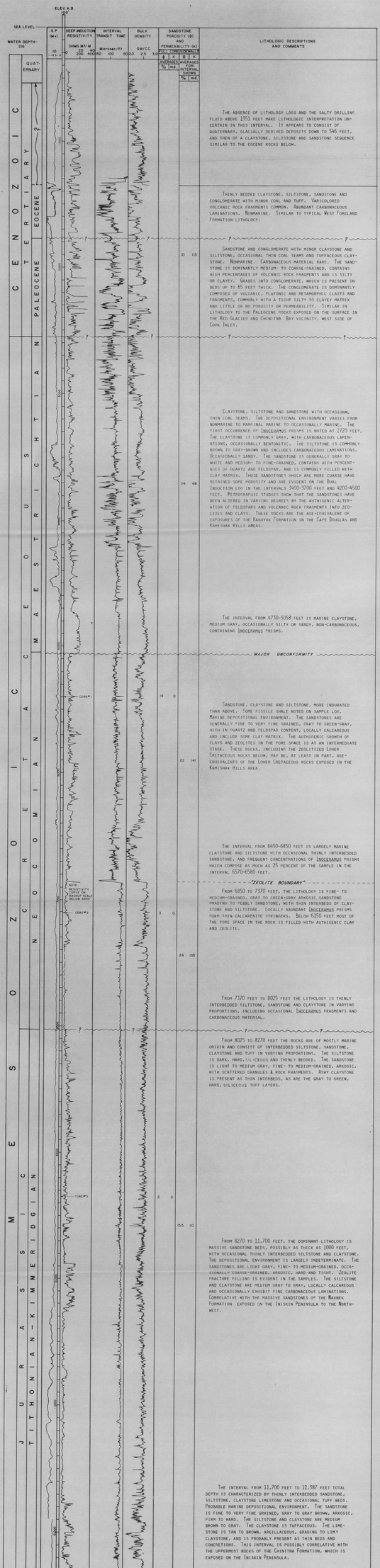
ARCO OPERATED

LOWER COOK INLET COST #1 WELL

BLOCK 489, TRACT 46

LOWER COOK INLET, ALASKA



THE ABSENCE OF LITHOLOGY LOGS AND THE SALTY DRILLING FLUID ABOVE 1351 FEET MAKE LITHOLOGIC INTERPRETATION UNCERTAIN IN THIS INTERVAL. IT APPEARS TO CONSIST OF QUATERNARY, GLACIALLY DERIVED DEPOSITS DOWN TO 546 FEET, AND THEN OF A CLAYSTONE, SILTSTONE AND SANDSTONE SEQUENCE SIMILAR TO THE EOCENE ROCKS BELOW.

THINLY BEDDED CLAYSTONE, SILTSTONE, SANDSTONE AND CONGLOMERATE WITH MINOR COAL AND TUFF. VARICOLORED VOLCANIC ROCK FRAGMENTS COMMON. ABUNDANT CARBONACEOUS LAMINATIONS. NONMARINE. SIMILAR TO TYPICAL WEST FORELAND FORMATION LITHOLOGY.

SANDSTONE AND CONGLOMERATE WITH MINOR CLAYSTONE AND SILTSTONE, OCCASIONAL THIN COAL SEAMS AND TUFFACEOUS CLAYSTONE. NONMARINE. CARBONACEOUS MATERIAL RARE. THE SANDSTONE IS DOMINANTLY MEDIUM- TO COARSE-GRAINED, CONTAINS HIGH PERCENTAGES OF VOLCANIC ROCK FRAGMENTS AND IS SILTY OR CLAYEY. GRADES INTO CONGLOMERATE, WHICH IS PRESENT IN BEDS UP TO 65 FEET THICK. THE CONGLOMERATE IS DOMINANTLY COMPOSED OF VOLCANIC, PLUTONIC AND METAMORPHIC CLASTS AND FRAGMENTS, COMMONLY WITH A TIGHT SILTY TO CLAYEY MATRIX AND LITTLE OR NO POROSITY OR PERMEABILITY. SIMILAR IN LITHOLOGY TO THE PALEOCENE ROCKS EXPOSED ON THE SURFACE IN THE RED GLACIER AND CHINITNA BAY VICINITY, WEST SIDE OF COOK INLET.

