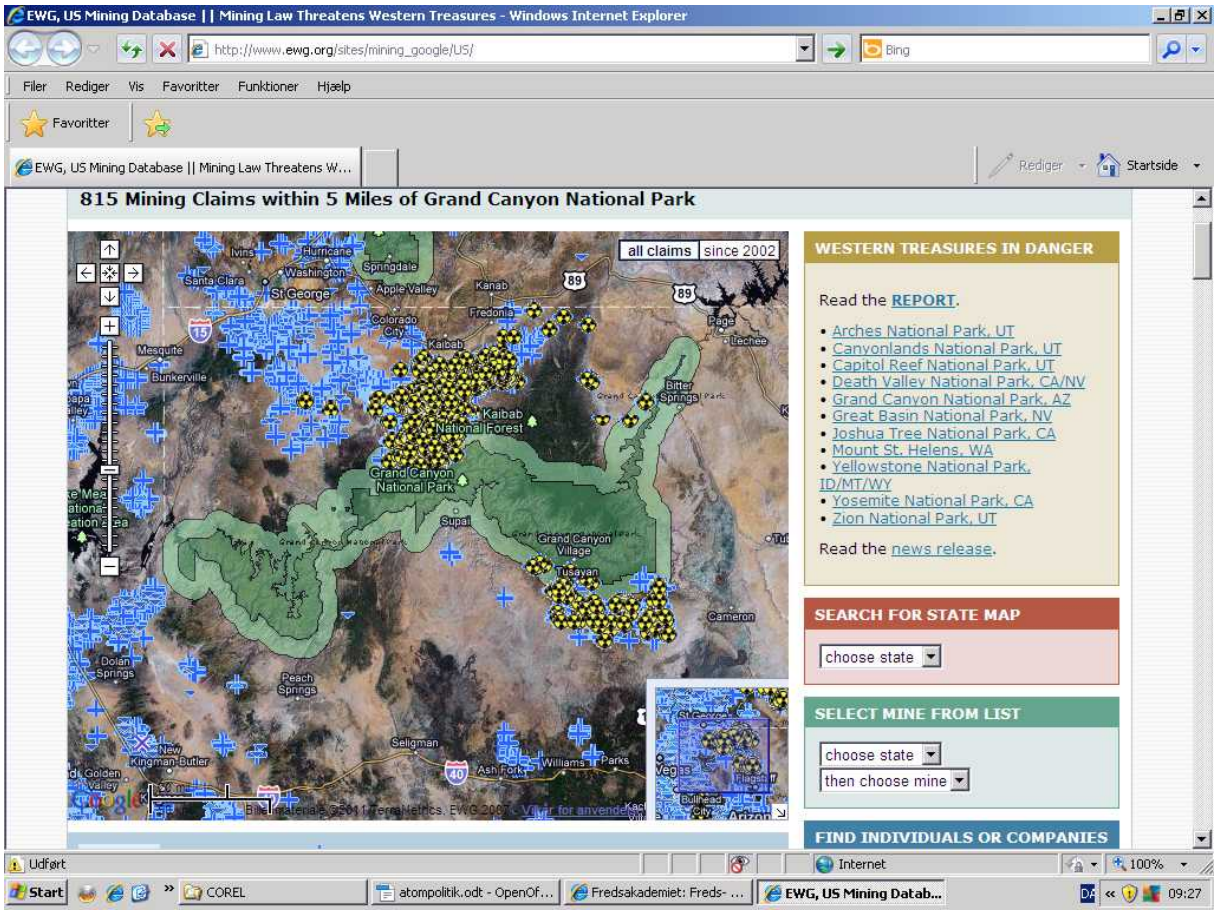
Atomvåbenproduktion i USA

Af Holger Terp, Fredsakademiet

Det atomvåbenindustrielle kompleks i USA er så vidt jeg ved det, ikke beskrevet på dansk.

Atompolitikken i Danmark har lige siden 1945 beskæftiget sig generelt med atomfysik[1], og atomvåben - eksempelvis deres udstationering og de forskellige opfattelser af, hvordan denne politik har påvirket vores allesammens sikkerhed.[2]

Men der er ingen her til lands der har beskrevet de miner, hvor råmaterialerne til kernevåbenproduktion var, fabrikkerne der fremstillede atomvåben, styrelserne der traf og stadig træffer beslutningerne herom i dybeste hemmelighed, atomvåbenforsøgene, samt deres menneskelige, miljømæssige og økonomiske omkostninger.



1 Issaacson, Walter: **Einstein : Hans liv og univers**. Gyldendal, 2006. - 742 s. : ill.

2 National Security Archive: **How Many and Where Were the Nukes?** What the U.S. Government No Longer Wants You to Know about Nuclear Weapons During the Cold War. National Security Archive Electronic Briefing Book No. 197, 2006l.

National Security Archive:**U.S. Strategic Nuclear Policy**: A Video History, 1945-2004 : Sandia Labs Historical Video Documents History of U.S. Strategic Nuclear Policy, 2011.

Air Force Special Film Project 416, "**Power of Decision**". Produced by Air Photographic and Charting Service. Circa 1958, For Official Use Only. Source: Digital copy prepared by National Archives and Records Administration Motion Pictures Unit, Record Group 342, Department of the Air Force.

Wittner, Lawrence S.: **The Struggle Against the Bomb**, I-III. Stanford University Press, 1993, 1997 & 2003.

Jeg fik ideen til projektet for et lille års tid siden og der mangler formodentlig meget endnu.

Det følgende er derfor smagsprøver på en meget omfattende og kompleks historie, der meget gerne må kommenteres og debatteres. Der er yderligere dokumentation om dette emne rundt omkring i Fredsakademiet. Stort set alle fremstillinger, kildemateriale, henvisninger og referencer er i sagens natur på engelsk. Undtagelsen her er den amerikanske journalist og forfatter Walter Isaacsons murstenstykke Einstein biografi, der dokumenterer den atompolitiske udvikling frem til 1955 - set med Einsteins briller.

Forsvarsministeriet og energiministeriet har ansvaret for udvikling af kernevåben i USA ud fra et ønske om en delvis civil kontrol med udviklingen og politikken. Det hele begynder med Manhattan projektet under anden verdenskrig, stort set det eneste i denne sammenhæng der er beskrevet på dansk på grund af atomfysikeren Niels Bohrs deltagelse[3].

Under den kolde krig var der to hovedretninger i udviklingen af atomvåben.[4] Den første var at give dem større og større sprængkraft, mest smæk for skillingen - i håbet om at en atomkrig mellem supermagterne aldrig blev til noget og for det andet, at gøde disse masseødelæggelsesvåben så små, at de kunne anvendes på slagmarken - i håbet om, at ødelæggelserne kunne begrænses til et acceptabelt niveau. De sidstnævnte tankegang gennemsyrer den aktuelle amerikanske tankegang om modernisering af landets kernevåben som eksempelvis udtrykkes igennem doktrinen om fælles nukleare operationer fra 2005 og fremefter[5], for som ambassadør Linton F. Brooks ud-

3 **Henningsen, Svend: Atompolitik 1939-1945**. /: Festskrift udgivet af Københavns Universitet, 1971 s. 7-254.

Ashley W. Oughterson, Henry L. Barnett,George V. LeRoy, Jack D. Rosenbaum, Averill A. Liebow, B. Aubrey Schneider, and E. Cuylar Hammond: **Medical Effects of Atomic Bombs** : The Report of the Joint Commission for the Investigation of the Effects of the Atomic Bomb in Japan; Volume VI. / Army Institute of Pathology: published (July 6, 1951).

Smyth, Henry De Wolf: **Atomic energy for military purposes; the official report on the development of the atomic bomb under the auspices of the United States Government**, 1940-1945. - Princeton, Princeton University Press, 1945. - 298 s.

4 **Beyond the United Kingdom: Trends in the Other Nuclear Armed States** / Ian Kearns

Discussion Paper 1 of the BASIC Trident Commission An independent, cross-party commission to examine UK nuclear weapons policy. British American Security Information Council (BASIC) 2011. - 40 s.

Nuclear Weapon Archive : **Complete List of All U.S. Nuclear Weapons**, 2006.

5 Kristensen, Hans M.: **Global Strike** : A Chronology of the Pentagon's New Offensive Strike Plan. - Washington DC : Federation of American Scientists, 2006. - 250 s.

USSTRATCOM: **Doctrine for Joint Nuclear Operations**. 2005. - 96 s.

Nuclear Brief February 2, 2006: **Pentagon Cancels Controversial Nuclear Doctrine**

Pentagon har formelt annulleret en kontroversiel revision af doktrinen for fælles nukleare operationer efter

taler det i 2005: "Ældre atomvåben systemer har ikke nye præcisionsvejledningsteknologier som vores konventionelle systemer har det fulde udbytte af". Han tilføjede, ældre atomvåben "er heller ikke gearet til små angreb eller fleksibilitet i kommando, kontrol og angreb."[6].
I den sidste del af den kolde krig - og også senere - sandsynliggjorde en række internationale klimaforskere, at selv en begrænset atomkrig ville medføre en global ultimativ miljøødelæggelse.[7]

De militære værn

Overordnet set består de militære værn, under ledelse af præsidenten og De øverste værnschefer, af følgende afdelinger.

- Hæren
- Flåden
- Luftvåbnet
- Marinekorpset
- Nationalgarden
- Den føderale civilforsvarsadministration
- Kystbevogtningen

samt Nukleare sikkerhedsvirksomheder / US Nuclear Security Enterprise og
Særlige aktionsstyrker / U.S. Special Operations Forces foruden diverse civile og militære efterretningstjenester. Kun flåden og luftvåbnet er i besiddelse af kernevåben.[8]

Efter Vietnamkrigen blev værnepligten afskaffet i USA.

Præsidenten har, i samarbejde med kongressen, retten til at melde krig[9] - og, må det formodes, også retten til at beslutte anvendelsen af kernevåben. Af gode grunde står der intet herom i den amerikanske forfatning og litteraturen om dette emne er af politiske grunde meget sparsom eller maskeret. Loven om atomenergi er fra 1954.[10]

doktrinen blev afsløret sidste år i en artikel i tidsskriftet Arms Control Today i september 2005 og Washington Post. Det reviderede udkast indeholdt for første gang beskrivelser af forebyggende brug af amerikanske atomvåben, og forårsagede Senatets Armed Services Committee til at bede om en orientering, og 16 lovgiverne til at protestere til daværende præsident Bush.

6 Gilmore, Gerry J.: **QDR to Address Transformation of U.S. Nuclear Arsenal**. American Forces Press Service, April 5, 2005.

Building Budgetary Transparency and Accountability for the US Nuclear Weapons Program / Stephen I. Schwartz. James Martin Center for Nonproliferation Studies September 8, 2011. - 12 s.

7 The Encyclopedia of Earth, **Nuclear Winter** Lead Author: Alan Robock. 2008, Cutler J. Cleveland, Ed. (Washington, D.C.: Environmental Information Coalition, National Council for Science and the Environment), herunder New studies of climatic consequences of regional nuclear conflict from Alan Robock, including links to new studies published in 2007.

8 **NNSA, Y-12 Complete Dismantlement of W70 Components** : Last Cold War U.S. Army nuclear weapon dismantled from U.S. nuclear weapons stockpile.

- http://nnsa.energy.gov/mediaroom/pressreleases/w70dismantle102111

Report of the Secretary of Defense Task Force on DoD Nuclear Weapons Management. Phase I:: The Air Force's Nuclear Mission. September 2008. - 92 s.

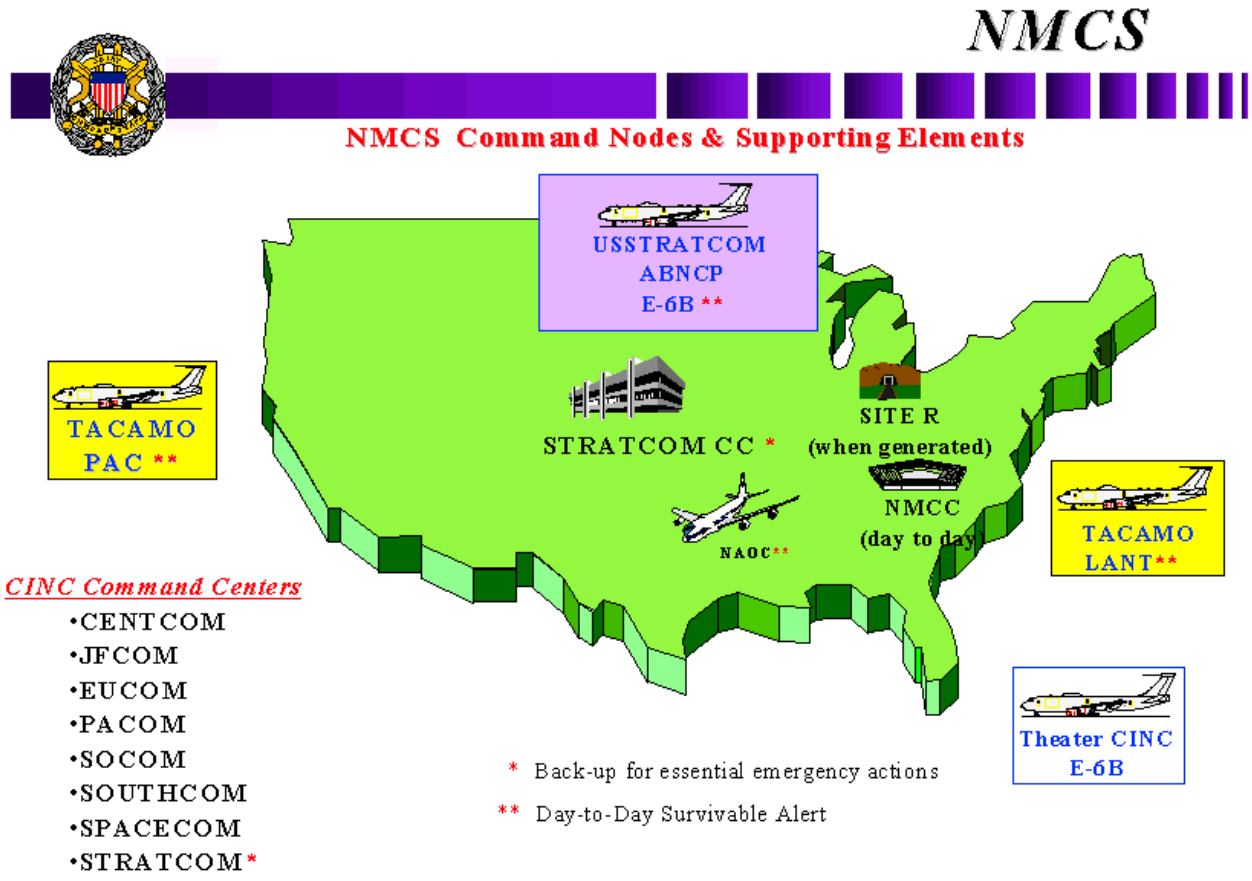
- http://www.defense.gov/pubs/phase_i_report_sept_10.pdf

9 Fisher, Louis: **When Wars Begin**: Misleading Statements by Presidents. Presidential Studies Quarterly 40, no. 1 (March) 171. 2010. Center for the Study of the Presidency.

10 Atomic Energy Act (AEA) of 1954 (as amended).

Den militære kommando for atomkrig kaldes Det nukleare kommando og kontrolsystem.[11] Dette består bl.a. af the National Military Command Center, the U.S. Strategic Command Global Operations Center, og Site-R eller Raven Rock Mountain Complex, samt mobile enheder under Operation Looking Glass, så som the E-4B National Airborne Operations Center, the E-6B Airborne Command Post, samt, the Mobile Consolidated Command Center .

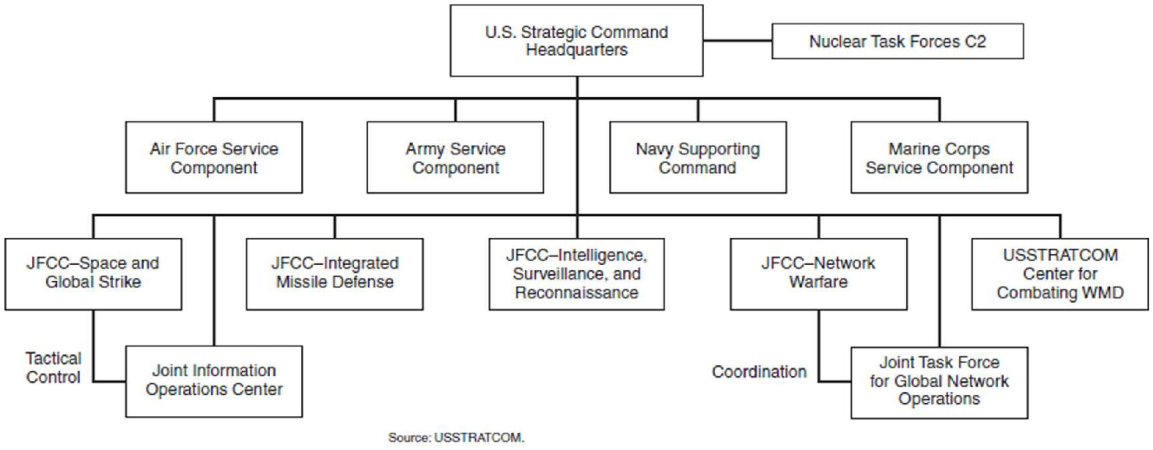
Beliggende i Pentagon, huser the National Military Command Center Den nationale kommandomyndighed, dens logistik og kommunikationscenter, herunder den varme Moskva-Washington linje. Den nationale kommandomyndighed / National Command Authority er et begreb, der bruges af det amerikanske forsvarsministerium til at henvise til den ultimative lovlige kilde til militære ordrer. Kommandoen består af De forenede stater præsident (som øverstbefalende) og forsvarsministeren i fællesskab, eller af deres behørige stedfortrædende efterfølgere, dvs. vicepræsident og viceforsvarsminister.



USAs strategiske kommando (USSTRATCOM) er en af de ti kommandoer i forsvarsministeriet. Kommandoen som beskæftiger mere end 2.700 mennesker, repræsenterer alle værn, herunder ministeriets civile og entreprenører og fører tilsyn med kommandoens operationelt fokuserede globale strategiske operationer.[12]

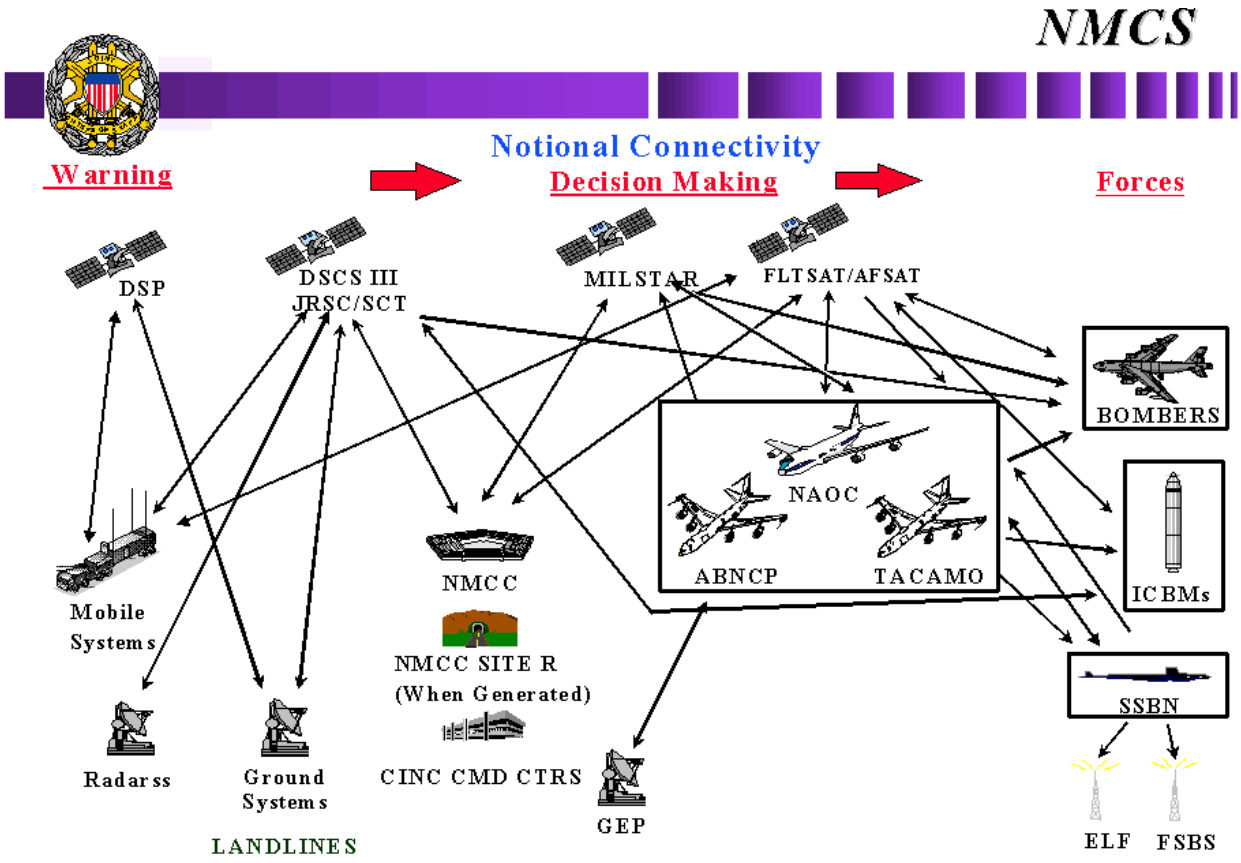
11 CRS: Nuclear Command and Control: Current Programs and Issues May 3, 2006 - 40 s.
The Nuclear Matters Handbook : Expanded and Revised Version / Office of the Assistant Secretary of Defense for Nuclear, Chemical, and Biological Defense Programs, 2011.- 350 s.
12 GAO: **Military Transformation** : Additional Actions Needed by U.S. Strategic Command to Strengthen

Figure 1: USSTRATCOM Organization



Source: USSTRATCOM.

Notes: C2= command and control; JFCC= Joint Functional Component Command; WMD= weapons of mass destruction.



Implementation of Its Many Missions and New Organization, 2006. - 71 s.

Arkiver

Nuclear History at the National Security Archive, herunder
National Security Archive : U.S Nuclear History. Nuclear Arms and Politics in the Missile Age, 1955 – 1968.
- http://www.gwu.edu/~nsarchiv/nsa/publications/nh/
Kildesamlingen 'dokumenter en af de mest formidable militære opbygninger i atomalderen. Det begynder i 1955, da det amerikanske luftvåben erhvervede sit første B-52 bombefly, og tilføjede massivt ødelæggende termonukleare våben til lagerbeholdningerne i stort antal, og præsident Eisenhower erklærede, at produktion af operationelle interkontinentale ballistiske missiler skulle have den højeste nationale prioritet. I de følgende år producerede og implementeret USA en potentiel ødelæggende række af Atlas, Titan, og Minuteman raketter og Polaris ubådsbaserede ballistiske missiler, alle klar til hurtig gengældelse eller første-slag i en krise. Ud over sin egen hurtige nukleare ekspansion, indsatte USA også tusinder af atommissiler i Vesteuropa i løbet af 1960'erne for at opretholde alliance forpligtelser med europæiske magter. Denne kildesamling slutter med 1968, hvor en ny fase i nukleare historie nærmede sig, med Sovjet på strategiske paritet, prioriterede det hvide hus våbenkontrolforhandlinger, samtidig med, at luftvåbnet med succes afprøvede flere selvstændigt målrette reentry vehicles for at forbedre ballistiske missilers destruktive rækkevidde.'[13]

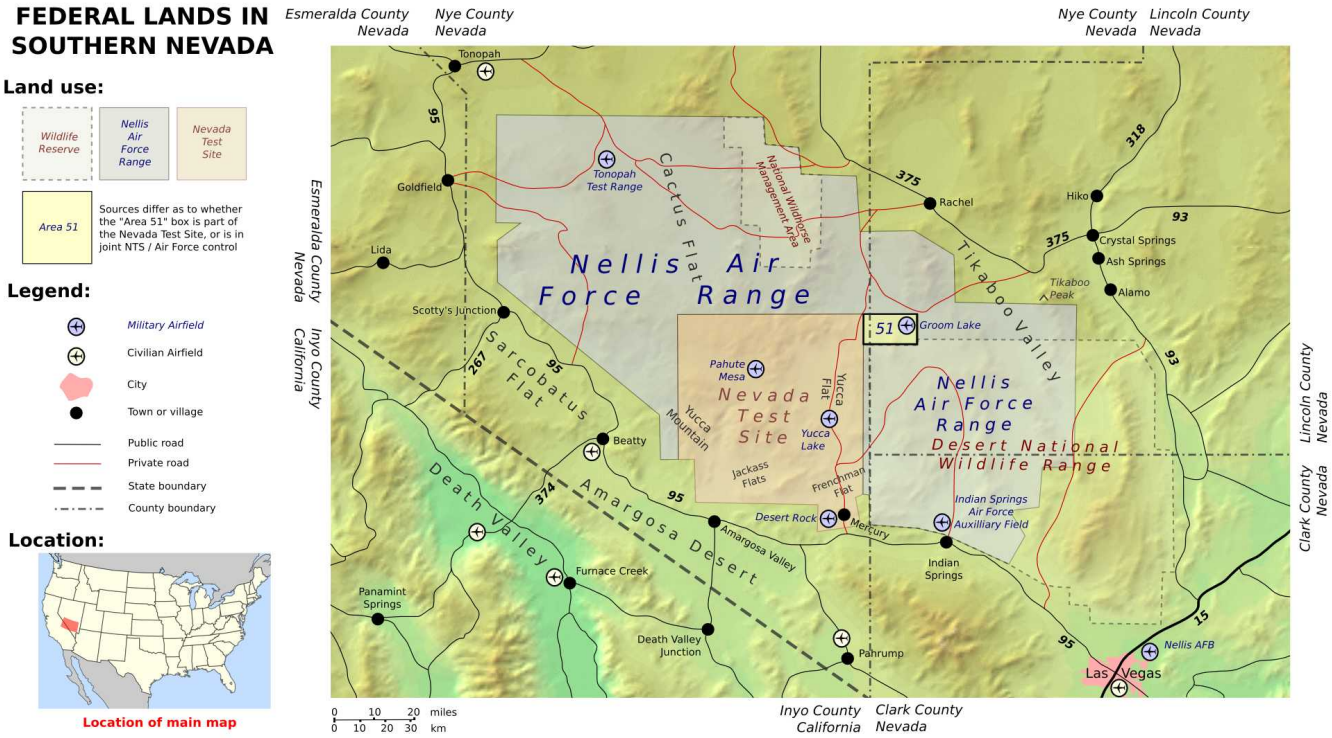
Den amerikanske Atomenergikommission

Historisk amerikansk regeringsorganisation oprettet 1947 som en fortsættelse af Manhattan projektet[14]. Kommissionen var bl.a. ansvarlig for de amerikanske atomvåbenforsøg[15] i den tidlige del af den kolde krig - herunder dem i forsøgsområderne i Stillehavet og Nevada,[16] samt, var ansvarlig for the Manhattan Project Signature Facilities, herunder plutoniumsfabrikkerne Hanford Engineer Works og Savannah River Site, indtil administrationen af dem blev privatiseret.

13 Klassificeringsreglerne fremgår bl.a. af Aftergood, Steven **Reducing Government Secrecy: Finding What Works**, Yale Law & Policy Review, 2009.
Restricted Data Declassification Decisions 1946 to the Present. U.S. Department of Energy. Office of Health, Safety and Security. Office of Classification, 2001. - 169 s.
14 National Archives: **Records of the Atomic Energy Commission** [AEC] (Record Group 326) 1923-75.
15 **The Atomic Cafe** 1982 - http://www.youtube.com/watch?v=NOUtZOqgSG8
16 **Draft Site-Wide Environmental Impact Statement for the Continued Operation of the Department of Energy/National Nuclear Security Administration Nevada National Security Site and Off-Site Locations in the State of Nevada**, 2009?
Abstract: This Site-Wide Environmental Impact Statement ... analyzes the potential environmental impacts of proposed alternatives for continued management and operation of the Nevada National Security Site (NNSS) (formerly known as the Nevada Test Site) and other U.S. Department of Energy/National Nuclear Security Administration managed sites in Nevada, including the Remote Sensing Laboratory (RSL) on Nellis Air Force Base in North Las Vegas, the North Las Vegas Facility (NLVF), the Tonopah Test Range (TTR), and environmental restoration areas on the U.S. Air Force Nevada Test and Training Range.
United States Geologic Survey / Dennis N. Grasso: **Nevada Test Site: Geologic Surface Effects of Underground Nuclear Testing: Buckboard Mesa, Climax Stock, Dome Mountain, Frenchman Flat, Rainier/Aqueduct Mesa, and Shoshone Mountain**, Nevada Test Site, Nevada, 2003. 1 s.
Nevada Test Site – Site Description. ORAU TEAM Dose Reconstruction Project for NIOSH. 2008. - 99 s.
DOE:**Origins of the Nevada Test Site** 12/1/2000. - http://www.nv.doe.gov/library/publications/historical.aspx

Organisationen spaltes som Atomreguleringskommissionen med den kommercielle kernekraftindustri som ansvarsområde og Energiforsknings og udviklingsadministrationen / the Energy Research and Development Administration som administrerede energiforskningen, udvikling af atomvåben, og flådens reaktor programmer i 1975.[17]

Disse organer sammenlægges i 1977 til Det amerikanske energiministerium.



Department of Energy

USA's Energiministerium oprettet i 1977 ved en sammenlægning af Atomreguleringskommissionen og Energiforsknings og udviklingsadministration. En del forskning, udvikling, vedligeholdelse, oprydning og udgifter til det amerikanske kernevåben industrielle kompleks administreres af energiministeriet bl.a. via Den nationale nukleare sikkerhedsadministration, oprettet i 2000[18]. Desuden skal det nævnes i forbifarten, at 'det amerikanske forsvar og militær er med 80 % af regeringens totale

17 Department of Energy: **Naval Reactors**. 2004. - 76 s.

18 GAO: **Modernizing the Nuclear Security Enterprise**: The National Nuclear Security Administration's Proposed Acquisition Strategy Needs Further Clarification and Assessment, September 20, 2011

'DOE)-- proposed in March 2010 a new acquisition strategy that includes consolidating the management and operating (M&O) contracts for two of its eight sites--the Y-12 National Security Complex (Y-12) in Tennessee and the Pantex Plant in Texas.'

DOE **Fundamentals Handbook: Nuclear Physics and Reactor Theory**. 1993. - 142 s.

'The Nuclear Physics and Reactor Theory Handbook was developed to assist nuclear facility operating contractors in providing operators, maintenance personnel, and the technical staff with the necessary fundamentals training to ensure a basic understanding of nuclear physics and reactor theory. The handbook includes information on atomic and nuclear physics; neutron characteristics; reactor theory and nuclear parameters; and the theory of reactor operation. This information will provide personnel with a foundation for understanding the scientific principles that are associated with various DOE nuclear facility operations and maintenance.'

energiforbrug således den største forbruger af energi. Heraf udgør militærfartøjer så som skibsflåder, fly, køretøjer, samt bygninger 75 % af energiforbruget', skriver det danske udenrigsministerium på hjemmesiden 'miljø og energi'. Det nationale nukleare sikkerhedsadministration administrerer også kernevåbenlaboratorier organiseret som Energiministeriets nationale laboratorier, eksempelvis:

- Argonne National Laboratory
- Ames Laboratory
- Bettis Atomic Power Laboratory
- Brookhaven National Laboratory
- Fermi National Accelerator Laboratory
- General Electric Vallecitos Nuclear Center
- Idaho National Laboratory
- Idaho Nuclear Technology and Engineering Center
- Knolls Atomic Power Laboratory
- Los Alamos National Laboratory
- Lawrence Berkeley National Laboratory
- Lawrence Livermore National Laboratory
- Los Alamos National Laboratory
- National Energy Technology Laboratory i Albany, Oregon; Fairbanks, Alaska; Morgantown, West Virginia; Pittsburgh, Pennsylvania; og Sugar Land, Texas
- National Renewable Energy Laboratory
- Oak Ridge National Laboratory
- Pacific Northwest National Laboratory
- Paducah Gaseous Diffusion Plant
- Princeton Plasma Physics Laboratory
- Sandia National Laboratories ved Albuquerque, New Mexico og Livermore, Californien
- Savannah River National Laboratory og Savannah River Site
- Separations Process Research Unit
- SLAC National Accelerator Laboratory
- Thomas Jefferson National Accelerator Facility

En komplet liste over ministeriets laboratorier fremgår bl.a. af dets aktuelle finanslovsforslag for 2012.[19]

Energiministeriets samlede ansvarsområde og økonomi i forbindelse med kernevåben fremgår bl.a. af det aktuelle finanslovsforslag for 2012.[20]

19 Department of Energy, Office of Chief Financial Officer: **FY 2012, Laboratory Tables Preliminary**. Congressional Budget Request, February 2012. - 133 s.

20 Department of Energy, Office of Chief Financial Office: **FY 2012 Congressional Budget Request, National Nuclear Security Administration, Office of the Administrator, Weapons Activities, Defense Nuclear Nonproliferation, Naval Reactors**. February 2011, Volume 1. - 562 s.

Se også **Nuclear Security Spending: Assessing Costs, Examining Priorities** / Stephen I. Schwartz with Deepti Choubey. Carnegie Endowment for International Peace, 2009. - 78 s.

Los Alamos National Laboratory

Del af USA's atomvåbenindustrielle kompleks under energiministeriet.[21]

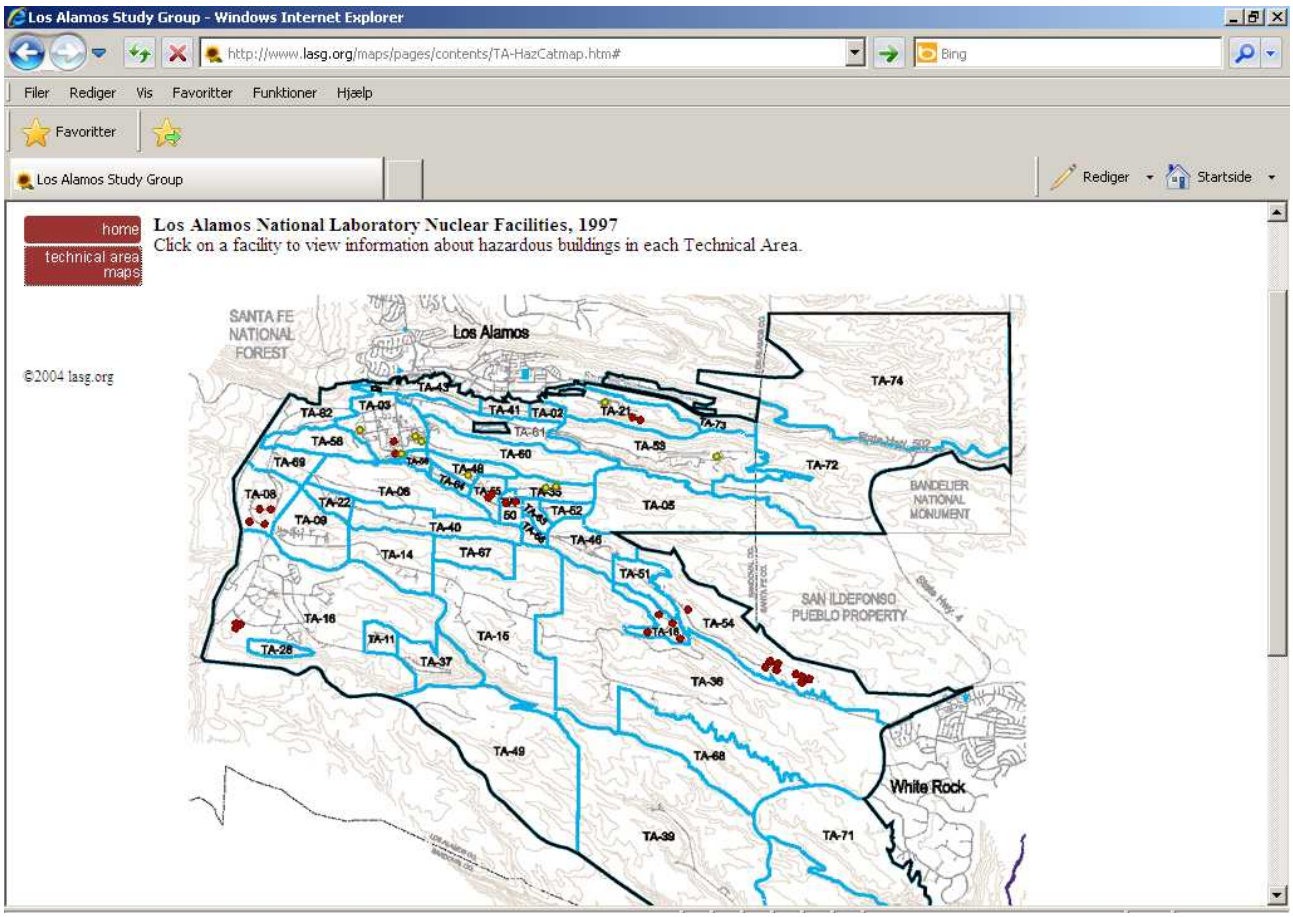
Laboratoriet blev grundlagt under anden verdenskrig, i 1943, som et hemmeligt, centraliseret anlæg til at koordinere den videnskabelige forskning i i forskellige universiteter under Manhattan projektet, der udviklede de første amerikanske atom-bomber. Blandt de atomfysikere der arbejdede i Los Alemos kan nævnes: Niels Bohr, Enrico Fermi, Robert J. Oppenheimer[22] og Edward Teller.[23]

21 **Fogbank: Lost Knowledge Regained**. Nuclear Weapons Journal, Issue 2 • 2009.

22 **The Atomic Bomb and the End of World War II: A Collection of Primary Sources**. National Security Archive Electronic Briefing Book No. 162. Edited by William Burr. 2007.
- http://www.gwu.edu/~nsarchiv/NSAEBB/NSAEBB162/index.htm

United States Atomic Energy Commission, Personnel Security Board: **In The Matter Of J.Robert Oppenheimer**. Selvbiografi s. 11-19. Government Printing Office, (1954). - 1008 s.
- http://www.archive.org/details/unitedstatesatom007206mbp

23 Mcnamara, Laura Agnes: **Ways of Knowing About Weapons**: the cold war's end at the Los Alamos National Laboratory. Dissertation Submitted in Partial Fulfillment of the Requirements for the Degree of Doctor of Philosophy, Anthropology. The University of New Mexico, Albuquerque, New Mexico. May, 2001. - 297 pp.


Los Alamos Study Group - Windows Internet Explorer
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technical area maps
Los Alamos National Laboratory Nuclear Facilities, 1997
Click on a facility to view information about hazardous buildings in each Technical Area.
©2004 lasg.org
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BANDELIER NATIONAL MONUMENT
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SAN ILDEFONSO PUEBLO PROPERTY
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White Rock
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TA-71

Oak Ridge, National Laboratory

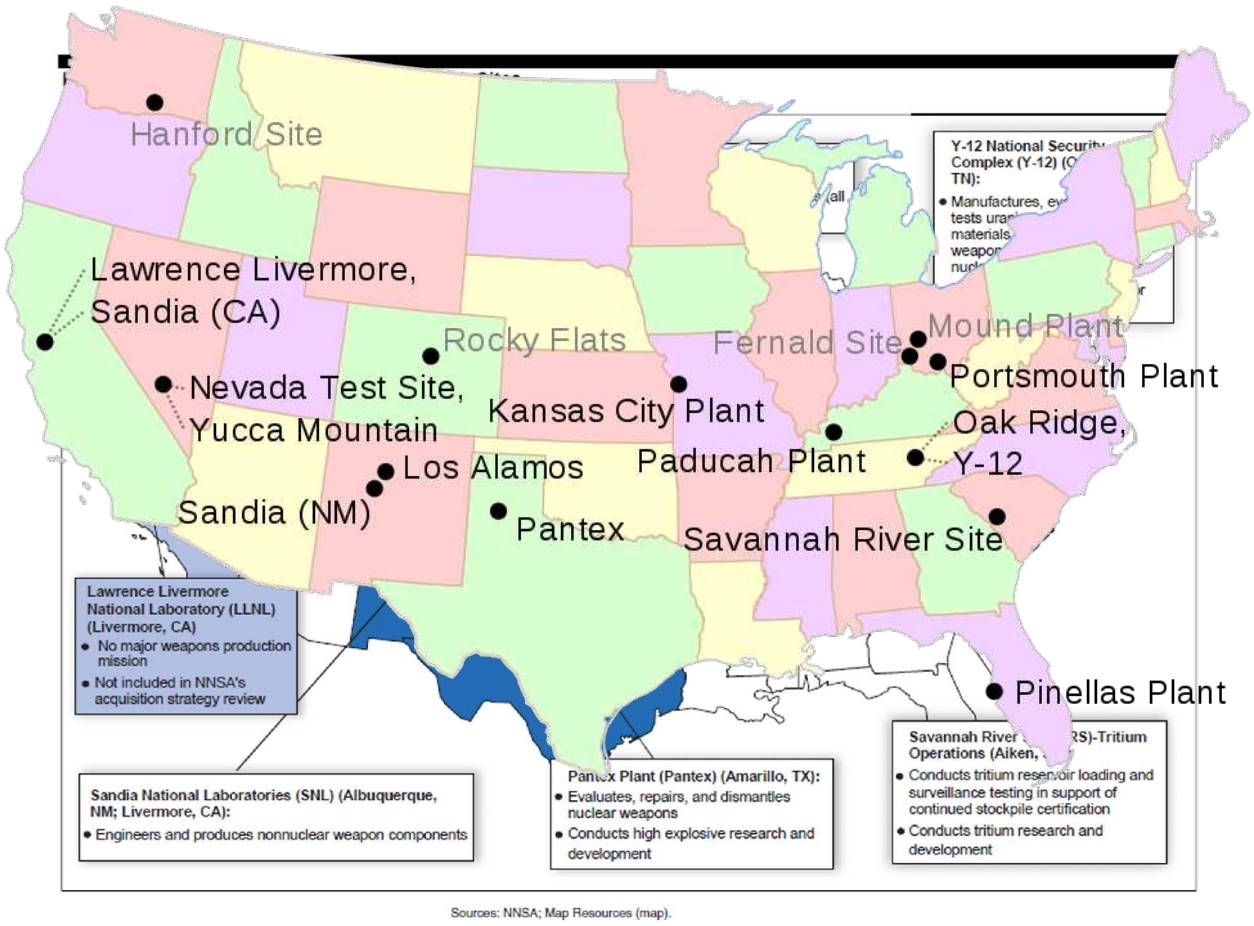
Amerikansk by i delstaten Tennessee, hvor hærens ingeniørkorps etablerede tre forskellige anlæg til produktion af beriget uran, dengang kaldet Clinton Engineer Works[24], i 1943 som en del af Manhattan projektet[25]. Nu under energiministeriet med navnet East Tennessee Technology Park..[26] Frem til og med 1964 blev al beriget uran i USA anvendt til kernevåben eller af den amerikanske flåde. Området, der ifølge **Nuclear Wastelands** s. 226 er stærkt forurenet er derfor underlagt den nationale beredskabsplan for olie og farlige stoffers forurening[27].

24 **Status of Upcoming SEC Petitions** / LaVon B. Rutherford, CHP. National Institute for Occupational Safety and Health Division of Compensation Analysis and Support. 2011. - 6 pp.
- http://www.cdc.gov/niosh/ocas/pdfs/abrwh/pres/secstat0811bw.pdf

25 National Archives: **Records of the Atomic Energy Commission** [AEC] (Record Group 326) 1923-75
Chamberlain, Owen: Physicist at Los Alamos, Berkeley professor, 1950-1989, and Nobel Laureate : oral history transcript / 2000. Bancroft Library. History of Science and Technology Program; Bancroft Library. Regional Oral History Office. - http://www.archive.org/details/physlosalamos00chamrich

26 Carl Malamud on behalf of the U.S. Congress: **Continuing Security Concerns at Los Alamos National Laboratory** (2007. U.S. House of Representatives, Committee on Energy and Commerce, Subcommittee on Oversight and Investigations, Tuesday, January 30, 2007.
- http://www.archive.org/details/gov.house.energycommerce.013007.oi.hrg.lanl)

27 U.S. Department of Energy, Office of Environment: **Safety, and Health. Independent investigation of the East Tennessee Technology Park.** Vol. 1: Past environment, safety, and health practices. October



Sources: NNSA; Map Resources (map).

Fredsbevægelser: Coalition to Demilitarize the University of California / Koalitionen til demilitarisering af Californiens Universitet er en aktuel amerikansk fredsgruppe som blev grundlagt i 2002 for at skabe rammer for samarbejde mellem campus og lokale organisationer, arbejder for at udfordre Californiens Universitets engagement i design, forskning, afprøvning og produktion af atomvåben på Los Alamos National Laboratory og Lawrence Livermore National Laboratory

2000. - http://www.archive.org/details/IndependentInvestigationOfTheEastTennesseeTechnologyPark

Davis, Adam : **What's In Your Glovebox?** The Costs of Plutonium Exposure at Los Alamos National Laboratory.
http://www.archive.org/details/WhatsInYourGloveboxTheCostsOfPlutoniumExposureAtLosAlamosNational

DOE National Laboratory restructuring : hearing before the Subcommittee on Basic Research of the Committee on Science, U.S. House of Representatives, One Hundred Fourth Congress, first session, on H.R. 884 to authorize retirement incentives for certain employees of the national laboratories and H.R. 2301 to designate an enclosed area of the Oak Ridge National Laboratory in Oak Ridge, Tennessee as the "Marilyn Lloyd Environmental, Life and Social Sciences Complex." (1996).

The Oak Ridge Health Agreement Studies, 1999:
Final Report of the Oak Ridge Health Agreement Steering Panel
Final Report for Iodine 131 Releases
Final Report for PCB Releases
Final Mercury Releases
Final Mercury Releases, Appendices
Final Uranium Releases Report.
Final Report for Screening Evaluation
Final Report for Radionuclides Releases from White Oak Creek
Final Report for Radionuclides Releases from White Oak Creek, Appendices

Robinson, George O: **The Oak Ridge story**: the saga of a people who share in history.
- Kingsport, Tenn., Southern Publishers, 1950. - 222 s.

Arbejdsgrupper i Energiministeriet anbefaler udvikling af nye kernevåben og modernisering af kernevåbenfabrikker så som Pantex og Kansas City fabrikkerne.

Aktuelle og historiske amerikanske atomvåbenfabrikker fremgår bl.a. af Energiministeriets liste over omfattede faciliteter i lov om erstatning for energimedarbejderes erhvervssygdomme af 2000[28]; herunder:

1) Atomvåben arbejdsgiver faciliteter
2) Det amerikanske energiministeriums faciliteter
3) Beryllium leverandører

Pentagon, US Department of Defense

USAs forsvarsministerium, tidligere krigsministerium.[29]

Bygningen som ministeriet ligger i er et pentagram eller pentagonal, femkantet.

Pentagonrapporten om Vietnamkrigen / Report of the Office of the Secretary of Defense Vietnam Task Force, offentliggøres i 1971 og i sin helhed i 2011. Ministeriet udvikler af en ny generation små atomvåben omkring januar 2003, eksempelvis earth penetrating weapons. Pentagon anbefaler anvendelsen af tortur, har hovedansvaret for genopbygningen af Irak og flere Information Operations Roadmap's.

Se også: Aerospace Defense Command ; Air Force Satellite Communications System ; Airborne Alert; Area 51, Nevada ; Area-Wide Missile Defense System ; ARPANET ; Army Security Service ;
Bases and other overseas military presence Program ;
CENTCOM (the U.S. Central Command) ; Chemical Weapons Stockpile Destruction Program ; CIFA Counterintelligence Field Activity ; Combat Operation Centre ; Comision to Asses US National Security Space Management and Organization ; Counter Communications System ; CREEL ;
DAPANET ; DAPRA ; DEFCON ; Defense Airborne Reconnaissance Office ; Defense Contract Management Agency ; Defense HUMINT Management Office ; Defense Mapping Agency ; Defense Meteorological Satellite Program ; Defense Nuclear Agency ; Defense Policy Board ; Defense Science Board ; Defense Security Cooperation Agency ; Defense Support Program ; Defense Technology Security Administration ; Defense Threat Reduction Agency[30] ; Deployments for Training Program ; DEW-line ; DIA;

28 **Energy Employees Occupational Illness Compensation Act of 2000: List of Covered Facilities**.
29 Barringer, Felicity: **Pentagon is Pressing to Bypass Environmental Laws for War Games and Arms Testing. -** http://www.nytimes.com/2004/12/28/politics/28exempt.html?th=&pagewanted=print&position=
CRS: **The Cost of Iraq, Afghanistan, and Other Global War on Terror Operations Since 9/11**.
GAO: **Defense Acquisitions : Assessments of Selected Major Weapon Programs**, March 2006
Mollenhoff, Clark R.: **The Pentagon : Policies, Profits and Plunder**.
- New York : G. P. Putnam's Sons, 1967. - 450 s.
Program Acquisition Costs by Weapon System : Department of Defense Budget for Fiscal Year 2007, February 2006.
30 **Responding to War, Terrorism, and WMD Proliferation: History of DTRA, 1998-2008** / Adams, Bianka J. Harahan, Joseph P.. DTRA History Series, Defense Threat Reduction Agency, U. S. Department of Defense, 2008. - 163 s.

ebombe ; DSCS (I, II, III) EUCOM ;
Federal Procurement Data Center ; Formerly Used Defense Sites ; Forward Based Systems ;
Global Information Grid ; GPS ;
HAARP ; Humanitarian Assistance Program ;
Information Operation Cell ;
Joint Chiefs of Staff ; Joint UAV Overarching Integrated Product Team ; Joint UAV Center of Excellence ;
Military Airlift Command ; Military Sealift Command ; Milsatcom ; Milsatcom Joint Programs Office ; Milstar (Blok II) ; Missile Defense Agency ; MITRA ; MX ; National Command Authority ;
National Geospatial-Intelligence Agency ; National Guard ; National Missile Defense System ; National Reconnaissance Office ; National Security Agency ; Naval Oceanographic Office (NAVO) ; Naval Security Group ; Naval Small Craft Instruction and Technical Training School ; U.S. Naval Base, Guantanamo Bay, Cuba ; Navy's Ocean Surveillance Information System ; Net Evaluation Subcommittee ; NOrth American Air Defense Command ; North Atlantic Radio System ; Northern Command (Northcom) ; NRO ; Nuclear Emergency Search Team ;
Office of Forces Transformation ; Office of Public Safety ; OMEGA ; ONR ; OSS ;
PACOM (the Pacific Command) ;
Reliable Replacement Warhead[31] ;
SAC ; SATCOM ; Sexual Assault Prevention and Response Office ; STRATCOM ; SPACECOM ; stop-svind dekreter ; Thule ;
US Southern Command.

31 Medalia, Jonathan: **Nuclear Warheads**: The Reliable Replacement Warhead Program and the Life Extension Program, CRS. 2007. - 51 s.
Medalia, Jonathan: **The Reliable Replacement Warhead Program**: Background and Current Developments. CRS, 2009 - 49 s.

Peacekeeper togvogn brugt til at transportere MX missiler

Se også: CIA ; Countervailing Strategy of Defense / Modvirkende forsvarsstrategier; deep strike ; Department for Homeland Security / Sikkerhedsministeriet eller Ministeriet for indenlandsk sikkerhed; depleted uranium ; deterrence ; devices ; Direct Commercial Sales Program ; drawdowns ; Darleen Druyun ; Economic Support Fund ; Energiministeriet ; FBI ; first strike ; fleksibelt svar ; Food for Peace ; Foreign Assistance Act ; Foreign Military Financing Program ; Foreign Military Interaction Program ; Foreign Military Sales Credit Program ; Foreign Military Sales Program / det militære salgsprogram til udlandet; forhåndslagring ; forstærkningsaftaler ; GAO ; Joint Strike Fighter ; Mutual Assured Destruction / gensidig sikret ødelæggelse ; Military Assistance Program ; Military Reserve Fund ; National Aeronautic and Space Administration ; Nuclear Posture Review ; Plan Columbia Support Program ; Total Information Awareness ; Tricare

Nuclear Weapons Complex

Amerikansk: *Atomvåbenkomplekset*. De offentlige og private virksomheder som i samspil med politikerne forsker i, udvikler og fremstiller kernevåben. Forsvarsministeriet og Energiministeriet har fælles ansvar for landets atomvåbenaktiviteter, som senest er beskrevet i et præliminært aftaledokument fra 1983 mellem de to ministerier. Det nationale agentur for nuklear sikkerhed har ansvaret for lagerbeholdningen, der skal 'sikre en troværdig amerikansk nuklear afskrækkelse uden fuld skala atomsprængninger. Lagerbeholdningsprogrammet er et altomfattende program, der omfatter aktiviteter i forbindelse med overvågning, evaluering, vedligeholdelse, istandsættelse, fremstilling og afvikling af lagerne, samt, ny forskning, udvikling og godkendelsescertificering[32].

32 **Transforming the U.S. Strategic Posture and Weapons Complex for Transition to a Nuclear Weapons-Free World**. Prepared by the Nuclear Weapons Complex Consolidation (NWCC) Policy Network, Natural Resources Defense Council, Washington, DC, Nuclear Watch New Mexico, Santa Fe, NM, Tri-Valley CAREs, Livermore, CA, Just Peace of Texas, Amarillo, TX, Physicians for Social Responsibility (Greater Kansas City Chapter). With contributions from Project On Government Oversight, Washington, DC. Lead Author Robert L. Civiak. Contributing authors Christopher Paine, Natural Resources Defense Council, Peter Stockton and Ingrid Drake, Project On Government Oversight, Jay Coghlan, Nuclear Watch New Mexico, Marylia Kelley, Tri-Valley CAREs. April 2009. - 157 s.

Basic Terminology of the Nuclear Posture Review

· Strategic Nuclear Forces (Strategic Weapon Systems): Strategic nuclear platforms with their associated strategic nuclear weapons.

- Strategic nuclear platforms: (retained in the NPR)

Med et videnskabeligt og teknologisk budget, der i øjeblikket er på omkring US $ 12 milliarder om året, er det amerikanske forsvarskompleks verdens største investor i militær forskning.[33]

Atomvåbenkomplekset består af energiministeriets våbenlaboratorier, fabrikker og anlæg, der udfører denne opgave, herunder uran[34] fabrikken Fernald Feed Materials Production Center, Ohio, Kansas City fabrikken som er en del af Honeywell Federal Manufacturing & Technologies, Lawrence Livermore National Laboratory under Californiens Universitet, Los Alamos National Laboratory, Nevada forsøgsområdet, Pantex fabrikken i Texas, Sandia National Laboratories, Albuquerque, New Mexico, Savannah River National Laboratory, Aiken, South Carolina og Y-12 National Security Complex, Oak Ridge, Tennessee, neutronbombefabrikken Mound Laboratories, Miamisburg, Ohio, tidligere Dayton Project, uranfabrikken Paducah Gaseous Diffusion Plant, Kentucky, uranfabrikken Portsmouth Gaseous Diffusion Plant, Ohio, Rocky Flats Plant, Denver, Colorado, Waste Isolation Pilot Plant, Carlsbad, New Mexico.

§ 14 SSBNs
§ 500 MMIII
§ 76 B-52s & 21 B-2s
- Strategic nuclear platform reductions:
§ 50 Peacekeeper missiles
§ 4 Trident submarines
§ All B-1s (nuclear re-role requirement eliminated)
· Strategic Nuclear Weapon: A nuclear warhead and its necessary arming, fuzing and firing components necessary to produce a nuclear yield that can be loaded on a strategic platform.
· Nuclear Warhead: A device that contains the nuclear or thermonuclear system.
· Strategic Active Stockpile: Operationally Deployed Weapons, the responsive force and logistic spares.
- Operationally Deployed Weapons: Strategic nuclear weapons that are on operational ballistic missiles or on bombers or in bomber base weapon storage areas (logistic spares in bomber weapon storage areas would not be counted). Operationally Deployed Weapons are for immediate and unexpected threats.
- Responsive Force: Strategic nuclear weapons available for uploading on existing strategic nuclear platforms. (Note: Some weapons may be in inactive stockpile.)
- Logistic Spares: Strategic nuclear weapons required to meet Operationally Deployed
Strategic Nuclear Weapons maintenance requirements.
· Strategic Inactive Stockpile: Strategic nuclear warheads reserved for DOE's Quality
Assurance and Reliability Testing (QART) and Reliability Replacement requirements. These warheads have certain limited life components removed, but are otherwise maintained to the same standards as weapons in the active stockpile.
- Quality Assurance and Reliability Testing (QART): Nuclear warheads retained in the inactive stockpile to replace weapons in the active stockpile withdrawn for DOE's surveillance program.
- Reliability Replacement: Nuclear warheads retained in the inactive stockpile to replace similar weapons in the stockpile that suffer a catastrophic failure.
· Total Strategic Stockpile: The summation of the strategic active stockpile and strategic inactive stockpile
The following are not part of the stockpile.
· Retired Warheads: Warheads no longer required for military use and are not part of the active and inactive stockpiles. These warheads are awaiting dismantlement by DOE.
· Dismantlement: The physical separation of high explosives from special nuclear material. Usually critical nuclear components are retained and non-nuclear components are placed in a demilitarization program.

33 **Beyond the bomb** : Twenty years after the end of the cold war scientists and the military still need each other. Nature Volume:477, s. 369.

34 **Transuranic elements in the environment** : a summary of environmental research on transuranium radionuclides funded by the U.S. Department of Energy through calendar year 1979. United States. Dept. of Energy. Office of Health and Environmental Research; Hanson, Wayne C. - [Oak Ridge, TN] : Technical Information Center/U.S. Dept. of Energy ; Springfield, Va. 1980. - 764 s.

Energimedarbejderes erhvervssygdomkompensationprogram

Energimedarbejderes erhvervssygdomkompensationprogram / The Energy Employees Occupational Illness Compensation Program begyndte den 31. juli 2001. Programmet, under Arbejdsministeriet, giver erstatning og sundhedsmæssige ydelser til amerikanske energiministerium atomvåben arbejdstagere (medarbejdere, tidligere medarbejdere, entreprenører og underentreprenører) samt, erstatning til visse overlevende, hvis arbejdstageren er allerede afgået ved døden. I september 2011, havde programmet identificeret 52407 civile, som mistede deres sundhed (herunder 23.851 som udviklede kræft) som følge af udsættelse for stråling og giftige stoffer mens de producere atomvåben for USA..[35]

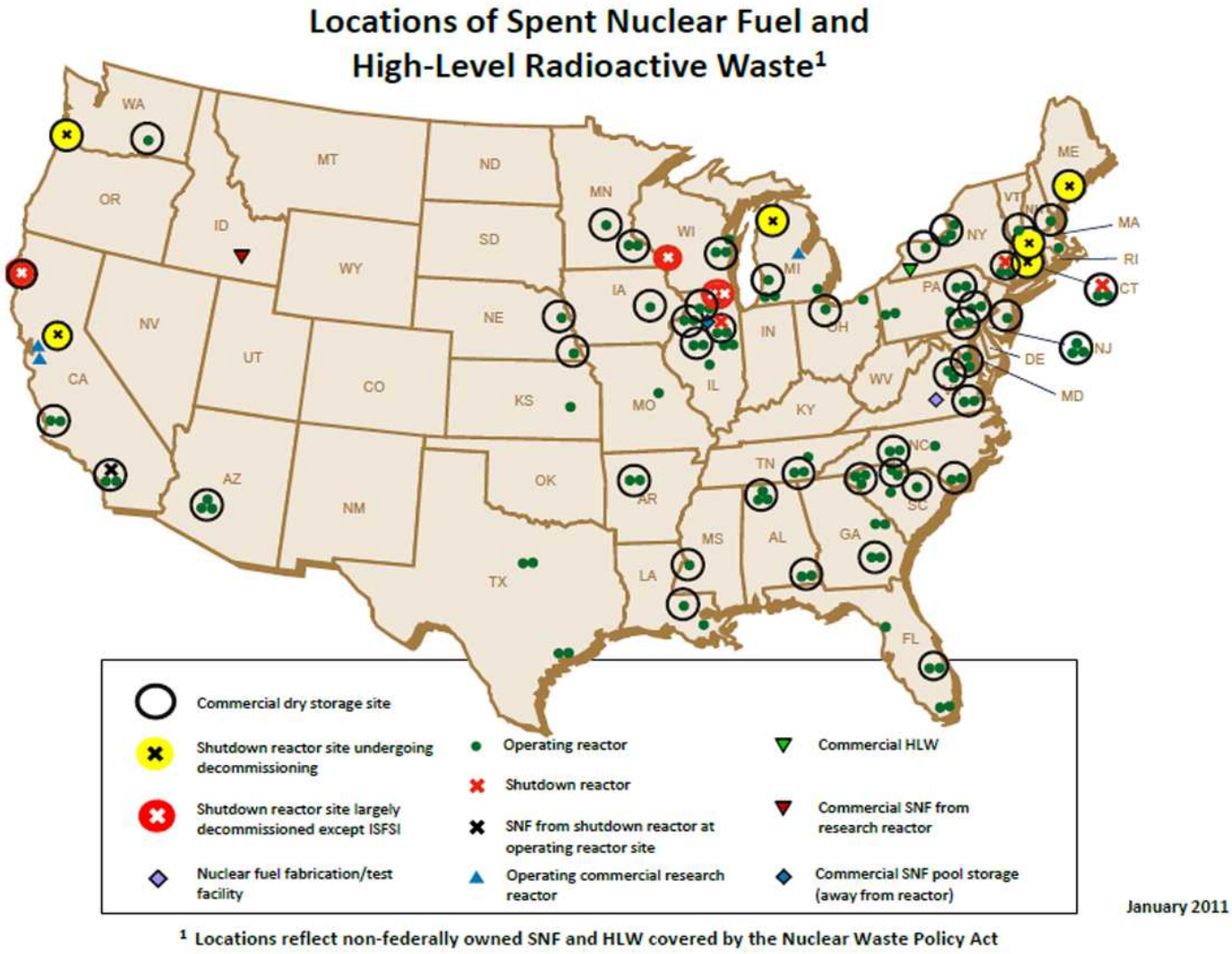
Epidemiologiske studier ved en tidligere atomvåbenfabrik

'Vi skitsere metoder til at integrere epidemiologiske og industriel hygiejne datasystemer med henblik på eksponeringsberegningen, eksponering overvågning, arbejdstager meddelelse og arbejdsmedicin praksis. Vi præsenterer eksempler på disse metoder fra vores arbejde på Rocky Flats anlægget - en tidligere atomvåben fabrik, der fremstillede plutonium aftrækkere til atomvåben, og er nu ved at blive renset og lukkes ned.

Våbnenes produktionsprocesser udsatte arbejdstagere for plutonium, gamma fotoner, neutroner, beryllium, asbest og flere farlige kemiske stoffer, herunder chlorerede kulbrinter og tungmetaller. Vi udviklede et job eksponeringsmatrix (JEM) til estimering af eksponering til 10 kemiske stoffer i 20 bygninger til 120 forskellige jobkategorier over en produktionshistorie der spænder over 34 år. Med JEM, skønnede vi livslange kemiske eksponeringer for omkring 12.000 af de 16.000 tidligere produktionsmedarbejdere.'[36]

35 US Labor Department : Office of Workers' Compensation Programs: **EEOICP Program Statistics** http://www.dol.gov/opa/media/press/OWCP/OWCP20111160.htm

36 **Integrating workplace exposure databases for occupational medicine services and epidemiologic studies at a former nuclear weapons facility** / Ruttenber AJ, McCrea JS, Wade TD, Schonbeck MF, LaMontagne AD, Van Dyke MV, Martyny JW. University of Colorado Health Sciences Center, Denver, USA. Appl Occup Environ Hyg. 2001 Feb;16(2):192-200.



Amerikanske naturressourcer

U.S. Defense Logistics Agency: Federal Strategic and Critical Materials Inventory / Forbundsrepublikkens strategiske og kritiske materialelager, herunder : ferrochromium, ferromangan, germanium, kobolt, krom, iridium, tin, wolframmalm og koncentrater deraf samt zink. Olie, herunder Alaska Oil Pipeline - Deepwater Horizon olieudslippet, 2010 ; Prudhoe Bay olie-udslippet, 2006. Salt, herunder Salmon Site eller Tatum Salt Dome (depotet), i Lamar County, Mississippi, sjældne jordarters metaller, U.S. Mining Database: uran ; Atlas Mineral Corporation: Moab uranium tailings / mineaffald. Sampson, Anthony: De syv søstre. Gyldendal, 1976.

