Department of Energy (DOE)
FY 2005 Report to Congress

Laboratory Directed Research and Development (LDRD)
at the DOE National Laboratories

December 2005

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FY 2005
LDRD Report to Congress

Executive Summary

The Laboratory Directed Research and Development (LDRD) program at the Department of Energy's (DOE's) multi-program national laboratories, as well as analogous programs at the Department's plants and at the Nevada Test Site, are Congressionally authorized programs designed to build capability to maintain the vitality of these nationally important institutions. This document fulfills all Congressionally requested LDRD program reporting requirements.

Overall, the multi-program national laboratories included in this report devoted approximately $384 million to LDRD, funding projects ranging in size from less than $5,000 per year to over $3 million, addressing topics that span the entire range of DOE's broad scientific mandate. An analysis of LDRD investments compared to the sources of laboratory funding indicates the LDRD benefits are commensurate with the funding received from defense, non-defense, and Department of Homeland Security (DHS) sources. In addition, the production plants invested approximately $20 million through the Plant Directed Research and Development (PDRD) program to fund science and technology projects with the potential to enhance the plants' mission-related manufacturing capabilities, operations, and core technical competencies. Also, the Nevada Test Site invested approximately $5 million through its Site Directed Research and Development (SDRD) Program.

In response to the fiscal year (FY) 2002 Energy and Water Development Appropriations Conference Report, the Secretary issued guidance requiring all LDRD laboratories to notify other Federal agencies concerning LDRD charges. With the creation of the DHS, there are additional provisions for the notification of LDRD charges, as well as requirements for acknowledgements regarding the benefits of LDRD, prior to final approval of all DHS projects (see Section 2.3). Collectively these policies provide the basis for the Secretary's affirmation that all FY 2005 LDRD activities derived from funds of other Federal agencies have been conducted in a manner that supports the science and technology development that benefits the programs of the sponsoring agencies and is consistent with the appropriations acts providing funds to those agencies. That requested affirmation is included as Appendix 1.

An important component of the LDRD program's contribution to the laboratories' future is its ability to attract promising young scientists and engineers to the institutions. LDRD-funded post-doctoral appointments, for example, supported about 40 percent of all post-doctoral scientists and engineers at the reporting multi-program National Laboratories in FY 2005. In addition, many graduate students participate in LDRD projects, and the LDRD program provides a mechanism for scientists and engineers at the laboratories to keep themselves current in their fields.

The Department has concluded that the LDRD program is essential to maintaining the vitality of the laboratories that support the Department's missions and national needs. We have carefully reviewed the management and administrative procedures and funding levels at each of the relevant laboratories and we intend to continue the LDRD program.

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I. Introduction

1.1 Background

Pursuant to Congressional intent, the DOE multi-program national laboratories and manufacturing plants, and the Nevada Test Site, operate research and development programs using a small portion of their overall budgets for the purpose of investing in critical future needs. This document reports on the programs for FY 2005.

LDRD, the first of these programs, was implemented at the DOE multi-program national laboratories to formalize what had been a long-standing practice, authorized by legislation, to use portions of laboratory overhead for critical research and development efforts.

Within the overall context of maintaining the vitality of the laboratories, the specific purpose of the LDRD program is to provide the DOE laboratories with funds to undertake research and development activities to:

> (1) pursue new and innovative scientific and technological ideas;
> (2) enhance the scientific and technological vitality of the institution;
> (3) manage strategic direction; and
> (4) develop and retain new workforce capabilities.

DOE policy provides guidance to ensure effective management and oversight of the LDRD program while supporting the laboratories' abilities to pursue innovative projects. The process is consistent with DOE's management philosophy for all research and development activities, and it includes annual planning and reporting documents as well as program and peer reviews. The Heads of National Nuclear Security Administration, the Office of Science, and the Office of Nuclear Energy, Science and Technology serve as cognizant Secretarial officers for the multi-program national laboratories.

1.2 Purpose of the Report

Formally, this report responds to the Conference Report (106-988) accompanying the Energy and Water Development Appropriations Act for FY 2001, which requested DOE's Chief Financial Officer "to develop and execute a financial accounting report of LDRD expenditures by laboratory and weapons production plant." It also responds to the Conference Report (107-258) accompanying the Energy and Water Development Appropriations Act for FY 2002 which called for the Secretary of Energy to include in the annual report to Congress for all LDRD

activities an affirmation that all LDRD activities derived from funds of other agencies have been conducted in a manner that supports science and technology development that benefits the programs of the sponsoring agencies and is consistent with the appropriation acts that provided funds to those agencies. Such an affirmation is included in Appendix 1 of this report.

Further, this report addresses Section 3136(b) (1) of the National Defense Authorization Act for FY 1997 (Public Law 104-201), which requires submission by February 1 of each year of "a report on the funds expended during the preceding fiscal year on activities under [the LDRD Program]...to permit an assessment of the extent to which such activities support the national security mission of the Department of Energy." As defined by the Department, its national security mission is clearly and comprehensively supported by LDRD activities.

This report addresses how the LDRD program is managed, what research and development activities the funding supports, and why the program is important to DOE and the laboratories. The multi-program national laboratories organize their respective programs according to their individual needs; however, the LDRD program does have a common administrative approach to Congressional and Departmental guidelines. This report speaks to those commonalities.

This report describes the LDRD program and its implementation at the various DOE multi-program national laboratories. Newer, analogous programs implemented at the Nevada Test Site and at the manufacturing plants are discussed in detail in Appendices 5 and 6 of this report. They are authorized under separate legislation. The Plant Directed Research, Development and Demonstration (PDRD) Site-Programs are consistent with Congressional intent as stated in the Energy and Water Development Appropriations Act for FY 2001 (Section 310) and the Defense Authorization Act for FY 2001 (Section 3156) at the following sites:

- The Kansas City Plant, Kansas City, Missouri;
- The Y-12 Plant, Oak Ridge, Tennessee;
- The Pantex Plant, Amarillo, Texas; and
- The Savannah River Plant, Aiken, South Carolina.

The conference agreement allows for a maximum funding level of 2 percent of the plants' National Nuclear Security Administration (NNSA) base operating budget to be utilized for the PDRD program.

The Site Directed Research, Development and Demonstration (SDRD) program is consistent with Congressional intent as stated in Section 310 of Energy and Water Development Appropriations Act for FY 2002 (H.R. 2311) which authorizes a program for directed research and development at the Nevada Test Site (NTS). The conference agreement allows for a maximum of 2 percent of NTS's national security budget to be utilized for the SDRD program.

2. FY 2005 LDRD Program

2.1 Financial Information

2.1.1 LDRD Funding Mechanism

The LDRD program is structured to pursue innovative and creative science and technology, often with an emphasis on projects that will contribute to the needs of multiple programs and Federal agencies. The Department views LDRD as a legitimate cost of doing business for all sponsors at the multi-program laboratories. Therefore, to ensure that all users of the laboratories support their fair share of LDRD, the costs are funded as part of laboratory indirect costs, up to a maximum of 6 percent of operating and capital equipment costs, and are treated as normal costs of doing business. As such, all organizations that fund laboratory programs also fund LDRD activities. The capabilities developed and maintained through LDRD, in turn, benefit all laboratory customers. This combination of equitable treatment of laboratory sponsors and multiple benefits derived from LDRD is achievable through the indirect cost funding mechanism for LDRD.

The pricing policy of DOE is full cost, which includes all direct costs incurred in performing the work, any other allocable costs incurred by the laboratory in performing the work, and a Federal administrative charge of 3 percent of these costs for non-DOE sponsors. LDRD charges and assessments on Work for Others (WFO) agreements are discussed in more detail in Section 2.3. LDRD is considered an allocable cost in accordance with the terms of the laboratory operating contract and is identified in the laboratory's accounting system. As stated above, LDRD charges are currently treated as indirect costs of doing business at the laboratories. As such, they are included in the laboratory's general and administrative expenses (along with costs such as laboratory management, legal services, etc.), and are allocated and reported in the cost of a laboratory's programmatic work (for both DOE programs and Work for Others).

2.1.2 FY 2005 Expenditures

For FY 2005 the multi-program national laboratories devoted approximately $384 million to LDRD. The following table shows the LDRD costs by site for FY 2005. For more details on the individual projects conducted at each site, see Note 1. Note 1 provides a project listing by site including project identifier, project name and total FY 2005 project costs and is available at **http://www.mbe.doe.gov/progliaison/ldrd.htm**. It should be noted that the following table includes all LDRD costs including individual project costs listed in Note 1 and any administrative costs not specifically assigned to individual FY 2005 projects, if applicable.

Table I. FY 2005 LDRD Costs by Laboratory

Laboratory	LDRD Costs ($M)
Argonne National Lab	22.2
Brookhaven National Lab	8.4
Idaho National Lab	16.8
Los Alamos National Lab	106.0
Lawrence Berkeley National Lab	13.6
Lawrence Livermore National Lab	71.0
Oak Ridge National Lab	16.7
Pacific Northwest National Lab	19.2
Sandia National Lab	110.8

2.1.3 FY 2005 LDRD Allocation Percentages

Departmental policy states that the maximum funding level established for LDRD must not exceed 6 percent of the laboratory's total operating budget, including non-DOE funded work for the year, plus an amount of capital equipment not to exceed 6 percent of its total capital equipment budget for the year. It is important to note that individual LDRD program estimates at each site are approved based on laboratory estimated budgets for the fiscal year.

Initial planning bases are derived from funds anticipated. The final percentage calculation is based on actual LDRD costs and actual operating and capital equipment costs. Table II below includes the FY 2005 end-of-year information. It is important to note that "laboratory costs" are not the amount of laboratory program funding, but rather what was accumulated as costs. Also shown is the cost of work performed on behalf of other Federal agencies and non-Federal customers' WFO programs. LDRD charges and assessments on WFO agreements are discussed in more detail in Section 2.3.

Table II. Reported FY 2005 overall laboratory costs and LDRD costs at participating DOE laboratories.

Laboratory	Laboratory WFO Costs ($M)	Total Laboratory Costs ($M)	LDRD Costs ($M)	LDRD Fraction
Argonne National Lab	128.6	509.9	22.2	4.35%
Brookhaven National Lab	75.6	451	8.4	1.86%
Idaho National Lab	237.1	537.5	16.8	3.13%
Los Alamos National Lab	246.0	1961.1	106.0	5.41%
Lawrence Berkeley National Lab	115.0	482.6	13.6	2.82%
Lawrence Livermore National Lab	332.5	1446.6	71.0	4.91%
Oak Ridge National Lab	228.9	871.6	16.7	1.92%
Pacific Northwest National Lab	228.1	638.6	19.2	3.01%
Sandia National Lab	684.7	2059	110.8	5.38%

An analysis of the FY 2005 LDRD program was conducted with respect to funding received from both defense and non-defense sources (including DOE and WFO sponsors) and the return on the dollars invested by those sources in the LDRD program. This analysis now also includes data related to the DHS.

The total FY 2005 funding for the LDRD program conducted at the laboratories was approximately $384 million or about 4 percent of total laboratory costs. Of this amount, $250 million was provided by defense customers, $118 million by non-defense customers, and $16 million by DHS. A review of the LDRD program funding shows that about $287 million supports projects that will be expected to benefit the defense and national security missions, $328 million supports projects that will be expected to benefit non-defense customer mission areas, and $159 million supports projects that will be expected to benefit DHS programs.

In assessing the return on the dollars invested in LDRD, it is essential to understand that the vast majority of research and development activities have application to national needs in defense, non-defense and DHS arenas. That is, as the numbers above indicate, many of the LDRD projects are put in more than one category since they support fundamental research and can be expected to benefit defense, non-defense and DHS missions. The clear implication is that the anticipated benefit of LDRD science and technology to defense, non-defense and DHS national needs will always exceed the relative contribution of funds from these sources independently.

2.2 Workforce Development

Maintaining the vitality of the DOE multi-program national laboratories—the overarching theme of the LDRD program—implies a responsibility not only for future-looking research and development but also for the workforce of the future. For the laboratories to be poised to tackle problems confronting DOE and the Nation it requires more than facilities and infrastructure. Scientists and engineers must also be available to implement the capabilities of the laboratories.

Post-doctoral appointments offer the single largest source of new scientific and engineering talent for the DOE laboratories and are therefore critical to maintaining institutional vitality. The LDRD program plays a central role in the various post-doctoral programs at all of the laboratories, as shown in Table III.

Table III. Postdocs supported by LDRD at the DOE Laboratories in FY 2005.

Laboratory	Total postdocs	Postdocs supported by LDRD	LDRD-supported fraction
Argonne National Lab	229	38	17%
Brookhaven National Lab	162	48	30%
Idaho National Lab	16	7	44%
Los Alamos National Lab	515	312	61%
Lawrence Berkeley National Lab	319	70	22%
Lawrence Livermore National Lab	137	116	85%
Oak Ridge National Lab	256	51	20%
Pacific Northwest National Lab	101	35	35%
Sandia National Lab	122	82	67%

In addition to this formal participation in post-doctoral programs, the LDRD program also supports a wide range of activities that enhance the laboratories workforce development. These include support for both undergraduate and graduate students working on LDRD projects, reputation building by providing laboratory visibility in a wider range of publication venues than would be the case without the results of LDRD, technical staff retention associated with opportunities to retain and hone scientific skills via LDRD, and a range of university collaborations stimulated via LDRD projects.

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2.3 LDRD and the Work for Others Program

One of the benefits of the DOE multi-program national laboratories is the synergistic application of science and technology to a broad range of national security and science missions, through the DOE WFO program.

As mentioned above, the LDRD program is structured to pursue innovative science and technology, often with an emphasis on projects that will contribute to the needs of multiple programs and Federal agencies. All WFO sponsors appear to benefit from the science and technology base enhanced by LDRD. The Department views LDRD as a legitimate cost of doing business for all programs at the multi-program laboratories. Therefore, to ensure that all users of the laboratories support their fair share of LDRD innovations, the cost is included as an allocable cost.

WFO programs are possible because the laboratories have developed unique research and development capabilities in a wide range of areas of relevance to organizations other than DOE. WFO customers seek out these capabilities and, in many cases, initiate WFO research and development at the laboratories. WFO research broadens the base of innovation at the DOE laboratories and increases the number of potential solutions to national challenges, including threats to national security. The laboratories' research results are enhanced by the cross-pollination of technologies developed in conjunction with its WFO partners.

In this regard, Congress provided language in the Conference Report accompanying the FY 2002 Energy and Water Development Appropriations Act that called for the Department to notify other Federal agencies that a portion of the funds collected through the WFO program will be used to fund LDRD projects. In addition, with the creation of the DHS, Congress enacted analogous requirements that LDRD funding associated with DHS programs be used to support DHS missions. As noted earlier, the Conference Report also called for the Secretary to affirm that all LDRD activities derived from funds of other agencies have been conducted in a manner that supports science and technology development that benefits the programs of the sponsoring agencies and is consistent with the appropriations acts that provided funds to those agencies.

In response to the FY 2002 Conference Report, the Secretary issued guidance requiring all LDRD laboratories to notify other Federal agencies concerning LDRD charges.
These procedures changed the WFO process to ensure proper notification of other Federal agencies as to the LDRD charges prior to funding work at the laboratory. Specifically, each new and/or revised WFO proposal provided to a Federal agency must indicate the amount of LDRD charges that will be collected. Furthermore, the proposal notifies the sponsor that, by providing funding, the agency is acknowledging that LDRD activities are beneficial to their organization and consistent with appropriation acts providing funds to that agency. Subsequently, each WFO funding acceptance document also includes the LDRD estimate acknowledgement.

In February of 2003, the Secretary of Energy and the Secretary of Homeland Security entered into a Memorandum of Agreement to implement key provisions of the Homeland Security Act. In addition, the Deputy Secretary of Energy issued a DOE Notice on *Reimbursable Work for the Department of Homeland Security*. The purpose of that document was to provide information on the process by which the DHS may place orders for reimbursable work activities to be performed at the DOE laboratories. Within that Notice, there are provisions for the notification of LDRD charges in the cost proposal as well as requirements for acknowledgements regarding the benefits of LDRD prior to final approval.

These policies have been implemented and provide a basis for the Secretary to affirm that the LDRD program is managed in accordance with the Congressional requests cited above. The Secretarial affirmation is included as Appendix 1. In December of 2003, the DOE Acting Chief Financial Officer transmitted applicable guidance and policy to reiterate the process to other Federal agency Chief Financial Officers who are customers and sponsors of work at the Department's laboratories.

The Conference Report accompanying the Consolidated Appropriations Act, 2005, contained language indicating that "DOE shall not advance funds for LDRD based upon work for others, but only provide the LDRD funds to the labs once the Department has received the fund transfers from the other agencies to pay for the work." In response, the Department issued guidance to field Chief Financial Officers that DOE contractors authorized to maintain LDRD accounts may not advance DOE funds to cover the LDRD costs allocable to work performed for Other Federal Agencies (OFA). OFA funds are only available to conduct LDRD once they have been collected.