CLAYSTONE, SILTSTONE AND SANDSTONE WITH OCCASIONAL THIN COAL SEAMS. THE DEPOSITIONAL ENVIRONMENT VARIES FROM NONMARINE TO MARINAL MARINE TO OCCASIONALLY MARINE. THE FIRST OCCURRENCE OF INOCERAMUS PRISMS IS NOTED AT 2720 FEET. THE CLAYSTONE IS COMMONLY GRAY, WITH CARBONACEOUS LAMINATIONS, OCCASIONALLY BENTONITIC. THE SILTSTONE IS COMMONLY BROWN TO GRAY-BROWN AND INCLUDES CARBONACEOUS LAMINATIONS. OCCASIONALLY SANDY. THE SANDSTONE IS GENERALLY GRAY TO WHITE AND MEDIUM- TO FINE-GRAINED, CONTAINS HIGH PERCENTAGES OF QUARTZ AND FELDSPAR, AND IS COMMONLY FILLED WITH CLAY MATRIX. THOSE SANDSTONES WHICH ARE MORE COARSE HAVE RETAINED SOME POROSITY AND ARE EVIDENT ON THE DUAL INDUCTION LOG IN THE INTERVALS 3930-3700 FEET AND 4200-4500 FEET. PETROGRAPHIC STUDIES SHOW THAT THE SANDSTONES HAVE BEEN ALTERED IN VARYING DEGREES BY THE AUTHIGENIC ALTERATION OF FELDSPARS AND VOLCANIC ROCK FRAGMENTS INTO ZEOLITES AND CLAYS. THESE ROCKS ARE THE AGE-EQUIVALENT OF EXPOSURES OF THE KAGUYAK FORMATION IN THE CAPE DOUGLAS AND KAMISHAK HILLS AREAS.

THE INTERVAL FROM 4730-5050 FEET IS MARINE CLAYSTONE, MEDIUM GRAY, OCCASIONALLY SILTY OR SANDY, NON-CARBONACEOUS, CONTAINING INOCERAMUS PRISMS.

SANDSTONE, CLAYSTONE AND SILTSTONE, MORE INDURATED THAN ABOVE. SOME FISSILE SHALE NOTED ON SAMPLE LOG. MARINE DEPOSITIONAL ENVIRONMENT. THE SANDSTONES ARE GENERALLY FINE TO VERY FINE GRAINED, GRAY TO GREEN-GRAY, HIGH IN QUARTZ AND FELDSPAR CONTENT, LOCALLY CALCAREOUS AND INCLUDE SOME CLAY MATRIX. THE AUTHIGENIC GROWTH OF CLAYS AND ZEOLITES IN THE PORE SPACE IS AT AN INTERMEDIATE STAGE. THESE ROCKS, INCLUDING THE ZEOLITIZED LOWER CRETACEOUS ROCKS BELOW, MAY BE, AT LEAST IN PART, AGE-EQUIVALENTS OF THE LOWER CRETACEOUS ROCKS EXPOSED IN THE KAMISHAK HILLS AREA.

THE INTERVAL FROM 6450-6850 FEET IS LARGELY MARINE CLAYSTONE AND SILTSTONE WITH OCCASIONAL THINLY INTERBEDDED SANDSTONE, AND FREQUENT CONCENTRATIONS OF INOCERAMUS PRISMS WHICH COMPOSE AS MUCH AS 25 PERCENT OF THE SAMPLE IN THE INTERVAL 6570-6580 FEET.