Tritium

Tung brint. Tritium består af to neutroner, én proton og én elektron, hvor brint normalt kun har én proton som atomkerne og én elektron anvendes i brintbomber til at øge fissionen, et termonuklear våbens primære eksplosion (den kan ligeledes anvendes i fission bomber). Tritium blev bl. a. i USA produceret i Oak Ridge og the Savannah River Site og bl.a. anvendt i Pinellas Fabrikken, Largo, Florida.[37]

Beryllium

Græsk: Berylliumforbindelser produceres i Japan, Rusland og USA og anvendes hovedsageligt militært til fremstilling af fly skivebremsere, komponenter til atomreaktorer og kernevåben, navigationssystemer, raketbrændstof og spejle. Tynde plader af beryllium anvendes i atomvåben design som det yderste lag af plutoniumdelen i termonukleare bombers kerne, placeret til at omgive de fissile materialer. Disse lag af beryllium er "pushere" for implosionen af plutonium-239, og de er også neutronreflektorer, ligesom de anvendes i beryllium-modererede nukleare reaktorer[38]. Beryllium-oxid bruges til at fremstille produkter såsom keramik, gyroskoper, militære køretøjer, rustninger, og elektriske isolatorer. Legeringer, der indeholder beryllium anvendes også i produktion af præcisionsinstrumenter, flymotorer og elektriske forbindelser.

37 Bergeron, Kenneth D.: **Tritium on Ice**: The Dangerous New Alliance of Nuclear Weapons and Nuclear Power. MIT Press, 2004 - 246 s.

Doney, Scott C.; Williams, P (1992). "**Bomb Tritium in the Deep North Atlantic**". Oceanography 5: 169–170.

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Oversight hearing on tritium production : hearing before the Subcommittee on Energy and Power of the Committee on Commerce, House of Representatives, One Hundred Fourth Congress, first session, November 15, 1995 (1996). - http://www.archive.org/details/oversighthearingo1996unit

Pinellas Plant - Site Description / Marquis P. Orr, Paul J. Demopoulos, and Brian P. Gleckler. National Institute for Occupational Safety and Health, 2011. - 41 s.

Review of Risks from Tritium. Report of the independent Advisory Group on Ionising Radiation on behalf of the Health Protection Agency, 2007 - ISBN: 978-0-85951-610-5

38 Cunningham, Larry D.: **Beryllium**, 3 s..

Report on Residual Radioactive and Beryllium Contamination at Atomic Weapons Employer Facilities and Beryllium Vendor Facilities / Prepared by: National Institute for Occupational Safety and Health, Office of Compensation Analysis and Support, Centers for Disease Control and Prevention, 8 s..

Plutonium

Plutonium er det 94. (giftigt) grundstof i det periodiske system, og har det kemiske symbol Pu, som dannes af uran i atom-reaktorer. Et halvt kilo af stoffet ville teoretisk kunne give hvert eneste menneske på jorden lungekræft. Er et nødvendigt led i produktion af kernevåben.[39] Plutonium fremstilledes første gang i 1940, og først derefter har man fundet det i naturen, dog kun i ganske ringe mængde.

Mellem 1944 og 1994, skønner Energiministeriet, at De Forenede Stater producerede og erhvervede i alt 111,4 tons plutonium, skriver forskeren Robert Alvarez og verdens lagre af plutonium er voksende. .

Tæt ved Tokio er der plutoniumartikler i havet som 'matcher amerikanske kernevåbensprængninger mellem 1946 og 1958 ved Bikini-atollen i Stillehavet, skriver Berlingske Tidende, 08/06/2004.

Under den kolde krig udsatte den amerikanske regering tusindvis af menneskelige forsøgskaniner med radioaktive gifte, herunder 18 amerikanere som fik sprøjtet plutonium direkte ind i deres blodårer. I en skole i Massachusetts blev 73 handikappede børn madet med havregryn bestrålet med radioaktive isotoper.

MOX, Mixed Oxide Fuel

Blandet oxidbrændsel = forbindelse mellem oxygen og et andet grundstof, her et blandingsprodukt, hvori indgår naturligt uran, forarbejdet uran og depleted uranium samt våbenplutonium. Atomaffald fra kernevåben genbruges som rektorbrændsel til produktion af atomkraft[40].

39 **Annotated Bibliography of Literature relating to wind transport of plutonium-contaminated soils at the Nevada Test Site** / N. Lancaster, R.Bamford. Quatemary Sciences Center Desert Research Institute, University and Community College System of Nevada prepared for Nevada Operations Office U.S. Department of Energy Las Vegas, Nevada, December 1993. - 49 s.

Alvarez, Robert Plutonium Wastes from the U.S. Nuclear Weapons Complex.
- Washington DC : - Institute for Policy Studies, 2010. - 16 s.

The Amount of Plutonium and Highly-Enriched Uranium Needed for Pure Fission Nuclear Weapons / Thomas B. Cochran and Christopher E. Paine. - Washington, DC : Natural Resources Defense Council. Inc. 20005. - 26 s.

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http://www.isis-online.org/global_stocks/end2003/tableofcontents.html

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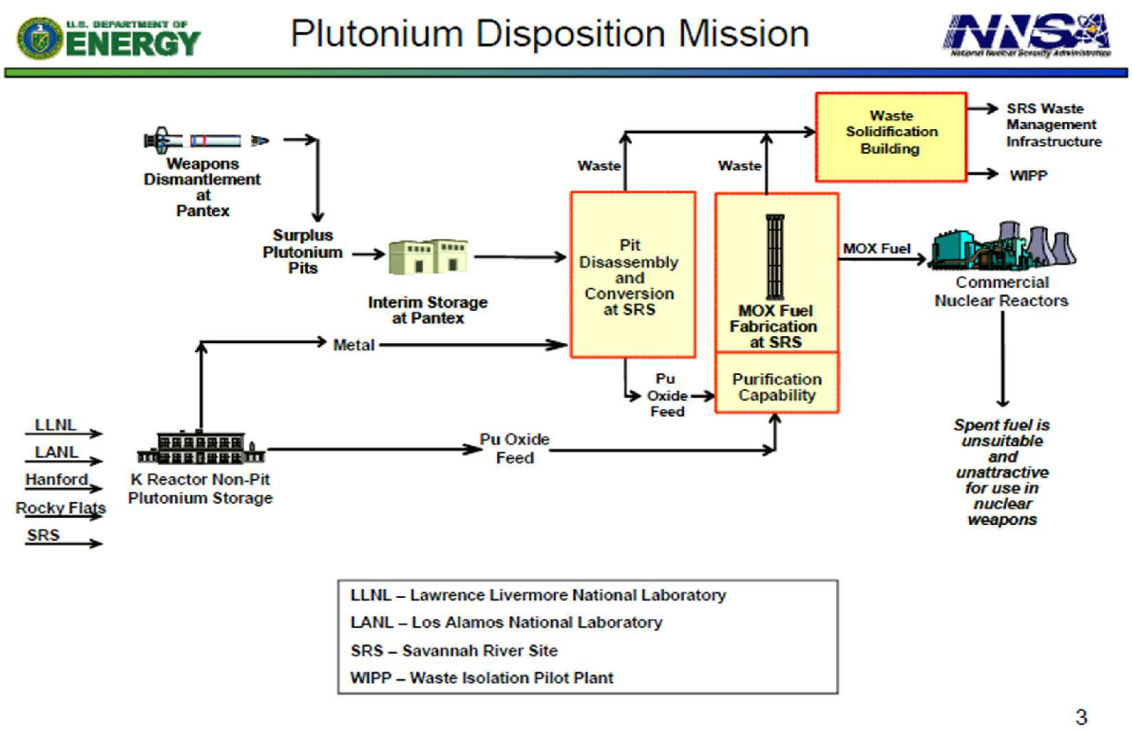
http://www.archive.org/details/stemmingplutoniu00unit

Weapons Plutonium in Los Alamos Soil and Waste: Environmental, Health, and Security Implications.
Brice Smith, Ph.D. ; Arjun Makhijani, Ph.D. November 29, 2005

Welsome, Eileen: **The Plutonium Files** : America's Secret Medical Experiments in the Cold War. 1999.

40 DOE: **Mixed Oxide Fuel Fabrication Facility**, 2011. - 9 s.



Se også: Belgonucléaire SA: Dessel ; Cadarache ; Hanford Site ; Marcoule ; mineralogi ; Mixed Oxide Fuel Fabrication Facility,[41] nuklear teknologi ; Savannah River Site ; Sellafield ; Tarapur ; Tokai-Mura ; uorganisk kemi.

41 **The Mixed Oxide (MOX) Fuel Fabrication Facility Project** / McConaghy, John M., Johnson, James V.), Bradley, Terry L., Li, Chin T., Meisenheimer, James K., Tsai, Nien C., 2001.
- http://www.iasmirt.org/SMiRT16/K1254.PDF

Hanford Engineer Works / Hanford Nuclear Reservation

Hanford ingeniørværker eller Hanford nuklear reservation.

Amerikansk anlæg til forarbejdning af plutonium til våbenbrug ved Richland og Columbia floden i i staten Washington. Startet under anden verdenskrig af den amerikanske regering som en del af Manhattan projektet som opfandt og udviklede de første atombomber. Senere under den kolde krig blev projektet udvidet til at omfatte ni atomreaktorer og fem store anlæg til oparbejdning af plutonium og MOX[42]. Området er i dag stærkt forurenet[43].

42 **Surveillance of Hearing Loss Among Older Construction and Trade Workers at Department of Energy Nuclear Sites** / John Dement, Knut Ringen, Laura Welch, Eula Bingham, and Patricia Quinn. American Journal of Industrial Medicine 48:348–358 (2005).

'Medical screening programs at three Departments of Energy (DOE) nuclear weapons facilities (Hanford Nuclear Reservation, Oak Ridge, and the Savannah River Site) have included audiometric testing since approximately 1996. This report summarizes hearing evaluations through March 31, 2003.'

'Hearing thresholds among DOE workers were much higher than observed in a comparison population of industrial workers with low noise exposures. Overall, 59.7% of workers examined were found to have material hearing impairment by NIOSH criteria. Age, duration of construction work, smoking [sic], and self-reported noise exposure increased the risk of hearing loss.'

43 **Amerikansk atomlager er »et af de mest forurenede steder på Jorden«** : En rapport fra den amerikanske rigsrevision kalder tilstanden for 177 underjordiske tanke med kemisk og radioaktivt affald fra atomvåbenproduktionen for uvis. 67 af tankene lækker allerede. Kalika Bro-Jørgensen I: Ingeniøren, tirsdag 15. jul 2008.

- http://ing.dk/artikel/89712-amerikansk-atomlager-er-et-af-de-mest-forurenede-steder-paa-jorden

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Fredsbevægelser: Hanford Challenge.
The Hanford Downwinders Litigation website

GAO: Report to the Subcommittee on Energy and Water Development, Committee on Appropriations, House of Representatives : **Nuclear Waste** : DOE Lacks Critical Information Needed to Assess Its Tank Management Strategy at Hanford, 2008. - 51 s. - http://www.gao.gov/new.items/d08793.pdf

GAO: Report to the Subcommittee on Energy and Water Development, Committee on Appropriations, House of Representatives : **Hanford Waste Treatment Plant** : Department of Energy Needs to Strengthen Controls over Contractor Payments and Project Assets, 2008. - 48 s. - http://www.gao.gov/new.items/d07888.pdf

US Dept of Energy: **Accelerating Hanford Cleanup**.- http://www.archive.org/details/acc300

US Dept of Energy: **Five Decades of Hanford Plutonium Production** (1997).

'A documentary featuring the history of plutonium production at Hanford. Film footage, photographs, and animation is used to highlight key facilities and to explain how plutonium is produced'.

Hanford: the Real Story. Michael Fox, Ph.D.

'Dr. Fox, a consultant with Westinghouse Hanford Co., has worked at Hanford for 22 years. Doctors for Disaster Preparedness 17th Annual Meeting 1999- Seattle, WA'. http://www.archive.org/details/HanfordTheRealStory.MichaelFoxPh.d

44 **The Hanford Thyroid Disease Study** / Stofskiftesygdomme."HTDS is a study of thyroid disease among people who were exposed to radioactive iodine (iodine-131) from the Hanford Nuclear Site in Washington State. The exposures occurred from 1944 through 1957. The question of the study was, "Did exposure to iodine-131 from Hanford result in increased incidence of thyroid disease?" Centers for Disease Control and Prevention and the Fred Hutchinson Cancer Research Center released the Final Report in June 2002'.- 614 s.

Kansas City Fabrikken

Amerikansk atomvåbenfabrik i byen Kansas i delstaten med det samme navn. Kansas fabrikken er en del af det amerikanske energiministeriums atomvåben industrielle kompleks som drives af den multinationale våbenfabrik Honywell. Virksomheden samler kernevåbenes konventionelle dele. Fabrikken der ligger i et stærkt forurenet industriområde i udkanten af byen, samarbejder bl.a. med Pantex fabrikken i Texas, hvor den endelige montering af sprænghovederne foregår.[45]

45 **Environmental Assessment for the Modernization of Facilities and Infrastructure for the Non-Nuclear Production Activities Conducted at the Kansas City Plant**. DOE/EA – 1592, April 21, 2008.

U.S. Environmental Protection Agency, Office of Inspector General: **Vapor Intrusion Health Risks at Bannister Federal Complex Not a Concern for Buildings 50 and 52, Unknown for Other Buildings**. 2011. - 22 s.

U.S Nuke Parts Site Nearly Half Done. Global Security Newswire Tuesday, Oct. 18, 2011

'One year after work began, construction is roughly 45 percent complete for a facility in Kansas City, Mo., that will produce non-nuclear parts for the U.S. strategic arsenal, the Kansas City Star reported on Monday.

The 1.57 million square foot complex is set to replace the Bannister Federal Complex plant, which opened in 1949. Work on the new Kansas City facility is projected to finish in November 2012. The $1 billion plant, expected to be fully operational in 2014, is being built by private developer CenterPoint Zimmer LLC, for Honeywell Federal Manufacturing and Technologies.

That company has an agreement with the U.S. National Nuclear Security Administration to produce 85 percent of the non-nuclear pieces in an atomic warhead. The replacement complex, which will include five concrete structures, is expected to operate until at least 2042, according to one federal estimate.'

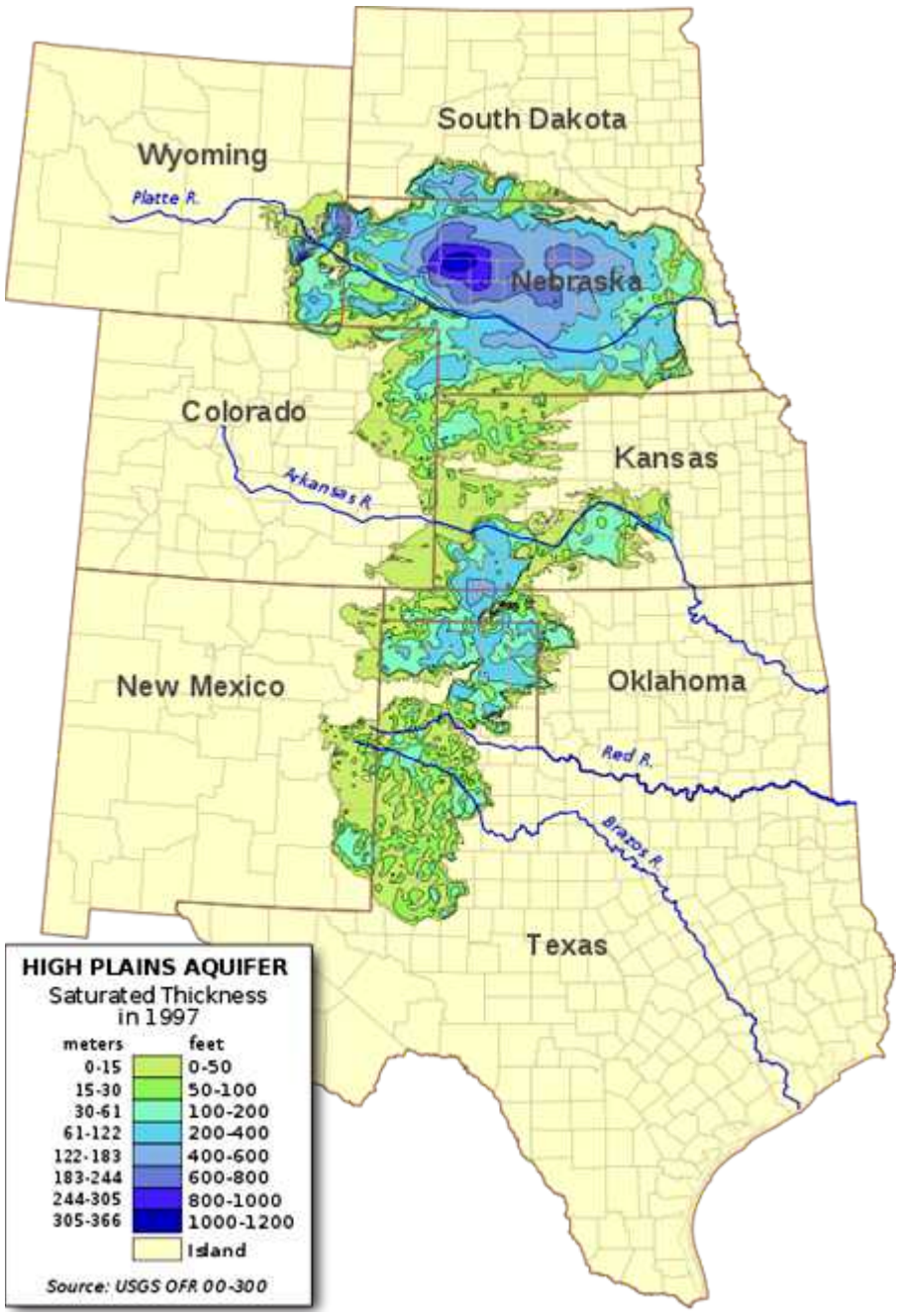
Wittner, Lawrence S.: Kansas City Here It Comes: A New Nuclear Weapons Plant!. I: Fredsakademiet, 09/05/2011.

Pantex fabrikken

Amerikansk atomvåbenfabrik i Texas. Del af USAs aktuelle atomvåbenindustrielle kompleks Pantex fabrikken nær Amarillo, Texas påbegyndte sine aktiviteter i 1942. Under anden verdenskrig var dets vigtigste funktion at fylde konventionel ammunition[46], bomber og granater, med eksplosive materialer. Denne fabrik udfases i 1945.

I 1949 solgte staten anlægget til Texas teknologiske kollegium (nu Texas tekniske universitet) for en dollar. Hæren krævede stedet i 1951 på foranledning af Atomenergikommissionen, således, at den kunne bygge en facilitet til at samle og adskille nukleare våben. Procter & Gamble var de operationelle entreprenører. Mason og Hanger-Silas Mason selskabet forpligtede sig til at genopbygge anlægget, overtog driften af anlægget i 1956, da Procter og Gamble afviste at forny deres femårige kontrakt. I 1963 overtog Atomenergikommissionen fuld kontrol over området. I 1984 og igen i 1989, blev flere tusinde ekstra hektar jord lejet fra Texas Tekniske som en sikkerhedsbuffer. Pantex har været den største virksomhed til samle nukleare våben komponenter i det endelige produkt, der har samlet næsten alle de over 60.000 nukleare våben produceret i USA, herunder depleted uranbaserede våben. Fabrikken har også været ansvarlig for at adskille atomvåben, men de nøjagtige tal er ikke kendte, fordi grænsen mellem samling og demontering er sløret. Energiministeriet har antydet, at omkring 50.000 atomvåben blev permanent afmonteret mellem 1945 og 1992 på Pantex, men i 1993, indrømmede det, at det formentlig kun var 10.000 til 15.000 der rent faktisk blev permanent demonteret (min fremhævelse). Pantex har faciliteter til fremstilling af den ikke-nukleare højeksplosivt sprængstof der komprimerer plutonium til den udløsende faktor i et atomvåben. Når et våben er demonteret, fjernes det høj-eksplosive sprængstof for at undgå en utilsigtet detonation. De højeksplosive sprængstoffer brændes i det fri i et område kendt som den brændende grund.

46 **Ammunition and Explosives Storage for the Navy (1939-1989) and the Air Force (1946-1989)**. Draft / Dean A. Doerrfeld, M.A. Principal Investigator, Kathryn Dixon, B.A., Dean A. Doerrfeld, M.A., Christine Heidenrich, M.A., and Rebecca Gatewood, M.H.P. R. Christopher Goodwin & Associates, Inc. for Naval Facilities Engineering Command. Washington Navy Yard, DC and United States Air Force Center for Environmental Excellence. Brooks City-Base Texas, 2008. - 200 s.
- http://www.denix.osd.mil/cr/upload/af-navy-ammunition-storage-public-rfs_pg1-200_rev.pdf

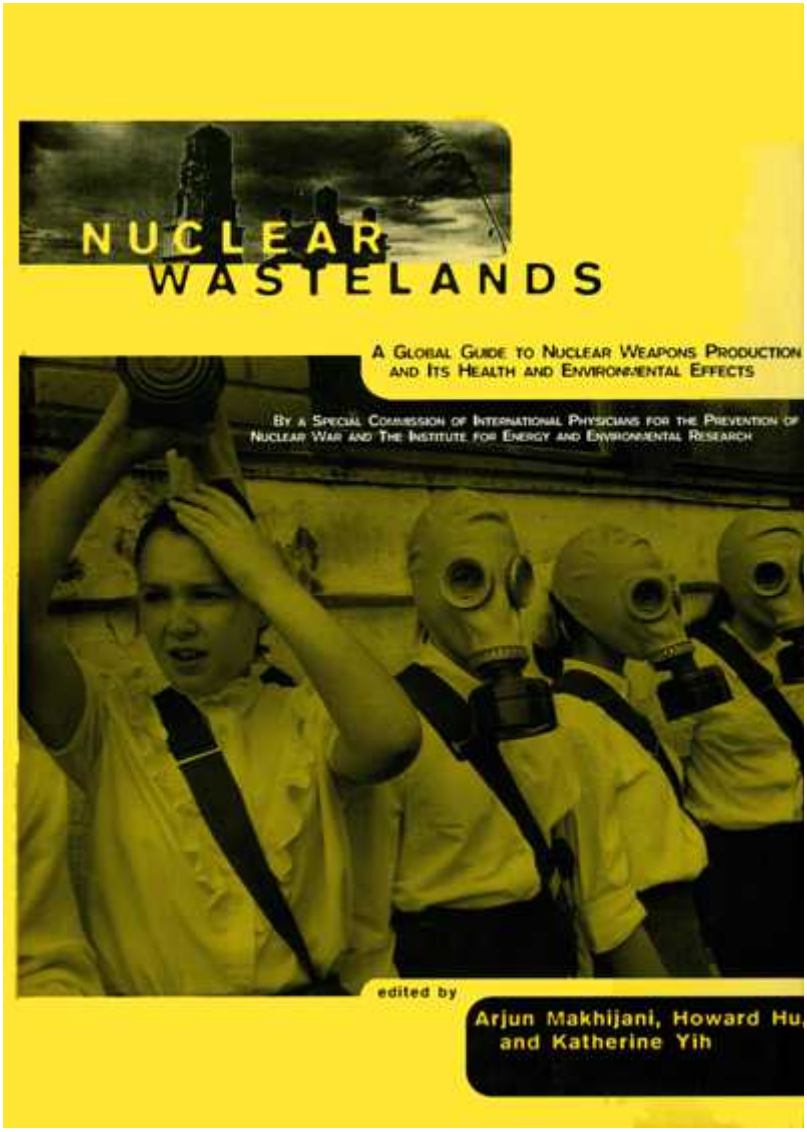


Pantex har udsendt både radioaktiv og ikke-radioaktive farlige materialer i miljøet.[47] Ministeriets indberetninger omfatter kun at 134 kubikmeter af lavaktivt radioaktivt affald ligger begravet på Pantex. Denne forholdsvis lille mængde kan forklares ved det faktum, at anlægget afsender det meste af sit affald til andre anlæg i USA.

Et af de vigtigste miljøproblemer som følge af Pantex er potentiel forurening af Ogallala grundvandsmagasinet som er omkring 150 meter dyb inden for området. Til dato er der ingen forurening konstateret i grundvandsmagasinet. Imidlertid er en række afgørende vandsystemer i Pantex blevet forurenet, (min fremhævelse) og nogle beviser peger på mulig fremtidig forurening af Ogallala.

47 Oak Ridge Associated Universities: **Pantex Plant – Site Description**, 2006. - 18 s.

Pantex har visse stedes et kontinuerligt system af 'øvre' vandførende lag, bestående af lave, lokale zoner af vand. I 1993 rapporterede Energiministeriet at grundvandsstikprøver i et af de højtliggende grundvandsmagasiner indikerede tilstedeværelsen af forskellige opløsningsmidler, tungmetaller, og højeksplosiver, men ministeriet fastholdt, at de højtliggende grundvandsmagasiner er "klart adskilte" fra Ogallala. Desuden fastslog en Energiministriel undersøgelse fra 1988, at udsætningen af ubehandlet kemikali-affald i gruber fra 1954 til 1980 udgjorde en risiko for migration til grundvandet, hvilket vil forurene de grundvandsmagasiner der anvendes til lokal vandforsyning. Undersøgelsen rangerede denne kemiske forureningsrisiko ved Pantex blandt de største farer i det samlede amerikanske atomvåben kompleks. De involverede kemikalier omfatter bl.a. toluen, acetone, tetrahydrofuran, methanol, dimethylformamid, methyl ethyl keton, og ethanol.



Der er også tegn på uranudslip i miljøet på Pantex. Ifølge en rapport fra Energiministeriet fra 1985, overstiger uranprøver i vegetationen på Pantex 70 gange det normale, og uran-koncentrationer i prærieharesnyrer var fire til seks gange større end normalt.

Pantex ophørte officielt med at samle nukleare våben i begyndelsen af 1990'erne. Men man fortsætter med at opretholde de eksisterende våbensystemer, og demonterer dem også. I nogle tilfælde kan adskilte våben blive renoveret og samles igen for efterfølgende implementering. I øjeblikket er aktiviteterne på Pantex centreret om afvikling af atomvåben og oplagring af plutonium sprænghoveder.

Plutonium fra demonterede sprænghoveder hober sig hurtigt på Pantex. I fortiden blev den sendt til Energiministeriets Rocky Flats fabriksanlæg nær Denver Colorado til genbearbejdning i nye sprænghoveder[48]. Nu, hvor Rocky Flats opgaver har ændret sig fra produktion til oprensning, er de sprænghoveder, der opbevares ved Pantex, der, i hvad ministeriet har kaldt en "overgangsperiode". Da den langsigtede opbevaring af plutonium endnu ikke er endeligt besluttet, kan midlertidig oplagring af tusindvis af plutonium sprænghoveder på Pantex strække sig ind i årtier. Da Pantex har ikke været tænkt som en plutonium lagerfacilitet, er denne praksis som bemyndiget af Energiministeriet yderst tvivlsom..[49]

Eksempler på miljøforurening ved Pantex fabrikken i Texas i forbindelse med produktion af kernevåben under den kolde krig, sakset fra Nuclear Wastelands s. 236-237:

Radionuklider (radioaktive stoffer) i jord: alfa og beta henfald fra plutonium, tritium, thorium, uran

Metalforurening i jord og vand: beryllium, bly, krom, kobber, sølv

Uorganiske forbindelser i jord og vand: bariumoxid (bruges primært til tørring), cyanider - herunder blåsyre, flussyre og svovlsyre

Flygtige organiske forbindelser eller organiske opløsningsmidler i jorden: acetone, benzen, dimethylformamid, ethylacetat (brandfarlig kemisk for-bindelse mellem eddikesyre og ethanol), kloroform (her formodentligt anvendt som rensemiddel (se også: Radiolyse af kloroform i den intense strålingsimpuls fra en atomeksplosion)), methylenklorid (lim), methylethyl-keton (eksempelvis anvendt som cellulosefortynder), methylisobutyl ketonperoxider, tetrachlormethan eller carbontetrachlorid (også brandslukningsmiddel), tetrahydrofuran (anvendes især til PVC), toluen (bruges som lim og ved fremstilling af sprængstoffet trotyl), trichlorethylen (rensemiddel til at rengøre og affedte metaldele)

Flygtige organiske forbindelser bundfældet i grundvand, herunder Ogallala grundvandsmagasinet: acetone, dimethylformamid, ethylacetat, kloroform, methylenklorid, methyl-ethylketon, methylisobutyl, keton-alkoholer, rensebenzin, tetrachlormethan, tetrakloretan, tetrahydrofuran, toluen, trichlorethylen

Diverse jordforurening: eddikesyre, benzin, dioxin, polychlorerede biphenyler og TNT

48 Amarillo Railroad Museum, Inc:: **Department of Energy Nuclear Weapons Transport Cars**. http://amarillorailmuseum.com/white_train.html

49 Sakset fra **Nuclear Wastelands: A Global Guide to Nuclear Weapons Production and It's Health and Environmental Effects**, Arjun Makhijani et al (eds.), The MIT Press, 1995.

Pinellas fabrikken, Largo, Florida

Del af USAs atomvåbenindustrielle kompleks.
Pinellas fabrikkens faciliteter består af cirka 70.195 kvadratmeter under tag i et område på på 40,4 ha (99,9 hektar). General Electric Corporation (GE) byggede det oprindelige 161.000 kvadratmeter store anlæg i 1956.

Atomenergikommissionen købte anlægget i juni 1957 og tildelte en 25-årig drift kontrakt til GE, der varede til 31. maj, 1992. Pinellas Anlægget, som det hed fortsatte med at blive brugt til at designe, udvikle og fremstille komponenter, såsom neutron generatorer (atomvåbnenes aftrækker), som en del af det amerikanske atomvåbenprogram. DOE udvidede Pinellas fabrikkens opgaver til design, udvikling og fremstilling af specielle elektroniske og mekaniske atomvåben komponenter, såsom neutrongenererende enheder, neutron detektorer, og tilknyttede produkt testere. Andet arbejde involverede elektroniske, keramik, og høj-vakuum teknologi, herunder fremstilling af termisk og lang levetids batterier, specialiserede stødabsorberende skum understøttelse, ferro- og glas-keramisk indkapslede materialer, og radioisotop-drevne termoelektriske generatorer.

Omfattende miljøforurening med diverse tungmetaller[50].

50 **Pinellas Plant - Site Description** / Marquis P. Orr, Paul J. Demopoulos, and Brian P. Gleckler. National Institute for Occupational Safety and Health, 2011. - 41 s.

Portsmouth gasdiffusion plant

Portsmouth gasdiffusion anlægget, der ligger i Piketon, Ohio, påbegyndte sine aktiviteter i 1954 som en del af den amerikansk regerings udbygningsprogram for produktion af højt beriget uran til brændstof for militære reaktorer og komponenter til atomvåben produktion.
Den primære form for berigelse var gasdiffusion af uran hexaflourid, for at adskille lettere fissile isotop, U-235, fra de tungere ikke-fissile isotop, U-238. Produktionen ophørte i 1991. I løbet af de næsten 60 års drift, rengøring, vedligeholdelse og udskiftning af procesudstyr på stedet genereres brugte opløsningsmidler og andre forurenende stoffer, der blev afhændet på lossepladser og i lagerbygninger.[51] Til dato er forureningen fundet på flere forskellige steder på værket, herunder i procesbygninger, tidligere køletårne, lossepladser, spildevandsdamme og i andre bygninger. Der er også grundvandsudløbere fra lossepladser. Entreprenører: USEC 2001-., Los Alamos Technical Associates and Parallax Portsmouth 2005-2009 (oprydning); Theta Pro2Serve Management Company 2005 -2009 (oprydning); Bechtel Jacobs Company 1998-2005 (oprydning); Lockheed Martin Energy Systems, Inc. 1995-1998; Martin Marietta Energy Systems 1986-1995; Goodyear Atomic Corporation 1954-1986. Entreprenører: for design, konstruktion og drift af Depleted Uranium Hexaflouride Conversion Project:: Uranium Disposition Services 2002-.

Pinellas Plant Environmental Baseline Report. Lockheed Martin Specialty Components, Inc.. Environmental, Safety and Health Division for The U. S. Department of Energy. Pinellas Area Office, 1997. - 363 pp.
Status of Upcoming SEC Petitions / LaVon B. Rutherford, CHP. National Institute for Occupational Safety and Health Division of Compensation Analysis and Support. 2011. - 6 pp.
- http://www.cdc.gov/niosh/ocas/pdfs/abrwh/pres/secstat0811bw.pdf
51 DOE, Office of Oversight, Environment, Safety and Health: **Portsmouth Gaseous Diffusion Plant Volume 1**: Past Environment, Safety, and Health Practices, 2000. - 99 s.

Savannah River Site

Tritium fabrikken fra 2007

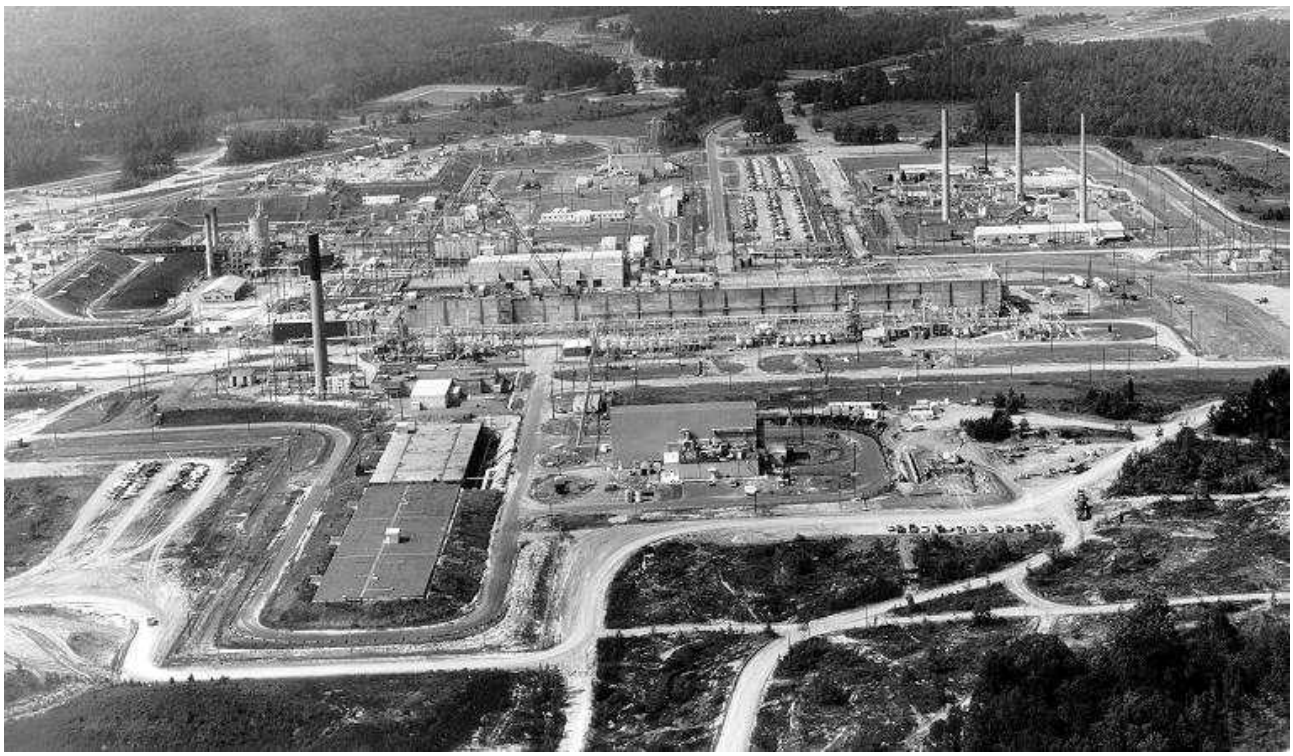
Amerikansk plutonium og tritium fabrik beliggende i delstaten South Carolina oprettet i begyndelsen af den kolde krig, 1950, nu under Det amerikanske energiministerium. Oplysninger om virksomheden er stadig skjulte som klassificeret eller maskeret information.[52]

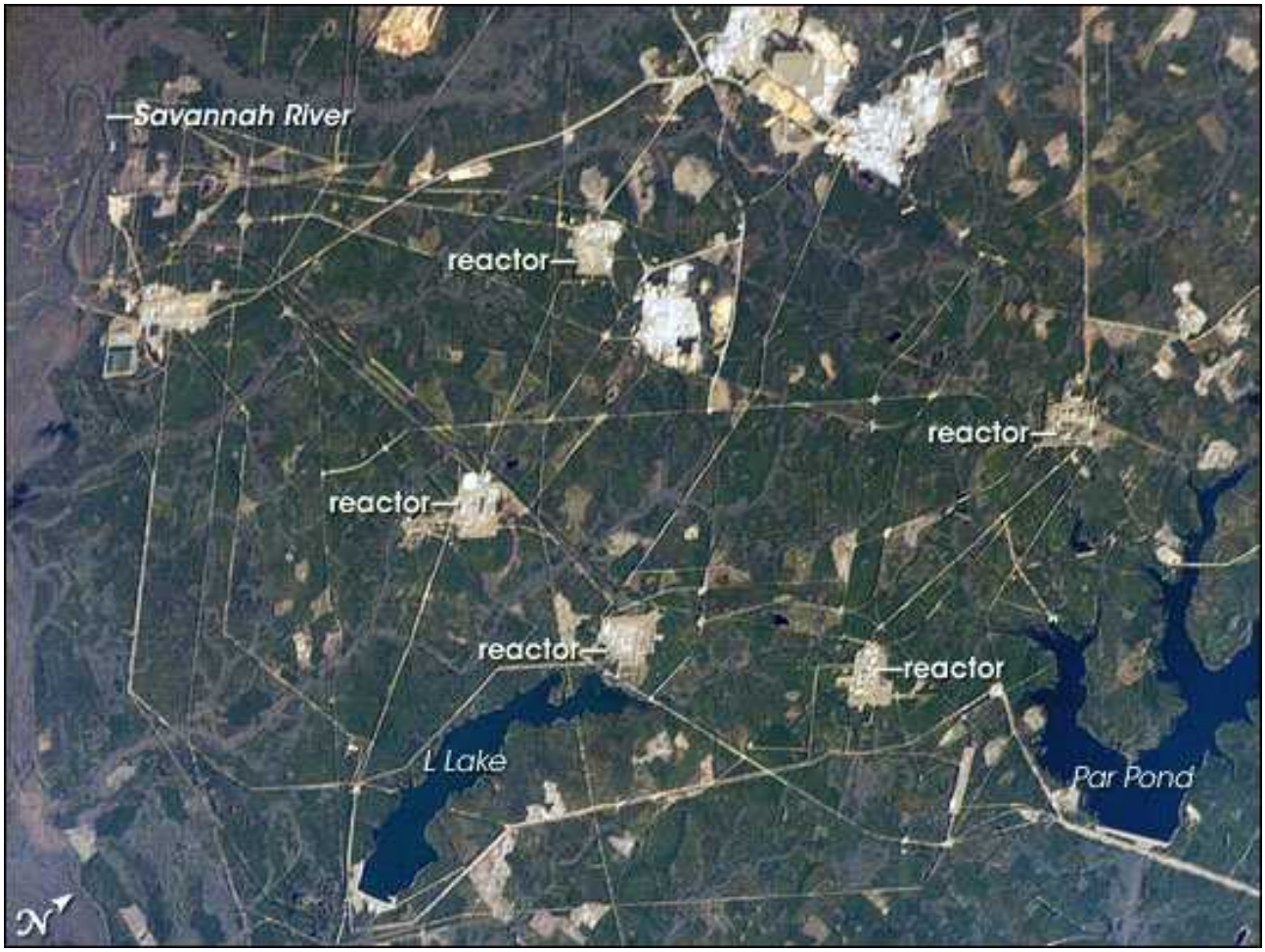
Savannah River Site[53] ligger i Sand Hills-regionen i South Carolina og omfatter et areal på 800 kvadratkilometer. I den sydlige halvdel af området er der en gruppe af bygninger med reflekterende hvide hustage. Den nærliggende Savannah-floden og dens biflods vandløb gav vand til atomreaktorer; med henblik herpå blev to kunstige søer "L" søen og Par dammen oprettet. Flodens bugtende kanal og dens flodslette, præget af gråbrune sedimenter. Da floden er så tæt på det nukleare område, og fordi den underliggende geologiske materialer (sand, ler, grus og kalksten) er gennemtrængelige, er en omfattende og løbende overvågning af miljøet og oprydning indsats nødvendig for at reducere potentiel forurening af lokale vandkilder.
Den radioaktive produktion blev, bl.a. fra og med Operation Greenhouse i 1951, anvendt i brintbomber.

52 **Preservation and Dissemination of the Hardcopy Documentation Portion of the NCSP Nuclear Criticality Bibliographic Database** / B. L. Koponen, D. Heinrichs. May 20, 2009. Topical Meeting of the ANS Nuclear Criticality Safety Division. Richland, WA, United States September 13, 2009 through September 17. 7 s.

53 Richardson D, Wing S. **Mortality among workers at the Savannah River Site**. American Journal of Industrial Medicine. 2007; 50(12):881-891.

Richardson D, Wing S. **Leukemia mortality among workers at the Savannah River Site**. American Journal of Epidemiology. 2007; 166(9):1015-22.




Savannah River
reactor
reactor
reactor
reactor
reactor
L Lake
Par Pond

Aktuelle freds- og miljøbevægelser:

Atlanta WAND - www.atlantawand.org,
Blue Ridge Environmental Defense League - www.bredl.org,
Carolina Peace Resource Center - www.carolinapeace.org,
Nuclear Watch South - www.nonukesyall.org

Yucca Mountain Underground Laboratory

Underjordisk amerikansk forskningsenhed og slutdepot for atomaffald som var beliggende i Forsøgsområdet i Nevada under energiministeriets kontor for civil forvaltning af radioaktivt affald[54]. 'Yucca Mountain er blevet valgt som stedet for ministeriets geologiske opbevaringssted designet til at opbevare og bortskaffe brugt nukleart brændsel og højradioaktivt affald. Når det er konstrueret, vil stedet blive landets første geologiske depot for bortskaffelse af denne type af radioaktivt affald' meddeler ministeriet i Yucca Mountain: The Most Studied Real Estate on the Planet. Anlægget blev opgivet i 2010.

54 GAO: **DOE Nuclear Waste : Better Information Needed on Waste Storage at DOE Sites as a Result of Yucca Mountain Shutdown**. 2011. - 40 s.
Underground exploration and testing at Yucca Mountain : A report to Congress and the Secretary of Energy (1993).

Atomvåbenforsøg

Græsk: Alle militære og videnskabelige eksperimenter med kernevåben; deres hardware og software. I alt 1030 amerikanske og 24 britiske atomvåbenforsøg blev udført inden for 55 operationer i USA[55]. Bortset fra nogle enkelte opremsninger af antallet af atomvåbenforsøg og deres kronologi er der af militære og politiske årsager stort set intet teknisk litteratur om emnet. Alt vedrørende disse eksperimenter er klassificeret eller maskeret som det er tilfældet med de få nedgraderede tekniske rapporter der er frigivet i forbindelse med atomveteranernes erstatningssager. Nogle af klassificeringsreglerne vedrørende atomvåbenforsøg fremgår bl.a. af: *Control of Nuclear Weapon Data*. U.S. DOE: National Nuclear Security Administration, Office of Nuclear Weapon Surety and Quality, 2011. Tilsvarende er ikke nukleare forsøg i forbindelse med atomvåbenforsøg – så som sikkerhedsforsøg – ikke genstand for den store opmærksomhed.[56] Har der fundet to eller flere sprængninger sted samme dag opgøres de som hovedregel som et forsøg. Det formindsker tilsyneladende problemernes omfang.

55 Geoscience Australia: **Nuclear Explosions database** - http://www.ga.gov.au/oracle/nuclear-explosion.jsp

56 Annewandter, Robert: Diploma Thesis. **Modelling Pressure Response and Propagation of the Concentration Front of Tracers indicating Underground Nuclear Explosions induced by Barometric Pumping** - A Double Porosity Approach. Department of Physics Faculty of Mathematics, Informatics and Natural Sciences. University of Hamburg. 2007.- 141 s.
- http://www.znf.uni-hamburg.de/diplomAnnewandter.pdf

Atomvåbenklubbens medlemmer har foretaget atomvåbenforsøg, kaldet hot spots i eller ved i USA: Alamogordo Trinity Site og Carlsbad i New Mexico, Forsøgsområderne i Stillehavet, herunder Johnston Island, Juleøen (Kiribati), Marshalløerne, herunder Bikini, Eniwetok og Rongelap atollerne[57], Mikronesien, samt i Hattiesburg, Mississippi og i Nevada.

Frankrig: i Algeriet: Ekker og Reggan i Sahara ørkenen, i Fransk Polynesien: Fangatau og Muroroa.
Storbritannien: Emu Field, Maralinga, Monte Bello øerne og Woomera i Australien samt ved Juleøen.
Kharan ørkenen i Pakistan, Lop Nur i Kina, Pokhran i Indien, i Det indiske ocean Prince Edward øerne (Israel og Sydafrika), i P'unggyeri i Nordkorea, og i Semipalatinsk og Novaya Zemlya i Sovetunionen, Rusland.

Delvist forbud mod prøvesprængninger med prøvestopaftalen fra 1963[58]. Alle atomvåbenforsøg er nu, ifølge international lov, forbudt ved Traktat om Altomfattende Forbud mod Atomprøvesprængninger fra 1996[59].

Se også: Atomnomader ; Atompacifisme ; US Citizen Alert Water Sampling Program ; CTBTO (Den Forberedende Kommission for Organisationen for Traktaten om et Altomfattende Forbud mod Atomprøvesprængninger eller Kommissionen for Over-holdelse af det Altomfattende Forbud mod Atomprøvesprængninger) ; US Ad Hoc Committee on Underwater Atomic Weapons Testing, 1947-1954 ; US National Association

57 **A Report on the People of Rongelap and Utirik Relative to Medical Aspects of the March 1, 1954 Incident Injury, Examination, and Treatment** / Presented by The Special Joint Committee Concerning Rongelap and Utirik Atolls (Public Law No. 4C-33) to the Fifth Congress of Micronesia, First Regular Session. February 1973. - 299 s.

U.S. Government: **Marshall Islands Nuclear Weapons Tests - Bikini, Rongelap, Enewetak, Utrok, Eugelab Atolls, First Hydrogen Bomb - Crossroads, Ivy, Mike Tests, Radiation, Health and Environmental Effects** (CD-ROM).

Commission on Life Sciences: **Radiological Assessments for the Resettlement of Rongelap in the Republic of the Marshall Islands**, National Academic Press, (1994) .
http://books.nap.edu/openbook.php?record_id=2352&page=98

Compensation for the People of Rongelap and Utirik. A Report By The Special Joint Committee Concerning Rongelap and. Utirik Atolls to the Fifth Congress of Micronesia. Second Regular Session, February 28, 19?4 - 97 s.

Castle Bravo nuclear test, 1954 compiled by Wm. Robert Johnston, 2005.
Database of radiological incidents and related events--Johnston's Archive
http://www.johnstonsarchive.net/nuclear/radevents/1954USA1.html

Martini Gotjé interviewed on Waiheke Radio (July 17, 2010). - http://www.archive.org/details/MartiniGotj

Memorandum of understanding by and between the republic of the Marshall Islands, the Rongeiap atoll local government council, the United States department of energy office of environment, safety and health and the united states department of the interior, office of territorial and international affairs: Memorandum made for the Rongelap resettlement project, 1992. - 13 s.

Thyroid Absorbed Dose for People at Rongelap, Utirik, and Sifo on March 1,1954 : A Report / Edward T. Lessard, Robert P. Miltenberger, Robert A. Conard, Stephen V. Musolino, Janikiram R. Naidu, Anant Moorthy, and Carl J. Schopfer / Prepared for Roger Ray, Nevada Operations Office United States Department of Energy Safety and Environmental Protection Division Brookhaven National Laboratory Upton, Long Island, New York, Undated. - 84 s.
- https://www.osti.gov/opennet/servlets/purl/16365783-cRMUbg/16365783.pdf

58 **Bekendtgørelse af traktat om forbud mod kernevåbenforsøg i atmosfæren, det ydre rum og under vandet**.

59 Medalia, Jonathan: **Comprehensive Nuclear-Test-Ban Treaty: Background and Current Developments**. CRS, 2011. - 54 s.

of Atomic Veterans ; experimental thermonuclear device ; Exercise Desert Rock 1951 ; US Families in the Offsite Human Surveillance Program ; forsøgskaniner ; infralyds-målestationer ; Joint Verification Experiment ; US Nuclear Test Personnel Review (NTPR) Program ; Operation Antler (Australien) ; Operation Argus ; Operation Buffalo (Australien) ; Operation Buster/Jangle 1951 ; Operation Castle ; Operation Crossroads ; Operation Cue ; Operation Dominic ; Operation Dominic Scientific 1962 ; Operation Doorstep 1953 ; Operation Fishbowl 1962 ; Operation Gnome 1961 ; Operation Grapple ; Operation Greenhouse ; Operation Hardtack ; Operation Hurricane (Australien) ; Operation Ivy ; Operation Nougat 1961 ; Operation Plumbbob 1957 ; Operation Ranger ; Operation Redwing; ; Operation Sandstone ; Operation Teapot - Military Effects Studies ; Operation Tumbler-snapper ; Operation Upshot-knothole[60] ;

Operation Wigwam 1955 ; Palau ; Project Gnome 1961 ; Project Rulison 1969 ; Project Sedan 1962 ; radioaktivitet[61] ; Sandia Base ; US Standby Air Surveillance Network ;

60 Lookout Mountain Laboratory:**The 280 mm Gun at the Nevada Proving Ground**, 1953. http://www.archive.org/details/The280mmGunattheNevadaProvingGround1953
Lookout Mountain Laboratory: **Operation Upshot-Knothole**, 1953. http://www.archive.org/details/OperationUPSHOT_KNOTHOLE1953

61 Allison, Pam **Radiation Monitoring at Pantex: A Review of the Bureau of Radiation Control Environmental Data 1993-2003**, Peace Farm, 2005.
Anspaugh, Lynn R.: **Radiation Dose to the Population of the Continental United States from the Inges-**

US Standby Milk Surveillance Network[62] ; Sustainable Stockpile Stewardship ; testsprængninger ; Tonopah Test Range: An Outdoor Laboratory Facility 1964 ; Trinity ; tritium ; the UN Scientific Committee on the Effects of Atomic Radiation (UNSCEAR)[63].

tion of Food Contaminated with Radionuclides from Nuclear Tests at the Nevada Test Site. Final Report Report to the National Cancer Institute. - Salt Lake City, UT : Lynn R. Anspaugh, Consulting, 2000. - 68 s.

Armed Forces Special Weapons Project ; Joint Crossroads Committee: **Radiological Defense**. Volume I-III. The Principles of Military Defense against Atomic Weapons (1951).
- http://www.archive.org/details/radiologicaldefe02arme

Department of Defense: **Report on Search for Human Radiation Experiment Records 1944-1994**, 1997. I-III. - 101+60+92 s.

Appendix I Results of DoD Human Radiation Experiment Records Search - 390 s.

Appendix II Information Sources - 89 s.

Appendix III Acronyms and Abbreviations/ Appendix IV Radiation Terms

http://www.defense.gov/pubs/dodhre/

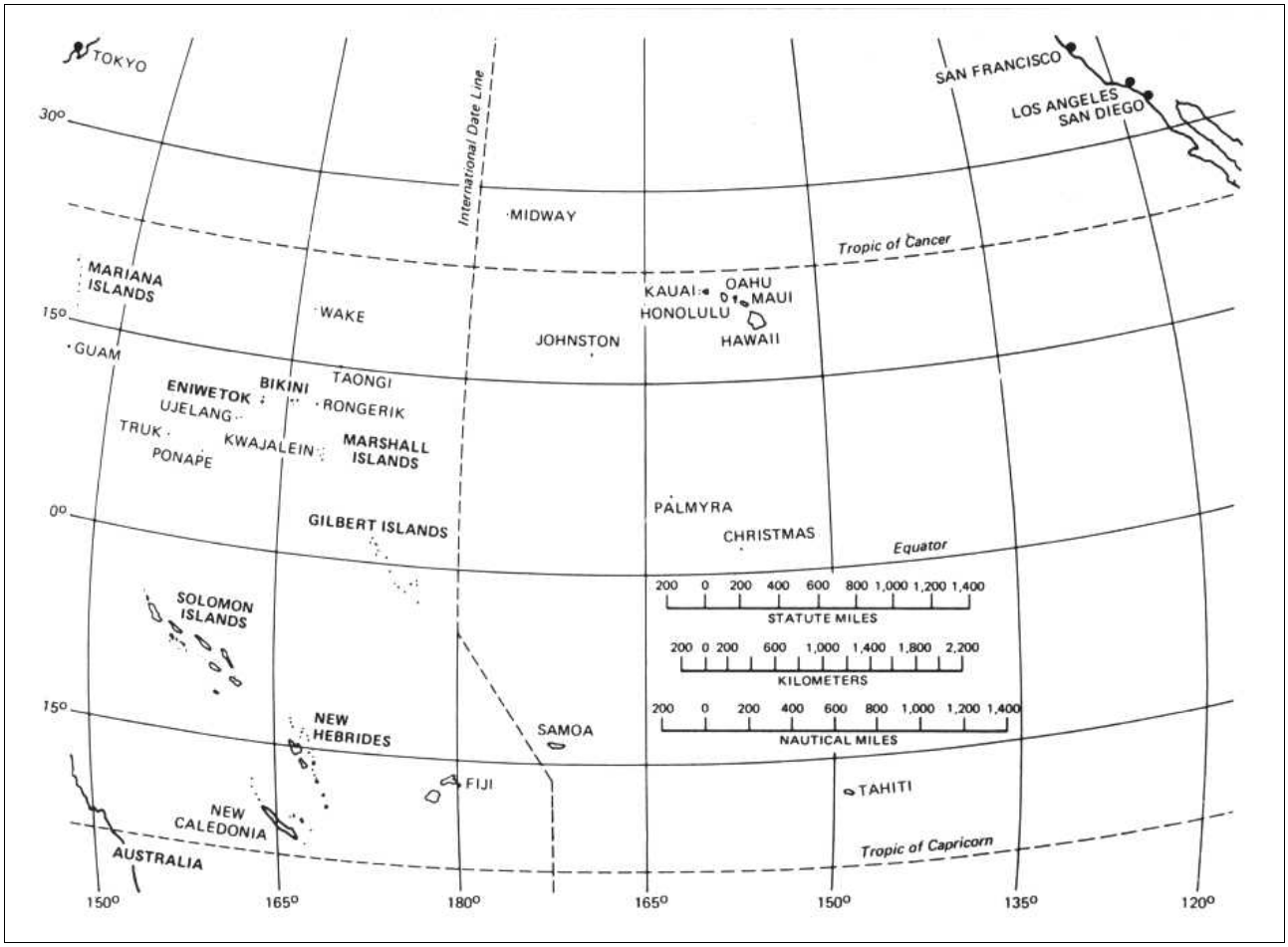
DOE: Radiological Effluents Released from U.S. Continental Tests, 1961 Through 1992. / C R Schoengold, M E DeMarre, E M Kirkwood. 1996.- 304 s. ' This report documents all continental tests from September 15, 1961, through September 23, 1992, from which radioactive effluents were released. The report includes both updated information previously published in the publicly available May 1990 report, DOE/NV-317, Radiological Effluents Released from Announced U.S. Continental Tests 1961 through 1988, and effluent release information on formerly unannounced tests.'

http://www.nv.doe.gov/library/publications/historical/DOENV_317.pdf

62 **Offsite Environmental Monitoring Report: Radiation Monitoring Around United States Nuclear Test Areas, Calendar Year 1993** / Deb J. Chaloud, Don M. Daigler, Max G. Davis, Bruce B. Dicey,Scott H. Faller, Chris A. Fontana, Ken R. Giles, Polly A. Huff,Anita A. Mullen, Anne C. Neale, Frank Novielli, Mark Sells, and the Nuclear Radiation Assessment Division United States Environmental Protection Agency. 1996. - 177 s.

63 Gusterson, Hugh: **The shared sins of Soviet and U.S. nuclear testing** [birth abnormalities after nuclear tests] Bulletin of the Atomic Scientists | 29 September 2009.

US Pacific Proving Grounds



Amerikansk: *Forsøgsområderne i Stillehavet*.[64]

De lokaliteter i Marshalløerne, herunder Bikini, Johnston Island og et par andre steder i Stillehavet, der anvendes af USA til at foretage atomprøvesprængninger i, i perioden 1946-1962, herunder Operation Crossroads (1946), Operation Sandstone (1948), Operation Greenhouse (1951), Operation Ivy (1952), Operation Castle (1954,) Operation Redwing (1956), Operation Hardtack I (1958), og Operation Dominic (1962). De amerikanske kernevåben testprogrammer på Marshalløerne har forårsaget store skader i Enewetak og Bikini, forurenet andre nordlige atoller, og forårsagede kræft og andre sygdomme blandt hundredvis af Marshall øboerne, herunder er bl.a. fødselsabnormiteter i Marshalløerne dokumenteret[65].

64 **Nuclear Testing Program in the Marshall Islands**: Hearing before the Committee on Energy and Natural Resources United States Senate one hundred ninth Congress first session on Effects of U.S. Nuclear Testing Program in the Marshall Islands July 19, 2005. GPO, 2005. - 116 s.

65 Yamada, Seiji: **Cancer, reproductive abnormalities, and diabetes in Micronesia**: the effect of nuclear testing. Pacific Health Dialog Vol 11. No. 2. 2004 s. 216-221.

Kendte amerikanske atomvåbenforsøg[66]

Operation Anvil
Operation Aqueduct
Operation Arbor
Operation Argus
Operation Bedrock
Operation Bowline
Operation Buster
Operation Castle
Operation Charioteer
Operation Cornerstone
Operation Cresset
Operation Crossroads
Operation Crosstie
Operation Dominic
Operation Emery
Operation Fishbowl
Operation Flintlock
Operation Fulcrum
Operation Fusileer
Operation Greenhouse
Operation Grenadier
Operation Grommet
Operation Guardian
Operation Hardtack I
Operation Hardtack II
Operation Ivy
Operation Jangle
Operation Julin
Operation Latchkey
Operation Mandrel
Operation Musketeer
Operation Newsreel
Operation Niblick
Operation Nougat
Operation Phalanx
Operation Plumbbob
Operation Praetorian
Operation Project 56
Operation Project 57
Operation Project 58
Operation Project 58A
Operation Quicksilver
Operation Ranger
Operation Redwing
Operation Roller Coaster
Operation Sandstone
Operation Sculpin
Operation Storax
Operation Sunbeam
Operation Teapot
Operation Toggle
Operation Touchstone
Operation Tumbler-Snapper
Operation Upshot - Knothole
Operation Whetstone
Operation Wigwam
Operations Tinderbox

66 De menneskelige omkostninger ved atomvåbenforsøg er bl.a. beskrevet i følgende publikationer:

Anspaugh LR. **Radiation dose to the population on the continental United States from the ingestion of food contaminated with radionuclides from high-yield weapons tests conducted in US, UK, and USSR between 1952 and 1963**. National Cancer Institute, Department of Health and Human Services, Centers for Disease Control and Prevention. Report on the Feasibility of a Study of the Health Consequences to the American Population from Nuclear Weapons Tests Conducted by the US and Other Nations. 2000;H:29. - www.cdc.gov/nceh/radiation/fallout/

Department of Defense: **Report on Search for Human Radiation Experiment Records 1944-1994**, 1997. I-III. - 101+60+92 s.

Appendix I Results of DoD Human Radiation Experiment Records Search - 390 s.

Appendix II Information Sources - 89 s.

Appendix III Acronyms and Abbreviations/ Appendix IV Radiation Terms.

Operation Tumbler-Snapper 1952 : United States Atmospheric Nuclear Weapons Tests. Nuclear Test Personnel Review./ Jean Ponton, Carl Maag, Mary Francis Barrett, Robert Shepanek. - Washington, DC: Defense Nuclear Agency. 1982. - 222 s.

Report on the Health Consequences to the American Population from Nuclear Weapons Tests Conducted by the United States and Other Nations. Centers for Disease Control and Prevention & the National Cancer Institute, 2001.

Radioaktiv forurening i USA som en følge af atmosfæriske atomvåbenforsøg

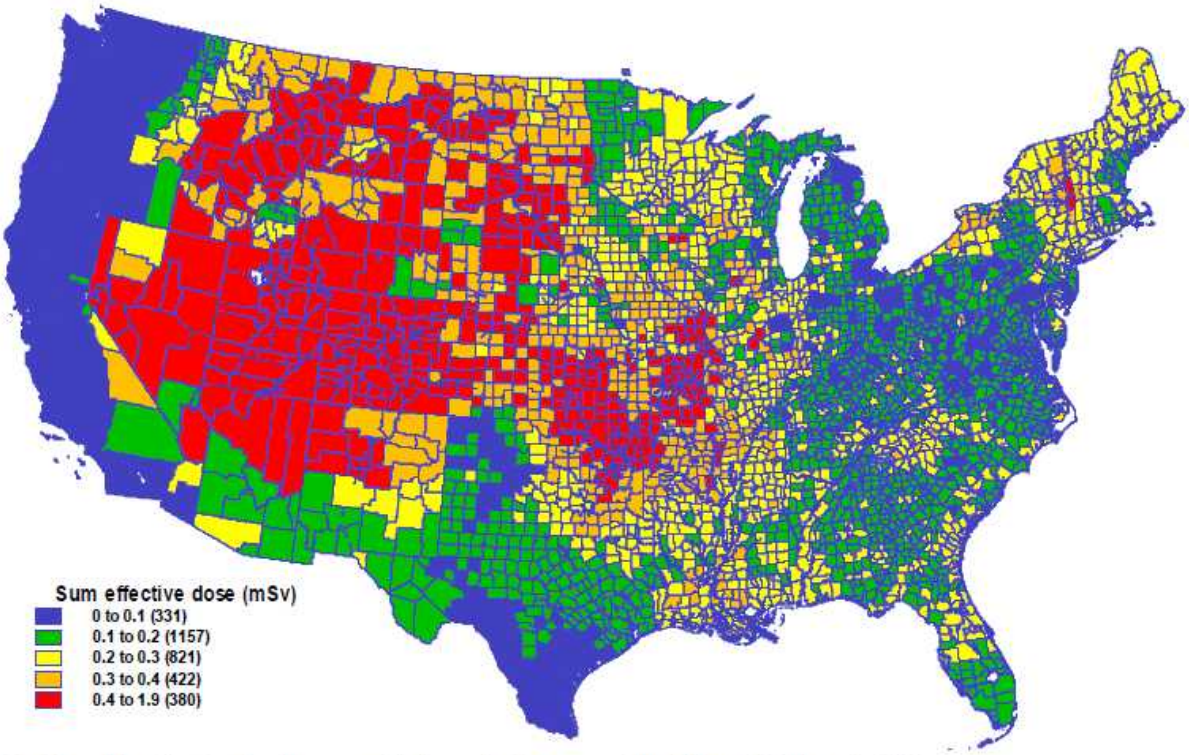
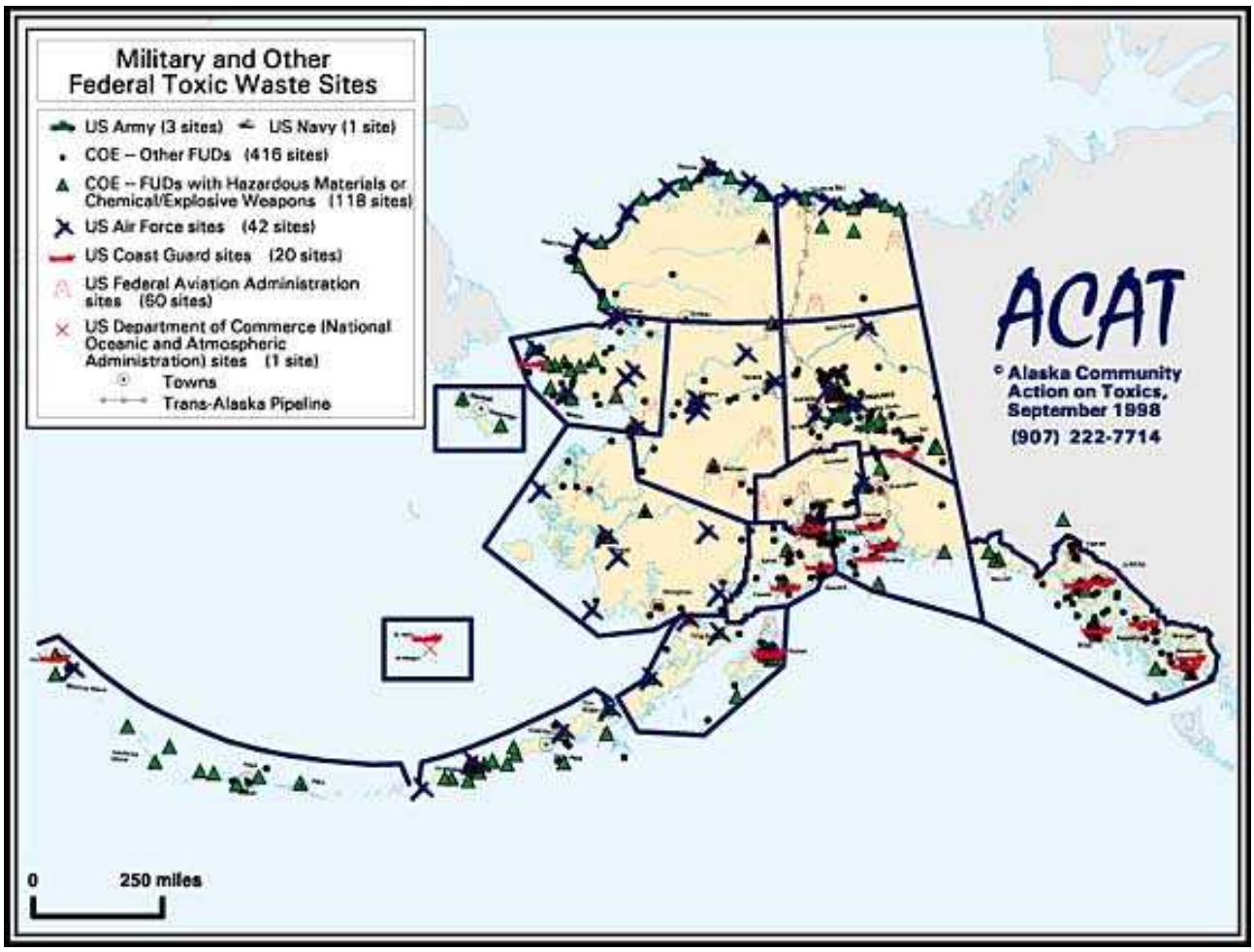


Fig. 26. Map of the effective dose by geographical area for the tests conducted from 1951 through 1962.

