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Geology of the 241-BX Tank Farm

April 1976

W. H. Price

K. R. Fecht

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Environmental Engineering Section
Research Department
Research and Engineering Division

Prepared for the U.S. Energy Research
and Development Administration
Under Contract E(45-1)-2130

Atlantic Richfield Hanford Company
Richland, Washington 99352

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ARH-LD-130

GEOLOGY OF THE 241-BX TANK FARM

by

W. H. Price
K. R. Fecht

Environmental Engineering Section
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April 1976

ATLANTIC RICHFIELD HANFORD COMPANY
RICHLAND, WASHINGTON 99352

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GEOLOGY OF THE 241-BX TANK FARM

INTRODUCTION

A series of maps have been compiled to document the structure and stratigraphy of the sediments underlying the high-level radioactive waste storage tank farms located within the Energy Research and Development Administration Hanford Reservation. The primary purpose of these maps is to provide basic geologic information to be utilized to evaluate the impact of suspected and confirmed tank leaks. For convenience of usage map sets for each tank farm have been published in separate document packets (see Table I). The contents of this packet (see Table II) contain maps compiled only for the 241-BX Tank Farm.

TABLE I

TANK FARM GEOLOGY DOCUMENTS AVAILABLE
AS OF APRIL, 1976*

Title	Document Number
Geology of the 241-A Tank Farm	ARH-LD-127
Geology of the 241-AX Tank Farm	ARH-LD-128
Geology of the 241-B Tank Farm	ARH-LD-129
Geology of the 241-BX Tank Farm	ARH-LD-130
Geology of the 241-BY Tank Farm	ARH-LD-131
Geology of the 241-C Tank Farm	ARH-LD-132
Geology of the 241-S Tank Farm	ARH-LD-133
Geology of the 241-SX Tank Farm	ARH-LD-134
Geology of the 241-T Tank Farm	ARH-LD-135
Geology of the 241-TX Tank Farm	ARH-LD-136
Geology of the 241-TY Tank Farm	ARH-LD-137
Geology of the 241-U Tank Farm	ARH-LD-138
Generalized Geology of the 241-SY Tank Farm	ARH-LD-139

*Additional documents will be completed as new tank farms are built and well monitoring networks installed.

GEOLOGY OF THE 241-BX TANK FARM

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TABLE II

241-BX TANK FARM GEOLOGY MAPS

Title	Drawing Number
241-BX Tank Farm Geologic Map Legend and Plot Plan	H-2-38981
241-BX Tank Farm Geologic Characterization Cross Section A-A'	H-2-64993
241-BX Tank Farm Geologic Characterization Cross Section B-B'	H-2-64994
241-BX Tank Farm Geologic Characterization Cross Section C-C'	H-2-64995
241-BX Tank Farm Geologic Characterization Cross Section D-D'	H-2-64996
241-BX Tank Farm Geologic Characterization Cross Section E-E'	H-2-64997
241-BX Tank Farm Geologic Characterization Cross Section F-F'	H-2-64998
241-BX Tank Farm Geologic Characterization Cross Section G-G'	H-2-64999
241-BX Tank Farm Geologic Characterization Cross Section H-H'	H-2-65000
241-BX Tank Farm Geologic Characterization Cross Section I-I'	H-2-65001
241-BX Tank Farm Geologic Characterization Base of Backfill	H-264992

PROCEDURES

During the drilling of 32 dry wells and 4 water wells in and around the 241-BX Tank Farm, sediment samples were collected from one to 5-foot depth intervals. Information utilized to prepare this series of maps was obtained by the analysis of these samples, numbering approximately 800.

Each sediment sample was quantitatively analyzed according to grain size and $CaCO_3$ content. Size analysis was carried out utilizing a nest of 9 sieves selected for coincidence with the Wentworth (1922) grain size nomenclature (see H-2-38981). The $CaCO_3$ content of each sample was determined utilizing a semiquantitative CO_2 displacement method (Horwitz, 1970). Size and $CaCO_3$ data was input into the Rocksan Computer Program (Parr, 1974) which categorized each sediment sample into 1 of 19 classes (classification scheme modified after Folk, 1968; see H-2-38981). After analysis, each sample was visually examined to aid in further characterization. Each sample was subsequently stored in the Hanford Well Library for future reference.

For convenience of usage, the geologic maps were prepared at the same scale (1" = 16') as drawing H-2-36939 (Wells in 241-BX Farm As-built). Steps outlining the preparation of the maps are listed in Figure 1.

GENERALIZED GEOLOGY

Included within this section is a brief discussion of the geology underlying the 241-BX Tank Farm. The stratigraphic descriptions included, along with the Glossary (see page 10). are designed only to provide sufficient information to permit a general understanding of the Tank Farm maps presented. For a more detailed discussion of the regional geologic setting of the 241-BX Tank Farm, the reader is referred to articles listed in the Selected References (see page 12).

The 241-BX Tank Farm is underlain by three major stratigraphic units (see Figure 2); (1) basalt of the Columbia River Group which forms the bedrock beneath the area; (2) semiconsolidated sediments of the Ringold Formation which directly overlie the bedrock; and (3) unconsolidated sand, silt, and gravel, collectively termed glaciofluvial sediments. A more detailed description of the character of these units underlying the Tank Farm follows.

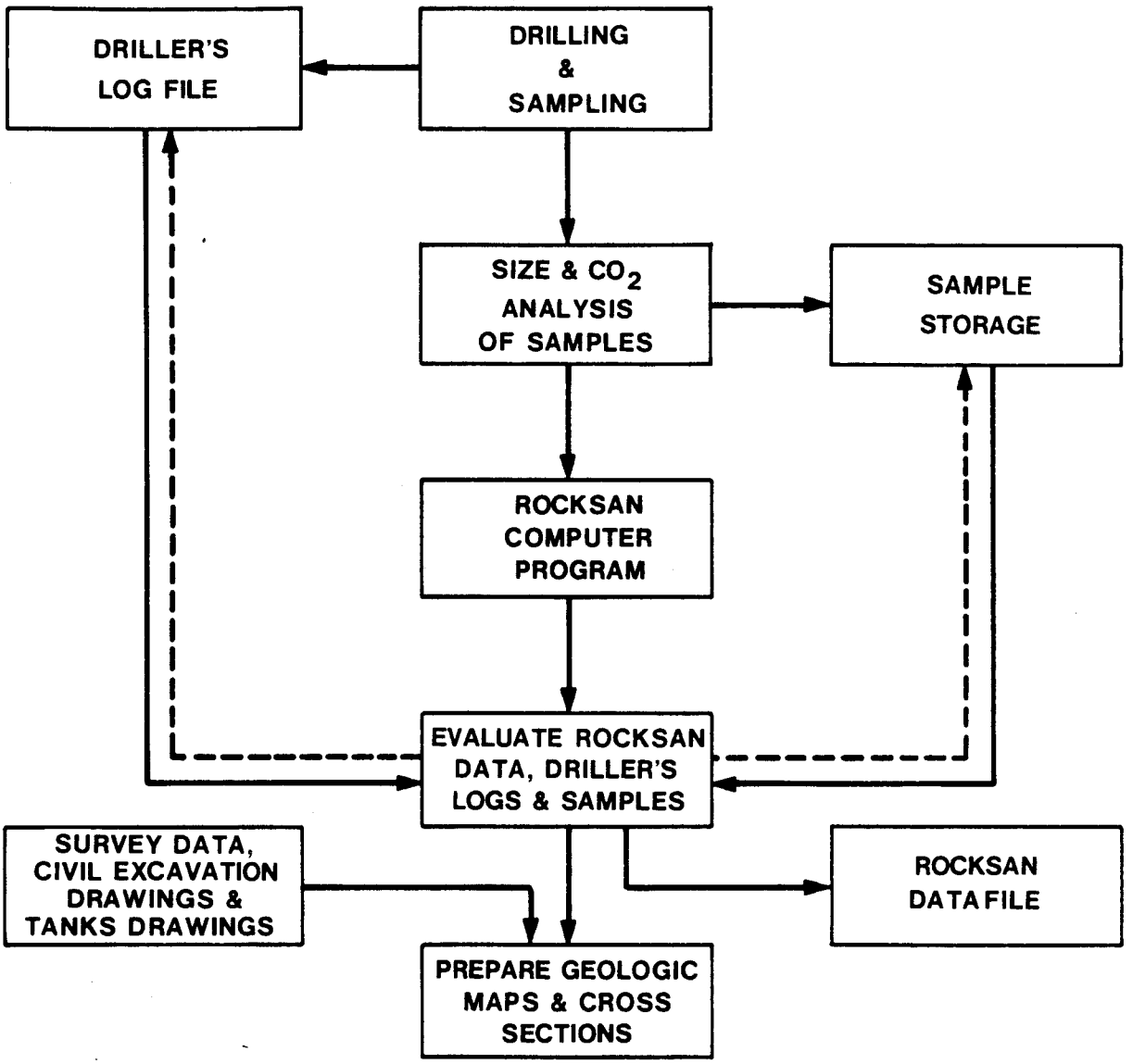

FIGURE 1

STEPS OUTLINING THE PREPARATION OF TANK FARM GEOLOGY MAPS

ERA	PERIOD	EPOCH	YEARS B. P.	STRATIGRAPHIC NAME AND/OR UNIT		LITHOLOGY DESCRIPTION
CENOZOIC	QUATERNARY	MODERN	30	BACKFILL		VERY POORLY SORTED GRAVEL, SAND & SILT
		PLEISTOCENE		GLACIOFLUVIAL SEDIMENTS		FAIRLY WELL SORTED FLUVIAL SAND & SILT WITH SOME GRAVEL
				EOLIAN SILT		FINE SAND & SILT DERIVED FROM THE UPPER RINGOLD
	TERTIARY	PLIOCENE	1,000,000	RINGOLD FORMATION	UPPER RINGOLD	WELL SORTED FLUVIAL OR LACUSTRINE SILT & SAND WITH SOME CALCAREOUS LAYERS
					MIDDLE RINGOLD	FLUVIAL GRAVEL & SAND VARIABLY CEMENTED WITH CALCIUM CARBONATE & SILICA
		MIOCENE	11,000,000	COLUMBIA RIVER BASALT GROUP	ELEPHANT MOUNTAIN MEMBER	DENSE BLACK EXTRUSIVE IGNEOUS ROCK, MICRO VESICULAR, BRICK BAT ENTABULATURE & NO COLUMNADE
					RATTLESNAKE RIDGE MEMBER	TUFFACEOUS SANDSTONE
					POMONA MEMBER	DENSE BLACK EXTRUSIVE IGNEOUS ROCK, SCATTERED OLIVINE PHENOCRYSTS, UPPER & SOMETIMES BASAL ENTABLATURE WELL DEVELOPED, FAN JOINTING IN COLUMNADE

WHP/KRF 1976

FIGURE 2

GENERALIZED STRATIGRAPHIC COLUMN FOR THE 200 AREA TANK FARMS

COLUMBIA RIVER BASALT GROUP

About 20 million years ago a series of fissures opened around the periphery of the subsiding Pasco Basin and large volumes of basaltic lava poured out over the land surface. The highly fluid lava was extruded intermittently from these fissures until approximately 8 million years ago. At the cessation of Columbia River Basalt volcanism, the basin had been filled with more than 12,000 feet of basalt.