3. Report Conclusions

The DOE LDRD program offers a mechanism by which the multi-program national laboratories maintain their vitality and, in the process, prepare themselves to help meet the Nation's future scientific and engineering challenges. In FY 2005, the multi-program national laboratories devoted approximately $384 million to LDRD, funding projects ranging in size from less than $5,000 per year to over $3 million. LDRD projects address topics that span the entire range of DOE's broad scientific mandate. In addition, the production plants invested approximately $20 million through the Plant Directed Research and Development (PDRD) program to fund projects that emphasized science and technology with the potential to enhance the plants' mission-related manufacturing capabilities, operations, and core technical competencies and the Nevada Test Site invested approximately $5 million through the Site Directed Research and Development (SDRD) Program.

An analysis of LDRD investments compared to the sources of laboratory funding indicates the LDRD benefits are commensurate with the funding received from defense, non-defense and DHS sources. The Department also affirms that all FY 2005 LDRD activities derived from funds of other Federal agencies have been conducted in a manner that supports science and technology development that benefits the programs of the sponsoring agencies and is consistent with the appropriations acts providing funds to those agencies.

An important component of the contribution of the program to the laboratories' future is their ability to attract promising young scientists and engineers to the institutions. LDRD funded post-doctoral appointments, for example, supported about 40 percent of all post-doctoral scientists and engineers at the multi-program national laboratories in FY 2005. In addition, many graduate students participate in LDRD projects, and the programs provide a mechanism for scientists and engineers at the laboratories to keep themselves current in their fields.

The LDRD program is essential to maintaining the vitality of the laboratories that carry out the Department's missions and national needs. We have carefully reviewed the management and administrative procedures governing the program and monitor LDRD funding levels at each of the laboratories. This oversight is integral to maintaining a strong, credible and effective LDRD program.

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Note 1

ANL - Argonne National Lab

Project ID	Project Name	FY Total
P/ANL2003-064	Bio/Inorganic Hybrid Arrays for Photovoltaic Cells and Biological Sensors	$108900
P/ANL2003-103	Fluxoid Manipulation by Josephson Vortices: New Opportunity for Vortex Logic	$65800
P/ANL2003-117	Quantized Magneto-Catalysis of Electron Transfer Reactions	$76300
P/ANL2003-124	Development of Polysiloxane-Based Solid Electrolytes for Lithium Batteries	$99200
P/ANL2003-146	Synthesis of High Temperature Superconductor Wires using Novel Atomic Layer Deposition Synthesis	$122800
P/ANL2003-151	Time-Resolved X-Tomography of Highly Transient Fuel Sprays	$111200
P/ANL2003-158	High-Sensitivity Infrared Imagers for Environmental and Energy Security/Safety Monitoring	$164000
P/ANL2003-172	Mass Spectral Detection of Biomolecular Interactions on a Functional Proteomic Biochip	$131000
P/ANL2003-173	Functional Genomics of Endothelial Cell Formation	$217200
P/ANL2003-176	Designer Antibodies and Interaction Mapping	$571200
P/ANL2003-177	Nano-Architecture from the Bio-System: Fabrication, Assembly and Function	$179100
P/ANL2003-185	High-Power Beam Dump for a Large Acceptance RIA Fragment Separator	$285900
P/ANL2003-188	Development of a Model 3-Spoke Superconducting Resonator for RIA	$335100
P/ANL2003-204	Lightweight and Robust Hydrogen Storage Materials for Automotive Fuel Cells	$105700
P/ANL2003-216	Linear Collider R&D: High Gradient Accelerating Structures	$303000
P/ANL2003-217	High-Brightness Beams Electron Sources	$192300
P/ANL2003-218	Damping Rings for Linear Colliders	$67400
P/ANL2003-219	Investigations of the Effect of the Biogeochemical Cycling of Iron on the Fate and Transport of Heavy Metal, Radionuclide, and Organic Contaminants	$400000
P/ANL2003-230	Demonstrate the Two-Charge State Injector Concept for the RIA Driver Linac	$288800
P/ANL2003-242	Transmission Multilayer Optics for Sub-Ten-Nanometer Focusing of Hard X-Rays	$78300
P/ANL2003-256	Vacuum-Ultraviolet Free-Electron Laser Studies	$234286
P/ANL2003-288	Thin-Film Liquid Lithium Stripper for the RIA Driver Linac	$280500
P/ANL2003-329	Hydrogen Production from Low Temperature Thermochemical Cycles Compatible with Heat from a Na-Cooled Nuclear Reactor	$260300
P/ANL2003-331	Process and Equipment Integration for a Recycling Capability	$101000
P/ANL2003-335	Experimental Testing of Pyroprocessing Structural Materials	$114600

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ANL - Argonne National Lab

Project ID	Project Name	FY Total
P/ANL2003-336	Multidisciplinary Theory	$298000
P/ANL2003-337	The Use of Synchrotron Radiation Sources for Homeland Security - Terahertz and X-Ray Radiation	$241600
P/ANL2003-338	Modeling Near-Field Atmospheric Dispersion and the Potential Health and Economic Impacts from Terrorism Scenarios Involving "Dirty Bombs" or Similar Devices	$218500
P/ANL2003-340	Core-Shell Nanocrystal Spring Magnets	$60400
P/ANL2003-341	Simulation and Modeling of Reactivity in Nanoporous Materials	$46700
P/ANL2004-002	Development of Germanium Double Sided Strip Detectors for Nuclear Imaging Applications	$112200
P/ANL2004-009	Ultrafast Laser/X-Ray Interactions	$67100
P/ANL2004-014	Development of Cross-Polarization Confocal Microscopy for Measurement of Subsurface Microstructure	$86400
P/ANL2004-018	Fundamental and Applied Studies of Novel Intermetallic Thin Films for Lithium Ion Battery Anodes	$130300
P/ANL2004-019	Multiphase CFD Analysis of Vascular Lesion Formation	$118500
P/ANL2004-026	Science and Technology of a New TiAlO Alloy Oxide and Its Application to a New Generation of Integrated Circuit Gate Dielectric	$86600
P/ANL2004-038	Time-Resolved Studies of Magnetization Dynamics in Nanostructured Materials	$105000
P/ANL2004-041	Site-Specific Magnetism in Crystals	$74800
P/ANL2004-044	Palladium/Semiconductor Nanohybrids as Hydrogen Sensors for Fuel Cell Applications	$126300
P/ANL2004-046	Superconducting Magnetic Control System for Manipulation of Magnetic Particles and Nano-Particles for Medical Applications	$120600
P/ANL2004-057	Novel Integrated (On-Chip) Magnetic Field Sensors	$74100
P/ANL2004-063	Ferromagnetic Micro-Disks with Superior Properties for Biomedical Applications	$115600
P/ANL2004-069	Design and Fabrication of Two Novel High-Gradient Accelerating Structures: The Metallic Photonic Bandgap Accelerator and the SiC Surface Wave Accelerator	$86700
P/ANL2004-086	A New Low Temperature Thermochemical Hydrogen Production Cycle Based on Heavy Element Halides	$93200
P/ANL2004-095	Nanoporous Separation Membranes	$131900

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ANL - Argonne National Lab		
Project ID	**Project Name**	**FY Total**
P/ANL2004-103	Direct Regeneration of Cofactors with an Electron/Ion Mixed Conductive Matrix	$114700
P/ANL2004-115	Photosynthetic Reaction Center as a Novel Quantum Electronic Circuit Element	$170100
P/ANL2004-126	Novel Hydrogen Storage Media through Nano-Structured Polymer and Carbon Layer Materials	$115300
P/ANL2004-133	Ultra-High-Sensitive Miniature Calorimeter for Studies of Confinement Effects of Bio-Organic Structures	$118900
P/ANL2004-141	Environment for a Nanoscale Materials Virtual Fab Lab	$257300
P/ANL2004-142	Simulations of Spin Wave Excitations in Magnetic Nanoparticles	$37500
P/ANL2004-144	Near-Field Optical Investigations of Nanoscale Photochemistry and Photophysics	$153400
P/ANL2004-145	Ultrasensitive Hydrogen Sensors	$67800
P/ANL2004-148	Discovery of Protein Space	$63800
P/ANL2004-149	Nano IR Spectroscopy and Imaging	$82800
P/ANL2004-154	Nanoscale Confinement of Highly Spin-Polarized Oxides	$43000
P/ANL2004-156	Functional Metalloproteomics	$106200
P/ANL2004-157	High-Throughput Analysis of Low Abundance Protein Constituents in Complex Biological Mixtures	$201000
P/ANL2004-158	Development of Peptide Biochips for a Whole-Proteome Analysis of Protein Interactions with Peptide Recognition Modules	$148400
P/ANL2004-159	Molecular Recognition: Protein-Small Molecule Interactions	$73100
P/ANL2004-160	Characterizing and Unveiling the Mechanism of Protein-Ligand Interactions	$134000
P/ANL2004-161	Evolution of the Hydrogen Infrastructure as a Complex Adaptive System	$52800
P/ANL2004-162	The Biogeochemical Cycle of Nitrogen: Effects on Climate Change	$189500
P/ANL2004-164	Challenge and Opportunity in Megaproteins	$149600
P/ANL2004-166	Inert Metal Matrix LWR Dispersion Fuel Fabrication	$41200
P/ANL2004-167	Evaluation of Fuel-Cladding Interaction in a Lined, ODS-Clad, SFR Fuel for Hydrogen Production Applications	$24600
P/ANL2004-169	Compact Heat Exchanger Studies for Supercritical CO_2 Power Conversion System	$176500
P/ANL2004-173	Modeling Nuclear Energy Market Penetration in the U.S. Energy Sector	$140400
P/ANL2004-174	Life Cycle Analysis for the DANESS System Dynamics Code	$174100

ANL - Argonne National Lab

Project ID	Project Name	FY Total
P/ANL2004-175	Economic Impacts of a Transmutation Enterprise	$176600
P/ANL2004-177	Recovering Actinides from UO[2]-Carbide Fuels	$57300
P/ANL2004-178	Incorporating Advanced Methods and Instrumentation into an Analytical Chemistry Laboratory to Support Advanced Fuel Cycle Needs	$18200
P/ANL2004-179	ICP-OES Methods for Actinide Accountancy Measurements and Process Control in Spent Fuel Processing	$57200
P/ANL2004-180	AMUSE Development, Beyond Solvent Extraction and Into Hybrid Processing	$133200
P/ANL2004-181	Evaluation and Development of a Supercritical Carbon Dioxide Based Dry Processing Technology and Related Closed Fuel Cycle Applications	$20600
P/ANL2004-185	Investigation of Passive Safety Performance of the Very High Temperature Reactor (VHTR) in Hydrogen Production Applications	$131500
P/ANL2004-186	Design of a Helium Loop with Controlled Impurity Control for Research on Materials with Application in VHTR	$42200
P/ANL2004-188	Development of Advanced Computational Procedure for VHTR Physics Analyses	$176500
P/ANL2004-191	Multidimensional Flow and Heat Transport Natural Convection Test Capability	$226100
P/ANL2004-194	Hydrogen and Oxygen Production from Low Temperature Hybrid Cycles	$59300
P/ANL2004-201	Microfluidic Study of Nanofluids	$57800
P/ANL2004-212	Novel Superhard Coatings for Wear Reduction and Energy Saving Applications in Diesel Engines	$68200
P/ANL2004-213	Pressure Rate Controlled Compression Ignition Engine (PRCCI)	$95500
P/ANL2004-215	Investigation into Nano-Particulate Production from Homogeneous Charge Compression Ignition (HCCI) Combustion	$97100
P/ANL2004-224	Improvement of High-Voltage Breakdown Characteristics in Linacs by Atomic-Scale Surface Smoothing Techniques	$17700
P/ANL2004-226	Development of Ultrafast Laser Techniques for Advanced Accelerator Research	$59400
P/ANL2004-227	Advanced Heavy-Ion Beam Dynamics	$109200
P/ANL2004-228	Next-Generation Light-Source Storage Ring Design and Simulation	$26100
P/ANL2004-231	Improvement of FNAL Run II Performance: Tevatron Optics Modeling	$26100
P/ANL2004-232	Improvement of FNAL Run II Performance: Optical Transition Radiation (OTR) Imaging for Protons and Antiprotons	$17700
P/ANL2004-233	Improvement of FNAL Run II Performance: Electron Cooling	$79000

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ANL - Argonne National Lab

Project ID	Project Name	FY Total
P/ANL2004-234	RF Superconductivity for Future Accelerators	$170300
P/ANL2004-238	Quantum Computation with Electron Spins: Qubit Networks of Endohedral N in C[60]	$68900
P/ANL2004-239	Evaluation of Fast Flux Test Facility	$182300
P/ANL2004-240	Proteomic and Phage-Display Analysis of Mitochondrial Compartmental Oxidant Biosensors for the Study and Reversal of Sudden Death Events	$50300
P/ANL2004-241	A New Approach to Recycling Spent Nuclear Fuel using Room Temperature Ionic Liquids	$109700
P/ANL2004-242	Laser Surface Texturing for Friction Reduction	$76300
P/ANL2004-243	Innovations for Small Modular Fast Reactor	$1254500
P/ANL2005-007	Motion of Nanoparticles in Nanofluids	$72200
P/ANL2005-024	ALD Stabilization of Nanoparticles Designed on the Atomic Scale	$98700
P/ANL2005-028	Fundamental and Applied Science of Hybrid Ferroelectric/Piezoelectric-Diamond Heterostructures for High-Performance MEMS/NEMS Devices	$113900
P/ANL2005-032	Uniform-Sized Biodegradable Nanospheres for Drug Delivery - Novel Synthesis Platform Can Revolutionize Targeted Drug Delivery	$70200
P/ANL2005-036	Investigating Ultra-Fast Catalysis and Electro-Catalysis Processes using Time-Resolved X-Ray Absorption Techniques	$132700
P/ANL2005-046	Nanosensors for Label-Free Detection of Protein-Ligand Binding at Biological Membrane Surfaces	$131900
P/ANL2005-065	Shock-Wave Desorption of Large Organic Molecules	$92700
P/ANL2005-067	Nano-Ionics: A Route to High Performance Fuel Cells, Membranes, and Sensors	$134800
P/ANL2005-086	Imaging Microbial Biofilms using Mass Spectrometry	$67000
P/ANL2005-089	Organic Light-Emitting Diodes Based on Nanostructured Non-Sandwich Electrodes	$119500
P/ANL2005-092	Enhancement of Battery and Ultracapacitor Performance through Novel Applications of Nanotechnology	$149700
P/ANL2005-116	High-Brightness Electron Gun Arc Suppression	$15700
P/ANL2005-119	High-Fidelity Integrated Simulation for Nuclear Energy Applications	$217500
P/ANL2005-122	Accurate Synchronization between Lasers and Accelerators	$25800
P/ANL2005-127	Collectivity in Inorganic and Bio-Inspired Optical Nanosystems	$149500

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ANL - Argonne National Lab

Project ID	Project Name	FY Total
P/ANL2005-128	Establishing Metallicity Threshold of Ultrasmall Metal Clusters: A New Size Regime for Nanophotonic Materials	$41000
P/ANL2005-135	Investigation of Innovative Joining Techniques For Oxide Dispersion Strengthened (ODS) Alloys	$102100
P/ANL2005-139	Nano-Pumping and Nano-Engine Made of Carbon Nanotubes	$41300
P/ANL2005-140	Reducing Heavy Duty Vehicle Emissions through Coupling Diesel Reforming to Emissions Catalysts and Engine Control Devices	$71900
P/ANL2005-142	Nanosized Bimetallic Catalysts for Hydrogen Production	$105500
P/ANL2005-146	Superconducting Undulator for Variable Helical Fields	$68400
P/ANL2005-147	Hybrid Nanostructures within Cell Machinery	$80700
P/ANL2005-148	Bio-Inspired Self Assembly	$72900
P/ANL2005-150	Metalloregulation of Signaling between the Extracellular Matrix and Intracellular Milieu	$165900
P/ANL2005-155	In Situ X-Ray, Electrochemical, and Modeling Investigation of High-Temperature Fuel Cell and Electrolysis Electrodes	$146600
P/ANL2005-157	High-Fidelity Integrated Simulation of Nuclear Energy Systems through Petascale Computing	$351300
P/ANL2005-159	Nano-Patterning Cell Focal Adhesion Formation on Diamond Surfaces	$53300
P/ANL2005-160	Planning for a New Neutrino Experiment at a Nuclear Reactor	$88500
P/ANL2005-161	Femtosecond Pulses of Coherent Synchrotron Radiation from an Emittance-Sliced X-Ray FEL	$21400
P/ANL2005-165	Nanoscience at the Interface between Homogeneous and Heterogeneous Catalysis	$57400
P/ANL2005-166	Aligned Molecular Targets for Fourth Generation Source	$78900
P/ANL2005-168	Lateral and Molecular Spintronic Structures	$169700
P/ANL2005-169	Advanced Spatial Analytical Techniques: New Methods to Communicate Complex Information	$438000
P/ANL2005-170	Investigating the Relationship between Emerging Infectious Disease in Wildlife and the Effects to Human Health and Biodiversity: A Computational Science Approach	$88000
P/ANL2005-171	Bio-mimetic Catalysts for Hydrogen Production	$72400
P/ANL2005-175	Fundamental Studies of Electrocatalysis for Low Temperature Fuel Cell Cathodes	$135600

