

The High Stakes History of Oak Ridge

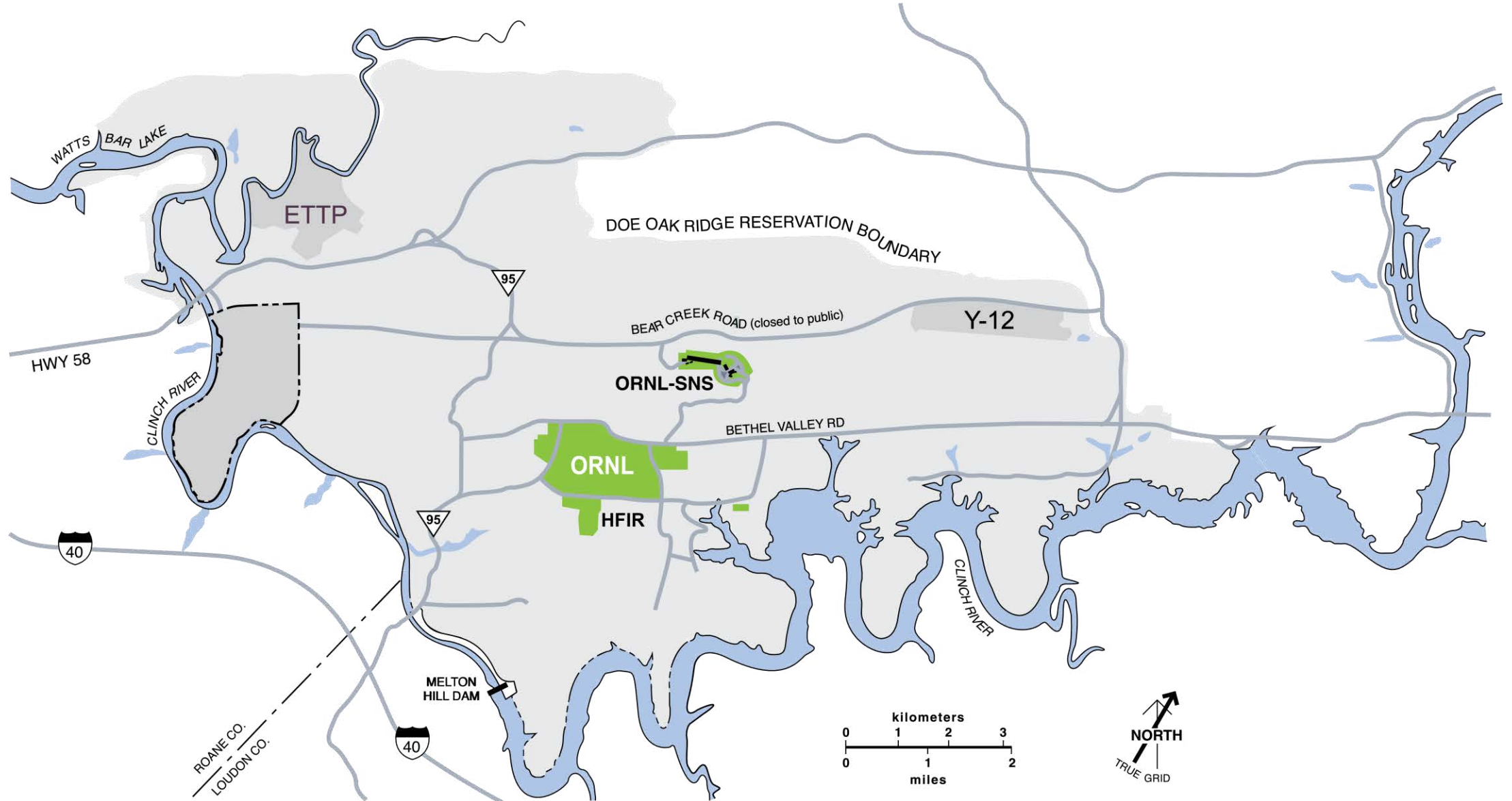
79th HPC User Forum

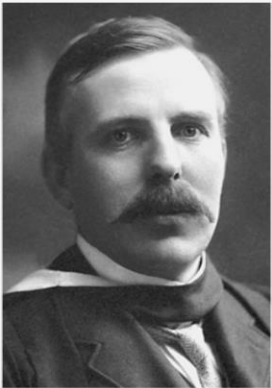
David Keim
Director, Communications

Oak Ridge, Tennessee
June 21, 2022

ORNL is managed by UT-Battelle LLC for the US Department of Energy

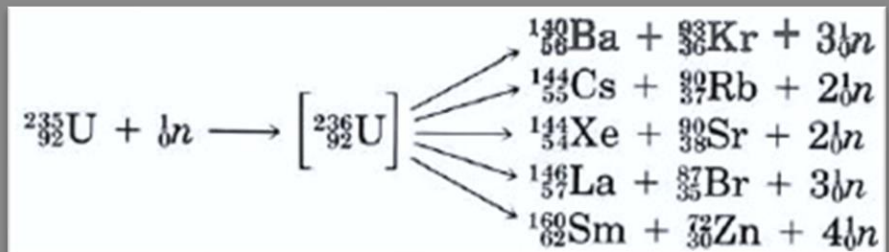
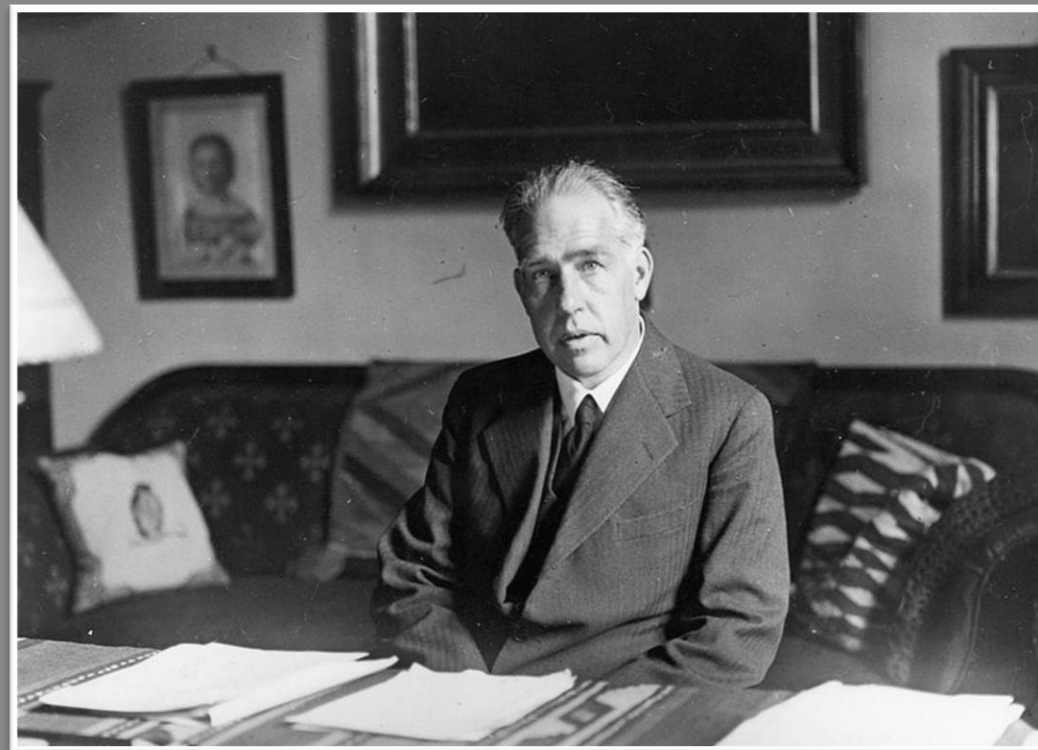
DOE has 3 large sites in Oak Ridge







Images courtesy of Wikimedia Commons



F.D. Roosevelt,
President of the United States,
White House
Washington, D.C.

Albert Einstein
Old Grove Rd.
Hassau Point
Peconic, Long Island
August 2nd, 1939

Sir:

Some recent work by E. Fermi and L. Szilard, which has been communicated to me in manuscript, leads me to expect that the element uranium may be turned into a new and important source of energy in the immediate future. Certain aspects of the situation which has arisen seem to call for watchfulness and, if necessary, quick action on the part of the Administration. I believe therefore that it is my duty to bring to your attention the following facts and recommendations:

In the course of the last four months it has been made probable through the work of Joliot in France as well as Fermi and Szilard in America - that it may become possible to set up a nuclear chain reaction in a large mass of uranium, by which vast amounts of power and large quantities of new radium-like elements would be generated. Now it appears almost certain that this could be achieved in the immediate future.

This new phenomenon would also lead to the construction of bombs, and it is conceivable - though much less certain - that extremely powerful bombs of a new type may thus be constructed. A single bomb of this type, carried by boat and exploded in a port, might very well destroy the whole port together with some of the surrounding territory. However, such bombs might very well prove to be too heavy for transportation by air.

-2-

as only very poor ores of uranium in moderate good ore in Canada and the former Czechoslovakia, source of uranium is Belgian Congo.

uation you may think it desirable to have some chain reactions in America. One possible way for you to entrust with this task a person and who could perhaps serve in an unofficial

comprise the following:

Government Departments, keep them informed of the put forward recommendations for Government action, on to the problem of securing a supply of uranium

ates;
experimental work, which is at present being carried out of the budgets of University laboratories, by funds be required, through his contacts with willing to make contributions for this cause, ning the co-operation of industrial laboratories equipment.

from the Czechoslovakian mines which she has taken over. That she should have taken such early action might perhaps be understood on the ground that the son of the German Under-Secretary of State, von Weizsäcker, is attached to the Kaiser-Wilhelm-Institut in Berlin where some of the American work on uranium is now being repeated.

Yours very truly,
A. Einstein
(Albert Einstein)