The surface of the Columbia River Basalt lies beneath 241-BX Yank Farm at an elevation of 378 feet (all elevations based on feet above mean sea level measured at approximate center of Tank Farm).

RINGOLD FORMATION

Following the cessation of Columbia River Basalt volcanism the ancestral Columbia River transported sediments from the surrounding highlands into the Pasco Basin where they accumulated to form the Ringold Formation. Beneath the Hanford Reservation, this formation is up to 1200 feet thick and can generally be divided into three units on the basis of lithology; the clays and silts of the lower Ringold unit; the pebbles and cobbles of the middle Ringold unit; and the silts and fine sands of the upper Ringold unit.

Within the region beneath 241-BX Tank Farm, the lower and upper Ringold units are missing. The total thickness of the middle Ringold unit present is approximately 48 feet.

Middle Ringold

Beneath the 241-BX Tank Farm, middle Ringold unit lies unconformably on the Columbia River Basalt and dips about one degree to the southeast. The unit consists predominantly of well-rounded pebbles and cobbles with the interstitial spaces filled with very coarse to coarse sand. Table III summarizes the grain size and $CaCO_3$ values of the middle Ringold sediments.

TABLE III

TYPICAL GRAIN SIZE AND CALCIUM CARBONATE VALUES FOR MIDDLE RINGOLD LITHOLOGY BENEATH 241-BX TANK FARM

Lithology	%Pebbles & Cobbles	% Sand					%Silt & Clay	$\%CaCO_3$
		Very Coarse	Coarse	Medium	Fine	Very Fine		
Silty Sandy Coarse to Very Fine Pebble to Pebbly Silty Very Coarse to Coarse Cand	32	23	17	10	6	4	8	0-12

GLACIOFLUVIAL DEPOSITS

During the close of the Ice Age, approximately 20,000 years ago, a continental ice sheet covered much of northern Washington. As the ice sheet retreated northward, the breakup of ice dams resulted in catastrophic floods in which large volumes of glacial meltwater were released. During one of these floods, over 500 cubic miles of water is estimated to have poured into the Pasco Basin at a rate of more than 9 cubic miles of water per hour. Sediments deposited within the basin by such flooding now comprise the glaciofluvial unit. The characteristic variability of sediment size and degree of sorting within this unit can be attributed to changes in water velocity and water level which occurred during the flooding process.

Glaciofluvial deposits are found beneath the 241-BX Tank Farm between elevations 426 and 614 feet. The 188-foot thick section of these deposits consists predominently of very coarse to medium sand with some silt and pebbles. Table IV summarizes the grain size and $CaCO_3$ values of the glaciofluvial sediments.

CLASTIC DIKES

Throughout the Pasco Basin, clastic dikes are found cross-cutting the Ringold Formation and glaciofluvial sediments. These dikes, which range from a few inches to several feet in width, are known to exist to depths of more than 100 feet below the ground surface. Generally, the dikes are

composed of fine silts to coarse sands. The origin of the clastic dikes is still in refute and will not be discussed here (see Selected References). Identification of clastic dikes by drilling is difficult and although some dikes were detected in the 241-BX Tank Farm, they could not be mapped.

TABLE IV

TYPICAL GRAIN SIZE AND CALCIUM CARBONATE VALUES FOR MAJOR GLACIFLUVIAL LITHOLOGIES BENEATH 241-BX TANK FARM

Lithology	%Pebbles & Cobbles	% Sand					%Silt & Clay	$\%CaCO_3$
		Very Coarse	Coarse	Medium	Fine	Very Fine		
Slightly Pebbly Very Coarse to Coarse Sand to Very Coarse to Coarse Sand	5	26	41	15	6	3	4	1.2
Coarse to Medium Sand	3	15	37	26	10	4	5	0.8
Slightly Silty Very Coarse to Coarse Sand to Slightly Pebbly Slightly Silty Very Coarse to Coarse Sand	5	23	24	17	13	6	12	1.0

BACKFILL MATERIAL

In preparation for tank construction, glaciofluvial material was excavated at the 241-BX Tank Farm site. This material, consisting predominantly of cobbles, pebbles, and coarse to medium sands with some silt, was subsequently used as backfill from the base of the completed tanks (614 feet) to the ground surface (656 feet). An inherent characteristic of the backfill is its poor sorting. Grain size and $CaCO_3$ values for the backfill are found in Table V.

WATER TABLE

The water table beneath the 241-BX Tank Farm is located within the middle Ringold unit at an elevation of 403 feet, 211 feet below the base of the tanks. For further information concerning contours on the water table beneath 200 East Area the reader is referred to drawings H-2-38398 (200 East Area Water Table Map) and H-2-38399 (200 East Area Depth to Water Map).

TABLE V

TYPICAL GRAIN SIZE AND CALCIUM CARBONATE VALUES
FOR THE 241-BX TANK FARM BACKFILL

Lithology	%Pebbles & Cobbles	% Sand					%Silt & Clay	$\%CaCO_3$
		Very Coarse	Coarse	Medium	Fine	Very Fine		
Silty Sandy Gravel to Sand Gravel	28	20	18	11	8	7	8	1.3

GLOSSARY

Basalt. Fine-grained, dark-colored, extrusive igneous rock.

Calcareous. Containing calcium carbonate.

Caliche. Gravel, sand, or silt cemented by calcium carbonate.

Cement. Chemically precipitated material occurring in the interstices between particles of gravel, sand, or silt.

Clastic. A textural term applied to rocks composed of fragmental material derived from pre-existing rocks.

Clastic dike. A tabular body of clastic material transecting the bedding of a sedimentary formation, representing extraneous material that has invaded the containing formation along a crack.

Dip. The angle at which a stratum or any planar feature is inclined from the horizontal.

Eolian. A formation formed by, or deposited from, the wind or currents of air.

Fluvial. Produced by the action of a river or stream.

Formation. The ordinary unit of geologic mapping consisting of a large and persistent stratum of some one kind of rock.

Glaciofluvial. Pertaining to streams flowing from glaciers or to the deposits made by such streams.

Grain. The particles or discrete crystals which comprise a rock or sediment.

Group. A local or provincial subdivision of a series, based on lithologic features and contains two or more formations.

Lacustrine. A formation deposited in a lake environment.

Lava. Fluid rock such as that which issues from a volcano or a fissure in the earth's surface and the same material solidified by cooling.

Lithology. The description of rocks or sediments on the basis of such characteristics as color, minerologic composition and grain size.

Sediment. Descriptive term for gravel, sand, and silt transported from their sources and deposited by air, water, or ice.

Sieve. A utensil having many small perforated openings, used to separate fine particles from coarser ones.

Siliceous. Containing silica.

Silt. Fine grained material between sand and clay in size.

Sorting. The grain size range of the sediments.

Stratigraphy. The part of descriptive geology of an area that pertains to the discrimination, character, thickness, sequence, age and correlation of the sediments and rocks of the area.

Subaerial. Formed, existing, or taking place on the land surface.

Unconformity. A surface of erosion or nondeposition that separates younger strata from older strata.

Water table. The upper surface of a zone of saturation except where that surface is formed by an impermeable body.

Winnowing. Separation of fine particles from coarser ones by wind action.

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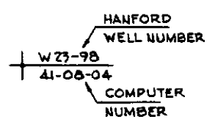
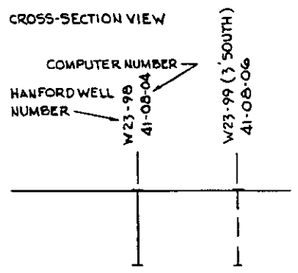
1 - WELL DESIGNATION
WELL NUMBERS PREFIXED BY 299-

PLOT PLAN VIEW



CROSS-SECTION VIEW



SOLID LINE ON CROSS-SECTION.

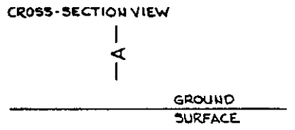
DASHED LINE WHEN PROJECTED TO CROSS-SECTION; DISTANCE AND DIRECTION FROM CROSS-SECTION ARE GIVEN.

2 - COORDINATES
BASED ON HANFORD COORDINATE SYSTEM.