ANL - Argonne National Lab

Project ID	Project Name	FY Total
P/ANL2005-177	Control of Bio-Based Nanoscale Hybrids for Optimal Energy Transduction using Light and Magnetic Fields	$61800
P/ANL2005-178	Bio-Hybrid Architectures for Parallel Catalysis	$114600
P/ANL2005-179	Fast Release ISOL Target Concept Based on Aerogels	$62600
P/ANL2005-181	Nanoscale Synthesis of Complex Oxides/Composites for Electronic and Photonic Applications through Highly Ordered AAO Templates	$47900
P/ANL2005-182	Aggressive Energy Recovery Design for a Hydrogen Engine in a Hybrid Electric Vehicle Application	$78600
P/ANL2005-184	Nanoscale Catalysis for the Hydrogen Economy	$77600
P/ANL2005-185	Property Control of Organic Semiconductor Nanoparticles by Hierarchic Structural Manipulations	$63000
P/ANL2005-187	Integrated Simulation Framework for National Security Decision Support	$197100
P/ANL2005-188	Dynamics of Topological Solitons in Nanomagnetic Structures	$63500
P/ANL2005-190	Synthesis and Properties of Nanocarbons	$64000
P/ANL2005-193	PDQuest: Investigations into Applications, Software and Architectures for Enabling Petascale Science	$690400
P/ANL2005-194	Computation and Informatics for Modeling and Analysis of Biological Systems	$676700
P/ANL2005-198	Proactive Designs of Self-Configuring Dynamic Sensor Networks for Wide Area Persistent Monitoring	$62700
P/ANL2005-202	Measurement of Unknown Optical Rotatory Properties of Biological Agents and Simulants using Optical Polarimetry	$88200
P/ANL2005-204	Universal Phylochip for Environmental Background Characterization and Monitoring	$198100
P/ANL2005-206	Advanced Accelerator Simulation and Modeling Support	$23900
P/ANL2005-207	Development of State-of-the-Art Nanoimprinting	$101200
P/ANL2005-209	Transport in Nanoscale Materials	$156500
P/ANL2005-210	Nanoscale Materials Synthesis and Self-Assembly	$167400
P/ANL2005-211	Synthesis and Characterization of Superconducting Doped Boron-Nanotubes	$63400
P/ANL2005-212	X-Ray Scattering from Optically Trapped Nanoparticles	$84100
P/ANL2005-213	Novel Magnetic Force Microscopy for Variable-Temperature Ultra-High-Vacuum Environments	$63600
P/ANL2005-214	A Hybrid Instrument - MISANS (Modulated Intensity Small-Angle Scattering)	$63700

ANL - Argonne National Lab

Project ID	Project Name	FY Total
P/ANL2005-215	High-Resolution Element-Selective Microscopy Using X-ray Enhanced Scanning Tunneling Microscopy	$78900
P/ANL2005-216	Quantum Critical Behavior in Nanostructured Materials	$112900
P/ANL2005-217	Precision Measurement of Hadronic Showers	$177000
P/ANL2005-219	Grazing Incidence SAXS Characterization of the In-Plane 3D Nanostructure in Hybrid Ultra-thin Multilayers	$62900
P/ANL2005-220	Superconductors at Nanoscale	$100800
P/ANL2005-221	Advancing Multidisciplinary Condensed Matter Theory	$123500
P/ANL2005-222	Prototyping Agent Models for Social Science Applications to Homeland Security	$49600
P/ANL2005-223	In-Situ Raman Spectroscopy of Catalysts	$347000

Total # of Projects for ANL:	**165**	**Total Cost for ANL:**	**$22154986**

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BNL - Brookhaven National Lab

Project ID	Project Name	FY Total
03-004	High-Brightness, High-Power Electron Beams	$190047
03-056	Structural Properties of Methane Hydrates	$14997
03-064	Investigation of Neutron and Gamma Probes to Detect Explosives in Sealed Containers	$90901
03-094	Structural Studies on the Integral Membrane Protein AlkB	$37988
03-099	The microPET Study of Gene Expression in Rodents	$51145
03-104	Hydrogen Atom Transfer from Carbon to Metal - Relevance of a Novel Reaction to Catalyzed Hydrocarbon Conversions	$58039
03-105	Radioprotection in D. Radiodurans, a Radiation Resistant Bacterium	$15329
03-107	New Development of Norepinephrine Transporter Radioligands for PET Studies of Substance Abuse, Depression and ADHD	$93195
03-118	Condition: Green Chemistry Radiolytic Studies of Ionic Liquids in Service of Security and the Environment	$36945
03-119	Exploring the Use of Powder Diffraction for Proteins	$34880
03-121	Element-Resolved Dynamics of Nanoscale Ferromagnets	$49698
03-122	Membrane Biophysics Using Model Membranes	$49740
03-127	High Pressure in Strongly Correlated Materials - An Optical Investigation	$11000
03-129	Polyoxometalate Giant Molecules: Novel Synthetic Methods, Characterizations and Potential Applications	$45558
03-138	Functional Bulk Mn-Based Nanocomposites	$42185
03-151	Radio Wave Detection of Ultra High Energy Cosmic Rays	$17502
03-162	New Synthesis Techniques to Control Atomic Defects in Advanced Intermetallic Compunds	$70713
04-011	Femtosecond Photoinitiated Nanoparticle Surface Chemistry	$121071
04-013	Chirped Pulse Amplification at the DUV-FEL	$119331
04-025	Overcoming Coherent Instabilities at Medium-Energy Storage Rings	$128858
04-033	Layered Cobaltates with High Thermoelectric Power	$103160
04-038	Complex Thin Films and Nanomaterial Properties	$190532
04-041	Physics of Quark Gluon Plasma (QGP)	$109751
04-043	Very Long Baseline Neutrino Oscillation Experiment	$106166
04-046	Advanced 3He Detectors for the Spallation Neutron Source	$109650

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BNL - Brookhaven National Lab

Project ID	Project Name	FY Total
04-055	Genetic NanoTags	$114424
04-060	The Use of Singular Point Genome Sequence Tags to Analyze Community Composition and Metabolic Potential	$185509
04-061	3-D Electronic Wave Functions from EM Images	$149814
04-062	Functional MRI Studies in Rats using Implanted Brain Electrodes	$119912
04-063	Optimizing Functional Neuroimaging Techniques to Study Brain Function in Health and Disease States	$144278
04-066	Technological Development of a Fluorescence Probe for Optical Detection of Brain Functional Activation in vivo	$132570
04-069	Nuclear Control Room Unfiltered Air In-Leakage by Atmospheric Tracer Depletion (ATD)	$88764
04-073	Perfluorocarbon Tracer Sampling, Tagging and Monitoring Techniques for use at the Urban Atmospheric Observatory	$98809
04-079	Development of an Aerosol Mobility Size Spectrometer and an Aerosol Hygroscopicity Spectrometer	$99415
04-086	Exploration of Thermal Diffusion Processes in CdZnTe for Improved Nuclear Radiation Detectors	$131041
04-088	An Integrated Approach of High Power Target concept Validation for Accelerator-Driven Systems	$121361
04-104	Hydrogen Storage Using Complex Metal Hydrides for Fuel Cell Vehicles	$108592
05-003	Full Power Test of the Amplifier for the Optical Stochastic Cooling using JLAB FEL	$112488
05-005	Study of Photon Coupling to an Electromagnetic Field Gradient	$105693
05-006	Heavy Ion Physics with the ATLAS Detector	$5623
05-017	Superconducting Lead Photoinjector	$117500
05-020	Controlled Formation of Nanostructured RuO2 Catalysts	$117502
05-021	Hydrogen Storage in Complex Metal Hydrides	$123301
05-028	Behavior of Water on Chemically Modified Semiconductor Surfaces: Toward Photochemical Hydrogen Production	$89092
05-030	Assembling of Biological and Hybrid Complexes on Surfaces	$139859
05-033	Ultra High Resolution Photoelectron Spectrometer	$67053
05-038	Metal-Metal Oxide Electrocatalysts for Oxygen Reduction	$99510
05-041	Multifunctional Nanomaterials for Biology	$128192

BNL - Brookhaven National Lab		
Project ID	**Project Name**	**FY Total**
05-042	Polariton-Enhanced FRET for Device-Integration of Plasma Membranes from Rhodobacter Sphaeroides	$79321
05-044	Intense THz Source & Application to Magnetization Dynamics	$50175
05-048	Nano-Imaging of Whole Cells with Hard X-Ray Microscopy	$19496
05-050	Study to Convert NSLS VUV Ring to Coherent IR Source	$49261
05-051	Superconducting Undulator Technology	$189451
05-057	Characterization and Imaging of Amyloid Plaques Using Diffraction Enhanced Imaging	$100793
05-058	Development of Methodologies for Analyzing Transcription Factor Binding in Whole Genomes	$92970
05-063	Application of Endophytic Bacteria to Improve the Phytoremediation of TCE and BTEX using Hybrid Poplar	$212900
05-064	Design and Build Two Dimensional Proten-Lipid Thin Film: A First Step Toward Novel Biochips	$61342
05-068	Positron Labeled Stem Cells for Non-Invasive PET Imaging Studies of In-Vivo Trafficking and Biodistribution	$63600
05-069	Breaking the Millimeter Resolution Barrier in fMRI	$109920
05-070	Novel Multi-Modality MRI and Transcranial Magnetic Stimulation to Study Brain Connectivity	$105571
05-071	Ovarian Hormone Modulation of ICP: MRI Studies	$107120
05-072	Feasibility of CZT for Next-Generation PET Performance	$111425
05-074	Biology on Massively Parallel Computers	$168787
05-078	Ionic Liquids in Biocatalysis and Environmental Persistence	$99464
05-082	Single Particle Laser Ablation Time-of-Flight Mass Spectrometer (SPLAT-MS) Enhancements: Aerosol Optical Properties and Increased Particle Detectivity	$97705
05-088	Transition Metals in Oil and Gas Exploration	$128489
05-092	An Innovative Infiltrated Kernel Nuclear Fuel (IKNF) for High-Efficiency Hydrogen Production with Nuclear Power Plants	$130393
05-094	Development of Green Processes: Catalytic Hydrogenation in Water Utilizing In Situ Biologically-Produced Hydrogen	$274561
05-098	Fast Neutron Imaging Detector	$124052
05-104	Giant Proximity Effect in High-Temperature Superconductors	$267837

BNL - Brookhaven National Lab

Project ID	Project Name	FY Total
05-105	Development of an Observation-based Photochemical-Aerosol Modeling System	$109033
05-106	Exploring Root Physiology in Relation to Uptake of Groundwater Pollutants	$165365
05-108	X-ray Absorption Spectroscopic Method for Studying Environmentally-relevant Reaction Kinetics	$92733
05-109	Global Cloud Analysis Technologies (G-CAT)	$92858
05-110	Computational Science	$109776
05-111	Structural Study of gamma-Secretase by Cryo-EM	$191280
05-112	Structural Analysis of Bacterial Pilus Biogenesis	$208405
05-114	Study of High-Tc Nanostructures	$265787

Total # of Projects for BNL:	**78**	**Total Cost for BNL:**	**$8378553**

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INL - Idaho National Lab

Project ID	Project Name	FY Total
AE101	Advanced Fission Product Detection Systems for the Next Generation Nuclear Reactors	$195195
AE102	Development of Advanced Aqueous Processing to Support the Nuclear Fuel Cycle	$171958
AE103	Radiation Chemistry of Supercritical Water	$158987
AE104	Development of Experimental Methods for Measurements of Nuclear Cross Sections	$959394
AE105	Evaluation of Alternate Materials for Coated Particle Fuels for the Generation IV Gas-cooled Fast Reactor	$435392
AE106	Fast Test Irradiation Facility	$240745
AE107	Investigation of Fundamental Thermal-Hydraulic Phenomena in Advanced Gas-Cooled Reactors	$298273
AE108	Advanced Fuel Development	$253493
AE109	Investigation of Nanofluids for use in Nuclear Reactors	$418327
AE110	Design of a High-Resolution Reactor Analysis Capability Using a Generic Transport Algorithm	$359912
AE111	Investigation of Core Flow Behavior During Loss of Coolant Transients for the Generation IV Gas Cooled Reactor Designs	$183828
AE112	Reactor Physics Methods Development for Idaho National Laboratory Competitiveness in Next Generation Nuclear Plant (NGNP) Design	$81673
AE113	Fuel Fabrication Development	$151539
AE114	SESAME: Simulations Enabled Safeguards Assessment Methodology	$182922
AE115	SINEMA: Simulation Institute for Nuclear Energy Modeling and Analyses	$50948
CS118	Advanced Automated Ion Mobility Spectrometer for Explosives Detection	$233628
CS119	First Responder and DOE Site Recon UAV Capability	$271772
CS120	Transmission Line Security Monitor and Repeater System Concept	$203848
CS121	Software Tool-kit for Effective and Repeatable Remote Attacks Against Command and Control Systems used in Electricity Generation and Distribution	$194268
CS122	TEstbed for Personal Electronic Devices (TEPED)	$162390
CS123	Development of a Carbothermal Reduction Reaction Process for the Manufacturing of SiC/TiB2 Ceramic Composite	$116398
CS124	Cyber Protection for Critical Infrastructure	$313606

INL - Idaho National Lab		

Project ID	Project Name	FY Total
CS125	Investigation of New Generation Imaging Systems for the Stand Off Detection of Suicide Bombing Suspects	$225322
CS126	Title Rapid Real Time Non Destructive Evaluation of Protective Systems	$51492
CS127	Attack Graph Approach to Control System Vulnerability Analysis	$205531
CS128	Next-Generation Neutron Generator	$68053
ET118	Intelligent Control of Multi Nodal Systems	$81363
ET121	Human Factors for Management of High Consequence Events	$145707
ET122	Developing the Scientific Basis for Landscape Level Management of Federal Facilities	$207678
ET125	Stable Enzymes for Hemicellulose Hydrolysis	$124927
ET129	Highly Selective Sorbents for Removal of Arsenic from Drinking Water	$181966
ET130	Investigation and Modeling of Dynamic Strain Rate Effects on Structural Material Response	$24997
ET132	Modulating Drain Valve for Continuous Processing of High Temperature Molten Materials	$122947
ET133	Systematic Feasibility Analysis of Power Production from Unconventional Geothermal Resources	$98361
ET134	Investigation of Passive Film Performance on Hastelloy C22 in Structural Loading	$106136
ET135	Dynamic Autonomy for Mobile Manipulation	$95813
ET136	Rapid Prototype for Geospatial Data Acquisition from Unmanned Aerial Vehicle Platforms	$49737
ET137	Development of Integrated Virtual Engineering Tools to Facilitate Unique High-Level Decision Making Capabilities	$49683
ET138	Two-cycle Engine Exhaust Emissions Separator	$17586
ET139	Advancing Human-Computer Interaction Techniques through State-of-the-Art Human-Reliability Analysis	$16474
ET140	Vertical Flow Engineered Wetland Field Mini-Test	$13664
ET141	Water Energy Continuum	$47415
ET142	Development of Modular Direct Referencing Sensor System for Unmanned Autonomous Vehicles	$66889
GC153	Development and Use of Transgenic Caenorhabditis elegans to Measure Bioavailability of Metals and Mutagenicity in Contaminated Media	$167648