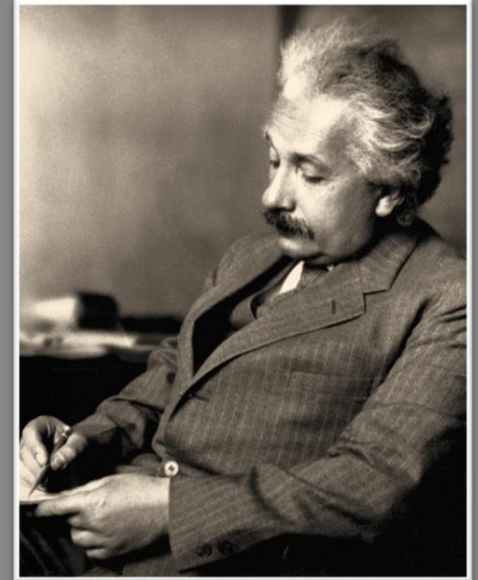
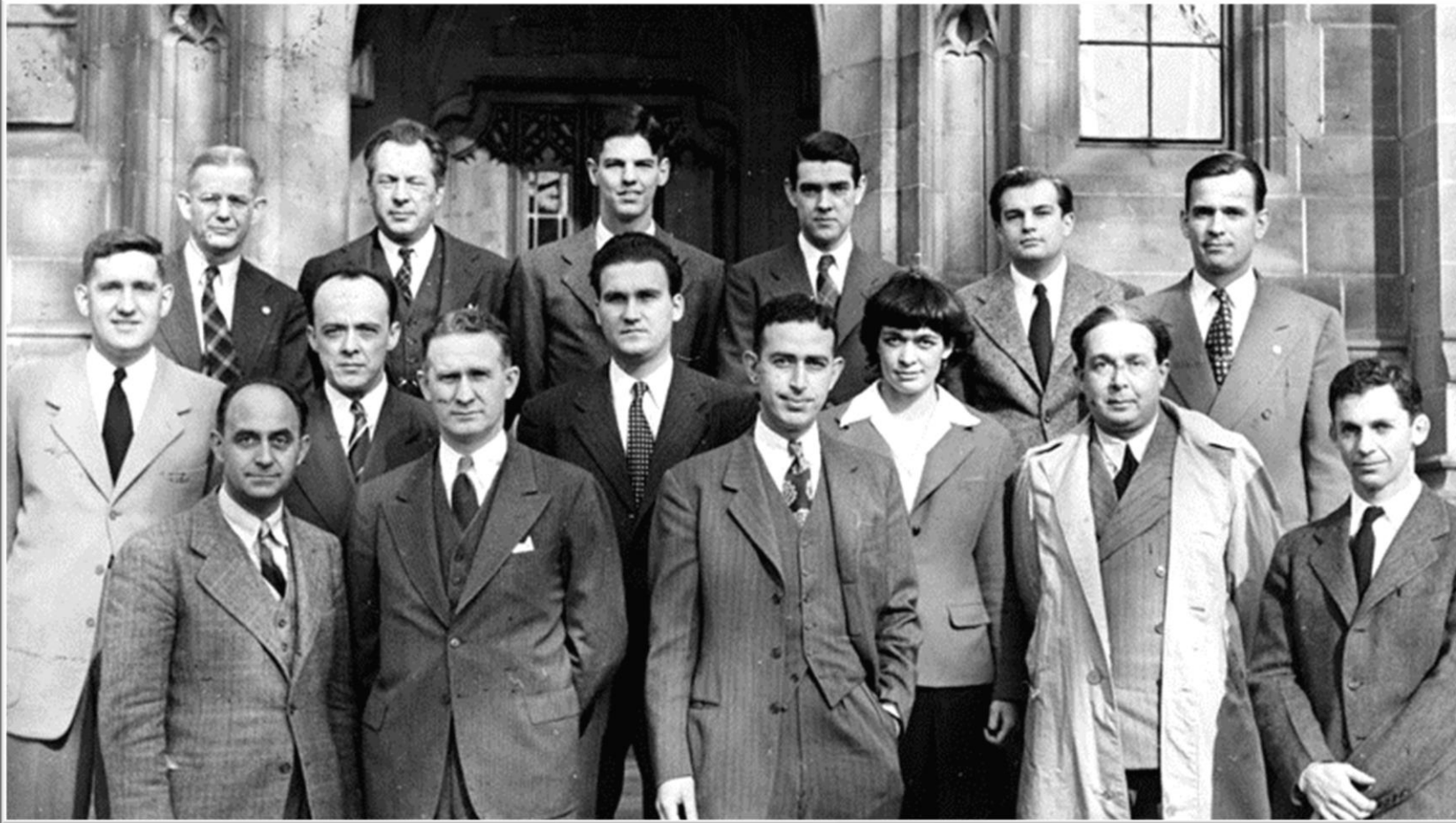