Eksempler på atomvåbenforsøg



Alaska

Projekt Chariot var en del af den amerikanske atomenergikommissions Plowshare program, som udarbejdes for at teste fredelig anvendelse af nukleare eksplosioner. Formålet med projektet var at skabe en dybtvandshavn til udskibning af kul, olie og andre naturressourcer som menes at findes langs denne del af Alaskas kyst. I 1962, foretog USA's Geologiske Undersøgelse en analyse for at bestemme spredningen af radioaktivt materiale fra en underjordisk atomeksplosion. Senere i 1962, før det nukleare sprængstof blev detoneret, blev Projekt Chariot aflyst.
Tre underjordiske atomvåbenforsøg, ved Amchitka øen, 1965-1971[67]. Oplysninger om

67 Consortium for Risk Evaluation with Stakeholder Participation II:**Background on Amchitka**, 2005. - 18 s.
Hydrogeologic assessment of the Amchitka Island nuclear test site Alaska with magnetotellurics / Martyn Unsworth, Wolfgang Soyer, Volkan Tuncer, Anna Wagner, og David Barnes. Geophysics,vol. 72, no. 3 May-June 2007; p. b47–b57
Miller, Pam: **Nuclear Flashback**: Report of a Greenpeace Scientific Expedition to Amchitka Island, Alaska – Site of the Largest Underground Nuclear Test in U.S. History. Greenpeace, 1996 - 33 s.
Nevada Environmental Restoration Project: **Subsurface Completion Report for Amchitka Underground Nuclear Test Sites**: Long Shot, Milrow, and Cannikin, 2006. - 63 s.
United States Nuclear Tests, July 1945 through September 1992. U.S. Department of Energy Nevada

forsøgene er stadig skjulte eller maskerede som klassificeret information, men Greepeace konkluderer, at 'Cannikin atomprøvesprængningstedet på Amchitka, området for den største underjordiske atomprøvesprængning i amerikansk historie er utæt. Elementer af radioaktivitet siver ud i Beringshavet via White Alice Creek / 'The Cannikin nuclear test site on Amchitka, the site of the largest underground nuclear test in U.S. history is leaking long-lived transuranic radioactivity into the Bering Sea via White Alice Creek. Two biological samples taken by Greenpeace researchers from White Alice Creek downgradient from Cannikin revealed the presence of americium-241, a beta decay product of plutonium-241. Americium-241 in the environmental samples indicates the presence of plutonium isotopes in the groundwater-surface water system at Amchitka. One of the two stream samples contained plutonium-239/-240. The plutonium-239 used to trigger the Cannikin fusion explosion (possibly 9-11 pounds of plutonium-239 2) was co-produced with plutonium-240 and plutonium-241 in a nuclear reactor designed to create weaponsgrade plutonium'.

- Proejct Long Shot, 1965
- Milrow 1969
- Cannikin 1971

Operation Crossroads 1946

Operation vejkryds. En serie på to amerikanske atomvåbenforsøg ved Bikini i Stillehavet under ledelse af Den amerikanske atom-energikommission. De første forsøg efter Trinity eksperimentet i juli 1945.
Oplysninger om operationen er stadig skjulte eller maskerede som klassificeret information: 'Letter of Transmittal...
The Joint Chiefs of Staff, Washington, D. C.
Subject: Final Report, JCS Evaluation Board
Gentlemen:
Your Board, appointed to evaluate the Bikini Atoll Atomic Bomb tests, has the honor to transmit to you its final report.
In accordance with our Directive this report is classified as a TOP SECRET. In order that the Joint Chiefs of Staff may make this report public, the Board has prepared a revision from which certain matter has been deleted. Prior to the publication of this revision it will be necessary that classified factual material be deleted by the Joint Chiefs of Staff....

Værnscheferne/ Overførselsskrivelse
Emne: Endelig rapport, JCS Evalueringsbestyrelse
Mine herrer
Jeres bestyrelse, udpeget til at evaluere Bikini-atollens atombombeforsøg, har den ære, at sende Jer den endelige rapport.
I overensstemmelse med vores direktiv er denne rapport klassificeret som top hemmelig. For at Fællesstaben af chefer kan offentliggøre denne rapport, har bestyrelsen udarbejdet en revision, hvorfra visse sager er blevet slettet. Forud for offentliggørelsen af denne revision vil det være nødvendigt at klassificeret faktuelt materiale blive slettet

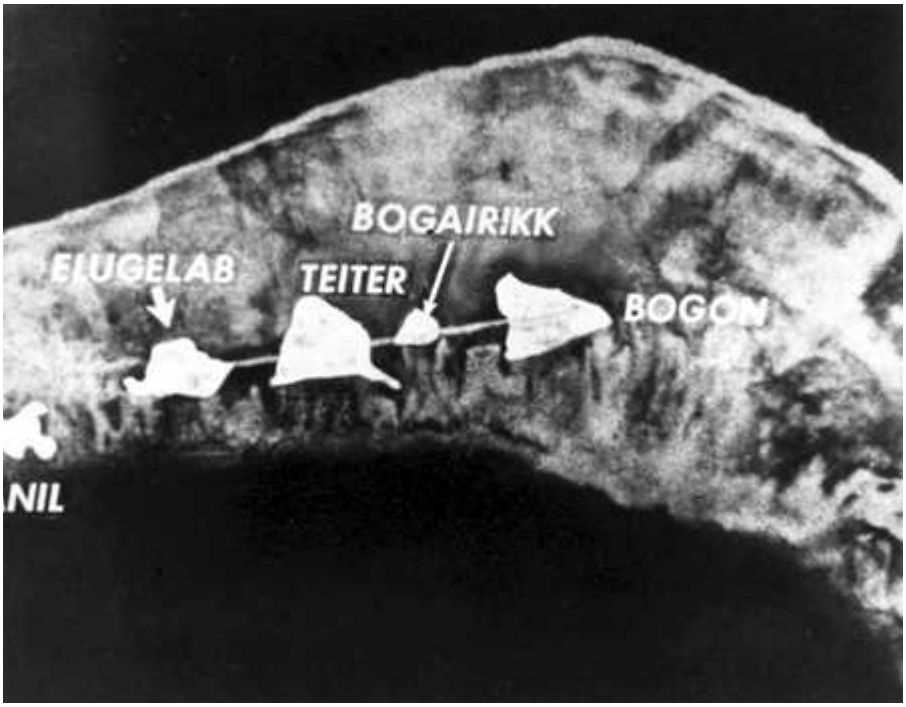
af den amerikanske militære overkommando', hedder det i indledningen til the Evaluation of the Atomic Bomb as a Military Weapon - the Final Report of the Joints Chiefs of Staff Evaluation Board for Operation Crossroads, 30 June 1947 Formålet med forsøgene var at undersøge effekten af atomvåben på orlogsfartøjer[68].
Atomvåbenforsøgene omfattede

ABLE eksplodere i en højde af 158 meter den 1. juli
BAKER eksploderede 27 meter under vandoverfladen den 25. juli.

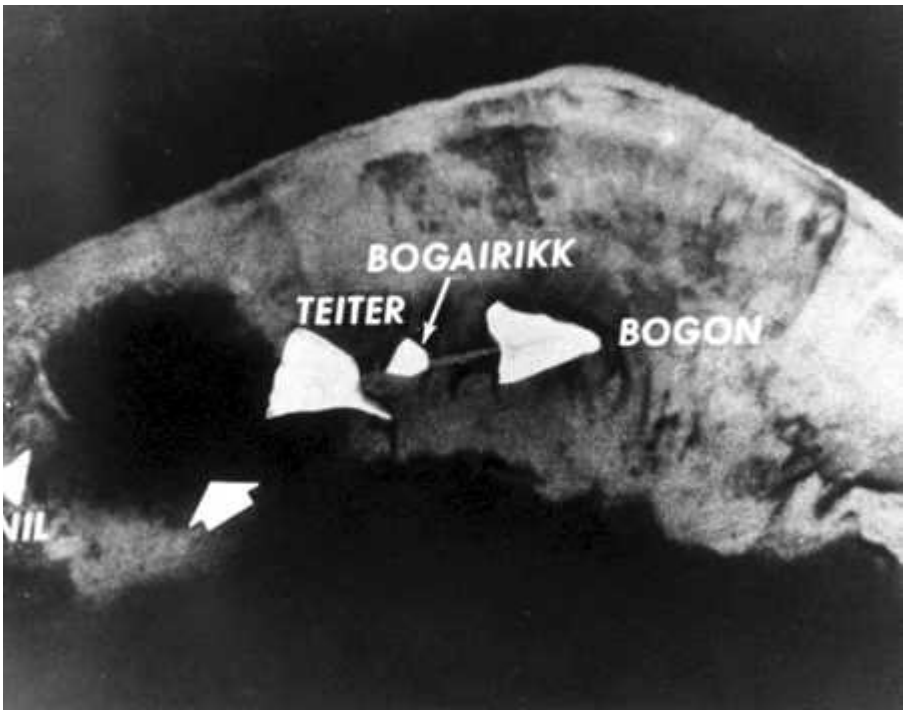
Det næste amerikanske atomvåbenforsøg var Operation Sandstone.

68 **First Pictures Atomic Blast!**, 1946/07/08 (1946).
'The dramatic film history of the atom bomb test at Bikini! Pictures of the actual bomb drop! Blasted ships and the terrible destructive force of the world's fourth atom bomb! Universal Newsreel, in cooperation with the Army and Navy, presents the motion picture drama, 'Operation Crossroads.' This film record of the historical event shows in dramatic detail the various phases of the epochal experiment, from takeoff to the awful blast that destroyed or damaged more than half the ships in Bikini Lagoon." scenes of Admiral William H. Blandy commanding Operation Crossroads at Bikini Lagoon, test animals put on ships, sheep is sheared, Secretary of Navy Forrestal speaks on deck of ship (sound distorted), crews leave, Bikini fleet ready, A-bomb loaded on B-29 Dave's Dream, plane takes off, bomb doors open, men put on protective goggles; "The bomb's away! It's falling ... " then explosion, "motion picture spectacle of all time" and another view of the explosion. (complete newsreel)'.
http://www.archive.org/details/1946-07-08_First_Pictures_Atomic_Blast
Mortality of Veteran Participants in the Crossroads Nuclear Test / J. Christopher Johnson, Susan Thaul, William F. Page, and Harriet Crawford, Editors; Committee on the CROSSROADS Nuclear Test, Institute of Medicine. 1996.
United States Nuclear Tests, July 1945 through September 1992.
U.S. Department of Energy Nevada Operations Office, DOE/NV--209-REV 15, December 2000.
National Park Service : **The Archeology of the Atomic Bomb - A Submerged Cultural Resources Assessment of the Sunken Fleet of Operation Crossroads at Bikini and Kwajalein Atoll Lagoons** (1991). - http://www.nps.gov/history/history/online_books/swcrc/37/contents.htm
Operation Crossroads (Part I) (1946).
http://www.archive.org/details/Operatio1946
Operations Crossroads Underway, 1946/07/01 (1946).
http://www.archive.org/details/1946-07-01_Operations_Crossroads_Underway
U.S. Army Air Forces: **Special Delivery** (1946) - 'Airplanes and missions of the U.S. Army Air Forces, emphasizing Operation Crossroads'. - http://www.archive.org/details/SpecialD1946
United States. Joint Task Force One; Shurcliff, William A.: **Bombs at Bikini; the official report of Operation Crossroads** (1947).
http://www.archive.org/details/bombsatbikinioff00unit
United States. Joint Task Force One: **Operation Crossroads, the official pictorial record** (1946).
http://www.archive.org/details/operationcrossro00unit

Operation Ivy 1952



Kort over Elugelab før og efter den første november 1952.



Operation vedbend. Serie på to amerikanske brint- og atomvåbenforsøg i Stillehavet i den første del af den kolde krig. Oplysninger om operationen er stadig skjulte som klassificeret eller maskeret information.

Brintbombeforsøget beskrives således af USAF Lookout Mountain Laboratoriet: "Øen Elugelab er forsvundet!" Præsident Eisenhower hørt denne korte beretning om Mike affyringen i Operation Ivy fra Gordon Dean, formand for Atomenergi-kommissionen. Mike var den første fuld-skala brint sprængladning, der skulle testes, men alligevel var det kun en videnskabelig test af et fussionkoncept. Mike var ikke et anvendeligt våben. Øen, hvor at anordningen er detoneret var fordampet...'[69]

"The island of Elugelab is missing!" President Eisenhower heard this short report on the Mike shot in Operation Ivy from Gordon Dean, Chairman of the Atomic Energy Commission. Mike was the first full-scale hydrogen explosive device to be tested, yet was only a scientific test of a thermofusion implosion device concept. Mike was not a deliverable weapon.

The island where the device was detonated was vaporized. The hole Mike left was big enough to accommodate 14 Pentagon-size buildings and deep enough to hold 17 story building under water, in a crater one mile in diameter and approximately 175 feet deep. Mike's yield was an incredible 10.4 megatons, signaling the proof-tested expansion of the nuclear explosive technology concepts from nuclear fission to thermofusion. Thermofusion is the same process that occurs in the core of the Sun.

This test, however, was not the first test of a liquid thermonuclear explosive. The first test ever conducted into the fusion principle occurred during Operation Greenhouse at Eniwetok in 1951, with the 225 kiloton George test. Another test of hydrogen in the center of a nuclear weapon before Mike was during the Greenhouse Item test at Eniwetok, proving a critical stockpiling yield efficiency concept, called "boosting.'" Mike was followed on November 15, 1952 by the King shot, the largest all-fission device ever tested by the United States. It was a uranium super oralloy Mark 18 prototype implosion core in a Mark 6D casing, with an advanced warhead that enabled it to produce 500 kilotons of equivalent TNT explosive energy.
Forsøgene kom efter Operation Tumbler-Snapper og før Operation Upshot-Knothole.
Arkiv: National Archives: Records of the Defense Threat Reduction Agency, (Record Group 374), 1943-73.

Atomvåbenforsøgene omfattede

Mike 1 November Elugelab Island, Eniwetok 10.4 - 12 megatons - første brintbombe
King 16 November Airburst 2,000 feet North of Runit Island, Eniwetok 500 kilotons

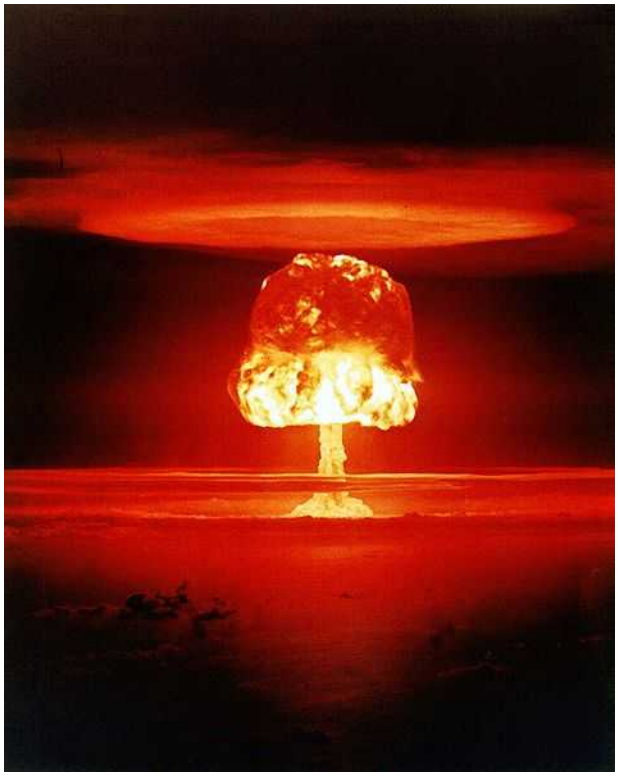
69 **Analysis of Radiation Exposure for Navy Personnel at Operation Ivy**. Science Applications, Inc.. 1983. - 78 s. - http://www.dtra.mil/documents/ntpr/relatedpub/DNATR8298.pdf

Hacker, Barton C.: **Elements of controversy: the Atomic Energy Commission and radiation safety in nuclear weapons testing, 1947-1974**. University of California Press, 1994 - 614 s.

Hansen, Chuck: **The Swords of Armageddon : U.S. Nuclear Weapons Development since 1945**.

United States Air Force Lookout Mountain Laboratory, Air Photographic Charting Service, Hollywood, California: **Operation** IVY (1952). - http://www.archive.org/details/OperationIVY1952

Operation Castle 1954



Amerikanske brintbombeforsøg ved Bikini i Stillehavet i den første del af den kolde krig med det formål, at teste fly baserede brintbombers design og virkninger. Oplysninger om operationen er stadig skjulte som klassificeret information.

'Bravo sprængningen i Castle serien var uventet på 15 megaton, den største af de amerikanske atmosfæriske forsøgssprængninger nogensinde'.

Den japanske fiskerbåd Daigo Fukuryu Maru blev stærkt forurenet af radioaktivt nedfald fra forsøget. Den nukleare nedfalds bevægelse efter den termonukleare Bravo test. Det er den værste forurening i USA nukleare historie. Numrene svarer til anslåede samlede (akkumulerede) dosis omrids eller konturer (rad).[70]

Gammadoser er Røntgen fra ankomsttidspunktet til 96 timer (4 dage) efter detonation, udenfor på land. Glasstone og Dolan nævner dette, fordi data fra havet ikke blev opsamlet i denne test. Bravos nedfald og konturerne til den nordlige del af øerne er usikre og andre nedfaldsmønstre fra den samme test tilskrives det høje niveau målt på Rongelap som et "hotspot "af den slags, der måles i vindretningen i havet i senere forsøg

Operationen kom efter Operation Upshot-Knothole og blev afløst af Operation Teapot. Arkiv: National Archives: Records of the Defense Threat Reduction Agency, (Record Group 374), 1943-73.

Atomvåbenforsøgene omfattede

Bravo, February 28, Bikini, 15 megatons
Romeo, March 26, Bikini, 11 megatons
Koon, April 6, Bikini, 110 kilotons
Union, April 25, Bikini, 6.9 megatons
Yankee, May 4, Bikini, 13.5 megatons
Nectar, May 13, Enewetak, 1.69 megatons

70 Kilde: Samuel Glasstone og Phillip J. Dolan, red., Virkningerne af kernevåben / **The Effects of Nuclear Weapons**, 3. udg. (Washington, D.C.: DOD og DOE, 1977) s. 437.

Protester

Emergency Committee of Atomic Scientists

Atomvidenskabsmændenes kriseudvalg.

Faglig historisk amerikansk fredsgruppe oprettet i 1946 af fysikerne Albert Einstein og Leó Szilárd med de formål, at advare politikere og befolkningen om farerne ved udvikling af kernevåben og desuden, at fremme fredelig anvendelse af atomenergi.

Kriseudvalget oprettes i kølvandet på Leo Szilárd appellen fra juli 1945 til USAs daværende præsident Harry S. Truman, imod brug af atombomben ud fra moralske grunde; en appel der blev underskrevet af 70 forskere, som alle arbejdede på Manhattan projektet, hvor størstedelen af dem ikke vidste, hvad de var ved at skabe på det tidspunkt[71]. Efter krigen skabte de bl.a. Federation of Atomic Scientists og det stadig eksisterende tidsskrift Bulletin of the Atomic Scientists, for, med Einsteins ord: 'De (forskerne) vidste, at det demokratiske grundlag for denne nations politik vedrørende atomenergi i sidste ende skal hvile på dens borgeres forståelse.

Amerikas beslutning vil ikke blive foretaget over et bord i FN. Vore repræsentanter i New York, Paris, eller i Moskva afhænger i sidste ende af beslutninger, der træffes i landsbyens torv. Til landsbyens torv skal vi bære atomenergiens faktiske kensgerninger. Derfra skal komme Amerikas røst.' Albert Einstein, New York Time Magazine, June 23, 1946 og A Statement of Purpose by the Emergency Committee of Atomic Scientists

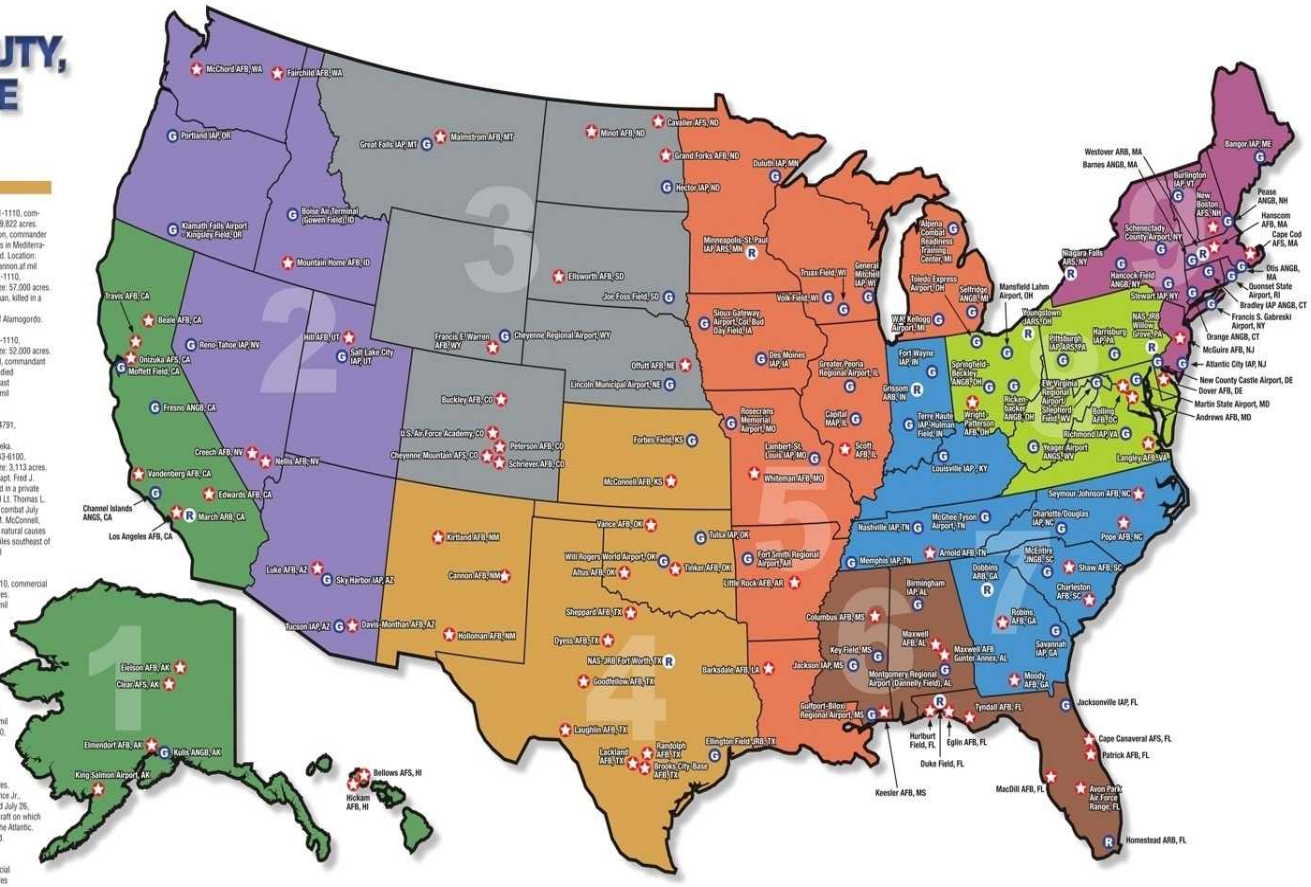
Organisationens protester mod atmosfæriske atomvåbenforsøg medvirkede til prøvestopaftalen i 1963. Blandt de aktive i organisationen som fungerede frem til 1950 kan nævnes Hans Bethe, Selig Hecht, Thorfin Hogness, Philip M. Morse, Linus Pauling, Lily Payson, Joseph H. Schaffner, Michael Straight, Leo Szilard, Harold Urey og Victor F. Weisskopf. Arkiv: University of Chicago, Special Collections.

Se også: American Association of Scientific Workers ; Association of Manhattan Project Scientists ; Association of Oak Ridge Engineers and Scientists, 1945-1952 ; Association of Oak Ridge Scientists ; Association of Scientists for Atomic Education, 1947 ; atompacifisme ; Federation of American Scientists ; Independent Citizens' Committee of the Arts, Sciences and Professions ; National Committee of Atomic Scientists ; National Committee on Atomic Information, 1946-1947 ; UN Atomic Energy Commission ; UN Emergency Committee of the Atomic Scientists ; Union of Concerned Scientists[72] ; World Movement for World Federal Government.

71 **Leo Szilard Papers**, Mandeville Special Collections Library, The UCSD Libraries, University of California, San Diego, 2005. - 81 s.

72 **The NRC and Nuclear Power Plant Safety in 2010** : A Brighter Spotlight Needed / David Lochbaum. Union of Concerned Scientists. 2011. - 64 s.

AIR FORCE ACTIVE DUTY, GUARD AND RESERVE FACILITIES



REGION 1

Alaska
Clear AFS, AFSPC, ANG, DSN 317-585-6110 or 6409, commercial (907) 585-6110 or 6409. Location: Anderson.
Eielson AFB, PACAF, DSN 317-377-1110, commercial 907-377-1110. Size: 23,500 acres. Named for Carl Ben Eielson, arctic aviation pioneer who died in November 1929. Location: 26 miles southeast of Fairbanks. ANG: DSN 317-377-8734, commercial 907-377-8734. ANG location: North Pole. www.eielson.af.mil
Elmendorf AFB, PACAF, DSN 317-552-1110, commercial 907 552-1110. Size: 13,441 acres. Named for Capt. Hugh Elmendorf, killed Jan. 13. 1933, during flight testing at Wright Field, Ohio. Location: Anchorage. www.elmendorf.af.mil
King Salmon Airport, PACAF, DSN 317-552-1110, commercial 907-552-1110 through Elmendorf AFB operator.
Kulis ANGB, ANG, DSN 317-626-1176, commercial 907-249-1176. Location: Next to Ted Stevens Anchorage IAP. www.akang.ang.af.mil

California
Beale AFB, ACC, DSN 368-1110, commercial 530-634-3000. Size: 22,944 acres. Named for Brig. Gen. E.F. Beale, surveyor general of California and Nevada before Civil War. Location: 13 miles east of Marysville. www.beale.af.mil
Channel Islands ANGS, ANG, DSN 893-7000, commercial 805-986-8000. Location: Point Mugu.
Edwards AFB, AFMC, DSN 527-1110, commercial 661-277-1110. Size: 301,114 acres. Named for Capt. Glen W. Edwards, killed in YB-49 crash, June 5, 1948. Location: Main base 16 miles east of Rosamond. www.edwards.af.mil
Fresno ANGB, ANG, DSN: 949-9100, commercial 559-454-5100. Location: Fresno.
Los Angeles AFB, AFSPC, Space and Missile Systems Center, DSN 633-1110, commercial 310-653-1110. Size: 220 acres (including new main base Schriever Space Complex; Fort MacArthur Annex; housing areas in San Pedro, 20 miles south). Location: 5 miles south of Los Angeles IAP in El Segundo. www.losangeles.af.mil
March ARB, ANG, AFRC, DSN 447-1110, commercial 951-655-1110. Location: 9 miles southeast of Riverside.
Moffett Field, ANG, DSN 359-9333, commercial 650-603-9333. Location: 2 miles north of Mountain View.
Onizuka AFS, AFSPC, DSN 561-3000, commercial 408-752-3000. Location: Sunnyvale. www.schriever.af.mil/onizuka
Travis AFB, AMC, DSN 837-1110, commercial 707-424-1110. Size: 7,580 acres. Named for Brig. Gen. Robert F. Travis, killed in a B-29 accident Aug. 5, 1950. Location: next to Fairfield. www.travis.af.mil
Vandenberg AFB, AFSPC, DSN 276-1110, commercial 805-606-1110.
Size: 99, 900 acres. Named for Gen. Hoyt S. Vandenberg, Air Force's second chief of staff. Location: 8 miles north-northwest of Lompoc. www.vandenberg.af.mil

Hawaii
Bellows AFS, PACAF, commercial 808-259-8080. Named for 2nd Lt. Franklin B. Bellows, World War I Distinguished Service Cross recipient, killed on reconnaissance mission Sept. 13, 1918. Location: Windward shore of Oahu. www.bellowsafs.com
Hickam AFB, PACAF, DSN 315-449-7110, commercial 808-449-7110. Size: 2,855 acres. Named for Lt. Col. Horace M. Hickam, air pioneer, killed in a crash Nov. 5, 1934. Location: 9 miles west of Honolulu. www2.hickam.af.mil

REGION 2

Washington
Fairchild AFB, AMC, DSN 657-1110, commercial 509-247-1212. Size: 4,551 acres. Named for Gen. Muir S. Fairchild, Air Force vice chief of staff at the time of his death in 1950. Location: 12 miles west-southwest of Spokane. www.fairchild.af.mil
McChord AFB, AMC, DSN 382-1110, commercial 253-982-1110. Size: 4,639 acres. Named for Col. William C. McChord, killed Aug. 18, 1937, during a forced landing in Virginia. Location: 8 miles south of Tacoma. public.mcchord.amc.af.mil

Oregon
Klamath Falls Airport-Kingsley Field, ANG, DSN 830-6198, commercial 541-885-6198. Location: 5 miles southeast of Klamath Falls.
Portland IAP, ANG, DSN 638-4000, commercial 503-335-4000. Location: Portland.

Idaho
Boise Air Terminal (Gowen Field), ANG, DSN 422-5322, commercial 208-422-5322. Location: 6 miles south of Boise at air terminal. www.124wg.ang.af.mil
Mountain Home AFB, ACC, DSN 728-1110, commercial 208-828-1110. Size: 9,112 acres. Location: 10 miles southwest of Mountain Home. www.mountainhome.af.mil

Utah
Hill AFB, AFMC, DSN 777-1110, commercial 801-777-1110. Size: 961,991 acres. Named for Maj. Ployer P. Hill, killed Oct. 30, 1935, on test flight of first B-17. Location: 8 miles south of Ogden. www.hill.af.mil
Salt Lake City IAP, ANG, DSN: 245-2200 commercial 801-245-2200. Location: East side of main airport, 5-mile drive from the Salt Lake IAP terminals.

Nevada
Creech AFB, ACC, DSN 682-1110, commercial 702-652-1110 through Nellis AFB operator. Named for Gen. Wilbur L. "Bill" Creech, father of Thunderbirds, the Air Force's premier air demonstration squadron.
Nellis AFB, ACC, DSN 682-1110, commercial 702-652-1110. Size: 2.9 million-acre restricted range; 15,000 square miles of airspace. Named for 1st Lt. William H. Nellis, P-47 pilot killed in Europe Dec. 27, 1944. Location: 8 miles northeast of Las Vegas. www.nellis.af.mil
Reno-Tahoe IAP, ANG, DSN 830-4500, commercial 775-788-4500.
Location: 5 miles southeast of Reno.

Arizona
Davis-Monthan AFB, ACC, DSN 228-1110, commercial 520-228-1110. Size: 11,000 acres. Named for 1st Lt. Samuel H. Davis, killed Dec. 28, 1921, and 2nd Lt. Oscar Monthan, killed March 27, 1924. Location: Tucson. www.dm.af.mil
Luke AFB, Ariz., AETC, DSN 896-1110, commercial 623-856-1110. Size: 4,200 acres (plus 1.5 million acres at Barry M. Goldwater Range). Named for 2nd Lt. Frank Luke Jr., first American aviator to receive Medal of Honor, killed in action Sept. 29, 1918, in France. Location: 20 miles west-northwest of Phoenix. www.luke.af.mil
Sky Harbor IAP, ANG, DSN 853-9000, commercial 602-302-9000. Location: Phoenix.
Tucson IAP, ANG, DSN 844-6192, commercial 520-295-6192. Location: Tucson.

REGION 3

Montana
Great Falls IAP, ANG, DSN 791-0202, commercial 406-791-0202. Location: 5 miles southwest of Great Falls.
Malmstrom AFB, AFSPC, DSN 632-1110, commercial 406-731-1110. Size: 3,573 acres. Named for Col. Einar A. Malmstrom, killed Aug. 24, 1954, in aircraft accident. Location: 1.5 miles east of Great Falls. www.malmstrom.af.mil

Wyoming
Cheyenne Regional Airport, ANG, DSN 388-6110, commercial 307-772-6110. Location: Cheyenne.
Francis E. Warren AFB, AFSPC, DSN 481-1110, commercial 307-773-1110. Size: 5,866 acres. Named for Francis Emory Warren, Wyoming senator and first state governor. Location: Cheyenne. www.warren.af.mil

Colorado
Buckley AFB, AFSPC, DSN 847-9011, commercial 720-847-9011. Size: 3,831 acres. Named for Lt. John H. Buckley, pilot from Longmont, Colo., killed in France Sept. 27, 1918. Location: 8 miles east of Denver. www.buckley.af.mil
Cheyenne Mountain AFS, AFSPC, DSN 268-1110, commercial 719-474-1110.
Peterson AFB, AFSPC, DSN 834-7011, commercial 719-556-7321. Size: 1,277 acres. Named for 1st Lt. Edward J. Peterson, killed in aircraft crash at base Aug. 8, 1942. Location: east of Colorado Springs. www.peterson.af.mil
Schriever AFB, AFSPC, DSN 560-1110, commercial 719-567-1110. Size: 3,840 acres. Named for retired Gen. Bernard Schriever. Location: 10 miles east of Colorado Springs. www.schriever.af.mil
U.S. Air Force Academy, DSN 333-1110, commercial 719- 333-1110.
Location: Colorado Springs.

Nebraska
Lincoln Municipal Airport, ANG, DSN 279-1110, commercial 402-309-1552.
Location: 1 mile northwest of Lincoln.
Offutt AFB, ACC, DSN 271-1110, commercial 402-294-1110. Size: 4,006 acres (including housing area and off-base sites). Named for 1st Lt. Jarvis J. Offutt, pilot who died Aug. 13, 1918. Location: 8 miles south of Omaha. www.offutt.af.mil

North Dakota
Cavalier AFS, AFSPC, DSN 330-3292, commercial 701-993-3292.
Grand Forks AFB, AMC, DSN 362-3000, commercial 701-747-3000. Size: 4,830 acres. Location: 16 miles west of Grand Forks. www.grandforks.amc.af.mil
Hector IAP, ANG, DSN 362-8110, commercial 701-241-7241. Location: Fargo.
Minot AFB, ACC, DSN 453-1110, commercial 701-723-1110. Size: 5,085 acres. Named for city of Minot that donated money to purchase base land. Location: 13 miles north of Minot. www.minot.af.mil

South Dakota
Ellsworth AFB, ACC, DSN 675-1110, commercial 605-385-1000. Size: 7,922 acres (3,411 acres on base). Named for Brig. Gen. Richard E. Ellsworth, killed March 18, 1953, in an RB-36 plane crash in Newfoundland. Location: 12 miles east-northeast of Rapid City. www.ellsworth.af.mil
Joe Foss Field, ANG, DSN 786-7700, commercial 605-988-5700. Location: north of Sioux Falls.

REGION 4

New Mexico
Cannon AFB, AFSOC, DSN 681-1110, commercial 575-784-1110. Size: 69,822 acres. Named for Gen. John K. Cannon, commander of World War II Allied air forces in Mediterranean and Tactical Air Command. Location: 7 miles west of Clovis. www.cannon.af.mil
Holloman AFB, ACC, DSN 572-1110, commercial 505-572-1110. Size: 57,000 acres. Named for Col. George Holloman, killed in a B-17 crash March 19, 1946.
Location: 8 miles southwest of Alamogordo. www.holloman.af.mil
Kirtland AFB, AFMC, DSN 246-1110, commercial 505-846-1110. Size: 52,000 acres. Named for Col. Roy C. Kirtland, commandant of Langley Field in 1930s who died May 2, 1941. Location: southeast Albuquerque. www.kirtland.af.mil

Kansas
Forbes Field, ANG, DSN 720-4791, commercial 785-861-4791.
Location: 2 miles south of Topeka.
McConnell AFB, AMC, DSN 743-6100, commercial 316-759-6100. Size: 3,113 acres. Named for Wichita brothers: Capt. Fred J. McConnell, B-24 pilot who died in a private plane crash Oct. 25, 1945; 2nd Lt. Thomas L. McConnell, B-24 pilot killed in combat July 10, 1943; and Lt. Col. Edwin M. McConnell, World War II pilot who died of natural causes in August 1997. Location: 5 miles southeast of Wichita. www.mcconnell.af.mil

Oklahoma
Altus AFB, AETC, DSN 866-1110, commercial 580-482-8100. Size: 7,746 acres.
Location: Altus. www.altus.af.mil
Tinker AFB, AFMC, DSN 884-1110, commercial 405-732-1110.
Size: 5,041 acres. Named for Maj. Gen. Clarence L. Tinker, who died at sea June 7, 1942, while leading a flight of bombers on strike on Wake Island.
Location: 8 miles southeast of Oklahoma City. www.tinker.af.mil
Vance AFB, AETC, DSN 448-7110, commercial 580-213-5000. Size: 4,555 acres. Named for Lt. Col. Leon R. Vance Jr., Medal of Honor recipient, killed July 26, 1944, when air evacuation aircraft on which he traveled disappeared over the Atlantic. Location: 6 miles south of Enid. https://www.vance.af.mil
Will Rogers World Airport, ANG, DSN 720-5221, commercial 405-686-5221. Location: 7 miles southwest of Oklahoma City.

Texas
Brooks City-Base, AFMC, DSN 240-1110, commercial 210-536-1110. Size: 1,246 acres. Named for Cadet Sidney J. Brooks Jr., killed Nov. 13, 1917, while on his commissioning flight. Location: San Antonio.
www.brooks.af.mil
Dyess AFB, ACC, DSN 461-1110, commercial 325-696-1110. Size: 6,405 acres. Named for Lt. Col. William E. Dyess, fighter pilot killed in crash in December 1943. Location: Abilene. www.dyess.af.mil
Ellington Field JRB, ANG, DSN 454-2337, commercial 281-929-2337. The 147th Reconnaissance Wing, Texas Air National Guard, is the DOD host unit. The 147th RW flies the predator unmanned aerial system. Location: 17 miles southeast of downtown Houston.
Goodfellow AFB, AETC, DSN 477-3231, commercial 325-654-1110. Size: 1,137 acres. Named for 1st Lt. John J. Goodfellow Jr., reconnaissance pilot killed in combat Sept. 14, 1918. Location: San Angelo.
www.goodfellow.af.mil
Lackland AFB, AETC, DSN 473-1110, commercial 210-671-1110. Size: 9,572 acres. Named for Brig. Gen. Frank D. Lackland, early commandant of Kelly Field who died in 1943. Location: 8 miles southwest of downtown San Antonio. www.lackland.af.mil
Laughlin AFB, AETC, DSN 732-1110, commercial 830-298-3511. Size: 5,357 acres. Named for 1st Lt. Jack Thomas Laughlin, a B-17 pilot killed over Java, Indonesia, Jan. 29, 1942. Location: 6 miles east of Del Rio.
www.laughlin.af.mil
NAS-JRB Fort Worth, AFRC, DSN 739-7170.
Location: Fort Worth.
Randolph AFB, AETC, DSN 487-1110, commercial 210-652-1110. Size: 5,044 acres. Named for Capt. William M. Randolph, killed Feb. 17, 1928, on takeoff from Gorman Field, Texas. Location: 17 miles east-northeast of San Antonio. www.randolph.af.mil
Sheppard AFB, AETC, DSN 736-1110, commercial 940-676-1110. Size: 6,158 acres. Named for Sen. Morris E. Sheppard, who died April 9, 1941. Location: 5 miles north of Wichita Falls. www.sheppard.af.mil

REGION 5

Minnesota
Duluth IAP, ANG, DSN 825-7210, commercial 218-788-7210. Location: Duluth.
Minneapolis-St. Paul IAP ARS, ARFC, DSN 783-1000, commercial 612-713-1000.
Location: Minneapolis.

Selfridge ANGB, ANG, DSN 273-4011, commercial 586-239-4011. Location: 3 miles northeast of Mount Clemens.
W.K. Kellogg Airport, ANG, DSN 580-3400, commercial 616-969-3400.
Location: Battle Creek. www.110fw.ang.af.mil

Illinois
Capital MAP, ANG, DSN 892-8219, commercial 217-757-1219. Location: 2 miles northeast of Springfield.
Greater Peoria Regional Airport, ANG, DSN 724-5210, commercial 309-633-5210. Location: 7 miles southwest of Peoria.
Scott AFB, AMC, DSN 576-1110, commercial 618-256-1110. Size: 3,589 acres. Named for Cpl. Frank S. Scott, first enlisted man to die in aircraft accident, Sept. 28, 1912.
Location: 6 miles east-northeast of Belleville. www.scott.af.mil

REGION 6

Mississippi
Columbus AFB, AETC, DSN 742-1110, commercial 662-434-7322. Size: 6,017 acres. Location: 10 miles north-northwest of Columbus. www.columbus.af.mil
Gulfport-Biloxi Regional Airport, ANG, DSN 363-6002, commercial 228-214-6002.
Location: Gulfport.
Jackson IAP, ANG, DSN 828-8350, commercial 601-405-8350.
Location: 7 miles east of Jackson.
Keesler AFB, AETC, DSN 597-1110, commercial 228-377-1110. Size: 3,554 acres. Named for 2nd Lt. Samuel R. Keesler Jr., aerial observer killed in action Oct. 8, 1918, near Verdun, France. Location: Biloxi. www.keesler.af.mil
Key Field, ANG, DSN 778-9000, commercial 601-484-9000. Location: Meridian.

Alabama
Birmingham IAP, ANG, DSN 778-2000, commercial 205-714-2000. Location: Birmingham.
Maxwell AFB, AETC, DSN 493-1110, commercial 334-953-1110. Size: 3,903 acres. Named for 2nd Lt. William C. Maxwell, killed in air accident in the Philippines Aug. 12, 1920.
Location: Montgomery. www.maxwell.af.mil
Maxwell AFB Gunter Annex, AETC, DSN 596-1110, commercial 334-416-1110.
Montgomery Regional Airport (Dannelly Field), ANG, DSN 358-9200, commercial 334-394-7200. Location: 7 miles southwest of Montgomery. www.almont.ang.af.mil

Florida
Avon Park Air Force Range, ACC, DSN 968-7110/2902, commercial 863-452-4110 or 813-828-2902.
Cape Canaveral AFS, AFSPC, DSN 467-1110, commercial 321-853-1110.
Duke Field, AFRC, AFSOC, DSN 872-1110, commercial 850-883-1110 through Eglin AFB operator.
Eglin AFB, AFMC, DSN 872-1110, commercial 850-882-1110. Size: 463,128 acres. Named for Lt. Col. Frederick I. Eglin, flier killed in aircraft accident Jan. 1, 1937. Location: 7 miles northeast of Fort Walton Beach. www.eglin.af.mil
Homestead ARB, AFRC, DSN 791-7000, commercial 305-224-7000. Location: Homestead.
Hurlburt Field, AFSOC, AFRC, DSN 579-1110, commercial 850-884-1110 through Eglin AFB operator. Size: 6,634 acres. Named for Lt. Donald W. Hurlburt, pilot killed on Eglin AFB reservation Oct. 1, 1943.
Location: 5 miles west of Fort Walton Beach. www.hurlburt.af.mil
Jacksonville IAP, ANG, DSN 641-7100, commercial 904-741-7100. Location: 15 miles northwest of Jacksonville.
MacDill AFB, AMC, DSN 968-1110, commercial 813-828-1110. Size: 5,631 acres. Named for Col. Leslie MacDill, killed in aircraft accident Nov. 8, 1938. Location: Tampa. www.macdill.af.mil
Patrick AFB, AFMC, DSN 854-1110, commercial 321-494-1110. Size: 2,341 acres. Named for Maj. Gen. Mason M. Patrick, Air Expeditionary Force Air Service chief in World War I; chief of Air Service/Air Corps, 1921-27. Location: 2 miles south of Cocoa Beach. www.patrick.af.mil
Tyndall AFB, AETC, DSN 523-1110, commercial 850-283-1113. Size: 29,102 acres. Named for 1st Lt. Frank B. Tyndall, pilot killed in a P-1 crash July 15, 1930. Location: 12 miles east of Panama City. www.tyndall.af.mil

REGION 7

Indiana
Fort Wayne IAP, ANG, DSN 786-1210, commercial 260-478-3210. Location: southwest of Fort Wayne.
Grissom AFB, ANG, DSN 388-5211, commercial 765-688-3348. Location: 15 miles north of Kokomo.

Terre Haute IAP-Hulman Field, ANG, DSN 724-1210, commercial 812-877-5210. Location: 5 miles east of Terre Haute.

Kentucky
Louisville IAP, ANG, DSN 741-4400, commercial 502-364-9400. Location: Louisville.

Tennessee
Arnold AFB, AFMC, DSN 340-1110, commercial 931-454-1110. Size: 39,081 acres. Named for Gen. H.H. "Hap" Arnold, former chief of Army Air Forces. Location: 7 miles southeast of Manchester. www.arnold.af.mil
McGhee Tyson ANGB, ANG, DSN 266-3210, commercial 865-985-3210.
Location: 11 miles south of Knoxville.
Memphis IAP, ANG, DSN 726-7101, commercial 901-541-7101. Location: Memphis.
Nashville IAP, DSN 778-6210, commercial 615-399-5410. Location: 6 miles southeast of Nashville.

Georgia
Dobbins ARB, AFRC, DSN 625-1110, commercial 678-655-5467. Location: 16 miles northwest of Atlanta.
Moody AFB, ACC, DSN 460-1110, commercial 229-257-1110. Size: 6,050 acres. Named for Maj. George P. Moody, killed in aircraft crash May 5, 1941. Location: 10 miles north-northeast of Valdosta. www.moody.af.mil
Robins AFB, AFMC, AFRC, DSN 468-1081, commercial 478-926-1110. Size: 8,723 acres. Named for Brig. Gen. Augustine Warner Robins, former chief of the Air Corps materiel division. Location: 15 miles southeast of Macon. www.robins.af.mil
Savannah IAP, CRTC, ANG, DSN 860-8201; commercial 912-966-8201. Location: 4 miles northwest of Savannah.

North Carolina
Charlotte-Douglas IAP, ANG, DSN 231-4100, commercial 704-391-4100.
Location: Charlotte.
Pope AFB, AMC, DSN 424-1110, commercial 910-394-1110. Size: 1,984 acres. Named for 1st Lt. Harley H. Pope, flier killed when his JN-4 "Jenny" crashed into the Cape Fear River Jan. 7, 1917. Location: 12 miles north-northwest of Fayetteville. www.pope.af.mil
Seymour Johnson AFB, ACC, DSN 722-1110, commercial 919-722-1110. Size: 3,233 acres. Named for Navy Lt. Seymour A. Johnson of Goldsboro; killed March 5, 1941, in aircraft accident. Location: Goldsboro.
www.seymourjohnson.af.mil

South Carolina
Charleston AFB, AMC, DSN 673-1110, commercial 843-963-1110. Size: 6,486 acres.
Location: North Charleston.
www.charleston.af.mil
McEntire JNGB, DSN 583-8000, commercial 803-647-8000. Location: 12 miles east of Columbia.
Shaw AFB, ACC, DSN 965-1110, commercial 803-895-1110. Size: 15,833 acres (includes Poinsett Air-to-Ground Bombing Range). Named for 1st Lt. Ervin D. Shaw, killed in action over France, July 9, 1918.
Location: 10 miles west-northwest of Sumter. www.shaw.af.mil

REGION 8

Ohio
Mansfield Lahm Airport, ANG, DSN 696-6210, commercial 419-520-6210. Location: 3 miles north of Mansfield.
Rickenbacker ANGB, ANG, DSN 696-4468, commercial 614-492-4357. Location: 5 miles south of Columbus.
Springfield-Beckley ANGB, commercial 937-327-2100. Location: 5 miles south of Springfield.
Toledo Express Airport, ANG, DSN 580-4078, commercial 419-868-4078. Location: 14 miles west of Toledo.
Wright-Patterson AFB, AFMC, DSN 787-1110, commercial 937-257-1110. Size: 8,145 acres. Named for Wilbur and Orville Wright and 1st Lt. Frank S. Patterson, killed in June 19, 1918, aircraft crash. Location: 10 miles east-northeast of Dayton. www.wpafb.af.mil
Youngstown JARS, DSN 346-1000, commercial 330-609-1000. Location: 16 miles north of Youngstown.

Pennsylvania
Harrisburg IAP ARS, ANG, DSN 491-2200, commercial 717-948-2200. Location: 5 miles south of Harrisburg.
Pittsburgh IAP ARS, AFRC: DSN 277-8000, commercial (412) 474-8000. ANG:
DSN 294-7359, commercial (412) 776-7359.
Location: AFRC: 15 miles west of Pittsburgh. ANG: 10 miles west of downtown Pittsburgh.
NAS JRB Willow Grove, AFRC, DSN 991-1500, commercial 215-443-1500.
Location: Willow Grove, Pa.

Delaware
Dover AFB, AMC, DSN 445-3000, commercial 302-677-3000. Size: About 3,400 acres.
Location: 3 miles southeast of Dover.
www.dover.af.mil
New Castle County Airport, ANG, DSN 445-7300, commercial 302-323-3300.
Location: 5 miles south of Wilmington.

Maryland
Andrews AFB, AFDW, DSN 858-1110, commercial 301-981-1110. Size: 6,853 acres. Named for Lt. Gen. Frank M. Andrews, killed in aircraft accident May 3, 1943. Location: 11 miles southeast of Washington, D.C.
www.andrews.af.mil
Martin State Airport, ANG, DSN 243-6210, commercial 410-918-6210. Location: 8 miles east of Baltimore.

Virginia
Langley AFB, ACC, DSN 574-1110 or 574-9990, commercial 757-764-1110. Size: 3,167 acres. Named for Samuel Pierpont Langley, aviation pioneer and scientist who died in 1906. Location: 3 miles north of Hampton. www.langley.af.mil
Richmond IAP, ANG, DSN 864-6210, commercial 804-236-6000. Location: 4 miles southeast of downtown Richmond.

D.C.
Bolling AFB and Air Force District of Washington, DSN 297-4781, commercial 202-767-4781. Size: 604 acres. Named for Col. Raynal C. Bolling, Air Service officer killed during World War I. Location: 3 miles south of the capital. www.bolling.af.mil

West Virginia
Eastern West Virginia Regional Airport/ Shepherd Field, DSN 242-9210, commercial 304-616-5100. Location: 4 miles south of Martinsburg.
Yeager Airport ANGS, ANG, DSN 366-6000, commercial 304-341-6000. Location: 4 miles northeast of Charleston.

REGION 9

New York
Stewart IAP, ANG, DSN 638-2000, commercial 845-563-2000. Location: Newburgh.
Schenectady County Airport, ANG, DSN 344-2300, commercial 518-344-2300. Location: 2 miles north of Schenectady.
Niagara Falls ARS, AFRC, DSN 238-2000, commercial 716-236-2000. Location: 6 miles east of Niagara Falls.
Hancock Field ANGB, ANG, DSN 243-2100, commercial 315-233-2100. Location: 5 miles northeast of Syracuse.
Francis S. Gabreski Airport, ANG, DSN 456-7100, commercial 631-723-7100.
Location: Westhampton Beach.
www.106rqw.ang.af.mil

New Jersey
Atlantic City IAP, ANG, DSN 455-6000, commercial 609-645-6000. Location: 10 miles west of Atlantic City. www.177fw.ang.af.mil
McGuire AFB, AMC, DSN 650-1100, commercial 609-754-1100. Size: 3,598 acres. Named for Maj. Thomas B. McGuire Jr., P-38 pilot and Medal of Honor recipient, killed in action Jan. 7, 1945. Location: 18 miles southeast of Trenton. www.mcguire.af.mil

Vermont
Burlington IAP, ANG, DSN 220-5210, commercial 802-660-5210. Location: 3 miles east of Burlington.

New Hampshire
New Boston AFS, AFSPC, DSN 489-2201, commercial 603-471-2201.
Pease ANGB, ANG, DSN 852-2453, commercial 603-430-2453. Location: Portsmouth.

Maine
Bangor IAP, ANG, DSN 698-7700, commercial 207-990-7700. Location: 4 miles northwest of Bangor.

Massachusetts
Barnes ANGB, ANG, DSN 698-1466, commercial 413-568-9151. Location: Westfield, Mass.
Cape Cod AFS, AFSPC, DSN 557-2244, commercial 508-968-3301.
Hanscom AFB, AFMC, DSN 478-1110, commercial 781-377-1110. Size: 1,005 acres. Named for Laurence G. Hanscom, pioneer of private aviation, killed in an airplane accident in 1941. Location: 17 miles northwest of Boston. www.hanscom.af.mil
Otis ANGB, ANG, DSN 557-1000, commercial 508-968-1000. Location: 7 miles north-northeast of Falmouth.
Westover ARB, AFRC, DSN 589-1110, commercial 413-557-1110. Location: 5 miles northeast of Chicopee.

Rhode Island
Quonset State Airport, DSN 476-3210, commercial 401-886-1210. Location: 20 miles south of Providence.

Connecticut
Bradley ANGB IAP, ANG, DSN 636-8310, commercial 860-292-2536.
Location: Windsor Locks.
Orange ANGB, ANG, DSN 795-2900, commercial 203-795-2900. Location: Orange.

ABBREVIATIONS

AB = Air Base
ACC = Air Combat Command
AETC = Air Education and Training Command
AFB = Air Force Base
AFRC = Air Force Reserve Command
AFS = Air Force Station
AFSOC Air Force Special Operations Command
AFSPC = Air Force Space Command
AMC = Air Mobility Command
ANG = Air National Guard
ANGB = Air National Guard Base
ANGS = Air National Guard Station
ARB = Air Reserve Base
ARS = Air Reserve Station
CONUS = Continental United States
CRTC = Combat Readiness Training Center
DSN = Defense Switched Network
IAP = International Airport
JARS = Joint Air Reserve Station
JRB = Joint Reserve Base
MAJCOM = Major Command
MAP = Municipal Airport
NAS JRB = Naval Air Station Joint Reserve Base
PACAF = Pacific Air Forces
USAFE = U.S. Air Forces in Europe
USCENTCOM = U.S. Central Command
USSOUTHCOM = U.S. Southern Command

SYMBOLS

Active Duty Base
G Air National Guard Base
R Air Force Reserve Command Base

OVERSEAS FACILITIES

Greenland
Thule AB, AFSPC, DSN 269-3840, commercial 719-474-3840.

Portugal
Lajes Field, USAFE, DSN 314-535-1110, commercial (from CONUS) 011-351-295-571-110. Size: 1,182 acres. Location: on Azores' Terceira Island; 900 miles west of mainland Portugal. www.lajes.af.mil

England
RAF Lakenheath, USAFE, DSN 314-226-1110, commercial (from CONUS) 011-44-1638-52-1110. Size: 2,290 acres. Named for nearby village. Location: 25 miles from Cambridge. www.lakenheath.af.mil
RAF Croughton, USAFE, DSN 314-236-1110, commercial 011-44-1280-70-8000. Named for nearby village. Location: 60 miles northwest of London. www.croughton.af.mil
RAF Fairford, USAFE, DSN 314-247-1110, commercial 011-44-1285-71-4000.
RAF Mildenhall, USAFE, DSN 314-238-1110, commercial (from CONUS) 011-44-1638-54-3000. Size: 1,121 acres. Named for nearby village. Location: 30 miles northeast of Cambridge. www.mildenhall.af.mil

Germany
Ramstein AB, USAFE, DSN 314-480-1110, commercial (from CONUS) 011-49-6371-47-1110. Location: 15 miles west of Kaiserslautern.
Sembach Annex, USAFE, DSN 314-496-1110, commercial (from CONUS) 011-49-6302-67-1110. Location: 30 minutes east of Ramstein AB.
Spangdahlem AB, USAFE, DSN 314-452-1110, commercial (from CONUS) 011-49-6565-61-1110. Size: 1,575 acres. Location: 8 miles east of Bitburg. www.spangdahlem.af.mil

Italy
Aviano AB, USAFE, DSN 314-632-1110, commercial (from CONUS) 011-39-0434-30-1110 or 1113. Size: 1,331 acres.
Location: 50 miles north of Venice. www.aviano.af.mil
Ghedi AB, USAFE, DSN 314-632-7301, commercial 011-39-030-904-2725.

Spain
Morón AB, USAFE, DSN 314-722-1110, commercial 011-34-95-584-8111.

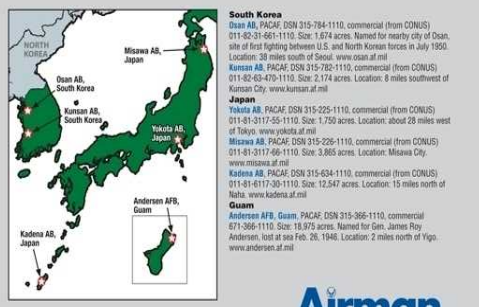
Turkey
Incirlik AB, USAFE, DSN 314-676-1110, commercial (from CONUS) 011-90-322-316-1110. Size: 3,400 acres. Base name means "fig orchard" in Turkish. Location: 6 miles east of Adana. www.incirlik.af.mil
Izmir AFS, USAFE, DSN 314-675-1110, commercial 011-90-232-462-3720.

Iraq
Kirkuk AB, USCENTCOM, DSN 318-444-1110
Al Asad AB, USCENTCOM, no phone number available
Joint Base Balad, USCENTCOM, DSN 318-443-1110
Sather AB, USCENTCOM, no phone number available
Ali Base, USCENTCOM, no phone number available

Afghanistan
Bagram Airfield, USCENTCOM, DSN 318-231-3260
Kyrgyzstan
Manas AB, USCENTCOM, DSN 318-441-1110
*Scheduled to close 1 Aug 2009

Honduras
Soto Cano AB, SOUTHCOM, DSN 449-4000

Puerto Rico
Muñiz ANGB, ANG, DSN 860-9101, commercial 787-253-5101.
Location: Luis Muñoz Marín IAP, San Juan. www.prsanj.ang.af.mil
DSN 740-3402

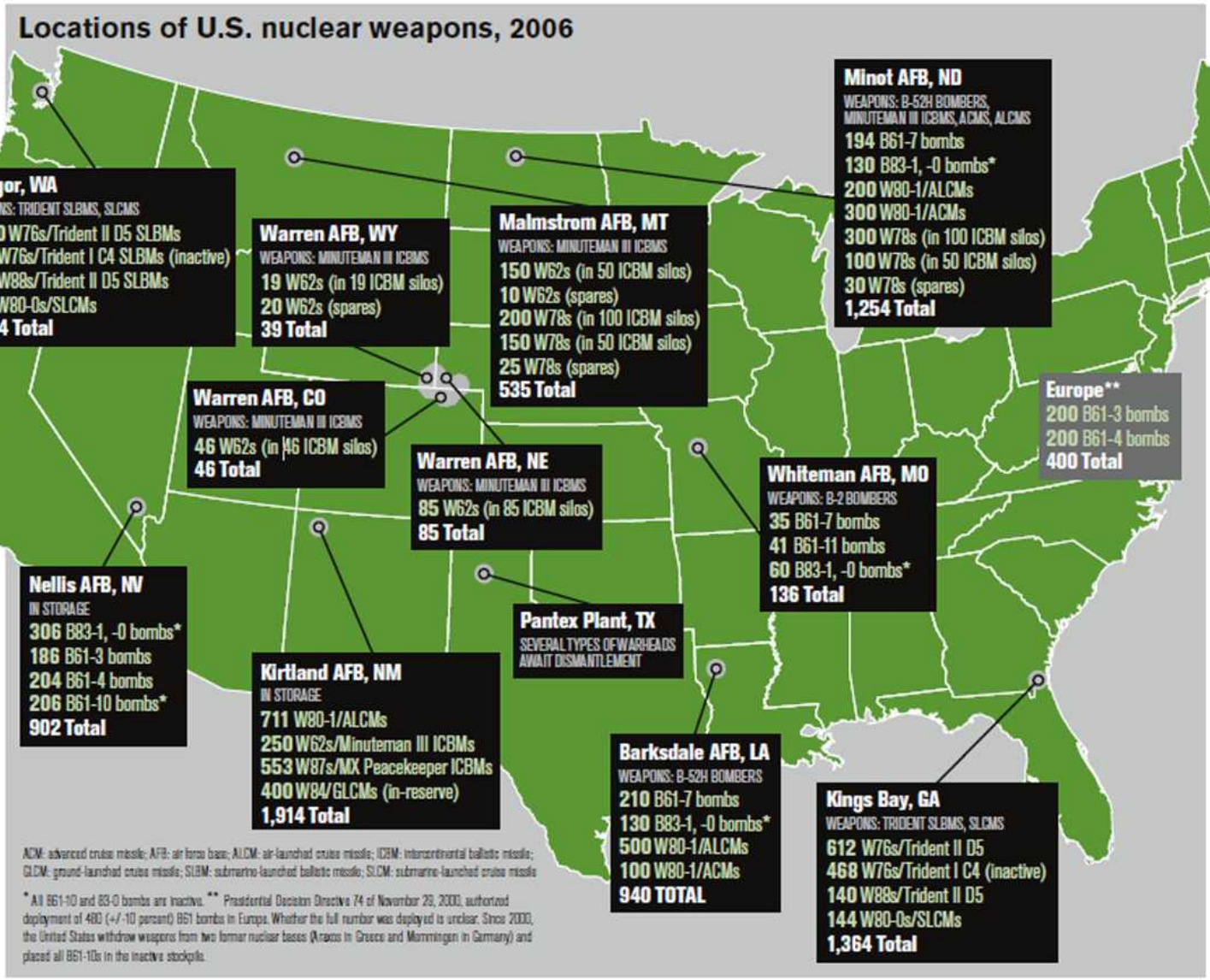


South Korea
Osan AB, PACAF, DSN 315-784-1110, commercial (from CONUS) 011-82-31-661-1110. Size: 1,674 acres. Named for nearby city of Osan, site of first fighting between U.S. and North Korean forces in July 1950.
Location: 38 miles south of Seoul. www.osan.af.mil
Kunsan AB, PACAF, DSN 315-782-1110, commercial (from CONUS) 011-82-63-470-1110. Size: 2,174 acres. Location: 8 miles southwest of Kunsan City. www.kunsan.af.mil

Japan
Yokota AB, PACAF, DSN 315-225-1110, commercial (from CONUS) 011-81-3117-55-1110. Size: 1,750 acres. Location: about 28 miles west of Tokyo. www.yokota.af.mil
Misawa AB, PACAF, DSN 315-226-1110, commercial (from CONUS) 011-81-3177-66-1110. Size: 3,865 acres. Location: Misawa City. www.misawa.af.mil
Kadena AB, PACAF, DSN 315-634-1110, commercial (from CONUS) 011-81-6117-30-1110. Size: 12,547 acres. Location: 15 miles north of Naha. www.kadena.af.mil

Guam
Andersen AFB, Guam, PACAF, DSN 315-366-1110, commercial 671-366-1110. Size: 15,975 acres. Named for Gen. James Roy Andersen, lost at sea Feb. 26, 1946. Location: 2 miles north of Yigo. www.andersen.af.mil

Airman



Amerikanske atomvåben

I dag har De Forenede Stater cirka 2.150 operationelle sprænghoveder, og andre 2.850 på lager, kaldet enduring stockpile / vedvarende lager, i alt 5.000. Det i finanslovsforslaget for 2011 beredskabs- og forvaltningsplan anført (bilag D, s. 2), at det planlagte produktionskompleks vil være i stand til at støtte et lager af 3.000-3.500 sprænghoveder, et niveau 1,500-2,000 sprænghoveder i det aktuelle lager. Men det kunne ikke give en tidsplan eller en strategi for sådanne reduktioner.[73]

En kvalificeret vurdering af antallet af aktuelle amerikanske atomvåben fremgår også

73 Nuclear Security Administration: **Stockpile Stewardship and Management Plan for fiscal 2012**.

af US Nuclear forces, 2011 / Hans M. Kristensen and Robert S. Norris i Bulletin of the Atomic Scientists 2011 67: 66.