INL - Idaho National Lab

Project ID	Project Name	FY Total
GC156	Manipulation of Flow in Subsurface Environments, Coupling between Precipitation and Fluid/Mass Transport	$357301
HT100	Hydrogen Production from High Temperature Nuclear Reactors	$200032
HT101	Polybenzimidazole-Based Composites as Candidate Materials for Hydrogen Containment and Purification	$129661
HT104	Hydrogen Delivery and Separation in Natural Gas Pipelines	$143992
HT105	Hydrogen Generation using Lanthanum Gallate Electrolysis Cells	$103147
HT106	Renewable Biomass Carbon for Synthetic Fuels to Support the Hydrogen Economy	$200446
HT107	H2O / CO2 Co-Electrolysis for Syngas Production	$194351
HT108	Alternate Configurations for High Temperature Electrolysis Cells	$95726
HT109	Hybrid Heterogeneous Catalysts for Hydrogenation of Carbon Dioxide to Liquid Hydrocarbons	$119537
HT110	Technical and Economic Evaluation of Options for CO2 Use	$96462
NE131	Bimodal Nuclear Thermal Propulsion	$197006
NE132	Evaluation of Fuel-Cladding Interaction in a Lined, ODS-Clad, SFR Fuel for Hydrogen Production Applications	$52391
NE133	Incorporating Advanced Methods and Instrumentation for an Analytical Chemistry Laboratory to Support Advanced Fuel Cycle Needs	$43488
NE134	Evaluation and Development of a Supercritical Carbon Dioxide Based Dry Processing Technology and Related Closed Fuel Cycle Applications	$5643
NE135	Evaluation of Fast Flux Test Facility	$71021
NE136	Inert Metal Matrix LWR Dispersion Fuel Fabrication	$69244
NE137	Investigation of Innovative Joining Techniques For Oxide Dispersion Strengthened Alloys	$61984
NE139	Dynamic Probabilistic Extensions to the SAPHIRE Risk and Reliability Designer Tool	$105020
NE141	Joint System Prognostics For Increased Efficiency And Risk Mitigation In Advanced Reactor Instrumentation And Control	$191290
NE142	System Reliability via Block Diagrams Extensions to the SAPHIRE Designer Tool	$72331
NS144	Proactive Designs of Self-Configuring Dynamic Sensor Networks for Wide Area Persistent Monitoring	$133031
NS145	Forensic Signatures of Higher Actinide Elements in Advanced Irradiated Fuels	$66140

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INL - Idaho National Lab

Project ID	Project Name	FY Total
NS146	Biological Threat Agent Forensics	$56746
NS147	Enhanced Explosives Testing Capability	$311790
NS148	Security and Reliability of Encryption Technology Applications over Geographically Separated Control System Nodes	$69528
NS149	Radio Frequency Test Range Characterization	$192856
PH103	Residual Hazards Management: Decisions Leading Toward Success or Failure?	$90824
PH104	Modeling an Earth Borehole System for Physical Property Determination in Shallow Subsurface Environments with Emphasis on Vadose Zone Applications.	$21503
PH105	Improving Soil Water Flux Estimates in the Deep Vadose Zone	$78822
PH106	A New Hydrogeophysical Method for Characterizing and Monitoring Preferential Flow Paths in Complex Layered and Fractured Basalt	$12126
PH107	Dependence of Coal Bed Permeability on Pore Pressure and Adsorbed Gas Content	$100073
RP101	Advanced Test Reactor Three Dimensional Neutronics Modeling	$271221
RP102	Hollow Waveguide Laser Ultrasonics for High Radiation Environments	$204501
RP104	Improved Techniques for In-Situ Measurements	$260486
RP105	NiCrFe Filler Metal for Cracking Resistance	$100774
RP106	Protective Coating Development for Reactor Instrumentation	$113652
RP107	Acousto-Optic MEMS for Hostile Environments	$98472
RP108	Processing Irradiated Beryllium for Disposal	$130101
RP109	Analysis and Modernization of Radioanalytical Methods and Equipment used to Support ATR	$119748
SC119	Development of Microelectrode Arrays for In Situ Detection of Localized Corrosion	$99981
SC120	Advanced Materials for Power Generation	$94707
SC121	Effect of Environmental Variables on Bicarbonate Transport by Marine and Freshwater Cyanobacteria	$235591
SC122	Synthesis and Characterization of Hybrid Materials for Advanced Membranes and Molecular Ropes	$179593
SC123	Investigation Into Parallelization of Fate and Transport Models	$49895
SC124	Phononic Crystals for Sensing	$50161
SC125	Elucidating Electrospray Mechanisms	$49723

INL - Idaho National Lab

Project ID	Project Name	FY Total
SC126	Electroimpedance Experiments on Enhanced Polymer Electrolytes for Seawater Batteries	$49111
SC127	Photochemical Molecular Devices	$49238
SC128	Synthesis, Characterization, and Stability of Bis-(p-trifluoromethylphenyl)dithiophosphinic Acid	$49210
SC129	Novel Intermetallic Superconductors for High Field Applications	$49223
SC130	Immobilization of Lead by Urea Hydrolyzing Bacteria	$47470
SC131	In-Situ Treatment of Arsenic	$48235
SC132	Use of Bacterial and Animal Test Models to Assess the Impact of Nanoparticles on the Environment	$79498
SC133	Materials Damage Evolution and Failure	$162897
SC134	In Situ Laser-based Characterization of Fatigue Damage in High Temperature Environments	$277161
SC135	Mechanism of Dusting in Nickel and Nickel Alloys	$13841
SC136	Real Time Processing and Visualization of 3D X-ray Computed Tomography data	$79258
SC137	Microbial Metabolic Systems Approach to the Evaluation of Hydrogenic Activity of Extremophilic Anaerobic Carboxydotrophs	$476136
SC138	Structure and Reactivity of Actinide Complexes and Clusters under Controlled Solvation Conditions	$87485
SC139	Optical Eddy Current Techniques for Harsh Environments	$59301
SC140	Multiple Sensor Array for Harsh Environments	$67483
SM103	Establishment of a Comprehensive Armor Material, Process and Manufacturing Program	$476829
ST110	Graphite Dust Palliative Technology	$53734
ST111	Quantitative Spatial Measurement System For Improved Video Imaging Capabilities in Underground Piping and Tanks.	$39470
ST112	Optimization of the Separation and Detection of I-129 in Environmental Samples	$34867
ST113	Co-precipitation of Sr in INTEC Alluvium using Reactive Gas Amendments	$43307
ST114	Investigation of the Potential for 90Sr Immobilization in INTEC Perched Water via Microbially Facilitated Calcite Precipitation	$27589
ST115	Experimental Investigations of Application and Delivery Mechanisms for In Situ Stabilization of Sr-90 in the Alluvium and Interbed Sediments Underlying the INTEC Tank Farm	$117008

INL - Idaho National Lab		
Project ID	**Project Name**	**FY Total**
ST116	Computational Capability Development for Shock-Wave and High-Strain-Rate Phenomena	$70435
ST117	High-Level Waste Disposal Optimization	$56917
WP002	NASA/DOE Europa Analog Project to Conduct a Model Life Search Mission	$1499
WP008	Chemical Downhole Steam Generator	$1344
Total # of Projects for INL:	**116**	
	Total Cost for INL:	**$16028549**

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KCP - Kansas City Plant

Project ID	Project Name	FY Total
KC02009-(703531)	Software-Defined Radio Systems	$43016
KC03002-(703538)	Evaluate the Feasibility of a Single-Containment Vessel	$292422
KC03009-(703545)	High-Precision Laser Micromachining Development	$19645
KC03011-(703547)	High-g Penetrator Telemetry Electronics(703547)	$19850
KC04003-(703568)	Molecular Design & Optimization of Urethane Encapsulants	$54903
KC04004-(703569)	Laser Welding of Small Parts Fabricated Using LIGA Processes	$85833
KC04008-(703573)	Multi-chip Module Transverter Circuit	$126329
KC04009-(703574)	Application of Diskless Workstation Technology to Computationally Intensive Manufacturing Applications	$15571
KC04010-(703575)	Setback Generator for Microfiring Systems	$165947
KC04014-(703579)	Robust Feature Extraction/Pattern Matching Algorithms in Unconstrained Environments	$159970
KC05001-703580	MILES Compatible Semi-Automated Pistol	$4926
KC05002-703581	Continous Air Monitor for Light Elements	$65567
KC05003-703582	Flexible Telemetry Transceiver	$145553
KC05004-703583	Ultrasonic Encapsulation Removal System	$14711
KC05005-703584	Accessible Electronics for High-G Packaging	$56689
KC05006-703586	Anti-Tamper Technology	$85018
KC05007-703587	Development of Microwave Packaging for RF MEMS	$87570
KC05008-703588	Development of Carotenoids and Poly-Ynes as Hydrogen Getters	$91429
KC05009-703589	Model-Based Machining Simulation	$63187
KC05010-703590	Wireless Sensor Network	$141211
KC05011-703591	FPGA Based Wireless Data Collection and Monitoring System	$168541
KC05012-703592	Development of Simulation Tools for Vulnerability Assessments	$34630
KC05013-703593	Miniaturized DSW Surface-Mount Quadrupler	$36583
KC05014-703594	Bore-Aligned, Miniaturized Engagement Simulation System (ESS) Transmitter	$100781
KC05015-703596	High-Precision, Multi-Point Distributed Initiation Systems Technology	$48912
KC05016-703597	3-D Capacitor fabrication Using Selective Laser Sintering	$77694
KC05017-703598	Zigbee Wireless Sensor Network Development	$20102
KC05018-703600	NNSA OST Escort Night/Vision System	$3384

United States Department of Energy
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KCP - Kansas City Plant

Project ID	Project Name	FY Total
KC05019-703601	Fequency Selective RF Palette	$268343
KC05020-703602	Resistance Bonding using LIGA membranes	$39933
KC05021-703603	Ultrasonic Evaluation of Nuclear-Grade Steel Bar Stock	$62215
KC05022-703604	Implementing Zero-Shrink, Low-Temperature Cofired Ceramic Technology	$29280
KC05023-703605	Optically Triggered Pulse Power Switch	$61784
KC05024-703606	Wideband High-G Subterranean Transceiver	$107090
KC05025-703607	Provide proof-of-concept utilizing Charge Deep-Level Transient Spectroscopy (Q-DLTS) and diamond sensors for detection of organics	$131540
KC05026-703608	Negative Poisson Ratio Structure	$196121
KC05027-703609	Online Process Monitoring and Control	$60067
KC05028-703610	Physical Vapor Deposition (PVD)of Thin Films on 3-Dimensional Objects	$38299
KC05029-703611	Digitization of Rapid Process Scheduling into Performance-Based Scheduling	$238818
KC05030-703612	Single-Shot Photo-Conductive Surface Switch (PCSS) in Gas Discharge Mode	$32981
KC05031-703613	RFID Inventory and Tracking System (RITS)	$8702
KC05032-703614	Missile Defeat Technology Study	$157249
KC05033-703615	Vacuum Sealing Microelectronics and Packaging	$113963
KC05034-703616	Development of Manufacturing Processes for Lead and Lead Alloys	$24645

Total # of Projects for KCP: **44**   **Total Cost for KCP:**   **$3801004**

LANL - Los Alamos National Lab

Project ID	Project Name	FY Total
LANL-2001511DR	Development of High Performance Cold Neutron Spectroscopy at LANSCE	$437799
LANL-20020052DR	Applied Quantum Technologies	$400381
LANL-20020225ER	Interfacial Solutions: Quasiliquids and Tropospheric Chemistry	$38938
LANL-20020360ER	New Modeling Techniques for Strongly-Coupled Atmospheric Processes that Occur in Wildland Fires	$24021
LANL-20020393PRD3	Synthesis and Characterization of Nanomaterials	$18904
LANL-20020459ER	Ultrahigh Weight Biomolecule Separation and Detection	$211385
LANL-20020517PRD4	The Synthesis of Metal Complexes Containing Actinide-Transition Metal and Actinide-Actinide Metal Bonds	$26614
LANL-20020521PRD4	Novel Structures Based on Multicompartment Self-Assembly of Fluoro/Hydro-Carbon Surfactants	$38857
LANL-20020525PRD4	Electronic Pumping of Nanocrystalline Quantum Dots	$43715
LANL-20030022DR	Novel Physical Behavior of Nanostructured Materials Derived from Interface Atoms	$1070925
LANL-20030029DR	Structural Bioinformatics: Inferring Protein Function from Sequence and Structure on a Genomic Scale	$1368472
LANL-20030030DR	Neutrino Physics and Fundamental Symmetries	$1393459
LANL-20030036DR	New States of Matter Near Zero-Temperature Phase Transitions	$1784533
LANL-20030037DR	Physics-Based Analysis of Dynamic Experimentation and Simulation	$1125739
LANL-20030038DR	Stochastic Closure for Multi-Scale Simulations	$489665
LANL-20030050DR	Scaling Relationships in Biology: Developing and Applying a Unifying Theory from Molecular through Biosphere Scales	$1649309
LANL-20030059DR	Clathrate Hydrate Science and Technology	$1337432
LANL-20030067DR	Water on Mars	$1147441
LANL-20030068DR	Non-equilibrium Electron Spin Transport and Dynamics in Solids	$1455216
LANL-20030069DR	Interfacial Energy and Charge Transfer in Multifunctional Bio-Inspired Nano-Assemblies	$1223359
LANL-20030084DR	Quasiparticles and Phase Transitions in High Magnetic Fields: Critical Tests of our Understanding of Plutonium	$1393992
LANL-20030091DR	Actinide Partitioning at Solid-Solution Interfaces	$919613
LANL-20030119ER	Synthesis of Labeled Glycosaminoglycans for Structural and Dynamical Studies of Macromolecular Complexes	$343352
LANL-20030129ER	Collisionless Magnetic Reconnection in 3D Geometries	$277253

LANL - Los Alamos National Lab

Project ID	Project Name	FY Total
LANL-20030137ER	Improving Local Search	$257343
LANL-20030138ER	Computational Study of Intense Short-Pulse Laser-Matter Interactions	$275576
LANL-20030151ER	Calculating the Kaon Bag Parameter B_K on Unquenched Lattices	$254060
LANL-20030162ER	Automatic Detection of Salient Objects in Real-world Imagery	$244887
LANL-20030169ER	Determining Fundamental Roles of Magnetic Field in the Universe: Laboratory Plasma Flow Experiments on Magneto-Rotational Instability (MRI) and Laminar Plasma Dynamo	$263158
LANL-20030179ER	Bacillus Anthracis Iron Acquisition	$269930
LANL-20030181ER	Efficient Computation of Free Energy Differences Relevant to Rational Drug Design	$214229
LANL-20030210ER	Measure-Valued Solutions of the Lagrangian-Averaged Euler Equations	$254028
LANL-20030216ER	Strong Ultrafine Grain Metals by Severe Plastic Deformation and Strain Path Changes: Application to Beryllium (Be)	$258995
LANL-20030225ER	Processor-Coupled Computing Fabric	$207939
LANL-20030227ER	Estimation of Aquifer Recharge Using Time-Lapse Gravity Surveys	$222592
LANL-20030232ER	Catalysis by Artificial Inorganic Enzymes	$260972
LANL-20030248ER	Distributed Multi-scale Markov Chain Monte Carlo for Uncertainty Quantification in Inverse Problems	$209982
LANL-20030251ER	Using Neutrons to Explore Peculiar Elastic Behavior of Rocks	$185627
LANL-20030258ER	Immune Cell-Based Biosensor for Rapid Pathogen Detection and Identification	$270485
LANL-20030261ER	Transport Studies of Vortex Motion in High Temperature Superconductors, MgB(2), and Borocarbides.	$188896
LANL-20030292ER	Synthesis and Characterization of Selective Ligands	$428689
LANL-20030301ER	Magnetocarcinotherapy: A Novel Molecular Imaging Diagnostic and Treatment Method for Cancers	$270600
LANL-20030310ER	Polymer-Assisted Aqueous Deposition (PAAD) of Metal-Oxide Films	$260563
LANL-20030317ER	Three Dimensional Effects in Core-Collapse Supernovae: Rotation, Convection and Neutron Star Kicks	$183927
LANL-20030351ER	Computational Schemes for Multiscale Modeling of Polymers	$282284
LANL-20030352ER	Double Beta Decay	$227104
LANL-20030355ER	Thin-Film Semiconductor Sensors on Polycrystalline Substrates	$237787

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Project ID	Project Name	FY Total
LANL-20030356ER	An Integrated Microarray-Based Platform for Sensitive High-Throughput Pathogen Detection and Identification	$192461
LANL-20030359ER	Electrically Pumped Colloidal Nanoemitters: Combining Top-Down and Bottom-Up Approaches in Nanoscale Engineering	$250698
LANL-20030360ER	Viral Invasion: Breaching the Cells Outer Defenses	$212055
LANL-20030363ER	Testing for a Relativistic Symmetry in the Nucleon-Nucleon Interaction	$169748
LANL-20030365ER	Cosmological Vacuum Energy	$243305
LANL-20030398ER	Desalination by Molecular Design	$214707
LANL-20030400ER	Atomic Level Engineering of Nanostructures and Devices	$255690
LANL-20030419DR	Assembly and Actuation of Nanomaterials Using Active Biomolecules	$451777
LANL-20030420DR	Active Photonic Nanostructures	$457699
LANL-20030486DR	Astrophysical Survey Science and Technology	$465894
LANL-20030487DR	Physics of Information	$1013200
LANL-20030488ER	Formation and Distribution of Galaxies: An Advanced Computational Approach	$334424
LANL-20030497PRD1	Analysis and Generation of Magnetic Flux Pinning Sites in YBa2Cu3O7-d Films	$25203
LANL-20030519PRD1	Solid-State Actinide Chemistry	$5085
LANL-20030522PRD1	Searching for Superhard Materials from Nanometric Scale and at Extreme Conditions	$45636
LANL-20030526PRD1	Identification of the Energy Gap in the 2D Metallic State of Strongly Interacting Fermions	$108665
LANL-20030544PRD1	Ultracold Collisions of Charged Particles	$82383
LANL-20030549PRD1	Physics of Metallo-Organic / Organic Materials and Devices	$88271
LANL-20030562PRD1	Synthesis of Continuous Carbon Nanotubes	$48447
LANL-20030568PRD1	Interaction of Magnetism and Superconductivity in Novel Superconductors	$134894
LANL-20030579PRD1	Cosmic Cinematography: Opening a New Window for Discovery in Astrophysics	$132433
LANL-20030597ER	LOFAR - A Low Frequency Radio Interferometer for Astronomy and Space Sciences	$183056
LANL-20030604ER	Preparation & Characterization of Inorganic & Organic High-Nitrogen Energetic Materials	$34778
LANL-20030622ER	Complex Dynamical Earth Systems	$434619