3 - PLANE OF CROSS-SECTION

PLOT PLAN VIEW

CROSS-SECTION VIEW



4 - TANK DESIGNATION
TANKS PREFIXED BY 241-

5 - CONTACT BETWEEN LITHOLOGIES

SOLID LINE WHERE ACCURATELY KNOWN
DASHED LINE IF APPROXIMATELY KNOWN
QUERIED DASHED LINE WHERE INFERRED
BASE OF BACKFILL

6 - LENSES OR STRINGERS

DISCONTINUOUS SEDIMENTS LESS THAN TWO FEET THICK
DISCONTINUOUS SEDIMENTS GREATER THAN TWO FEET THICK

7 - WATER TABLE

CROSS-SECTION VIEW — WATER TABLE (12/75)
DATE WATER LEVEL MEASUREMENTS TAKEN

DATUM - MEAN SEA LEVEL

8 - HORIZONTAL AND VERTICAL SCALES

VERTICAL EXAGGERATION - 1X
VERTICAL SCALE - FEET ABOVE MEAN SEA LEVEL

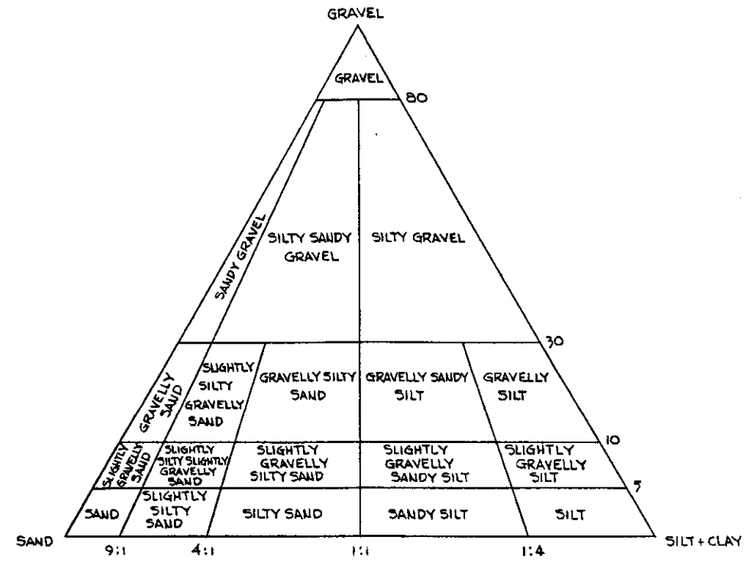
20 10 0 10 20 30 40 50

1:920

9 - SEDIMENT DESCRIPTION

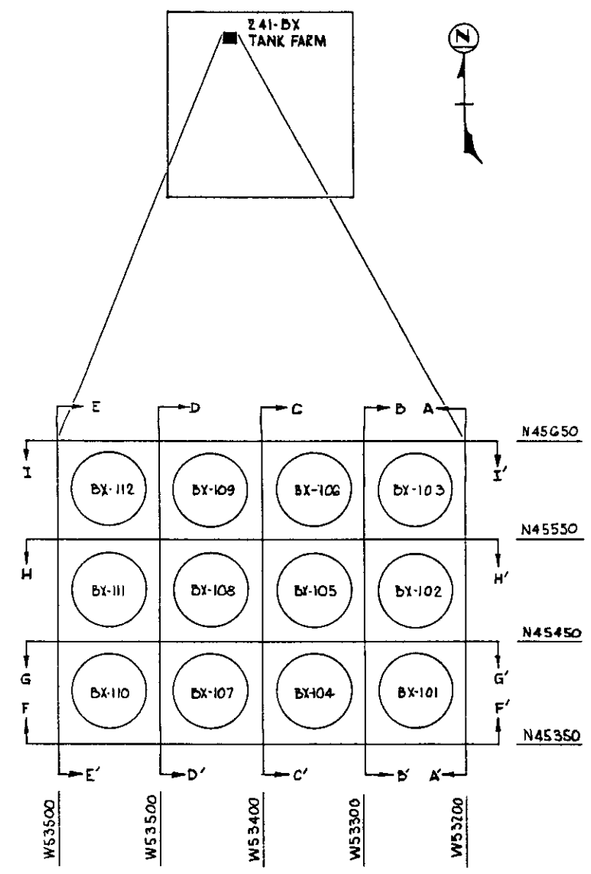
SEDIMENTS BENEATH THE TANK FARMS ARE CLASSIFIED ON THE BASIS OF ONE OF NINETEEN SEDIMENT TYPES (SEDIMENT CLASSIFICATION). FURTHER DETAIL IS GIVEN USING MODIFIERS FROM THE GRAIN SIZE NOMENCLATURE. SEDIMENTS WITH CHEMICALLY PRECIPITATED MATERIALS OCCURRING IN THE INTERSTICES BETWEEN GRAINS ARE PREFIXED BY THE TERM CEMENTED. SEDIMENTS WITH GREATER THAN 10% CALCIUM CARBONATE ARE PREFIXED BY THE MODIFIER CALCAREOUS. SEDIMENTS CONTAINING SILICA IN THE INTERSTICES BETWEEN GRAINS ARE MODIFIED BY THE TERM SILICEOUS.

SEDIMENT CLASSIFICATION (MODIFIED AFTER R.L. FOLK, 1968)



SAND : SILT RATIO

200 EAST AREA



GRAIN SIZE NOMENCLATURE (MODIFIED AFTER C.K. WENTWORTH, 1922)

	PARTICLE DESIGNATION		PARTICLE DIAMETER (MM)
GRAVEL	BOULDER		> 256
	COBBLE	LARGE	256 - 128
		SMALL	128 - 64
	PEBBLE	VERY COARSE	64 - 32
		COARSE	32 - 16
		MEDIUM	16 - 8
		FINE	8 - 4
		VERY FINE	4 - 2
	SAND	VERY COARSE	2 - 1
		COARSE	1 - 0.5
		MEDIUM	0.5 - 0.25
		FINE	0.25 - 0.125
		VERY FINE	0.125 - 0.0625
	SILT + CLAY		< 0.0625

DWG. NO.	REV. NO.	DRAWING TITLE OR INDEX NO.
REFERENCE DRAWINGS		
NEXT USED ON		

MICRO F'M'D	BY-DATE	FOR	BY-DATE	FOR	REV. BY DATE	DESCRIPTION	REV. NO.
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REVISIONS							
COMMENT PRT ISSUE NO.		DATE	CHECK PRT ISSUE NO.		DATE		LAST REV. 0
DRAWING STATUS							

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APPD — 4/14/76
DESIGN D. LIEN — 4/14/76
G.E. APPD. — 4/14/76
CHECKED
DRAWN ERICKSON — 3/24/75
SCALE NONE
CLASSIFIED BY NOT REQUIRED — DATE
CLASSIFICATION NONE

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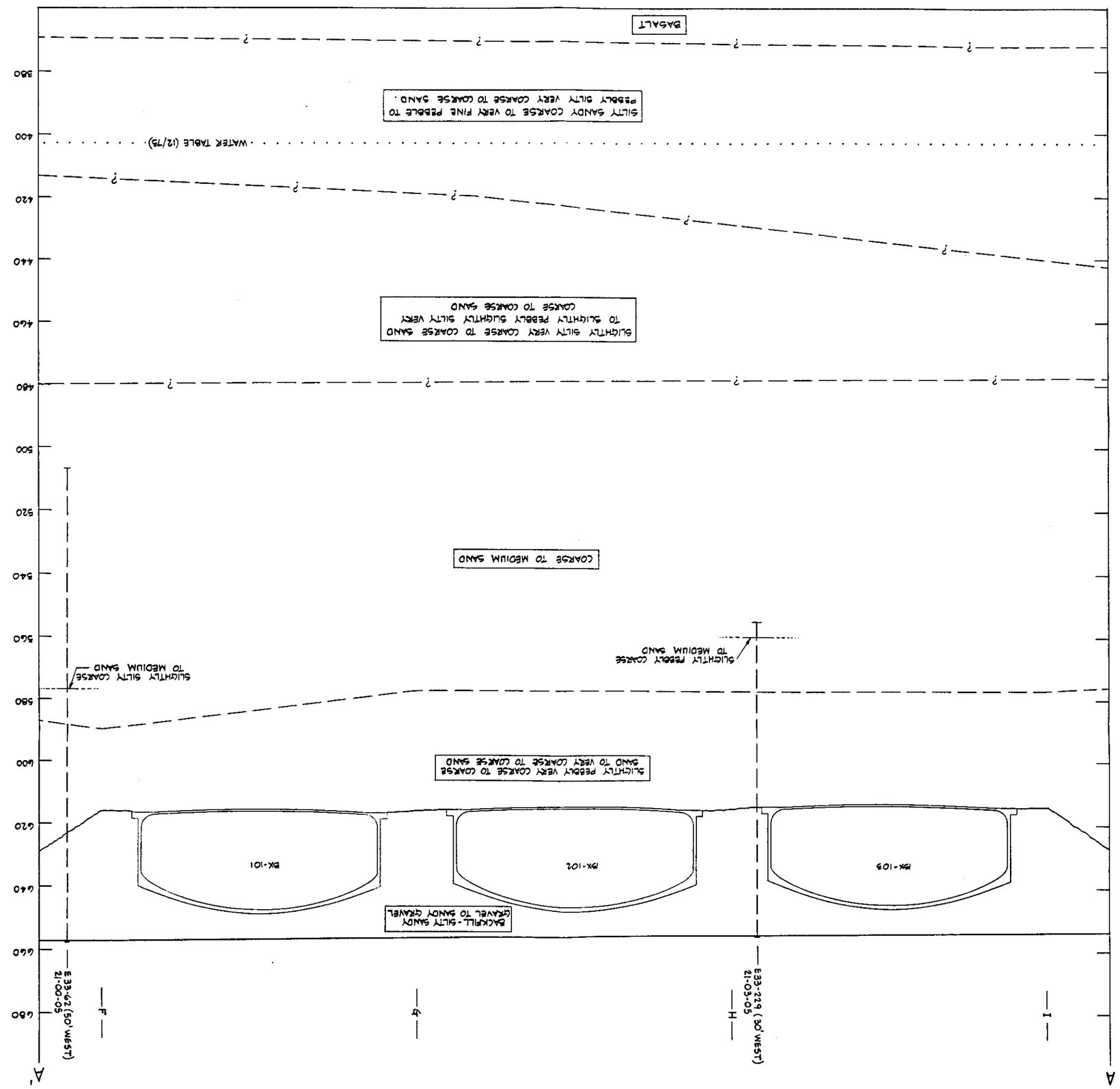
241-BX TANK FARM
GEOLOGIC MAP
LEGEND AND PLOT PLAN

PROJ NO CK-0065 — PROJ TITLE GEOLOGIC CHARACTERIZATION
SCHK. NO. 241-BX — INDEX NO. 0000
DWG NO. H-2-38981 — REV. — —



CROSS SECTION A-A'

REFERENCE DRAWINGS		
DWG. NO.	REV NO.	DRAWING TITLE OR INDEX NO.