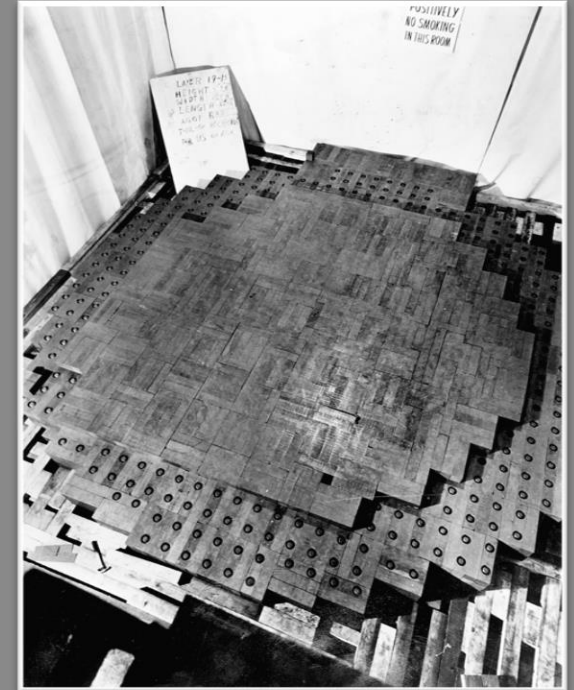
Image: Wikimedia Commons



Image: Lawrence Berkeley National Laboratory



Images: University of Chicago Archive