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Project ID	Project Name	FY Total
LANL-20030623ER	Space Weather Foundations	$324753
LANL-20030624ER	Dynamical Astrophysics	$517780
LANL-20030625ER	Planetary Geophysics-Core to Crust	$395857
LANL-20030635PRD2	Theoretical and Computational Studies of the Behavior of Plasma at the Edge of a Tokamak	$85498
LANL-20030637PRD2	Global Three-Dimensional Magnetospheric Structure	$84389
LANL-20030642PRD2	Superheating Upon Superfast Dynamic Loading	$54653
LANL-20030643PRD2	Theoretical Studies of Advanced Materials	$54301
LANL-20030663PRD2	Electric Field Control of Optical and Electronic Properties of Semiconductor Quantum Dots	$71999
LANL-20030666PRD2	Host-Pathogen Interactions of Intracellular Microbes	$55292
LANL-20030680PRD2	Pattern Formation and Dynamics in Systems with Competing Forces	$78788
LANL-20030699PRD3	Trace-Level Analysis of Radionuclides Using Membrane-Based Ion-Selective Chemical Sensors	$69026
LANL-20030718PRD3	Neutrino Physics, Astrophysics and Cosmology	$108934
LANL-20030744PRD3	Investigation of Electrical Properties of [Ba1-xSrxTiO3/Ba1-ySryTiO3] Multilayers for Applications in Tunable Microwave Devices	$107828
LANL-20030766PRD3	Development of Self-Monitoring and Self-Repairing Structural Systems using Smart Materials	$90738
LANL-20030770PRD3	Short-term Decoherence in Quantum Optics	$95431
LANL-20030811PRD4	Fracture and Damage Evolution of Fluorinated Polymers	$88548
LANL-20030837PRD4	An Organometallic Chemistry Approach to the Preparation of Fluorinated Polymers	$118017
LANL-20030839ER	Proteins in Protein Networks	$387920
LANL-20030840PRD4	Novel Antibiotic Targets for B. anthracis: Fosmidomycin and Siderophores	$118080
LANL-20030859PRD4	Fault Tolerant and Recovery-Oriented Computing	$121612
LANL-20030861PRD4	Mechanisms of Creep in Bulk Metallic Glasses	$103964
LANL-20030865PRD4	Compton Imaging and High Energy Astrophysics	$119053
LANL-20030874PRD4	Ion Beam Slicing With Point Defect Engineering	$116288
LANL-20040014DR	Localization and Itinerancy in Plutonium	$2025300
LANL-20040031DR	Scalable Reconfigurable Computing: Exploiting an Exponential Increase in Computational Density	$1155082

LANL - Los Alamos National Lab		
Project ID	**Project Name**	**FY Total**
LANL-20040040DR	Search for Variation of the Fine Structure Constant with Optical Frequency References	$1366360
LANL-20040042DR	Science of Geological Carbon Sequestration: Integration of Experimentation and Simulation	$1031759
LANL-20040049DR	Solid-State Quantum Information Processing: A New Approach to Demonstrate Quantum Entanglement	$1152779
LANL-20040064DR	Energetic-Particle Interactions with Dense Plasmas: A Study Relevanto to Boost and to Fast Ignition Using Laser-Driven High-Current Ion Beams	$1523993
LANL-20040069DR	High-Power MM-Wave Source Technology	$1341822
LANL-20040072DR	Radiography with Background Radiation	$1517203
LANL-20040087DR	Understanding the Molecular Mechanisms of Pathogen Recognition by the Immune System: Biothreat Reduction through Predictive Science	$1446738
LANL-20040093DR	Understanding Electronic and Magnetic Communication Between f-Electrons in Actinide and Lanthanide Materials	$1409648
LANL-20040104DR	Testing Time-Reversal Symmetry with Ultracold Neutrons and with Solid State Systems	$1241366
LANL-20040120DR	Fluorobody Switches: Recognition Proteins Which Fluoresce Upon Binding Targets	$1016049
LANL-20040134DR	Bose-Einstein Condensate Physics: Dynamics and Applications	$1630491
LANL-20040141DR	Statistical Physics of Infrastructure Networks	$1646262
LANL-20040167ER	Exploring the Turbulent-Viscosity Effect in Solar-Wind/Magnetosphere Coupling	$113066
LANL-20040171ER	Fermion Quantum Phase Transitions	$286051
LANL-20040184ER	Response Networks of M. Tuberculosis and Bio-Threat Agents	$234771
LANL-20040187ER	Electroweak Symmetry Breaking	$323796
LANL-20040193ER	Dark Lightning: Throwing Light on Monster Convective Storms	$187878
LANL-20040195ER	Precision Cosmology: A First Principles Approach to Galaxy Clustering	$326132
LANL-20040201ER	The Dynamic Response of Polymers Under Stress Using a Unique Probe for the Molecular Events Governing Materials Responses	$249907
LANL-20040212ER	Detecting Weak Gaseous Plumes in Hyperspectral Remote Sensing Imagery	$275048
LANL-20040213ER	Ion-Beam Synthesis and Luminescence Characterization of a New Class of Nanomaterials-Nanophosphors	$257702
LANL-20040218ER	Error-Minimizing, Implicit Adaptive-Grid Solutions of Time Dependent Problems	$176128

LANL - Los Alamos National Lab

Project ID	Project Name	FY Total
LANL-20040236ER	Computational Complexity and Quantum Entanglement	$279569
LANL-20040237ER	New Mathematical Tools for the Quantum Dynamics of a Bose-Einstein Condensate	$222567
LANL-20040256ER	Hybrid Density Functional Theory Investigations in Condensed Matter	$236398
LANL-20040259ER	Nonlinear-Acoustic Tomographic-Imaging of Damage in Solids	$282199
LANL-20040262ER	Understanding and Predicting the Initiation of DNA Transcription	$229466
LANL-20040284ER	The Dynamics of Two-Dimensional Turbulence	$255403
LANL-20040291ER	Tracking Single Molecules in Three Dimensions	$245583
LANL-20040294ER	Study of Phases with Hidden Order Parameter in the Actinides and Other Strongly Correlated Electron Systems	$259325
LANL-20040295ER	Design Principles of Genetic Regulatory Networks	$262263
LANL-20040301ER	Understanding Global Planetary Processes Through a Study of the Moon's Surface Composition	$287405
LANL-20040326ER	Massively Parallel Fabrication of Complex Nanoscale Structures in Soft Materials	$225117
LANL-20040344ER	Understanding and Controlling the Chemistry of Biocidal Polymers	$211127
LANL-20040358ER	Measurement of Vibrational Anharmonicities for Chemical Dynamics	$263287
LANL-20040359ER	Spatially-Isochronous Time-of-Flight Mass Spectrometer	$216011
LANL-20040379ER	Modeling Invariance in Data Space	$350113
LANL-20040391ER	Quantum Devices for Electronic Circuitry and Advanced Detection	$312398
LANL-20040393ER	Genetic Programs Underlying Key Physiological States in Burkholderia Pseudomallei	$178139
LANL-20040408ER	Coherent Control of the Raman Fingerprint Spectrum Via Single-Pulse Coherent Anti-Stokes Raman Scattering	$349665
LANL-20040412ER	Mining the Sky with Both Eyes Open: Stereoscopic Monitoring of the Night Sky	$253145
LANL-20040415ER	Supernovae Neutrinos	$204943
LANL-20040419ER	Statistical Models for Natural Graphs	$192402
LANL-20040425ER	A Dynamic 2-D Ultrasonic Particle Trap for Particle and Cell Array Processing of Biological Assays in Micro-Fluidic Channels	$259499
LANL-20040430ER	Synthesis of Continuous Carbon Nanotubes	$297270
LANL-20040438ER	Quantum Control and Information Processing Using Semiconductor Quantum Dots	$272021

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LANL - Los Alamos National Lab

Project ID	Project Name	FY Total
LANL-20040454ER	High Throughput Isolation of Optimal Protease Substrates	$314173
LANL-20040461ER	Secure Communications in Fiber Links Using Randomness and Nonlinearity of Optical Fibers	$210086
LANL-20040478ER	Hyperthermal Surface Ionizer for Aerosol Chemical and Biological Analysis	$269989
LANL-20040480ER	Self-Healing High-Perfomance Parallel Computers	$243091
LANL-20040481ER	Efficient Modeling of Systems with Uncertainty on Multiple Scales	$216129
LANL-20040508ER	The Synthesis of Single Walled Carbon Nanotubes with Specific Diameters	$276381
LANL-20040840DR	Computational Models of the Water Cycle of Semi-Arid Basins	$501120
LANL-20040842DR	Fission Fragment Physics in Extreme Environments (U)	$424588
LANL-20040844DR	Phase Transitions and Strong Anharmonicities in Plutonium	$1932291
LANL-20040848ER	Exploring Movel Magneto-Electric Phenomena in Frustrated Spin Systems	$198102
LANL-20040849ER	Imaging Optical Interferometry	$329761
LANL-20040862ER	Software-Based, Power-Aware Computing	$120737
LANL-20040882PRD1	Exploring Protein Cameleons Using Single Molecule Spectroscopy	$113109
LANL-20040884PRD1	Energy Dissipation in Laminate and Particulate Composites With Nano- or Micro-meter Phases	$124613
LANL-20040885PRD1	Mechanistic Studies on Fe(III)(hydr)oxide Dissolution and Actinide Mobilization in an Aqueous Aerobic Environment	$109121
LANL-20040895ER	Probing Nucleosynthesis with DANCE	$60414
LANL-20040897PRD1	Supernova Light Curves	$85692
LANL-20040908PRD1	Thermal Shrinkage and Compressional Expansion in Framework Oxides: Underlying Structural Mechanisms and Phase Stability	$137928
LANL-20040909PRD1	New Theoretical and Computational Approaches to Ultra-Relativistic Heavy Ion Collisions	$144610
LANL-20040919PRD1	Optical Probing of Dense Structured Media such as Clouds: 3D Radiative Transfer at Work	$139028
LANL-20040923ER	Development of Technology for Particle Astrophysics and Other Applications	$37062
LANL-20040937PRD2	Valence Ambiguity in Organoactinide Chemistry	$84503
LANL-20040941PRD2	Magnetic Field Induced Quantum Critical Points in Correlated Electron Systems	$120261
LANL-20040953PRD2	Amine-Boranes for Chemical Hydrogen Storage	$112321
LANL-20040954PRD2	Quantifying Information Flow and Information Integration in Complex Networks	$108538

LANL - Los Alamos National Lab		
Project ID	**Project Name**	**FY Total**
LANL-20040961PRD2	Femtosecond Optical Combs for Precision Spectroscopy	$114665
LANL-20040967PRD2	High Resolution Retinal Prosthesis: Theory and Experiment	$86035
LANL-20040969PRD2	Coherent Terahertz Radiation From Intense Laser-Produced Plasmas	$113573
LANL-20040978PRD2	Tunable Photonic Crystal/Quantum Dot Lasers	$119681
LANL-20040980DR	Advanced Computer Architectures and Algorithmic Implications	$1236730
LANL-20040985PRD3	MiniBooNE Neutrino Oscillation Analysis	$119294
LANL-20040991ER	Practical Discharge-Pumped, Dressed Atom, Coherent Light Amplifiers and Generators	$103256
LANL-20041005PRD3	Bose-Einstein Condensation of Spins in Quantum Magnets	$115879
LANL-20041010DR	Dynamics of Complex Networks: Biology, Information, and Security	$656392
LANL-20041027PRD3	Materials Interactions with Terahertz Radiation	$143119
LANL-20041031PRD3	Dynamics of Quantum Phase Transitions	$79136
LANL-20041034PRD3	Rydberg Atom Interactions in Fields and Plasmas	$102271
LANL-20041040PRD3	Predictive Stellar Evolution	$83925
LANL-20041043PRD3	Gamma-Ray Bursts Afterglows in the Swift Era: Perspectives of New Major Discoveries	$61032
LANL-20041061PRD3	Investigation of the Dynamics of Protein Misfolding and Aggregation	$91421
LANL-20041075ER	Investigations into the Fundamental Chemistry and Structure of Hybrid Organic-Inorganic Materials	$139448
LANL-20041078ER	Nano-Scale Physics and Near-Contact Hydrodynamics	$268855
LANL-20041086ER	Nuclear Materials Detection Algorithm Development for Port-of-Entry Applications	$106626
LANL-20041091ER	Generation of Novel Materials with Applications to L.A.N.L. Programmatic Goals	$296871
LANL-20041097PRD4	High Precision Measurements of CO_2 and O_2 to Determine Variability of Soil Carbon Turnover Time	$126410
LANL-20041100PRD4	Thermal Transport: a probe of the Bose-Einstein Condensate in Quantum Magnets	$134151
LANL-20041105PRD4	Ferroic Films for Multifunctional Devices	$53970
LANL-20041118PRD4	Intercalated Nanocomposites - Innovative Fuel Cell Catalysts	$84704
LANL-20041122PRD4	Nonlinearity and Chaos in Spatially Extended Dynamical Systems	$74660

LANL - Los Alamos National Lab

Project ID	Project Name	FY Total
LANL-20041123PRD4	New Frontier in Modeling Multi-Scale Processes Involving Reactive Transport in Porous Media	$42627
LANL-20041131PRD4	Quantum Simulations in Optical Lattices	$76279
LANL-20041132PRD4	Ionic Liquids: A New Platform for Sensors	$97763
LANL-20050014DR	Resolving the Aerosol-Climate-Water Puzzle: Predictive Science for Global Stability and Security	$1610953
LANL-20050031DR	Coming Out of the Cosmic Dark Ages - The First Stars in the Universe	$1384313
LANL-20050043DR	Pu-H Interactions: Studies of Plutonium Hydride Phenomena (U)	$1302890
LANL-20050064DR	Protocell Assembly	$1418062
LANL-20050066DR	Lagrangian Measurements of Fluid Mixing	$1590251
LANL-20050076DR	Cold Atom Quantum Simulators	$1459209
LANL-20050107DR	Material Response During Dynamic Loading at Subpicosecond Time and Nanometer Length Scales	$1464217
LANL-20050123DR	Metabolome Scale Characterization of the Biothreat Agent, Bacillus anthracis	$1385258
LANL-20050127DR	Be-Specific Human Immune Response and Development of Chronic Bereyllium Disease	$1450913
LANL-20050155DR	Rational Vaccine Design: Theory and Experimental Validation	$1424193
LANL-20050158ER	Salient Anomaly Detection: In Search of the Unknown in Images and Signals	$269982
LANL-20050161DR	Thinking Telescopes: Pursuing a New Paradigm for Discovery in Observational Science	$1539460
LANL-20050164DR	Probing New Physics with Ultra-Cold Neutrons	$1067374
LANL-20050184DR	New Americium Delta-A Metric for Primary Certification (U)	$1601980
LANL-20050199ER	Processing and Properties of Bulk Nanostructured Alloys	$193286
LANL-20050246ER	Gamma-Ray-Channeling Optics	$276095
LANL-20050271ER	A System-Scale Theory for Fast Magnetic Reconnection	$191174
LANL-20050277ER	Laser-Cooling Molecules to Millikelvins	$265803
LANL-20050290ER	A Microfabricated Single Molecule Sorter	$333875
LANL-20050304ER	Redox Interplay Underpinning 4f-Element Metallocene-Based Magnetic Systems	$200402
LANL-20050306ER	Exploration of the Role in Interfaces in Nanolayered Composites in Creating Radiation Damage Tolerant Materials.	$269968
LANL-20050307ER	HAWC: The Next Generation VHE All-Sky Gamma Ray Observatory	$172922