NEXT USED ON

REVISIONS							
REVISIONS PR'S	BY-DATE / PDR / BY-DATE / PDR	APPD FOR COMPONENT WITH DRAWING CHKT	APPD	REV BY DATE	DESCRIPTION	REV NO.	

COMMENT PART ISSUE NO.	DATE	CHECK PART ISSUE NO.	DATE

DRAWING STATUS

APPD. FOR CONFORMANCE WITH DESIGN CRITERIA	DATE		
BY			
PDR			
APPD			

ENERGY RESEARCH & DEVELOPMENT ADMINISTRATION
RICHLAND OPERATIONS OFFICE

VITRO ENGINEERING • HOUSTON • WASHINGTON
A DIVISION OF AUTOMATION INDUSTRIES, INC.

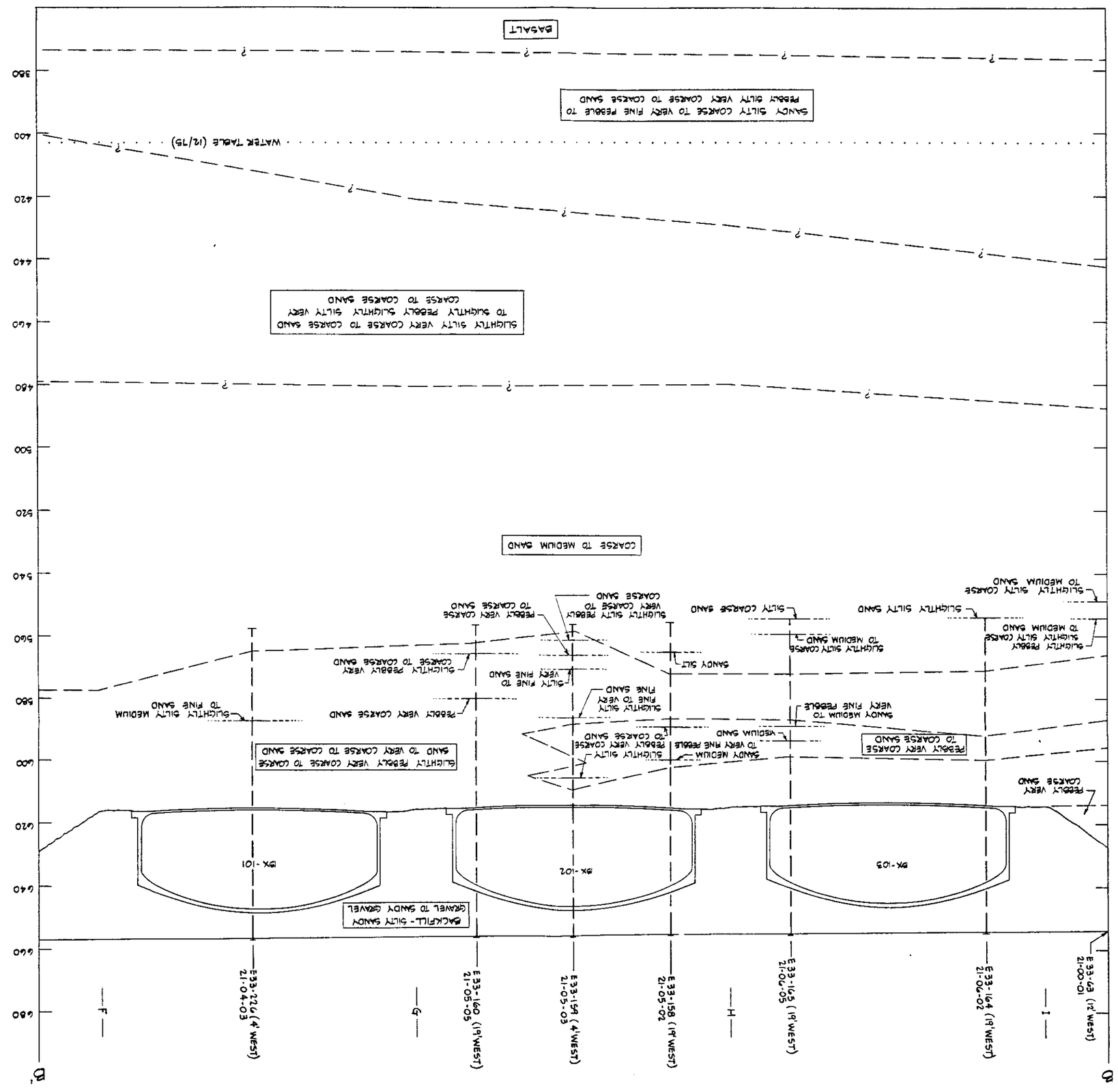
241-BX TANK FARM
GEOLOGIC CHARACTERIZATION
CROSS SECTION A-A'

DRAWN	D.L. FORT	1/31/78
CHECKED		
DA APPD		
DHEF	D. LEAH	1/31/78
PROJ MGR		1/31/78

CLASSIFIED BY		
CLASSIFICATION	NOT REQ'D	DATE
SCALE 1" = 10'-0"		
PROJ. NO: CN-0008	PROJECT TITLE: TANK FARM	
MCNS CN-0008	GEOLOGIC CHARACTERIZATION	
SCALE: NONE	INDEX NO. 241-BX	0402.0501
DWG NO.		LATEST DWG NO. IN USE

SIZE	DWG NO.	REV NO.
	H-2-64993	—

NONE



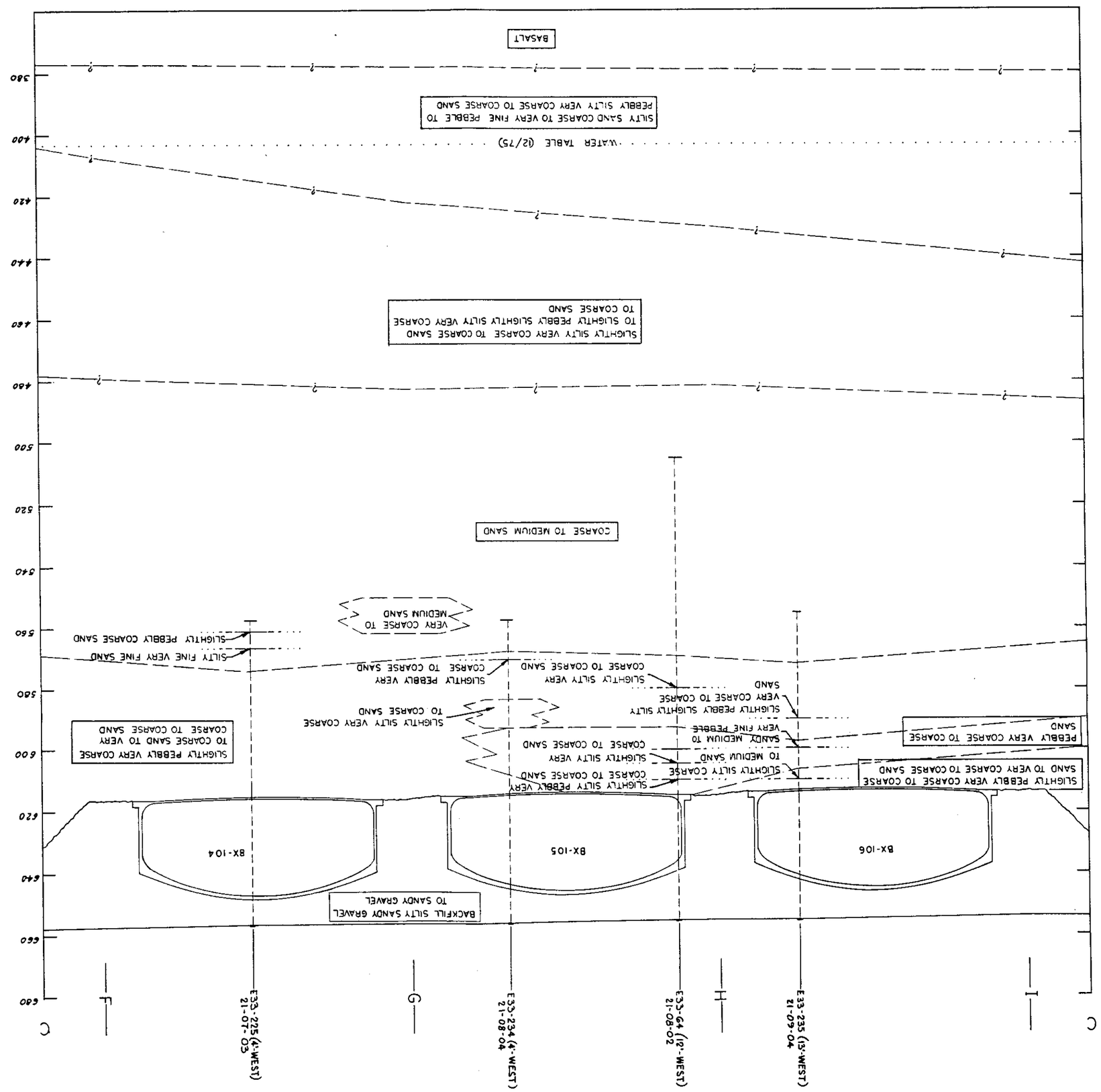
APPD. FOR COMPLIANCE WITH DRAWING & SPECS.	DATE	ENERGY RESEARCH & DEVELOPMENT ADMINISTRATION RICHLAND OPERATIONS OFFICE
BY ARHCO	3/24/76	VITRO ENGINEERING • Richland, Washington A Division of AUTOMATION INDUSTRIES, INC.
PCN		241-BX TANK FARM
APPD.		GEOLOGIC CHARACTERIZATION
BY D. LIEN	3/24/76	CROSS SECTION B-B'
DR. APPD.	3/24/76	
CHECKED		
DRAWN D.L. HORT	3/15/76	
SCALE 1" = 10'-0"		
CLASSIFICATION NOT REQ'D	DATE	
SIZE 24" x 36"	DWG. NO. 241-BX	MODEL NO. 0402,0501
PROJ. NO. N-GK-0006	PROJECT TITLE: TANK FARM GEOLOGIC CHARACTERIZATION	
CLASSIFICATION NO. OF PAGES		
—	—	H-2-64994