Ifølge ***The Internet and the Bomb: A Research Guide to Policy and Information about Nuclear Weapons***, omfatter den private atomvåbenindustri bl.a. følgende firmaer

Aerojet - http://www.aerojet.com/
MX and Minuteman rocket motors.[74]

Battelle National Security Division - http://www.battelle.org/natsec/natsec.html

Bechtel Hanford, Inc. (A division of Bechtel National, Inc.) - http://www.bhi-erc.com/
Effective October 1, 2007, the US Department of Energy awarded Bechtel partnership LLNS LLC the contract to operate Lawrence Livermore National Laboratory: Bechtel has a presence, through various partnerships, of the bulk of the US nuclear weapons facilities, including Los Alamos National Laboratory (design and pit production), Lawrence Livermore National Laboratory (design), Savannah River Site (nuclear materials), Hanford Site (nuclear materials), Pantex Plant (assembly/disassembly), Y-12 National Security Complex (nuclear materials), and the Nevada Test Site (subcritical testing). Bechtel is also under contract for the new A1B reactor, a nuclear reactor being designed for use by the United States Navy to provide electricity generation and propulsion for the Gerald R. Ford-class aircraft carriers The environmental restoration contractor at Hanford. A major focus of the program is protecting the Columbia River by cleaning contamination in Hanford's 100 Area, an approximate 20-mile stretch of land along the river, where nine nuclear reactors operated from World War II through the late 1980's.

Bechtel Nevada - http://www.bechtel.com/nvtest.htm
Operators of the DOE Nevada Test Site.

Boeing - http://www.boeing.com/
Prime contractor on the B-1B, B-52, Minuteman missile and ALCM. On 15 December 1996, announcement was made that an agreement had been reached to merge McDonnell Douglas with Boeing. Earlier in 1996, Boeing had bought the Aerospace & Defense division from Rockwell, the original prime contractor of the B-1B.
Boeing Defense and Space Group
http://www.boeing.com/dsg/def.html

EG&G - http://egginc.com/
A former major DOE contractor that traces its roots to the Manhatttan Project. Its history page recounts its involvement

74 **Rocket Fuel in Drinking Water**: New data show widespread nationwide contamination. Environmental Working Group (http://www.ewg.org), 2003. - 41 s. ' Perchlorate, the explosive main ingredient of rocket and missile fuel, contaminates drinking water supplies, groundwater or soil in hundreds of locations in at least 43 states, according to Environmental Working Group's updated analysis of government data. EWG's analysis of the latest scientific studies, which show harmful health effects from minute doses, argues that a national standard for perchlorate in drinking water should be no higher than one-tenth the level the U.S. Environmental Protection Agency currently recommends as safe.'

Fluor Daniel Hanford - http://www.hanford.gov/contrctr/fdh.htm

General Dynamic's Electric Boat division operates a hull fabrication plant here, where large Navy vessels are assembled. The 169-acre shoreline facility is a former Naval Air Station, closed in the 1970's. Soon after closure, Electric Boat took over the site, and employed as many as 5,700 people here in the 1980's. Current employment is around 1,500. Quonset Point is an assembly site for nuclear submarines. The partially built vessels are barged to Electric Boat's main facility in Groton, Connecticut.
Source: CLUI Land Use Database.

General Dynamics Electric Boat Division[75] - http://www.gdeb.com
Maker of the Trident (Ohio class) submarine.

General Electric Corporation - http://www.ge.com/aircraftengines/index.htm
Makers of aircraft engines for the B-1B, B-2, F-16 and F-117.

Hughes Missile Systems Company - http://www.hughesmissiles.com/
Makers of the Tomahawk SLCM and the ACM. A subsidiary of General Motors. The defense operations of Hughes Electronics (Hughes Aircraft) are to merge with Raytheon and become Raytheon Hughes Systems.

75 **General Dynamics, Electric Boat Division, Groton, Connecticut**. / National Institute for Occupational Safety and Health. - [Atlanta, Ga.?] : U.S. Dept. of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health ; [Springfield, Va. : National Technical Information Service, distributor, 1998] - 45 s.
HETA 87-348-2011 / National Institute for Occupational Safety and Health. - [Atlanta, Ga.?] : U.S. Dept. of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health ; [Springfield, Va. : National Technical Information Service, distributor, 1990] - 100 s.

Kaman Sciences Corporation - http://www.kiac.com
Major DOD nuclear weapons consultant.

Lockheed Martin Corporation - http://www.lmco.com/
Aktuel amerikansk våbenfabrik, en del af USA's militær-industrielle kompleks og atomvåbenindustrielle kompleks grundlagt i 1926.
Nuværende selskabsopbygning er fra 1995. Ansatte: omkring 125,000. Omsætning omkring 200 milliarder kr. Selskabet har bl.a fabrikker i Clarksburg, West Virginia, Fort Worth, Texas, Greenville, South Carolina, Johnstown, Pennsylvania, Marietta, Georgia, Meridian, Mississippi, Palmdale, California og San Antonio, Texas.
Lockheed Martin er verdens største våbenfabrik som bla.a. producerer og sælger the Joint Strike Fighter (F35), F-22, F-16 krigsflyene, C-130J militære transportfly samt Atlas, Titan og Athena raketterne, den Trident II (D5) ubådsbaserede balistiske raket produceres i samarbejde med Alliant Techsystems. Desuden producerer Lockheed Martin satelliter til NASA og militæret og har omfattende leverancer af militære informations- og kommandosystemer til USAs stjernekrigsprojekter, eksempelvis GPS, Milstar og Milsatcom. Blandt Lockheed Martins administrerede selskaber kan nævnes Idaho National Engineering and Environmental Laboratory, Oak Ridge National Laboratory, Pinellas Park fabrikken i , Florida, Y-12 fabrikken K-25 Site og Sandia nuclear weapons laboratory.

Lockheed Martin Energy Systems - http://www.ornl.gov/mmes.html
Operators of the Sandia Laboratories, INEEL, Oak Ridge Y-12 and K-25, and ORNL.

Lockheed Marine Missiles and Space - http://www.lmsc.lockheed.com/
Makers of Trident SLBMs for the Navy.

Lockheed "Skunk Works"
http://www.lmsw.external.lmco.com/lmsw/text/index.html
Developers of the U-2, SR-71 and F-117 aircraft.

Mason & Hanger-Silas Mason Company - http://www.mhe.com/
Operators of the Pantex Plant.

McDonnell-Douglas - http://www.mdc.com/
To merge with Boeing. Makers of the F-15E aircraft.

Northrop-Grumman Corporation[76]
http://www.northgrum.com/

76 **The Limitations of Wellhead Treatment** : Bethpage and Massapequa, Long Island, New York / Lenny Siegel. The Center for Public Environmental Oversight, July, 2011 - 4 s.

Pratt & Whitney - http://www.pwfl.com/
Makers of F-15E and F-16 aircraft engines.

Raytheon - http://www.raytheon.com
Makers of nuclear weapons-related radars and early warning devices (e.g., PAVE PAWS, BMEWS, Cobra Dane, Cobra Judy). On 6 January 1997, Raytheon announced a buyout of Texas Instruments' Defense Systems and Electronics Group. On 16 January 1997, Ratheon announced that it would buy Hughes Electronics Corporation defense operations (Hughes Aircraft) from General Motors.

Rockwell International[77] (B-1B, Minuteman) - http://www.rockwell.com/
Rockwell sold its Aerospace & Defense to Boeing in 1996.

SAIC - http://www.saic.com/
Major DOD and DOE nuclear weapons consultant and contractor.

77 National Archives: **Records of the Atomic Energy Commission** [AEC] (Record Group 326) 1923-75.

Thiokol - http://www.thiokol.com
Products made by the aerospace divisions of RMI and Thiokol include motors used in Subroc, the Pershing missile, the Peacekeeper missile, Poseidon missile, Minuteman missile, and the Trident I and Trident II missiles. Thiokol produces powerplants for numerous U.S. military missile systems, including AIM-9 Sidewinder, AGM-88 HARM, AGM-65 Maverick, AGM-69 SRAM, and AIR-2 Genie..

Westinghouse
- http://www.westinghouse.com/
Makers of submarine nuclear reactors and DOE Hanford contractor.

Trident II

Trident[78]

Latin: Navn på USAs og Englands, atomubåde og deres atomraketter.

Atomvåben i det amerikanske flådearsenal er indsat via ballistiske missiler, ubåde og fly. De amerikanske Trident ubåde planlægges og bygges fra finansåret 1974. Producenterne er bl.a. våbenfabrikkerne Electric Boat Division, General Dynamics og Lockheed Martin Space Systems Co. Søværnets øvrige atomvåben er B61 atombomben. B61 er en termonuklear bombe kastet F/A-18 Hornet og Super Hornet bombefly.

Den første Trident-ubåd, USS Ohio (SSGN 726), blev operationel i november 1981. Ubådene indeholder op til 192 interkontinentale (ICBM) med MIRV kapacitet; atomsprænghoveder på 100 kilotons. De amerikanske Trident ubåde har bl.a. base i søværnets Kitsap base / Naval Base Kitsap som er en flådebase placeret på Kitsap halvøen i staten Washington. Denne blev skabt i 2004 ved at sammenlægge den tidligere flådestation Bremerton med marinens ubådsbase i Bangor. I 1973 udvalgte søværnets Bangor basen som hjemhavn for den første eskadrille af Ohio-klassens Trident ubåde.

78 Ainslie, John: Trident : **Britain's weapon of mass destruction**. Scottish CND, 1999. - 32 s.
Campbell, Duncan: **Secret Society I**, BBC 1987.
http://www.archive.org/details/SecretSociety-Part1SecretConstitution
[In this freedom of information tour de force Campbell exposes the secret decision to buy U.S. Trident nuclear submarines as well as laying bare the cabinet level dirty tricks campaign against CND and its general secretary Bruce Kent. Margaret Thatcher, James Callaghan, the British Atlantic Committee, The ultra-right Coalition for Peace Through Security and the cabinet secretary come in for sharp criticism for keeping key decisions secret from MP's.]
CONTRACTS from the United States Department of Defense, herunder.
CONTRACTS from the United States Department of Defense. December 20, 2005.
CONTRACTS from the United States Department of Defense. January 12, 2006.
U.S. Space Command: **The Military Arm of Corporate Globalization**.
http://www.archive.org/details/PhilosopherSeed-BruceGagnon570
Hoon Geoffrey: **Trident Missile's Costs**. January 18, 2005.

Den 1. februar 1977 blev basen officielt aktiveret.

Marinens Kitsap base omfatter den strategiske våbenfacilitet for Stillehavsområdet / Strategic Weapons Facility Pacific, der yder vedligeholdelse, reservedele og opbevaring af Tridents ballistiske missilers atomare sprænghoveder. Denne Trident ubådsbase er den eneste amerikanske atomubådsbase for Stillehavsområdet, mens Trident basen i Kings Bay, Georgia eller Naval Submarine Support Base Kings Bay, dækker Atlanterhavsområdet. De amerikanske Trident SSGN er ubåde med flere opgaver, optimeret til både taktiske angreb og støtte til specielle operationer.

Se også: BAe Systems Submarine Solutions ; Coalition to Stop Trident ; the UK Naval Base at Faslane ; US Naval Submarine Base New London, Connecticut ; US Nuclear Regional Maintenance Department ; TRIDENT II Fire Control Omnibus Contract.; Trident Ploughshares.

Amerikanske atomvåbenfabrikker

Kendte historiske og aktuelle beryllium virksomheder og atomvåbenfabrikker i USA. Databasen er bl.a. udarbejder ved hjælp af the Energy Employees Occupational Illness Compensation Program, hvorfra store dele af beskrivelserne af virksomhederne stammer. Data kan være mangelfulde på grund af klassificering eller maskering af information.[79]

American nuclear weapons plants

Known historical and current beryllium companies and nuclear weapons plants in the USA. The database includes data from the Energy Employees Occupational Illness Compensation Program, where much of the descriptions of the companies are. Data can be incomplete due to classification or masking of information.

79 Cunningham, Larry D.: **Beryllium**.
DOE: Energy Employees Occupational Illness Compensation Act of 2000; **List of Covered Facilities**, 2001.- 14 pp..See also: **Data collection, processing, validation, and verification** / Deborah L. Martin et al.
Dose Reconstruction Cases by Nuclear Weapons Production Facility as of January 15, 2004.
Report on Residual Radioactive and Beryllium Contamination at Atomic Weapons Employer Facilities and Beryllium Vendor Facilities / Prepared by: National Institute for Occupational Safety and Health, Office of Compensation Analysis and Support, Centers for Disease Control and Prevention, - 8 pp.
United States Environmental Protection Agency: **Solid Waste and Emergency Response** : National Biennial RCRA Hazardous Waste Report (Based on 1991 Data), 1994. - 105 pp. 'This document contains a list of treatment, storage and disposal facilities, as identified by EPA's Biennial Report ... There are 3,845 treatment, storage and disposal facilities on this list.'

•AK **Clear Air Force Station, Ballistic Missile Early Warning System Site II**[80], Anderson vicinity Atomic Weapons Employer, AWE

•AL **Southern Research Institute** Sylacauga AWE 1955-1958; 1962; 1976 - The Southern Research Institute was involved in several AEC projects. During the period from November 10, 1955 through June 1, 1958, it was licensed to receive source material from National Lead Company of Ohio (Fernald) for research on the properties of uranium-liquid metal fuel elements. The Institute performed hot tensile tests on uranium metal and was authorized to receive 300 pounds of normal uranium from NLO. Records also indicate that it handled test quantities of radioactive metals for NLO in 1976.

•AL **Speedring Experimental & Tool Company** Culman BE - 1971-2011 - Speedring has performed work using beryllium for Rocky Flats, Sandia National Laboratory, Idaho National Engineering Laboratory and Oak Ridge National Laboratory. There was another Speedring facility in Detroit, MI.

•AL **Tennessee Valley Authority**[81] or Uranium Recovery Pilot Plant and Laboratory Muscle Shoals AWE - 1951-1955 - At its National Fertilizer Development Center, the TVA performed research and development on uranium recovery under formal agreement with the AEC. The work involved the extraction of uranium during the production of fertilizer from leached zone phosphate ore.

•AZ **Ore**[82] **Buying Station at Globe**, Globe DOE - 1955-1957 - The ore buying station at Globe purchased uranium ore for the AEC. American Smelting and Refining Company (ASRC) managed and operated the Globe station on behalf of the AEC from July 1955 to January 1956. Lucius Pitkin replaced ASRC as the management and operating contractor for the site in February 1956. The uranium ores processed at the Tuba City mill came largely from sites in Arizona: the Orphan Lode mine within the Grand Canyon National Park, mines in the Cameron area and adjacent areas, mines in the Monument Valley district, and ores purchased by the U.S. Atomic Energy Commission (AEC) at the Tuba City ore buying station and at other AEC ore buying stations1, including the Globe ore buying station, Gila County, Arizona.[83] Contractors: American Smelting and Refining Company (1955-1956); and Lucius Pitkin, Inc. (1956-1957).

•CA **Arthur D. Little Co.** San Francisco AWE - 1948-1956 - Under contract to the Atomic Energy Commission from 1948-1956, initially as the Merrill Company, A.D. Little researched the separation and recovery of uranium from various ores. Specific work included the recovery of uranium and vanadium from alkaline carbonate leach

80 Historic American Engineering Record: **Clear Air Force Station, Ballistic Missile Early Warning System Site II, One mile west of mile marker 293.5 on Parks Highway, 5 miles southwest of Anderson, Anderson vicinity, AK**. Library of Congress, Prints and Photographs Division - 80 pp. - http://www.loc.gov/pictures/item/AK0486/

81 **Technical Basis Document: Basis for the Development of an Exposure Matrix for Tennessee Valley Authority, Muscle Shoals, Alabama, Period of Operation: 1951–1955** / Jeri L. Anderson. NIOSH Dose Reconstruction Project. 2004. - 10 pp.

82 Bureau of Mines / **Minerals yearbook metals and minerals (except fuels) 1952**. Year 1952, Volume I (1955). United States Government Printing Office, 1955.

83 The Alliance: More on mining, 2009.

solutions from domestic ores.

•CA **Atomics International**[84] Canoga Park BE - 1955-1966 - The Atomics International Division of North American Aviation is a statutory beryllium vendor under the EEOICPA. Atomics International worked with beryllium and radioactive materials under contract with the Atomic Energy Commission at numerous locations. These locations include, but are not necessarily limited to, Area IV of the Santa Susana Field Laboratory, portions of the Downey facility, the Vanowen Building at the Canoga facility and the De Soto facility.

•CA **Burris Park Field Station**[85] Kingsburg AWE - Site owned and operated by Univ. of CA conducted experiments on decontamination of soils containing Strontium-90.

•CA **California Research Corp.** Richmond - 1948-1949 - Using small amounts of plutonium and uranium, the California Research Corporation performed experiments to investigate the use of continuous chelation as a means of separating plutonium and zirconium from uranium. The California Research Corporation performed the work as a subcontractor to the Kellex Corporation which was under contract to the AEC to in-

84 **Radiation Survey of the Downey Facility**, May 7, 2001. - 103 pp.
- http://www.etec.energy.gov/library/D&D_page/RS-00019_(Downey).pdf

85 DOE: **Memorandum/Checklist; Levine to the File**; Subject: Elimination Recommendation; May 7, 1987. - 3 pp.

vestigate waste recovery methods.

•CA **Canoga Avenue Facility**[86] Los Angeles County DOE - 1955-1960 - Under an operating contract with the Atomic Energy Commission (AEC), North American Aviation performed research and development into the peaceful uses of nuclear energy at the Canoga Avenue Facility in Canoga Park, CA. This work was previously performed at North American Aviation's Downey Facility, but was moved to Canoga Avenue at the very end of 1955. Principal work performed included design, development and radiochemistry. The North American Aviation Corporation AGM-28 Hound Dog was a supersonic, jet propelled, air-launched cruise missile. 1960-?. Rockwell International's defense and space divisions (including the North American Aviation divisions Autonetics and Rocketdyne) were sold to Boeing in December 1996.

•CA **Ceradyne, Inc.** Costa Mesa BE - 1987; 1990-1996 - Ceradyne sold beryllium-graphite composite materials to the Y-12 plant in Oak Ridge in 1987 and between 1990 and 1996.

•CA **Ceradyne, Inc.** Santa Ana BE- 1977-1988 - Ceradyne provided beryllium parts to the Y-12 plant.

•CA **City Tool & Die Manufacturing** Santa Clara BE - 1985-2001 - Description: City Tool is a precision machine shop that provided services to Sandia National Laboratory, California. The work involved machining beryllium-copper materials.

CA **Crocker Laboratory** University of California Davis AWE

86 **Area IV of the Santa Susana Field Laboratory, the Canoga Avenue Facility, the Downey Facility, and the De Soto Avenue Facility (sometimes referred to as Energy Technology Engineering Center [ETEC] or Atomics International) – Occupational External Dose** / Leo G. Faust and Eugene W. Potter. National Institute for Occupational Safety and Health, 2010. - 20 pp.
- http://www.cdc.gov/niosh/ocas/pdfs/tbd/atomicsi6-r2.pdf

•CA **De Soto Avenue Facility**[87] Los Angeles County DOE - 1959-1995 - In 1959, the Atomics International Division of North American Aviation moved to its new facility on De Soto Avenue. AEC/DOE work conducted at this location included engineering design, construction, and nuclear fuel fabrication. The facility also had a radiochemistry laboratory and a gamma irradiation facility. The fuel fabrication facility was used to produce a variety of different fuel elements for test reactors. AEC-sponsored work involving the manufacture of beryllium-containing parts also took place at this site. Fuel fabrication was terminated in 1984, however small scale laboratory research work on gamma irradiation and analysis of radioactive samples continued until 1995. A DOE-owned mass spectrometer at this location was removed from the premises and sent to the Pacific Northwest National Laboratory in 1995. Contractors: The Boeing Company (1996-1998); Rockwell International (1973-1996); North American Rockwell (1967-1973): North American Aviation (1959-1967).

•CA **Dow Chemical Co.** Walnut Creek AWE - 1947-1957 - The Dow operation involved process studies and experimental investigations on different uranium ores and thorium-bearing ores, including pilot-scale solvent extraction of uranium from phosphoric acid.

87 **Area IV of the Santa Susana Field Laboratory, the Canoga Avenue Facility, the Downey Facility, and the De Soto Avenue Facility (sometimes referred to as Energy Technology Engineering Center [ETEC] or Atomics International) – Occupational External Dose** / Leo G. Faust and Eugene W. Potter. National Institute for Occupational Safety and Health, 2010. - 20 pp.
- http://www.cdc.gov/niosh/ocas/pdfs/tbd/atomicsi6-r2.pdf

Source: Abandoned & Little-Known Airfields: California - Central Los Angeles Area - http://www.airfields-freeman.com/CA/Airfields_CA_LA_C.htm

•CA **Downey Facility**[88] Los Angeles County DOE - 1948-1955 - Under an operating contract with the Atomic Energy Commission (AEC), North American Aviation operated a 2 MeV Van De Graaff accelerator at Downey. In addition, the AEC funded a four-watt Water Boiler Neutron Source Reactor at the Downey facility. Start up for the reactor was in April of 1952. This small research reactor was moved to Area IV of the Santa Susana Field Laboratory in 1955. Personnel and operations from Downey moved to the new Canoga Avenue facility in late 1955.

•CA **EDM Exotics** Hayward BE - 1990-1997 - EDM Exotics provided machine shop services to Sandia National Laboratory, California, working with beryllium-copper materials

•CA **Electro Circuits, Inc.** Pasadena AWE - 1952-1953 - Electro Circuits used uranium metal to conduct tests aimed at determining the usefulness of ultrasonics in the detection of pipe in ingots.

•CA **Electrofusion Corporation** Fremont BE - 1986-2002 - Electrofusion Corporation provided beryllium products to Sandia National Laboratory, California. Electrofusion was acquired by Brush Wellman in 1990 and is currently part of the Brush Wellman Engineered Products Division.

88 **Area IV of the Santa Susana Field Laboratory, the Canoga Avenue Facility, the Downey Facility, and the De Soto Avenue Facility (sometimes referred to as Energy Technology Engineering Center [ETEC] or Atomics International) – Occupational External Dose** / Leo G. Faust and Eugene W. Potter. National Institute for Occupational Safety and Health, 2010. - 20 pp.
- http://www.cdc.gov/niosh/ocas/pdfs/tbd/atomicsi6-r2.pdf

•CA **Energy Technology Engineering Center**[89] Santa Susana DOE- 1955-1988 - The Santa Susana Field Laboratory (SSFL) is located in eastern Ventura County, California, and borders Los Angeles County. The SSFL is divided into four administrative and operational portions based on ownership and operations. Area IV was devoted to nuclear operations. It is Area IV that is covered under EEOICPA as a DOE facility. Coverage includes, but is not necessarily limited to the following operations: The Energy Technology Engineering Center (ETEC), the Nuclear Development Field Laboratory (NDFL), and the Liquid Metal Engineering Center (LMEC).

89 **Energy Technology Engineering Center – Site Description.** Dose Reconstruction Project for NIOSH, 2006. - 47 pp. - http://www.cdc.gov/niosh/ocas/pdfs/tbd/etec2.pdf

Sit**e Inspection Report : Energy Technology Engineering Center/Area IV Sind Hills**, California. 2003. - 96 pp

A nuclear energy R&D facility owned by the Department of Energy, and operated by Rocketdyne/Boeing, involved in applying nuclear technologies related to space flight, defense programs, and liquid metal reactors, in addition to solar energy and remediation technologies. The DOE facility is located on 90 acres within Rocketdyne's 2,700 acre rocket field test facility in the Simi Hills. Source: CLUI Land Use Database.

This also includes the Sodium Reactor Experiment Facility, the Kinetics Experiment Water Boiler Facility, the Water Boiler Neutron source (which is also known as the AE-6/L-85 Facility), the Organic Moderated Reactor, as well as facilities in Area IV associated with the Systems for Nuclear Auxiliary Power (SNAP) Program; the Sodium Graphite Reactor Critical Facility, the Shield Test Experiment/Shield Test Irradiation Reactor Facility, the Advanced Epithermal Thorium Test Facility, the Hot Lab Facility, the Fuel Storage Facility, the Radioactive Measurement Facility, the Radioactive Material Handling Facility, the Van De Graaff Accelerator Facility and the Radiation Instrument Calibration Laboratory. Contractors: The Boeing Company (1996-present); Rockwell International (1973-1996); North American Rockwell (1968-1973); North American Aviation (1955-1967).

•CA **General Atomics** La Jolla AWE/BE/DOE - BE 1959-1969 - General Atomics was one of a number of private contractors that processed unirradiated scrap for the Atomic Energy Commission in the 1960s. In addition, the Hot Cell Facility was used for numerous post-irradiation examinations of Department fuels, structural materials, reactor dosimetry materials, and instrumentation. The Department-sponsored activities at the General Atomics Hot Cell Facility primarily supported the High Temperature Gas Cooled Reactor and the Reduced Enrichment Research Test Reactor programs. In December 1994, General Atomics notified the Nuclear Regulatory Commission and the State of California Department of Health Services of its intent to cease operations in the Hot Cell Facility. General Atomics was also the operating contractor for the AEC's Experimental Beryllium Oxide Reactor (EBOR). General Atomics manufactured EBOR fuel elements (UO2-BeO) on site and examined them in the site's hot cell.

•CA **General Electric** Vallecitos Pleasanton AWE - 1958-1978; 1981-1982 - In 1958, General Electric constructed four hot cells for postirradiation examination of uranium fuel and irradiated reactor components. The U.S. Government's involvement (through the Atomic Energy Commission and later, the Department of Energy) was limited to a single hot cell, Hot Cell No. 4. Between 1965 and 1967, Hot Cell No. 4 was decontaminated, equipped with a stainless steel liner to contain plutonium, and dedicated to the study of mixed oxide fuel rods in support of the Atomic Energy Commission's fast breeder reactor development programs. In 1978, Hot Cell No. 4 was placed on standby; it was used by Lawrence Livermore National Laboratory for six months in 1981 and 1982.

•CA **Hafer Tool** Oakland BE - 1965-1985 - Hafer Tool is a machine shop that provided services to Sandia National Laboratory, California. Some of this work involved the use of beryllium materials.

•CA **C.L. Hann Industries** San Jose BE - 1985-1994; 2000 - C.L. Hann Industries provided machine shop services to Sandia National Laboratory, California.

•CA **Fairfield Air Force Station**[90]**,** Travis AFC, CA AWE - National Nuclear Weapons Stockpile Site. The Radioactive Burial Site is a fenced back-filled trench that was part of the former Fairfield AFS at Travis AFB. Cleaning materials from the maintenance of the nuclear components were buried in the trench. This is the only soil site on Travis AFB with elevated radioactive readings. The Air Force will excavate the waste materials and contaminated soil and send it to an off-base low level radioactive waste repository specifically designed to handle these materials.

•CA **Hexcel Products, Inc.** Berkeley AEC -1964-1965 - Hexcel produced a small number of corrugated beryllium sheet panels for the AEC in the mid-1960s. The finishing process involved vapor blasting and scrubbing of the beryllium panels with steel wool and cleansing powder

•CA **High Energy Rate Forging** (HERF) Facility Oxnard DOE - 1984-1997 - The Department of Energy purchased this facility in 1984 for the purpose of producing forgings for weapons parts. It consists of 13.75 acres and 7 buildings. The DOE Rocky Flats Plant managed the forging process and produced forgings at this location through 1995. In 1994, DOE decided to close the facility upon completion of its defense-related mission in 1996.

•CA **Hunter Douglas Aluminum Corp.** Riverside AWE - 1959-1963 - In 1959, Hunter Douglas Aluminum extruded approximately 1600 pounds of solid uranium stock for National Lead Company of Ohio (Fernald). In a subsequent subcontract, the

90 **Ammunition and Explosives Storage for the Navy (1939-1989) and the Air Force (1946-1989)**, 2008. - 200 pp. - http://www.denix.osd.mil/cr/upload/af-navy-ammunition-storage-public-rfs_pg1-200_rev.pdf

company fabricated uranium-zirconium billets for the GE Evendale Plant.

•CA **Jerry Carroll Machining, Inc.** San Carlos BE - 1985-1991 - Jerry Carroll Machining provided machine shop services to Sandia National Laboratory, California, including the machining of beryllium-copper materials.

•CA **Laboratory for Energy-Related Health Research**[91] Davis DOE - 1958-1989; 1991-. For over 30 years, LEHR was the site of studies on the long-term health effects of low-level radiation[92] on laboratory animals. Through the support of DOE's predecessor, the AEC, LEHR (also known in the earlier years as the Radiobiology Laboratory) began in 1951 as a research project investigating the biological effects of X-rays. A few years later, the Atomic Energy Commission contracted with LEHR for what became a 33-year study that investigated the health effects of internal exposure to low levels of strontium 90 and radium 226. In a separate but related project, research animals were exposed to cobalt 60 radiation. Research involving the use of small amounts of plutonium 241, thorium 228, and other radioisotopes was also performed. Research at LEHR has focused on: understanding better the effects of exposure to low-level radiation on the skeleton and its blood-forming constituents; investigating the behavior of certain bone-seeking radioactive materials; studying the beagle as an experimental animal model; exploring how low-level radiation triggers and affects the formation of tumors and development of leukemia; and, developing effective ways to use results gathered from animal studies to assess risks to humans. LEHR closed in 1989 and has been in remediation mode since 1991

•CA **Laboratory of Biomedical and Environmental Sciences** Los Angeles DOE - 1947-. - The Laboratory of Biomedical and Environmental Sciences (LBES) was established in 1947 on the campus of the University of California, Los Angeles, to provide biomedical and environmental support to nuclear testing activities. Today's programs are in three areas: nuclear medicine, where the study of positron emission tomography (PET) is applied to medical problems; biomolecular and cellular sciences, which involves factors influencing gene expression, particularly with reference to early molecular events in cancer induction; and environmental biology, which focuses on the basic physiology of plants in arid ecosystems.

•CA **Laboratory of Radiobiology and Environmental Health** San Francisco DOE - 1951-1999 - The Laboratory of Radiobiology and Environmental Health (LREH), established by the Atomic Energy Commission in 1951, is an institute for research and training in cell biology. LREH is dedicated to fundamental research and investigation of the ways in which radiation and other energy-related biomedical insults affect cellular processes and lead to detrimental genetic and somatic biomedical effects. Research studies are undertaken to investigate the mechanisms by which perturbation and repair of cellular systems can affect the whole organism, cause cancer in the present generation, and damage future generations. Research focuses specifically on ways in which the organism can cope with such insults. As a research unit in the University of California San Francisco School of Medicine, the laboratory closed in 1999.

91 **Laboratory for Energy-Related Health Research Final Release**. (U.S. Department of Energy. [a/k/a Old Campus Landfill (University of California, Davis)]. Public Health Assessment. Energy Section. Federal Facilities Assessment Branch. Division of Health Assessment and Consultation. Agency for Toxic Substances and Disease Registry, 2004. - 167 pp.
- http://www.atsdr.cdc.gov/hac/pha/LEHR061704-CA/LEHR4_26_04.pdf

92 WISE Uranium Project: **Bibliography: Cleanup of Radiation Sites** (last updated 24 Sep. 2011).
- http://www.wise-uranium.org/udlit.html#UMT

•CA **Lawrence Berkeley National Laboratory** Berkeley DOE - 1942-. - The laboratory that eventually became the Lawrence Berkeley National Laboratory was founded in 1931 by Ernest Orlando Lawrence, winner of the 1939 Nobel Prize in physics for his invention of the cyclotron. Once the Manhattan Engineer District (MED) was founded in 1942, the Berkeley Laboratory became part of the MED. As part of the MED, scientists at Berkeley developed the electromagnetic enrichment process that was installed and operated at the Y-12 plant in Oak Ridge from 1943-1947. Scientists at Berkeley also discovered the transuranium elements, which include plutonium, neptunium and americium. Work performed on behalf of LBL which took place in Gilman Hall on the University of California campus is also considered part of LBL.

•CA **Lawrence Livermore National Laboratory** Livermore DOE - 1950-. - The Atomic Energy Commission established the Lawrence Livermore National Laboratory as a facility for nuclear weapons research. The Department of Energy (DOE) owns the Lawrence Livermore National Laboratory Main Site and Site 300; DOE and the University of California jointly operate the sites. The Main Site was initially used as a flight training base and an engine overhaul facility. Transition from naval operations to scientific research began in 1950, when the Atomic Energy Commission (AEC) authorized construction of a materials-testing accelerator site. The AEC established the University of California Radiation Laboratory, Livermore Site (the predecessor of the Lawrence Livermore National Laboratory) as a facility for nuclear weapons research. The DOE purchased Lawrence Livermore National Laboratory's Site 300 from local ranchers in the 1950s for use as a remote high-explosives testing facility.

•CA **Lebow** Goleta BE - 1977-2002 - The Lebow Company produces ultra-thin metal foils for Sandia National Laboratory, California, some of which contain beryllium.

Mount Laguna Air Force Station is located atop Mount Laguna, with a steep drop into the Anza Borrego desert. It was a DEW (defense early warning) site, watching for incoming missiles, and housed about 170 people until it was downsized in 1981. Now it is a multi-use satellite and radar communications site, operated primarily by the FAA, out of Los Angeles Center. Source: CLUI Land Use Database.

•CA **Mount Laguna Air Force Station** AWE
•CA **Pleasanton Tool and Manufacturing** Pleasanton BE- 1989-2002 - Pleasanton Tool provides machine shop services to Sandia National Laboratory, California.
•CA **Poltech Precision** Fremont BE - 1999 - Poltech Precision did machining work for Sandia National Laboratory, California.
•CA **Philco-Ford Corporation** or Ford Aeronutronic Newport Beach BE - 1967-1972 - The Aeronutronic Division of the Philco-Ford Corporation engaged in research on beryllium manufacturing techniques for the AEC between 1967 and 1972. The overriding goal of the program was to demonstrate the feasibility of shear spinning technology for beryllium production.
•CA **Robin Materials** Mountain View BE - 1985-1997 - Robin Materials provided metal materials to Sandia National Laboratory, California. This material included beryllium-copper.
•CA **Ron Witherspoon, Inc.** Campbell BE - 1990-1995 - Ron Witherspoon, Inc. produced beryllium springs for Sandia National Laboratory, California.
•CA **Sandia Laboratory** Salton Sea Base Imperial County DOE - 1946-1961 - The Salton Sea Test Base was used for a variety of activities such as military training and weapons research, development, testing, and evaluation. The base was used by numerous tenant and non-tenant military commands as well as by research divisions of government agencies and private companies working on government projects. The site

was established in 1942 as an operational base for seaplanes during World War II. Later, the Atomic Energy Commission renovated and expanded the base for aerodynamic testing of weapons-delivery vehicles. From 1946 to 1961, Sandia National Laboratory operated a testing program at the site. The remoteness of the area was ideal for training and other operations. It is unclear from the documentation whether this testing work involved the use of radioactive materials.

•CA **Sandia National Laboratories**-Livermore Livermore DOE - Sandia National Laboratory-Livermore was established in 1956 to conduct research and development in the interest of national security. The principal emphasis was on development and engineering of the parts of nuclear weapons outside the warhead physics package. The site was selected for its proximity to Lawrence Livermore National Laboratory to facilitate a close working relationship between the two laboratories. Contractors: Lookheed Martin (1995-present); Martin Marietta (1993-1995); AT&T (1951-1993).

•CA **Stanford Linear Accelerator Center** Palo Alto DOE - 1962-. - The Stanford Linear Accelerator Center (SLAC) is owned and operated by Stanford University under contract with the Department of Energy. The Stanford Linear Accelerator Center was established in 1962 as a research facility for high energy particle physics. The Center's four major experimental facilities are the Linear Accelerator, the Positron Electron Project Storage Ring, the Stanford Positron Electron Asymmetric Ring, and the Stanford Linear Accelerator Center Linear Collider.

•CA **Stauffer Metals, Inc.** Richmond AWE - 1961 - Stauffer performed electron beam melting tests on uranium metal for National Lead of Ohio (Fernald). The company had performed similar tests for Hanford.

•CA **Tapemation** Scotts Valley BE- 1990-1995 - Tapemation is a machine shop that provided services to Sandia National Laboratory, California. Several small jobs involved the precision machining of beryllium-copper materials.

Building 925 represents an important link in the design and development of nuclear weapons storage facilities during the early Cold War period. It is one of only five alert nuclear weapons storage facilities of this type built in the United States. Building 925 is a distinguished contributing element of the Armed Forces Special Weapons Project Q Area at Travis Air Force Base, which has been recommended as a historic district eligible for inclusion in the National Register of Historic Places under criterion c. Source: Library of Congress.

•CA **Travis Air Force Base**, Building No. 925[93], W Street, Fairfield, Solano AWE - In 1949, the Strategic Air Command (SAC) became the parent major command for Travis AFB, turning it into a major long-range reconnaissance and intercontinental bombing installation for the 9th Bomb Group/9th Bomb Wing. For the next nine years, airlift operations became secondary while Travis served as home for SAC bombers such as the B-29 Superfortress, B-36 Peacemaker, and eventually, the B-52 Stratofortress. United States Army Nike surface-to-air missile sites were constructed during 1957-58 as Travis Air Force Base Defense Area

•CA **University of California** Berkeley AWE/DOE

93 Library of Congress: Historic American Buildings Survey/Historic American Engineering Record: **Travis Air Force Base, Building No. 925, W Street, Fairfield, Solano, CA.**

Exterior view of south and east walls of Oxidizer Conditioning Structure (T-28D), looking northwest. This structure was designed to condition nitrogen tetroxide, the oxidizer used in the Titan II's fuel system, to specified temperatures. The taller structure to the rear is the Long-Term Oxidizer Silo (T-28B).
Source: Library of Congress.

[LGM-25C Titan II]

Exterior view of south wall of Oxidizer Conditioning Structure (T-28D), looking north. The taller structure immediately to the rear in the upper left background is the Long-Term Oxidizer Silo (T-28B). Source: Library of Congress.

• CO **Air Force Plant PJKS, Systems Integration Laboratory, Oxidizer Conditioning Structure** Lakewood vicinity, Jefferson AWE

•CO **Climax Uranium Mill** Grand Junction DOE – 1951-1970.
•CO **Coors Porcelain** Golden BE - 1947-1975 - Coors Porcelain performed beryllium work for the Atomic Energy Commission. An early AEC document makes reference to Coors Porcelain's involvement in beryllium work during the period from 1947-1948. Coors Porcelain had an earlier contract with the Clinton Engineer Works (now Oak Ridge Reservation), but it is unclear whether beryllium was involved. From 1957 through 1964, the company worked as a subcontractor with Lawrence Livermore National Laboratory on Project Pluto, a project undertaken to determine the feasibility of using heat from reactors as the energy source for ramjet engines. Coors developed fuel elements from beryllium ceramics for the project, which began in 1957 and ended in 1964.

•CO **Glenn L. Martin Company, Titan Missile Test Facilities** Lakewood vicinity, Jefferson, including Glenn L. Martin Company, Titan Missile Test Facilities, CaptiveTest Stand D-3 and Glenn L. Martin Company, Titan Missile Test Facilities, Captive Test Stand D-4 AWE

•CO **Grand Junction Operations Office**[94] DOE – 1943-. - In 1943 the Manhattan Engineer District purchased the Grand Junction site and constructed a plant to produce uranium concentrate from "green sludge" delivered from plants at Uravan and Durango Colorado. The purpose of this plant was to provide domestic uranium for the Manhattan Project. The Grand Junction Office of the AEC was the headquarters for the uranium procurement program from 1947-1970. One of the principal functions of the GJO was the receipt, sampling, and analysis of uranium and vanadium concentrates from the numerous (32) ore processing operations in the western US. More than 347 million pounds of uranium oxide and 28 million pounds of vanadium oxide were received during the period from 1948-1971[95]. In 1951 the AEC built a concentrate sampling plant and assay laboratory in the Grand Junction compound. This was operated by Ledoux company under a management and operating contract. In addition, the AEC built two ore-testing pilot plants in its compound in Grand Junction. These were, in effect, miniature processing plants in which approximately 30,000 tons of ore from 40 different uranium mines were tested between the years of 1953-1958[96]. Furthermore, the AEC established a sampling and assaying station for

94 HHS Designation of Additional Members of the Special Exposure Cohort under the Energy Employees Occupational Illness Compensation Program Act of 2000: **Designating a Class of Employees from Grand Junction Operations Office Grand Junction, Colorado**, 2011. - 5 pp.

SEC Petition Evaluation Report, Petition SEC-00175, 2011. - 99 pp

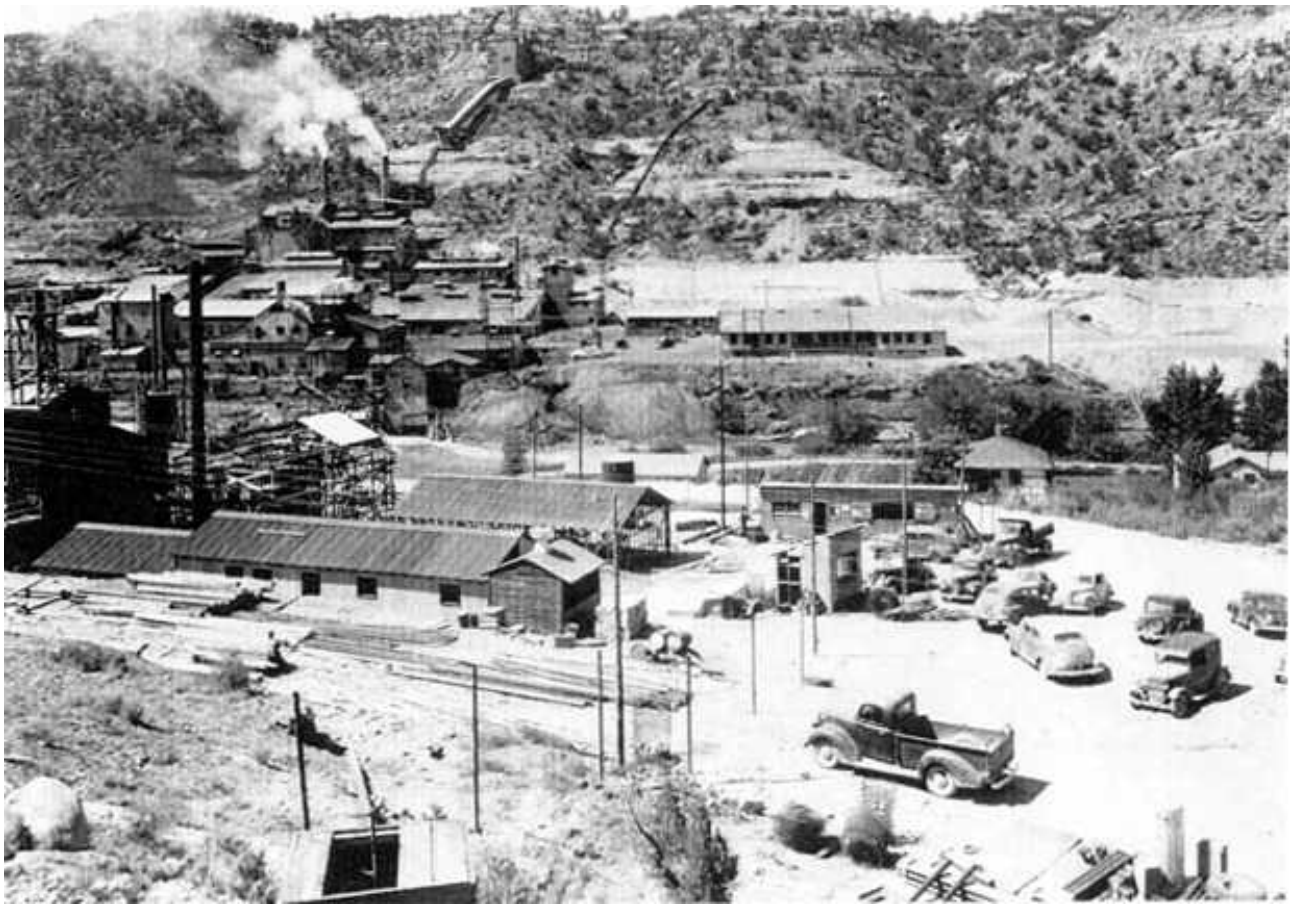
Status of Upcoming SEC Petitions / LaVon B. Rutherford, CHP. National Institute for Occupational Safety and Health Division of Compensation Analysis and Support. 2011. - 6 pp.

- http://www.cdc.gov/niosh/ocas/pdfs/abrwh/pres/secstat0811bw.pdf

95 **Atomic Age Narrow Gauge** : Uranium and the Rio Grande Southern Railroad / Stephen S. Hart. Rio Grande Southern Railroad Technical Information Page. Volume 4, No. 2 - January, 2002.

96 **Decommissioning of U.S. Uranium Production Facilities**. Energy Information Administration, Office of Coal, Nuclear, Electric and Alternate Fuels. U.S. Department of Energy, Washington, DC. 1995. - 71 pp.

the receipt of uranium ores at Grand Junction. Concentrates produced by mills were delivered in steel drums to Grand Junction where they were received, weighed, sampled, and assayed as the basis for payment to the mills under the terms of their respective contracts. On September 30, 2001 the Department of Energy transferred ownership of the Grand Junction property to the Riverview Technology Corporation. The DOE, however, continues to lease portions of the site. Contractors: Lucius Pitkin, Inc. (1956-1971) (ore buying station, sampling, and assaying); National Lead Company (1954-1958) (pilot plant); American Cyanamid Company (1953-1954) (pilot plant); American Smelting and Refining Company (1948-1955) (ore buying station, sampling, and assaying); Ledoux and Company (1948) (concentrate sampling); U.S. Vanadium Corporation (1943-1946) (uranium processing mill).



•CO **Green Sludge Plant in Uravan** Uravan DOE - 1943-1945 - The Manhattan Engineer District (MED) obtained uranium from residues left over from the production of vanadium. The resulting product made at these plants was called "green sludge." It was further processed at Grand Junction. Two plants in Uravan, Colorado, provided the MED with uranium extracted from green sludge. The green sludge plant in Uravan owned by Union Carbide and operated by its subsidiary, the U.S. Vanadium Company, is not covered under EEOICPA. This listing applies only to the MED-owned plant, which was located on the north side of the San Miguel River. The U.S. Vanadium Company operated the MED-owned plant under a fixed fee contract during World War II. The plant was shut down in 1945. Contractors: The U.S. Vanadium Company, a subsidiary of the Union Carbide Corporation (1943-1945).

•CO **Machlett Laboratories** Springdale BE - 1952 - Beginning in the 1940s,

Machlett Laboratories worked with beryllium in its commercial business as a supplier of x-ray and electron vacuum tubes. Machlett produced a handful of brazed beryllium window assemblies in 1952 under an AEC contract.

•CO **Rocky Flats Plant**[97] Golden DOE - 1951-2006 - Rocky Flats was built in 1951 as a plutonium and uranium component manufacturing center. From 1952 to 1989, the site's primary mission was to fabricate the "pit" that contains the heavy metals and serves as the trigger device for nuclear warheads. Rocky Flats was also responsible for recycling plutonium from scrap and plutonium retrieved from retired nuclear warheads. The final products of this recycling included components and assemblies manufactured from uranium, plutonium, beryllium, stainless steel, and other metals. Production activities included metalworking, component fabrication and assembly, chemical recovery and purification of plutonium, and associated quality control functions.

97 The Rocky Flats Stewardship Council formed in February 2006 to provide ongoing local government and community oversight of the post-closure management of Rocky Flats, the former nuclear weapons plant northwest of Denver.

A Technically Useful History of the Critical Mass Laboratory at Rocky Flats / Dr. Robert E. Rothe, May 2005. - http://b-dig.iie.org.mx/BibDig/P05-0909/PDFFILES/PAPERS/472.pdf

Research and development in the fields of chemistry, physics, metallurgy, materials technology, nuclear safety, and mechanical engineering were also conducted at the site. In 1989, many of the site's nuclear component production functions were suspended after a safety review temporarily shut down plutonium operations. Following an extensive review, which included considerable independent oversight, a few buildings were authorized by the Secretary of Energy to resume limited plutonium operations: to stabilize plutonium oxide and repackage plutonium for safe storage. In 1989, as a result of the environmental contamination caused by production activities at the site.

Rocky Flats was placed on the Superfund National Priorities List. In January 1992, nuclear component production was terminated and the site's primary mission changed from nuclear weapons production to environmental cleanup and restoration.[98] Contractors: Kaiser-Hill Company (1995-present); EG&G Rocky Flats, Inc. (1989-1995); Rockwell International (1975-1989); Dow Chemical (1951-1975).

98 Democracy Now! Tuesday 04 May, 2004 (May 4, 2004).
'**Recycling Plutonium:** How the EPA is Disbursing Toxic and Radioactive Waste From the Lowry Landfill to the Sewage System and onto CO Farmlands and Public Parks'. - http://www.archive.org/details/dn2004-0504

•CO **Shattuck Chemical**[99] Denver AWE - 1950s; 1963 - Shattuck Chemical prepared uranium compounds and uranium oxide in the late 1950s. (This was probably done under a Source Materials License issued by the Atomic Energy Commission.) Shattuck also processed refined uranium and produced natural uranium oxides on a commercial basis for the private market, and in 1963, supplied a small quantity of uranium to the Rocky Flats plant. The Shattuck facility was closed in 1984.

•CO **University of Denver Research Institute** Denver AWE/BE - 1963-1965 - The University of Denver Research Institute is listed as a processor of radioactive materials for National Lead of Ohio (Fernald). It appears that the University of Denver handled test quantities of radioactive metal in February 1965. In 1963, a University of Denver Research Institute researcher (F. Perkins) held an AEC contract for work on intermediate-temperature oxidation of beryllides.

•CO **Titan One Missile Complex 2A**[100] Aurora vicinity, Arapahoe AWE - The Colorado Department of Public Health and Environment (CDPHE), Hazardous Materials and Waste Management Division, provides regulatory oversight of the

99 **Neighbors hope to use former Shattuck Chemical land for garden** / Matthew Rodriguez YourHub.com, 01/24/2011. 'Buried in the $33 million cleanup of the radioactive Shattuck Chemical site in Denver, along South Bannock Street, was a $250,000 settlement for ecological restoration'.

Cleanup fund for radioactive Shattuck Chemical site quadruples to $1 million / Mark Jaffe. The Denver Post, 11/23/2009. - http://www.denverpost.com/news/ci_13847754#ixzz1dseGorIz

100 **Final five-year review plan former Lowry Bombing and Gunnery Range Arapahoe County, Colorado**. Prepared for: U.S. Army Corps of Engineers. Omaha District. Omaha, Nebraska / Prepared by: Shaw Environmental, Inc., 2011. - 71 pp.

Formerly Used Defense Sites and Base Realignment and Closure programs in Colorado, with assistance from the US Environmental Protection Agency (EPA) Region 8 and local governments.

•CO **Uranium Mill in Durango**[101] Durango DOE - 1948-1953 - The AEC purchased the 147-acre uranium mill site in Durango, Colorado, in 1948 from the Vanadium Corporation of America. The AEC leased the facility back to Vanadium that same year, with an option to purchase the facility in 1953. Between 1948 and 1953, Vanadium operated the mill on behalf of the AEC. The company exercised its purchase option in 1953, and thereafter, the mill was operated as a privately owned facility. The company shut down and dismantled the mill in March 1963. Contractor: The Vanadium Corporation of America (1948-1953).

•CT **American Chain and Cable Co.** Bridgeport AWE - 1944 - American Chain and Cable worked under contract to the Du Pont Company to support the manufacture of uranium slugs during the Manhattan Project. In 1944, the company swaged (reduced the diameter) of uranium rods at its Bridgeport facility.

•CT **Anaconda Co.** Waterbury AWE - 1942; 1956-1959 - In 1942, the American Brass Company produced the barriers used in the gaseous diffusion process. In the late 1950s, under contract to Nuclear Metals Inc., the company extruded copper-clad uranium billets into tubes at least two separate times for the Savannah River Site. While the original plans called for work on 500 billets, only around 50 were actually

101 **Collection M 008: Durango (Colo.) Uranium Mill Tailings Removal collection inventory**. Years this material was created: 1960-1990; bulk dates 1978-1989. Quantity: 2.2 linear shelf feet (in 5 document cases), Fort Lewis College Foundation, Center of Southwest Studies account.
- http://swcenter.fortlewis.edu/inventory/Umtra.htm

processed.

•CT **Bridgeport Brass Co.**, Havens Lab. Bridgeport AWE - 1952-1962 - Bridgeport Brass, at the Havens Laboratory in Connecticut and in Adrian, Michigan, worked to improve the process for extruding uranium. Eventually this work was taken over by Reactive Metals, which operated the AEC/DOE extrusion facility in Astabula, Ohio. Bridgeport cut and stored uranium, and may have been involved in the rolling of uranium. Some work of the Havens Laboratory was moved to Seymour, CT, in 1962, to a facility that is now owned by Seymour Specialty Wire. From 1954-1961, the Bridgeport Brass Company performed contract work for the AEC. Operations included production of uranium fuel elements for the Hanford and Savannah River Plant reactors and developmental extrusion work on thorium and depleted natural and slightly enriched uranium. After termination of AEC activities in 1961, most of this plant's functions were transferred to Reactive Metals, Inc. (RMI) in Astabula, Ohio. Bridgeport shipped one large extrusion press to RMI and all other equipment was dismantled and scrapped.

•CT **Combustion Engineering** Windsor AWE/DOE - 1965-1972 - Facility Description: Combustion Engineering (CE) sent shipments of uranium to Fernald between 1965 and 1972 for use in the nuclear weapons production process. It is because of these shipments that this site qualifies as an Atomic Weapons Employer for these years. Combustion Engineering performed substantial work for the Atomic Energy Commission in other years as well, but this work is not covered under EEOICPA because it was either non-nuclear or was not related to weapons production. Starting in the 1940s, this initial work at the site involved non-nuclear components. In 1955, CE began to use highly enriched uranium for its work in supporting the Naval Reactors Program. In the 1960s, CE obtained a license to fabricate fuel elements for power reactors.

•CT **Connecticut Aircraft Nuclear Engine Lab.** (CANEL) Middletown BE/DOE 1958-1966 - The Connecticut Aircraft Nuclear Engine Laboratory (CANEL) worked on an Atomic Energy Commission (AEC) program to develop a nuclear reactor with which to propel aircraft. Specifically, CANEL worked on developing high temperature materials, fuel elements, and liquid metal components and coolants. CANEL consisted of a hot laboratory facility, a nuclear physics laboratory, a fuel element laboratory, a nuclear materials research and development laboratory, and other buildings. The AEC Annual report for 1959 indicates that approximately $4 million in AEC equipment was at CANEL. Plutonium, mixed fission products, and probably uranium were handled at CANEL. A former ORNL employee who had worked at CANEL stated that beryllium metal and oxide in a powdered form were also handled at CANEL. Although President Kennedy canceled the aircraft nuclear propulsion program in 1961, AEC work apparently continued at CANEL until 1965.

•CT **Dorr Corp.** Stamford AWE - 1954; 1963 - The Dorr Corp. conducted waste handling tests on low-level radioactive material (ammonium diuranate). This work was done as a subcontractor to National Lead of Ohio (Fernald).

•CT **Fenn Machinery Co.** Hartford AWE - 1950 - Fenn conducted swaging tests on uranium rods to determine if the process could be used to produce properly shaped rods for Hanford's production reactors. Two tests, each lasting less than one day, were conducted in June 1950.

•CT **New England Lime Co.** Canaan AWE - 1963 - In 1963, the New England Lime

Co. (NELCO) conducted tests on "prill," a magnesium[102]-uranium waste product, to determine the feasibility of recovering these materials for re-use in the nuclear weapons production system. The prill came from the AEC's Fernald facility. Six drums of prill were sent from Fernald to NELCO for the test. The New England Lime Company also provided magnesium and calcium to the Manhattan Engineer District and Atomic Energy Commission from 1944-1956.

•CT **Seymour Specialty Wire** Seymour AWE/DOE - 1962-1964 - From 1962 to 1964, the Bridgeport Brass Company performed contract work at the Seymour site for the Atomic Energy Commission (AEC). This work involved developing an extrusion process for natural uranium metal. After 1964, the work was consolidated at the Reactive Metals site in Ohio. Operation of the Seymour site was later taken over by employees and the facility eventually became the Seymour Specialty Wire Company.

•CT **Sperry Products, Inc.** Danbury AWE - 1952-1953 - In 1952 and 1953, Sperry developed processes for testing and examining uranium plates for the Sylvania Corp., a major AEC contractor.

•CT **Torrington Co.** Torrington AWE - 1951-1953 - The Torrington Company performed small-scale swaging experiments on uranium rods in the early 1950s. Torrington conducted this work for two companies: the Bridgeport Brass Company and American Machine and Foundry.

•DC **National Bureau of Standards**, Van Ness Street Washington AWE

102**SUMMARY OF DATA FOR CHEMICAL SELECTION: Magnesium Oxide 1309-48-4**. / Prepared by Technical Resources International, Inc. for NCI to support chemical nominations under contract no. N02-CB-07007 (11/01). http://ntp.niehs.nih.gov/ntp/htdocs/Chem_Background/ExSumPdf/Magnesiumoxide.pdf

•DC **Naval Research Laboratory**[103] Washington AWE/DOE - Pioneering research by NRL yielded the first separation of uranium isotopes by the liquid thermal diffusion process, invented by NRL's Philip Abelson. This process was one of the three methods used by the Manhattan Project to obtain the enriched uranium necessary to make the first atomic bombs. The uranium separation plant in Oak Ridge, Tennessee, was built in 1944 to the blueprints of NRL's plant.
•DE **Allied Chemical and Dye Corp.** North Claymont AWE - early 1950s-late 1960s; Residual Radiation late 1960s-1977 - Allied Chemical and Dye Company was involved in research and development and small pilot-scale operations on uranium recovery from a phosphoric acid plant.
•DE **E.I. Du Pont de Nemours and Company** [104]AWE
•FL **American Beryllium Co.** Sarasota BE - 1967-1992- American Beryllium Company machined parts for Y-12 and Rocky Flats.
•FL **Armour Fertilizer Works** Bartow AWE - 1951-1955 - Under contract with the AEC, Armour operated a pilot plant which produced uranium from phosphoric acid.
•FL **C.F. Industries, Inc.** Bartow AWE
•FL **Gardinier, Inc.** Tampa AWE - 1951-1954; 1956-1961 - Under contract to the AEC, Gardinier (under the name U.S. Phosphoric Products) operated a pilot plant

103Naval Research Laboratory: **The Little Book of Big Achievements**. 2000.- 28 pp. http://www.nrl.navy.mil/content_images/little_book.pdf
104National Archives: **Records of the Atomic Energy Commission** [AEC] (Record Group 326) 1923-75.

from 1951 to 1954 which recovered uranium from phosphoric acid. From 1956 to 1961, it produced uranium by recovery of U3O8 from phosphoric acid. Maximum production was 60 tons of uranium concentrate per year. The uranium was ultimately used in weapons production.

•FL **International Minerals and Chemical Corp.** Mulberry AWE - 1951-1961 - International Minerals and Chemical Corp. produced uranium as a byproduct of the recovery of phosphate chemicals and fertilizers. The 1951, AEC contracted with International Minerals and Chemical Corp. for the recovery of uranium, which was ultimately used for the production of weapons. The original production plant was shut down in 1959. Starting in 1954, the uranium recovery unit was located at the Bonnie Plant. In 1955, it switched to the phosphoric acid process. International Minerals and Chemical Corp. became Central Farmers (now C.F.) Industries; in 1969, C.F. Industries became C.F. Chemicals, Bartow Phosphate Works. The phosphoric process was shut down in 1961.

•FL **Pinellas Plant**[105] Clearwater DOE - General Electric (GE) constructed the Pinellas Plant in 1956 for the production of neutron generators for the nation's nuclear weapons program. The Atomic Energy Commission purchased the Pinellas Plant from GE in 1957 and contracted them to manage and operate the site. GE Neutron Devices (GEND) served in this capacity until June 1992, at which time Lockheed Martin Speciahy Components, Inc., (Specialty Components) (formerly Martin Marietta Specialty Components, Inc.)

assumed operation of the plant. The major product lines at the plant included the following: neutron generators and detectors, Radioisotopically-powered Thermoelectric Generators (RTGs), specialty capacitors, vacuum switch tubes, electromagnetic devices, thermal batteries, thermal ambient temperature batteries, frequency control devices, quartz digital accelerometers, Lightning Arrestor Connectors (LACS), ceramics, ferroelectric ceramics, foam support pads, and optoelectronics.

•FL **University of Florida** Gainesville AWE - 1963-1969 - Documents indicate that the University of Florida handled test quantities of radioactive material under a National Lead of Ohio (Fernald) sub-contract between 1963 and 1969. Upon completion of the project, the material was sent to the Savannah River Site. The University also obtained licenses to handle radioactive material from the Nuclear Regulatory Commission.

•FL **Virginia-Carolina Chemical Corp.**[106] Nichols AWE - 1952-1957 - The Virginia-Carolina Chemical Corporation produced uranium as a byproduct of the recovery of phosphate chemicals and fertilizers. The AEC contracted with the Virginia-Carolina Chemical Corp. for the recovery of the uranium, which was ultimately used in weapons production. The research lasted only about 6 months. The laboratory was dismantled, and all equipment was removed prior to sale of the building in 1965 for use as a warehouse.

•FL **W.R. Grace Co., Agricultural Chemical Div.**[107] Ridgewood AWE - 1954 - For

105**Facts and Sources for EEOICPA Pinellas Plant Claimants**, April 2008. Nuclear Workers of Florida. 162 pp

106DOE, Office of Nuclear Energy Office of Remedial Action and Waste Technology, Division of Facility and Site: **Decommissioning Projects: Formerly utilized sites remedial action program elimination report for the former Virginia-Carolina Chemical Corporation Richmond, Virginia**, Undated. - 8 pp.

107EEOICPA BULLETIN NO.07-13, Issue Date: April 10, 2007, Revised Residual Radioactive Contamination Report– Summary of All Sites : **Facilities Identified by NIOSH with the Potential for Significant Residual Contamination Outside Of the Periods**.

in Which Weapons-Related Production Occurred.

one month in 1954, W.R. Grace performed the pilot plant work on solvent extraction for Armour Fertilizer, which used the solvent process to extract uranium from phosphates.

• GA **Georgia Nuclear Aircraft Laboratory**, AFP No. 67, Air Force Plant 67 AWE

•HI **Kauai Test Facility**[108] Kauai DOE - 1975? - Kauai Test Facility is situated on the north end of the U.S. Navy Pacific Missile Range Facility on the west side of the island of Kauai, Hawaii. The Kauai Test Facility has 25 major buildings. Kauai Test Facility is equipped with resources for assembling, testing, launching, tracking, and recovering instrumented rockets, rocket payloads, and aircraft payloads. The Facility also provides capabilities for receiving, recording, and "quicklook playback" of radio telemetered test data. Additionally, resources are available for optical tracking and photometric coverage of test objects and experiments. The Kauai Test Facility has been in operation since the mid-1970s, conducting an average of three to four weapon system delivery tests per year. The Department of Energy (DOE) suspected that these tests resulted in contamination of three release sites including the rocket launch pads, a drum storage area, and a photography laboratory.