FROM 6850 TO 7370 FEET, THE LITHOLOGY IS FINE- TO MEDIUM-GRAINED, GRAY TO GREEN-GRAY ARKOSIC SANDSTONE GRADING TO PEBBLY SANDSTONE, WITH THIN INTERBEDS OF CLAYSTONE AND SILTSTONE. LOCALLY ABUNDANT INOCERAMUS PRISMS FORM THIN CALCARENITE STRINGERS. BELOW 6350 FEET MOST OF THE PORE SPACE IN THE ROCK IS FILLED WITH AUTHIGENIC CLAY AND ZEOLITE.

FROM 7320 FEET TO 8025 FEET THE LITHOLOGY IS THINLY INTERBEDDED SILTSTONE, SANDSTONE AND CLAYSTONE IN VARYING PROPORTIONS, INCLUDING OCCASIONAL INOCERAMUS FRAGMENTS AND CARBONACEOUS MATERIAL.

FROM 8025 TO 8270 FEET THE ROCKS ARE OF MOSTLY MARINE ORIGIN AND CONSIST OF INTERBEDDED SILTSTONE, SANDSTONE, CLAYSTONE AND TUFF IN VARYING PROPORTIONS. THE SILTSTONE IS DARK, HARD, SILICEOUS AND THINLY BEDDED. THE SANDSTONE IS LIGHT TO MEDIUM GRAY, FINE- TO MEDIUM-GRAINED, ARKOSIC, WITH SCATTERED GRANULES & ROCK FRAGMENTS. ASHY CLAYSTONE IS PRESENT AS THIN INTERBEDS, AS ARE THE GRAY TO GREEN, HARD, SILICEOUS TUFF LAYERS.

FROM 8270 TO 11,700 FEET, THE DOMINANT LITHOLOGY IS MASSIVE SANDSTONE BEDS, POSSIBLY AS THICK AS 1000 FEET, WITH OCCASIONAL THINLY INTERBEDDED SILTSTONE AND CLAYSTONE. THE DEPOSITIONAL ENVIRONMENT IS LARGELY INDETERMINATE. THE SANDSTONES ARE LIGHT GRAY, FINE- TO MEDIUM-GRAINED, OCCASIONALLY COARSE-GRAINED, ARKOSIC, HARD AND TIGHT. ZEOLITE FRACTURE FILLING IS EVIDENT IN THE SAMPLES. THE SILTSTONE AND CLAYSTONE ARE MEDIUM GRAY TO GRAY, LOCALLY CALCAREOUS AND OCCASIONALLY EXHIBIT FINE CARBONACEOUS LAMINATIONS. CORRELATIVE WITH THE MASSIVE SANDSTONES OF THE NAVIKA FORMATION EXPOSED ON THE INISKIN PENINSULA TO THE NORTHWEST.

THE INTERVAL FROM 11,700 FEET TO 12,387 FEET TOTAL DEPTH IS CHARACTERIZED BY THINLY INTERBEDDED SANDSTONE, SILTSTONE, CLAYSTONE LIMESTONE AND OCCASIONAL TUFF BEDS. PROBABLE MARINE DEPOSITIONAL ENVIRONMENT. THE SANDSTONE IS FINE TO VERY FINE GRAINED, GRAY TO GRAY BROWN, ARKOSIC, FIRM TO HARD. THE SILTSTONE AND CLAYSTONE ARE MEDIUM BROWN TO GRAY. THE CLAYSTONE IS TUFFACEOUS. THE LIMESTONE IS TAN TO BROWN, ARGILLACEOUS, GRADING TO LIMY CLAYSTONE, AND IS PROBABLY PRESENT AS THIN BEDS AND CONCRETIONS. THIS INTERVAL IS POSSIBLY CORRELATIVE WITH THE UPPERMOST ROCKS OF THE CHINITNA FORMATION, WHICH IS EXPOSED ON THE INISKIN PENINSULA.

DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

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PLATE II - GEOPHYSICAL AND LITHOLOGIC LOGS