NO.	REVISIONS DESCRIPTION	REV BY	DATE	APPD.	PCN	BY-DATE	PCN	BY-DATE	APPD. PCN COMPLIED WITH DRAWING CHKT	PCN	BY-DATE

DRAWING STATUS			
COMMENT PRT ISSUE NO.	DATE	CHECK PRT ISSUE NO.	DATE

NEXT USED ON		
REFERENCE DRAWINGS		
DWG. NO.	REV NO.	DRAWING TITLE OR INDEX NO.

CROSS SECTION C-C'



ENERGY RESEARCH & DEVELOPMENT ADMINISTRATION RICHLAND OPERATIONS OFFICE			
APPD. FOR CONFORMANCE WITH DESIGN CRITERIA BY ALCO	DATE 3/10/79	241-BX TANK FARM GEOLOGIC CHARACTERIZATION CROSS SECTION C-C'	
UNITED ENGINEERS & CONSTRUCTORS a division of ALTOMAHTION INDUSTRIES, INC.			
APPD.		DRAWN D. LIEN	3/1/78
		CHECKED	3/1/78
		DR. APPD.	3/1/78
		DRAWN S. HODGSON	3/10/78
		SCALE 1"=10'-0"	
		CHARGEABLE TO NOT KEYED	DATE
		CLASSIFICATION NONE	LAST REV. 0
		PROJ. NO. 241-BX	DWG. NO. 04-C-0501
		PROJECT TITLE: TANK FARM GEOLOGIC CHARACTERIZATION	
		PROJ. NO. 24-0009	
		DWG. NO. H-2-64995	

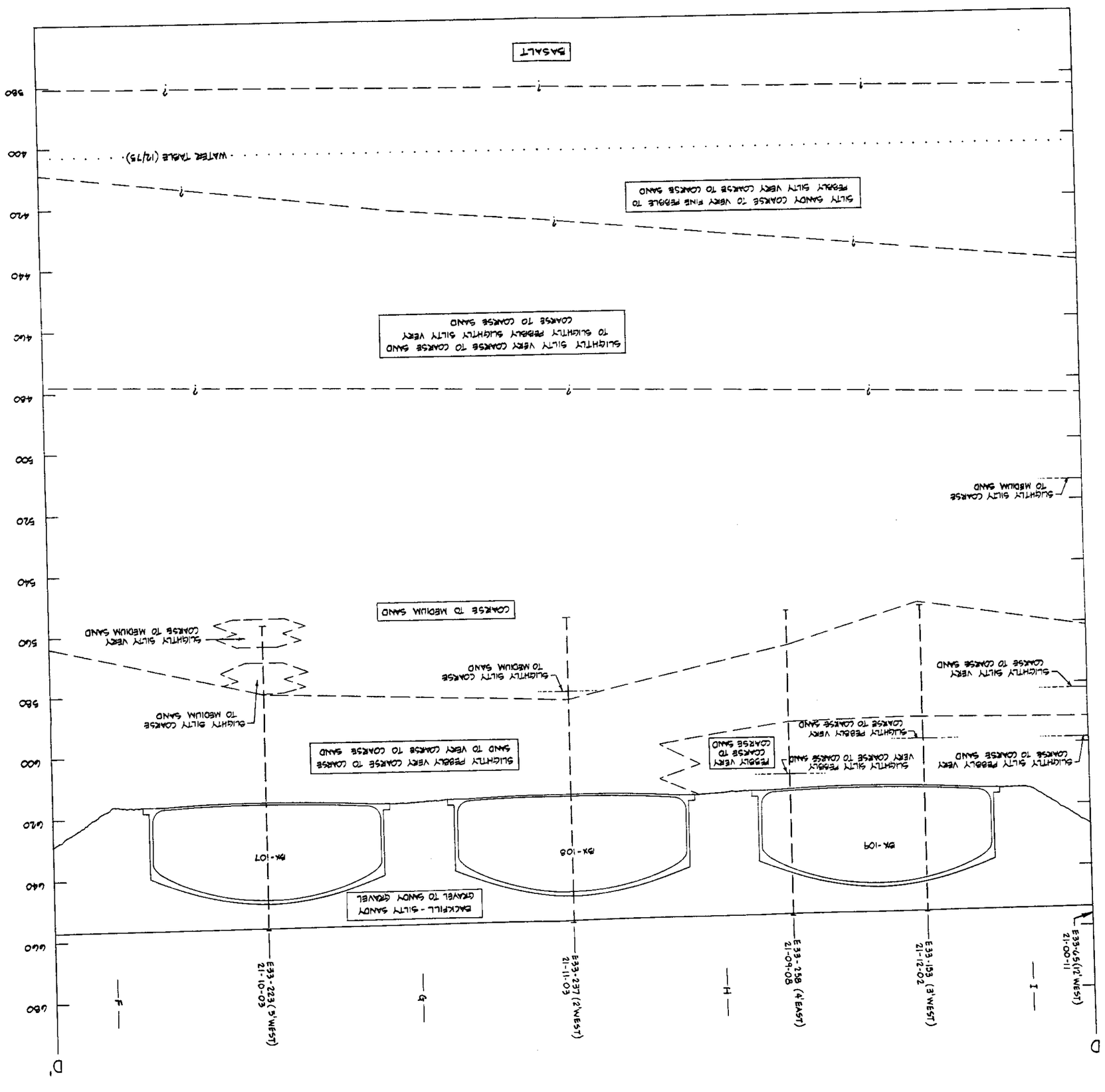
REVISIONS							
REVISION PTR.	REVISED		APPD. FOR CONFORM WITH DESIGN CRIT.		APPD.		DESCRIPTION	REV. NO.
			REVISED	PDM	REV. BY	DATE	

REFERENCE DRAWINGS		
DWG. NO.	REV. NO.	DRAWING TITLE OR INDEX NO.

NEXT USED ON

DRAWING STATUS			
COMMENT PRT ISSUE NO.	DATE	CHECK PRT ISSUE NO.	DATE

CROSS SECTION D-D'



ENERGY RESEARCH & DEVELOPMENT ADMINISTRATION
NIGHLAND OPERATIONS OFFICE

APPR. FOR COMPLIANCE WITH DESIGN CRITERIA
BY RECORD
DATE 3/4/76

NITKO ENGINEERING • Architects • Engineers
A division of AUTOMATION INDUSTRIES, INC.

241-BX TANK FARM
GEOLOGIC CHARACTERIZATION
CROSS SECTION D-D'

DR. D. LEAR 3/4/76
CHECKED 3/4/76
DRAWN D.L. HOFT 3/4/76
SCALE 1" = 10'-0"
PROJ. NT CA-0005 PROJECT TITLE: TANK FARM
MO NT CA-0005 GEOLOGIC CHARACTERIZATION
DWG. NO. 241-BX DRAWING NO. 0402.0501
REV NO. —
REV NO. — —

REV. NO.	REV BY	DESCRIPTION	REV BY DATE

REVISIONS					
NOTE P.S.D.	REVISIONS PER DESIGN CRIT	REVISIONS PER COMPLIANCE WITH DESIGN CRIT	APPD	REVISIONS	REV BY DATE