•IA **Ames Laboratory** Ames DOE- 1942-. - Ames Laboratory is located on the Iowa State University Campus in Ames, Iowa. During the Manhattan Project, researchers

108Sandia National Laboratories **Kauai Test Facility : Environmental Assessment**. DOE. - 1991. - 227 pp.

at Iowa State perfected a magnesium reduction process, producing pure uranium metal that quickly became the industry standard. Iowa State was one of the first organizations to supply metallic uranium used as fuel for the first self-sustaining chain reaction at the University of Chicago. On May 12, 1943 a fire occurred at the WPA storage shed. The fire burned 32 cans of uranium turnings and sawings. Uranium oxides were also lost in the fire.In 1947, the AEC formally established the Ames Laboratory and directed it to focus on materials research. The Ames Laboratory Neutron Scattering group (ALNS) is part of the Ames Laboratory Condensed Matter Physics group (CMP). The ALNS group works in collaboration with the Oak Ridge National Laboratory's (ORNL) High Flux Isotope Reactor (HFIR), Center for Neutron Scattering (CNS).. Over the years the laboratory broadened its mission to include fundamental research in the physical, chemical, mathematical, engineering, and environmental sciences as well. In 2005, the DOE contracted with The University of Iowa College of Public Health to coordinate FWP medical screenings for Ames Laboratory former workers at Iowa State University in Ames, Iowa.

•IA **Bendix Aviation** Davenport AWE - 1960 - On three separate occasions, National Lead of Ohio (Fernald) personnel conducted tests to see how well a Bendix sonic energy cleaning system could clean uranium-contaminated 55 gallon drums.[109]

•IA **Iowa Ordnance Plant** or Burlington Atomic Energy Commission Plant Burlington DOE - 1949[110]-1974 - The Iowa Ordnance Plant (IOP), also known as the Iowa

109 Bendix Aviation founded the company in 1951 in Davenport, Iowa, USA,and sold the facility to Litton Industries in 1982. Northrop Grumman Corporation acquired Litton Industries in 2001 and then in August 2003, divested the Life Support division, based in Davenport, IA, to Cobham plc, Dorset, United Kingdom.

110**This Circular replaces Circular No. 07-01**, Department of Energy (DOE) facility description of Line 1 (Division B) at the Iowa Ordnance Plant, with one correction. The SEC period of 1947 through 1974 referenced in Circular 07-01 is incorrect. The correct SEC period is March 1949 through 1974.EEOICPA

Army Ammunition Plant (IAAP), is a load, assemble, and pack munitions facility that began production in 1941 and continues to operate as a Government-owned, contractor-operated installation[111]. Between 1947 and 1974, a portion of the IAAP was operated under contract to the Atomic Energy Commission (AEC) for the purpose of supplying the AEC with explosive components for nuclear weapons. 'In 1947, Silas Mason Company entered into a contract with the Ordnance Department to assist in the design and engineering to construct and operate a facility for the purpose of supplying the Atomic Energy Commission (AEC, predecessor to the present day Department of Energy) with explosive components for nuclear weapons[112]. Under contract with the AEC, Silas Mason Company conducted high explosive fabrication, assembly of non-nuclear and nuclear components, retrofits, modifications, surveillance, and disassembly of nuclear weapons. This work was performed adjacent to other areas at the IAAP dedicated to the production and manufacture of routine military munitions. The qualifying "DOE facility" portion of the IAAP extends to those locations of the plant where Silas Mason Company (aka Mason & Hanger – Silas Mason, Co. Inc.) performed operations for the AEC.' The area of the IOP that performed work for the AEC includes the buildings and property/grounds of the IAAP that is identified as Line 1, as well as Yards C, G and L and the Firing Site Area, Burning Field "B" and the storage sites for pits and weapons, including Buildings 73 and 77. Work performed in these areas is covered under the Energy Employees Occupational Illness Compensation Program Act[113]. In 1974, the AEC closed out its activities at the plant and transferred all functions to the Pantex Plant. Contractor: Mason & Hanger-Silas Mason Company (1947-1974). In 1993, off-post contamination of private drinking water wells with explosives was confirmed.[114] According to Wikipedia, In the late 1990s, reporters Dennis J. Carroll and Mike Augspurger wrote a series of stories about health problems experienced by former workers of the Iowa Army Ammunition Plant and its predecessor, the Iowa Ordnance Plant, and their families. The stories helped raise awareness of formerly secret work at the munitions plant carried out by the Atomic Energy Commission. That resulted in the creation of the Burlington Atomic Energy Commission Plant-Former Worker Program

•IA **Titus Metals** Waterloo AWE - 1956 - Titus Metals performed the extrusion of uranium oxide billets into fuel plates for the Argonaut reactor at Argonne National Laboratory on June 29, 1956.

Circular NO. 07-03, May 22, 2007

111Explosion damage at the Iowa Ordnance Plant, Burlington, Iowa 04 March 1942

112The U.S. Army Materiel Command: **The Metal Book**. 2007. - 39 s.

113**Cumulative EEOICPA Compensation Paid -Iowa Ordnance Plant**, 2011. - 1 p.

Centers for Disease Control and Prevention: **Iowa Ordnance Plant**. Federal Register / Vol. 69, No. 205 / Monday, October 25, 2004 / Notices.

SEC Petition Evaluation Report, 2005. - 10 pp.

114Team Iowa: **Iowa Army Ammo Plant - Installation Action Plan**, 2001.- 80 pp.

•ID **Argonne National Laboratory** West Scoville DOE - 1946-. - Argonne is one of the U.S. DOE's largest research centers. It is also the nation's first national laboratory, chartered in 1946. The Laboratory specializes in reactor engineering, reactor physics, chemistry and metallurgy. Early reactor research focused on the production of plutonium from uranium. Argonne is a direct descendant of the University of Chicago's Metallurgical Laboratory, part of the World War II Manhattan Project. Argonne National Laboratories - West was a part of Argonne National Laboratory, operated by the University of Chicago. ANLW was located on the southeastern portion of the Idaho National Engineering and Environmental Laboratory. On February 1, 2005 the Idaho National Engineering and Environmental Laboratory and Argonne National Laboratory - West became the Idaho National Laboraotry (INL).

Nuclear technology lab and test location, and a major radioactive material storage/disposal site. Located on 573,608 acres in southern Idaho, facilities include 52 nuclear reactors, 13 of which are still operable. The Navy's nuclear-powered submarine reactors are disposed of in a pit at INEL, as are radioactive wastes from other government sources. At the Test Area North, uranium-hardened armor for Abrams tanks is manufactured. Non-nuclear defense and energy-related R&D is performed at labs on the site as well, and INEL is a major contributor of waste management technologies. The only two nuclear-powered jet aircraft engines ever made were developed and built at INEL in the late 1950's, and remain on their outdoor test tracks today. The installation, owned by the Department of Energy, employs 7,500 people and is operated by Lockheed Martin. Source: CLUI Land Use Database.

•ID **Idaho National Engineering Laboratory**[115] Scoville DOE - 1949-. - In 1949, the Atomic Energy Commission established the National Reactor Testing Station on the site of a 1940s US Navy bombing and artillery range. Today, this site is known as the Idaho National Laboratory (INL). This was the primary nuclear reactor development laboratory in the United States. Over 100 reactor concepts were conceived and tested here. Between 1953 and 1992, the Idaho Chemical Processing Plant (ICPP) at INL reprocessed spent nuclear fuel from naval propulsion, test, and research reactors to recover enriched uranium for reuse in nuclear weapons production. Other facilities at INL also conducted various nuclear weapons research and development activities. On February 1, 2005 the Idaho National Engineering and Environmental Laboratory and Argonne National Laboratory-West became the Idaho

115 **Citizens Guide to the United States Department of Energy's Idaho National Laboratory**. Fourteenth Edition / Compiled for the Environmental Defense Institute by Chuck Broscious. Environmental Defense Institute, Inc. 2006. - 300 pp.

Heavy Element Radionuclides (Pu, Np, U) and 137 Cs in Soils Collected From the Idaho National Engineering and Environmental Laboratory and Other Sites in Idaho, Montana, and Wyoming / T.M. Beasley, J.M. Kelley, L.A. Bond, Wm. Rivera, Jr., M.J. Liszewski, K.A. Orlandini. Environmental Measurements Laboratory, U.S. Department of Energy. 1998. - 80 pp.

National Laboratory. The INL mission is to continue as a National Laboratory, developing and demonstrating compelling national security technologies, and delivering excellence in science and technology. Also at this time, the Idaho Completion Project (ICP) was formed to remediate the site, including the disposition of reactor and non-reactor nuclear facilities.

•ID **Northwest Machining and Manufacturing** Meridian BE – 1996-2000

- Northwest Machining provided machine shop services to Sandia National Laboratory, California.

•IL **Allied Chemical Corp.** or **General Chemical Division**[116] Metropolis AWE - 1959-1976 - After World War II, many companies working for the United States Government produced UF6 feed for uranium enrichment and diffusion plants. The Allied Plant in Metropolis, IL was completed and initial deliveries began sometime in 1959. In 1962, several feed plants were shut down and the privately-owned Allied Chemical Company Plant in Metropolis, IL, took over the conversion of U3O8 to UF6. This plant produced approximately five thousand tons of uranium hexafluoride feed for the Paducah Gaseous Diffusion Plant per year. It was shut down in 1964.

•IL **American Machine and Metals, Inc.** E. Moline AWE - 1960 - American Machine and Metals demonstrated a process for National Lead of Ohio (Fernald) that involved dehydration of green salt using a centrifuge process.

•IL **Argonne National Laboratory**[117] East Argonne DOE

•IL **Armour Research Foundation** Chicago AWE - 1957 - Records indicate that Armour Research Foundation may have tested radioactive materials for National Lead Company of Ohio (Fernald).

•IL **Blockson Chemical Co.** Joliet AWE - 1951 - 1960 - Blockson Chemical Company operated a plant which produced uranium from phosphoric acid. The AEC contracted with Blockson for the recovery of the uranium, which was ultimately used in weapons production. The AEC Uranium production work performed by Blockson was conducted in a one-story brick structure known as Building 55. This listing is also intended to cover the AEC-funded laboratory, pilot plant and oxidation process, which also occurred at Blockson, and was related to the work in Building 55.

•IL **C-B Tool Products Co.** Chicago AWE - 1944 - For a six month period in 1944, C-B Tool Products Company had a subcontract with the University of Chicago to provide personnel, facilities, and equipment to produce special machining of parts for special equipment, tools, jigs, and fixtures to the Met Lab from materials provided by the University of Chicago. It is unclear whether the company handled radioactive materials

•IL **Crane Co.** Chicago AWE - 1947-1949 - Crane Co. supplied the Atomic Energy Commission with uranium and thorium in the 1940s (and perhaps in the 1950s) and likely used materials containing uranium in manufacturing and conducted valve development studies for for the AEC and General Electric at Hanford. At the completion of one project in 1949, 1000 pounds of contaminated wastes, including 346 grams of uranium, were shipped from Crane to Oak Ridge. In 1949, Crane also shipped 265 kg of normal uranium to Hanford.

116 **Site Profile for Allied Chemical Corporation Plant** / Shelby L. Gubin, Robert Hysong, Cindy W. Bloom, and Joseph S. Guido. National Institute for Occupational Safety and Health, 2007. - 34 pp. - http://www.cdc.gov/niosh/ocas/pdfs/tbd/allied-r1.pdf

Advisory board on Radiation and Worker Health. National Institute for Occupational Safety and Health: **Draft Review of the NIOSH Site profile for Allied Chemical Corporation Plant, Metropolis, Illinois** / Prepared by Gregory Hofer and Robert Anigstein. S. Cohen & Associates. September 2011. - 28 pp

117 **Argonne National Laboratory – East – Site Description** / ORAU TEAM Dose Reconstruction Project for NIOSH, 2006. - 34 pp. - http://www.cdc.gov/niosh/ocas/pdfs/tbd/anle2a.pdf

•IL **Dow Chemical Co.** Madison AWE - 1957-1960 - The Dow facility in Madison, Illinois, supplied the AEC with Magnesium-thorium sheets and plates, non radioactive equipment, metal products and other services. Dow received a purchase order from Mallinckrodt in March 1960, for research and development on the extrusion of uranium metal and rod. The Department of Energy also has invoices from 1957 and 1958 indicating that the Mallinckrodt Chemical Company Uranium division purchased magnesium-thorium plates and sheets from the Dow Chemical Company in Madison Illinois. Dow sold this facility in 1969 to Consolidated Aluminum, which continued to operate the facility from 1969 through 1986.

•IL **ERA Tool and Engineering Co.** Chicago AWE - 1944 - From February 1944 through June 1944, ERA Tool and Engineering Company contracted with the University of Chicago to supply services and supplies to the Met Lab, specifically to provide necessary personnel, facilities, and equipment required to produce special machining of parts for special equipment, tools, jigs, fixtures, etc. from materials furnished by the University.

•IL **Fansteel Metallurgical Corp.**[118] North Chicago BE - 1944; 1950 - Fansteel Metallurgical Corp. performed beryllium work for the Manhattan Engineer District under Contract No. W-7425 eng-27 for the fabrication of beryllium into sintered shapes and for the manufacture of 600 bricks for delivery to Los Alamos. Fansteel also worked with "approximately 150 pounds of nominal grade beryllium carbide powder" for use in the Nuclear Energy for the Propulsion of Aircraft (NEPA) project. This work is reported to have occurred between April and June of 1950.

118**The Bomb's Chicago Fallout** : U.S. Says '40s Research Put Thousands at High Risk
By Sam Roe and Jeremy Manier, Chicago Tribune, February 2, 2001

Herbert Anderson was a major figure in the race for the atomic bomb, a pioneering physicist who made history at the University of Chicago in 1942 when he helped create the world's first controlled nuclear chain reaction. But Anderson paid a heavy price for such achievements.

He contracted a rare lung disease from handling beryllium, an extraordinarily toxic metal critical to nuclear weapons production. Before he died, his lungs were so damaged he couldn't breathe without an oxygen tank, and his bones were so brittle he once broke two fingers just by shaking someone's hand.

•IL **Fermi National Accelerator Laboratory** Batavia DOE - 1972-. - Fermi National Accelerator Laboratory was established in 1972 as a research and development facility. Fermi has one of the most powerful particle accelerators in the world and is used to conduct a variety of high-energy physics programs.
•IL **Granite City Steel** Granite City AWE/DOE - 1953-1966 - From 1953 through 1966, General Steel Castings/Industries performed quality control work for the AEC. Specifically, it x-rayed uranium ingots and betatron slices to detect metallurgical flaws for Mallinckrodt Chemical Company. This work was performed in a facility located at 1417 State Street, which was part of what was later known as the "South Plant" of Granite City Steel. This listing is intended to cover only the South Plant, identified by the State Street address, and not any other facility that may have been owned by Granite City Steel prior to or after its purchase of the General Steel Industries facility in the early 1970s. For example, this listing does not cover Granite City Steel facilities on Madison or 20th Street.
•IL **Great Lakes Carbon Corp.** Chicago AWE - 1952-1958 - In 1952, the Great Lakes Carbon Corp. studied graphite for the Atomic Energy Commission and in 1958 it did some Transient Reactor Test Facility (TREAT) fuel work for Argonne National Laboratory (ANL). As part of the contract, ANL agreed to decontaminate the facility used. It handled radioactive uranium and radioactive thorium under AEC contract.
•IL **GSA 39th Street Warehouse** Chicago AWE - 1942-1949 - The 39th Street Warehouse was occupied by the Metallurgical Laboratory and Argonne National Laboratory until approximately 1949. Activities in the building included the storage of radioactive materials.
•IL **International Register** Chicago AWE - 1943 - International Register was involved in the development of uranium machining techniques for the Metallurgical

Lab and the Manhattan Project.
•IL **Kaiser Aluminum Corp.** Dalton AWE - 1959 - In March 1959, Kaiser performed the extrusion of three CP-5 type fuel elements containing normal uranium oxide for Argonne National Laboratory.
•IL **Lindsay Light and Chemical Co.**[119] W. or Kerr-McGee Chicago AWE - 1942-953 - Lindsay Light and Chemical was a commercial processor of monazite sands, which yield several commercially valuable products, including the radioactive metal thorium. The Manhattan Engineer District and then the Atomic Energy Commission purchased thorium from Lindsay.
•IL **Madison Site** (Speculite) Madison AWE/DOE
•IL **Metallurgical Laboratory** Chicago - BE 1942-1946; AWE:1942-1946 - The University of Chicago's Metallurgical Laboratory (Met Lab) was involved in early uranium metallurgical work as part of the Manhattan Project. The first self-sustaining nuclear chain reaction was achieved at the university in a "pile" called the Chicago Pile 1, built by Enrico Fermi and his Met Lab colleagues. The Met Lab is the direct predecessor of Argonne National Laboratory into which all Met Lab functions were transferred in 1946.
•IL **Midwest Manufacturing Co.** Galesbury AWE - 1944 - A November 7, 1944, document indicates that Midwest Manufacturing worked on the "self-lubricating draw die" which was related to metal fabrication for the Manhattan Project.

•IL **Museum of Science and Industry** Chicago AWE - 1946-1953 - Portions of the East Pavilion of the Museum of Science and Industry were used by employees of the Metallurgical Laboratory and the Argonne National Laboratory.
•IL **National Guard Armory** Chicago AWE/DOE - 1942-1951 - In the 1940s, the Manhattan Project leased the National Guard Armory from the State of Illinois for uranium processing and radioactive material storage. In 1951, the site was returned

119See also: Lindsay Manufacturing Company, Platte County, Nebraska.

to the State of Illinois.

•IL **Podbeliniac Corp.** Chicago AWE - 1957 - In 1957, National Lead Company of Ohio (Fernald) used equipment at the Podbeliniac Corp. to conduct an extraction experiment using uranium in solution.

•IL **Precision Extrusion Co.** Bensenville AWE - 1949-1950; 1956-1959 - Precision Extrusion was involved in several projects for the Atomic Energy Commission and Argonne National Laboratory. From 1949 to 1950, it extruded experimental fuel channel tubes from aluminum and aluminum-lithium alloys.

•IL **Quality Hardware and Machine Co.** Chicago AWE - 1944-1945 - Quality Hardware had a contract to support the University of Chicago. The company canned experimental unbonded uranium slugs for Hanford.

•IL R. **Krasburg and Sons Manufacturing Co.** Chicago AWE - 1944 - In 1944, R. Krasberg entered into a subcontract with the University of Chicago for services and supplies for the Metallurgical Laboratory. The subcontract required Krasberg to provide necessary personnel, facilities and equipment to produce special machining of parts for special equipment, tools, jigs, fixtures, etc., from materials furnished by the University.

•IL **Sciaky Brothers, Inc.** Chicago AWE - 1953 - In 1953, Argonne National Laboratory suggested that Sciaky Brothers be used to perform a stitch welding operation for a uranium cord, zirconium clad specimen EBR irradiation.

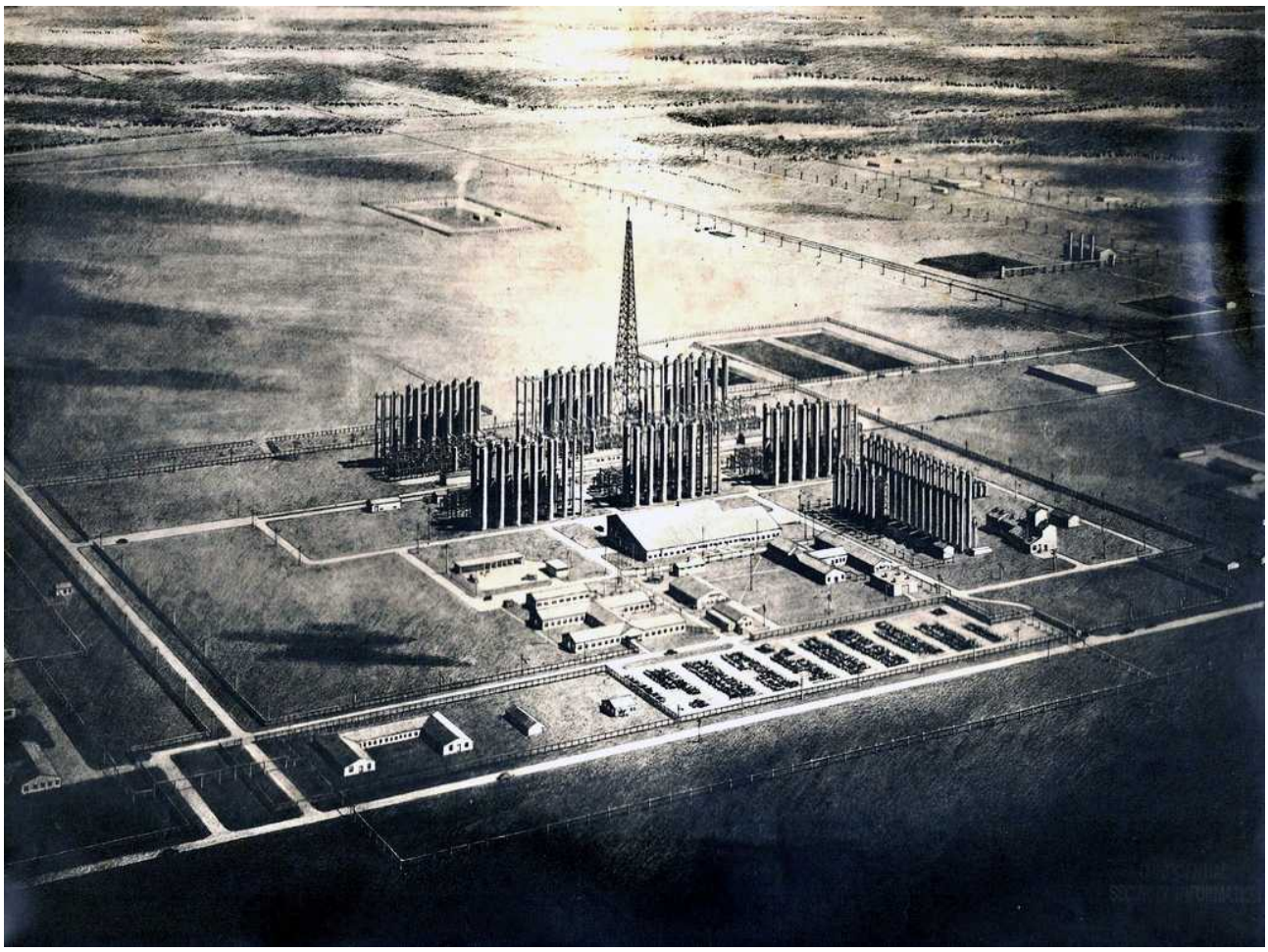
•IL **Swenson Evaporator Co.** Harvey AWE - 1951 - Swenson Evaporator was scheduled to perform a raffinate spray drying test for National Lead Company of Ohio (NLO) on March 20, 1951.

•IL **University of Chicago** Chicago AWE/DOE

•IL **W.E. Pratt Manufacturing Co.** Joliet AWE - 1943-1946 - The W.E. Pratt Manufacturing Company performed metal fabrication tasks (machining and grinding) for the University of Chicago Metallurgical Laboratory beginning in the spring of 1943. The purpose of the machining done by Pratt was to speed up delivery of pieces for the experimental pile and to learn all that could be learned about handing uranium metal in turret lathes and automatic screw machines. In 1944, Pratt was subcontracted by the University of Chicago to finish “short metal rods” by centerless grinding. This work continued until June 30, 1946. The Manhattan Engineer District History indicates that DuPont placed an order with Pratt to turn and grind unbonded Hanford slugs.

•IL **Wycoff Drawn Steel Co.** Chicago AWE - 1943 - In 1943, the Metallurgical Laboratory conducted experiments of centerless grinding equipment on uranium.

•IN **American Bearing Corp.** Indianapolis AWE 1954-1959; Residual Radiation 1960-1983 - American Bearing Corp. was selected to participate in the machining of a sample lot of four hollow extrusion uranium billets from ingots for National Lead of Ohio (Fernald). Subsequently, National Lead used the Special Products Area of American Bearing to process uranium materials in the late 1950s. In May 1959, National Lead Industries (NLI), Nuclear Division was formed in Albany (Colonie), NY, and this work was moved to this NLI facility.



•IN **Dana Heavy Water Plant** Dana DOE - 1943-1957 - Most of the heavy water for the U.S. nuclear weapons programs was made at two sites: the Dana Heavy Water Plant and the Savannah River Heavy Water Plant. The Dana Heavy Water Plant was designed and built by the Girdler Corporation (under direction from E.I. du Pont de Nemours and Company) and operated by E.I. du Pont de Nemours and Company. The plant, located in Newport, Indiana, operated until May 1957, and remained on standby until July 1959. The site used a combination of hydrogen sulfide-water chemical exchange, water distillation, and electrolysis processes to make heavy water.
•IN **General Electric Plant** Shelbyville AWE - 1956 - In 1956, this facility handled thorium metal under subcontract to National Lead of Ohio (Fernald).
•IN **Joslyn Manufacturing and Supply Co.** Ft. Wayne AWE - 1944-1952 - Joslyn rolled uranium rods from billets for use by the MED and the AEC in weapons production.
•IN **Newport Army Ammunition Plant** Newport, Vermillion
•IN **Purdue University Van der Graaf Lab.** Lafayette AWE - 1942-1946 - Purdue was involved in nuclear physics research during the Manhattan Project.
•IN **Washrite** Indianapolis AWE
•KS **Spencer Chemical Co.**, Jayhawks Works Pittsburg AWE

•KY **Paducah Gaseous Diffusion Plant**[120] Paducah DOE - 1951-1998 - The Department of Energy's Paducah Gaseous Diffusion Plant opened in 1952 to enrich uranium for nuclear weapons. During the plant's Cold War history, more than one million tons of uranium was processed. Construction of the Paducah plant began in 1951 in response to the increased demand for highly-enriched uranium resulting from nuclear weapons production. Initial operations began in 1952 and full operation was reached by 1955. In addition to producing enriched uranium for weapons production, the plant also supplied enriched uranium for the Navy and for commercial fuel. The Paducah Plant also acted as the uranium hexafluoride feed point for all gaseous diffusion plants until 1964. Throughout the course of its operations, the potential for beryllium exposure existed at this site. According to GAO, since 1988, DOE has spent $823 million, adjusted to fiscal year 2002 constant dollars, on the Paducah cleanup program.
•LA **Ethyl Corporation** now Albemarle Corporation Baton Rouge BE - 1967-1971 - Lawrence Livermore National Laboratory purchased beryllium from the Ethyl Corporation, Baton Rouge.
•MA **American Potash & Chemical** West Hanover AWE - 1959 -1961 - American Potash and Chemical Company conducted uranium metal shaping and uranium-magnesium explosive forming studies for Union Carbide Nuclear Corporation, Oak Ridge.
•MA **C.G. Sargent & Sons** Graniteville AWE - 1968 - C.G. Sargents and Sons Company performed extruder and drying oven tests with thorium for National Lead of Ohio (Fernald). It also conducted a uranium sump cake drying test for NLO.
•MA Chapman Valve Indian Orchard AWE/DOE - 1948-1949 - Chapman Valve sup-

120GAO: **Nuclear Waste Cleanup**: Preliminary Observations on DOE's Cleanup of the Paducah Uranium Enrichment Plant, 2004. - 15 pp.

Former Worker Medical Surveillance Program at Department of Energy Gaseous Diffusion Plants. Phase I: Needs Assessment./ Robert Wages, Steven Markowitz, Sylvia Kieding, Mark Griffon, Elizabeth Averill, 1997. - 215 pp.

State-Corporate Crime and the Paducah Gaseous Diffusion Plant / Alan S. Bruce, Paul J. Becker. Western Criminology Review 8(2), 29–43 (2007).

plied valves to the MED and the AEC. In 1948, Chapman Valve machined uranium rods into slugs for the Brookhaven National Laboratory. Uranium slugs were used as reactor fuel.

•MA **Edgerton Germeshausen & Grier, Inc.** Boston AWE - 1950-1953 - EG&G was under contract to the AEC during the period from 1950-1953 for "research and development and manufacturing incident to the installation of scientific test instrumentation at AEC test sites; design, manufacture, test, maintenance of operations systems, weapons systems; and participation in weapons test evaluation."

•MA **Fenwal, Inc.** Ashland AWE - 1967-1968 - In 1967 and 1968, National Lead of Ohio (Fernald) asked Fenwal to conduct tests aimed at determining the capabilities of Fenwal's fire extinguishing equipment for suppressing fires originating in uranium contaminated magnesium. The tests were conducted at Fenwal facilities and involved small amounts of uranium.

•MA **Franklin Institute** Boston BE - 1962 - The Franklin Institute conducted a study for the Division of Reactor Development in 1962.

•MA **Heald Machine Co.** Worcester AWE - 1960 - National Lead of Ohio (Fernald) conducted tests on a drilling machine at the Heald facility. The tests involved drilling a few uranium slugs on the machine which Fernald intended to purchase.

•MA **La Pointe Machine and Tool Co.** Hudson AWE - 1956 - National Lead of Ohio (Fernald) conducted a single test involving the use of uranium metal on a broaching machine and an arbor press at the La Pointe Machine Tool Company facility.

•MA **Massachusetts Institute of Technology** Cambridge AWE/BE - 1946-1963 - The Massachusetts Institute of Technology (MIT) began experimental work on producing uranium metal in the spring of 1942 using a process involving melting and casting. It is this uranium metallurgical work which took place on the MIT campus by MIT employees that supports its designation as an Atomic Weapons Employer (AWE). MIT is also designated as a beryllium vendor. MIT's work with beryllium was known as the "Metallurgical Project" and started when it entered into a research and development contract with the Manhattan Engineer District (MED). The Metallurgical Project involved studying the characteristics of beryllium metal and attempting to make a satisfactory beryllium-uranium alloy. In addition, beryllium oxide crucibles were made for use by the MED. After a number of its employees contracted beryllium disease, MIT consolidated the activities described above in an off-campus site known as the Hood Building, which is a separate covered facility under the EEOICPA. The transition to the Hood Building was complete by the fall of 1946. In 1946, the Massachusetts Institute of Technology (MIT) relocated the work it had been performing under Manhattan Engineer District (MED) contracts into the Hood Building as a means of consolidating work with unique health hazards. The MED, and subsequently the Atomic Energy Commission (AEC) owned the Hood Building, which was located adjacent to the MIT campus. Contractors working in the Hood Building performed the same work that was previously performed on MIT's campus, including work with uranium, beryllium and other metals under contract with the MED and AEC. In 1954 Nuclear Metals Inc. was established and took over the work that MIT had been performing in the Hood Building. Those operations continued until October 29, 1958, when the work was relocated again. The Hood Building was subsequently demolished after which the AEC released it to its new owners on July 11, 1963. Contractors: MIT (1946-1954); Nuclear Metals, Inc. (1954-1958)

•MA **Metals and Controls Corp.** Attleboro AWE - 1952-1967 - Records indicate that

Metals and Controls Corporation fabricated fuel elements for production reactors, but it is unclear whether its work related to the nuclear weapons complex. For example, Metals and Controls Corporation fabricated uranium foils for reactor experiments and fuel components, fabricated complete reactor cores for the Naval Reactors program, and fabricated uranium fuel elements for experimental and research reactors. Records indicate shipments of depleted uranium between Rocky Flats and M&C during the period from 1955-1958.

•MA **National Research Corp.** Cambridge AWE - 1944-1952 - National Research had Manhattan Engineer District experience in working with vacuum centrifugal castings, in developing jets and baffles for diffusion pumps, and in developing cold trap systems. National Research's work with vacuum centrifugal castings involved casting tubealloy (uranium metal) using the "lost wax" technique. In 1948, National Research did work for Mallinckrodt involving the vacuum melting of approximately 500 pounds of uranium.

•MA **Norton Co.** Worcester AWE/BE - BE 1944-1956; AWE 1945-1957 - Norton manufactured refractory products from boron, beryllium, uranium, thorium, and magnesium oxide for the MED and the AEC. As early as 1943, Norton was providing boron to the SAM laboratory. Documents show that Norton began working with beryllium for the MED in approximately September 1944 and that work with beryllium continued through 1956. Work with thorium and uranium continued through 1957 at Norton's Worcester location. Norton continued to manufacture refractory products until at least 1965 for the AEC weapons complex, including Rocky Flats, Hanford and Y-12. However, after 1957 these contracts specified that the refractory products were to be made out of magnesium oxide.

•MA **Nuclear Metals**, Inc[121]. Concord AWE/BE - BE 1954-1986; AWE 1958-990 - Nuclear Metals, Inc. was incorporated in 1954. Its work evolved out of the MIT's Metallurgical Laboratory. On October 29, 1958 the company moved its operations from

121George Matthews : CEO and Chairman of the Board. Nuclear Metals, Inc. 229 Main Street. Age 66. Interviewed November 22, 1996. **Interviewed for the Nuclear Metals Archives and the Concord Oral History Program**. Renee Garrelick, Interviewer.

the Hood Building in Cambridge (which is a separate covered facility under the EEOICPA) to their new Concord location. The company's current name is Starmet. In 1958, Nuclear Metals began operating as a facility that produced depleted uranium products, primarily as penetrators for armor-piercing ammunition. It also supplied copper-plated uranium billets that were used to fuel Savannah River's production reactors. Other work at this facility included the manufacture of metal powders for medical applications, photocopiers and other applications. Thorium and thorium oxide was also handled at the site under license to the NRC. During the period from 1962-1986, Nuclear Metals was the sole source supplier for beryllium alloy end closure fuel element rings used in the "N" Reactor in Richland.

•MA **Reed Rolled Thread Co.** Worcester AWE - 1955 - In 1955, Reed Rolled Thread and Die was scheduled to thread roll a test lot of 1500 Savannah River plant slugs for National Lead Company of Ohio (Fernald).

•MA **Shpack Landfill** Norton AWE/DOE - 1960-1965 - The Shpack Landfill began operating as a private landfill in the early 1960s and received both industrial and domestic wastes. The landfill was closed in 1965 under court order. In 1978, a concerned citizen who had detected elevated radiation levels at the site contacted the Nuclear Regulatory Commission. The Commission investigated the site and confirmed the presence of radioactivity in excess of natural background levels for the area. Exactly when these contaminants were deposited at the site is not known. However, the Nuclear Regulatory Commission determined that the Texas Instruments plant (see Metals and Controls Corp.) of Attleboro had used the landfill to dispose of trash and other materials. The Nuclear Regulatory Commission concluded that the contaminants probably resulted from this waste stream.

•MA **Stony Brook Air Force Station**[122], Westover AB AWE - National Nuclear Weapons Stockpile Site

•MA **Ventron Corporation** Beverly AWE/DOE - 1942-1948 - From 1942 to 1948, Metal Hydrides Corp. was under contract to the Manhattan Engineer District and the Atomic Energy Commission to convert uranium oxide to uranium metal powder. This work, as well as later operations to recover uranium from scrap and turnings from a fuel fabrication plant at Hanford, was conducted at a foundry at the site. During this period, Metal Hydrides was the AEC's primary uranium scrap recovery contractor. The plant is currently owed by the Ventron Division of Morton International.

•MA **Winchester Engineering and Analytical Center** Winchester DOE - 1952-1961 - The Winchester Engineering and Analytical Center, built in 1952 under sponsorship of the AEC, was used to continue development of methods for extraction of uranium and thorium form ore and to prepare metal grade uranium tetrafluoride. Massachusetts Institute of Technology (MIT) began the work in 1946 at Cambridge, MA and continued the work after it was transferred later that year to Watertown Arsenal, Watertown, MA. American Cyanamid Company succeeded MIT in operating the project at Watertown Arsenal from 1951 until October 1952, when it was transferred to the Winchester Facility. In 1954, National Lead Company, Inc. took over operations. Beginning in 1959, facility use shifted to laboratory testing of environmental analysis methods pertaining to uranium waste. In 1961, the work was discontinued, and the facility was transferred to the Department of Health, Education and Welfare (HEW) for use as a low-level environmental radiation surveillance

122 **Ammunition and Explosives Storage for the Navy (1939-1989) and the Air Force (1946-1989)**, 2008. - 200 pp.
- http://www.denix.osd.mil/cr/upload/af-navy-ammunition-storage-public-rfs_pg1-200_rev.pdf

laboratory and for analysis of radiopharmaceuticals. The facility is now run by the Food and Drug Administration. Contractors: National Lead Company (1954-1961); American Cyanmid (1952-1954)

•MA **Woburn Landfill** Woburn AWE - 1955-1960 - Fifty 55-gallon drums of low grade uranium ore were buried at the Woburn site. The material came from the AEC Raw Materials Development Laboratory (see the Winchester Engineering and Analytical Center) operated by the National Lead Company under contract from 1955-1960.

•MA **Watertown Arsenal**, Building No. 100, Watertown, Middlesex

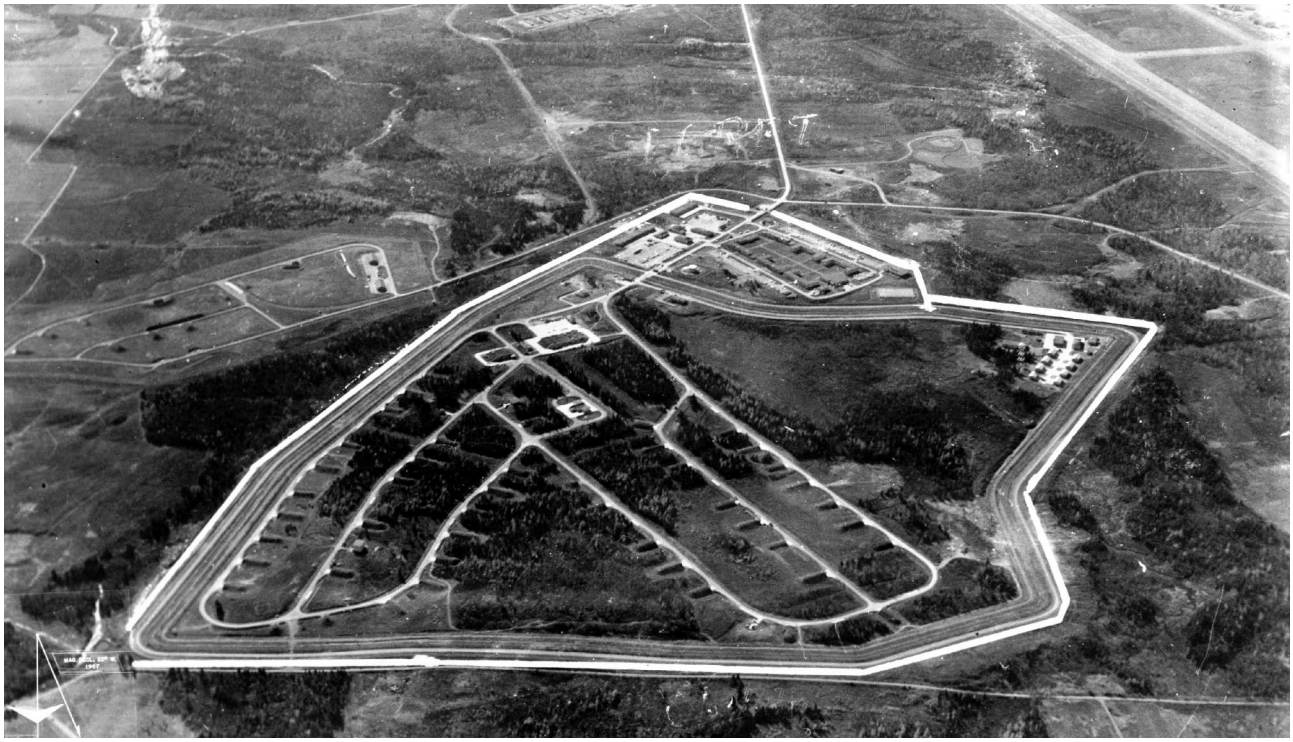
•MA **Wyman Gordon Inc.** Grayton, North Grafton BE - 1959-1965 - Wyman-Gordon supplied beryllium powder forgings and beryllium blanks to the Rocky Flats plant and beryllium metal and parts to the Y-12 plant.

•MD **Armco-Rustless Iron & Steel** Baltimore AWE - 1948 - Armco-Rustless Iron and Steel Co. rolled eight billets of uranium for the AEC. It was a one time test of rolling.

•MD **W.R. Grace and Company** Curtis Bay AWE/DOE - 1955-1958 - Processing of radioactive materials at W.R. Grace began in July 1955 when Rare Earths, Inc. (W.R. Grace's predecessor) entered into a contract with the Atomic Energy Commission to extract thorium and rare earths from naturally-occurring monazite sands. In 1956, the Atomic Energy Commission contract and Rare Earths' license to possess, transfer, and use radioactive thorium were transferred to W.R. Grace & Company. The facility where thorium processing took place (Building 23) operated until late spring of 1957, when W.R. Grace and the Atomic Energy Commission agreed to terminate the contract, effective January 31, 1958.

•ME **Caribou Air Force Station**[123], Loring AFB - National Nuclear Weapons Stockpile Site

123 **Ammunition and Explosives Storage for the Navy (1939-1989) and the Air Force (1946-1989)**, 2008. - 200 pp. - http://www.denix.osd.mil/cr/upload/af-navy-ammunition-storage-public-rfs_pg1-200_rev.pdf



Loring Air Force Base, Weapons Storage Area.
Source: Historic American Engineering Record, Library of Congress

•ME **Loring Air Force Base**, Limestone vicinity, Aroostook AWE - Loring Air Force Base is a former United States Air Force base that was under the operational control of the Strategic Air Command (SAC) for most of its existence. In 1992, it was transferred to the newly-established Air Combat Command, and it was finally closed as an active Air Force installation in 1994. The Nuclear Weapons Storage Area at Loring once operated as a separate, top secret facility. Originally called the North River Depot, the remote area to the northeast of Loring's property was the first U.S. Operational site specifically constructed for the storage, assembly, and testing of atomic weapons.

•MI **AC Spark Plug** Flint BE - 1946-1947 - There was also a small amount of thorium procurement related to AC Spark Plug in the 1946-1947 timeframe.

•MI **Baker-Perkins Co.** Saginaw AWE - 1956 - On May 14-18 1956, Baker-Perkins performed a test of their mixing equipment for National Lead Company of Ohio (Fernald).

•MI **Brush Beryllium Co.**[124] Detroit AWE- 1942-1950s - The Brush Beryllium Company in Detroit, MI, was one of several companies that rolled or extruded uranium rods for Hanford reactor fuel in the late 1940s and early 1950s and the development of a powder metallurgy process, by the Brush Beryllium Co., known originally as Process Q, which yielded a fine grained beryllium suitable for fabrication.. In 1950, Hanford began making rolled uranium rods on site, but the Atomic Energy Commission shifted the rolling work to the Fernald, OH, Feed Materials Production Center and its supporting contractors in 1952. A number of private companies, including Brush Beryllium Company, contracted with Fernald to provide Hanford with these rolled rods.

•MI **Carboloy Co.** Detroit AWE - 1956 - In 1956, the Carboloy Company conducted

124**Mechanical Properties of Beryllium Fabricated By Powder Metallurgy** by W. W. Beaver and K. G. Wikle. May 1954, Journal of Metals.

operations to turn down the outer diameter of uranium slugs.

•MI **Extruded Metals Co.** Grand Rapids AWE - 1944 - A November 7, 1944, document indicates that Extruded Metals participated in work related to metal fabrication for the Manhattan Project.

•MI **General Motors Adrian** AWE/DOE

•MI **Gerity-Michigan Corp.** Adrian BE - 1949-1950s - Gerity-Michigan operated a 2200/550 ton tube and rod extrusion press and performed the first extrusion of beryllium there on May 11, 1949 for the AEC.

•MI **Mitts & Merrel Co.**[125] Saginaw AWE - 1956 - In a test for National Lead of Ohio (Fernald), Mitts and Merrell reduced a thorium metal chunk to small particle size pieces in its Hog Grinder.

•MI **Oliver Corp.** Battle Creek AWE - 1956-1957; 1961-1962 - The Oliver Corporation participated in green salt briquetting testing for the National Lead Company of Ohio (Fernald). Records indicate that testing took place in November 1956, July 1957, May 1961 and May 1962.

•MI **Revere Copper and Brass** Detroit AWE/BE - BE 1946-1950; AWE 1943-1954 - Revere Copper and Brass extruded uranium rods at its Detroit plant starting in 1943 under contracts for the Atomic Energy Commission (AEC). Additionally, in October 1964, Revere Copper and Brass produced one thorium bar, which was divided up and sent to a number of AEC facilities. Revere also extruded beryllium ingots and billets into rods at its Detroit plant between 1946 and 1950. Revere had a contract with the AEC for beryllium work, but not with the MED. Revere also worked with beryllium alloys. Some of the beryllium work was done on parts or components for the Materials Testing reactor.

•MI **A.O. Smith Corporation** 1948-1950 - A.O. Smith studied methods for protecting beryllium carbide-matrix bodies for the Nuclear Energy for the Propulsion of Aircraft (NEPA) project

•MI **Speedring Experimental & Tool Company** Detroit BE -

•MI **Speedring Systems, Inc.** Detroit BE- 1963; 1968; 1973-1975; 1992 - Speedring machined beryllium-containing parts for Rocky Flats and Y-12. The Detroit Speedring office designation covers both of the locations to which the Detroit forwarding office sent work, including their locations in Warren, MI and Rochester Hills, MI. There is a separate Speedring facility in Culman, Alabama.

•MI **Star Cutter Corp.** Farmington AWE - 1956 - The Star Cutter Corporation manufactured machine tools. Records indicate that National Lead of Ohio (Fernald) conducted a one-time test of a Star Cutter drill to hollow uranium slugs.

•MI **University of Michigan** Ann Arbor AWE - 1944 - The University of Michigan developed radar fuses and conducted ordnance research to assist Los Alamos in atomic bomb research and production.

•MI **Wolverine Tube Division**[126] Detroit AWE/BE - 1943-1946 - In 1943, the

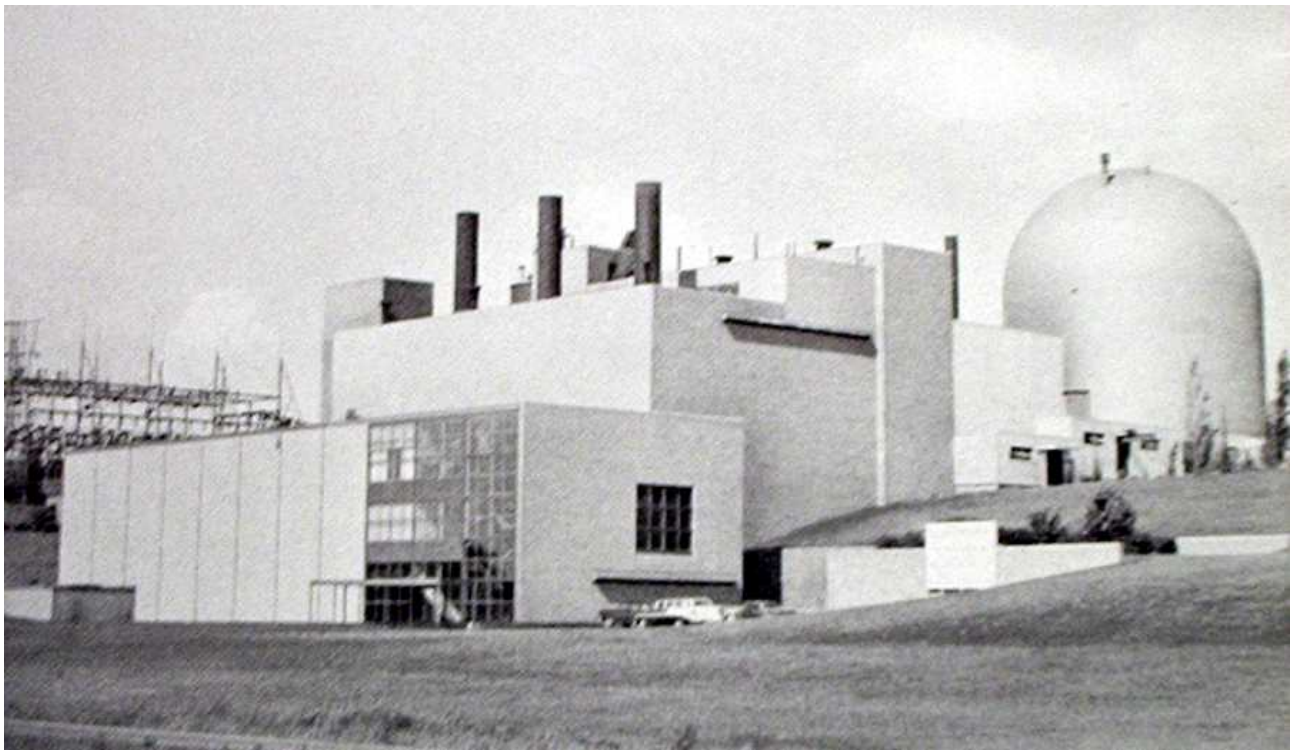
125 DOE Memorandum; Williams to File; **Elimination of the Sites from the Formerly Utilized Sites Remedial Action Program**; December 23, 1993. - 1 p.

- http://www.lm.doe.gov/Considered_Sites/Sutton_Steele_and_Steele_Co_-_TX_09.aspx

'In each case, the potential for radiological contamination above applicable guidelines is small. In each case the amounts of radioactive materials handled was small. Based on these considerations, these sites are hereby eliminated from further consideration under the Formerly Utilized Sites Remedial Action Program.'

126**James Francis Schumar, 85: Pioneer metallurgist in uranium** / Joan Giangrasse Kates. Special to the Chicago Tribune, August 03, 2002. James Francis Schumar, 85, of Hinsdale, a retired senior scientist from Argonne National Laboratory and a pioneering metallurgist in the study of uranium who worked on the Manhattan Project ...

University of Chicago subcontracted to Wolverine Tube of Detroit, Michigan, for help in extrusion of metals that were needed as part of the Manhattan Project. Wolverine Tube performed research on the fabrication of aluminum slugs and the process of aluminum canning and also experimented with thorium and beryllium. This contract ended in 1946.



•MN **Elk River Reactor** Elk River DOE - 1962-1968 - The Elk River Reactor was constructed by the AEC as part of its power reactor demonstration program. The Rural Cooperative Power Association received a contract for the dismantling of the reactor and the removal of all detectable reactor radioactivity when operations ceased.
•MO **Hematite Fuel Fabrication Facility** Festus, Jefferson DOE

•MO **Kansas City Plant** Kansas City DOE – 1949-. The Kansas City Plant (KCP) is situated on approximately 141 acres of the 300-acre Bannister Federal complex located within the city limits, 12 miles south of downtown Kansas City, Missouri. The plant shares the site with nine other Federal agencies. The KCP is a major operational facility engaged in the production of non-nuclear weapons components for the Department of Energy (DOE) nuclear weapons program. The principal mission of AlliedSignal Federal Manufacturing and Technologies/Kansas City (ASFM&T/KC), the integrating contractor, is to serve DOE by producing and procuring non-nuclear electric, electronic, electromechanical, mechanical, plastic, and non-fissionable metal components for the DOE nuclear weapons program.

•MO **Latty Avenue Properties Hazelwood** AWE/DOE - 1967-1974 - The Mallinckrodt Chemical Company conducted uranium milling and refining operations under contracts with the Manhattan Engineer District and the Atomic Energy Commission at the St. Louis Downtown Site in Missouri. Mallinckrodt transported process residues to the St. Louis Airport Site (also in Missouri) for storage until the Commercial Discount Corporation of Chicago purchased them in 1967; Commercial Discount transported the residues to the Latty Avenue Properties for storage and processing. This material was sold to the Cotter Corporation in 1969 and was dried and shipped to their facilities in Canon City, Colorado.

•MO **Mallinckrodt Chemical Co.**,Destrehan St. Plant St. Louis AWE/DOE - 1942-1962 - From 1942 to 1957, Mallinckrodt Chemical Company conducted a variety of milling and recovery operations with uranium chemical compounds at the St. Louis Downtown Site, also known as the Destrehan Street Plant. The plant refined uranium ore, ultimately producing uranium metal. The activities supported research, development, and production programs for the national defense program. By 1957, the Mallinckrodt Chemical Company had processed more than 45,000 metric tons (50,000 tons) of natural uranium products at its facilities. During closeout of operations in 1957, government-owned buildings were either dismantled or transferred to Mallinckrodt as part of a settlement. Decontamination work continued to 1962 when

the plant was released back to Mallinckrodt.

•MO **Medart Co.** St. Louis AWE - 1951-1952 - The Medart Company manufactured steel mill machining equipment which was useful in uranium processing.

•MO **Roger Iron Co.** Joplin AWE - 1956 - The Roger Iron Company conducted a test operation involving crushing of a dolomite c-liner for the AEC. The liner had trace amounts of uranium and magnesium fluoride.

•MO **Spencer Chemical Co.** Kansas City AWE - 1956-1961 - The Spencer Chemical Company, Jayhawks Works, processed unirradiated uranium scrap for the AEC, recovering enriched uranium from it for use in the weapons complex.

•MO **St. Louis Airport Site** St. Louis AWE/DOE - 1947 -1973; 1984-1998 - The Manhattan Engineer District (MED) began utilizing the St. Louis Airport Storage Site (SLAPS) in 1946 as a place to store residues from the Mallinckrodt Chemical Works. The MED acquired title to the property on January 3, 1947. In 1973 the property was transferred back to the city of St. Louis. Then in 1984, through the Energy and Water Development Appropriations Act (Public Law 98-3060) the property was returned to the Department of Energy until 1997 when Congress transferred it to the U.S. Army Corps of Engineers.

•MO **Tyson Valley Powder Farm** St. Louis AWE - 1942-1949 - The Tyson Valley Powder Farm was a storage site for radioactive materials in the late 1940s. Records show, for example, that at the end of 1946, 206,110 pounds of uranium metal were stored at this location for the Manhattan Engineer District.

•MO **United Nuclear Corp.** Hematite AWE - 1958-1973 - The United Nuclear

Corporation in Hematite, Missouri, processed unirradiated uranium scrap for the AEC, recovering enriched uranium from it for use in the nuclear weapons complex. Mallinckrodt Chemical Works owned the Hematite plant until 1961.

•MO **Weldon Spring Plant** Weldon Spring DOE - 1955-1966 - On January 25, 1955, through a permit from the U.S. Department of the Army (Army), the U.S. Atomic Energy Commission (AEC) occupied land on the Army's Weldon Springs Ordnance Works for a planned uranium facility. On August 6, 1956, the Army transferred 205 acres of what had been the Weldon Springs Ordnance Works to AEC for construction of a uranium feed materials plant. AEC constructed the Weldon Spring Uranium Feed Materials Plant at this location and contracted with the Mallinckrodt Chemical Company to operate the plant starting in June 1957. The plant was used for uranium refining activities in support of the national defense program. AEC closed the plant in December 1966 after deciding it was obsolete. After closing the plant, AEC transferred the plant and the land back to the Army on December 31, 1967. On October 1, 1985, custody of the chemical plant was retransferred from the Army back to the DOE, which was given responsibility for remediation of the plant. Contaminated groundwater still exists. The area is under institutional controls and monitoring until natural flushing reduces contaminates to acceptable levels. Contractors: Mallinckrodt Chemical Company (1957-1966), National Lead of Ohio (1975-1981); Bechtel National Inc. (1981-1985); MK-Ferguson Company and Jacobs Engineering Group (1986-2002)

•MO **Weldon Spring Raffinate Pits** Weldon Spring DOE - 1955-1966 - On January 25, 1955, the U.S. Atomic Energy Commission (AEC) occupied land, by a permit from the U.S. Department of the Army (Army), to build a uranium feed materials plant. On August 6, 1956, the Army transferred 205 acres of what had been the Weldon Springs Ordnance Works to AEC to construct the plant. In addition to the plant, the AEC also constructed four raffinate pits adjacent to the plant between 1958 and 1964. The pit area expansion was located on an additional 14.88 acres transferred by the Army to AEC on August 24, 1964. The pits were used as collection points and settling basins for chemical and radioactive waste streams coming from the plant. After closing the plant (including the associated raffinate pits) in December 1966, AEC transferred the land back to the Army, but AEC retained ownership and control of the wastes in the raffinate pits. On October 1, 1985, the land was retransferred from the Army back to the DOE, which was given responsibility for remediation of the pits. Contaminated groundwater still exists. The area is under institutional controls and monitoring until natural flushing reduces contaminates to acceptable levels. Contractors: Mallinckrodt Chemical Company (1957–1966); National Lead of Ohio (1966–1981); Bechtel National, Inc. (1981–1985); M-K Ferguson Company and Jacobs Engineering Group (1986–2002.)

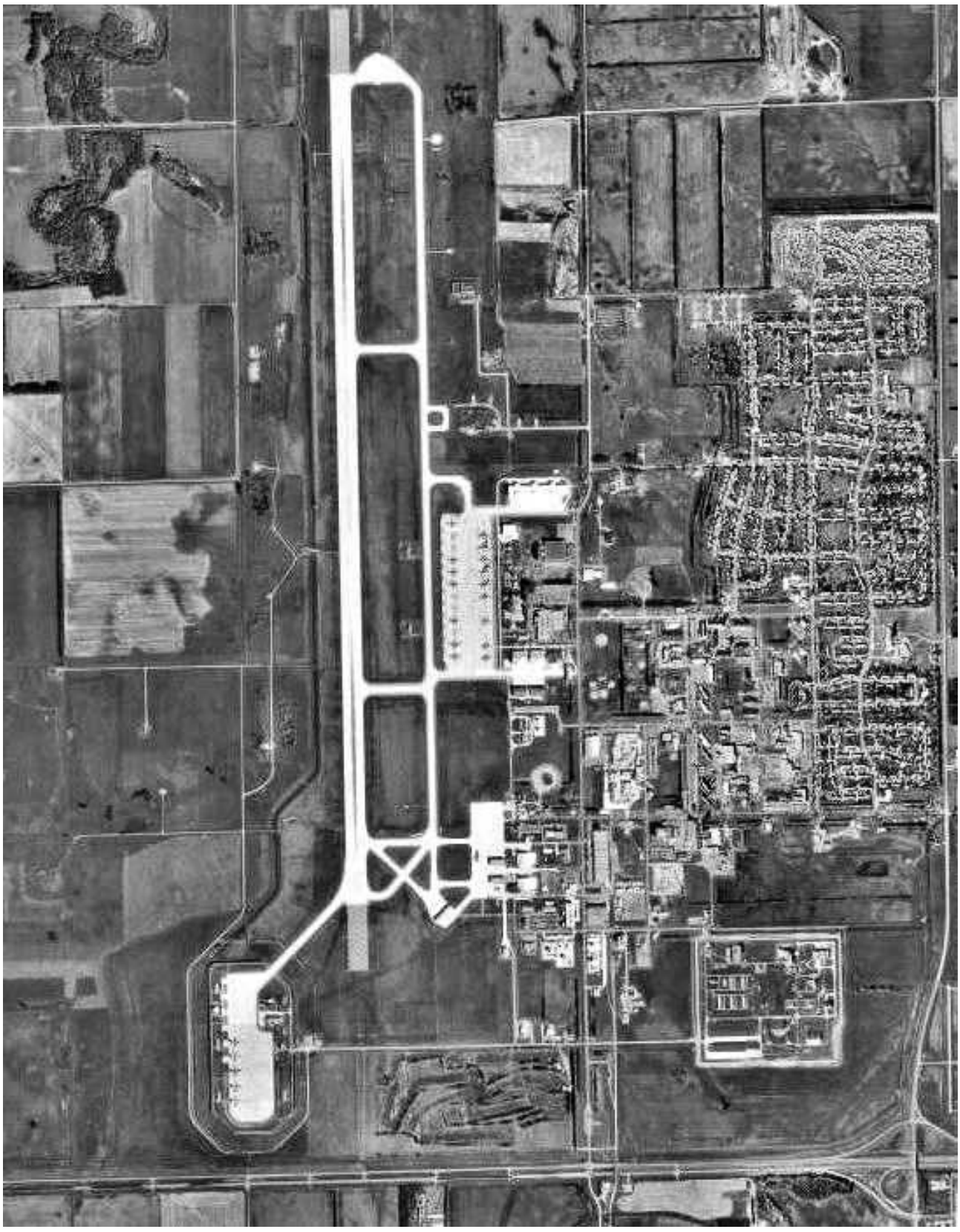
•NC **Beryllium Metals and Chemical Corp.** Bessemer City BE - 1962-1969 - Purchase orders from Y-12 indicate that Beryllium Metals and Chemical Corp. (BERMET) did some beryllium work for Y-12, beginning in 1963 and continuing at least through 1965.

•NC **University of North Carolina**[127] Chapel Hill BE - 1949-1954 - The AEC

127 DOE Memorandum; Williams to File; **Elimination of the Sites from the Formerly Utilized Sites Remedial Action Program**; December 23, 1993. - 1 p.
- http://www.lm.doe.gov/Considered_Sites/Sutton_Steele_and_Steele_Co_-_TX_09.aspx
'In each case, the potential for radiological contamination above applicable guidelines is small. In each case the amounts of radioactive materials handled was small. Based on these considerations, these sites are hereby eliminated from further consideration under the Formerly Utilized Sites Remedial Action Program.'

Division of Biology and Medicine supported beryllium research at the University of North Carolina.

•ND **Aurora Pulsed Radiation Simulator**, U.S. Army Research Laboratory, Building No. 500, Adelphi, Prince George's AWE - The Aurora Pulsed Radiation Simulator was the first gamma radiation simulator of its size and capacity built in the world, The simulator achieved a new plateau of nuclear effects simulation, able to test complete weapons electronics packages critical œor both strategic and tactical nuclear weapons design.



・ND **Grand Forks Air Force Base** Grand Forks AWE

•ND **Stanley R. Mickelsen Safeguard Complex** Missile Site Control Building Nekoma vicinity, Cavalier AWE - The Safeguard Program was a United States Army anti-ballistic missile system developed during the late 1960s. Safeguard was designed to protect U.S. ICBM missile sites from counterforce attack.

•NE **Cornhusker Army Ammunition Plant**[128] Grand Island AWE

128 EPA: **Cornhusker Army Ammunition Plan**t. 2011. - 9 pp.

•NE **Hallam Sodium Graphite Reactor** Hallam DOE - 1960-1971 - The Atomic Energy Commission (AEC) built and operated the Hallam Nuclear Power Facility in the 1960s. When the AEC retired this facility in 1971, the reactor core and most other radioactive materials were removed from the site; some radioactive materials were entombed in place.

•NE **Nebraska Ordnance Plant**[129] Mead, Saunders County AWE -1959-1964 - The Air Force built and maintained three Atlas missile silos at the facility from 1959 to 1964..

•NJ **Aluminum Co. of America** (Alcoa) Garwood AWE - 1944 - Under subcontract to the Metallurgical Laboratory (University of Chicago), the Garwood facility manufactured casting dies and used them to cast uranium slugs. This work was conducted intermittently between July and November of 1944.

•NJ **American Peddinghaus Corp.** Moonachle AWE - 1978 - The facility conducted a one-day shear (cutting) test on uranium metal for National Lead of Ohio (Fernald) in 1978.

•NJ **Baker and Williams Co.** Newark AWE - 1943 -1962 - Baker and Company processed radioactive platinum as part of the process of making polonium, which was needed for initiators in nuclear weapons. Baker and Co. also processed unirradiated uranium scrap for the AEC to recover enriched uranium for use in the weapons complex.

•NJ **Bell Telephone Laboratories** Murray Hill AWE - 1943-1944 - This facility handled a quantity of uranium during World War II, probably in support of its work to develop effective barrier materials for the K-25 facility in Oak Ridge and later together with Douglas Aircraft and Western Electric design & manufacturing of Nike Ajax and Hercules nuclear weapons.[130]

•NJ **Bloomfield Tool Co.** Bloomfield AWE - 1947; 1951 - The facility had a small research contract with the Atomic Energy Commission in 1947. In 1951, it did some experimental machining of uranium slugs for the AEC.

•NJ **Bowen Lab. North Branch** AWE - 1951 - Bowen Engineering conducted some experimental work at their laboratory in New Jersey on uranium compounds during a two-day period in 1951.

•NJ **Callite Tungsten Co.** Union City AWE - 1944 - According to a 1944 document, the Callite Tungsten Co. used its machines to cold roll uranium metal rods for the Manhattan Engineer District.

•NJ **Chemical Construction Co.** Linden AWE - 1953-1955 - The Chemical Construction Company conducted research and development activities to recover uranium and other metals from low-grade waste materials. The wastes were generated by uranium processing operations at the Mallinckrodt facility in St. Louis, Missouri.

•NJ **Du Pont Deepwater Works** Deepwater AWE/DOE - 1942-1949 - In the 1940s, E.I. DuPont de Nemours & Company (DuPont) produced uranium products and conducted research on uranium hexafluoride. These activities were conducted first for the U.S. Office of Scientific Research and Development (OSRD), and later under contract to the Manhattan Engineer District and the Atomic Energy Commission. DuPont also developed processes to convert uranium dioxide to uranium hexafluoride, and produced uranium oxide and uranium metal which was used to fuel the CP-1 re-

129 EPA: **The Former Nebraska Ordnance Plant**, 2009. - 6 pp.
Final Ordnance and Explosives (OE) Recurring Review Report. Department of the Army. U.S. Army Corps of Engineers. Kansas City District, 2010. - 48 pp.

