OF THE STATE OF MARYLAND, DEVELOPED A PLAN TO CREATE AN UNDERWATER MOUND USING DREDGED MATERIAL. THE MOUND PROTRUDES ABOVE THE SILT LAYER ON THE BOTTOM.

A DEMONSTRATION PROJECT TO EVALUATE THE ABOVE PREMISE IS UNDERWAY AT SLAUGHTER CREEK, LOCATED IN DORCHESTER COUNTY, MARYLAND. WE REFER TO THIS EFFORT AS THE "SHELLFISH HABITAT DEVELOPMENT PROJECT," WHICH DOES NOT LEND ITSELF TO THE USE OF AN ACRONYM THAT WE ARE SO PARTIAL TO IN THE WASHINGTON, D. C., AREA. THIS IS A CHART SHOWING THE NAVIGATION CHANNEL, THE PREVIOUSLY USED UPLAND CONTAINED DISPOSAL SITE, AND THE DORMANT OYSTER GROUND.

WE RECENTLY REMOVED ABOUT 14,000 CUBIC YARDS OF MATERIAL FROM THE NAVIGATION CHANNEL USING A SMALL CUTTERHEAD DREDGE AND PLACED THE MATERIAL IN AN AREA OF JUST OVER TWO ACRES WITHIN THE 100 ACRES OF THE DESIGNATED OYSTER GROUND. THE MATERIAL IS COMPOSED OF ABOUT 60 PERCENT SAND AND ABOUT 40 PERCENT SILT, SO WE FEEL THE SPECIFIC GRAVITY OF THE UNDERWATER BERM WILL BE

SUFFICIENT TO SUPPORT THE OYSTER SHELLS THAT ARE PLACED ON THE MOUND.

IN ORDER TO MINIMIZE DISPERSION DURING THE PLACEMENT OF THE DREDGED MATERIAL, WE USED A DIFFUSER LOCATED UNDERWATER AT THE EXTREMITY OF THE DREDGE DISCHARGE PIPELINE. WE DEVELOPED THE DIFFUSER SOME YEARS AGO AND IT ACTS SOMEWHAT LIKE A HYDROCLONE. THE AVERAGE WATER DEPTH AT THE SITE IS 14 FEET AND THE TOP OF THE MOUND IS ABOUT 8 FEET DEEP. THE SEEDED OYSTER SHELL CAP HAS A THICKNESS OF ABOUT 8 INCHES.

IN THE PAST, WE HAVE PLACED THE DREDGED MATERIAL AT A COST OF $153,000 IN AN UPLAND CONTAINED DISPOSAL AREA OF ABOUT 10 ACRES. WE ESTIMATE THAT THE TOTAL COST OF THE DEMONSTRATION PROJECT WILL BE $90,000 WHICH REPRESENTS A COST REDUCTION OF ABOUT 42 PERCENT, A SIGNIFICANT AMOUNT.

A GREAT DEAL OF CREDIT IS DUE OUR BALTIMORE DISTRICT AND NORTH ATLANTIC DIVISION STAFFS. THEY AGREED TO UNDERTAKE THE DEMONSTRATION PROJECT AS AN "OTHER DUTIES AS ASSIGNED" PROJECT WHILE ADDRESSING AN EXISTING LARGE SCALE WORKLOAD. THEY ALSO TOOK THE CONSIDERABLE TIME REQUIRED TO FULLY COORDINATE OUR PLANS WITH ALL OF THE ENVIRONMENTAL GROUPS AND ORGANIZATIONS.

THE STAFF OF THE STATE OF MARYLAND DESERVES CONSIDERABLE CREDIT ALSO. IN ADDITION TO ENDORSING THE CONCEPT, THE STATE IS OFFSETTING THE CORPS EXPENDITURE BY DISTRIBUTING THE CULCHES OR SHELLS AND ALSO BY CONDUCTING SHELL DEPTH AND SPAT SURVEYS.