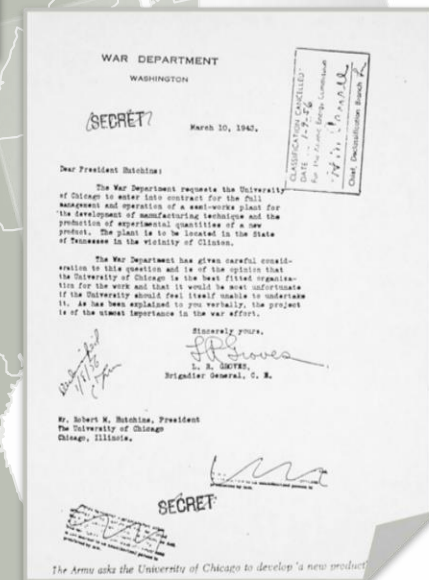
Hanford

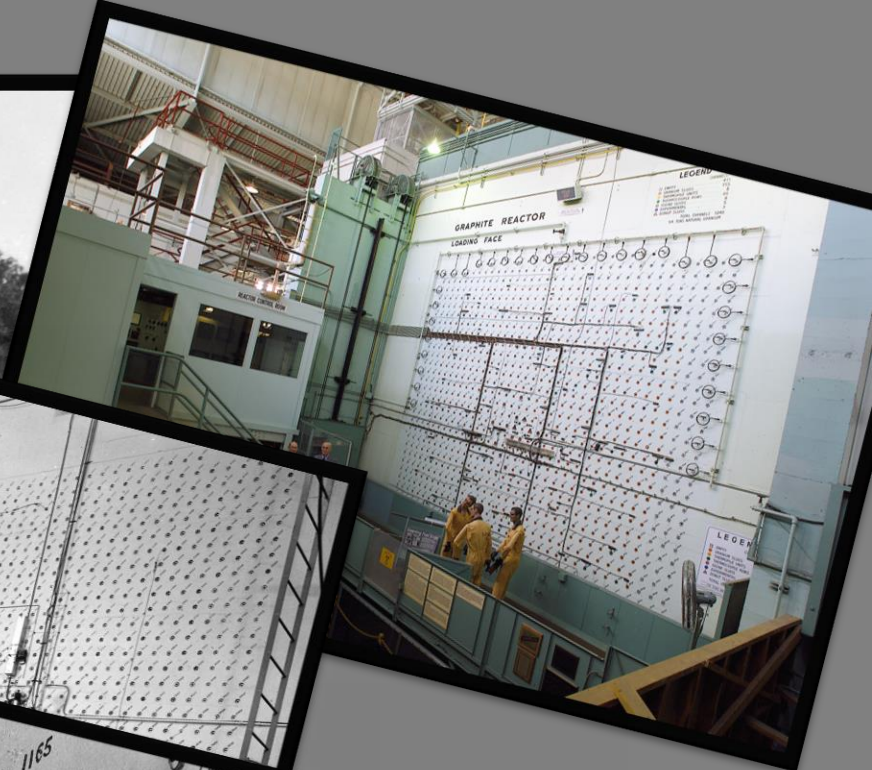
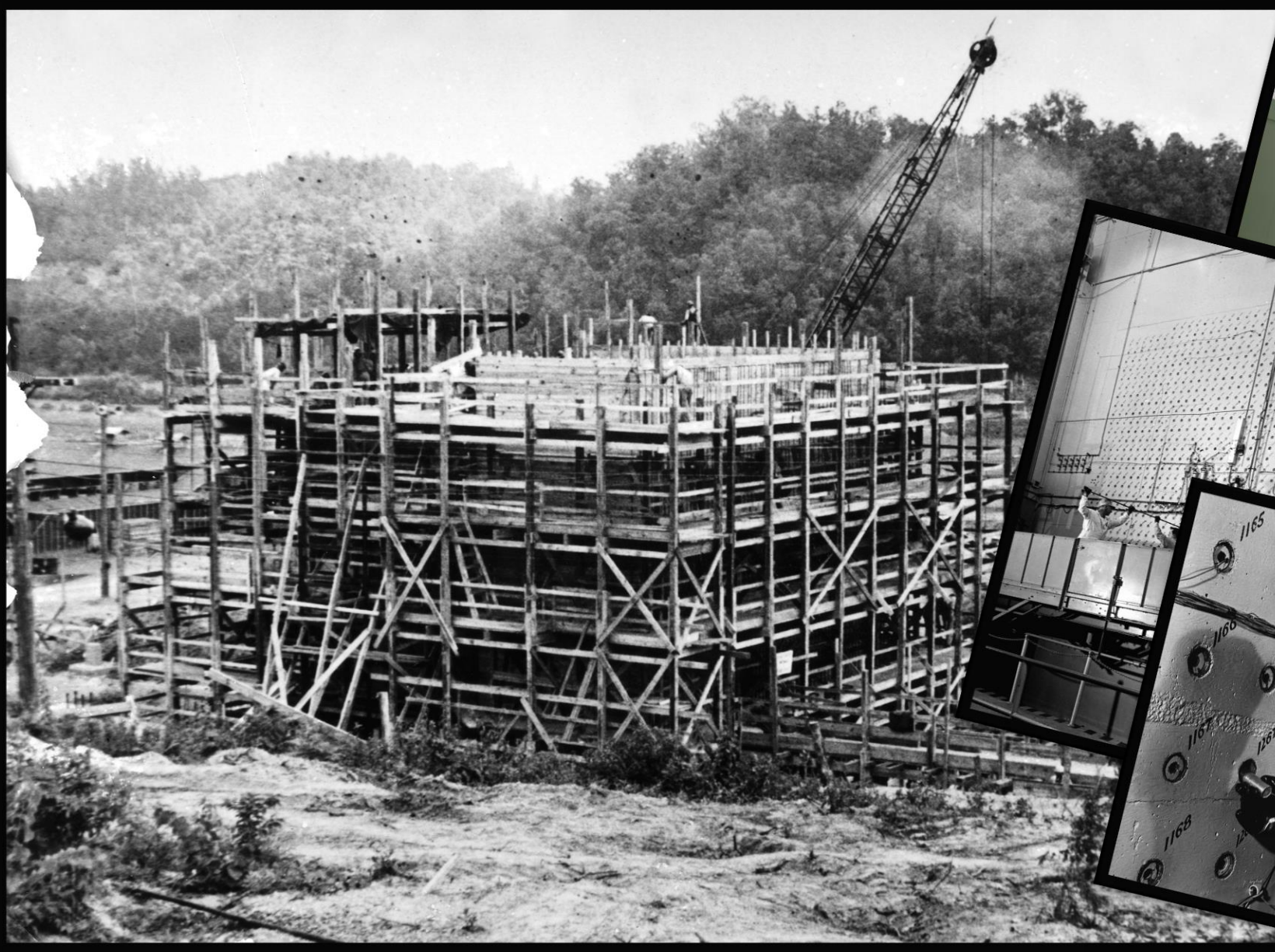


