

NEW MEXICO OIL CONSERVATION COMMISSION

Santa Fe, New Mexico

MISCELLANEOUS NOTICES

RECEIVED
APR 24 1937
RESERVED

Submit this notice in triplicate to the Oil Conservation Commission or its proper agent before the work specified is to begin. A copy will be returned to the sender on which will be given the approval, with any modifications considered advisable, or the rejection by the Commission or its agent, of the plan submitted. The plan as approved should be followed, and work should not begin until approval is obtained. See additional instructions in the Rules and Regulations of the Commission.

Indicate nature of notice by checking below:

NOTICE OF INTENTION TO TEST CASING SHUT-OFF	<input checked="" type="checkbox"/>	NOTICE OF INTENTION TO SHOOT OR CHEMICALLY TREAT WELL	
NOTICE OF INTENTION TO CHANGE PLANS	<input type="checkbox"/>	NOTICE OF INTENTION TO PULL OR OTHERWISE ALTER CASING	
NOTICE OF INTENTION TO REPAIR WELL	<input type="checkbox"/>	NOTICE OF INTENTION TO PLUG WELL	
NOTICE OF INTENTION TO DEEPEN WELL	<input type="checkbox"/>		

Monument, New Mexico

April 23, 1937

Place

Date

OIL CONSERVATION COMMISSION,
Santa Fe, New Mexico.

Gentlemen:

Following is a notice of intention to do certain work as described below at the _____

Amerada Petroleum Corporation State 2 Well No. 2 in SE 1/4 NE 1/4
Company or Operator Lease
of Sec. 13, T. 20, R. 36, N. M. P. M., Monument Field,
Lea County.

FULL DETAILS OF PROPOSED PLAN OF WORK

FOLLOW INSTRUCTIONS IN THE RULES AND REGULATIONS OF THE COMMISSION

12 1/2" 40# 8-Thd. New Lapweld casing was set in this well at 191' and cemented by the Halliburton Method with 200 sacks.

Cement will be drilled out of the casing and the hole will then be bailed dry and allowed to stand undisturbed for one hour. The bailer will then be run to bottom again to determine if any water has accumulated. In no water has accumulated the drilling will then be resumed.

DUPLICATE

Approved APR 26 1937, 19_____
except as follows:

Amerada Petroleum Corporation
Company or Operator
By J. A. Starkey
Position Sup't.
Send communications regarding well to
Name J. A. Starkey
Address Monument, New Mexico

OIL CONSERVATION COMMISSION
By Guy Shepard
Title Oil & Gas Inspector

100.

THE UNIVERSITY OF CHICAGO

PHYSICS DEPARTMENT

PHYSICS 551

LECTURE 10: QUANTUM MECHANICS OF PARTICLES IN POTENTIALS

1. THE SCHRÖDINGER EQUATION

The Schrödinger equation is the fundamental equation of quantum mechanics. It describes the time evolution of the wave function $\psi(\mathbf{r}, t)$ of a particle in a potential $V(\mathbf{r})$.

$$i\hbar \frac{\partial \psi}{\partial t} = -\frac{\hbar^2}{2m} \nabla^2 \psi + V(\mathbf{r}) \psi$$

For stationary states, the wave function can be written as $\psi(\mathbf{r}, t) = \phi(\mathbf{r}) e^{-iEt/\hbar}$.

$$-\frac{\hbar^2}{2m} \nabla^2 \phi + V(\mathbf{r}) \phi = E \phi$$

This is the time-independent Schrödinger equation. It is a second-order partial differential equation.

The boundary conditions for the wave function are $\psi \rightarrow 0$ as $r \rightarrow \infty$.

2. THE PARTICLE IN A BOX

Consider a particle of mass m confined to a one-dimensional box of length L .

The potential is zero inside the box and infinite outside. The wave function must satisfy $\psi(0) = \psi(L) = 0$.

$$\psi(x) = A \sin(kx) \quad 0 < x < L$$

The boundary condition at $x=L$ requires $\sin(kL) = 0$, so $kL = n\pi$.

$$k = \frac{n\pi}{L} \quad n = 1, 2, 3, \dots$$

The energy eigenvalues are $E_n = \frac{\hbar^2 k^2}{2m} = \frac{\hbar^2 \pi^2 n^2}{2mL^2}$.

The corresponding wave functions are $\psi_n(x) = \sqrt{\frac{2}{L}} \sin\left(\frac{n\pi x}{L}\right)$.

3. THE PARTICLE IN A POTENTIAL WELL

Consider a particle in a potential well of width L and depth V_0 .

The potential is zero outside the well and $-V_0$ inside. The wave function must satisfy $\psi(0) = \psi(L) = 0$.

The wave function inside the well is $\psi(x) = A \sin(kx)$ and outside the well is $\psi(x) = B e^{-\kappa x}$ for $x > L$.

The boundary conditions at $x=L$ require $\psi(L) = 0$ and $\psi'(L) = 0$.

The energy eigenvalues are determined by the transcendental equation $\tan(kL) = \frac{\kappa}{k}$.

where $k = \sqrt{2m(E + V_0)}$ and $\kappa = \sqrt{2m(V_0 - E)}$.

The energy eigenvalues are $E_n = -V_0 + \frac{\hbar^2 k_n^2}{2m}$.

The corresponding wave functions are $\psi_n(x) = \sqrt{\frac{2}{L}} \sin\left(\frac{k_n x}{L}\right)$.

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