WE DO NOT KNOW WHETHER THIS PROJECT WILL SUCCEED OR NOT. HOWEVER, I BELIEVE THERE IS A HIGH POTENTIAL FOR SUCCESS. IN ABOUT SIX MONTHS, WE WILL BE ABLE TO SUMMARIZE THE RESULTS, SO WE WILL SOON KNOW WHETHER WE HAVE A "WINNER" OR NOT.

NOW, LET'S HAVE A LOOK AT ANOTHER APPROACH. HISTORICALLY, THERE HAS BEEN AN ABUNDANCE OF SUBMERGED AQUATIC GRASS (ZOSTERA MORINA) OR EELGRASS ALONG THE EASTERN COAST OF SMITH ISLAND. IN SOME AREAS, THE EELGRASS, WHICH IS CONDUCIVE TO SEAFOOD PROPAGATION, IS DISAPPEARING AND THIS IS DISTRESSING TO US AND TO THOSE FOLKS WHOSE LIVELIHOOD IS DEPENDENT UPON HARVESTING SEAFOOD PRODUCTS. OUR HYPOTHESIS IS THAT THE LACK OF EELGRASS GROWTH ON SMITH ISLAND IS DUE TO THE RELATIVELY STEEP SLOPE OF THE UNDERWATER GRADIENT WHICH RESULTS IN DEPTHS TOO GREAT TO SUPPORT EELGRASS GROWTH. WE FEEL THAT THE WAVE ENERGY ALONG THE SHORELINE CREATED THIS CONDITION.

THIS SLIDE SHOWS THE NAVIGATION CHANNEL, THE PREVIOUSLY USED UPLAND CONTAINED DISPOSAL SITE, AND THE OPEN WATER AREA WE ARE USING TO CORRECT THE STEEP SLOPE, WATER DEPTH AND WAVE ENERGY PROBLEMS.

WE RECENTLY EXCAVATED ABOUT 15,000 CUBIC YARDS OF MATERIAL FROM THE NAVIGATION CHANNEL USING A SMALL INDUSTRY CUTTERHEAD DREDGE. THE MATERIAL IN THIS CASE IS COMPOSED OF 40 PERCENT SAND AND 60 PERCENT SILT.

THE FIRST PHASE OF OUR PLAN CONSISTS OF FILLING A LONGARD POLYETHYLENE TUBE. THE FILLED TUBE, WITH A DIAMETER OF 40 INCHES, WILL THEN BE PLACED, AS SHOWN ON THIS SLIDE, IN SUCH A WAY THAT IT WILL SERVE AS A WAVE DAMPENING STRUCTURE. WE WILL THEN PUMP THE DREDGED MATERIAL FROM THE CHANNEL INTO AN AREA CONSISTING OF ABOUT 3 ACRES. HAVING CREATED A MORE GENTLE UNDERWATER SLOPE AND DEPTHS CONDUCIVE TO EELGRASS GROWTH LOCATED SHOREWARD OF THE WAVE DAMPENING TUBE, WE WILL THEN PLANT THE AREA WITH EELGRASS AND HOPE THAT IT WILL THRIVE. OUR SCIENTISTS HAVE INFORMED ME THAT IN ONLY FOUR TO SIX MONTHS WE SHOULD HAVE AN INDICATION AS TO WHETHER THE PROJECT IS A SUCCESS OR NOT.

IN THE PAST, WE HAVE PLACED THE DREDGED MATERIAL IN AN UPLAND CONTAINED DISPOSAL AREA CONSISTING OF 15 ACRES

AT A COST OF $271,000. WE ESTIMATE THAT THE TOTAL COST OF THE DEMONSTRATION PROJECT WILL BE ABOUT $198,000 WHICH REPRESENTS A COST REDUCTION OF 27 PERCENT. THIS IS NOT AS GREAT AS FOR THE SLAUGHTER CREEK PROJECT, BUT STILL A SIGNIFICANT FIGURE. PLEASE KEEP IN MIND THAT THE COST OF THE LONGARD TUBE RESEARCH ASPECT ($18,480) IS INCLUDED IN THE DEMONSTRATION PROJECT.