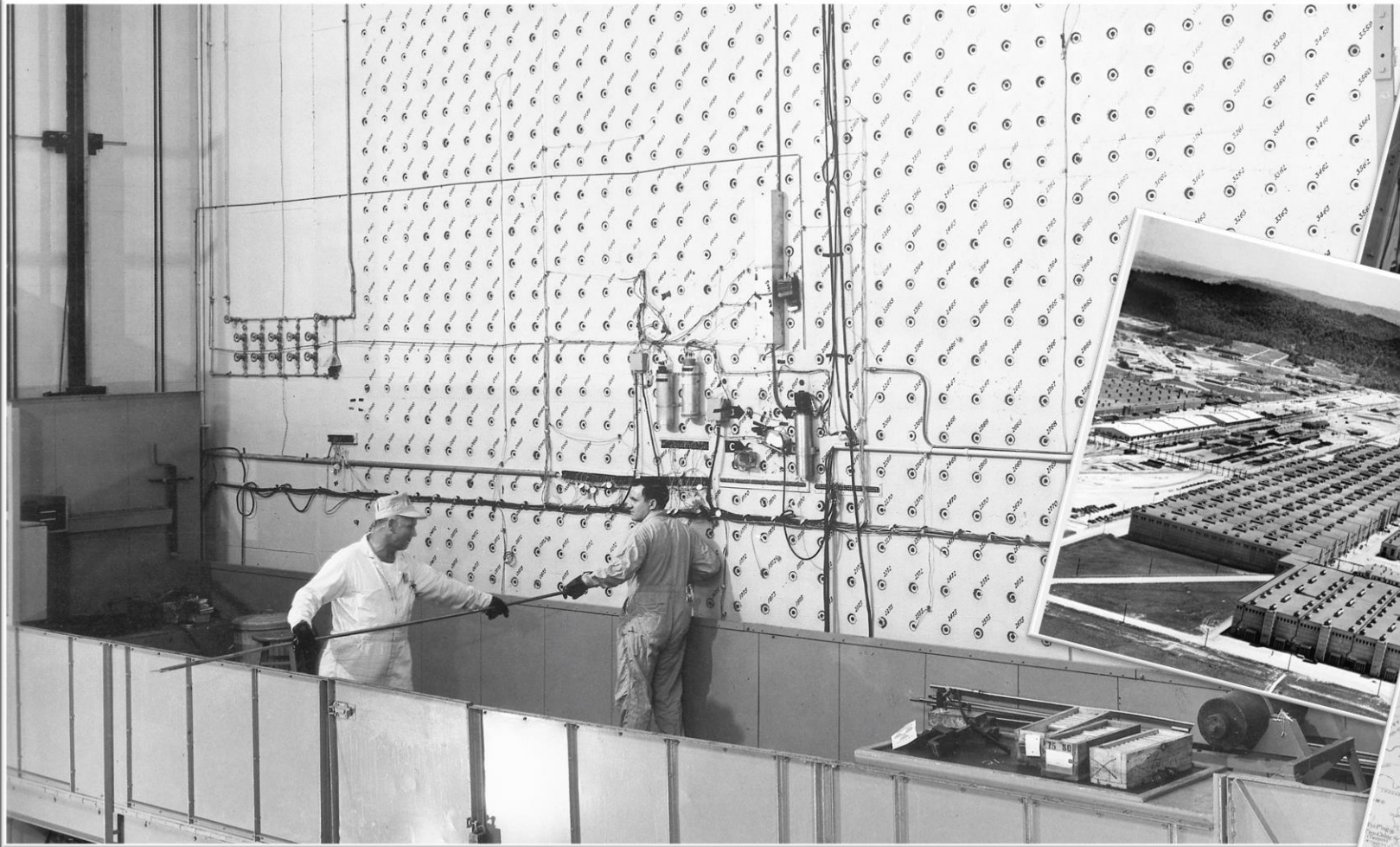
Los Alamos



Oak Ridge





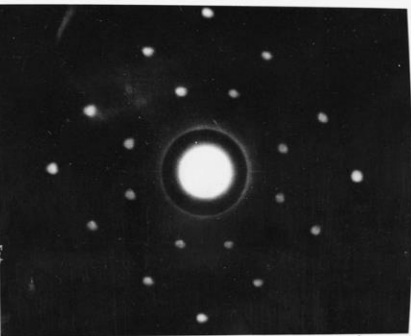
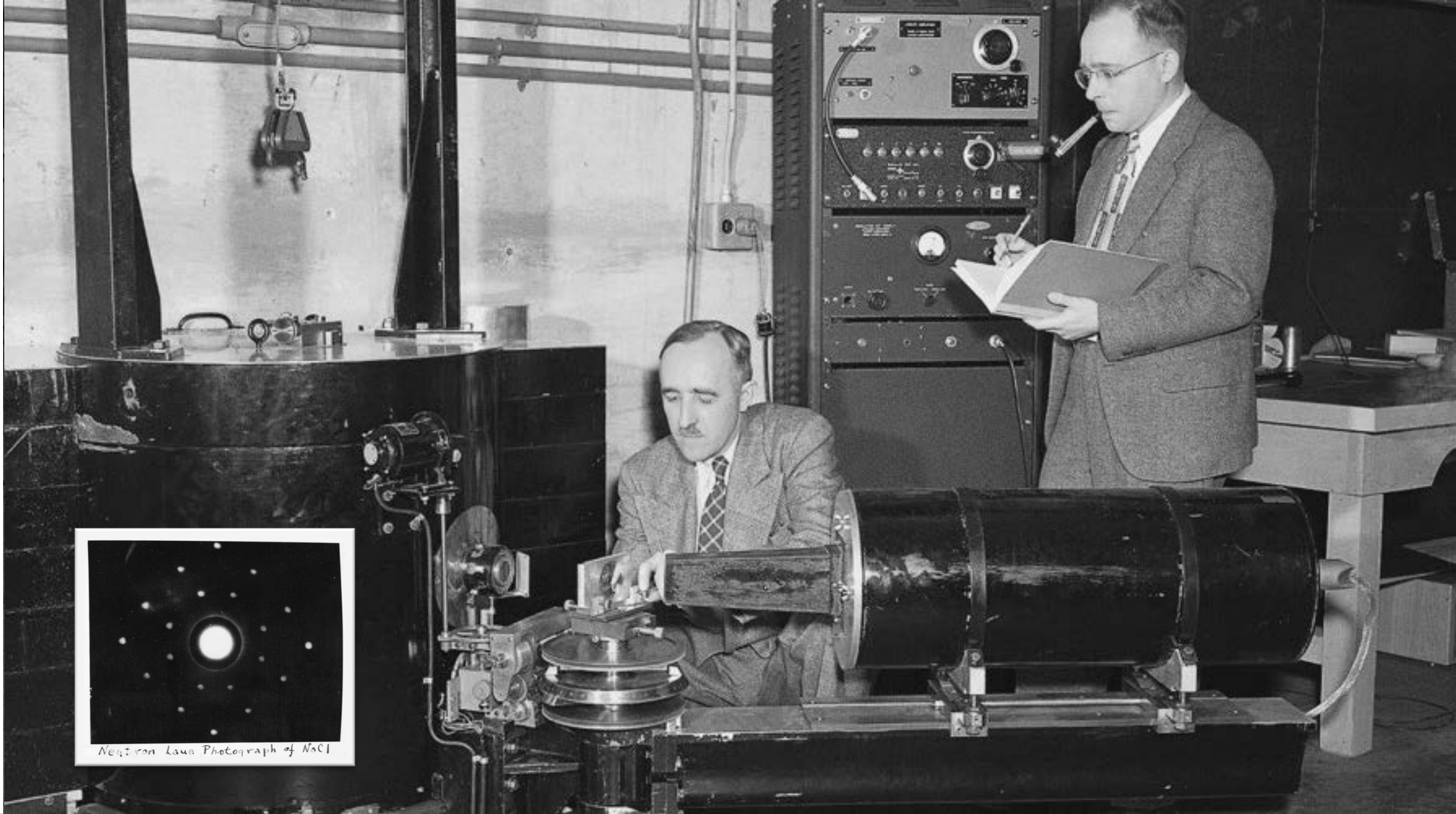