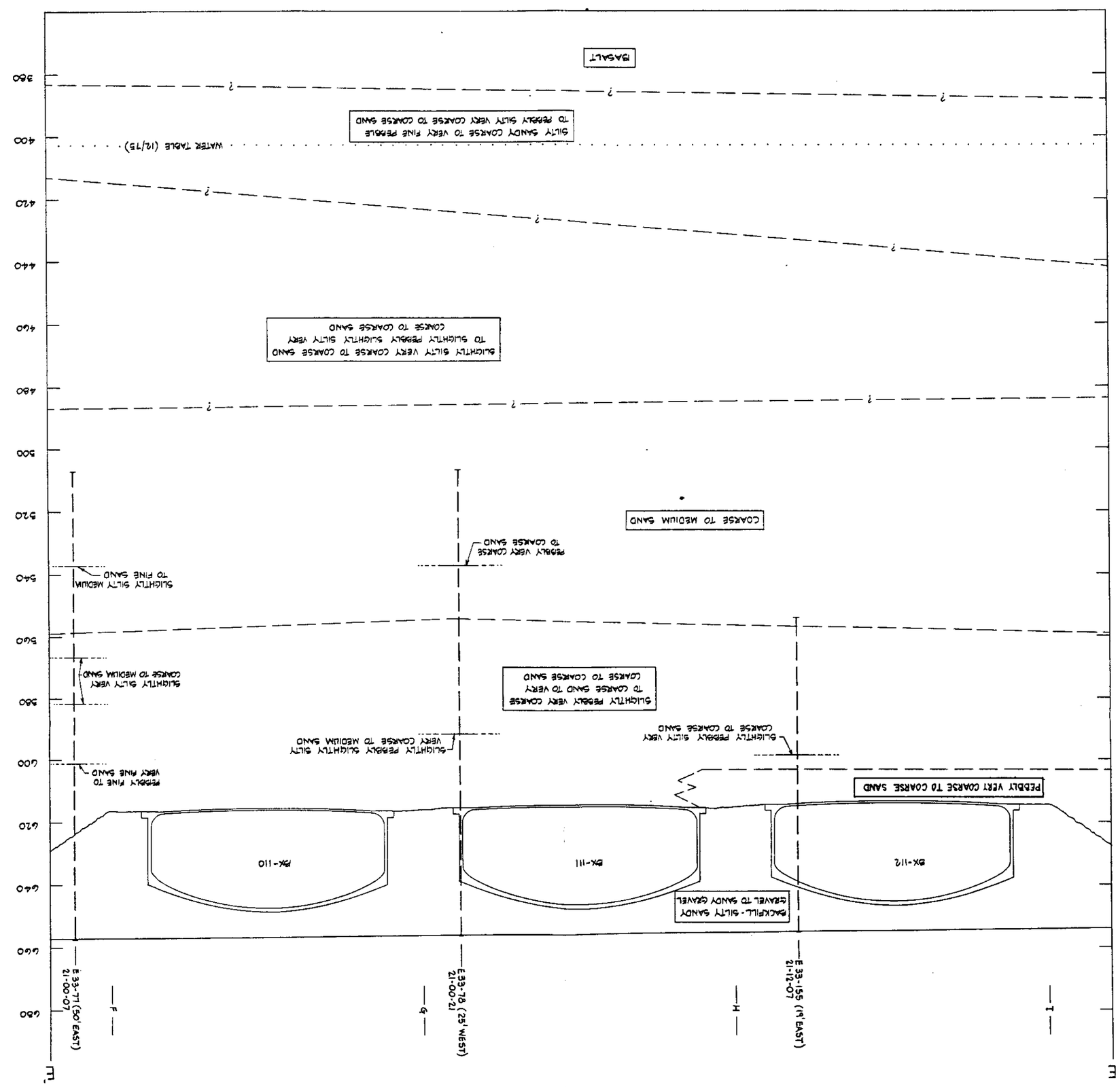
CLEARANCE BY NOT REQ'D DATE
CLASSIFICATION UNCLASSIFIED
LAST NEXT USED ON

REFERENCE DRAWINGS		
DWG. NO.	REV NO.	DRAWING TITLE OR INDEX NO.

DRAWING STATUS		
CONTRACT FRT ISSUE NO.	CHECK FRT ISSUE NO.	DATE

NONE

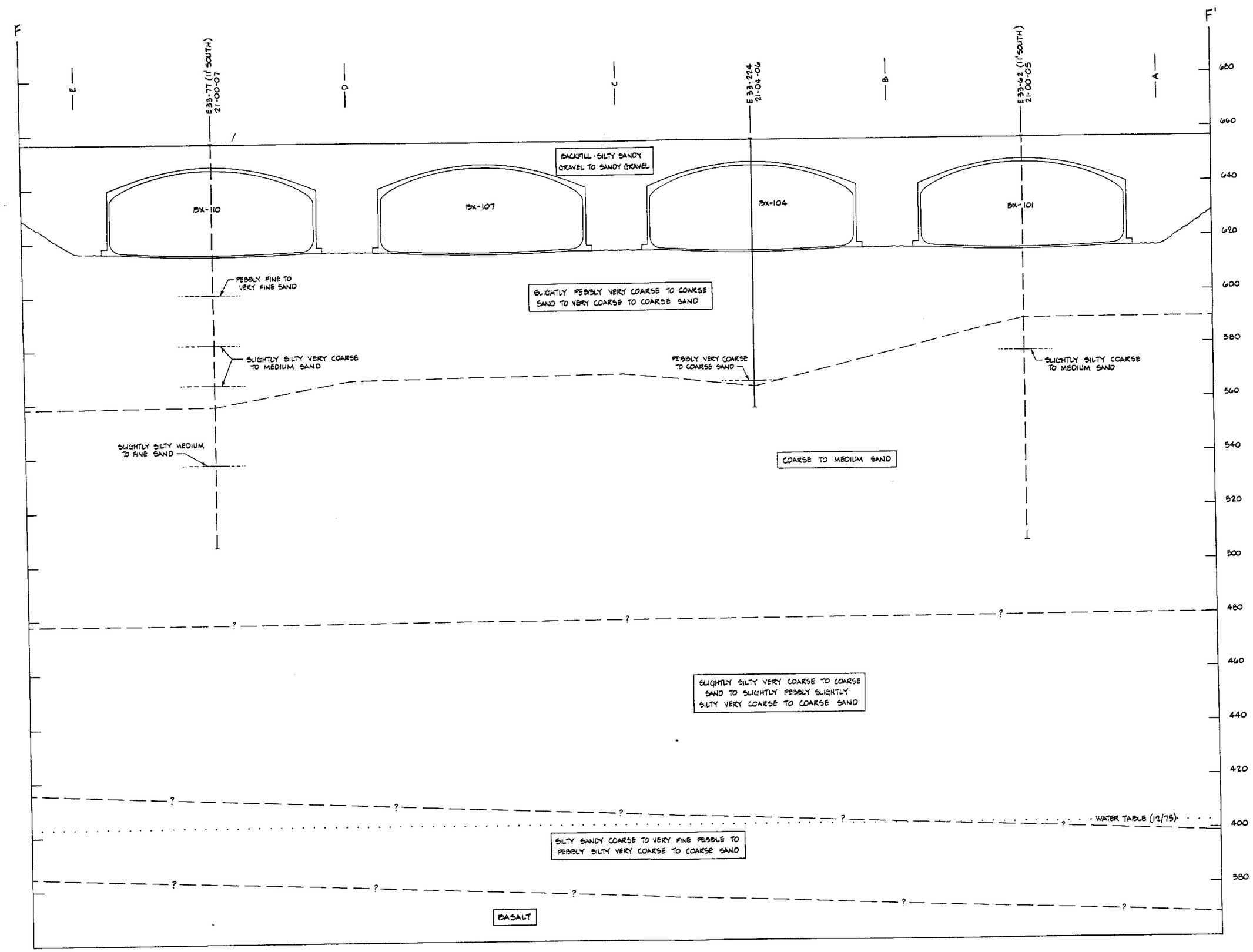
H-2-64996 — —



ENERGY RESEARCH & DEVELOPMENT ADMINISTRATION
NEVADA OPERATIONS OFFICE
MILLIKAN & JACOBS
NITRO ENGINEERING • INCORPORATED
a division of AUTOMATION INDUSTRIES, INC.

241-BX TANK FARM
GEOLOGIC CHARACTERIZATION
CROSS SECTION E-E'

D.L. FORT
SCALE 1" = 10'-0"
PROJ NO: CX-00-06
PROJECT TITLE: TANK FARM
NONE: CX-00-06
GEOLOGIC CHARACTERIZATION
DWG. NO. 241-BX
H-2-64997
NOT REQ'D
NONE



CROSS SECTION F-F'

DWG. NO.	REV NO.	* DRAWING TITLE OR INDEX NO.
REFERENCE DRAWINGS		
NEXT USED ON		

MICRO FWS	BY-DATE	FOR	BY-DATE	FOR	REV BY DATE	DESCRIPTION	REV NO.
	APPD FOR CONFORM WITH DESIGN CRIT		APPD				
REVISIONS							
COMMENT PRT ISSUE NO.		DATE	CHECK PRT ISSUE NO.		DATE	LAST 3"	
DRAWING STATUS							

APPD. FOR CONFORMANCE WITH DESIGN CRITERIA BY RPEGUE FOR ARHCO — DATE 3/31/76

APPD — DATE

ENGR D. LEE — DATE 3/16/76

QA APPD Thos Garcia — DATE 3/16/76

CHECKED — DATE

DRAWN D.L. FORT — DATE 3/15/76

SCALE 1" = 10'-0"