AGAIN THE STATE OF MARYLAND STAFF WERE FULLY IN SUPPORT OF THE CONCEPT AND WERE VERY HELPFUL IN DESCRIBING THE PROJECT METHODOLOGY AND THE POTENTIAL BENEFITS TO ENVIRONMENTAL GROUPS AND INDIVIDUALS. AND AGAIN, OUR BALTIMORE DISTRICT AND NORTH ATLANTIC DIVISION PERSONNEL DID AN OUTSTANDING JOB FROM BOTH THE TECHNICAL IMPLEMENTATION AND COORDINATION VIEWPOINTS.

IN SUMMARY, THE ADVANTAGES OF THE SLAUGHTER CREEK AND TWITCH COVE DEMONSTRATION PROJECTS ARE:

- ENVIRONMENTAL ENHANCEMENT

- COST EFFECTIVENESS.

- AVAILABILITY OF PLACEMENT SITES ON A LONG RANGE BASIS.

– AND A MORE RELIABLE CHANNEL MAINTENANCE DREDGING PROGRAM SCHEDULE.

I SHOULD NOT LEAVE TODAY WITHOUT DISCUSSING ANOTHER ITEM -- TERMINOLOGY AND VOCABULARY. ONE OF MY PERSONAL OBJECTIVES OVER A LONG PERIOD OF TIME HAS BEEN TO CHANGE SOME OF THE TERMINOLOGY USED IN THE DREDGING PROFESSION. WITHIN THE ARMY CORPS OF ENGINEERS, I HAVE BEEN SOMEWHAT SUCCESSFUL, BUT THE TOPIC CONTINUES TO NEED SOME EMPHASIS.

WORDS CAN CONVEY ALL SORTS OF CONNOTATIONS. THE WORD "SPOIL" CLEARLY HAS A NEGATIVE CONNOTATION IMPLYING SOMETHING THAT IS UNDESIRABLE OR WHICH HAS DETERIORATED ORGANICALLY. WHEN WE REFER TO UNCONTAMINATED DREDGED MATERIAL, AND AT LEAST 90 IF NOT 95 PERCENT OF THE MATERIAL WE HANDLE ON A NATIONAL BASIS IS UNCONTAMINATED, WHY DON'T WE USE ANOTHER TERM SUCH AS DREDGED MATERIAL? THE WORD "DISPOSAL" WHICH IS USED SO OFTEN DOES NOT CONVEY A POSITIVE IMPRESSION EITHER. WHY NOT USE WORDS LIKE "RELOCATION" OR "FILL"? INSTEAD OF USING THE WORD "DUMPING," WHY DON'T WE CONSIDER USING THE WORD "PLACEMENT"? IF WE IN THE SCIENTIFIC, ENGINEERING AND BUSINESS PROFESSIONS USE NEGATIVE TERMS OR WORDS, HOW CAN BE EXPECT THE PUBLIC NOT TO THINK IN NEGATIVE TERMS?

IT IS NOT A QUESTION OF WHETHER TO DREDGE OR NOT; WE MUST DREDGE BECAUSE SAFE AND EFFICIENT MARITIME TRAFFIC IS ESSENTIAL TO OUR NATIONAL WELL-BEING. ONE OF THE MOST IMPORTANT JOBS OF THE ARMY CORPS, AS I SEE IT, IS TO STUDY, EVALUATE AND THEN APPLY THE MOST ENVIRONMENTALLY SUITABLE AND COST EFFICIENT OPTIONS TO KEEP OUR PORTS VIABLE. FROM TODAY'S PRESENTATION, I HOPE IT IS CLEAR THAT WE ARE DOING OUR UTMOST TO "ACCENTUATE THE POSITIVE." WE INTEND TO KEEP AT IT BECAUSE THE AMERICAN PEOPLE DESERVE OUR BEST EFFORT.