130 **Locations of Former Nike Site Locations & Status**. - http://ed-thelen.org/loc.html#Design

actor at the University of Chicago. After completion of these activities, the AEC conducted limited decontamination and released the site to DuPont for reuse. DuPont currently operates a chemical plant at this site. The original research work was conducted at the Jefferson Lab in Building J-16. This building was demolished and several feet of earth removed sometime between 1943 and 1945. Building J-26 was eventually built at that location. The other two projects were located in buildings 708 and 845. A portion of building 708 was demolished in 1945. The rest of the building along with several feet of earth was removed in 1953[131].

•NJ **International Nickel Co**., Bayonne Laboratories Bayonne AWE - 1951-1952 - International Nickel plated uranium slugs with nickel for use in the nuclear weapons production system during the early 1950s.

•NJ **J.T. Baker Chemical Co.** Phillipsburg AWE - 1948; 1957-1958 - J.T. Baker Chemical was licensed by Atomic Energy Commission to process and distribute refined uranium.

•NJ **Kellex/Pierpont** Jersey City AWE/DOE - 1943-1953; Residual Radiation 1954-1978; 1981-1983 - In 1943, the M.W. Kellogg Company established the Kellex Corporation to design and construct the first gaseous diffusion uranium enrichment facility, the K-25 Plant, in Oak Ridge TN. This work was conducted under contract to the Manhattan Engineer District (MED) and later to the Atomic Energy Commission (AEC). In the 1940s and early 1950s, Kellex conducted research and development on fuel reprocessing and component testing using uranium hexafluoride, and uranium processing and recovery techniques at. In 1951, the Vitro Corporation of America assumed all the rights and obligations of the Kellex Corporation. In 1953, Kellex discontinued all AEC contract work at the Kellex/Pierpont site.

•NJ **Maywood Chemical Works** Maywood AWE/DOE - 1947-1950 - From 1916 to 1959, Maywood Chemical Works extracted radioactive thorium and rare earth elements from monazite sands for use in commercial products. From 1947 to 1950 the AEC purchased thorium compounds from the Maywood Chemical Company.

•NJ **Middlesex Municipal Landfill** Middlesex AWE/DOE - 1948-1960 - From 1948 to 1960, the Middlesex Sampling Plant conducted thorium and uranium activities and disposed of the wastes at the Middlesex Municipal Landfill.

•NJ **Middlesex Sampling Plant** Middlesex DOE - 1943-1967 - In 1943, the Manhattan Engineer District (MED) established the Middlesex Sampling Plant to assay, sample, store, and ship uranium, thorium, and beryllium ores. Until 1950, the plant was operated by the MED and then the AEC. By 1948, Ledoux and Company and Lucius Pitkin, Inc. personnel were stationed on site to perform assaying work. Another contractor, Perry Warehouse, provided laborers until about 1950. From 1950 to 1955, United Lead, a subsidiary of National Lead Co., operated the plant for the AEC. The plant discontinued uranium and beryllium assaying and sampling activities in 1955 and was used as a thorium storage and sampling site until 1967. In 1967, operations at Middlesex were terminated and all remaining thorium sampling activities were transferred to the Feed Materials Production Center and to the Weldon Spring Plant. Contractor: United Lead Company (1950-1955)

131 **Site Profiles for Atomic Weapons Employers that Refined Uranium and Thorium** / R.J. Traub. National Institute for Occupational Safety and Health. 2006. - 75 pp.
- http://www.cdc.gov/niosh/ocas/pdfs/arch/bat-6001-r0.pdf

Technical Basis Document for the DuPont Deepwater Works Deepwater, New Jersey. National Institute for Occupational Safety and Health. 2011. - 16 pp.
- http://www.cdc.gov/niosh/ocas/pdfs/tbd/dupontd-r0-pc1.pdf

•NJ **National Beryllia** Haskell BE - 1968 - 1973; 1983-1986 - National Beryllia performed a demonstration of its capabilities for production of parts for Y-12 beginning in late 1968, with delivery in March 1969. Additionally, National Beryllia delivered some parts to Union Carbide (Y-12), though the records indicate there was only partial performance for this purchase order, which was terminated in April of 1973. Between 1984 and 1986 the National Beryllia division of General Ceramics had a series of purchase orders through Martin Marietta, which was operating Y-12 at the time. These contracts involved the shipment of beryllium from BrushWellman to National Beryllia with Y-12 being the ultimate customer.
•NJ **New Brunswick Laboratory** New Brunswick DOE - 1948-1977 - From 1948 to 1978, the Atomic Energy Commission (AEC), a predecessor agency of the Department of Energy (DOE), used the New Brunswick Laboratory as a general nuclear standards laboratory for assaying nuclear and non-nuclear materials used in reactor and weapons programs. The New Brunswick Laboratory (NBL) provided a variety of activities using nuclear materials, including thorium and uranium ores, high purity plutonium and americium, and enriched uranium. In 1977 the New Brunswick Laboratory was moved from New Jersey onto the campus of Argonne National Laboratory -- East, where it remains today.
•NJ **Picatinny Arsenal** Dover AWE
•NJ **Princeton Plasma Physics Laboratory** Princeton DOE - 1951-. - In 1951, the Atomic Energy Commission (AEC), a predecessor agency of the Department of Energy (DOE), began operating the Princeton Plasma Physics Laboratory (PPPL) on Site C and Site D of the James Forrestal Campus. This property is owned by Princeton University. Research at PPPL began with construction of the Model-C Stellerator, which was later converted to a pulse-operated device. Today, this laboratory continues to conduct research on nuclear fusion and development of nonweapons applications of this technology.
•NJ **Rare Earths/** W.R. Grace Wayne AWE/DOE - 1950-1960 - Rare Earths extracted thorium from monazite sands from 1950-1960 under various contracts with the AEC. The AEC needed the thorium for its weapons program. Although the processing of monazite sands continued at Rare Earths through 1971, it was no longer performed under contract for the AEC, but rather was for commercial purposes. Remediation activities were conducted from 1985-1987 by Thermo Analytical/Eberline and Bechtel National Inc. (BNI) under the BNI umbrella contract as part of the Formerly Utilized Site Remediation Action Program (FUSRAP).
•NJ **Standard Oil Development Co. of NJ** Linden AWE - 1942-1945 - Standard Oil locations at both 1900 East Linden Avenue (Linden) and the property at 1400 Park Avenue (Bayway) performed a variety of tasks for the Manhattan Engineer District (MED) during World War II. The company was contracted to obtain materials for work being done by the Metallurgical Laboratories of the MED. It also conducted studies and performed development work to produce uranium metal through chemical reduction processes and to construct and operate a centrifuge pilot plant for uranium separation. The company continued to provide consulting and analytical services for the Atomic Energy Commission.
•NJ **Stevens Institute of Technology** Hoboken BE - 1959-1960 - The Stevens Institute of Technology performed beryllium research and development for the AEC. Researchers at the school's Powder Metallurgy Laboratory experimented with slip casting production techniques as a replacement for the conventional vacuum-hot-

pressed block process. Beryllium powder was the primary ingredient in the production process. The laboratory's working inventory during the course of the contract included approximately 50 pounds of beryllium metal powder produced by the Brush Beryllium Company.

•NJ **Tube Reducing Co.** Wallington AWE - 1952; 1955; 1957 - Tube Reducing Co. conducted tests for National Lead of Ohio (Fernald) on shaping and sizing uranium rods. In January 1952, two uranium rods were processed. More tubes were extruded in a reduction experiment in January 1955. Another test was conducted in 1957.

•NJ **U.S. Pipe and Foundry** Burlington BE- 1943 - A small amount of beryllium mesh (15 pounds) was sent to U.S. Pipe and Foundry by the MED.

•NJ **United Lead Co.** Middlesex AWE - 1950-1967 - From 1950 to 1955, United Lead, a subsidiary of National Lead Company, was the AEC's operating contractor for the Middlesex Sampling Plant. The Middlesex Sampling Plant sampled, assayed, stored, and shipped uranium, thorium, and beryllium ores. The plant discontinued uranium and beryllium assaying and sampling activities in 1955. Until 1967, the site was used as a thorium storage and sampling site.

•NJ **Vitro Corp. of America** West Orange AWE - 1951-early 1960s - In December 1951, Vitro was asked to submit a proposal for research on thorium fluoride production, scrap recovery and waste recovery to involve 14 chemists and analysts. Though it is not certain whether this work was undertaken, by the late 1950s and early 1960s, Vitro conducted work under AEC contract converting low-enrichment uranium dioxide to uranium carbide spheres. The uranium dioxide was shipped from Rockwell International (then known as the Atomics International Division of North American Aviation, Inc.) to Vitro for conversion into uranium carbide and was then shipped back to Rockwell. Around 1958, Vitro also conducted work under contract to the AEC Oak Ridge Operations Office for the separation of fission products.

•NJ **Westinghouse Electric Corp.** Bloomfield AWE - 1942 -1949 - Westinghouse

Electric, located in Bloomfield, NJ, was one of the large commercial contributors to Manhattan Project research. Specific tasks related to uranium metal production and enrichment. Because developing the technology to produce pure uranium metal became a priority for the Manhattan Project, universities, and private companies experience in related chemical processes participated in the task. From 1942-1943, Westinghouse used a photochemical process for metallic uranium and supplied metallic uranium for the first self-sustaining chain reaction in Chicago. In addition to contributing to uranium metal production, Westinghouse Electric participated in activities related to uranium enrichment. Westinghouse also worked with thorium for the Manhattan Project at this location.

•NJ **Wykoff Steel Co.** Newark AWE - 1950 - Wykoff Steel conducted tests of methods to straighten and finish uranium rods on September 6, 1950.

•NM **Accurate Machine & Tool** Albuquerque - 1987-2002 - Accurate Machine & Tool provides machine shop services to Sandia National Laboratory, CA

•NM **Albuquerque Operations Office** Albuquerque DOE 1942-. - The Albuquerque Operations Office is the major defense program field organization in the Department of Energy. Although its roots can be traced to the Manhattan Engineer District's efforts to provide the nation with a nuclear weapons capability, the Albuquerque Operations Office did not officially come into existence as a civilian organization until the establishment of the Atomic Energy Commission in 1946. Originating during the war years as the Los Alamos "Z" division - the engineering branch of the project. After the establishment of the AEC, it was called the Santa Fe Operations Office. The Office moved to Albuquerque in 1951 and in 1956, became the Albuquerque Operations Office. Today, in managing a national program, Albuquerque's primary mission continues to be stewardship and maintenance of the nation's nuclear weapons stockpile.

•NM **Chupadera Mesa** Chupadera Mesa DOE

•NM **Hangar 481** DOE 1989 - 1996 - The Department of Energy contracted with Ross Aviation, Inc. to manage and operate Hangar 481 on the premises of the Kirtland Air

Force Base for the convenience of the adjacent Sandia National Laboratory.
•NM **Holmes and Narver, Incorporated**[132] AWE

•NM **Kirtland Air force Base**[133] AWE - National Nuclear Weapons Stockpile Site - In December 1949, Kirtland became headquarters for the Air Force Special Weapons Center. In 1963, the Special Weapons Center gave up much of its research and development work to the newly created Air Force Weapons Laboratory. In 1992, the Kirtland Underground Munitions Storage Complex (KUMSC) was activated at Kirtland AFB. KUMSC is the largest storage facility for nuclear weapons in the world. The facility provides storage, shipping and maintenance for the United States Air Force and Navy.
•NM **Kirtland Operations Office** Albuquerque DOE – 1964.- -The Kirtland Operations Office was founded in 1964 as part of the US atmospheric nuclear testing readiness program. Today, this applied-science and engineering organization supports the National Nuclear Security Administration. Contractors: Honeywell Corporation

132 National Archives: **Records of the Atomic Energy Commission** [AEC] (Record Group 326) 1923-75
133 **Ammunition and Explosives Storage for the Navy (1939-1989) and the Air Force (1946-1989), 2008.** - 200 pp. - http://www.denix.osd.mil/cr/upload/af-navy-ammunition-storage-public-rfs_pg1-200_rev.pdf

(2000 - 2009); AlliedSignal(1984-2000); Allied Corporation (1982 - 1984); Bendix Corporation (1 964- 1982).

•NM **Los Alamos Medical Center** Los Alamos DOE - 1952-1963 - Los Alamos Medical Center started as an Army hospital for Manhattan Project workers. A new facility was constructed in 1951 and opened in January 1952. The AEC sold the hospital in 1963.

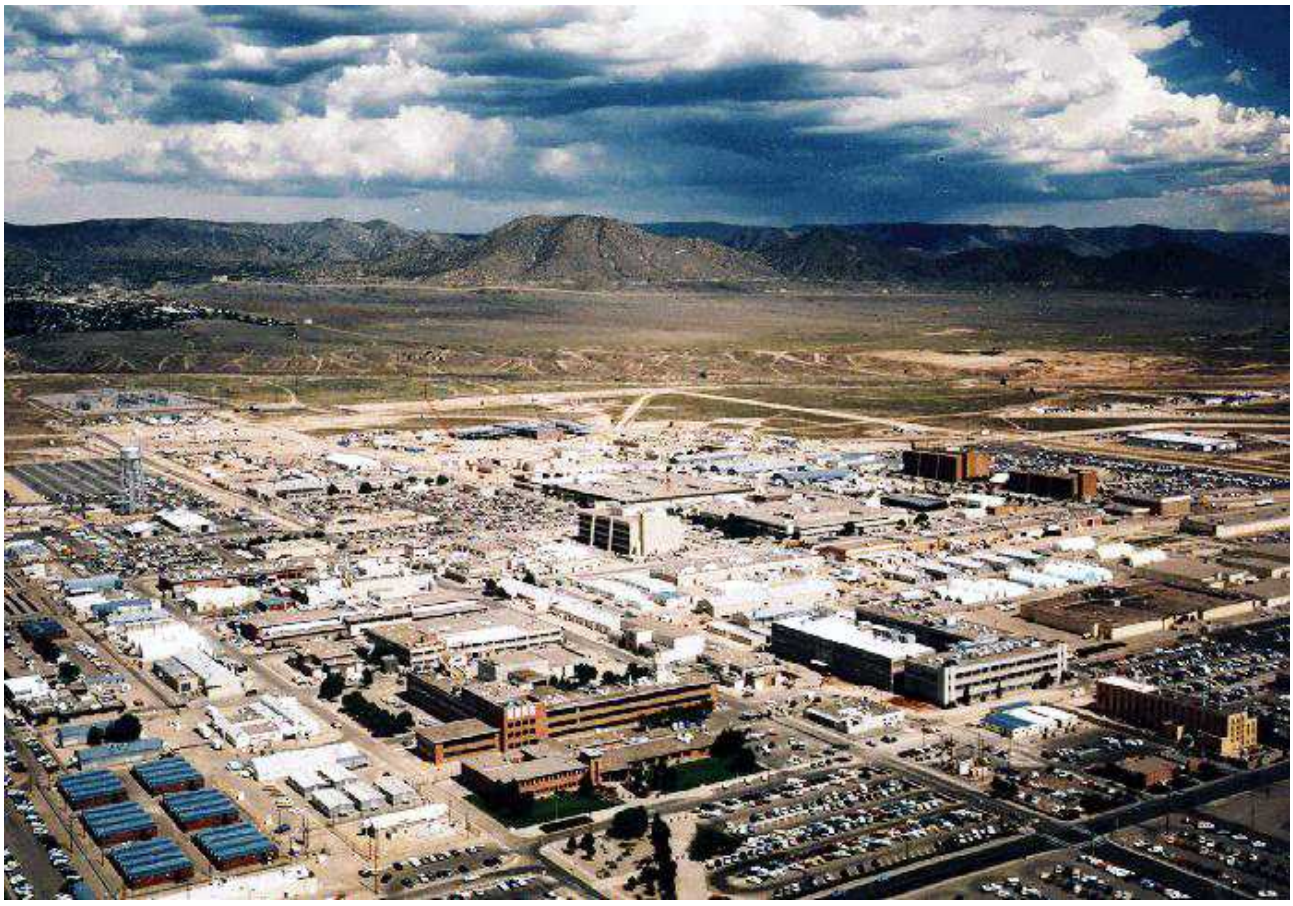
•NM **Los Alamos National Laboratory** Los Alamos DOE - 1942-. - Operated by the University of California since its inception, Los Alamos National Laboratory designed, developed and tested the world's first nuclear weapons. After World War II, Los Alamos (called the Los Alamos Scientific Laboratory) continued as an important nuclear weapons research and development facility. Research programs included nuclear physics, hydrodynamics, chemistry, metallurgy, radiochemistry and life sciences. LANL also used its research facilities to back up other areas of the weapons production com-

plex, particularly plutonium processing and fabrication of weapon components.

•NM **Lovelace Respiratory Research Institute** Albuquerque DOE - 1960-. - The Lovelace Respiratory Research Institute (formerly the Inhalation Toxicology Research Institute or ITRI) is located on Kirtland Air Force Base. It was established in 1960 to conduct research on the human health consequences of inhaling airborne radioactive materials. The Institute is operated for Department of Energy (DOE) by the non-profit Lovelace Biomedical and Environmental Research Institute.

•NM **Ore Buying Station at Grants**[134] Grants DOE - 1956-1958 - The ore buying station at Grants purchased uranium ore for the AEC. Lucius Pitkin managed and operated the Grants station on behalf of the AEC from July 1956 to mid-1958. Contractors: Lucius Pitkin, Inc. (1956-1958).

•NM **Ore Buying Station at Shiprock** Shiprock DOE - 1952-1954 - The ore buying station at Shiprock purchased uranium ore for the AEC. American Smelting and Refining Company managed and operated the Shiprock station from July 1952 to January 1954. Contractor: American Smelting and Refining Company (1952-1954).



•NM **Sandia National Laboratories**[135] Albuquerque DOE - 1949-. - Sandia National Laboratory originated in the 1940s as the Z Division of Los Alamos, the engineering

134 **The AEC and the Grants Mineral Belt** / M. Clifford Smith, JR.. U.S. Atomic Energy Commission, Grand Junction, Colorado. New Mexico Geological Society-Eighteenth field conference.

135 Furman, Necah Stewart: **Sandia National Laboratories: The Postwar Decade** - Albuquerque: The University of New Mexico Press, 1990. Covering the 1945-1955.

Status of Upcoming SEC Petitions / LaVon B. Rutherford, CHP. National Institute for Occupational Safety and Health Division of Compensation Analysis and Support. 2011. - 6 pp.
- http://www.cdc.gov/niosh/ocas/pdfs/abrwh/pres/secstat0811bw.pdf

arm of the US nuclear weapons development program. In 1949, it was given the mission to design the non-nuclear components for nuclear weapons. Since 1953, areas have been used to test nuclear and non-nuclear weapons components. From 1946-1957, Sandia also housed a weapons assembly line and from 1963-1971, an onsite liquid waste disposal system for liquid radioactive discharges from the Sandia Experimental Reactor Facility. Throughout the course of its operations, the potential for beryllium exposure existed at this site, due to beryllium use, residual contamination, and decontamination activities. Contractors: Lockheed Martin (1995-present); Martin Marietta (1993-1995); AT&T (1951-1993)

•NM **South Albuquerque Works** Albuquerque DOE - 1951-1967 - The AEC owned the South Albuquerque Works from 1951-1967 and used it to produce weapons components. It was opened in anticipation of the 1952 closing of the Buffalo Works. American Car and Foundry was part of the Buffalo operation and also operated the South Albuquerque Works for the AEC. Contractor: American Car and Foundry, Inc. (1951-1967)

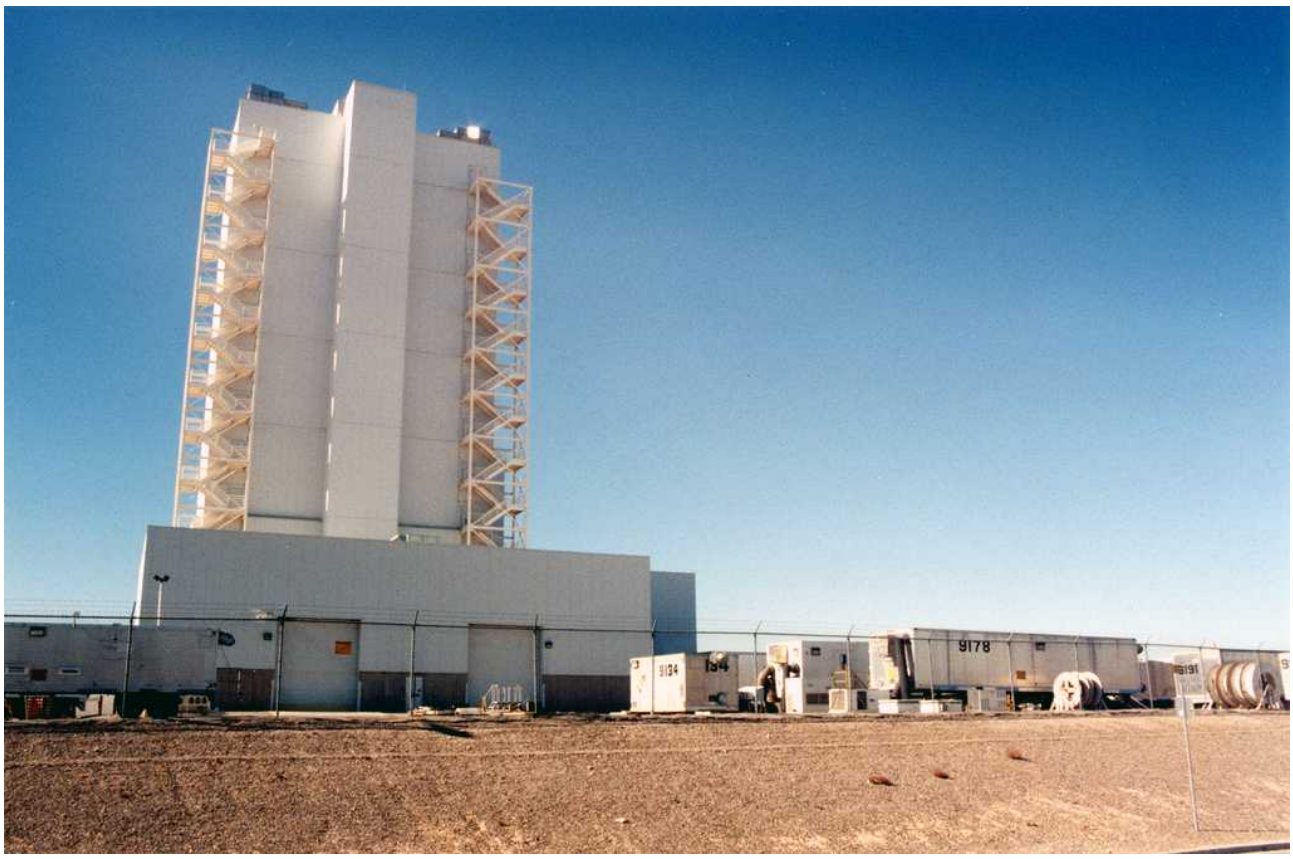
•NM **Uranium Mill at Shiprock**[136] Shiprock DOE - 1984-1986 -The former Uranium Mill at Shiprock processed a total of about 1.5 million short tons of uranium ore.

•NM **Waste Isolation Pilot Plant** Carlsbad DOE - 1999-. - The Waste Isolation Pilot Plant (WIPP) was designed for the disposal of transuranic radioactive waste resulting from the research and production of nuclear weapons. It is the world's first underground repository licensed to safely and permanently dispose of transuranic radioactive waste left from the research and production of nuclear weapons. WIPP began operations on March 26, 1999. Contractor: Westinghouse WIPP Company (1999-present).

• NV **Lake Mead Base**[137], **Nellis AFB** AWE - National Nuclear Weapons Stockpile Site.

136 **Stream Surveys in Vicinity of Uranium Mills. IV. Area of Shiprock, New Mexico - November 1960** : Public Health Service, Denver, Colo. Div. of Water Supply and Pollution Control. 1962.

137 **Ammunition and Explosives Storage for the Navy (1939-1989) and the Air Force (1946-1989)**, 2008. - 200 pp. - http://www.denix.osd.mil/cr/upload/af-navy-ammunition-storage-public-rfs_pg1-200_rev.pdf



•NV **Nevada Site Office** or Nevada Operations Office North Las Vegas DOE - 1962-. - The Nevada Site Office was created and assumed responsibility for operations and programs at the Nevada Test Ste (NTS) on March 6, 1962, when nuclear weapons testing became a year-round effort. Prior to that date, it had been operated by the Albuquerque Field Office and prior to that the Santa Fe Operations Office. Atmospheric nuclear testing began at the Nevada Test Site on January 27, 1951 and continued through 1963 when the Test Ban Treaty was signed. After the Test Ban, all nuclear testing was conducted underground. In 2002, beryllium contamination was found in buildings B-1, B-2, B-3 and A-1 in the North Las Vegas Complex. Operations in these building were halted and employees were relocated, due to exposure concerns. Contractors: EG&G Energy Measurements, Raytheon Services Nevada and Reynolds Electrical & Engineering Company (REECO) (1962-1995), Bechtel Nevada (1996-present); Wackenhut Services Incorporated (security)(1965-present); IT Corp. (Environmental Services (1993-2003) Stoller/Navarro (Environmental Services)(2003-present)

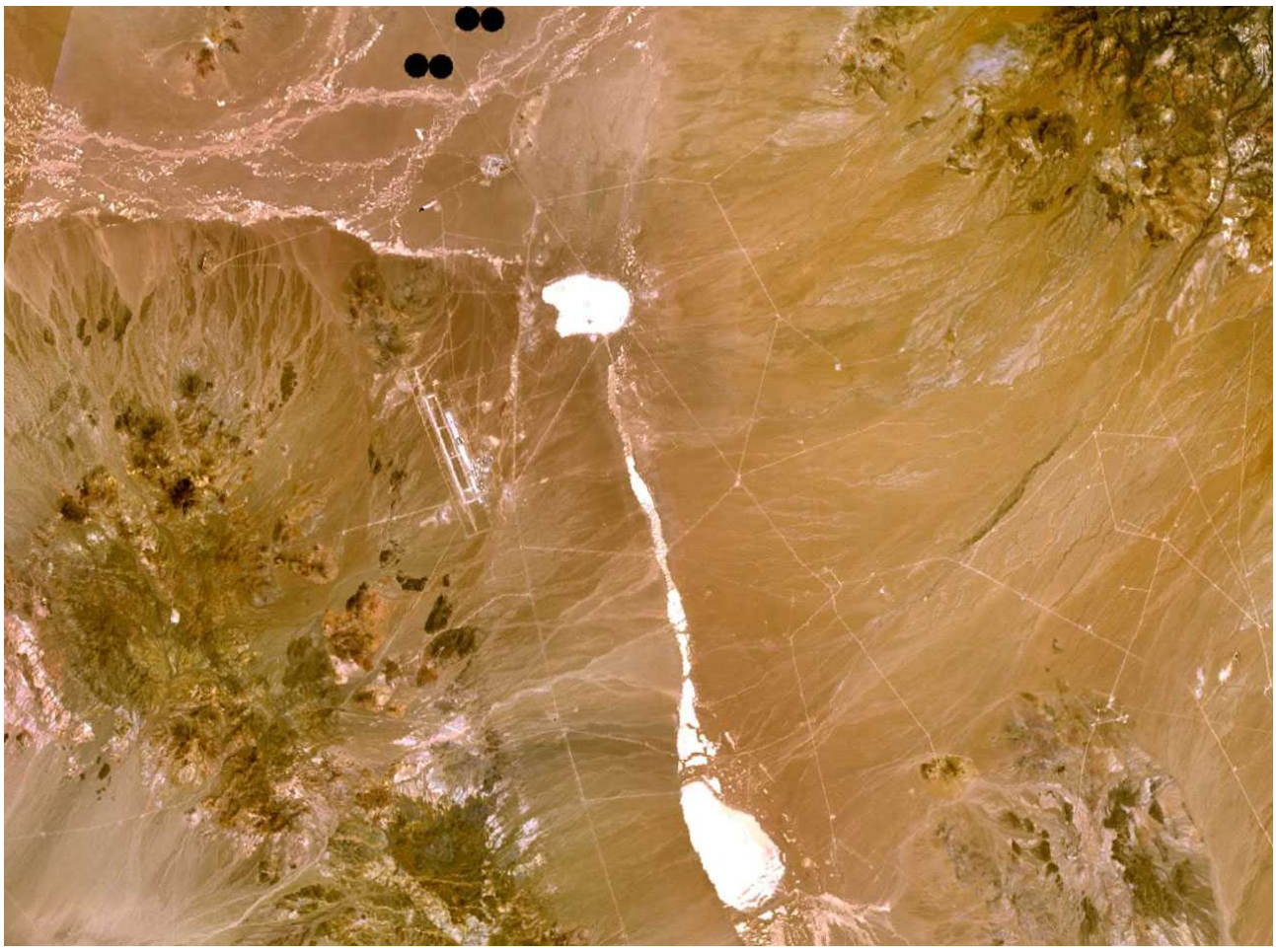
•NV **Nevada Test Site**[138] Mercury DOE - 1951-. - The Nevada Test Site was established in 1951. The mission of the Test Site is to conduct field tests of nuclear devices in connection with the research and development of nuclear weapons. The Nevada Test Site, slightly larger than the State of Rhode Island, has been the primary location for testing nuclear explosive devices since Operation Ranger was first conducted in 1951.[139] In addition, the site is used for low-level waste disposal. Currently, the site is allowing other types of testing at the site, conducting remediation, and is in a standby mode so that if nuclear weapons testing ever is needed again, it could be conducted at the Nevada Test Site. Contractors: Bechtel Nevada (1996-present); Reynolds Electrical & Engineering Company (1952-1995). Holmes and Narver was an architectural and engineering contractor at the Nevada Test Site from late 1951 until November 1990. Holmes and Narver's role at the Nevada Test Site was to design and supervise construction of facilities that included towers, bunkers, instrument stations, tunnel complexes, and other test-support facilities. In November 1990, this function was assumed by a new contractor, Raytheon Services, Nevada.

138**Nevada Test Site – Site Description** / Eugene M. Rollins. National Institute for Occupational Safety and Health, 2008.- 99 pp. - http://www.cdc.gov/niosh/ocas/pdfs/tbd/nts2-r1-p1.pdf

139Hacker, Barton C.: **Elements of controversy: the Atomic Energy Commission and radiation safety in nuclear weapons testing, 1947-1974**. University of California Press, 1994 - 614 pp.

Carl Maag, Stephen Rohrer, Robert Shepanek : **Operation Ranger: Shots Able, Baker, Easy, Baker-2, Fox, 25 January-6 February 1951**. United States Atmospheric Nuclear Weapons Tests, Nuclear Test Personnel Review, Prepared by the Defense Nuclear Agency as Executive Agency for the Department of Defense, 1982. - 186 pp.

Department of Energy: Nuclear Test Film - **Operation Ranger, Operation Buster/Jangle** (1951).



•NV **Tonopah Test Range**[140] Tonopah DOE - 1956-. - The Tonopah Test Range was established by Sandia Corporation and continues today as an outpost to Sandia National Laboratories. Tonopah was established to provide an isolated place for the Atomic Energy Commission to test ballistics and non-nuclear features of atomic weapons. The AEC began leasing this isolated 525 square mile property from the Air Force in early 1956. In August of the same year the AEC contracted Reynolds Electrical and Engineering Company for the construction of temporary facilities on the test range. The AEC contracted with Lembke Construction for permanent facilities at the site in 1960. Rocket testing began in 1957 with the series "Doorknob." It is believed that the only operation on site involving radiation occurred in 1963 and was known as Operation Roller Coaster. Studies were also conducted in 1964 at the Tonopah test range as part of the AEC program known as Project Plowshare. These involved the use of non-nuclear explosives to examine earth cratering patterns. A separate Air Force installation at the test range, which consisted of housing, hangers, and other facilities standard to modern Air Force bases, was constructed on the Tonopah Test Range in the late 1970s for developmental testing of the Air Force's F-117 Stealth Fighter plane. The Air Force moved its stealth program to Holloman Air Force Base and mothballed its Tonopah base in 1994. The Air Force installation does not qualify as a DOE facility. CAU 426 consists of one Corrective Action Site (CAS) which is comprised of four waste trenches (CAS Number RG-23-001-RGCS). The trenches were excavated to

140 US Air Force: **Final environmental assessment for sanitary landfill expansion on the Tonopah Test Range, Nye County, NV.** 2007 . - 49 pp.

receive solid waste generated in support of .Operation Roller Coaster, primarily the Double Tracks Test in 1963, and were subsequently baclctllled. The Double Tracks Test involved the use of live animals to assess the biological hazards associated with the non-nuclear detonation of plutonium-bearing devices (i.e., inhalation uptake of plutonium aerosol).[141] Contractors: REECO; Lembke Construction of Las Vegas, EG&G, and Advanced Security. Raytheon also served as a contractor at the site, and in the 1993, KMI received Tonopah's primary support and maintenance contract.

•NV **Yucca Mountain Site Characterization Project** Yucca Mountain DOE

•NY **Allegheny-Ludlum Steel** Watervliet AWE - 1950-1952 - Allegheny-Ludlum Steel rolled uranium billets into rods for the AEC as part of the multi-site process overseen by the New York Operations Office for the production of uranium metal for fabrication into slugs for fueling the Hanford production reactors.

•NY **American Machine and Foundry** Brooklyn AWE - 1951-1954; Residual Radiation 1955-1992 - During the early 1950s, this location designed and produced industrial equipment for the Atomic Energy Commission. American Machine Foundry also performed a large volume of uranium, thorium and possibly zirconium metal machining work from 1951-1954.

•NY **Ashland Oil** Tonawanda AWE/DOE - 1944-1960; 1974-1982 - In August 1944, the Manhattan Engineer District purchased the Ashland #1 property, formerly known as the Haist Property, for use as a disposal site for approximately 7,250 metric tons (8,000 tons) of uranium ore tailings and concentrate refining residues generated at the nearby Linde site. When the uranium residues were transported to the Ashland #1 site, they were spread over two-thirds of the property to estimated depths of 0.3 to 1.5 meters (one to five feet). In 1960, the Atomic Energy Commission determined that the levels of residual radioactivity at Ashland #1 site were below then current criteria and released the land as surplus. The Ashland Oil Company eventually acquired the property. From 1957 to 1982, the Ashland Oil Company used a portion of the Ashland #2 site as a landfill for disposal of general plant refuse and industrial and chemical wastes and materials. Between 1974 and 1982, Ashland Oil transported from the Ashland #1 site an unknown quantity of soil mixed with radioactive residues to the Ashland #2 landfill.

141 Nevada Environmental Restoration Project: **Closure Report for Corrective Action Unit 426: Cactus Spring Waste Trenches**, Tonopah Test Range, Nevada. 1998.- 63 pp.

•NY **Baker and Williams Warehouses** New York AWE/DOE - 1942-1949 - The Manhattan Engineer District and the Atomic Energy Commission used the Baker & Williams site warehouses for short-term storage of uranium concentrates. This material was generated in Port Hope, Canada by milling African ores from African Metals Corporation.

•NY **Bethlehem Steel** Lackawanna AWE - 1949-1952 - In 1949, Bethlehem Steel of Lackawanna, New York developed improved rolling mill pass schedules for uranium billets into 1.5-inch rods to be used for reactor fuel rods to later be used at the Fernald plant. Bethlehem also performed uranium rolling experiments to help design the Fernald rolling mill. 'Retired workers in western New York say they have had a hard time meeting program requirements because they worked for companies, like Linde and Bethlehem Steel, where weapons development projects contracted by the government made up only a small part of their business. Over time, the companies changed hands or closed, making records hard to come by, thus blocking compensation for former workers.'[142]

'On May 7, 1976 an article appeared in the Buffalo Courier Express listing Bethlehem Steel Corporation's Lackawanna Plant as one of several facilities which handled radioactive material for the U. S. Atomic Energy Commission (AEC) during the late 1940's and early 1950's. The U, S. Energy Research and Development Administration (ERDA), formerly the research and development arm of the AEC, had developed a list of 49 sites for which only incomplete records' existed. Lackawanna was one of the 49 sites. The initial story was reported by the Washington Star and subsequently picked up by the Buffalo paper. The report in the Star indicated that Federal experts were surveying for possible contamination from lax handling methods, for material. possibly buried at the sites, and for possible spreading to other sites.'[143]

'• There are no records for the time period from 1949 through 1950.

• Workers were not supplied with personal protective equipment.

142 **Sickened, and Fighting Another Cold War**. New York Times, December 23, 2007.

143 **Preliminary Survey of Bethlehem Steel Lackawanna, New York** / Work performed by the Health and Safety Research Division. Oak Ridge National Laboratory. Oak Ridge, Tennessee, 1980. - 14 pp.

• Thirteen ton of radioactive materials were left at the Bethlehem Steel site.
• The amount of uranium rolling could not have been done in a 10-hour day.
• The work at Bethlehem Steel involved more manual labor than at Simonds Saw and Steel.
• The government admits to destroying records.
• The work areas could not have been cleaned in one day.
• NIOSH initially stated that the highest dust levels were at the rollers, and then later, NIOSH stated the highest exposures were somewhere else.
• Grinding was not recognized or incorporated in the Bethlehem Steel Technical Basis document.
• Workers ate and drank in dusty areas and could have ingested uranium.
• Workers wore contaminated coveralls.'[144]

•NY **Bliss & Laughlin Steel**[145] Buffalo AWE/DOE - 1951-1952 - Under contract to the National Lead Company of Ohio (Fernald), Bliss and Laughlin Steel rolled uranium rods for the AEC and also provided uranium slug machining services. Bliss and Laughlin was part of a complex called the Buffalo Works that fashioned components for the early weapons program. The functions were transferred to the Albuquerque South Valley Site in 1952.

144 **SEC Petition Evaluation Report Petition SEC-00056** : Bethlehem Steel Corporation / Robert Coblentz, Roger Gard, Timothy Adler. National Institute for Occupational Safety and Health, 2006. - 53. pp

145 **SEC Petition Evaluation Report for Bliss & Laughlin Steel (January 1, 1951 through December 31, 1952 and/or during the residual period from January 1, 1953 through December 31, 1998** / Donald R. Watkins, Monica Harrison-Maples, Riasp Medora, Kyle Kleinhans, James K. Alexander, and Jack Beck. National Institute for Occupational Safety and Health, 2009. - 53 pp.
- http://www.cdc.gov/niosh/ocas/pdfs/sec/blsteel/blisser.pdf

•NY **Brookhaven National Laboratory** Upton DOE - 1947-. - Brookhaven National Laboratory (BNL) is the former site of a U.S. Army installation (Camp Upton) and has been involved in research and development activities in support of the Department of Energy (DOE) and its predecessor agencies since 1947. BNL's facilities conduct basic and applied research in high energy and nuclear physics and in other areas of science. Contractors:Brookhaven Science Association (Battelle Memorial Institute and State University of New York at Stony Brook)(1998-Present); Associated Universities, Incorporated (1947-1998)

•NY **Burns & Roe, Inc.** Maspeth BE - 1949 - In 1949, under AEC contract AT(30-1)438, Burns & Roe constructed a pilot plant in Maspeth on Long Island. The plant was constructed as a means of determining the potential value of the Sheer-Korman process in the manufacture of reactor materials. At least one test run involving beryllium was conducted in 1949. The New York Operations Office Health and Safety Laboratory sampled for beryllium in the air in 1949 and 1950, when the plant was dismantled.

•NY **Carborundum Company** Niagara Falls AWE - 1943-1944; 1959-1967 - In 1943 and 1944 the Carborundum Company at its Globar Plant and Buffalo Avenue locations was engaged in various phases of Manhattan Engineer District (MED) programs to determine suitable methods for engineering and shaping uranium rods. This work also involved the forming, coating, and canning of uranium rods for the MED pile. From 1959 through 1967, the company used powder fabrication techniques to manufacture uranium, plutonium, and carbide pellets for an AEC research program. The Hanford facility supplied Carborundum with materials during that period. Carborundurn also performed work during the 1950s that is not covered under EEOICPA, including fabricating nuclear fuel elements for commercial purposes and producing zirconium, hafnium, and titanium for AEC's special reactor materials program.
•NY **Colonie Site** (National Lead) Colonie AWE/DOE - 1958-1968 - From 1958-1968, National Lead Industries owned and operated the Colonie site and during this time it produced uranium products under contract to the AEC. This contract was terminated in 1968. Thereafter, National Lead fabricated various products from depleted uranium. The largest customer for these products was the U.S. Department of Defense with its contract for armor penetrator cores.
•NY **Columbia University**[146] New York City AWE/DOE
•NY **Crucible Steel Co.** Syracuse AWE - 1951 - In 1951, New York Operations Office personnel performed a test forging and rolling of 10 thorium billets at Crucible Steel Company.
•NY **Electro Metallurgical** Niagara Falls AWE - 1942-1953 - In 1942, the Electro Metallurgical Company (ElectroMet), a subsidiary of Union Carbide and Carbon Corporation, was contracted by the Manhattan Engineer District to design, engineer, construct, and operate a metal reduction plant. Developing the technology to produce pure uranium metal was a priority for the Manhattan Project. ElectroMet received uranium tetrafluoride from Union Carbide's Linde Air Products Division. ElectroMet reacted the uranium tetrafluoride with magnesium in induction furnaces to produce uranium metal. Once the metal was produced, it was cast into ingots, and the ingots were then shipped out for testing or for rolling. The leftover process residues were sent to other sites for uranium recovery, storage, or disposal. ElectroMet was also in charge of recasting metal, research and development in low- and high-grade uranium ores, and supplying calcium metal to Los Alamos and other laboratories. From 1950 through 1953, the plant casted zirconium metal sponge into ingots. Ownership of the facility was transferred from the Atomic Energy Commission to ElectroMet in 1953.

146National Archives: **Records of the Atomic Energy Commission** [AEC] (Record Group 326) 1923-75

•NY **Environmental Measurements Laboratory** New York DOE - 1946-2003 - EML traces its roots to the Medical Division of the Manhattan Project during and after World War II. The Division focused on industrial hygiene, radiation protection and safety. In 1946, the Atomic Energy Commission (AEC) was created. The lab was renamed the Health and Safety Division of the AEC. In 1953 it became the Health and Safety Laboratory, or HASL. Fallout from nuclear weapons tests became a major concern and the lab's focus shifted to measurements and assessments of fallout using a network of gummed film monitoring stations and measurements of the radioactivity levels in various food products. In the 1950's and 1960's, the worldwide sampling network was expanded considerably to include soil and water samples, air filter samples at the surface and in the stratosphere, biological samples, and measurements of wet and dry fallout. In the 1970's, the lab's worldwide sampling programs were expanded to include non-nuclear pollutants. When the Atomic Energy Commission was abolished in 1975, the Health and Safety Laboratory became part of the Energy Research and Development Administration. In 1977, the Energy Research and Development Administration was absorbed by the Department of Energy, and the Health and Safety Laboratory changed its name to the Environmental Measurements Laboratory. In the 1970's, the lab performed extensive radiation transport and dosimetry studies in and around nuclear facilities, and established the Quality Assurance Program for environmental dosimeters and radioanalytical measurements. The lab also did extensive dose reconstructions for nuclear weapons tests, and studied radon in homes. The lab took immediate measurements after the Three-Mile Island and Chernobyl accidents, providing the ability to accurately and comprehensively reconstruct the environmental contamination resulting from these incidents. In 1997, the lab underwent a major change of focus when it moved from the DOE Office of Energy Research to the Office of Environmental Management. Today, EML's primary focus is to support environmental monitoring, decommissioning, decontamination, and remediation efforts. EML continues to put its worldwide monitoring network to good use by developing models of the atmospheric transport of pollutants. The lab has assisted in developing instruments in support of non-proliferation activities and conducts in-situ measurements in support of many decontamination and decommissioning activities undertaken by DOE after the end of the Cold War. In 2003 this laboratory was incorporated into the Department of Homeland Security.

•NY **Fairchild Hiller Corporation** Farmingdale, Long Island BE - 1969-1970 - The Republic Aviation Division of the Fairchild Hiller Corporation produced beryllium products for the AEC's Rocky Flats facility in 1969 and 1970.

•NY General Astrometals Yonkers BE - 1963-1965; 1970 - General Astrometals supplied beryllium metal and parts to the Y-12 plant and to Lawrence Livermore National Laboratory. It also purchased beryllium chips and contaminated powder from Oak Ridge. In 1970 they analyzed some beryllium samples for Rocky Flats.

•NY **Hooker Electrochemical** Niagara Falls AWE - 1943-1948; Residual Radiation 1949-1976 - In January 1943, Hooker began work for the Manhattan Engineer District to manufacture fluoridated and chlorinated organic chemicals. The by-product of this work was hydrochloric acid that was subsequently used in the chemical processing of a uranium-bearing slag as a precursor of uranium recovery. This work was continued until shortly after World War II. Activities related to this contract ended June 1948.

•NY **International Rare Metals Refinery, Inc.** Mt. Kisko AWE - 1942-1949 - The International Rare Metals Company processed pitchblende ores for the African Metals

Corporation to extract radium. The same ores were processed for the Manhattan Engineer District to recover uranium.

•NY **Ithaca Gun Co.** Ithaca AWE - 1961-1962 - During 1961-1962, Ithaca Gun conducted tests involving the forging of hollow uranium billets into tubes for the metallurgical group at National Lead Company of Ohio (Fernald).

•NY **Kesselring Site, Knolls Atomic Power Laboratory**[147], West Milton, AWE 1950-1953 - The Knolls Atomic Power Laboratory (KAPL) - Kesselring, is engaged solely in research and development for the design and operation of naval nuclear propulsion plants. It operated from 1950 to 1953 as a pilot plant to research the reduction/oxidation and plutonium uranium extraction chemical processes to extract uranium and plutonium from irradiated uranium. These operations resulted in waste that contaminated buildings and about 30 acres of land at the KAPL facility.On September 29, 2010, a radioactive contamination event occurred while performing open air demolition of Building H2 at the Separations Process Research Unit (SPRU) in Niskayuna, New York. Though initial indications demonstrated that low levels of contamination had been found on workers shoes and on KAPL property adjacent to the SPRU work activities, the magnitude and significance of the contamination event were not fully identified and understood by the SPRU project for several days.

•NY **Lake Ontario Ordnance Works** Niagara Falls DOE - 1944-1997 - In 1944, the Manhattan Engineer District (MED) obtained a portion of the Lake Ontario Ordnance Works (LOOW) from the Department of Defense (DOD) for storage of low-grade radioactive residues resulting from pitchblende ore processing at the Linde Air Products facility. In 1948, when the DOD decommissioned the LOOW, the AEC acquired 1511 acres of the site, including the original storage areas. The AEC declared most of this property as excess in 1955, and by 1968 the General Services Administration was able to dispose of 1298 acres, with 213 acres remaining under AEC control. In 1975,

147 **DOE shakes up radioactive material cleanup team after leaks at Knolls labs site** : Project manager ousted, private cleanup firm gets warning as DOE studies radioactive material releases at Knolls labs / Brian Nearing. Times Union. November 20, 2010.

U.S. Department of Energy. Office of Environmental Management: **Type B Accident Investigation Report Radiological Contamination Event During Separations Process Research Unit Building H2 Demolition September 29, 2010**. November 23, 2010. - 82 pp.
- http://spru.energy.gov/Final%20Report%20-%20SPRU%20Type%20B.pdf.

Documentation of environmental indicator determination, Interim Final 2/5/99. **Migration of Contaminated Groundwater Under Control**: U. S. Department of Energy - Knolls Atomic Power Laboratory.
http://www.epa.gov/region2/waste/usdoe750.pdf

additional property was transferred to the town of Lewiston, leaving the present 191-acre site. The DOE portion of the site became known as the Niagara Falls Storage Site (NFSS). The site remained under DOE control until 1997 when it was transferred to the Corps of Engineers under the FUSRAP program. Following World War II, Linde's refinery was decommissioned and contaminated equipment was disposed at the LOOW. Contaminated materials from other MED/AEC facilities were also shipped to LOOW for disposal. Beginning in 1949, residues from operations at the Mallinckrodt Chemical Works were shipped to LOOW for storage. During the early 1950's, the AEC portion of the LOOW was also used for interim storage of uranium and thorium billets and rods being processed by various New York companies. During 1953-1954, the AEC constructed a boron isotope separation plant at the LOOW, which began operations in 1954. The operating contractor for this plant was the Hooker Electrochemical Company which referred to it as Plant 31 (P-31).. In 1958, the facility was placed on stand-by and a maintenance contractor, Page Airways, was employed for routine surveillance. The operation was restarted in 1964, with Nuclear Materials and Equipment Company as the operating contractor. In 1971, the boron facility was again placed on stand-by with National Lead Company of Ohio (NLO) as the caretaker. In 1981, Bechtel National took over the caretaker contract and began plans for remedial work at the site. Clean-up began in 1982. Contractors: Hooker Electrochemical (1953-1958); Page Airways (1958-1964); Nuclear Materials and Equipment Company (NUMEC) (1964-1971); National Lead Company of Ohio (1971-1981); Bechtel National (1981-1997)

•NY **Ledoux and Co.**[148] New York AWE – 1946-? - The weighing and assaying of the [African] ore samples were performed for the Federal Princeton University, Princeton, New Jersey; and the National Bureau of Standards (NBS), Washington, D.C. Weighing and assaying for African Metals, Inc., were performed by Ledoux and Company, New York, New York.

'A Ledoux & Company laboratory somehow "lost" a vial of uranium-235 sometime between March 30 and April 1. The lab could receive a whopping $3,250 fine from the NRC for the potentially deadly accident. The mishap resulted from several license violations including:failure to adequately survey a package and remove the U-235; failure to retain the package in spite of the missing uranium; failure to keep the material in a restricted area; and unlawful disposal of the uranium in an ordinary landfill. In an April 12 search, lab staff determined that the container of U-235 had been disposed of in any of several area landfills. No effort to retrieve the radioactive substances planned. The NRC concurred with the company that a search was "impractical" given the number of possible dumps to be checked. The NRC claims that the U-235 emits less than one-tenth of a millirem per hour and posed "no threat to members of the public."'[149]

148 **Description of the Formerly Utilized Sites Remedial Action Program**. United States, Department of Energy. 1980. - 85 pp.

149 NRC News Release, Nov. 2, 2005.

•NY **Linde Air Products**[150] Buffalo AWE - 1944-1947 - The Linde Air Products facility, also known as the Chandler Plant, was involved in the development and production of barrier for the Oak Ridge Diffusion Plant. During World War II, Linde was part of the Carbide and Carbon Chemical Corporation, later known as Union Carbide. In the 1944-l946 period, with the explicit approval and knowledge of Army officials, Linde Air Products, then a Manhattan Project contractor, disposed of over 37 million gallons of radioactively contaminated liquid chemical wastes in shallow underground wells located beneath the Linde property. These liquid wastes , which were highly caustic, emanated from the first stage of the uranium ore refining processing at the Linde Plant. Both the Army and Linde were well_ aware that this method of disposal would further contaminate Linde ' s wells.[151]

•NY **Linde Ceramics Plant**[152] Tonawanda AWE/DOE - 1942-1953 - The Linde Air Company performed uranium and nickel processing for the Manhattan Engineer District (MED) and the Atomic Energy Commission (AEC) at the Ceramics Plant in Tonawanda. African and Canadian ores were milled to black oxides at the plant. Documents indicate that the facility was placed on standby as of March 1, 1950. Linde's contractual agreements with the AEC continued through 1953 for various activities relating to closing out work at the Tonawanda location. Linde was a part of Carbide and Carbon Chemical Corporation (C&CCC), which then became Union Carbide.

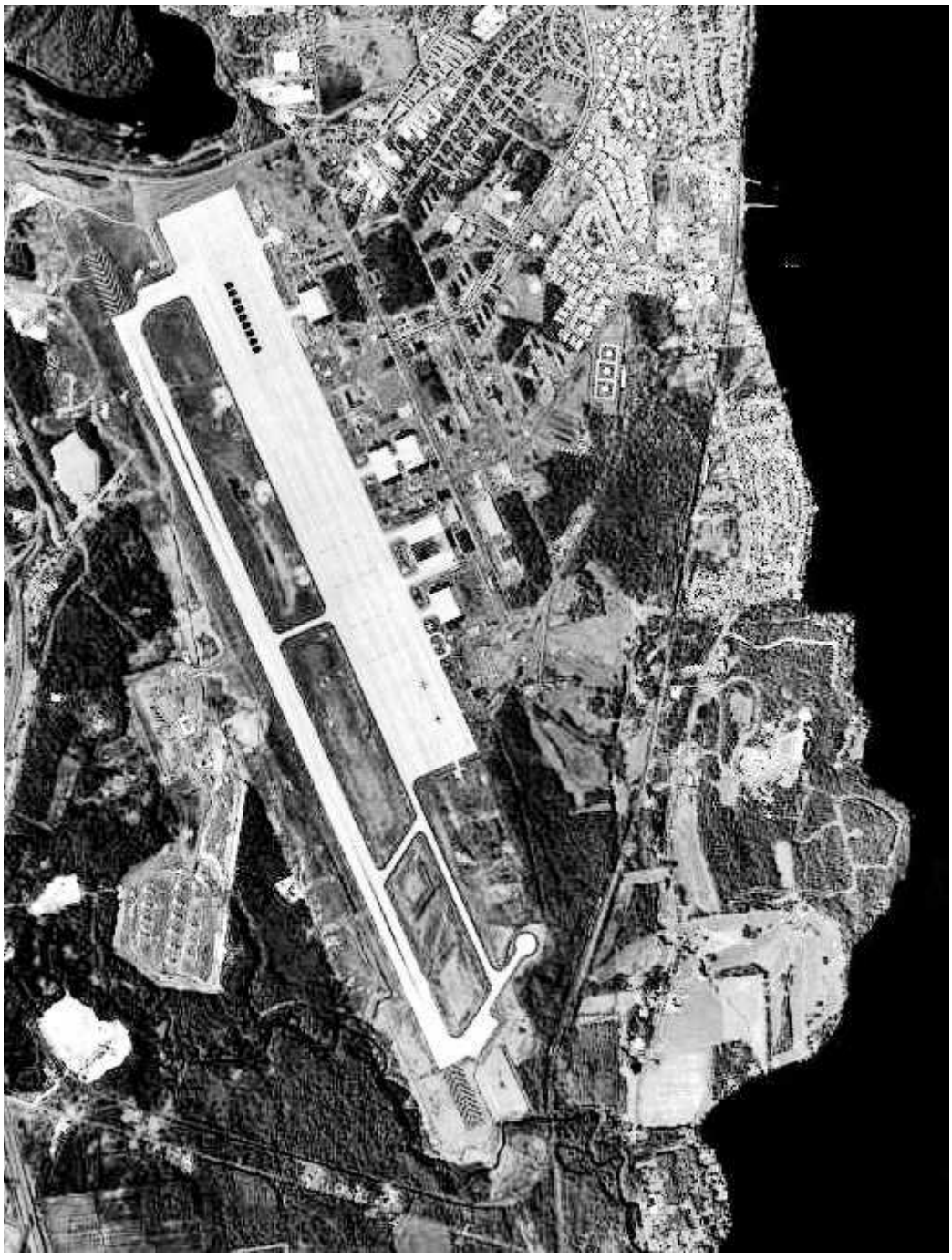
150National Archives: **Records of the Atomic Energy Commission** [AEC] (Record Group 326) 1923-75

151The Assembly. State of New York: **The Federal Connection** : A History of U.S. Military Involvement in the Toxic Contamination of Love Canal and the Niagara Frontier Region. January 29, 1981: An Interim Report to New York State Assembly Speaker, Stanley Fink. New York State Assembly Task Force on Toxic Substances VOLUME I. 1981. - 293 s. - http://www.factsofwny.com/fedcon1.pdf

The Legacy of the Manhattan Project in Niagara Falls / Geoff Kelly and Louis Ricciuti. Artvoice Nagazine - Buffalo, New York, 2001.

152 Draft ADVISORY BOARD ON RADIATION AND WORKER HEALTH, National Institute for Occupational Safety and Health: **Review of the Linde Ceramics Plant Special Exposure Cohort (SEC) Petition 00107 and the NIOSH SEC Petition Evaluation Report**, 2009. - 57 pp.

•NY **New York University** New York AWE - 1946-1952 - New York University worked on the development of counting equipment for the Manhattan Engineer District/Atomic Energy Commission.
•NY **Peek Street Facility**[153] Schenectady DOE - 1947-1954 - Peek Street was a predecessor to the Knolls Atomic Power Laboratory.



•NY **Plattsburgh Air Force Base** Plattsburgh, Clinton, NY AWE - Plattsburgh Air Force Base is a former United States Air Force Strategic Air Command (SAC) base .
•NY **Radium Chemical Co.** New York AWE - 1943-1950 - Beginning in 1943, the Radium Chemical Co. supplied most of the radium required for the Manhattan

153 **A lonely battle against atomic illnesses** : Ex-NL Industries workers unaware of often tough-to-get federal help / Brian Nearing. Times Union. Tuesday, April 19, 2011.

Engineer District. Combinations of material supplied and/or mixed by the Radium Chemical Company included radium bromide and radium bromide mixed with powdered beryllium. Brass was also used.

•NY **Rensselaer Polytechnic Institute** Troy AWE - 1951-1952; 1963 - Under an AEC contract in the early 1950s, researchers at the Rensselaer Polytechnic Institute investigated methods for improving the ductility of beryllium by coating the material with copper. The Brush Beryllium Company supplied the beryllium powder for the project. RPI also borrowed 400 lbs. of beryllium for AEC-sponsored research from Oak Ridge National Laboratory in 1963. Scientists at RPI conducted a number of AEC-sponsored research studies in the 1950s and 1960s using enriched uranium obtained from commercial sources.

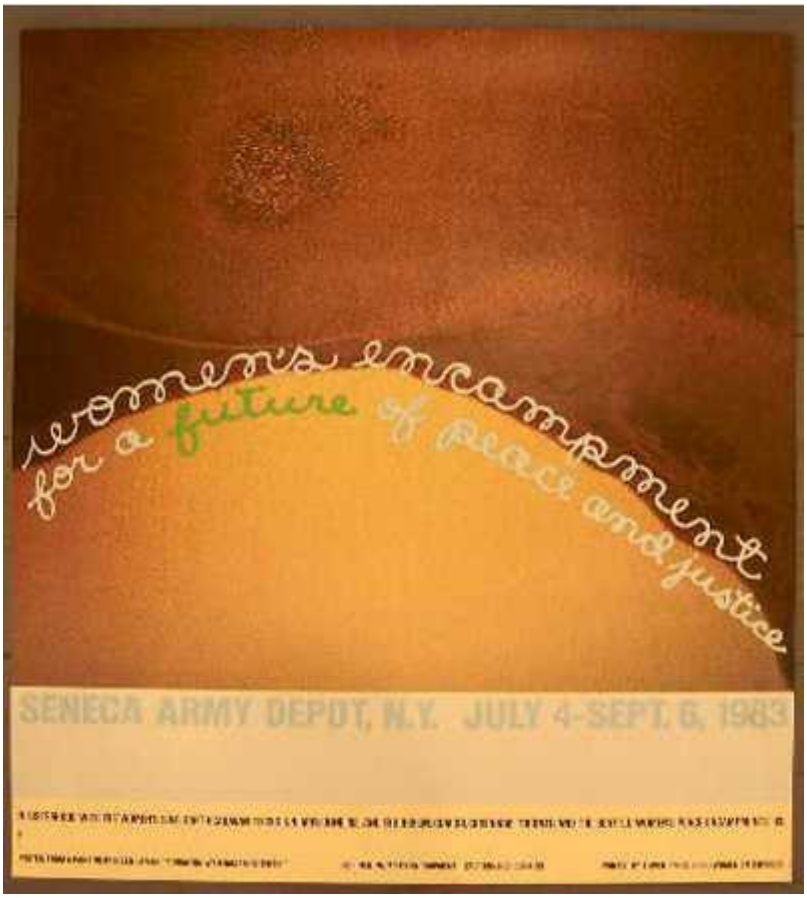
•NY **Sacandaga Facility** Glenville DOE - 1947-1953 - The Sacandaga Facility was operated by the General Electric Company Knolls Atomic Power Laboratory for the AEC from 1947 to 1953. AEC-sponsored research at the facility involved physics studies and sodium technology development in support of breeder reactor design. Work also involved the use of beryllium.

•NY **SAM Laboratories** or Special Alloyed Materials Laboratories, Columbia University New York City DOE - 1942-1947 - Columbia University was already researching some of the problems involved in determining whether it was feasible for the US to build a nuclear weapon prior to the establishment of the Manhattan Engineer District (MED). Once the MED was formed in 1942, Columbia became part of the effort to build the first atomic weapons. At that time, the Columbia effort was reorganized and designated as SAM (Special Alloy Materials or Substitute Alloy Materials) Laboratories. Buildings used as part of the SAM laboratories at Columbia included Pupin, Schermerhorn, Prentiss, Havemeyer and Nash.

•NY **Seaway Industrial Park**[154] Tonawanda AWE/DOE - 1974 - In 1974, the Ashland Oil Company constructed bermed areas on the Ashland #1 property to hold two petroleum tanks. Some of the soil removed during construction was disposed of in three areas of the Seaway Industrial Park landfill. Subsequent investigations determined that the soil from the Ashland site contained radioactive contaminants exceeding Department of Energy (DOE) guidelines. This soil came from an area used for disposal of radioactive residues from the nearby Linde Air Products site. This company processed uranium for the Atomic Energy Commission and the Manhattan Engineer District, predecessor agencies of the Department of the Energy (DOE). The Seaway site is located on River Road in Tonawanda, New York, just north of Buffalo. Between 1974 and 1982, the site was contaminated during the transfer of soil containing low-level radioactive residues from the Ashland 1 site to the Ashland 2 site. This contamination is primarily soil containing the radionuclides thorium-230, uranium-238, and radium-226. The original contamination resulted from activities involving radioactive material conducted under government contract at Ashland 1. At the time of the soil transfer, the Seaway site was a sanitary landfill operated by Browning-Ferris Industries (BFI). It is believed that contaminated soil was placed on top of existing municipal solid waste. The site is currently owned by the Seaway Industrial Park Development Company, Inc.[155]

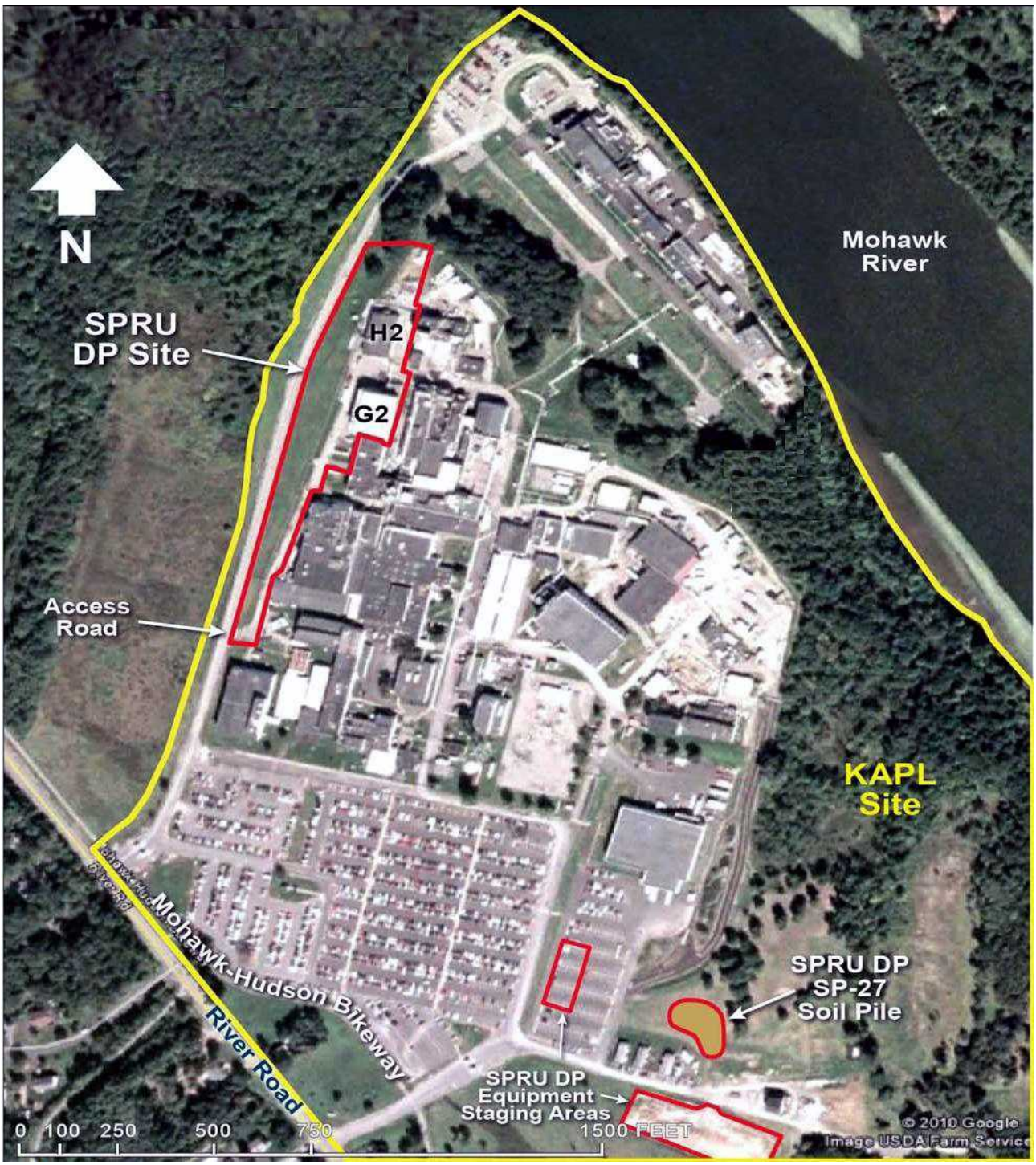
154 **Estimation of Contamination Volume at Seaway Area A, New York** / L. Durham and R. Johnson Environmental Assessment Division, Argonne National Laboratory, 1999. - 28 pp.