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Project ID	Project Name	FY Total
LANL-20050315ER	Implicit Adaptive Mesh Refinement: a Magnetohydrodynamics Application	$196473
LANL-20050323ER	Testing Embedded Model Assumptions of Stable Isotopic Dynamics with Continuous Sampling: Are Modelers' Assumptions of the Global Carbon Cycle Correct?	$241837
LANL-20050343ER	Atomistic Studies of Fast Chemical Processes in Nano-Structured Metastable Composites	$216849
LANL-20050360ER	Low-Threshold, Single-Exciton Nanocrystal Lasing Using Engineered Exciton-Exciton Interactions	$294872
LANL-20050363ER	Combustion Enhancement Using Plasma	$252425
LANL-20050377ER	Observing Individual Antibody-antigen Encounters for Decades of Timescales	$224965
LANL-20050379ER	Taming and Accelerating Particle-In-Cell	$211340
LANL-20050388ER	Spatio-temporal Plasmonics: Controlling Plasmon Polaritons at the Nanoscale	$315177
LANL-20050400ER	Eliminating PCR in Biothreat Detection: Highly Multiplexed Nucleic Acid Dipsticks for Rapid and Sensitive Pathogen Identification	$336907
LANL-20050402ER	Immune Response to West Nile Virus in Birds	$307914
LANL-20050411ER	Quantitative Modeling of Living Neuronal Networks In Vitro	$266515
LANL-20050425ER	Computational Foundations for a New Class of Digital Filter Banks	$240264
LANL-20050430ER	Fulde-Ferrell-Larkin-Ovchinnikov Inhomogeneous Superconducting State	$360295
LANL-20050480ER	The First Complete Classification Algorithm	$264801
LANL-20050484ER	Novel High-Speed Electro-Optic Switches Based on Domain Microoptics Embedded in a Ferroelectric Chip	$246266
LANL-20050506ER	Hierarchical Assembly of Porous Materials: Obeying Bio-Inspired Allometric Scaling Laws	$181691
LANL-20050531ER	Neyman-Pearson Learning	$235072
LANL-20050540ER	A New Form of Secure Communication; Spatial Encryption Using superluminal Sources	$197654
LANL-20050559ER	Plasma Catalyzed Coal Gasification	$248620
LANL-20050566ER	Ion Beam Synthesis of Ferromagnetic Semiconductors	$243600
LANL-20050583ER	High Efficiency Carrier Multiplication Using Impact Ionization in Semiconductor Quantum Dots	$249130
LANL-20050626ER	High-Valent Ruthenium Oxides on Tio2: Toward the Development of Light-Driven Oxidation Catalysts	$307914
LANL-20050631DR	Nonlinear Behavior in Complex Systems	$618455

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Project ID	Project Name	FY Total
LANL-20050632DR	Cooperative Phenomena in Soft Matter	$612999
LANL-20050633DR	Exploiting Emergent Materials Behavior on the Nanoscale	$909838
LANL-20051086PRD1	Traveling-Wave Tube Bandwidth and Lineraity Study	$34666
LANL-20051087ER	Antineutrino Monitoring of Reactors	$306593
LANL-20051090ER	Nanoscale Metal Oxide Thin Film Deposition and Interactions with Substrates	$72614
LANL-20051092ER	Design of Experiment Construction and Assessment	$72392
LANL-20051098PRD2	Metallic Quantum Dot Superlattices	$65892
LANL-20051100PRD1	Hybrid Quantum-Dot/Photonic-Crystal Structures	$135774
LANL-20051102PRD1	Improving the Predictive Capabilities of Complex, Spatially Distributed Environmental Models	$73704
LANL-20051104PRD1	Trapped Ion Quantum Simulations	$26126
LANL-20051116DR	Physical Modeling of Biomolecules and Ribonucleo-Protein Complexes of Importance to Pathogenicity	$637521
LANL-20051118PRD1	Control of Inelastic Collisions for Improved Atom Interferometry	$57810
LANL-20051121PRD1	Measuring Neutrino Properties with Oscillation Experiments	$57474
LANL-20051122PRD1	Photovoltaics of Nanocrystalline TiO2	$68528
LANL-20051124PRD1	Tuning Plutonium Compounds Through the Localized/Itinerant Crossover	$107200
LANL-20051125PRD1	W-Band Photonic Band Gap Structure Research	$64798
LANL-20051127PRD1	Artificial Design of Novel Multiferroic Materials	$84460
LANL-20051132PRD1	Exploration of Deformation Physics at Nanometer Scale	$42709
LANL-20051143PRD1	Hydrogen Storage in Novel Molecular Compounds	$5815
LANL-20051148PRD2	New Paradigms for Modeling Communicable Diseases	$70313
LANL-20051149DR	Cross sections for the Isomer of 235U	$745212
LANL-20051159ER	Comparative Genomic Analysis to Identify Unique Signatures in Pathogen Genomes	$98013
LANL-20051164DR	Nanoscale Fluctuations in Multifunctional Materials	$645377
LANL-20051169ER	Physics of Astrophysical Jets	$257565
LANL-20051239PRD3	Computer Simulations of Phase Stability and Microstructure Evolution in Alloys Using Hybrid Molecular Dynamics and Phase-Field Approaches	$27719
LANL-20051257PRD3	Investigation of Fuel Cell Electrocatalysts for Improved Activity and Durability	$4802
LANL-20051265PRD3	Three-dimensional Micro Architectures for Neural Interfaces	$29724

LANL - Los Alamos National Lab

Project ID	Project Name	FY Total
LANL-20051282PRD3	Theory and Trapped Ion Quantum Simulations	$8137
LANL-20051284PRD3	Two Dimensional Spectroscopic Studies of Biexcitons in Quantum Dots	$20641
LANL-20051304ER	DNA Concentrator	$100781
Total # of Projects for LANL:	**269**	**Total Cost for LANL:** **$104703784**

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LBNL - L. Berkeley National Lab

Project ID	Project Name	FY Total
LB02045	Parallel Methods for Robust Optimization and Uncertainty Quantification	$135432
LB03008	Application of Real-Time PCR with Reverse Transcription for Quantification of Specific Microbial Activity in Complex Communities	$80000
LB03012	Interactive Visualization Methods for Exploration and Comparison of Multi-Billion Base Pair Sequence Data	$78290
LB03021	Optimal Solvers for Infinite-Dimensional Hamiltonian Systems	$100032
LB03028	Electron Production and Collective Field Generation in Intense Particle Beams	$129792
LB03030	Evolution of Computer Architecture Alternatives	$165524
LB03035	Microscopic Theory of Protein Surface: Structure, Response, and Design	$113051
LB04003	High Throughput Strategy for Protein Complex Identification	$199792
LB04004	Autonomous Sensors for Ocean Dissolved Organic Matter	$249999
LB04005	Development of Biosensors for Endocrine Disrupting Compounds in Agricultural Watersheds	$89997
LB04007	Techniques of Sample Controls for a Transmission Electron Aberration-corrected Microscope	$248845
LB04008	Gold-catalyzed Synthesis of Germanium Quantum-dot Arrays	$99920
LB04009	Next Generation Codes for Modeling Subsurface Processes	$119915
LB04010	Molecular Microscopy and Tomography	$199770
LB04011	Functional Interpretation of Cancer Genomes	$596228
LB04012	Designing a Novel Reactor Neutrino Experiment for Measuring the Mixing Angle Theta13	$299495
LB04013	Coherent X-ray Diffraction Imaging (CXDI)	$246923
LB04014	Neuroimaging with Advanced Molecular Probes	$367673
LB04017	Research and Development for Double Beta Decay Experiments	$299999
LB04018	Nanoscale Lithography to Guide Self-Assembly for the Creation of Functional, Hierarchical Nanostructures	$100078
LB04019	Critical Accelerator Technologies for Future Advanced Light Sources	$861971
LB04021	Structured Cathodes for Efficient Organic LEDs	$153769
LB04022	Imaging three-dimensional signaling networks in normal and malignant tissue	$99709
LB04023	Evaluating Aerosol Effects on Regional and Global Energy and Water Budgets	$100011
LB04024	Optimizing Genomic Data Storage for Wide Accessibility	$99001

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LBNL - L. Berkeley National Lab

Project ID	Project Name	FY Total
LB04025	California Water and Energy System: An Approach for Addressing Future Crises	$199937
LB04026	Making the Most of Sequencing: Improved Assembly, Improved Protocols, and True Comparative Annotation Tools	$146273
LB04027	Spectroscopy and Dynamics of Pure and Doped Helium Nanodroplets	$100256
LB04028	Novel high-temperature membranes and electrocatalyst structures for fuel cells	$149616
LB04029	Advanced Computational Methods for Photon- Molecule Collision Processes	$299970
LB04030	Ultrafast Magnetization Dynamics	$149219
LB04034	Advancing the Next Generation of Rock-Fluid Imaging and Stimulation Technologies	$70000
LB04035	Magnetism at the Nanometer Scale in Spin Polarized Materials	$80000
LB04037	High Average Power Laser Amplifier	$482024
LB04038	Gas Phase Studies of the Building Blocks of Life	$79819
LB04039	Development of Techniques for the Study of Large Macromolecular Complexes Using X-ray Crystallography	$54420
LB04041	High-throughput Production of Proteins and Protein Complexes	$120133
LB04043	World Energy Scenarios: The Crucial Role of Energy Demand	$120588
LB04044	Lensless Imaging of Yeast Cells	$46269
LB05001	Studies of the Health Effects of Nanostructured Materials	$297531
LB05002	Advanced Detectors to Understand the Early Universe	$178455
LB05003	The Behavior and Impact of Nanoparticles in the Environment	$149777
LB05004	Ultrafast measurements of charge-ordering/disordering in manganites: Development of a femtosecond electron diffraction probe	$100361
LB05005	Modeling human disease in Drosophila melanogaster	$149958
LB05006	Organization of Cellular Components on Signaling and Function: Theory and Computation as Essential Complements to Genetic and Biochemical Experiments	$197913
LB05007	Oxygen Catalysis though Proton and Electron Control: Biomimetic Chemistry for Renewable Energy	$77150
LB05008	Cryptographic Foundation for New Generation Distributed Systems	$129171
LB05009	Unmasking the Human Genome Alternative Splicing Program	$150582
LB05010	Novel Imaging Detectors for Materials and Biology Research	$394879

LBNL - L. Berkeley National Lab		
Project ID	**Project Name**	**FY Total**
LB05011	Micro-characterization and Chemical Micro-dynamics of Atmospheric Mineral Dust	$99902
LB05012	Constraining Ammonia Emission Inventories for Control of Air Quality	$230174
LB05013	Synthetic cytoskeleton: Protrusive structures for reconstituted cell motility	$70560
LB05015	Peer-to-Peer Resource Discovery Framework	$88226
LB05016	Engineering of Nature's Ion Channels and Transporters to Use Light as Both a Signal and an Energy Source	$164894
LB05017	Highly Efficient PLED Through Polymer Morphology Control	$200076
LB05019	Time-resolved X-ray Absorption Spectroscopy of Metalloporphyrins	$99808
LB05020	Development and Application of Quantum Monte Carlo (QMC) Methods to Biological Systems	$100336
LB05021	Rapid Characterization of Nucleic Acids using Nanopores	$148192
LB05022	Enabling High Energy Density Physics	$371694
LB05024	Left-Handed Nanoscale Meta-Materials: Towards the Optical Domain	$144557
LB05025	Development of Key Physics and Technical Approaches for the Production of Intense Rare Isotope Beams	$249808
LB05026	New capabilities in nuclear astrophysics and radiation biology using neutrons at the 88-Inch Cyclotron	$149974
LB05027	New Directions for Theoretical Physics at the TeV-Scale	$250055
LB05028	Analysis of High-temperature Polymer-electrolyte Fuel-cell Phenomena	$90368
LB05029	Enhancing Commodity Processors with Vector Components for Increased Scientific Productivity	$202832
LB05030	Improved Spectroscopy of Weakly Bound States in Nuclei	$150000
LB05031	Advanced Computational Tools for Electric Power Systems	$247799
LB05032	Computational Texture Models for Patterns of Protein Expression	$73051
LB05033	NanoARPES: A New Detector for Nanometer-scale Electronic Structure Measurements	$167650
LB05034	Transgenic Mouse Production and Identification of New Genes in Transgenic Mice	$64983
LB05035	Computational and Theoretical Studies of Bulk and Nano Solid Systems	$59976
LB05036	Biogeochemical Reaction Rates and Pathways in Porous Media	$99677
LB05037	A New Approach for the Catalyic Conversion of Methane and other Inert Hydrocarbons	$79430

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LBNL - L. Berkeley National Lab		
Project ID	**Project Name**	**FY Total**
LB05038	Experimental Signatures of Deconfined Phases and Phase Transitions	$68250
LB05039	Low Energy Spread Electron Source	$127134
LB05040	Computational Analysis of Structural Impacts of Exocyclic DNA Adducts on Specificity and Efficiency of Human Repair Enzymes	$49921
LB05041	Application of Single Particle Analysis to Transcriptional Complexes Involved in Cell-microenvironment Interactions	$55435
LB05042	Improved Phase Contrast for Cryo-EM of Biological Machines and Subcellular Structure	$74908
LB05043	Scientific Basis for Advanced Geologic Storage Technologies	$164873
LB05044	Statistical Dynamics of Protein Evolution	$88682
LB05045	Science and Technology of Quantum Materials	$179986
Total # of Projects for LBNL:	**81** **Total Cost for LBNL:**	**$13572728**

LLNL - L. Livermore National Lab

Project ID	Project Name	FY Total
02-ERD-046	Magnetic Transition Metals and Oxides at High Pressures	$159436
02-ERD-047	A Revolution in Biological Imaging	$655345
02-ERD-066	Dynamic Simulation Tools for the Analysis and Optimization of Novel Filtration, Sample Collection, and Preparation Systems	$131090
02-ERD-071	Development of a Quantum-Limited Microwave Amplifier using a Direct Current Superconducting Quantum Interference Device	$120473
03-ERD-001	Chemical Dynamics of High-Pressure Interfaces	$210541
03-ERD-002	Adaptive Optics Views of the Hubble Deep Fields	$201446
03-ERD-004	Quantum Electrodynamics and Electron Collisions in the Superstrong Fields of K-Shell Actinide Ions	$352370
03-ERD-005	Exploring Properties of Quantum Chromodynamics with Proton-Nucleus and Deuteron-Nucleus Collisions	$384091
03-ERD-006	Correction of Distributed Optical Aberrations	$237923
03-ERD-007	Ultrafast Radiation Detection by Modulation of an Optical Probe Beam	$303982
03-ERD-008	Electron Production and Collective Field Generation in Intense Particle Beams	$148908
03-ERD-009	A Coupled Turbulence-Transport Model for Edge Plasmas	$296337
03-ERD-013	DNA Detection through Designed Apertures	$228948
03-ERD-015	Strain Rate Scaling of Deformation Mechanisms	$325290
03-ERD-017	Determining Phonon Dispersion Curves for Delta-Phase Plutonium-Gallium Alloys	$435923
03-ERD-018	Determination of the Microstructural Morphology of Shock-Induced Melt and Resolidification	$376017
03-ERD-019	Mononitride Fuel Development for STAR and Space Applications	$194957
03-ERD-024	Microfluidic System for Solution Array-Based Bioassays	$343628
03-ERD-027	Adaptive Mesh Refinement Algorithms for Parallel Unstructured Finite Element Codes	$259378
03-ERD-031	Detection and Tracking in Video	$300267
03-ERD-033	Scalable Discretization-Enhanced Solvers	$319729
03-ERD-042	Predicting the Effects of Climate Change and Variability on Water Availability	$306581
03-ERD-044	Colliding Nanometer Beams	$312784
03-ERD-050	Carbon-Nanotube Permeable Membranes	$206160
03-ERD-051	Development of a Virtual Crystallizer	$1013227

LLNL - L. Livermore National Lab		
Project ID	**Project Name**	**FY Total**
03-ERD-059	Large-Aperture Diffraction Gratings: The Enabling Technology for High-Energy Petawatt Lasers	$505466
03-ERD-060	Molecular Engineering of Electrodialysis Membranes	$740776
03-ERD-061	Parallel Graph Algorithms for Complex Networks	$442960
03-ERD-062	Microbial Pathways	$530781
03-ERD-064	A Two-Particle Formulation of Electronic Structure	$191324
03-ERD-067	Nitrate Biogeochemistry and Reactive Transport in California Groundwater	$503951
03-ERD-068	The Instrumented Cell	$780615
03-ERD-070	Laser-Matter Interactions with a 527-Nanometer Drive	$754747
03-ERD-071	Optics Performance at 1 omega, 2 omega, and 3 omega	$1033233
03-ERD-072	Characterization and Optimization of High-Energy K-Alpha X-Ray Sources	$14542
03-ERD-073	A Compact Accelerator for Proton Therapy	$214013
03-ERD-074	Novel Methods for Bonding Disparate Materials	$148757
03-ERD-076	Persistent Monitoring Platforms	$414938
03-ERD-077	Plutonium and Quantum Criticality	$495218
03-ERI-001	Tectonic Morphochronology of the Southern San Andreas Fault System	$213800
03-ERI-003	A Computational Design Tool for Microdevices and Components used in Pathogen Detection Systems	$293498
03-ERI-004	Elucidation of the Mechanism of Gene Silencing using Small Interfering RNA-DNA Hybrid Molecules	$40565
03-ERI-007	Development of Sample Handling and Analytical Expertise for the Stardust Comet Sample Return Mission	$470714
03-ERI-009	Force Spectroscopy to Study Multivalent Binding in Protein-Antibody Interactions	$99360
03-ERI-010	Intracellular Chemical Measurements: A Generalized Approach with High-Spatial Resolution using Functionalized Nanoparticles	$67677
03-ERI-011	Single Molecule Techniques for the Study of Chromatin Assembly and Remodeling	$88479
03-ERI-012	Using Femtosecond Laser Subcellular Surgery as a Tool to Study Cell Biology	$134105
03-LW-001	A High-Efficiency Grazing Incidence Pumped X-Ray Laser	$116557
03-LW-005	Space-Time Secure Communications for Hostile Environments	$207914
03-LW-047	Laser-Initiated Nanoscale Molecularly Imprinted Polymers	$191090