CLASSIFIED BY NOT REQ'D — DATE

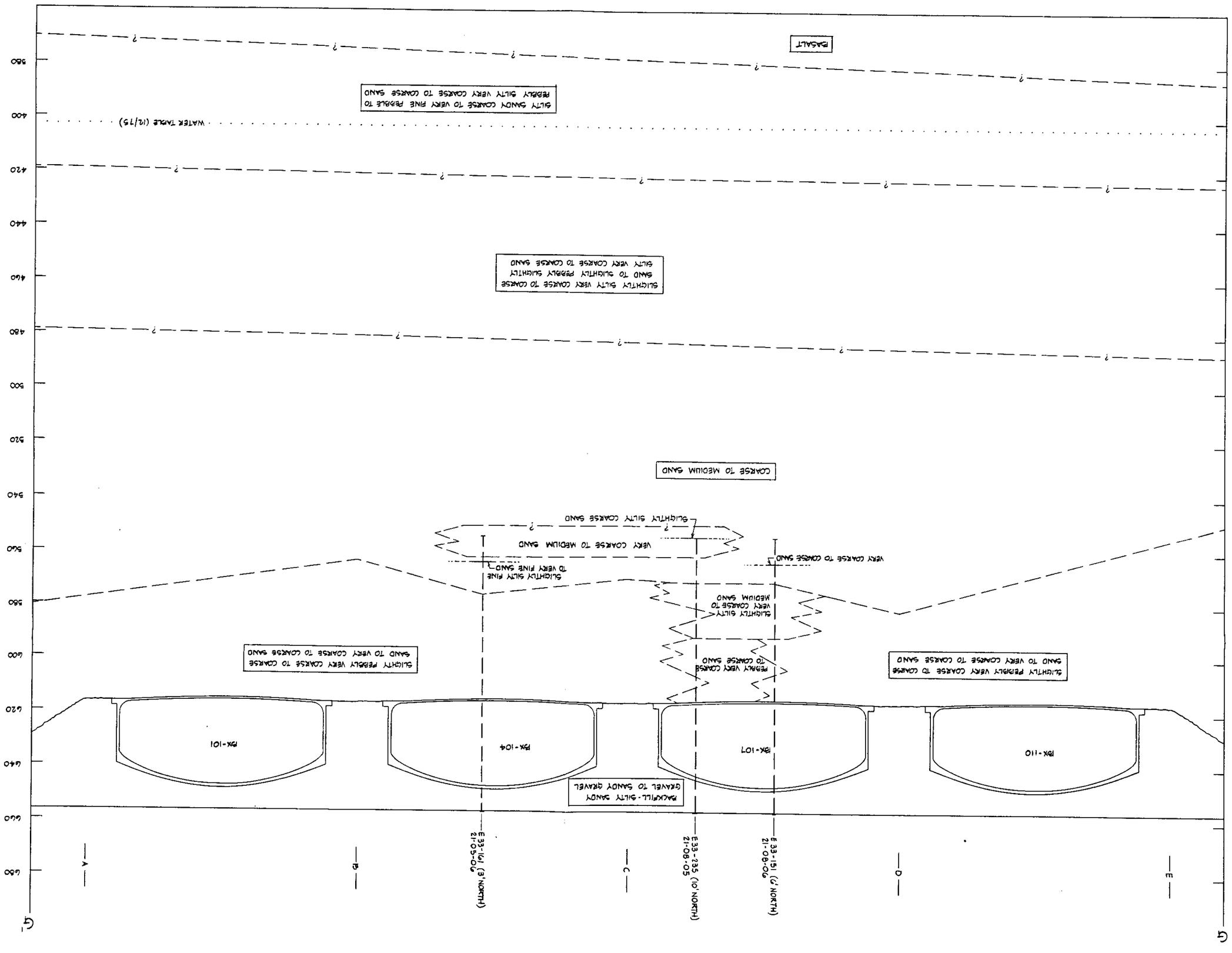
CLASSIFICATION NONE

ENERGY RESEARCH & DEVELOPMENT ADMINISTRATION
RICHLAND OPERATIONS OFFICE

VITRO ENGINEERING • architects • engineers
a division of AUTOMATION INDUSTRIES, INC.

241-BX TANK FARM GEOLOGIC CHARACTERIZATION CROSS SECTION F-F'

PROJ. NO. CK-0006 — PROJECT TITLE TANK FARM
W.O. NO. CK-0065 — GEOLOGIC CHARACTERIZATION
BLDG. NO. 241-BX — ISSUED NO. 0402,0501
DWG NO. H-2-64998 — SHEET NO. — NO. OF SHTS —



CROSS SECTION G-G'

REVISIONS							
MICRO F.N.O.	BY-DATE VERIFIED WITH DRAWING CHKT	PDR	BY-DATE	PDR	APPD BY DATE	REV	DESCRIPTION	REV NO.
	APPD PDR COMPARED							

REFERENCE DRAWINGS		
DWG. NO.	REV NO.	DRAWING TITLE OR INDEX NO.

NEXT USED ON

CONTENT PRT ISSUE NO.	DATE	CHECK PRT ISSUE NO.	DATE

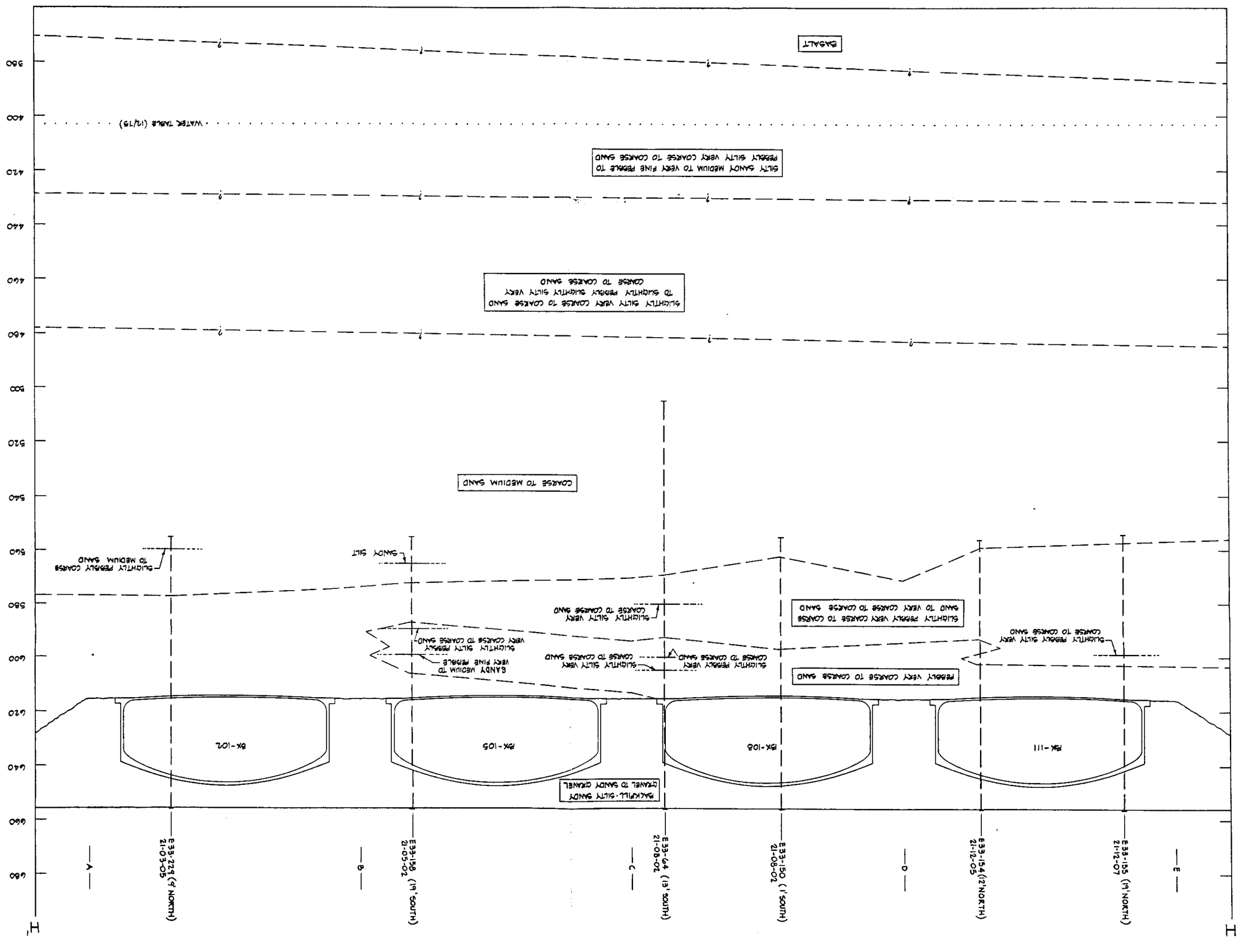
DRAWING STATUS

ENERGY RESEARCH & DEVELOPMENT ADMINISTRATION
RICHLAND OPERATIONS OFFICE

VITRO ENGINEERING • architects • engineers
a division of AUTOMATION INDUSTRIES, INC

241-BX TANK FARM
GEOLOGIC CHARACTERIZATION
CROSS SECTION G-G'

DRAWN	D. LIEN	9/16/76
CHECKED		
REQ. NO.	N21-CX-0006	PROJECT TITLE: TANK FARM
WO NO.	CX-0006	GEOLOGIC CHARACTERIZATION
SCALE	1" = 16'-0"	
CLASSIFICATION	NOT RECD	
BLDG. NO.	241-BX	INDEX NO. 0402.0501
DWG NO.	H-2-64999	SHEET NO. — OF —



CROSS SECTION H-H'

REV.	DATE	BY	DESCRIPTION

DWG. NO.	REV. NO.	DRAWING TITLE OR INDEX NO.