155 **Estimation of Contamination Volume at Seaway Area A, New York** / L. Durham and R. Johnson. Environmental Assessment Division, Argonne National Laboratory,1999. - 28 pp.



•NY **Seneca Army Depot** Romulus AWE - 1941-2000 - National Nuclear Weapons Stockpile Site[156] - According to the Center for Land Use Inter-pretation: 'Seneca is a munitions storage site in upstate New York, that is being cleaned up and converted to civilian use. The 11,000-acre base was an explosives, chemical weapons, and hazardous material supply depot, with 519 ammunition storage igloos and over 20 large warehouses. Weapons were also disposed of at Seneca, by detonation, incineration, and open burning. The contents of some dumping areas is still classified by the Army. Though most radioactive material, some of which dated back to the Manhattan Project, has been removed from the site, some portions of this base may never be totally cleaned up.' - Beginning July 4, 1983, and running for several years, antiwar and antinuclear activists mounted major protests at the facility, staging civil disobedience protests and establishing the *Seneca Women's Encampment for a Future of Peace and Justice*, the American Greenham Common.

156 **Ammunition and Explosives Storage for the Navy (1939-1989) and the Air Force (1946-1989)**, 2008. - 200 pp. - http://www.denix.osd.mil/cr/upload/af-navy-ammunition-storage-public-rfs_pg1-200_rev.pdf



•NY **Separations Process Research Unit** (at Knolls Lab.) Schenectady DOE - 1950-1965 - In 1950, the Atomic Energy Commission (AEC) constructed the Separations Process Research Unit (SPRU) as a pilot plant for developing and testing two chemical processes to extract both uranium and plutonium from irradiated fuel. This facility was operated by the Knolls Atomic Power Laboratory. Research and development was completed at SPRU in 1953 and the facility was closed. The technology developed at SPRU was transferred to the Hanford site. In March of 1965 the site was taken over by the Naval Nuclear Propulsion Program. Contractors: (Remediation) Accelerated Remediation Company, LLC (2007-2010), Washington Group International (2008-2010).

•NY **Simonds Saw and Steel Co.** Lockport AWE - 1948-1957 - Simonds Saw and Steel rolled uranium billets into rods for the AEC as part of the multi-site process overseen by the New York Operations Office for the production of uranium metal for fabrication into slugs for fueling Hanford production reactors. Simonds also rolled thorium metal whose most likely use was irradiation in Hanford reactors for the weapons program. Simonds rolled between 25 million and 35 million pounds of uranium and between 30,000 to 40,000 pounds of thorium.

•NY **Staten Island Warehouse** New York AWE - 1942 - This warehouse was used for uranium ore storage from the Belgian Congo. From this warehouse, the ore was transported to various Manhattan Engineer District (MED) sites for long-term storage and/or processing. The ore was the property of the African Metals Corporation and the MED contractor purchased only the U3O8 content of the ore while African Metals retained ownership of the radium and precious metals in the ore.

•NY **Sylvania Products Corp.** Bayside AWE/BE - 1947-1962 - The Metallurgical Laboratory of the Sylvania Electric Company investigated uranium and thorium powder metallurgy. It also produced powdered metal slugs, developed bonding techniques, and plated uranium slugs with nickel. The work with slugs included the conversion of uranium metal to uranium hydride using hydrogen. A February 1948 AEC Monthly Summary of Activities indicates that the Lab's "initial program will involve determining the physical properties and the health hazards of beryllium and uranium powders and the applications of powder metallurgy to these metals and their alloys." In 1948, the work required 315 pounds of raw beryllium metal. Beryllium was handled

first in the regular metallurgical building and then, after the objections of the AEC medical division, in a special AEC metallurgical development laboratory.

•NY **Sylvania Corning Nuclear Corp.**[157] Hicksville AWE/DOE 1952-1966 - Under Atomic Energy Commission (AEC) contracts, the facility was used for research and development with radioactive materials, principally uranium and thorium. It was also licensed by the AEC to fabricate reactor fuel elements for the AEC, for Sylvania use, for sale, and for research purposes. The Sylvania Corning Plant/former Sylvania Electric Products Facility (a.k.a Sylcor) site is a 9.49 acres area divided into three (3) separate properties located at 70, 100, and 140 Cantiague Rock Road, Town of Oyster Bay, County of Nassau, State of New York, in the westernmost portion of Hicksville, Long Island approximately thirty (30) miles east of lower Manhattan. The site was utilized for the manufacture of Government and commercial nuclear elements (e.g., cores, slugs, fuel elements) for reactors used in research and electric power generation between 1952 and 1967. Operations at the site used natural,enriched, and depleted uranium, and to a lesser extent thorium. Site contamination consists of these radioactive materials as well as nickel and volatile organics.

•NY **Titanium Alloys Manufacturing**[158] Niagara Falls AWE - 1950-1956 - In the early 1950s, Titanium Alloys Manufacturing was under contract to the AEC to provide zirconium tetrachloride. In 1955, TAM was issued an AEC source material license to do work related to the conversion of thorium scrap to anhydrous tetrachloride. Correspondence from Oak Ridge indicates that it was not interested the company's thorium work. In 1956, this division reduced ores and other uranium compounds by arc melting in an induction furnace.

157 **So How Contaminated Is the Old Nuclear Plant?** / John Rather. New York Times, January 13, 2002.
United States Government Department of Energy: **Memorandum**. Date: July 8, 2004. Subject: Sylvania Corporation, Hicksville, NY and Bayside, NY. 2004. - 213 pp.
- http://energy.gov/sites/prod/files/maprod/documents/sylvania_corporation.pdf
'This PDF file contains copies of letters to the Department of Energy (DOE) that request documents that pertain to facilities located in Hicksville, NY, Bayside, NY, or to the Sylvania Corporation. The requests were made under the Freedom of Information Act, 5 U.S.C. 552.'

158 **Status of Upcoming SEC Petitions** / LaVon B. Rutherford, CHP. National Institute for Occupational Safety and Health Division of Compensation Analysis and Support. 2011. - 6 pp.
- http://www.cdc.gov/niosh/ocas/pdfs/abrwh/pres/secstat0811bw.pdf

•NY **Trudeau Foundation** Saranac Lake BE - 1950-1957 - The AEC Division of Biology and Medicine supported beryllium research studies at the Trudeau Foundation.
•NY **University of New York, Institute of Mathematical Sciences**[159] 1956
•NY **University of Rochester Atomic Energy Project & University of Rochester Medical Laboratory** Rochester AWE/DOE - 1943-1986 - Although much of the early theoretical and experimental work that led to development of the first nuclear weapon was accomplished outside the United States, American researchers made a number of fundamental contributions as well. Prior to 1942, the University of Rochester was one of the institutions that contributed to early nuclear physics research in the United States. The university was responsible for more than a hundred projects in chemistry, physics, biology, medicine and psychology. During the Manhattan Project, it had major responsibility for the medical aspects of the bomb program. After the war, Rochester received an AEC contract to operate the Atomic Energy Project (AEP), which focused on the biomedical aspects of nuclear energy. The University of Rochester also received funding to study the pathology and toxicology of beryllium as well as to study the analytical chemistry of micro-quantities.
•NY **Utica St. Warehouse** Buffalo AWE - 1945 - Residues from Linde Air operations were stored and rebarreled at this location.

159 **Annual summary report of research problems initiated at the Institute of Mathematical Sciences, Contract no. AT-(30-1)-1480, July (1956). -** http://www.archive.org/details/annualsummaryrep00newy

•NY **West Valley Demonstration Project** West Valley DOE - 1966-1973 - From 1966 to 1972, Nuclear Fuel Services, Inc., under contract to the State of New York, operated a commercial nuclear fuel reprocessing plant at the Western New York Nuclear Services Center. The plant reprocessed uranium and plutonium from spent nuclear fuel; sixty percent of this fuel was generated at defense facilities. Spent nuclear fuel reprocessing generated approximately 600,000 gallons of liquid high-level radioactive waste; this waste was stored onsite in underground tanks. In 1980, the United States Congress passed the West Valley Demonstration Project Act (Public Law 96-368), which authorized the Department of Energy (DOE) to conduct a technology demonstration project to solidify the liquid high-level waste at the Western New York Nuclear Services Center. Under this act, DOE is also responsible for developing containers suitable for the permanent disposal of the solidified high-level waste at an appropriate Federal repository; transporting the containers to this repository; disposing of low level waste and transuranic waste generated by high level waste solidification; and decontaminating and decommissioning facilities used for the solidification. DOE is also responsible for dispositioning the spent nuclear fuel stored at the site.In 1982, DOE selected vitrification as the treatment process for high level waste. This process solidifies and stabilizes nuclear waste by mixing it with molten glass. Pretreatment of the high-level waste began in 1988 and was successfully completed in 1995. DOE expects to complete the West Valley Demonstration Project by 2005.

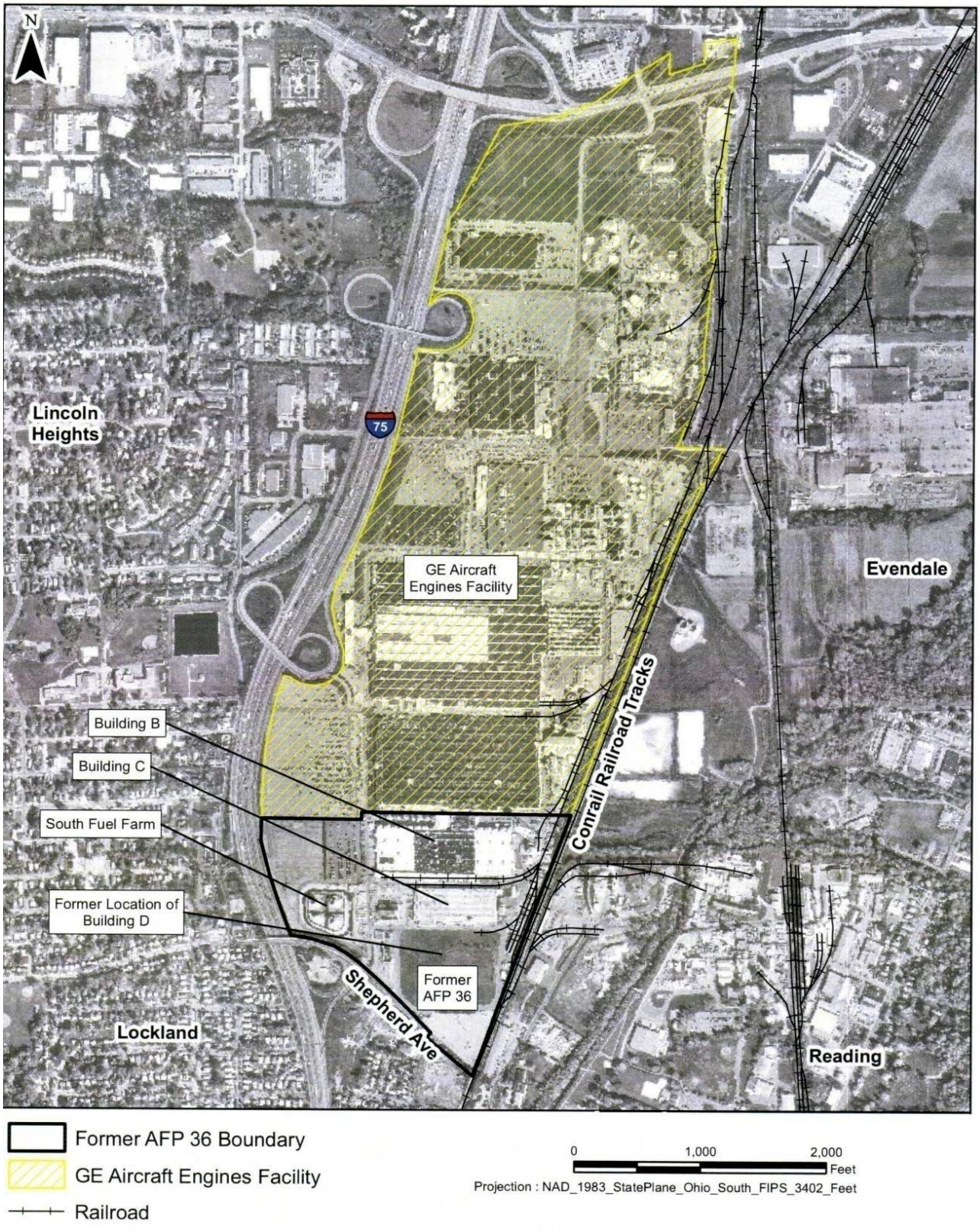
This auto body shop located at 1127 Irving Ave. on the Brooklyn/Queens border in Ridgewood was once the site of the Wolff-Alport Chemical Corporation. The New York City Department of Health is currently investigating radioactive contamination at and in the immediate vicinity of the site, where Wolff-Alport processed materials during the 1940s and 1950s that produced radioactive byproducts. Source: Ridgewood Times.

•NY **Wolff-Alport Chemical Corp.**[160] Brooklyn AWE - 1949-1950 - Wolff-Alport Chemical Corporation which operated from 1920 until 1954 was under contract with the AEC for the procurement of thorium containing sludge for stockpiling by the AEC. A March 1949 document mentions, "current contract expires June 30, 1949 and will probably be extended for another year. Cost is approximately $50,000 annually." This same document shows that almost 30,000 pounds of thorium oxalate sludge was provided the AEC that year. In 1940, the company began processing monazite sand to concentrate rare metals for use by industry. [Monazite sand is naturally occurring and found in North Carolina, South Carolina, Idaho, Colorado, Montana, and Florida in the United States, and in Brazil, India, Australia, and South Africa. Monazite sand is a source of materials, such as rare metals, that are used in the manufacture of television and computer screens, fluorescent light bulbs, and highly efficient batteries, among other industrial applications. It also contains, Thorium, a radioactive material. packaged the thorium and sold it to the government for military uses.] The monazite

160 **Information on Radiation Survey at the Former Wolff-Alport Chemical Corporation 1127-1129 Irving Avenue, Queens, NY September 5, 2007**. New York City Department of Health and Mental Hygiene. - 3 pp.

sand contained small amounts of thorium, a radioactive material.[161] The process of extracting the rare metals produced a concentrated thorium residue. This residue was considered a waste product, so the company dumped it into the sewer system. It is possible that small amounts of thorium remain in the sewers, buildings and soil around the building. In 1947, the federal government ordered Wolff-Alport to stop dumping the thorium into the sewer.

161 **Ridgewood Site Is Radioactive Health Dept. Probes Former Chemical Factory** / Robert Pozarycki. Ridgewood Times, December 23, 2010.



•OH **Air Force Plant 36**[162] Evandale AWE - Former AFP 36 is currently used to support the activities of the adjacent GE Evendale Plant. Plant facilities have served as aircraft engine test cells (Building B), storage (Building C-east), a machine shop

162 **Former U.S. Air Force Plant 36 Environmental Restoration Program Optimization (ERP-O) Report** August 13, 2009. 62s. - http://www.afcee.af.mil/shared/media/document/AFD-091013-091.pdf

and solid radioactive waste storage facility (former Building D), and nuclear engine research and test facilities (Buildings C-west and D).
Former AFP 36, originally known as the Wright Aeronautical Engine Plant, was built in the early 1940s for use as an aircraft engine production plant. After World War II, some of the U.S. Air Force (USAF) property was sold to Autolite, who later sold the facilities to GE. GE later purchased additional property contiguous to the Former AFP 36 to form the present GE Evendale Plant. In June 1989, the GE Evendale Plant grew to encompass the Former AFP 36 when the USAF sold this property to GE.[163]

•OH **Ajax Magnathermic Corp.** Youngstown AWE - 1958-1962 - The Ajax-Magnethermic Corp. was involved in induction heat treatment of various forms of uranium for National Lead Company of Ohio (Fernald) and also for General Electric (Hanford). The company fabricated an induction heating unit for NLO in 1961.

•OH **Alba Craft** Oxford AWE/DOE - 1952-1957- From 1952 to 1957, Alba Craft provided a variety of machine shop services on natural uranium metal for National Lead Company of Ohio (Fernald). Early work at Alba Craft included general and developmental machining of threaded reactor fuel slugs for use at the Savannah River Site. Subsequent production-scale operations consisted of hollow drilling and turning of slugs for the Savannah River and Hanford plutonium-production reactors.

•OH **Associated Aircraft Tool and Manufacturing Co.** Fairfield AWE/DOE - 1956 - From February to September 1956, Associate Aircraft Tool and Manufacturing Company machined hollow uranium slugs for the Hanford and Savannah River plutonium-production reactors under a subcontract from National Lead Company of Ohio (Fernald).

•OH **B & T Metals** Columbus AWE/DOE - 1943 - During the early stages of nuclear weapons production, uranium reactor fuel was produced by a variety of metallurgical techniques including extrusion, casting, and machining. In February 1943, DuPont, acting as an agent of the Manhattan Engineer District, contracted B&T Metals to extrude rods from uranium metal billets for the Hanford reactor in Washington State. B&T Metals extruded an estimated 50 tons of uranium between March 1943 and August 1943.

•OH **Baker Brothers** Toledo AWE/DEL - 1943-1944 - Between June 1943 and July 1944, DuPont and the University of Chicago subcontracted the Baker Brothers company to machine roll metal rods into uranium slugs that were used for fuel in the world's first production reactors located in Oak Ridge, TN and Hanford, WA.

163 **Former U.S. Air Force Plant 36: Environmental Restoration Program Optimization (ERP-O) Report**. August 13, 2009. - 62 pp.

An industrial laboratory and office complex a few miles outside of downtown Columbus that is the main lab and headquarters for Battelle Laboratory Columbus, a nonprofit R&D lab with over 7,500 employees at several locations. Battelle partners with companies to develop new technologies, and has been involved in numerous commercial projects, including the application of the product "bar-code," and the invention of the photocopier. But the labs work has been, and is still, primarily with the Department of Energy and its predecessor. Source: CLUI Land Use Database.

•OH **Battelle Columbus Laboratories** Columbus AWE - AWE 1943-1986; BE 1943-1961; DOE 1986-2000 - From 1943 to 1986, Battelle Memorial Institute performed atomic energy research and development as well as beryllium work for the Department of Energy and its predecessor agencies. The Battelle Laboratories have two separate locations in Columbus - King Avenue and West Jefferson. Battelle's research supported the government's fuel and target fabrication program, including fabrication of uranium and fuel elements, reactor development, submarine propulsion, fuel reprocessing, and the safe use of reactor vessels and piping.
•OH **Battelle Memorial Institute** Columbus AWE/BE/DOE
•OH **Beryllium Production Plant** (Brush) Luckey BE/DOE - BE 1949-1959; DOE 1949-1961 - From 1942 through 1945, National Lead operated a magnesium processing facility on the Luckey site for the U.S. government. In 1949, the Atomic Energy Commission (AEC) built a beryllium production facility at the site. The government built the plant to replace the production that was lost when the Brush Beryllium Lorain plant was destroyed by fire. The Brush Beryllium Company (now Brush Wellman) under contract to the AEC, produced beryllium pebbles at this site

until 1958. Records indicate that the facility produced between 40,000 and 144,000 pounds of beryllium. In 1959, the AEC contracted with Brush to close down the facility. The site was sold to the Vulcan Materials Company in 1961. In 1951, AEC sent approximately 1,000 tons of radioactively contaminated scrap metal to the Luckey site. This material was to be used by the Diamond Magnesium Company to resume magnesium processing at the idle facility.

•OH **Brush Beryllium Co.** Cleveland AWE/BE - 1942-1943 & 1949-1953 - The Brush Cleveland facility conducted research on a process for producing uranium metal (1942-1943) through magnesium reduction of molten green salt (uranium tetrafloride). The facility later conducted research and development with uranium (1949-1953) and extruded thorium billets into slugs which were placed in Hanford production reactors (1952-1953). The Brush Cleveland facility also produced beryllium metal and beryllium oxide for the MED (1943-1946) and later for the AEC (1947-1965?).

•OH **Brush Beryllium Co.** Elmore AWE/BE - 1957-2001 - Brush Beryllium plant in Elmore, OH, was built in 1953. It began producing beryllium for the AEC in 1957 after operations at the Brush Luckey, OH, facility ended. (Prior to 1957 it produced beryllium for the commercial market only.) The plant supplied beryllium to the Y-12 plant in 1990 and Brush purchase orders show that shipments from its Elmore location continued to Los Alamos and Sandia through April 2001.

•OH **Brush Beryllium Co.** Loraine AWE/BE - 1949-1950 - The Lorain plant produced beryllium metal and beryllium oxide for the MED and the AEC. The plant was destroyed by fire in 1948.

•OH **Cincinnati Milling Machine Co.** Cincinnati AWE - 1963 - The Cincinnati Milling Machine Co. built electro-chemical machining units. In September 1963, the company tested the feasibility of electro-chemical machining of uranium.

•OH **Clifton Products Co.** Clifton BE

•OH **Clifton Products Co.** Painesville BE - 1942-1952 - Clifton had at least six large contracts with the AEC to supply beryllium products. By 1949, at least 8 beryllium-related deaths had occurred at Clifton.

•OH **Copperweld Steel** Warren AWE - 1943-1946 - The Copperweld Steel Company of Warren, Ohio, straightened and outgassed a large number of uranium rods for the Hanford and Oak Ridge reactors between May and August of 1943.

•OH **Du Pont-Grasselli Research Laboratory** Cleveland AWE - 1943-1945 - The Grasselli Laboratory participated in the development the slug canning and coating processes for the Hanford site.

•OH **Eagle-Picher Industries, Inc.** Quapaw BE - 1988-1996 - Eagle-Picher's Quapaw, Oklahoma plant machined beryllium-alloy parts for the DOE's Y-12 facility in Oak Ridge, Tennessee, during the 1980s and the 1990s.

•OH **Extrusion Plant** Ashtabula DOE - 1962-. - From 1962 to 1988, Ashtabula (formerly known as Reactive Metals, Inc.) received uranium billets from Fernald's Feed Materials Production Center and the Weldon Springs Plant and extruded them into feed stock for fabrication of fuel and target elements to be used in nuclear materials production reactors. In 1988, the need for Cold War weapons production diminished and the DOE began closing the Extrusion Plant. By April of 1993 the DOE and RMI had formed a partnership to clean the site as part of decontamination and decommissioning. The DOE contracted with RMI Environmental Services (RMIES), a division of the RMI Titanium Company, to manage the cleanup project. RMIES has since changed its name to EARTHLINE Technologies. Reactive Metals Inc. of Ashtabula,

Ohio was the corporate successor of the Bridgeport Brass Company of Adrian, Michigan, which performed similar extrusion work from 1954 to 1961. The semi-production extrusion press used at Adrian was transported and installed at Ashtabula. In addition to its work for the Department of Energy (DOE) and its predecessor agencies, Ashtabula performed work for the Department of Defense and a number of commercial entities under a Nuclear Regulatory Commission (NRC) license.

•OH **Feed Materials Production Center** Fernald DOE - 1951-. - The Feed Materials Production Center (FMPC) at the Fernald site was established by AEC in 1951 to convert depleted uranium, natural uranium, and low-enriched uranium compounds into uranium metal and to fabricate uranium metal into feed stock for fuel and target elements for reactors that produced weapons-grade plutonium and tritium. The Fernald Plant, operated by National Lead of Ohio (NLO), along with the Weldon Spring Plant in Missouri, were feed materials plants built by the AEC in the 1950s to supply fuel to the increasing number of nuclear reactors located at Hanford and Savannah River. Production operations at the Fernald site continued until July 10, 1989, when they were suspended by the Department of Energy (DOE). DOE formally shut down the facility on June 19, 1991. During its production mission, the Fernald site produced over 225 million kilograms (500 million pounds) of high-purity uranium products to support United States defense initiatives. Contraactors: Fluor Fernald (1992-present); Westinghouse (1985-1992); National Lead of Ohio (1951-1985)

•OH **General Electric Company** Cincinnati/Evendale AWE/BE/DOE - BE 1951-1970; DOE 1961-1970 - The Evendale Plant's major mission is to build aircraft engines. The AEC used this facility to work with a variety of radioactive materials, including uranium and thorium. This facility was also involved in the refining or fabrication of beryllium or beryllium oxide.

•OH **Gruen Watch** Norwood AWE - 1956 - The Gruen Watch Co. conducted cold shaving and stamping and hot stamping washer tests for National Lead Company of Ohio (Fernald) in May and June 1956.

•OH **Harshaw Chemical Co.** Cleveland AWE - 1942-1955; Residual Radiation 1956-October 2009 - Harshaw Chemical of Cleveland, Ohio refined black oxide and sodium diuranate to orange oxide and then to brown oxide for the Manhattan Project during World War II. The final result was a "green salt", which the Manhattan Project used to produce uranium hexafluoride for enrichment into weapons grade fuel for nuclear weapons at the gaseous diffusion plants. Harshaw also produced uranium hexafloride during the war and this production activity was expanded in 1947. Harshaw production was reduced in 1951 and by May of 1953 the green salt plant was dismantled and the hexafluoride plant was placed on standby. The contract for removal of AEC equipment continued until September 30, 1955. This designation is limited to the Harshaw facility located at 1000 Harvard Avenue, Cleveland and generally referred to as the Harvard-Denison plant. Harshaw Chemical Company was acquired by Kewaunee Oil Company in 1964. Kewaunee Oil was then acquired by the Gulf Oil Company in 1976. Kaiser Chemical Company acquired Harshaw interests in 1982.

•OH **Herring-Hall Marvin Safe Co.** Hamilton AWE/DOE - 1943-1951; Residual Radiation 1952-1993; - Intermittently from the 1943 to 1951, the Herring-Hall-Marvin Safe Company machined natural uranium metal slugs from rolled stock under subcontract to DuPont and the University of Chicago.

•OH **Horizons, Inc.** Cleveland AWE - 1952-1956; Residual Radiation 1957-October 2009 - Starting in 1952, Horizons, Inc. was under contract with the AEC for the pro-

duction of granular thorium metal and conducted some thorium research work for Savannah River.

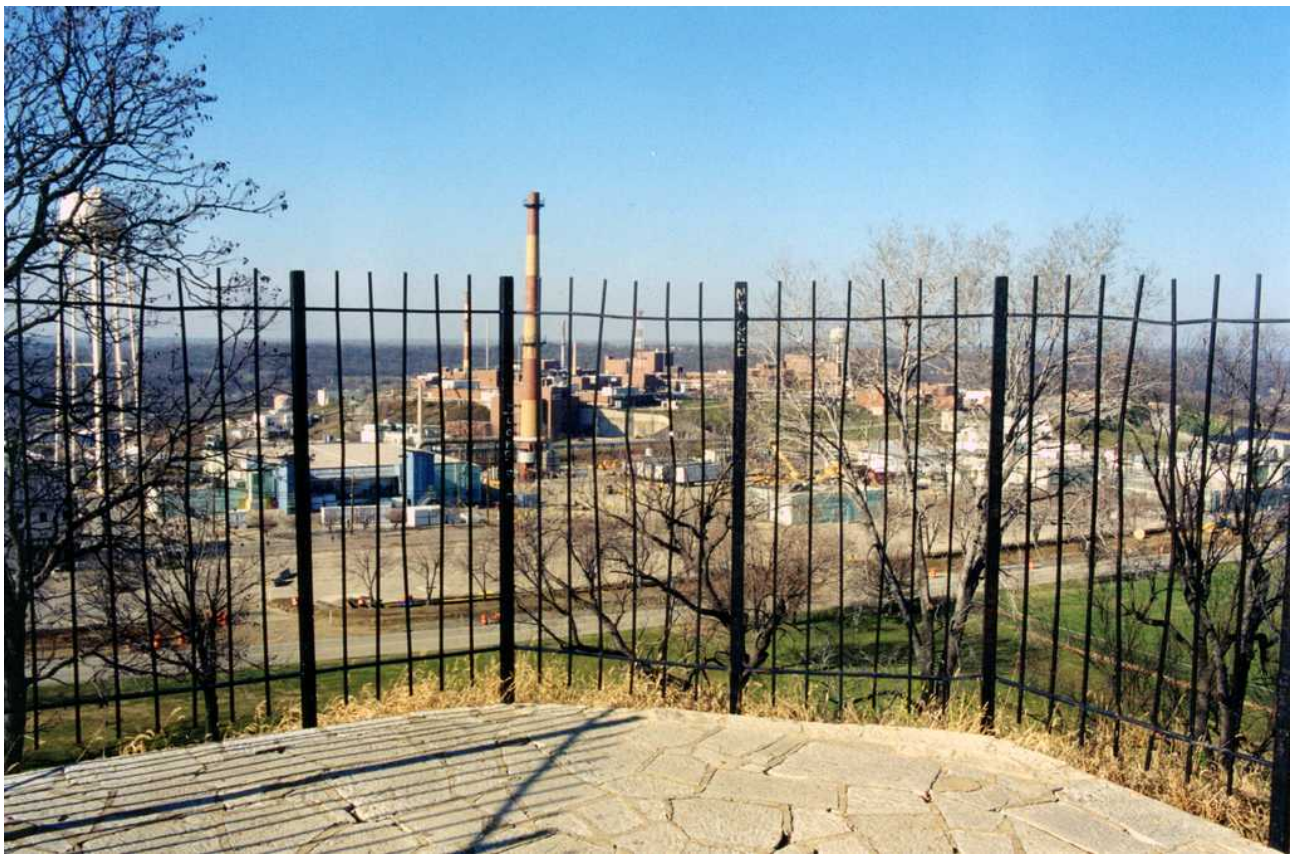
•OH **Kettering Laboratory**, University of Cincinnati Cincinnati BE - 1947 - 1950 - The AEC funded a Kettering Laboratory researcher's investigation of the biological effects of beryllium and its compounds. Kettering was also working on analytical methodology for beryllium for the AEC.

•OH **Magnus Brass Co.** Cincinnati AWE - 1954-1957 - The site machined various forms of uranium metal under subcontract to the National Lead Company (Fernald). The work was performed at two locations: Reading Road (from December 1954 through November 1955) and West 7th Street (from December 1955 through December 1957).

•OH **McKinney Tool and Manufacturing Co.** Cleveland AWE - 1944 - Between May and August of 1944, McKinney Tool & Manufacturing of Cleveland, Ohio, turned and ground unbonded slugs to provide fuel for the first nuclear reactors, including the three Chicago piles; the Oak Ridge X-10 reactor; and the Hanford B, D, and F production reactors and 305 test pile.

•OH **Mitchell Steel Co.** Cincinnati AWE - 1954 - In 1954, Mitchell Steel Company may have participated in the machining of a sample lot of four hollow extrusion uranium billets from ingots for National Lead of Ohio (Fernald)

•OH **Monsanto Chemical Co.** Dayton AWE - In 1943, the Manhattan Engineer District (MED) began the Dayton Project to investigate the chemistry and metallurgy of polonium. Monsanto was chosen for the project because of its earlier work at its Scioto Research Laboratory (also in Dayton). Work for the MED was initially performed at Monsanto's facility on Nicholas Road in 1943 (Unit I). As the project expanded, it moved into a location on West First Street (Unit III) with all operations being transferred to Unit III by October 1944. By 1944 it was clear that even this space was inadequate, and so the former Runnymeade Playhouse was converted to a laboratory and referred to as Unit IV, to be operated in conjunction with Unit III. When space became too tight in the combined areas of Units III an IV, preparations were made to move the operations to the present day Mound facility in Miamisburg. Processing began at Mound in February 1949 and shortly thereafter Units III and IV were dismantled and decontaminated.



Owned by the Department of Energy and operated for many years by Monsanto and EG&G, the Mound Plant produced detonation devices for nuclear weapons and conducted research on nuclear fuels and isotope separation, starting in 1947. The primary activity at this plant is now decontamination of the buildings and grounds, in preparation for the expected full conversion to commercial use, by 2006. Around $90 million has been spent annually on these remediation efforts. The Mound Plant is named for a large Indian mound, adjacent to the plant. Source: CLUI Land Use Database.

•OH **Mound Plant**[164] Miamisburg DOE - 1947-. - In 1943, the Manhattan Engineer District began the Dayton Project to investigate the chemistry and metallurgy of polonium. Between 1943 and 1948, this work was performed at locations around Dayton, all of which turned out to e too small for the job. As such, the Mound Plant was constructed in 1947 in Miamisburg, Ohio to replace these earlier laboratories. Mound was first occupied in May 1948 and became operational February 1949. The Mound Plant's first mission was to manufacture polonium-beryllium initiators for atomic weapons. As part of this process, the site extracted polonium-210 from irradiated bismuth slugs and machined beryllium parts. Mound stopped producing initiators after the Pinellas Plant in Florida began producing accelerator-type neutron generators in 1957. In 1954, Mound began developing and producing weapons components containing tritium, and in 1969, the plant began recovering and purifying tritium from dismantled nuclear weapons. During the 1950s and 1960s the Mound Plant also developed and produced a variety of nonnuclear weapons components including detonators, cable assemblies, firing sets, ferroelectric transducers, and explosive timers. In 1995, Mound discontinued weapons component production. The Mound Plant has also performed non weapons work. The site developed and manufactured radioisotope thermal generators and conducted research in the following areas: radioactive waste decontamina-

164 Sample report: **Mound Laboratory Progress Report for September 1962.** 1963. - 30 pp. - http://www.osti.gov/bridge/servlets/purl/4551552-YWF5Bf/4551552.pdf

tion; the properties of uranium, protactinium-231, and plutonium-239; and separation of stable isotopes and noble gases. Mound continues to produce thermal generators which are used for remote power applications including space probes.

•OH **National Smelt & Refining**[165] Cleveland, Ohio DOE

•OH **Painesville Site** (Diamond Magnesium Co.) Painesville AWE/DOE

•OH **Piqua Organic Moderated Reactor**[166] Piqua DOE 1963-1969 - From 1963 to 1966, the Piqua Nuclear Power Facility was operated as a demonstration project by the City of Piqua. The facility contained a 45.5-megawatt (thermal) organically cooled and moderated reactor. In 1966, the AEC discontinued facility operations and terminated its contract with the city. The AEC dismantled and decommissioned the reactor between 1967 and 1969.

•OH **Portsmouth Gaseous Diffusion Plant** Piketon DOE - 1952-1988

•OH **R. W. Leblond Machine Tool Co**. Cincinnati AWE - 1961 - National Lead Company of Ohio (Fernald) contracted with Leblond Machine for the purchase of a rapid boring machine. In 1961, acceptances tests, using 17 tons of natural uranium, were conducted at Leblond Machine.

•OH **Tech-Art, Inc.** Milford AWE - 1952 - In 1952, National Lead Company of Ohio

165 DOE Memorandum; Williams to File; **Elimination of the Sites from the Formerly Utilized Sites Remedial Action Program**; December 23, 1993. - 1 p.
- http://www.lm.doe.gov/Considered_Sites/Sutton_Steele_and_Steele_Co_-_TX_09.aspx
'In each case, the potential for radiological contamination above applicable guidelines is small. In each case the- amounts of radioactive materials handled was small. Based on these considerations, these sites are hereby eliminated from further consideration under the Formerly Utilized Sites Remedial Action Program.'

166 **SEC Petition Evaluation Report Petition SEC-00126: Piqua Organic Moderated Reactor** / Louise Buker, Roger Halsey, Karin Jessen, Dan Mantooth, Eugene W. Potter. National Institute for Occupational Safety and Health, 2009. - 89 pp. - http://www.cdc.gov/niosh/ocas/pdfs/sec/piqua/piquaer-126-r1.pdf

(Fernald) used Tech-Art to grind inserts as part of a study of Firth Sterling HF carbide profile inserts in conjunction with the machining development program. Additional documentation shows that Tech-Art possessed a subcontract with NLO for "[m]achine shop operations on Government owned materials at prescribed hourly rates of pay."

•OH **Tocco Induction Heating Div.** Cleveland AWE - 1967-1968 - Tocco had a contract with National Lead of Ohio (Fernald) to develop induction heating coil equipment for heating uranium fuel cores. Tocco performed operational tests of these units at its Ohio facility, which took place during 1967-1968. The company received 2000 pounds of natural uranium machined fuel cores and 5600 pounds of depleted uranium machined fuel cores from NLO for testing.

•OH **Vulcan Tool Co.** Dayton AWE - 1959 - At the request of National Lead Company of Ohio (Fernald), Vulcan Tool Company conducted experiments involving the cutting of normal uranium slugs and tubes on a Brehm cutter in October 1959.

•OK **Kerr-McGee**[167] Guthrie AWE - 1963-1973; Residual Radiation 1974-October 2009 - Kerr-McGee processed uranium for the AEC as part of the nuclear weapons production process. The Recycled Uranium reports show material being shipped from Kerr-McGee to both Fernald and Savannah River.

•OR **Albany Research Center** Albany AWE/DOE - 1987-1993 (remediation) & 1995-present - The Albany Research Center became part of the Department of Energy in 1995. In 2004 residual beryllium contamination associated with historic beryllium use at Albany Research Center was identified.

•OR **Wah Chang** Albany AWE - 1971-1972 - In 1971 and 1972, Wah Chang was sub-contracted to Union Carbide Corporation to melt uranium-bearing materials for the Oak Ridge Y-12 plant.

•PA **Aeroprojects, Inc.** West Chester AWE - 1951-1973; Residual Radiation 1974-1976 - Beginning in 1951, Aeroprojects Inc. performed research and development for the AEC. The company's work included investigation of the use of ultrasonic energy in the areas of instrumentation, welding, filling of tubes with powders, extrusion, solidification and cleaning. Materials used by the company include alloys and compounds of aluminum, beryllium, mercury, thorium and uranium.

•PA **Aliquippa Forge** Aliquippa AWE/DOE - 1947-1950; Residual Radiation 1951-1987; 1989-1992 - In the late 1940s, Aliquippa Forge (previously Vulcan Crucible) was a supplier of rolled uranium rods usedin Hanford's reactors. The AEC operated a rolling mill, two furnaces and cutting and extrusion equipment at Vulcan. Work at the site ended in 1950.

•PA **Aluminum Co. of America** (Alcoa) New Kensington AWE - 1943-1945; Residual Radiation 1946-1991 - The Aluminum Company of America (Alcoa) site in New Kensington, Pennsylvania was one of 14 facilities in the early 1940s that produced nuclear fuel for the X-10 pilot plant reactor in Oak Ridge, Tennessee and the production reactors at Hanford, Washington. Alcoa used a unique welding process to "can" and seal uranium slugs produced by these other facilities.

•PA **Babcock & Wilcox** Parks Township AWE

•PA **Beryllium Corp. of America** Hazleton BE - 1957-1979 - The Manhattan Engineer District and the Atomic Energy Commission (AEC) contracted with the facility for the production of beryllium metal, beryllium oxide, and beryllium powder. The AEC contracted with the facility for the refining and fabrication of beryllium. Later the facility produced beryllium blanks for the Y-12 plant and Dow (Rocky Flats).

167 National Priorities List : Deleted National Priorities List (NPL) Sites - by State, 2011.

•PA **Beryllium Corp. of America** Reading BE - 1943 -1979 - In 1947, the Beryllium Corporation plant at Reading produced highly distilled and pure beryllium oxide on a small scale for the AEC. By 1960, the plant focused on alloy and oxide work. In 1961, the plant supplied beryllium parts to the Y-12 plant and produced beryllium powder for the AEC from government inventory beryllium ingots.
•PA **Birdsboro Steel & Foundry** Birdsboro AWE - 1951-1952 - n 1951, eight assorted uranium billets weighing a total of 346 pounds, originating at Birdsboro, were received by the AEC's Lake Ontario Ordnance Works. In 1952, Birdsboro received 11.5 pounds of uranium wafers for processing.
•PA **C.H. Schnoor** Springdale AWE/DOE - 1943-1951 - In 1943, C.H. Schnorr & Company began providing metal fabrication services in support of Manhattan Engineer District (MED) operations. C.H. Schnorr machined extruded uranium for the Hanford Pile Project.
•PA **Carnegie Institute of Technology** Pittsburgh AWE - 1942-1946 - During the Manhattan Project, Carnegie Institute of Technology was key participant in research on the phases of special metals and their alloys. It also worked on the development of methods for testing materials of construction and the construction of "necessary equipment."
•PA **Carnegie Mellon Cyclotron Facility** Saxonburg AWE
•PA **Carpenter Steel Co.** Reading AWE - 1943-1944 - Beginning in 1943, Carpenter Steel Corporation was one of the 14 private contractors and vendors that produced fuel for the Oak Ridge X-10 pilot plant reactor and the full-scale Hanford production reactors. As an alternative to extrusion, the Carpenter Steel Company of Reading, Pennsylvania experimented with rolled uranium rods in July 1944, but these proved to be inferior to the extruded product. The metal tended to form laps and seams on the surfaces of the rolled bars. Carpenter Steel has since changed its name to Carpenter Technology Corporation.
•PA **Chambersburg Engineering Co.** Chambersburg AWE - 1957 - In March 1957, a series of hot uranium forging tests were conducted at the Chambersburg Engineering company by the Metallurgical Department of National Lead Company of Ohio (Fernald)
•PA **Foote Mineral Co.** East Whiteland Twp. AWE - BE 1947; AWE 1942-1948 - Foote Mineral had a pilot plant at its East Whiteland Township location which processed monazite sands. Monazite sands are known to have a very high thorium content. Because the AEC needed fairly large quantities of thorium, they were very interested in different methods of extracting it from monazite sands. Foote Mineral Company was also a major importer of beryl ore from Brazil. Under contract to the Atomic Energy Commission, Foote Mineral Company procured 500 tons of beryl ore in 1947.

•PA **Frankford Arsenal**[168] Philadelphia AWE - 'Formerly Used Defense Site plus-up funds received in 2007 were used to execute a Containerized/Hazardous, Toxic, Radioactive Waste project, which included the abandonment of several old monitoring wells, eligible underground storage tanks and 1600+ nickel cadmium batteries. The contaminants of concern were polychlorinated biphenyls, volatile organic compounds (VOCs) and semi-volatile organic compounds.'
•PA **Heppenstall Co.** Pittsburgh AWE - 1955; Residual Radiation 1956-1989 - Under contract to the Mallinckrodt Chemical Co., the site was used to heat, press and water quench uranium "dingots". Approximately 100,000 pounds of normal uranium metal was shaped at Heppenstall over about a 6-month period.
•PA **Jessop Steel Co.** Washington AWE - 1950-1954 - In the early and mid 1950s, the Jessop Steel Company was under contract to the AEC for metal fabrication with some work through DuPont. In the early 1950s, records indicate that uranium metal in nickel scrap was sent to Jessop to make stainless steel piping for Fernald. In 1954, tentative plans were made for Jessop to roll uranium for Fernald billet production.
•PA **Koppers Co., Inc.** Pittsburgh AWE - 1956-1957; Residual Radiation 1958-1996 - In conjunction with the Kennecott Copper Co., Koppers conducted pilot plant tests for the production of uranium hexafluoride. In 1956, Koppers was licensed receive 2000 pounds of refined source material for use in studies toward the preparation of uranium dioxide for reactor fuel elements and 6,150 pounds of refined source material for use in research and pilot plant investigations on feed material processing. In October 1957, they were authorized to receive 110 pounds of normal uranium hexafluoride. Most of the research works appears to have taken place at the Koppers Research Department in Verona, PA.
•PA **Landis Machine Tool Co.** Waynesboro AWE - 1952 - In 1952, National Lead of Ohio (Fernald) personnel performed tests involving the machining of uranium slugs at

168**Frankford Arsenal** : Fact Sheet as of 1 January 2011. U.S. Army Corps of Engineers - Baltimore District, 2011. - 2 pp.

Landis Machine Tool Company.

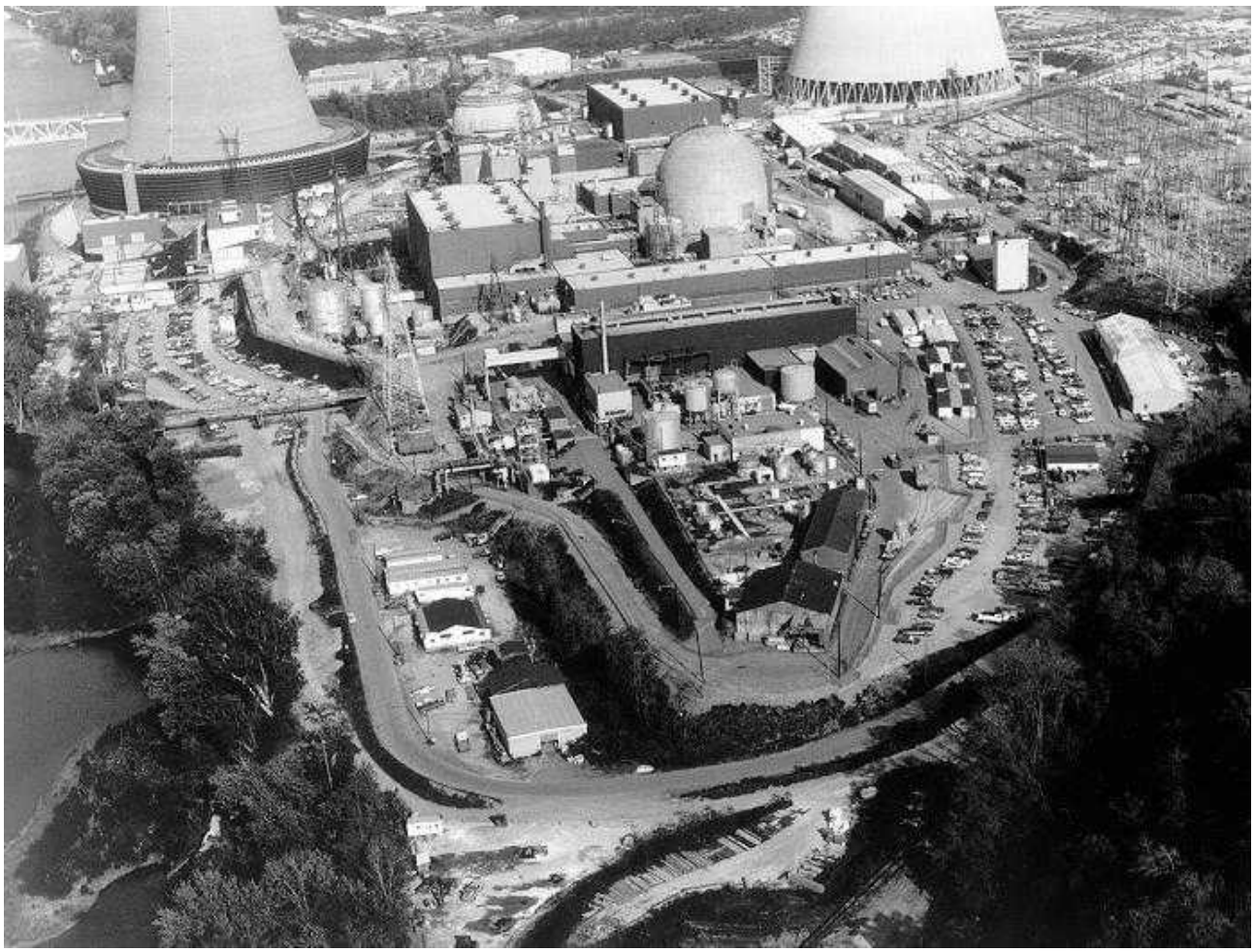
•PA **McDaniel Refractory Co.** Beaver Falls BE - 1942-1949 - The Manhattan District History indicates that the McDanel Refractory was used to fabricate oddly shaped beryllium crucibles or beryllium crucible stopper rods for the Manhattan Project.

•PA **Nuclear Materials and Equipment Corp.** Apollo AWE/BE - BE 1960-1968; AWE 1957-1983 - The Nuclear Material and Equipment Company (NUMEC) began operations at the Apollo and Parks Township facilities in the late 1950s. The Atlantic Richfield Company (ARCO) purchased the stock of NUMEC in 1967. In 1971, Babcock & Wilcox (B&W) purchased NUMEC and is the current owner of the Apollo and Parks Township facilities. NUMEC processed unirradiated uranium scrap for the AEC in the 1960s. This facility also provided enriched uranium to the naval reactors program and included a plutonium plant, plutonium plant storage area, highly enriched uranium fuel facility, metals and hafnium complex and a uranium hexafluoride storage area. The facility also fabricated plutonium-beryllium neutron sources. The B&W Apollo facility ceased manufacturing nuclear fuel in 1983.

•PA **Nuclear Materials and Equipment Corp.** Parks Township AWE/BE - BE 1960-1968; AWE 1957-1980 - The Nuclear Material and Equipment Company (NUMEC) began operations at the Apollo and Parks Township facilities in the late 1950s. The Atlantic Richfield Company (ARCO) purchased the stock of NUMEC in 1967. In 1971, Babcock & Wilcox (B&W) purchased NUMEC and is the current owner of the Apollo and Parks Township facilities. The primary function of the NUMEC Parks Township facility was the fabrication of plutonium fuel, the preparation of high-enriched uranium fuel, and the production of zirconium/hafnium bars. The Parks Township facility ceased fuel fabrication activities in 1980.

•PA **Penn Salt Co.** Philadelphia AWE - 1953-1956 - Pennsylvania Salt experimented with samples of fluoride containing byproducts from AEC operations to determine if they could be used for hydrogen fluoride production or to extract uranium from the material.

・PA **Philadelphia Naval Yard** Philadelphia AWE



•PA **Shippingport Atomic Power Plant** Shippingport DOE - 1984-1995 - Shippingport Atomic Power Station, located in Shippingport, Pennsylvania, was one of the first large-scale nuclear power plants in the world. Naval Nuclear Propulsion program.

•PA **Superior Steel Co.** Carnegie AWE - 1952-1957 - Superior Steel produced uranium strip and rolled uranium slabs for use by the Savannah River Laboratory. In 1955, for example, they hot rolled twenty-five tons of uranium into strip.

•PA U.S. Steel Co., National Tube Division McKeesport AWE 1959-1960 - Tests at the Christy Park Works, National Tube Division of the U. S. Steel Corporation, conducted in 1959 and 1960, demonstrated that rotary piercing of uranium was possible. The tests were conducted for National Lead of Ohio (Fernald).

•PA **Vitro Manufacturing** Cannonsburg AWE/BE - 1942-1959 - Starting in 1948, Vitro was under contract to recover uranium from scrap. In the period from 1954-1956, Vitro had a contract to process production quantities of radioactive material (UF4) for National Lead of Ohio (Fernald). Vitro continued to provide uranium to the Atomic Energy Commission under various contracts through 1959. Canonsburg was a major uranium milling facility and although the EEOICPA definition of an Atomic Weapons Employer excludes mining and milling, this site is covered because of its scrap processing activities performed under contract to the Atomic Energy Commission. A 1948 document indicates that General Electric shipped scrap containing beryllium to the Canonsburg site. The Canonsburg site is one of 24 former uranium mill sites designated for Department of Energy remediation by the Uranium Mill Tailings

Radiation Control Act (UMTRA).

•PA **Westinghouse Atomic Power Development Plant**[169] East Pittsburgh AWE - 1942 -1944 - Westinghouse prepared uranium metal for Enrico Fermi's Stagg Field experiment and conducted development and pilot-scale production of uranium oxide fuel elements.

•PA **Westinghouse Nuclear Fuels Division**[170] or Westinghouse Commercial Manufacturing Cheswick AWE - 1971-1972 - The Westinghouse Nuclear Fuels Division received shipments of nuclear materials from the AEC nuclear weapons complex in 1971 and 1972. The Cheswick site received a shipment of enriched uranium from the AEC's Fernald plant in 1971. It also received a shipment of plutonium in 1972 from the West Valley facility. This plutonium originated out of Hanford. Because this material came from the nuclear weapons complex, the site qualifies as an Atomic Weapons Employer for these years.

•PR **BONUS Reactor Plant**[171] Punta Higuera DOE - 1964-1968 - The Boiling Nuclear Superheat Reactor (BONUS) was licensed from April 2, 1964 to June 1, 1968. Full power operation began in late 1965 and stopped in July 1967. The plant was Atomic Energy Commission/Department of Energy owned; it was not regulated by the Nuclear Regulatory Commission. Plutonium has been recovered from reactor fuel.

169**SEC Petition Evaluation Report : Petition SEC-00096 : Westinghouse Atomic Power Development Plant** / Daniel H. Stempfley. National Institute for Occupational Safety and Health, 2009. - 48 pp.

170**Former Westinghouse workers qualify for nuclear payment** / Jennifer Gross, Valley news dispatch, Wednesday, January 15, 2003. Pittsburgh Tribune-Review
- http://www.pittsburghlive.com/x/valleynewsdispatch/s_112868.html#ixzz1dCJh89Tn

171DOE: **BONUS, Puerto Rico, Decommissioned Reactor**. 2009. - 2. pp.

•PR **Puerto Rico Nuclear Center** Mayaguez DOE - 1957-1976 - The Puerto Rico Nuclear Center (also known as the Center for Energy and Environment Research) was established in 1957 as a nuclear training and research institution. The facility included a one megawatt MTR research reactor, which became operational in 1960. During the next ten years, the AEC supported training and research activities at an annual level of approximately $2 million. The MTR was shut down in 1971 and replaced a two megawatt TRIGA research reactor. Except for brief periods of time, TRIGA was never operated at power levels in excess of 1.2 megawatts. In 1976, the facility was renamed the Center for Energy and Environmental Research (CEER) and the mission was broadened to include research, development and training for both nuclear and non-nuclear energy technologies. The programs were transferred to the University of Puerto Rico at that time. The TRIAGA reactor was shut down on September 30, 1976 and a program for decommissioning and removal of the reactor was initiated. Contractors: University of Puerto Rico (1957-1976) , BNI(1987), Cleveland Wrecking Caribe, Inc. (1987).
•RI **C.I. Hayes, Inc.** Cranston AWE - 1964 - In 1964, C.I. Hayes Inc. handled uranium metal under subcontract to the National Lead Company.

•SC **Savannah River Site** Aiken DOE - 1950-. - From 1950 until the late 1980s, the Savannah River Site conducted multiple operations that played a vital role in the U.S. nuclear weapons complex. Of greatest importance were the production of plutonium and tritium. Many facilities were built at SRS to support these production efforts and to address their resulting environmental impacts. They include five nuclear reactors, two chemical separation plants (also known as canyons), a nuclear fuel and target fab-

rication facility, a heavy water plant, and waste management facilities. In addition, SRS is the location of the Savannah River Technology Center and the Savannah River Ecology Laboratory. SRS remains a key Department of Energy facility with an important national security mission of maintaining the nation's nuclear weapons stockpile and ensuring future production capabilities. Throughout the course of its operations, the potential for beryllium exposure existed at this site, due to beryllium use, residual contamination, and decontamination activities. The High Level Waste Tanks at SRS are considered by DOE and South Carolina Department of Health and Environmental Control (SCDHEC) to be the greatest human health risk in South Carolina. Contractors: Westinghouse Savannah River Company (1989-present); E. I. Du Pont de

Nemours and Company (1950-1989)

•SD **Ellsworth Air Force Base, Rushmore Air Force Station**[172] Meade AWE - National Nuclear Weapons Stockpile Site

•SD **Ore Buying Station at Edgemont** Edgemont DOE - 1952-1956 - The ore buying station at Edgemont purchased uranium ore for the AEC. The American Smelting and Refining Company (ASRC) managed and operated the Edgemont station from November 1952 to January 1956. Lucius Pitkin replaced ASRC as the M&O contractor in February 1956. The Mines Development Corporation purchased the ore buying station on July 12, 1956. Contractors: American Smelting and Refining Company (1952-1956); and Lucius Pitkin, Inc. (1956).

•Tennessee **Clarksville Facility**[173] Clarksville DOE - 1949-1967 - The Clarksville

172 **Ammunition and Explosives Storage for the Navy (1939-1989) and the Air Force (1946-1989)**, 2008. - 200 pp. - http://www.denix.osd.mil/cr/upload/af-navy-ammunition-storage-public-rfs_pg1-200_rev.pdf

173 ORAU TEAM Dose Reconstruction Project for NIOSH: **Site Profile for Clarksville Base Weapons Storage Area and Modification Center with Supplementary Guidance for Medina Base** / Ronald J. McConn, Jr., Eva Eckert Hickey, Richard J. Traub, Jerome B. Martin, and Donald E. Bihl., 2006. - 69 pp.

Modification Center was established in 1958 for the purpose of testing and modifying the components of nuclear weapons. The Center was located near Clarksville, TN, on a corner of the Ft. Campbell, KY, military reservation. Prior to 1958 some buildings were used by the AEC for storage. The Clarksville Modification Center was closed in September 1965 and its functions were transferred to Pantex and Burlington. In 1967 the AEC surrendered control of the area back to the Army. Contractors: Mason & Hanger-Silas Mason (1958-1965); Sandia Corporation was the storage contractor (1949-1967).

•TN **Clarksville Base**[174], Campbell AFB AWE - National Nuclear Weapons Stockpile

Site.

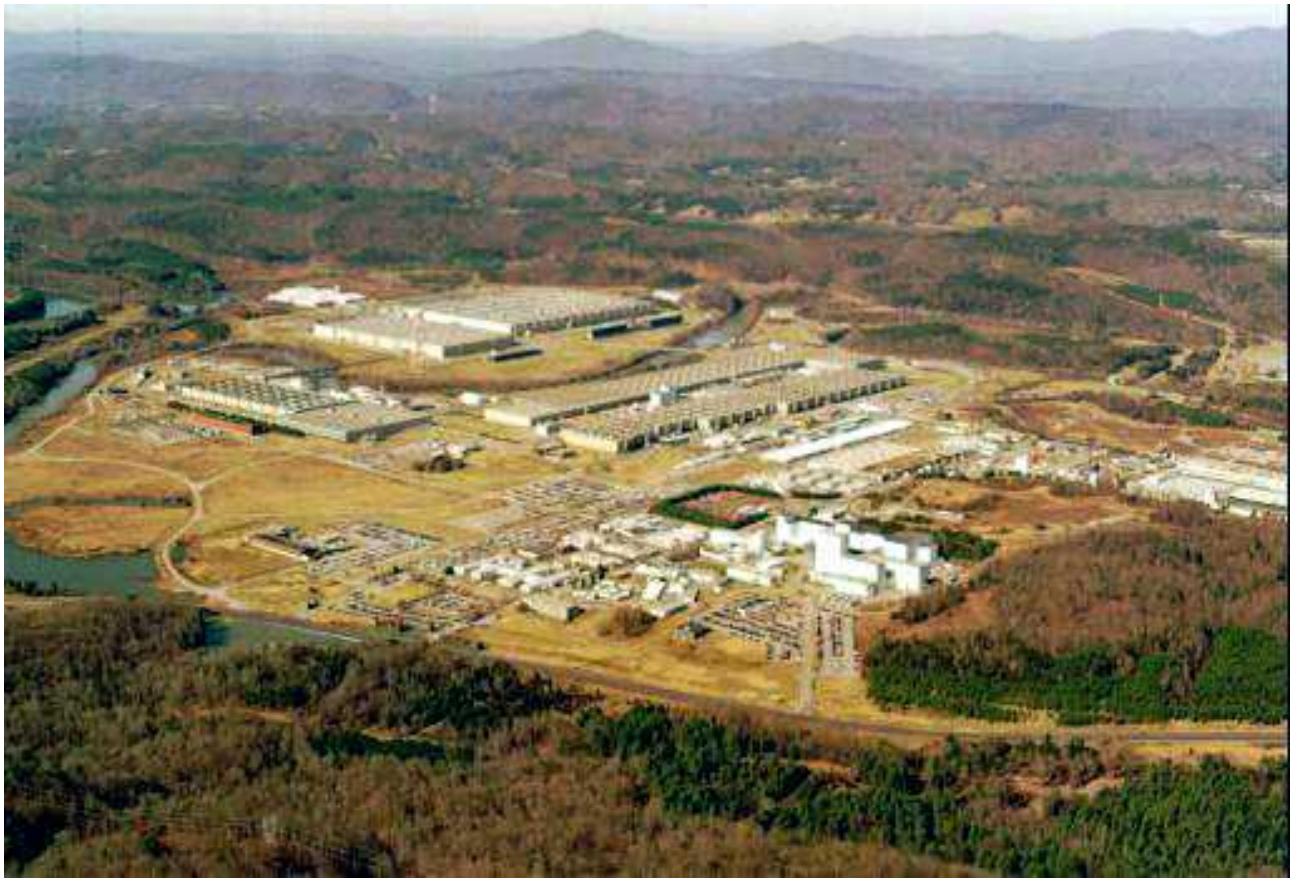
•TN **Holston Army Ammunition Plant**[175] Kingsport, Sullivan – DOD - The Holston Army Ammunition Plant, also known as the Holston Ordnance Works, was constructed by Tennessee Eastman in Kingsport, Tennessee to manufacture explosives during World War II. BAE Systems' division Ordnance Systems, Inc. currently operates the plant under a 25-year facilities use contract. Among the many unique products produced here are the explosive powders used to trigger nuclear weapons.

•TN **Manufacturing Sciences Corporation** BE - 1992-1994 - Manufacturing Sciences Corporation performed beryllium work for Los Alamos National Laboratory.

174 **Ammunition and Explosives Storage for the Navy (1939-1989) and the Air Force (1946-1989)**, 2008. - 200 pp.
- http://www.denix.osd.mil/cr/upload/af-navy-ammunition-storage-public-rfs_pg1-200_rev.pdf

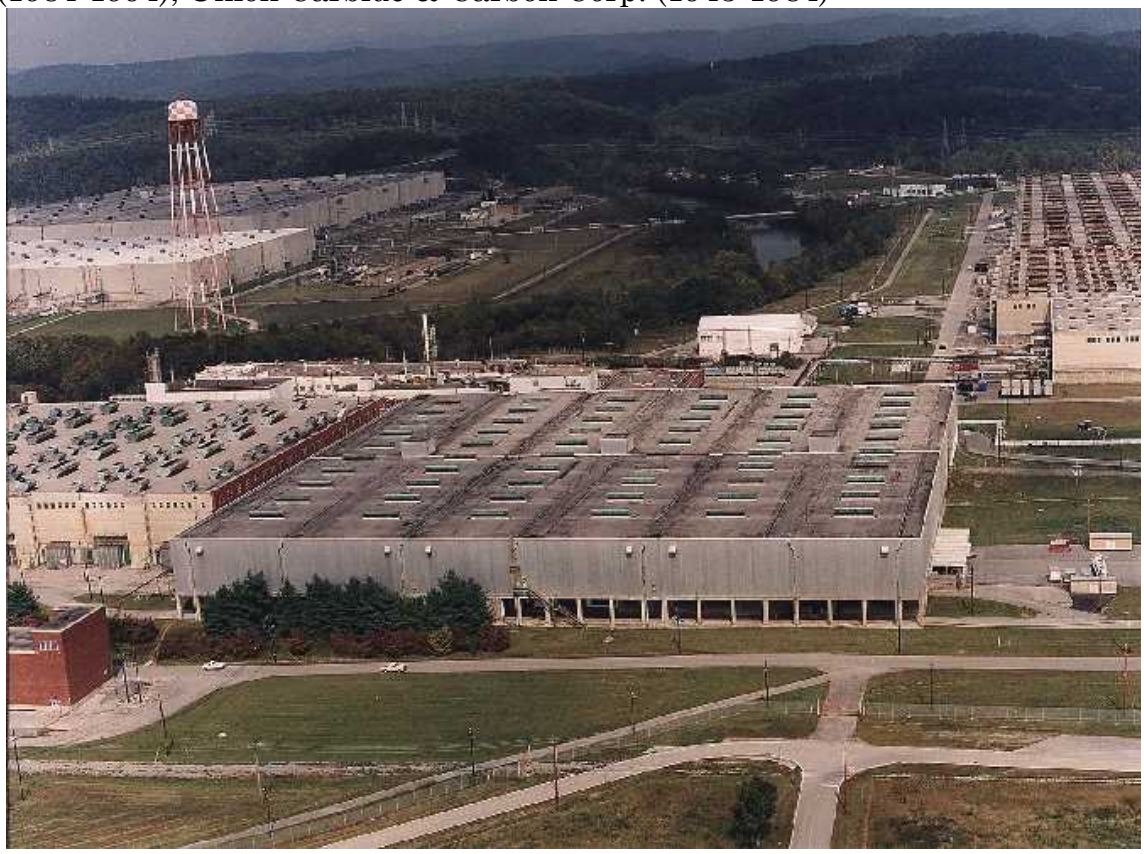
175The U.S. Army Materiel Command: **The Metal Book**. 2007. - 39 s.