LLNL - L. Livermore National Lab

Project ID	Project Name	FY Total
03-LW-059	A Novel Antimatter Detector with Application to Dark Matter Searches	$185184
03-SI-001	Biological and Synthetic Nanostructures Controlled at the Atomistic Level	$1564674
03-SI-003	ICE: The Image Content Engine	$2369251
03-SI-004	Advancing the Technology of Tabletop, Mesoscale Nondestructive Characterization	$345807
03-SI-005	Pathomics	$1644195
04-ERD-001	Nonaqueous Phase Liquid Dissolution in Porous Media: Multi-Scale Effects of Dissolution Kinetics on Cleanup Time	$225097
04-ERD-002	Multiprobe Investigation of Proteomic Structure of Pathogens	$149997
04-ERD-004	Three-Dimensional Vectorial Time-Domain Computational Photonics	$245946
04-ERD-005	Infrared Diagnostics for Dynamic Events	$282139
04-ERD-007	Dynamic Combinatorial Libraries for Target-Driven Ligand Development	$297093
04-ERD-010	Time-Resolved Dynamic Studies using Short-Pulse X-Ray Radiation	$494736
04-ERD-012	Locally Adaptive Mesh Refinement for Linearly Scaling Electronic Structure Calculations	$314045
04-ERD-013	Acoustic Characterization of Mesoscale Objects	$395566
04-ERD-017	Broadband Radiation and Scattering	$260905
04-ERD-019	Development of Absolute Spectroscopic Diagnostics for Nonlocal-Thermodynamic-Equilibrium Plasmas	$236781
04-ERD-020	Electronic Transitions and Phonons in f-Band Metals at High Pressures	$241476
04-ERD-021	High-Strain-Rate Deformation of Nanocrystalline Metals	$372219
04-ERD-023	Short-Pulse Laser Absorption and Energy Partition at Relativistic Laser Intensities	$286432
04-ERD-024	XChem	$171653
04-ERD-025	Ultrafast Transient Recording Enhancements for Optical-Streak Cameras	$391755
04-ERD-026	Fission Fragment Sputtering	$225995
04-ERD-027	Magnetic Dynamos and Stars	$248493
04-ERD-028	The Creation of a Neutron Star Atmosphere	$304784
04-ERD-030	Electronic Polymerase Chain Reaction	$330307
04-ERD-032	New Generation X-Ray Optics: Focusing Hard X Rays	$394902

LLNL - L. Livermore National Lab

Project ID	Project Name	FY Total
04-ERD-033	Nanosecond Ultrasonics to Study Phase Transitions in Solid and Liquid Systems at High Pressure and Temperature	$362443
04-ERD-036	Multiscale Characterization of Body-Centered-Cubic Crystals Deformed to Large Extents of Strain	$402584
04-ERD-037	Dynamic Data-Driven Event Reconstruction for Atmospheric Releases	$1026448
04-ERD-039	Bioforensics: Characterization of Biological Weapons Agents by NanoSIMS	$193681
04-ERD-040	Developing New Tools for In-Vivo Generation and Screening of Cyclic Peptide Libraries	$358569
04-ERD-043	Nanomechanics: Strength and Structure for Nanotechnology	$178729
04-ERD-046	Coupling Micromechanics and Reactive Fluid Flow in Fracture Networks	$188597
04-ERD-047	Exfiltration Interdiction Algorithm Development	$179887
04-ERD-048	High-Average-Power, High-Energy, Short-Pulse Fiber Laser System	$209945
04-ERD-052	A Coupled Computational and Experimental Approach to Determine Functions of Deeply Conserved "Anonymous" Human Genes	$504343
04-ERD-054	Development and Application of a Predictive Computational Tool for Short-Pulse, High-Intensity Target Interactions	$381033
04-ERD-057	Surrogate Nuclear Reactions and the Origin of the Heavy Elements	$283803
04-ERD-058	Stellar Astrophysics and a Fundamental Description of Thermonuclear Reactions	$238501
04-ERD-059	High-Energy-Density Galaxy Jets	$333506
04-ERD-060	Carbon Sequestration and Transport in Natural Environments: The Role of Organic Carbon and Microbial Processes in the Ocean--Observations and Modeling	$188203
04-ERD-064	High-Brightness, Laser-Driven, X-Ray Source for Nanoscale Metrology and Femtosecond Dynamics	$134907
04-ERD-065	Creating the Core Conditions of Extrasolar and Solar Giant Planets in the Laboratory	$253933
04-ERD-068	Protein Classification Based on Analysis of Local Sequence-Structure Correspondence	$379009
04-ERD-069	Ionization Chemistry of High-Temperature Molecular Fluids	$289213
04-ERD-070	The Large Synoptic Survey Telescope and Foundations for Data Exploitation of Petabyte Data Sets	$339253
04-ERD-071	Ultrafast, In-Situ Probing of Shocked Solids at the Mesoscale and Beyond: A New Paradigm for Materials Dynamics	$1241833
04-ERD-076	Molecular Radiation Biodosimetry	$807065

LLNL - L. Livermore National Lab

Project ID	Project Name	FY Total
04-ERD-084	Characterizing the Regulatory Genome: Transcription Factor Proteins and Gene Regulation Networks in Living Cells	$1301270
04-ERD-085	New Fragment Separation Technology for Superheavy Element Research	$273484
04-ERD-086	Electro-Thermal-Mechanical Simulation Capability	$445561
04-ERD-088	A New "Natural Neighbor" Meshless Method for Modeling Extreme Deformations and Failure	$312424
04-ERD-093	An Integrated Laboratory for the Study of Interventional Device Dynamics	$243520
04-ERD-095	Internet Ballistics: Identifying Internet Adversaries Despite Falsified Source Addressing	$181235
04-ERD-102	Petascale Simulation Initiative	$1354274
04-ERD-103	De Novo Identification of Regulatory Regions in Intergenic Spaces of Prokaryotic Genomes	$356305
04-ERD-104	Time-of-Flight, Secondary Ion Mass Spectrometry Measurement of Metabolites from Single Cells	$274060
04-ERD-105	NanoBIS Determination of the Unoccupied Electronic Structure of Pu	$319311
04-ERD-106	Mapping Phonons at High-Pressure: Phase Transformation, Phase Stability and Elastic Anisotropy	$191956
04-ERD-107	Nanomaterials for Radiation Detection	$299552
04-ERD-108	Non-Equilibrium Phase Transitions	$278663
04-ERI-004	Mission to Very Early Earth	$220283
04-ERI-009	Calcium Dynamics in Human Bone	$268882
04-ERI-013	Iodine-129 Accelerator Mass Spectrometry for Earth Science, Biomedical, and National Security Applications	$229906
04-ERI-014	Carbon Flux in a California Grassland Soil Sequence: The Role of Dissolved Organic Carbon in Carbon Sequestration	$180814
04-ERI-015	Single-Cell Level Investigation of Cytoskeletal Response to External Stimuli	$102227
04-FS-011	Laser Pulse Compression by Stimulated Raman Scattering in a Plasma	$13426
04-FS-019	The Innermost Inner Core: Fact Or Artifact?	$20925
04-FS-031	Geophysics Experiments on High-Powered Lasers	$10000
04-FS-032	Two-Phase Noble Liquid-Gas Detectors for Detection of Coherent Elastic Neutrino Scattering	$14654
04-FS-034	Microfluidic Liquid Cell for Molecular Imaging in Aqueous Phase Using Atomic Force Microscopy	$15242

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Project ID	Project Name	FY Total
04-LW-017	Development of Insulating Liquids for Detecting and Imaging of Low-Energy Particles	$180213
04-LW-020	Relativistic Antimatter Plasmas Created by Ultraintense Lasers	$184709
04-LW-036	Fractality of Fracture Surfaces in Polycrystalline Materials	$163723
04-LW-048	Understanding the Mechanism of Human P450 CYP1A2 using Coupled Quantum-Classical Simulations in a Dynamical Environment	$189383
04-LW-049	Investigation of AAA+ Protein Machines that Participate in DNA Replication, Recombination, and Response to DNA Damage	$190317
04-LW-054	New-Shape Memory Polymers for Actuators	$176230
04-LW-065	Application of Light-Emitting Polymers to Detect Pathogen DNA in Blood	$185619
04-LW-069	A Single-Molecule Study of the Movement of a DNA Sliding Clamp	$227019
04-LW-077	Constraints on the Nature of Terrestrial Core-Forming Melts: Ultrahigh-Pressure Transport Property Measurements and X-Ray Computed Tomography	$172832
04-SI-003	Kinetic Simulation of Boundary-Plasma Turbulent Transport	$1213007
05-ERD-003	The Structure and Properties of Nanoporous Materials	$328614
05-ERD-006	Developing Radiography for Advanced Radiography Capability at Future Large Fusion-Class Lasers	$272345
05-ERD-007	Physics from the MIPP Experiment	$322889
05-ERD-008	Emerging Contaminants: Application of Microarray Technology to the Detection of Mixtures of Endocrine-Active Agents	$252431
05-ERD-009	Nano-Barometers: An In Situ Diagnostic for High-Pressure Experiments	$203757
05-ERD-011	Neutron Capture Cross Section Measurements at DANCE	$182814
05-ERD-012	Catalyzing the Adoption of Software Components	$243800
05-ERD-014	Hysteresis and Kinetic Effects during Liquid-Solid Transitions	$219804
05-ERD-016	Characterization and Control of Laser-Induced Modifications in KDP and DKDP Crystals	$444707
05-ERD-018	LOCAL: Locality-Optimizing Caching Algorithms and Layouts	$200582
05-ERD-019	A New Capability for Regional High-Frequency Seismic Wave Simulation in Realistic Three-Dimensional Earth Models to Improve Nuclear Explosion Monitoring	$219438
05-ERD-020	Fully Atomistic Simulations of Hydrodynamic Instabilities and Mixing	$313797
05-ERD-021	Heterogeneous Processes at the Intersection of Chemistry and Biology	$203985

LLNL - L. Livermore National Lab

Project ID	Project Name	FY Total
05-ERD-025	Avoiding Surprise: Countering Novel Chem-Bio-Warfare Agent Threats	$413799
05-ERD-026	Chemical Specific Cellular Imaging of Biofilm Formation	$165072
05-ERD-027	Innovative Copolymer Complex to Inhibit the Transport of Biological Aerosols	$285795
05-ERD-028	CHEMTREAT: Accelerated Remediation of Contaminated Fine-Grained Sediments by a Chemical Clay Cracking and Co-Solvent Flushing Process	$216751
05-ERD-029	Decontamination of Terrorist-Dispersed Radionuclides from Surfaces in Urban Environments	$199058
05-ERD-030	Optical Properties as a Real-Time in-situ Materials Diagnostic at Extreme Conditions	$273372
05-ERD-032	Remote Sensing of Alpha and Beta Particle Sources	$352002
05-ERD-033	Homodyne Imaging Vibrometry Experiment (HIVE)	$388108
05-ERD-035	Controls of Fluid Chemistry on Fracture Growth	$235772
05-ERD-036	Advanced Studies of Hydrogen at High Pressures and Temperatures	$222142
05-ERD-037	Ceramic Laser Materials	$167374
05-ERD-038	Integration and Codevelopment of a Geophysical CO_2 Monitoring Suite	$263431
05-ERD-039	Determination of the High-Pressure Melting Curve of Iron	$151538
05-ERD-041	Risk Analysis of Secure Knowledge Discovery	$143969
05-ERD-042	Detection and Attribution of Regional Climate Change	$189363
05-ERD-043	A Dynamically-Coupled Groundwater, Land Surface and Regional Climate Model to Predict Seasonal Watershed Flow and Groundwater Response	$216570
05-ERD-044	Hydrodynamic, Atomic Kinetic, and Monte Carlo Radiation Transfer Models of the X-Ray Spectra of Compact Binaries	$144149
05-ERD-045	The Opacity of the Solar Interior	$429724
05-ERD-047	Environmental Consequences of Large-Scale Deployment of New Energy Systems	$231224
05-ERD-048	Is Climate Change Predictable? Really?	$9714
05-ERD-049	A Multiplexed Diagnostic Platform for Point-of-Care Pathogen Detection	$467020
05-ERD-050	Developing a Reactive Chemistry Capability for the NARAC Operational Model (LODI)	$265180
05-ERD-053	Rapid Screening of Human Effluents with Single Particle Mass Spectrometry for Early Detection of Respiratory Disease and Cancer	$343419
05-ERD-054	Enhanced Isolation Performance of Geologic CO_2 Storage Sites through Mineral Trapping: Experimental and Field Confirmation of Model Predictions	$208961

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Project ID	Project Name	FY Total
05-ERD-055	Probing Other Solar Systems with Current and Future Adaptive Optics	$275984
05-ERD-058	RadTracker: Optical Imaging of High Energy Radiation Tracks	$290982
05-ERD-060	Split-Beam, Short-Pulse Final Optics and Characterization for High-Energy Short Pulses	$1070440
05-ERD-061	Precision Split-Beam, Chirped-Pulse, Seed Laser Technology	$829117
05-ERD-062	Amplifier and Compressor Technology for Split-Beam, High-Energy Short Pulse Generation	$1150000
05-ERD-063	Large-Aperture Synoptic Survey Telescope Dark Matter and Dark Energy Science	$205120
05-ERD-064	Characterizing Hypothetical Proteins	$313105
05-ERD-065	Comparative Analysis of Genome Composition with Respect to Metabolic Capabilities and Regulatory Mechanisms	$195804
05-ERD-066	Mitigation of Optical Damage Sites on UV Optics	$1203768
05-ERD-067	A Fracture Mechanics and Tribology Approach to Understanding Subsurface Damage on Fused Silica during Grinding and Polishing	$775848
05-ERD-068	Development of Hot, LTE-Tunable Radiation Sources for Material Science Studies and Simulating Radiation Transport in Dense Astrophysical Plasmas	$224119
05-ERD-071	Characterization of the Effect of Short Pulse Exposure on Laser Damage Size, Morphology, and Conditioning in Wide-Bandgap Materials	$833897
05-ERD-073	Leading the Quantum Limit Revolution	$127421
05-ERD-075	Chemical Synthesis of Vaccines	$102904
05-ERD-076	Terascope: Terahertz Spectroscopic Imaging for Standoff Detection of High Explosives	$161810
05-ERD-078	Discovering the Folding Rules that Proteins Obey	$203572
05-ERD-079	A New Method for Wave Propagation in Elastic Media	$247768
05-ERD-080	Feasibility of Single Molecule DNA Sequencing using Surface-Enhanced Raman Scattering	$151561
05-ERD-081	Sensor Fusion for Regional Monitoring of Nuclear Materials with Ubiquitous Detection	$254731
05-ERD-082	Ultra-precision 14CO2 Measurements in Air Samples	$100763
05-ERD-083	Technology Basis for Fluorescence Imaging in the Nuclear Domain	$224376
05-ERD-084	Rapid Defense Against the Next-Generation BioThreat	$286077

LLNL - L. Livermore National Lab

Project ID	Project Name	FY Total
05-ERI-001	Developing the Physics Basis of Fast-Ignition Experiments at Future Large Fusion-Class Lasers	$395267
05-ERI-002	Efficient and Reliable Data Exploration via Multiscale Morse Analysis and Combinatorial Information Visualization	$530748
05-ERI-003	Measuring Plasmon Density of States in Warm Dense Matter	$286509
05-FS-004	Detection of Human Presence from Aerosol Collection	$59154
05-LW-006	Understanding the Nuclear Magnetic Fields	$140260
05-LW-018	Development of a Chemoenzymatic-like and Photoswitchable Method for the Ordered Attachment of Proteins to Surfaces	$186658
05-LW-027	High-Pressure Multi-Mbar Conductivity Experiments on Hydrogen: The Quest for Solid Metallic Hydrogen	$188908
05-LW-040	Molecular Transport in One-Dimensional Lipid Bilayers: A Biological "Smoke Alarm"	$128904
05-LW-062	Fiber Laser Replacement for Short Pulse Ti: Sapphire Oscillators--Scalable Mode Locking to Record Pulse Energies	$103686
05-SI-003	Biological Imaging with Fourth-Generation Light Sources	$684698
05-SI-005	Target Fabrication Science and Technology: An Enabling Strategic Initiative	$2234567