Periodic Table of the Elements

Periodic Table of the Elements																			
1 1A 1A 1 H Hydrogen 1.008		2 2A 2A 4 Be Beryllium 9.012												13 3A 3A 5 B Boron 10.811	14 4A 4A 6 C Carbon 12.011	15 5A 5A 7 N	16 6A 6A 8 O	17 7A 7A 9 F	18 8A 8A 10 He Helium 4.003
3 Li Lithium 6.941	4 Be Beryllium 9.012											13 Al Aluminum 26.982	14 Si Silicon 28.086	<div><div>117 Ts Tennessee</div></div>			18 Ar Argon 39.948		
11 Na Sodium 22.990	12 Mg Magnesium 24.305	3 3B 3B 21 Sc Scandium 44.956	4 4B 4B 22 Ti Titanium 47.867	5 5B 5B 23 V Vanadium 50.942	6 6B 6B 24 Cr Chromium 51.996	7 7B 7B 25 Mn Manganese 54.938	8 8 26 Fe Iron 55.845	9 8 27 Co Cobalt 58.933	10 10 28 Ni Nickel 58.693	11 1B 1B 29 Cu Copper 63.546	12 2B 2B 30 Zn Zinc 65.38	31 Ga Gallium 69.723	32 Ge Germanium 72.631				36 Kr Krypton 83.798		
19 K Potassium 39.098	20 Ca Calcium 40.078	21 Sc Scandium 44.956	22 Ti Titanium 47.867	23 V Vanadium 50.942	24 Cr Chromium 51.996	25 Mn Manganese 54.938	26 Fe Iron 55.845	27 Co Cobalt 58.933	28 Ni Nickel 58.693	29 Cu Copper 63.546	30 Zn Zinc 65.38	31 Ga Gallium 69.723	32 Ge Germanium 72.631	33 As Arsenic 74.922	34 Se Selenium 78.96	35 Br Bromine 79.904	36 Kr Krypton 83.798		
37 Rb Rubidium 85.468	38 Sr Strontium 87.62	39 Y Yttrium 88.906	40 Zr Zirconium 91.224	41 Nb Niobium 92.906	42 Mo Molybdenum 95.94	43 Tc Technetium 98.906	44 Ru Ruthenium 101.07	45 Rh Rhodium 102.905	46 Pd Palladium 106.42	47 Ag Silver 107.868	48 Cd Cadmium 112.411	49 In Indium 114.818	50 Sn Tin 118.710	51 Sb Antimony 121.757	52 Te Tellurium 127.6	53 I Iodine 126.905	54 Xe Xenon 131.29		
55 Cs Cesium 132.905	56 Ba Barium 137.327	57-71	72 Hf Hafnium 178.49	73 Ta Tantalum 180.948	74 W Tungsten 183.84	75 Re Rhenium 186.207	76 Os Osmium 190.23	77 Ir Iridium 192.222	78 Pt Platinum 195.084	79 Au Gold 196.967	80 Hg Mercury 200.59	81 Tl Thallium 204.383	82 Pb Lead 207.2	83 Bi Bismuth 208.980	84 Po Polonium [209]	85 At Astatine [210]	86 Rn Radon [222]		
87 Fr Francium 223.020	88 Ra Radium 226.025	89-103	104 Rf Rutherfordium [261]	105 Db Dubnium [262]	106 Sg Seaborgium [266]	107 Bh Bohrium [264]	108 Hs Hassium [277]	109 Mt Meitnerium [276]	110 Ds Darmstadtium [271]	111 Rg Roentgenium [272]	112 Cn Copernicium [285]	113 Nh Nihonium [284]	114 Fl Flerovium [289]	115 Mc Moscovium [288]	116 Lv Livermorium [293]	117 Ts Tennessee [294]	118 Og Oganesson [294]		
Lanthanide Series			57 La Lanthanum 138.905	58 Ce Cerium 140.116	59 Pr Praseodymium 140.908	60 Nd Neodymium 144.242	61 Pm Promethium [144.913]	62 Sm Samarium 150.36	63 Eu Europium 151.964	64 Gd Gadolinium 157.25	65 Tb Terbium 158.925	66 Dy Dysprosium 162.500	67 Ho Holmium 164.930	68 Er Erbium 167.259	69 Tm Thulium 168.934	70 Yb Ytterbium 173.055	71 Lu Lutetium 174.967		
Actinide Series			89 Ac Actinium 227.028	90 Th Thorium 232.038	91 Pa Protactinium 231.036	92 U Uranium 238.029	93 Np Neptunium 237.048	94 Pu Plutonium 244.064	95 Am Americium 243.061	96 Cm Curium 247.070	97 Bk Berkelium 247.070	98 Cf Californium 251.080	99 Es Einsteinium [254]	100 Fm Fermium 257.095	101 Md Mendelevium 258.1	102 No Nobelium 259.101	103 Lr Lawrencium [262]		