NEXT USED ON

DATE	CHECK PRT ISSUE NO.	DATE	COMMENT PRT ISSUE NO.	LAST ✓

DRAWING STATUS

ENERGY RESEARCH & DEVELOPMENT ADMINISTRATION
RICHLAND OPERATIONS OFFICE

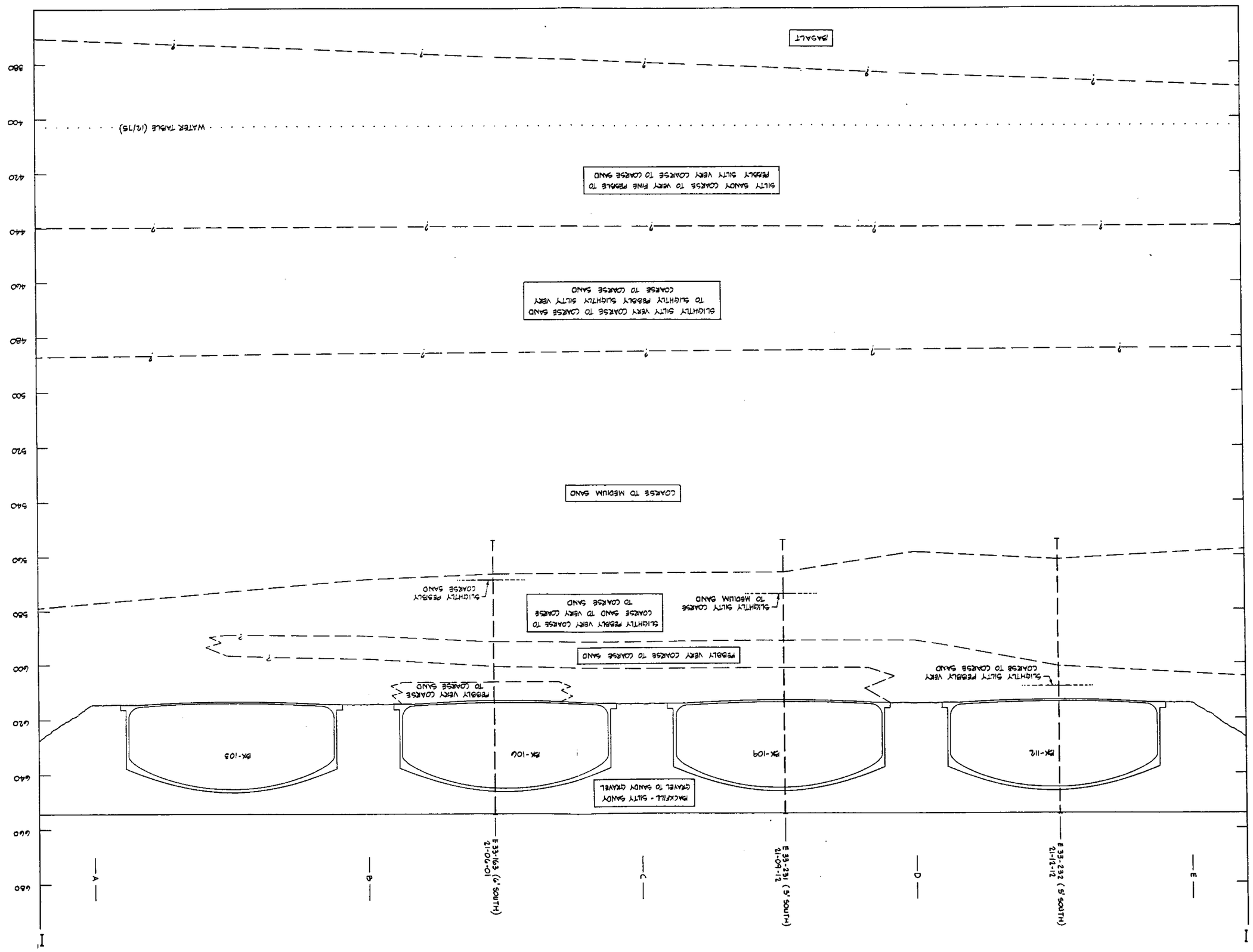
VITRO ENGINEERING • architects • engineers
a division of AUTOMATION INDUSTRIES, INC.

24-BX TANK FARM
GEOLOGIC CHARACTERIZATION
CROSS SECTION H-H'

PROJ. NET: CK-0005 PROJECT TITLE: TANK FARM
WO NET: CK-0005 GEOLOGIC CHARACTERIZATION

SCALE: 1" = 10'-0"
DRAWN: D.L. MOTT
DATE: 1/84
DWG. NO. 241-BX
INDEX NO. 0405L0501

NONE
H-2-65000
—
—



CROSS SECTION I-I'

REFERENCE DRAWINGS		
DWG. NO.	REV NO.	DRAWING TITLE OR INDEX NO.

NEXT USED ON

REVISIONS							
REVISED F.W.S.	BY, DATE APPD FOR COMPLIANCE WITH DESIGN CRITERIA	BY, DATE APPD	BY, DATE APPD	BY, DATE APPD	REV NO.	DESCRIPTION	REV NO.

DRAWING STATUS			
COMMENT PRT ISSUE NO.	DATE	CHECK PRT ISSUE NO.	DATE

LASER ID

CLASSIFICATION: NONE

APPD. FOR COMPLIANCE WITH DESIGN CRITERIA		DATE
FOR	AR Hart / Michigan	
APPD		
BY		

ENERGY RESEARCH & DEVELOPMENT ADMINISTRATION
RICHLAND OPERATIONS OFFICE

VITRO ENGINEERING • Architects • Engineers
a division of ATLORAMA INDUSTRIES, INC.

24 1-BX TANK FARM
GEOLOGIC CHARACTERIZATION
CROSS SECTION I-I'

DRAWN	D.L. HORT	3/31/76
CHECKED		
SR. APPD.		3/31/76
DESIGN	D. Lizer	3/31/76
APPD.		3/31/76

CLASSIFIED BY: NOT KGO'D — DATE

SCALE: 1" = 10'-0"

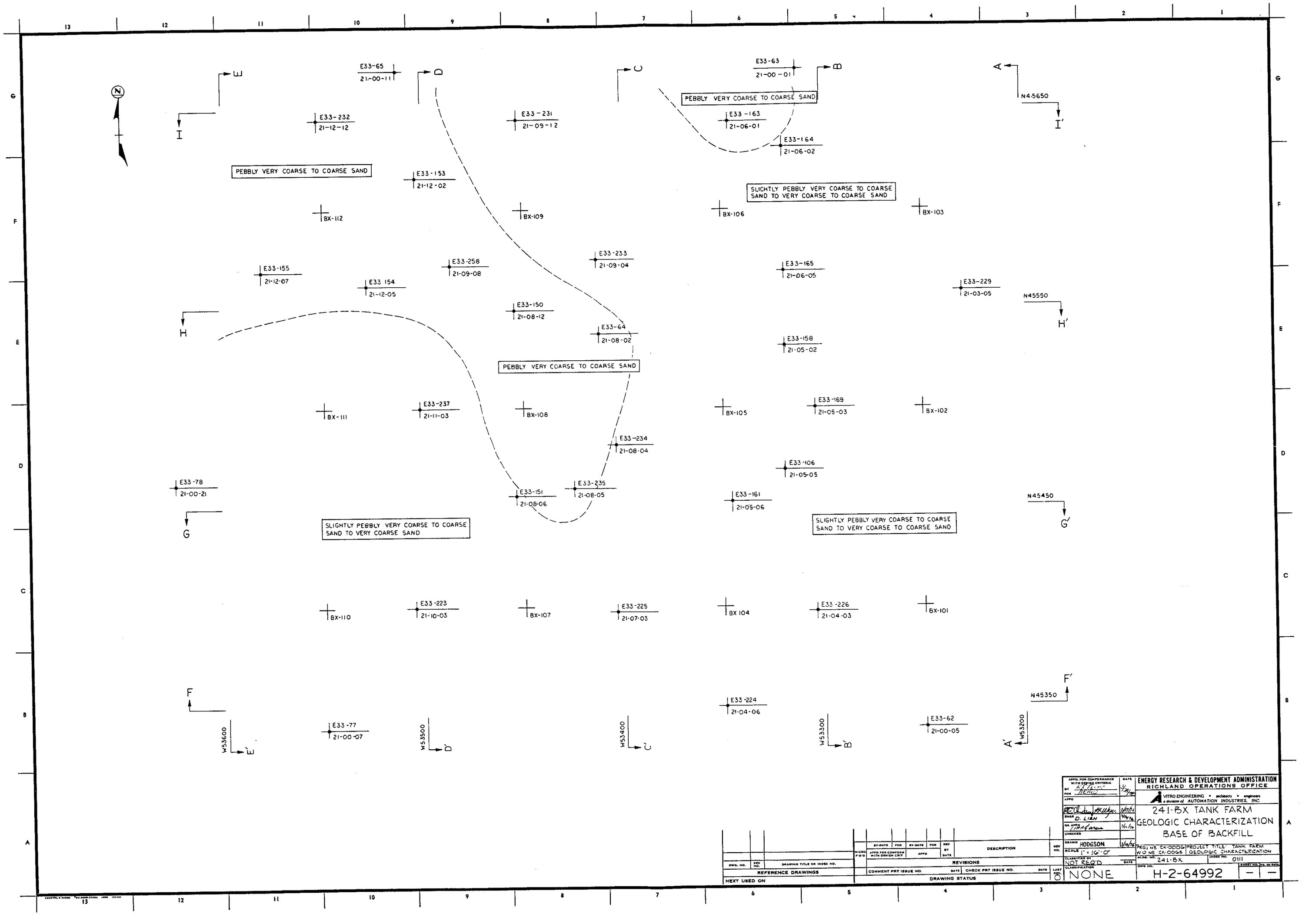
W.O. NO.: CK-0049 — GEOLOGIC CHARACTERIZATION

PROJ./WBS: CK-0000A — PROJECT TITLE: TANK FARM

DWG. NO. H-2-65001 — — —

SHEET NO. 1 OF 1

DWG. NO. 24-1-BX — INDEX NO. 0402-L-0501



DWG. NO.	REV. NO.	DRAWING TITLE OR INDEX NO.
REFERENCE DRAWINGS		
NEXT USED ON		

MICRO F'M'D	BY-DATE	FOR	BY-DATE	FOR	REV BY DATE	DESCRIPTION	REV NO.
	APPD FOR CONFORM WITH DESIGN CRIT		APPD				
REVISIONS							
COMMENT PRT ISSUE NO.		DATE	CHECK PRT ISSUE NO.		DATE	LAST REV. 0	
DRAWING STATUS							

APPD. FOR CONFORMANCE WITH DESIGN CRITERIA — BY A.K. Fritz — FOR Hartley — APPD — DATE 3/24/76

ENGR. D. LIEN — 3/17/76 — 3/24/76

QA — 3/24/76

CHECKED

DRAWN HODGSON — 3/24/76

SCALE 1" = 16'-0"

CLASSIFIED BY NOT REQ'D — DATE

CLASSIFICATION NONE

ENERGY RESEARCH & DEVELOPMENT ADMINISTRATION
RICHLAND OPERATIONS OFFICE

VITRO ENGINEERING • architects • engineers
a division of AUTOMATION INDUSTRIES, INC.

241-BX TANK FARM
GEOLOGIC CHARACTERIZATION
BASE OF BACKFILL

PROJ. NO. CK-0006 | PROJECT TITLE: TANK FARM
W.O. NO. CK-0006 | GEOLOGIC CHARACTERIZATION

BLDG. NO. 241-BX — INDEX NO. 0111

DWG. NO. H-2-64992 — SHEET NO. — NO. OF SHTS. — —