'MSC's manufacturing plant is a fully integrated manufacturing facility with the capacity to melt, cast, roll or machine products from many specialty metals such as steel, aluminum, uranium, tantalum, and niobium. MSC remains the sole commercial facility in the world with the capability to cast, roll and machine products from depleted uranium (DU). While DU accounts for approximately half of MSC's annual sales revenue, the rolling and manufacturing of specialty metals is an important and growing component of our business.'



•TN **Oak Ridge Gaseous Diffusion Plant** (K-25) Oak Ridge DOE - 1943-1987; 1988-. - The K-25 gaseous diffusion plant at East Tennessee Technology Park (ETTP) was built as part of the World War II Manhattan Project to supply enriched uranium for nuclear weapons production. Construction of the ETTP started in 1943 with the ETTP Building, the first diffusion facility for large-scale separation of uranium-235. The ETTP Building was fully operable by August 1945. Additional buildings involved in the enrichment process were operable by 1956. Along with the plants in Paducah, KY, and Portsmouth, OH, the site was used primarily for the production of highly-enriched uranium for nuclear weapons until 1964. From 1959 to 1969, focus shifted to the production of commercial-grade, low-enriched uranium. In 1985, declining demand for enriched uranium caused the enrichment process to be placed on standby. In 1987, the process was stopped permanently (K-29). The ETTP was also a host for centrifuge facilities constructed as part of a program to develop and demonstrate uranium-enrichment technology. These facilities have also been shut down. Contractors: URS/CH2M Oak Ridge LLC (UCOR)(2011-present); Bechtel Jacobs (1998–2011);

Lockheed Martin Energy Systems, Inc. (1994-1998); Martin Marietta Energy Systems, Inc. (1984-1994); Union Carbide & Carbon Corp. (1943-1984)



・TN **Oak Ridge Plant** (K-29)

・TN **Oak Ridge Plant** (K-31)

・TN **Oak Ridge Plant** (K-33)

Source: Gloria Ingleman Collection

•TN **Oak Ridge Hospital**[176] Oak Ridge DOE - 1943-1959 - Originally a US Army Hospital for the Manhattan Project workers, this facility was operated for the AEC by Roane-Anderson Co. In 1959, ownership of the hospital was privatized and its operation taken over by the Oak Ridge Hospital of the Methodist Church.

176 **The President's Advisory Committee**

In January 1994 President Clinton convened an Advisory Committee to investigate the accusations surrounding the human radiation experiments. In their final report presented to the president on 3 October, 1995, the Committee found that up to the early 1960s it was common for physicians to conduct research on patients without their consent.

The Committee's harshest criticism was reserved for those cases in which physicians used patients without their consent in experiments in which the patients could not possibly benefit medically. These cases included the 18 people injected with plutonium at Oak Ridge Hospital in Tennessee, the University of Rochester in New York, the University of Chicago, and the University of California at San Francisco, as well as two experiments in which seriously ill patients were injected with uranium, six at the University of Rochester and eleven at Massachusetts General Hospital in Boston. The plutonium and uranium experiments undoubtedly put the subjects at increased risk for cancer in ten or twenty years' time.

The Human Radiation Experiments: Final Report of the Advisory Committee on Human Radiation Experiments. Oxford University Press, New York, 1996.

National Security Archive. 1981 **Hearings on the Human Total Body Irradiation Program at Oak Ridge before the Subcommittee on Investigations and Oversight of the House Science and Technology Committee**, 97th Cong., 1st Sess. (Sept. 23, 1981).

The Human Radiation Experiments : How scientists secretly used US citizens as guinea pigs during the Cold War / Alan R Cantwell Jr., M.D. New Dawn No. 68 (September-October 2001.

SEC Petition Evaluation Report Petition SEC-00137 : Oak Ridge Hospital in Oak Ridge, Tennessee/ Lara Hughes. National Institute for Occupational Safety and Health, 2009. - 46 s.

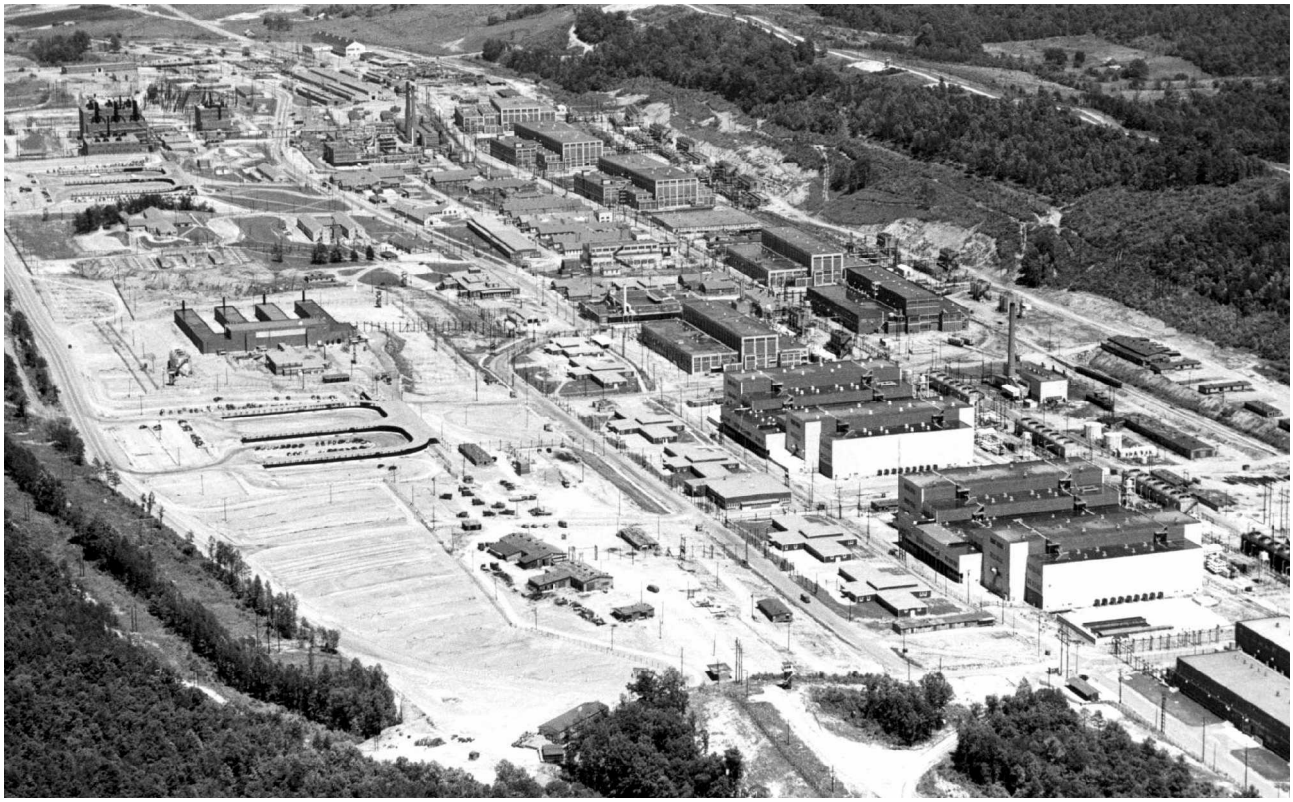
•TN **Oak Ridge Institute for Science Education** Oak Ridge DOE - 1946-. - Oak Ridge Associated Universities (ORAU) was established in 1946 to manage the Oak Ridge Institute for Nuclear Studies (ORINS). It is a private, not-for-profit consortium of 88 colleges and universities with a mission to provide and develop capabilities critical to the nation's technology infrastructure, particularly in the areas of energy, education, health, and the environment. In 1966, ORINS became known by the name of the operating contractor, ORAU. In the early 1990s, the name was changed to ORISE, the Oak Ridge Institute for Science Education. The South Campus Facility was originally established to study accidental irradiation of cattle during testing of the first atomic bomb near Alamogordo, New Mexico. This facility was also known as the Agricultural Research Laboratory and Farm and then as the Comparative Animal Research Laboratory (CARL). It was operated by the University of Tennessee for the Atomic Energy Commission until it was assigned to ORAU and ORISE in 1981.

•TN **Oak Ridge National Laboratory** [177](X-10) Oak Ridge DOE - 1943-. - During the Manhattan project, the Oak Ridge National Laboratory (ORNL) site was used by the University of Chicago Metallurgical Laboratory to construct the first pile semiworks - a test plant that would move the plutonium product process from the research stage to large scale production. DuPont began construction of the test pile, the X-10 reactor in March 1943 and was ready for operations by January 1944. A research facility designated as the Clinton Laboratories was built during the war to support X-10 reactor activities and included chemistry, health and engineering divisions. After the war, the laboratory was transformed from a war production facility to a nuclear research center and changed its name to Oak Ridge National Laboratory in 1948. The Laboratory's research role in the development of nuclear weapons decreased over time, but the scope of its work expanded to include production of isotopes, fundamental hazardous and radioactive materials research, environmental research, and radioactive waste disposal. Throughout the course of its operations, the potential for beryllium exposure existed at this site, due to beryllium use, residual

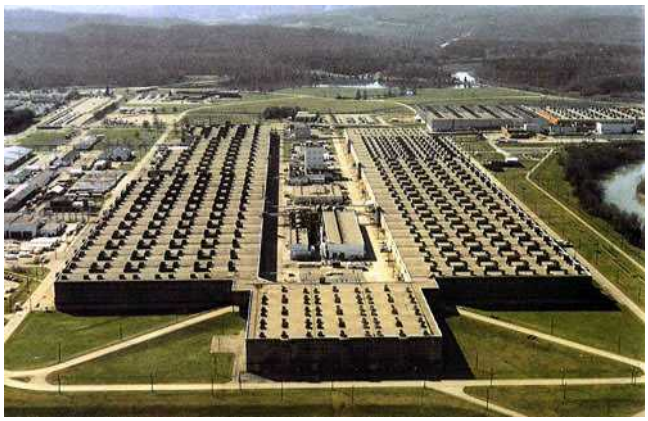
177U.S. Department of Energy, Office of Environment, **Safety, and Health: Independent Investigation Of The East Tennessee Technology Park**, October 2000.
"Conservative estimates indicated that 35,000 pounds of uranium were released into the air from all sources. 4,300 pounds of uranium a month was unaccounted for or released to the environment. ETTP operates an incinerator which handles radioactive, hazardous and uranium-contaminated PCB wastes. ETTP generated transuranic elements (isotopes with atomic numbers greater than uranium) such as neptunium-237 and plutonium-239; fission products such as techneitum-99; PCBs; toxic metals; and volatile organic compunds such as trichloroethene (TCE) and present risk to the public".
DOE National Laboratory restructuring : hearing before the Subcommittee on Basic Research of the Committee on Science, U.S. House of Representatives, One Hundred Fourth Congress, first session, on H.R. 884 to authorize retirement incentives for certain employees of the national laboratories and H.R. 2301 to designate an enclosed area of the Oak Ridge National Laboratory in Oak Ridge, Tennessee as the "Marilyn Lloyd Environmental, Life and Social Sciences Complex." (1996).
Robinson, George O.: **The Oak Ridge story**; the saga of a people who share in history.
- Kingsport, Tenn., Southern Publishers, 1950. - 222 pp.

contamination, and decontamination activities. Contractors: University of Chicago (1943-1945); Monsanto Chemical (1945-1947); Union Carbide and Carbon Corp. (1948-1984); Martin Marietta Energy Systems (1984-1994); Lockheed Martin Energy Research Corp. (1994-1998); UT Battelle (2000-present)

•TN **Office of Scientific and Technical Information** (OSTI) Oak Ridge DOE - 1957-. - The Office of Scientific and Technical Information was created to serve as a federal government repository for all technical reports pertaining to the Department of Energy and its predecessor agencies.



•TN **Tennessee Eastman Company** now Eastman Chemical Company, Kingsport AWE - Tennessee Eastman was hired by the Army Corps of Engineers to manage Y-12 during the Manhattan Project. The company operated the plant from 1943 to May 1947.



•TN **S-50 Oak Ridge Thermal Diffusion Plant**[178] Oak Ridge DOE - The S-50 Plant at Oak Ridge was constructed in 1944 to enrich uranium feed material for the Y-12 electromagnetic facility using a liquid thermal diffusion process. The process was originally developed at the Naval Research Laboratory in Washington, DC, and tested on a pilot plant level at the Philadelphia Naval Shipyard. Located near the K-25 gaseous diffusion facility, the S-50 Plant operated for a limited period during 1944-1945. The plant was closed in September 1945 because the thermal diffusion process was not as efficient as the gaseous diffusion. The S-50 plant was reopened in 1946 as part of the joint Air Force/AEC project to investigate the possibility of developing a nuclear-powered airplane. This project, known as Nuclear Energy for the Propulsion of Aircraft (NEPA), was housed at S-50 and the contractor was the Fairchild Engine and Aircraft Corporation. Fairchild's NEPA Division at S-50 conducted a number of experiments involving beryllium powder during the time period 1946-1951.

•TN **Vitro Corp. of America** Chattanooga AWE/BE - BE 1959-1965; AWE 1957-1968 - Records indicate that "Vitro Corporation" of Chattanooga, TN performed some beryllium work for Y-12 during the period 1959-1965. A 1962 document also mentions that the AEC met with members of the beryllium industry, including representatives from "Vitro Chemical" (no address), but does not mention whether any contracts were involved in these discussions. The original owner of this site was Heavy Metals Inc. and possessed an AEC license to process uranium and thorium products beginning as early as 1957. Documentation indicates that the company provided price quotes to the AEC for thorium products as early as 1954, but there is no indication that it received a contract for that work. Vitro Chemical of Chattanooga, TN, a subsidiary of Vitro Corporation, took over the site at the end of 1959 and was under contract to the AEC to produce thorium metal, thorium fluoride and thorium oxide. The current owner, W.R. Grace, purchased the site in 1965 and continued operations until 1983, but records do not reveal any weapons-based link after 1968. The State of Tennessee took over licensing of this site in 1968. In 1953 Vitro acquired the Kellex Corporation, a company involved in the development of the nuclear bomb. The same year the company reorganised as the Vitro Corp. of America. One of Vitro's earliest customers was the United States Navy, a relationship which continued into the 1990s. In 1968 Vitro was acquired by Automation Industries Inc and renamed Vitro Engineering Corp. In 1978 Automation Industries and its Vitro subsidiary were acquired by General Cable Corp, which renamed the new company GK Technologies. In 1981 GK Technologies (including Vitro) was acquired by the Penn Central Corporation. Penn Central had emerged from bankruptcy without its failing rail businesses (acquired by Federal government) and diversified into defense and other businesses. By the early 1990s Penn Central had begun to focus on financial services and in 1992 announced it was divesting Vitro. In 1993 Tracor completed its purchased of Vitro for $94 million. The Vitro acquisition almost doubled the size of Tracor. Vitro merged with Tracor Applied Sciences to form Tracor Systems Technologies, Tracor's largest subsidiary. In July 1998 the British electronics conglomerate GEC plc purchased Tracor. In November 1999 GEC merged its defense arm (including Tracor) with British Aerospace to form BAE Systems.

•TN **W. R. Grace** Erwin AWE - 1958-1970 - The Davison Chemical Division of W.R. Grace Co. (later Nuclear Fuel Services) processed unirradiated uranium scrap for the

178**SEC Petition Evaluation Report: Petition SEC-00060** / Christopher J. Miles, Michael S. Kubiak. 2006. - 15 s.

AEC, recovering enriched uranium from it for use in the nuclear weapons complex. Correspondence from 1963 also indicates that the company also worked with thorium, which was associated with their work for the civilian nuclear reactor industry and the naval reactors program.[179]

•TN **Watts Bar Nuclear Generating Station**[180] Spring City DOE – 1973-. - The Watts Bar Nuclear Generating Station is a Tennessee Valley Authority (TVA) nuclear reactor used for electric power generation and tritium production for nuclear weapons.

179**Residents file lawsuit against NFS Erwin nuclear fuel plant**

Attorneys from three states filed a class action lawsuit today (June 13) against Erwin's Nuclear Fuel Services, claiming emissions from NFS are to blame for high rates of cancer. The attorneys are fighting for their clients to get compensation for personal injury and property damage.

"No one wants to face the truth here and the truth is, I have highly enriched uranium on my property and I am 21 river miles downstream," says Park Overall who's one of the main advocates of the lawsuit against Nuclear Fuel Services. "I began to hear about all this cancer here, and we started to look into it. These chemicals and radioactive isotopes are related to particular cancers that we have too much of in the area." Overall says Monday's filing of the class action lawsuit is the biggest step so far for the Erwin Citizens Awareness Network (ECAN). ECAN is a group that's researched NFS's emissions dating back to 1954. (Tricities June 13, 2011)

Adkins, et al. v. W.R. Grace & Company, No. 2:11-CV-00173 (E.D. Tenn.)

180**Final Supplemental Environmental Impact Statement June 2007**: Completion and Operation of Watts Bar Nuclear Plant Unit 2.Rhea County, Tennessee. Tennessee Valley Authority, 2007. - 176 pp.

•TN **Y-12 Plant**[181] Oak Ridge DOE - 1942-. - Built in a rural section of East Tennessee, the Y-12 National Security Complex, previously known as the Oak Ridge Y-12 Plant, was part of the Manhattan Project. Its job was to process uranium for the first atomic bomb. Construction of Y-12 started in February 1943; enriched uranium production started in November of the same year. Construction, however, was not entirely finished until 1945.The first site mission was the separation of uranium-235 from natural uranium by the electromagnetic separation process. The magnetic separators were taken out of commission at the end of 1946 when gaseous diffusion became the accepted process for enriching uranium. Since World War II, the number of buildings at Y-12 has doubled. Its missions have included uranium enrichment, lithium enrichment, isotope separation and component fabrication. For more than 50 years, Y-12 has been one of the DOE weapons complex's premier manufacturing facilities. Every weapon in the stockpile has some components manufactured at the Y-12 National Security Complex. Contractors: BWXT (2000-present); Lockheed Martin Energy Systems (1994-2000); Martin Marietta Energy Systems (1984-1994); Union Carbide & Carbon Corp. (1947-1984); Tennessee Eastman Corp. (TEC) (1943-1947).

181 **Evaluation of Iodine-131 Releases from the Oak Ridge Reservation Public Health Assessment** / Prepared by: Site and Radiological Assessment Branch. Division of Health Assessment and Consultation. Agency for Toxic Substances and Disease Registry, 2008. - 123 pp. 'Due to a lack of information, ATSDR cannot determine whether people living off site could have been harmed from breathing elemental mercury from 1950 through 1963, swallowing water with inorganic mercury from East Fork Poplar Creek from 1953 to 1955, and eating fish with organic mercury during the 1950s and 1960s.'

•TX **AMCOT**[182] Fort Worth[183] AWE - 1961-1962 - The American Manufacturing Company of Texas (AMCOT) conducted specialized tube elongation and billet piercing tests on uranium metal for National Lead Company of Ohio (Fernald). The tube elongation tests were conducted from July to September 1961 and involved approximately 7 tons of uranium. The billet piercing tests were conducted from June to September 1962 and involved approximately 23 tons of uranium.

•TX **Bossier Base**, Barksdale AFB[184] AWE - National Nuclear Weapons Stockpile Site. On November 1, 1949, Barksdale was reassigned to Strategic Air Command (SAC), and became home of Headquarters Second Air Force. The Bossier Base, now The East Reservation was formerly a Defense Atomic Support Agency.

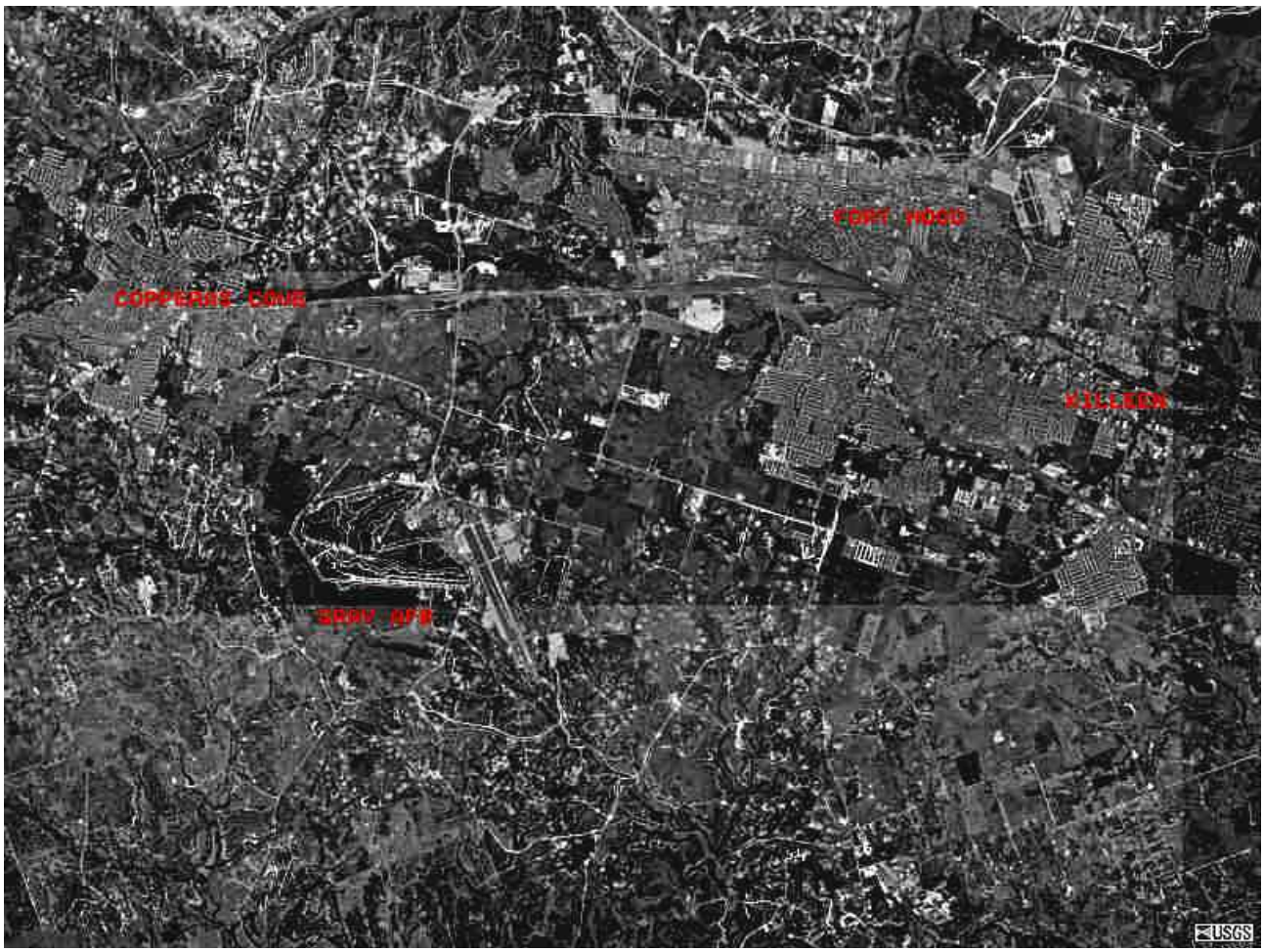
182 **Formal Elimination Report for The Former American Manufacturing Company of Texas (AMCOT) in Fort Worth, Texas**. U.S. Department of Energy. Office of Environmental Restoration, undated. - 5 pp.

183 **High-Level Worries** : Environmentalists from Sustainable Energy and Economic Development Coalition are still fighting a dump that could bring in much more nuclear waste than originally thought / / Betty Brink. Fort Worth Weekly. Wednesday, 22 December 2010.

184 **Ammunition and Explosives Storage for the Navy (1939-1989) and the Air Force (1946-1989)**, 2008. - 200 pp. - http://www.denix.osd.mil/cr/upload/af-navy-ammunition-storage-public-rfs_pg1-200_rev.pdf

•TX **Ft Hood, Killeen Base**[185] AWE - National Nuclear Weapons Stockpile Site. During the beginning of the cold war, Killeen Base was one of the Air Force's storage-and-assembly bases for nuclear weapons.

185 **Ammunition and Explosives Storage for the Navy (1939-1989) and the Air Force (1946-1989)**, 2008. - 200 pp. - http://www.denix.osd.mil/cr/upload/af-navy-ammunition-storage-public-rfs_pg1-200_rev.pdf



Gray Air Force Base near the AEC's Killeen Base (Site Baker), one of three National Stockpile Sites where nuclear weapons were stored at the time. Routine maintenance and assembly of nuclear weapons produced small quantities of contaminated wastes. These wastes were placed in lead-lined cylinders and stored in underground tubes.

•TX **Mathieson Chemical Co.**[186] Pasadena AWE

•TX **Medina Base**[187] San Antonio AWE - National Nuclear Weapons Stockpile Site - Medina Base, also known as the Medina Annex, at Lackland AFB in San Antonio Texas was initially a National Stockpile Site (NSS) constructed between 1953 and 1955. Texas hosted two of the original National Stockpile Sites (NSS). Killeen Base ("Site B") at Fort Hood, Texas, was the first of the initial three (with Manzano Base and Clarksville Base) to receive weapons, in 1948. The second NSS was Medina Base at Lackland AFB, San Antonio. The original storage area was constructed between 1953 and 1955. In 1959, the AEC built a Modification Center at Medina Base for disassembling weapons and storage operations for the military ceased. Lackland AFB

186 DOE: **FUSRAP Elimination Report for Mobil Mining and Minerals Company (The Former Mathieson Chemical Company) Pasadena, Texas.** Circa 1985. - 35 pp.

187 November 13, 1963, Atomic Energy Commission Storage Igloo, Medina Base, San Antonio, Texas
While three employees were dismantling the high explosive (HE) components of a nuclear bomb, they began burning spontaneously, triggering a large blast involving 120 pounds of HE. The explosion caused little contamination. **U. S. Nuclear Weapons Accidents** : Selected Accidents Involving Nuclear Weapons -1950-1993/ Jaya Tiwari and Cleve J. Gray. Greenpeace.
- http://www.cdi.org/issues/nukeaccidents/accidents.htm

Ammunition and Explosives Storage for the Navy (1939-1989) and the Air Force (1946-1989), 2008. - 200 pp. - http://www.denix.osd.mil/cr/upload/af-navy-ammunition-storage-public-rfs_pg1-200_rev.pdf

is part of Joint Base San Antonio, an amalgamation of the United States Army Fort Sam Houston, the United States Air Force Randolph Air Force Base and Lackland Air Force Base, which were merged on 1 October 2010.

•TX **Medina Facility** San Antonio DOE - 1958-1966 - The Medina Modification Center was established in 1958 for component testing, modification, repairs, and refinements. It operated until the early spring of 1966, at which point its functions were transferred to Burlington and Pantex. Contractor: Mason & Hanger-Silas Mason (1958-1966).

•TX **Pantex Plant**[188] Amarillo DOE

•TX **Sutton, Steele and Steele Co.**[189] Dallas AWE - 1951; 1959 - In 1951, AEC and AEC contractor personnel conducted tests at Sutton, Steele, and Steele, Inc. which were aimed at devising means of recovering uranium from low grade wastes and residues. The tests were to determine the feasibility of separating fused dolomite from

188 **Programmatic agreement among the U.S. Department of Energy/National Nuclear Security Administration/ Pantex site office, the Texas state historic preservation office, and the Advisory Council on Historic Preservation authorizing the Pantex plant. cultural resource management plan**. U.S. Department of Energy, National Nuclear Security Administration, Pantex Site Office. April 2004 - 74 pp.

National Institute for Occupational Safety and Health: **Pantex Plant Site Profile Review** / Prepared by S. Cohen & Associates. 2008. - 136 pp.

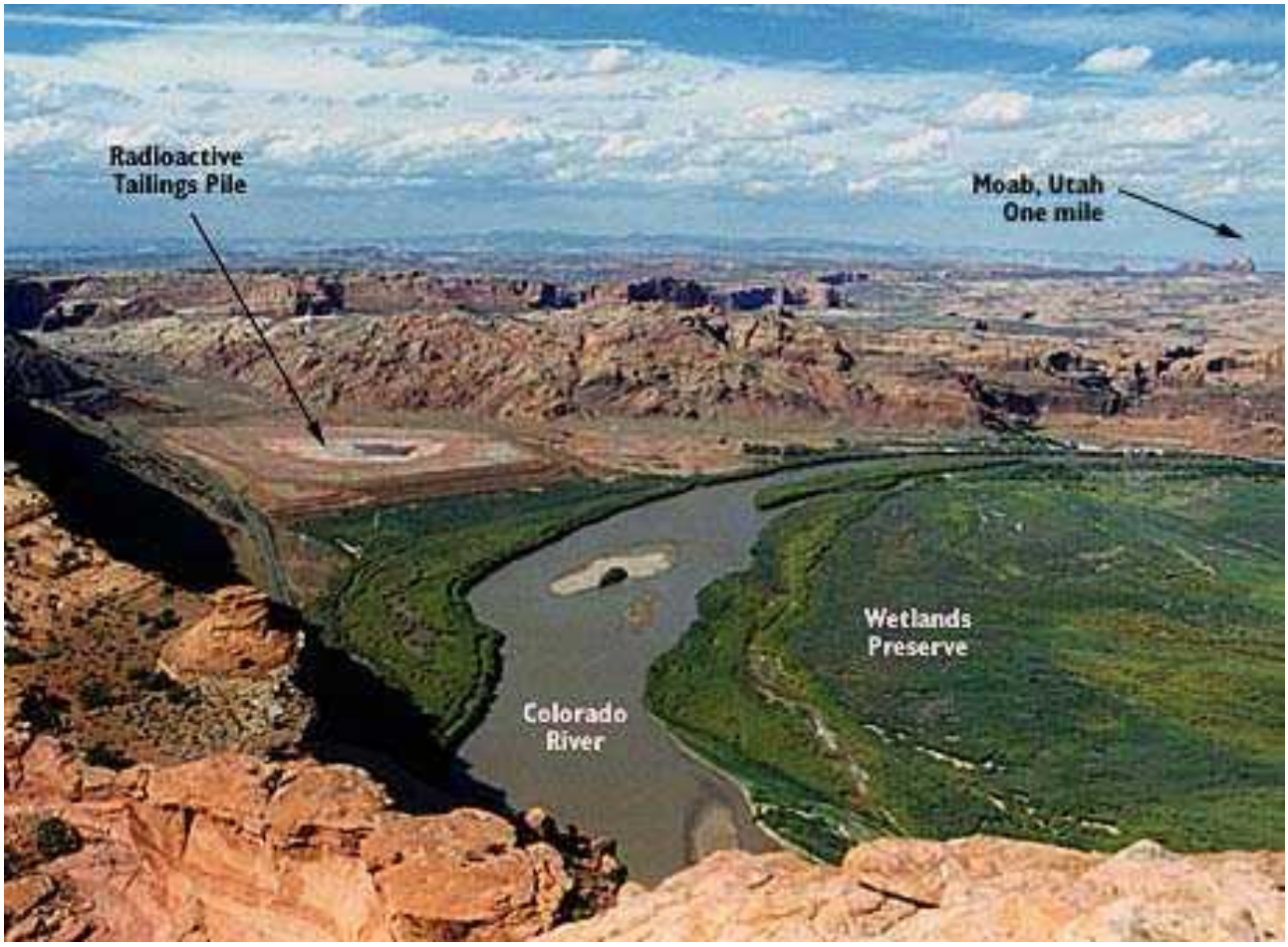
189 DOE Memorandum; Williams to File; **Elimination of the Sites from the Formerly Utilized Sites Remedial Action Program**; December 23, 1993. - 1 p.

- http://www.lm.doe.gov/Considered_Sites/Sutton_Steele_and_Steele_Co_-_TX_09.aspx

'In each case, the potential for radiological contamination above applicable guidelines is small. In each case the amounts of radioactive materials handled was small. Based on these considerations, these sites are hereby eliminated from further consideration under the Formerly Utilized Sites Remedial Action Program.'

magnesium floride slag and uranium. In 1959, National Lead of Ohio (Fernald) personnel evaluated Sutton, Steele, and Steele's dry tabling equipment for the separation of normal uranium shot.

•TX **Texas City Chemicals, Inc.**[190] Texas City AWE - 1953-1955 - Texas City Chemicals produced uranium by recovery of U3O8 from a phosphate fertilizer production plant. The AEC contracted with Texas City Chemicals for the recovery of uranium which was ultimately used in weapons production. The TCC plant encountered numerous problems during start-up of the fertilizer plant, and it produced a small amount of uranium for the AEC in the first few months of operation; full-scale uranium production was never realized due to problems with the fertilizer plant. TCC was operating at a loss and it ceased operations and filed for bankruptcy in U.S. District Court sometime in 1956. The court allowed the Smith-Douglas Corporation to acquire and reorganize TCC and reopen the plant later that year. Smith-Douglas did not pursue uranium work with the AEC.



• UT **Atlas Mill**[191], Moab DOE

• UT **Mexican Hat Mill Site** San Juan County, Utah DOE - The former Mexican Hat

190 **SEC Petition Evaluation Report Petition SEC-00088: Texas City Chemicals, Inc.** / Thomas P. Tomes. National Institute for Occupational Safety and Health, 2010. - 64 pp.

191 **Uranium mining left a legacy of death** / Jerry D. Spangler and Donna Kemp Spangler. Deseret News, Tuesday, Feb. 13, 2001. 'Engineers say cleaning up the mill tailings at a single site, the defunct Atlas mill on the banks of the Colorado River just outside of Moab, could cost $300 million.'

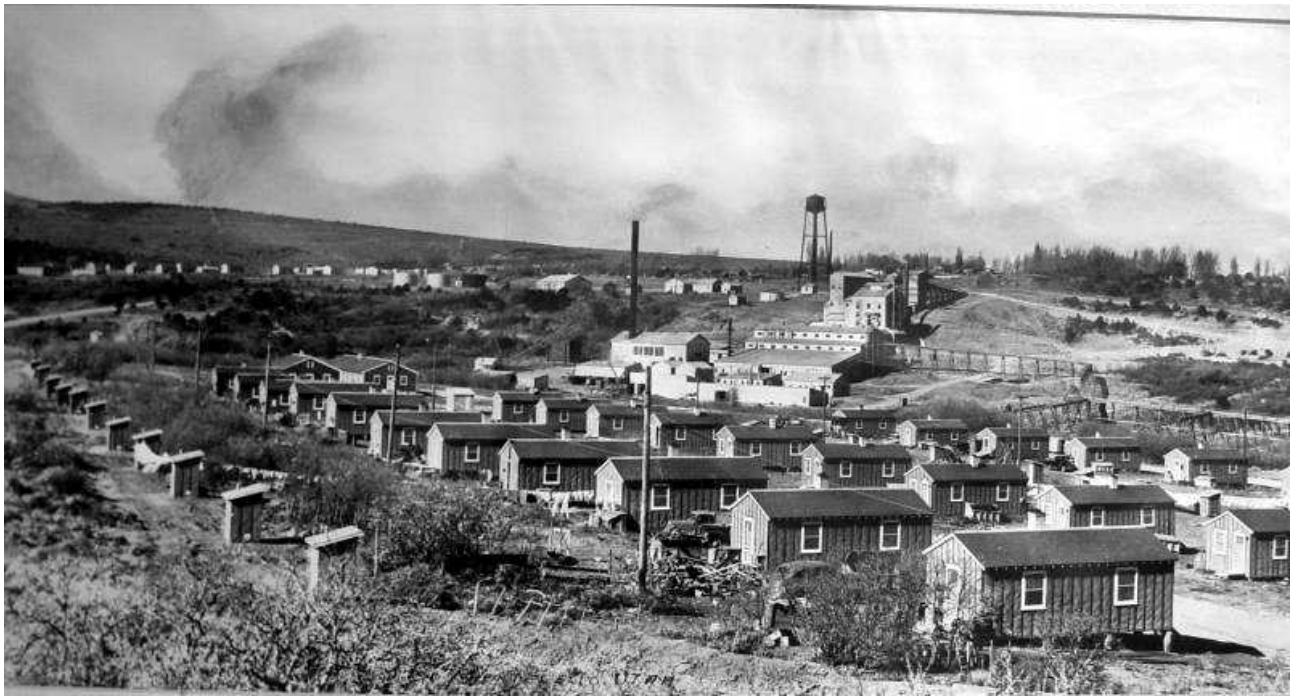
Atlas Mill Reclamation Task Force. **Decommissioning of Moab, Utah, Uranium Mill Tailings**. - http://www.wise-uranium.org/udmoa.html

uranium mill site is located on Navajo Nation land 1.5 miles southwest of Mexican Hat, San Juan County, Utah. The site is northeast of the town of Halchita, Utah.

•UT **The Mill at Moab Utah** Moab DOE 2001-. - The Moab[192] site is located about 3 miles northwest of the city of Moab in Grand County, Utah. The former mill site encompasses approximately 435 acres, of which about 130 acres is covered by the mill tailings pile. Through donation in 2011 of the adjacent private property to the south, the DOE property now consists of almost 500 acres. Other federally owned land now borders the site on the south. Sandstone cliffs border the site on the north and southwest. Under the National Defense Authorization Act for Fiscal Year 2001, Congress authorized the U.S. Department of Energy (DOE) to manage and reclaim the former uranium-ore processing site near Moab, Utah, under Title I of the Uranium Mill Tailings Radiation Control Act. DOE assumed ownership of the facility, now known as the Moab Project, on October 25, 2001. The U.S. Department of Energy has started a project to move 16 million tons of uranium tailings from the banks of the Colorado River, near the city of Moab, to a permanent disposal site 30 miles north, near the town of Crescent Junction.

192 **Geology of the Moab Region (Arches, Dead Horse Point and Canyonlands)** / Annabelle Foos. Geology Department, University of Akron. 1999. - 27 pp.
- http://www.nature.nps.gov/geology/education/foos/moab.pdf

Crescent Junction



Source: ABC 4 News

This project is called the Moab Uranium Mill Tailings Remedial Action (UMTRA) Project. DOE has established a newsletter called "Tailings Times" to keep the public informed of their ongoing activities at the Moab Site. Currently, S.M. Stoller Corporation, under its prime contract with DOE, and its teaming partner MFG. Contractors: MACTEC-ERS (October 31, 2001, to July 2002); S.M. Stoller, MFG Corporation, and Battelle. (July, 2002 – present).

•UT **Uranium Mill in Monticello**[193] Monticello DOE - 1941-1960 - The Vanadium Corporation of America (VCA) began construction of a vanadium mill in Monticello in 1941 in response to the increased demand for radioactive material brought about by World War II. In 1943, VCA began producing a uranium-vanadium sludge for the Manhattan Engineer District. It employed 200 workers until it closed in 1946. In 1948, the U.S. Federal Government purchased the mill and reopened it in 1949 as a converted uranium and vanadium processing plant. The AEC-owned processing mill at Monticello recovered uranium and vanadium from AEC-furnished ore. The Galigher Company became the Management and Operations (M&O) contractor for the mill in August 1949, one year after the AEC purchased it from the War Assets Administration. The National Lead Company, Inc., assumed responsibility for mill management and operations on April 1, 1956. The AEC shut down the mill and began decommissioning activities in 1960. Contractors: Galigher Company (1948-1956); and the National Lead Company, Inc. (1956-1960).

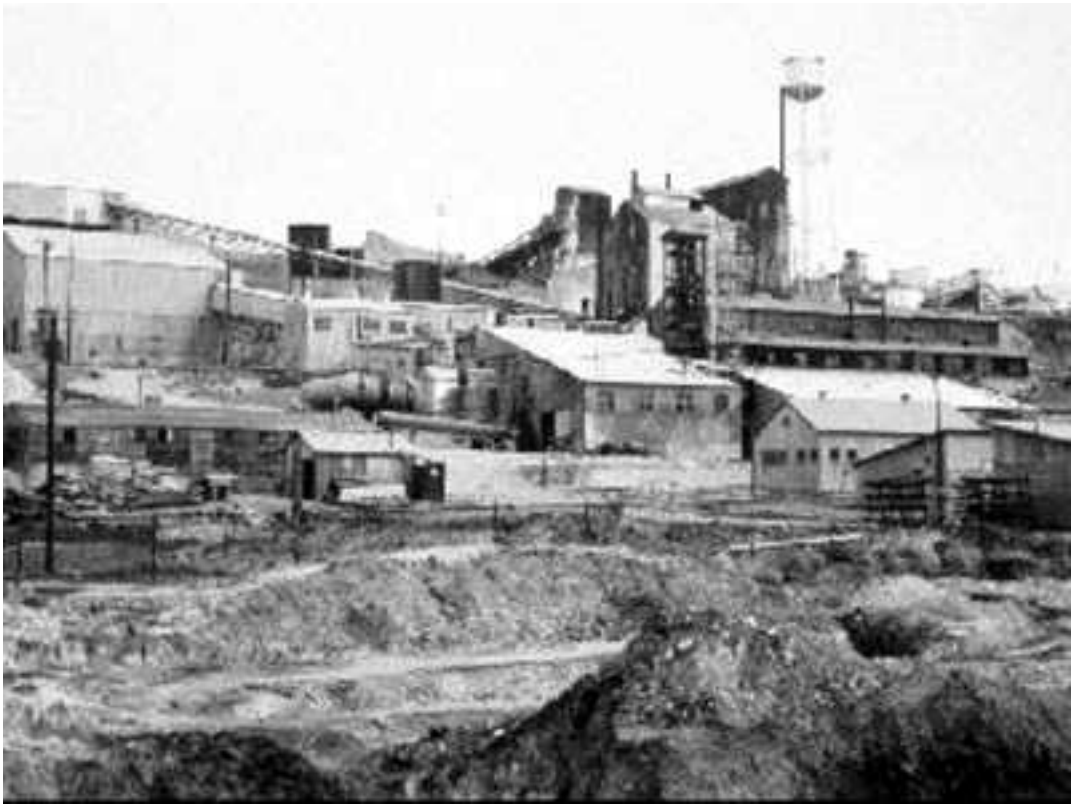
•UT **Ore Buying Station at Marysvale**[194] Marysvale DOE - 1950-1957 - The ore buying station at Marysvale purchased uranium ore for the AEC. The American Smelting and Refining Company (ASRC) managed and operated the Marysvale station from March 1950 to January 1956. Lucius Pitkin replaced ASRC as the M&O contractor in February 1956. The AEC leased the land on which the ore buying station sat from a private owner. Contractors: American Smelting and Refining Company

193 **Uranium mill blamed for cancer cluster in Monticello** / Brent Hunsaker. ABC 4 News. Updated: 5/07/2010 5:15 am | Published: 5/06/2010 11:03 pm.

194 **Marysvale Uranium Property (Terminated August, 2009)**. - http://www.dnimetals.com/properties/utah_marysvale.htm

(1950-1956); and Lucius Pitkin, Inc. (1956-1957).

•UT **Ore Buying Station at Moab** Moab DOE - 1954-1960 - The ore buying station at Moab purchased uranium ore for the AEC. The American Smelting and Refining Company (ASRC) managed and operated the Moab station from May 1954 to January 1956. Lucius Pitkin replaced ASRC as the M&O contractor in February 1956. The AEC leased the site, which is located adjacent to a Uranium Reduction Company mill, from a private owner. A second ore buying station located on the property of the Uranium Reduction Company mill site is not covered under EEOICPA. Contractors: American Smelting and Refining Company (1954-1956); and Lucius Pitkin, Inc. (1956-1960).



Source: Shades of hope for uranium's forgotten victims / Nathan Rice. The Daily Climate. 29 June 2010.

•UT **Ore Buying Station at Monticello**[195] Monticello DOE - 1948-1962 - The ore buying station at Monticello purchased uranium ore for the AEC. The American Smelting and Refining Company (ASRC) managed and operated the Monticello station from 1948 to January 1956. Lucius Pitkin replaced ASRC as the M&O contractor in February 1956. The AEC purchased the site in 1948 from the War Assets

195 Recent Cancer Cluster Investigations : Follow up study of cancer incidence in Monticello City, Utah – 1973-2004 - http://health.utah.gov/enviroepi/activities/EPHTP/ephtcc.htm

An Investigation of Cancer Incidence in Mapleton, Utah, 1978 - 2001. Utah Department of Health. Office of Epidemiology. Environmental Epidemiology Program, 2006. - 61 pp.

An Investigation of Cancer Incidence in Cottonwood Heights, Utah

An Investigation of Cancer Incidence in Monticello, Utah

Analysis of the Spatial Proximity of Childhood Leukemia to High Traffic Roads in Utah

An Investigation of Cancer Incidence in Sunset and Clinton, Utah, 1973-1999.

Geospatial Analysis of Cancer Rates in Residents Living OverContaminated Shallow Ground Water Plumes in Davis And Weber Counties 1973-2001.

Administration. Contractors: American Smelting and Refining Company (1948-1956); and Lucius Pitkin, Inc. (1956-1962).

•UT **Ore Buying Station at White Canyon** White Canyon DOE - 1954-1957 - The ore buying station at White Canyon purchased uranium ore for the AEC. The American Smelting and Refining Company (ASRC) managed and operated the White Canyon station from October 1954 to January 1956. Lucius Pitkin replaced ASRC as the M&O contractor in February 1956. The AEC leased the land for the ore buying station from the Bureau of Land Management (BLM). Contractors: American Smelting and Refining Company (1954-1956); and Lucius Pitkin, Inc. (1956-1957).

Ingalls Shipyard is one of the largest shipbuilding facilities in the United States. With over 10,000 workers, the yard is the state's largest private employer. Navy destroyers, cruisers, nuclear submarines, and numerous other types of vessels are built at this 800-acre shipyard, more than a square mile of intense heavy engineering, on the Mississippi Coast. Like many American Shipyards, it grew quickly during WWII, but unlike most others, it continued to grow after the war, peaking with 25,000 workers in 1977, as the Navy's busiest battleship building facility. It was operated by Litton Industries for many years, until Litton was acquired by Northrop Grumman in 2001. Northrop's other Gulf ship yard is the Avondale Yard, near New Orleans. Northrop also operates the largest shipbuilding yard in the US, at Newport News, Virgina. Source: CLUI Land Use Database.

•VA **Babcock & Wilcox Co.** Lynchburg AWE - 1959; 1968-1972 & 1985-2001 - Babcock and Wilcox Company's main plant at Mount Athos and the Lynchburg Research Center, also known as the Lynchburg Technology Center in Lynchburg, VA, performed work for a variety of Atomic Energy Commission (AEC) and DOE projects. Babcock and Wilcox Company's Nuclear Facilities Plant in Lynchburg, VA, participated in the AEC's Oxide Pellet Fabrication Program, which was managed by the New York Operations Office. Records indicate that shipments of enriched uranium were made to and from the Fernald facility during the years 1968-1972. The company also recovered highly enriched uranium from weapons scrap received from the DOE's Oak Ridge facility between 1985 and 1996. In 1997 the Babcock & Wilcox Company facility in Lynchburg, VA became the BWX Technologies facility. From 1998 to 2000, the company fulfilled a contract for the recovery of enriched uranium from scrap materials containing beryllium. The Lynchburg plant also participated in a DOE-

sponsored program called Project Sapphire, under which the plant had responsibility from 1995 to 2001 for downblending enriched uranium obtained from the government of Kazakhstan.[196]

•VA **Skiffes Creek Annex**[197], Yorktown Naval Weapons Station - AWE National Nuclear Weapons Stockpile Site

•WV **Huntington Ingalls Industries** AWE - Huntington Ingalls Industries HII is an American shipbuilding company formed on March 31, 2011 as a spin-off of Northrop Grumman. Formerly known as Northrop Grumman Shipbuilding NGSB, it was created on 28 January 2008 by the merger of Northrop Grumman's two shipbuilding sectors, Northrop Grumman Ship Systems and Northrop Grumman Newport News. HII is the sole designer, builder, and refueler of nuclear-powered aircraft carriers in the United States. It is one of two nuclear-powered submarine builders. 70% of the current, active US Navy fleet has been built by HII's erstwhile units.

Facilities

•Newport News Shipbuilding, Newport News, Virginia Nuclear Aircraft Carriers, Submarines, Overhaul

•Ingalls Shipbuilding, Pascagoula, Mississippi Surface Combatants, Amphibs, Coast Guard large cutters

•New Orleans, Louisiana Amphibs, Auxiliaries

•Virginia Beach, Virginia AMSEC, Fleet Support

•San Diego, California Continental Maritime, Fleet Repair & Support

•Gulfport, Mississippi Composite R&D, Composite Components

•Tallulah, Louisiana Components & Subassemblies

196 **Description of Project Sapphire**. / R. G. Taylor. Nuclear Criticality Safety Department. Health, Safety, Environment and Accountability Organization, 1995.- 9 s

197 **Ammunition and Explosives Storage for the Navy (1939-1989) and the Air Force (1946-1989)**, 2008. - 200 pp. - http://www.denix.osd.mil/cr/upload/af-navy-ammunition-storage-public-rfs_pg1-200_rev.pdf

•VA **Naval Station Norfolk**[198] Virginia AWE

•VA **Thomas Jefferson National Accelerator Facility** Newport News DOE - 1994- - The Thomas Jefferson National Accelerator Facility is a basic research laboratory built to probe the nucleus of the atom to learn more about the quark structure of matter. Contractor: Southeastern Universities Research Association, Inc. (1994-present) .

•VA **University of Virginia** Charlottesville AWE - 1942-1949; 1960s - The University of Virginia played an integral role in developing the process to use uranium in the development in nuclear weapons. The Naval Research Laboratory asked Dr. Jesse Beams, of UVA, about the possibility to using isotope separation by centrifuge for the enrichment process of uranium. He was

198 DOE Memorandum; Williams to File; **Elimination of the Sites from the Formerly Utilized Sites Remedial Action Program**; December 23, 1993. - 1 p.
- http://www.lm.doe.gov/Considered_Sites/Sutton_Steele_and_Steele_Co_-_TX_09.aspx
'In each case, the potential for radiological contamination above applicable guidelines is small. In each case the amounts of radioactive materials handled was small. Based on these considerations, these sites are hereby eliminated from further consideration under the Formerly Utilized Sites Remedial Action Program.'

able to successfully enrich uranium by the use of his high-speed centrifuge. Later, the University of Virginia's Nuclear Reactor Facility, operated by the Department of Mechanical, Aerospace and Nuclear Engineering, housed the UVAR, a light-water-cooled and moderated research pool-type reactor which began operation in 1960 and ceased operations in 1998.

•WA **Deep Creek Air Force Station**[199], Fairchild AFB - National Nuclear Weapons Stockpile Site

•WA **Hanford** Richland DOE 1942-

199 **Ammunition and Explosives Storage for the Navy (1939-1989) and the Air Force (1946-1989)**, 2008. - 200 pp. - http://www.denix.osd.mil/cr/upload/af-navy-ammunition-storage-public-rfs_pg1-200_rev.pdf

United States Air Force Environmental Restoration Program: Final Record of Decision. **On-Base Priority One Operable Units Fairchild Air Force Base**. June 1993. - 63 pp.

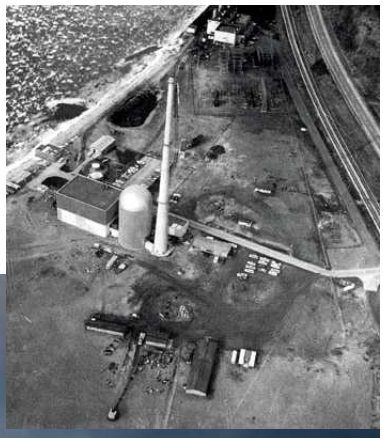
•WA **Pacific Northwest National Laboratory** Richland DOE - 1965-. - Pacific Northwest National Laboratory's began in 1965 when Battelle won the contract to perform research and development for the Hanford Site. The Laboratory's first projects were based on the needs of the Hanford Site and included protecting the environment, fabricating reactor fuel, and designing reactors. These projects, staff expertise in diverse fields, and national needs led to research and development in several key areas: environment, health, energy, computer science, and security.

Source: Milwaukee County Historical Society

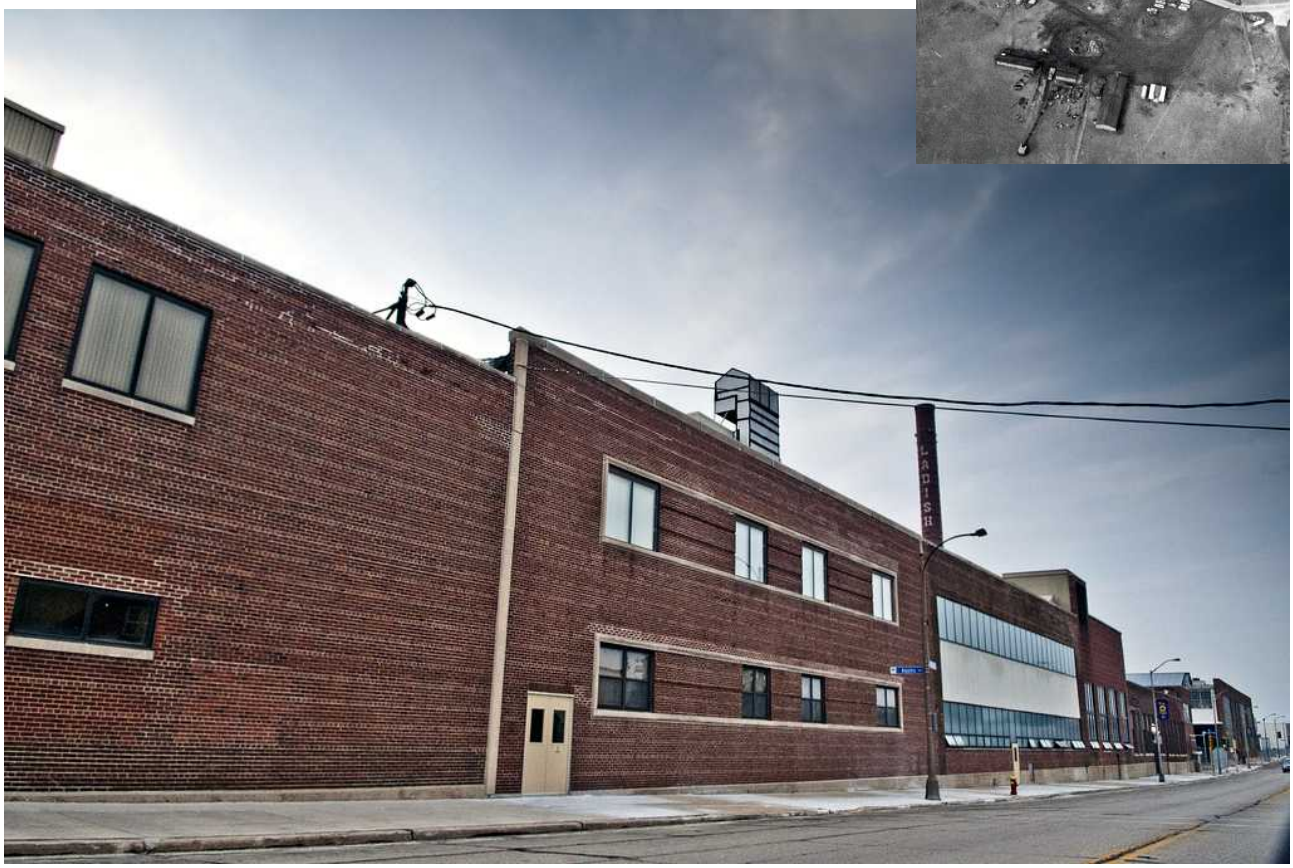
•WI **Allis-Chalmers Co.** West Allis, Milwaukee AWE - 1943-1944 - Allis-Chalmers made vacuum pumps for the Y-12 plant effort. The company also wound magnetic coils for the "calutrons" used in the Y-12 plant to produce highly enriched uranium. In late 1943 General Groves ordered some partially-used coils be sent back to Allis-Chalmers for cleaning. Allis-Chalmers was also involved in the construction of the K-25 Plant.
•WI **Besley-Wells** South Beloit AWE - 1953 - Besley was a cutting tool manufacturer. A National Lead Company of Ohio (Fernald) proposal indicates Besley was to machine a trial lot of 500 uranium slugs at its Beloit, WI, plant to evaluate whether the use of the Besley facing and radiusing machine could increase production.
•WI **General Electric X-Ray Division**[200] Milwaukee AWE - 1956-1966 - General Electric's X-Ray Division performed research and development work which supported

200 National Archives: **Records of the Atomic Energy Commission** [AEC] (Record Group 326) 1923-75.

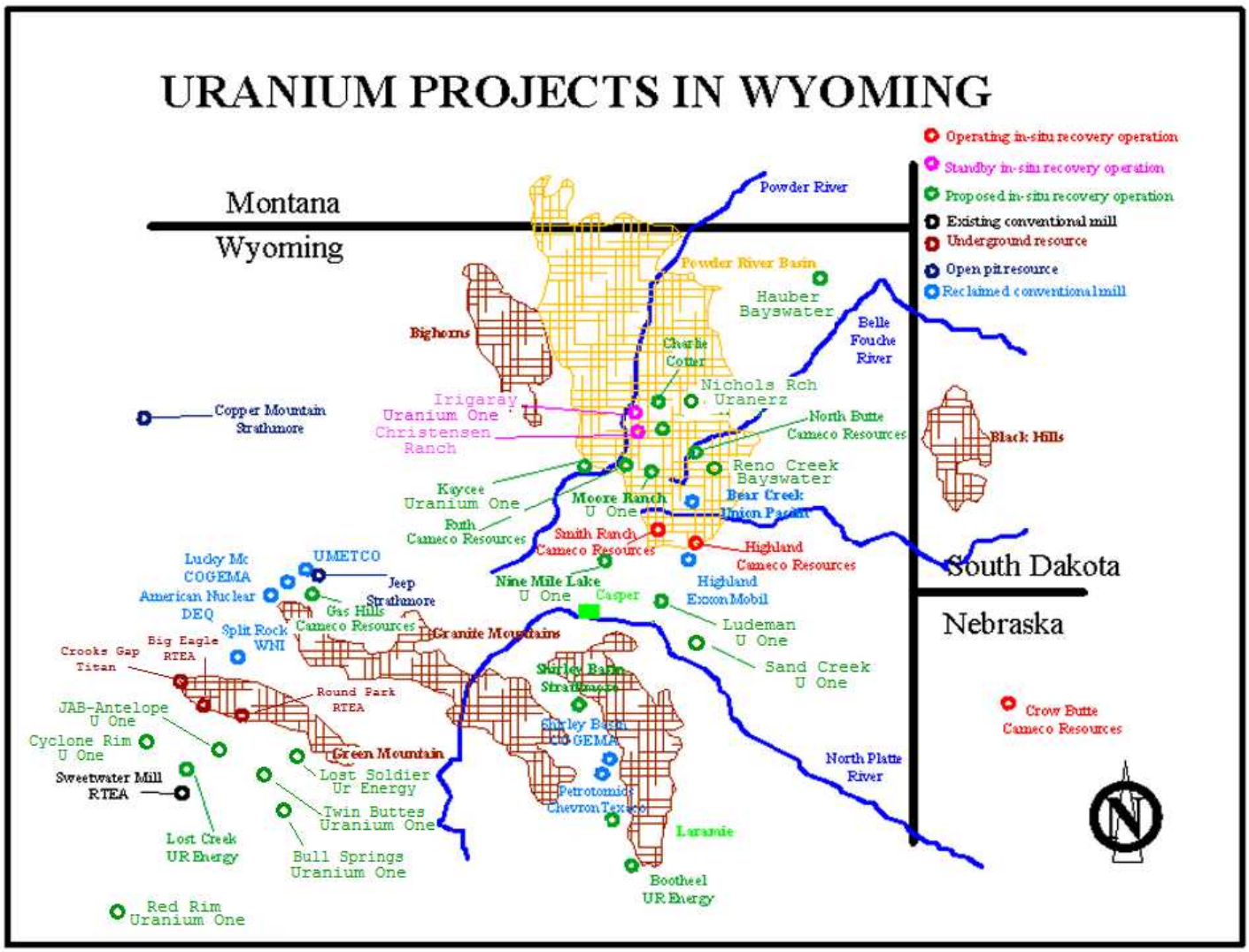
its activities as contractor for the Pinellas Site in Florida. This work included the operation of a small pilot plant in Milwaukee. Sandia National Laboratory managed the GE X-ray division contract as part of the nuclear weapons program. The work in Milwaukee continued until 1966 when these activities were transferred to Pinellas and the staff relocated accordingly.



•WI **LaCrosse Boiling Water Reactor** LaCrosse DOE-1967-1969 - The LaCrosse Boiling Water Reactor (LACBWR), now owned and operated by Dairyland Power Cooperative, was one of a series of demonstration plants funded by the Atomic Energy Commission along with commercial utilities.



•WI **Ladish Co.** Cudahy BE - 1959-1965 - Ladish supplied beryllium metal and parts to the Y-12 plant.



•WY **Ore Buying Station at Crooks Gap**, Ore Buying Station at Split Rock or Ore Buying Station at Jeffrey City Crooks Gap DOE - 1956-1957 - The ore buying station at Crooks Gap purchased uranium ore for the AEC. The Lucius Pitkin managed and operated the Crooks Gap station from December 1956 to July 1957. The AEC leased the land and equipment from a private company. Contractors: Lucius Pitkin, Inc.

•WY **Ore Buying Station at Riverton**[201] Riverton DOE - 1955-1957 - The ore buying station at Riverton purchased uranium ore for the AEC. The American Smelting and Refining Company (ASRC) managed and operated the Riverton station from March 1955 to January 1956. Lucius Pitkin replaced ASRC as the M&O contractor in February 1956. The AEC leased the land on which the ore buying station was located from a railroad. Contractors: American Smelting and Refining Company (1955-1956); and Lucius Pitkin, Inc. (1956-1957).

•WV **Huntington Pilot Plant**[202] Huntington AWE/DOE - 1951-1963; 1978-1979 -

201**An Overview of Uranium Production in Wyoming**. White Paper. School of Energy Resources, University of Wyoming. July, 2010. - 14 s.

Ammundson, Michael A.: Home on the Range No More: Boom and Bust of a Wyoming Uranium Mining Town 1957 -1958. Western Historical Quaterly 26 (Winter 1995): 483-505.

202 Office of Compensation Analysis and Support: **Technical Basis Document for the Huntington Pilot Plant, Huntington, West Virginia /** Tom Tomes, Sam Glover, Christine Corwin, 2008. - 30 pp.

Rutherford Tony: **Huntington's Houdaille Plant Contained Radioactive Materials** : Hundreds Allegedly Died of Lung Cancer.Huntingtonnews.net, Oct. 28, 2010.

The AEC built the Huntington Pilot Plant in 1951 to supply nickel powder for use in the Paducah and Portsmouth gaseous diffusion plants. One source of the nickel was scrap nickel which was contaminated with uranium. The plant was shutdown in 1963 and maintained in standby condition. It was demolished in 1978-1979.

De militærfolk, politikere og videnskabsfolk som planlagde og udviklede atomvåben under anden verdenskrig så kun glimtvis de enorme konsekvenser disse våben ville få for alt liv på denne planet. Og i den mellemliggende tid er truslerne fra dette våbensystem også kun anet i den brede befolkning, dem der blev forsvaret med disse våben. Når vi kun kan gennemskue toppen af isbjerget af de mange uløste problemer der er og vil komme i fremover i forbindelse med kernevåben skyldes det, at vi af politiske og militære årsager aldrig er blevet fortalt den fulde sandhed om disse våben. Det er først nu vi kan se, studere og forstå omfanget af problemstillingerne i en af atommagterne: USA.
Den militær-industrielle udvikling i landet har bogstaveligt astronomisk betydning på sundhedsområdet, for miljøet og for økonomien både nu og i fremtiden og hovedproblemet i alle årene har været den manglende adgang til relevant information. Under anden verdenskrig blev alle beslutninger om kernevåben truffet i dybeste hemmelighed. Offentligheden blev først informeret om projektet efter de første bomber var kastet. Begivenhederne under verdenskrigen skabte en tradition for hemmeligholdelse af militær information.

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Holger Terp er redaktør af Fredsakademiet og har i en del år beskæftiget sig med forskellige sikkerhedspolitiske aspekter.

Manuscript edition closed November, 15th 2001.
Holger Terp is the editor of the Danish Peace Academy, and has for several years worked with various security aspects.

Rutherford, Tony: **Over Five Million Dollars Paid to Former Huntington Pilot Plant Workers**: More Than $413 Million to Portsmouth Workers. Huntingtonnews.net, April 2, 2010.
'Huntington, WV (HNN) – Based on statistics supplied by the U.S. Department of Labor (Office of Worker's Compensation Programs EEOICP) statistics 540 individuals have received a total of over five million dollars for occupational (atomic related) illness at the now buried plant'.