Neutron Laue Photograph of NaCl



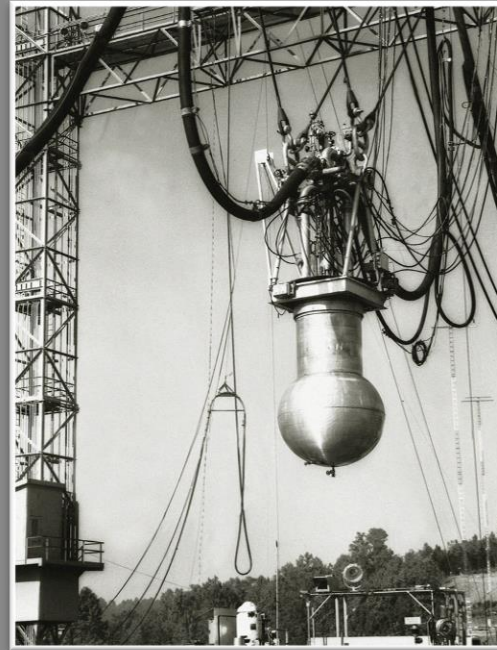
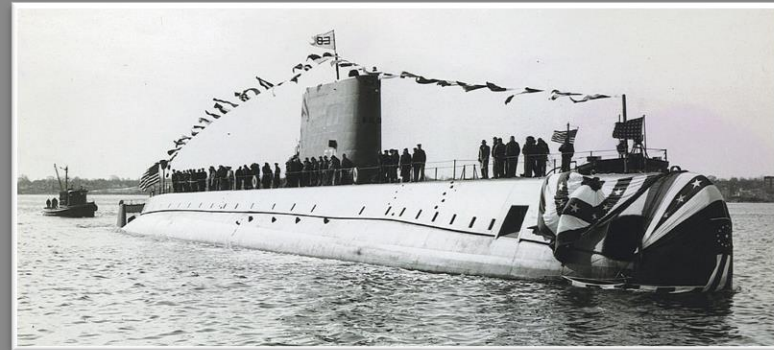
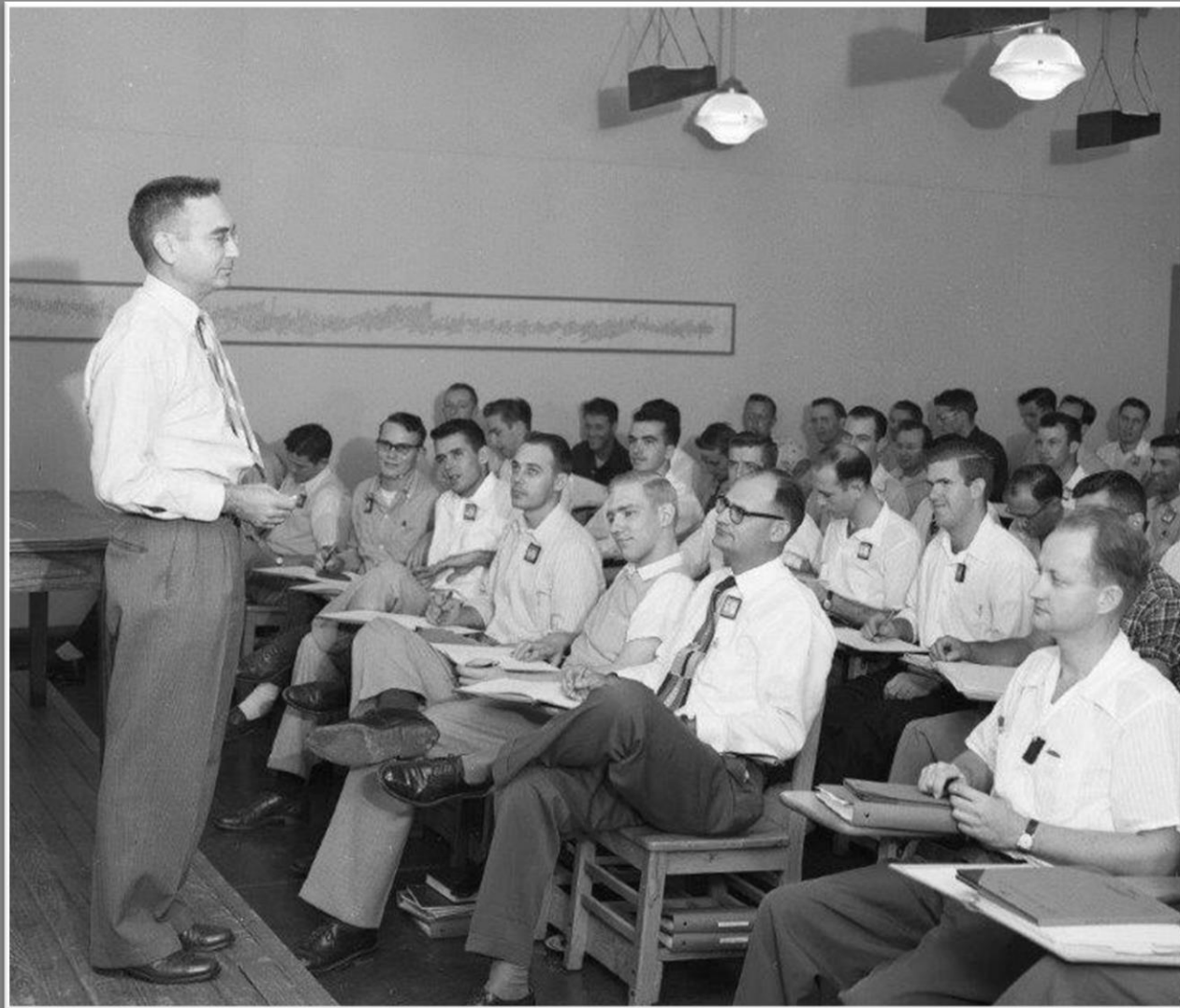


Image courtesy of
Wikimedia Commons





One ORNL

“

Our goal is to **maintain ORNL as a coherent, purposeful and interacting institution.**

Is anything really lost if a big laboratory becomes only a collection of weakly interacting little laboratories? To my mind, the laboratory's very essence is lost, in both applied and basic research . . . the strength of laboratories like ORNL lies in the interdisciplinary composition of their staffs. Over and over again it has been demonstrated that the whole can be greater than the sum of its parts, that good people from diverse fields working together can make major scientific discoveries that are denied geniuses working in isolation.

– Alvin M. Weinberg, 1967



”

Discussion