Total # of Projects for LLNL:	**200**	**Total Cost for LLNL:**	**$70326850**

NTS - Nevada Test Site

Project ID	Project Name	FY Total
H1701025	Digital Streak Camera	$251582
H1701043	Framing Tube Design & Fabrication	$48625
H1701055	Laser Multipulsed X-ray Generator Performance	$234299
H1701075	Monte Carlo Simulation of Hi-speed Gated X-ray Detectors	$127205
H1701085	Development of a Multichannel Velocity Interferometer Optical Probe	$44278
H1701165	Streak pyrometer	$91680
H1701225	DSP technology intergrated into a VISAR receiver	$96815
H1701245	Xbox Beowulf cluster	$7262
H1701265	Bayesian inversion of noisy spectral data	$33410
H1702014	40mm Image Converter	$58909
H1702015	Optimization of BN-50 streak tube temporal resolution	$92954
H1702035	Electron trajectory codes for image tube design	$76575
H1702045	Ge-based near infrared photocathode	$62257
H1702055	Phototube anode metalizzation	$71075
H1702065	High power pulser	$96402
H1702085	Electron beam CCD-camera readout	$168036
H1702105	High-efficiency, low energy x-ray source	$55827
H1702115	Production and calibration of improved x-ray detector	$34141
H1702125	CMOS x-ray color camera	$37859
H1702135	Ultra-high speed, long-data-length transient recorder	$133411
H1702145	Versatile, higher-demension x-ray imager	$146781
H1702155	Nano-materials-enhanced x-ray sources	$61754
H1702165	Laser multipulsed x-ray generator	$76438
H1703025	Velocimetric probe development for optical pin dome experiments	$95560
H1703054	2 Bank DPFA	$168048
H1703085	DOE test complex universal trigger distribution system	$150997
H1703135	Optical transducer development for UGT testing	$100370
H1703175	Novel anode/cathode designs for DPF optimization	$43142
H1703195	Self-calibrating Be neutron detector	$19132

NTS - Nevada Test Site

Project ID	Project Name	FY Total
H1703205	Extension of HOT/very HOT tube	$137763
H1703215	Variable temperature/flow-rate stack for fugtive releases	$139802
H1704014	A High Res Gamma Spectrometer at Room Temp	$100411
H1704035	Feasibility of mapping radiation distributions with measurements restricted to the perimeters of an area	$26502
H1704125	A tagged photon source for energy-dependent radiography	$80563
H1704135	Investigation of Interferometer Synthetic Aperture Radar Mapping	$94912
H1704145	Wide area sensor network prototype with small number of nodes	$118281
H1704155	Small Compton-suppressed gamma detectors	$19359
H1704215	Sequential probability ratio test	$28408
H1704235	Development of Microchannel Plate - Microsphere Plate Detectors to measure gammas & neutrons	$43494
H1704265	Liquid Organic Detector for Special Nuclear Material Detection	$113237
H1704295	Multi-path Communication Device	$97186
H1704335	Time-dependent CM spreadsheets for nuclear weapon detonation	$28244
H1704345	Atmospheric Dispersion Models	$33107
H1704425	Investigation of field effects on neutron detection	$10707
H1704435	Neutron Diode Detectors	$160668
H1705035	Directional Neutron Detector	$78337
H1705044	Compact Penning Mass Spectrometer	$76210
H1705075	Multilayer solid-state neutron detector	$152806
H1705085	Optically-sampled Mach Zehnder system	$155764
H1705105	Diode laser VISAR system	$49138
H1705195	Displacement Interferometry System	$90368
H1705225	Polymerized crystalline colloid arrays for sensing nerve agents	$137297
H1705245	Circular polarizing flake materials for optical tracking & tagging	$42107
H1705265	Solid State Ultraviolet Laser Diode	$71263
H1705295	Large Format Phosphor Imager	$82883
H1705315	Laser-ablation Phase Diagnostic	$68331
H1705385	Carbon nanofiber field emitter	$62326

Total # of Projects for NTS: 57   **Total Cost for NTS:** $4984298

ORNL - Oak Ridge National Lab

Project ID	Project Name	FY Total
3210-2091	Development of a Three-Dimensional Radioisotope Depletion Method Using Monte Carlo Transport	$29986
3210-2093	Alanates for High-Capacity Hydrogen Storage	$19957
3210-2096	Sounds of Rapids as an Attractant for Migratory Fish	$10970
3210-2100	Metallic Nanofuels for Vehicles	$65308
3210-2101	Enhancing Performance of Hydrogen-Storage Materials Through Nanoscale Design	$50102
3210-2102	Development of a Novel Method for Rapid Cellular Material Extraction and Separation in Air	$39476
3210-2103	Advanced Diagnostics Algorithm for Cancer Detection Using Hyperspectral Fluorescence Imaging	$39847
3210-2105	A Shortcut to Making Mouse Models for Stressor Resistance for Application to Longevity (Aging) and Other Exposure-Biology Research	$24941
3210-2107	Selectively Enhanced Adatom Diffusion	$27994
3210-2109	Environmental Isotope Forensics of Perchlorate Contamination	$9954
3210-2112	Hydrogen Production from Naturally Occurring Iron Silicates	$19342
3210-2113	Cyclopentadienyl Iron Clusters as Nanoscale Building Blocks for Multi-Electron Electrocatalysis	$29168
3210-2114	Development of a Position-Sensitive Neutron Detector for Use at the High Flux Source Facilities: SNS and HFIR	$27882
3210-2115	Development of the Ultimate Scanning Tunneling Microscropy for the Center for Nanophase Materials Science	$42323
3210-2116	Real Space Imaging of High Frequency Transport on the Nanoscale	$32377
3210-2117	"Novel, Tunable, Ultrafast, Nonlinear Optical Switching"	$74972
3210-2118	"Development of a High-Throughput, Laser-Based Technique for Quantifying the Elemental Composition of Wood: Applications in the Forest Products Industry"	$22713
3210-2119	Optically Manipulated Microelectronics Artificial Retina	$24987
3210-2120	Mesoscopic Fluidic-Based Actuators	$25035
3210-2121	Creation of Switchable Photosystem II Designer Alga for Hydrogen Production	$87233
3210-2122	Development of a Multimode and Multispectral Automated Mueller Matrix Polarization Imaging System for Noninvasive Detection and Diagnosis of Skin Cancer	$62445

ORNL - Oak Ridge National Lab

Project ID	Project Name	FY Total
3210-2123	Design and Synthesis of Oriented Guest-Host Nanostructures for Enhanced Membrane Performance	$74757
3210-2124	A Hybrid Solid-State Process for Joining High-Temperature Materials	$65899
3210-2127	An Energy Efficient Method for Semi-Solid Material Processing	$58822
3210-2128	Using Live-Cell Imaging Technologies to Probe Molecular Interactions Between Bacterial Cells and Heavy Metals	$99735
3210-2130	An Image-Based Method for Screening and Diagnosis of Blinding Eye Disease	$82832
3210-2131	"Direct Band Gap Semiconductors on Silicon for Solid State Lighting: Silicon-Based, Blue-Light Emitting Diodes"	$49748
3210-2133	Development of New Nanoparticle-Strengthened Ferritic and Martensitic Steels by Thermomechanical Treatment	$104212
3210-2135	Novel Technologies for Wide-Scale Production of Magnesium and Hydrogen	$53199
3210-2137	Chemical Vapor Depostion--Based Combinatorial Chemistry for New Hydrogen Storage Materials	$59116
3210-2138	High-Order Ferroelectric Nanolithography: A Key to Near-Atomic-Density Information Storage and Patterning	$139858
3210-2139	Development of a Methodology for Using Automotive Knock Sensors to Detect Start-of-Combustion for Diesel Engines Operating in both CIDI and HECC Modes	$18833
3210-2140	No-Moving-Parts Pump and Preconcentrator	$99440
3210-2141	Three-Dimensional Imaging of Multiple Fluorophores	$69426
3210-2142	Alzheimer s Disease Detection via Nonlinear Analysis of EEG	$62250
3210-2143	Nano/Microelectromechanical Systems Tools for Retinal Surgery	$94265
3210-2144	Metabolic Profiling of Phosphorylated and Coenzyme-Bound Metabolites Using Pressure-Assisted Capillary Electrophoresis Mass Spectrometry	$74800
3210-2145	Fundamental Growth Mechanisms of Metal Nanoparticle-Carbon Nanotube Nanocomposite Materials	$96553
3210-2146	Detecting Concealed Nuclear Materials with Photofission	$121479
3210-2147	Integrating Hydrologic and Economic Data for Water-Energy Nexus Assessment	$69966
3210-2148	Integrating High-Surface-Area Electrodes in Microfluidic Manifolds	$124596
3210-2149	Coupled-Cluster Theory with Effective Three-Body Forces	$59974
3210-2150	Excited-State Quantum-Classical Molecular Dynamics	$57995
3210-2151	Distributed Capacitance Sensor System fro Conduit Safeguards Applications	$59773

ORNL - Oak Ridge National Lab

Project ID	Project Name	FY Total
3210-2152	Light-Activated Decontamination of Chemical Agents using the ORNL Plasma Arc Lamp	$24535
3210-2153	Ionic Liquids as Novel Lubricants	$59910
3210-2154	Exploring New Pathways in the Impact of Aerosols on Terrestrial Carbon and Hydrological Cycles	$64925
3210-2155	A Device for Gated Gas Sampling of Transient Combustion Exhaust Events	$19326
3210-2156	Pulse Thermal Processing and Characterization of Nanocrystalline Silicon Thin-Films for Photovoltaic Applications	$19791
3210-2157	Quick Steps: A Fast and Cost-Effective Method of Manufacturing Carbon Single-Walled Nanotube Composites	$19985
3210-2158	"Modeling and Computational Platform for Architecture Design of Phase-Locked, High-Power Semiconductor Laser Arrays"	$74811
3210-2159	"Large-Area, Flexible, Heteroepitaxial, Single-Crystal-Like Diamond Films on Low-Cost Substrates for Wide-Ranging Electronic Applications"	$25302
3210-2160	Development of Readout Electronics for the ALICE Electromagnetic Calorimeter	$34988
3210-2161	Modeling of Impression Deformation to Characterize Plasticity of Nanocrystalline Ceramics	$19887
3210-2162	Development of a Prototypic Three-Dimensional Deterministic Shielding and Criticality Analysis Capability	$19991
3210-2163	Orientational Imaging in Biological Systems by Electromechanical Scanning Probe Microscopy: Galvani Experiment on the Nanoscale	$34998
3210-2164	Development of an Intermediate-Temperature Solid Oxide Fuel Cell	$51410
3210-2165	Sensing Arrays Based on Non-Nernstian Sensing Elements	$27441
3210-2166	Multivariate Dependence in Climate Extremes	$10744
3210-2167	Out-0f-Autoclave Stabilization/Carbonization of Pitch-Based Carbon-Carbon Composites and Other Pitch Materials	$78105
3210-2168	Understand and Optimize Thermal Creep Resistance in Nb-1%Zr for High-Temperature Applications	$65078
3210-2169	Evaluation of Urea-Diesel Emulsions to Lower NOx Emissions	$20756
3210-2170	A New Forensics Tool: Development of an Advanced Sensor for Detecting Clandestine Graves	$19937
3210-2171	Lead-Free Electromechanical Transducer Materials	$39793
3210-2172	Thermoelectric Properties of Uranium Dioxide	$5983
3210-2173	Preliminary Study of Phosphor-Based Tracer Rounds	$15975

ORNL - Oak Ridge National Lab

Project ID	Project Name	FY Total
3211-2075	Advanced Ion Trap Mass Spectrometry for the Rapid and Confident Identification of Biological Agents	$84351
3211-2081	Probing Explosive Nucleosynthesis Through Measurements at the Holifield Radioactive Ion Beam Facility	$43917
3211-2082	Nano/Micro Systems for Advanced Neuronal Interfacing	$206123
3211-2083	Nanorods for Energy and Photonics	$218611
3211-2084	A Revolutionary Infrared Nanoscale Processing Approach	$218917
3211-2086	Profiling Spin Injection at the Atomic Scale	$237043
3211-2087	Comprehensive Fusion Simulation: Component-Based Software Engineering and Evolutionary Time Advancement	$284677
3211-2088	Bringing Statistical Visualization to the Terascale and Beyond: Visual Analysis in Full Context	$214609
3211-2089	Nanochemistry: The Bridge from Materials to Biological Sciences	$185063
3211-2090	Characterizing the Complex Metaproteomes of Microbial Communities	$170253
3211-2091	Comprehensive Analysis of Microbial Proteomes Using Signature Peptides	$84587
3211-2092	Building ORNL s Capabilities for Genome-Scale Quantitative Measurements of Protein Complexes	$121510
3211-2093	Exploring New Methodologies in Detecting Low Abundance Protein Complexes	$157004
3211-2094	Flameless Combustion Engines in the Transition to Hydrogen	$250901
3211-2097	Advanced Processes for Nuclear Fuel Microspheres	$175386
3211-2098	Genetic Variability in Host Responses to Bioterror Agents	$178549
3211-2099	Complex Oxides with Frustrated Orbital Ordering	$178577
3211-2100	H- Laser Stripping Proof-of-Principle Experiment for the Spallation Neutron Source Power Upgrade Proposal	$306726
3211-2101	Development of In-Situ Neutron Diffraction Capabilities for Studies of Deformation and Fracture Behavior under Hydrogen-Rich Environments	$182011
3211-2102	Quantum Circuit Modeling for Nanoelectronics	$179997
3211-2103	High-Throughput Biological Data Analysis and Modeling Tools for Genomes to Life Facilities	$175169
3211-2105	Exploratory Computational Biology for Genomes to Life Facility III	$174972
3211-2106	Characterization of Spin Structure and Spin Dynamics of Nanostructure Assemblies Using In-Field Scanning Electron Microscopy with Polarization Analysis	$114579

ORNL - Oak Ridge National Lab

Project ID	Project Name	FY Total
3211-2109	Information Analysis and Fusion for Threat-Vulnerability Analysis	$229940
3211-2110	Advanced Plasmonic Sensor Array for Homeland Security	$239817
3211-2111	A Neutron Science Portal Infrastructure to Facilitate Remote Access to Spallation Neutron Source Data and Computation	$162002
3211-2112	Photonic Bandgap Crystal Sensor	$149798
3211-2113	"Redefining ORNL's Suite of Protein Analysis Technologies by Adding Flexibility, Analytical Capacity, and Biological Utility"	$84924
3211-2114	Research and Development for Neutron Structural Biology and Soft-Matter Science	$148998
3211-2115	Neutron Reflectometry Studies of the Structure of Polyelectrolyte Thin Films Subject to Shear	$166355
3211-2116	SANS Investigation of the Mechanism and Kinetics of Membrane Protein Crystallization in Self-Assembled Surfactant Mesophases	$86198
3211-2117	"Applications of Ultrafast, Ultra-Intense Lasers to Radioactive Ion Beam Production and Diagnostics"	$249735
3211-2118	Nanostructured Superhydrophobic Materials	$275706
3211-2119	"Real-Time, Interconnection-Wide, Power System Analysis and Visualization"	$296404
3211-2120	"Multiscale Mathematics on Massively Parallel Computers: New Tools for Computational End-Stations on the Cray X1E, Red-Storm, and the IBM Blue Gene"	$206999
3211-2121	Exploring Alternative Technologies for Next-Generation Leadership-Class Computing	$310973
3211-2122	A Chemistry End-Station for the Large-Scale Computing Facility (Chemical Catalysis at the Nano-Scale)	$245892
3211-2123	Computational Mechanics End-Station: Parallel Implementation of Finite Element Software on Ultrascale Computers and Its Application on Modeling Human Joints	$269652
3211-2124	A Novel Thermomechanical Process for Producing Fe-3% Si Magnetic Steel Sheet for Transformers	$225543
3211-2125	Advanced Network Capabilities for Terascale Computations on Leadership-Class Computers	$179999
3211-2126	Computational Modeling of Alloy Deformation Based on a Novel Statistical Mechanics Approach	$157708
3211-2127	"Toward Systematic Computational Instrumentation for Nanoscale, Condensed Matter, and Materials Science"	$269557
3211-2128	"Reliability Availability, and Serviceability for Terascale Computing"	$319160

ORNL - Oak Ridge National Lab

Project ID	Project Name	FY Total
3211-2129	Terascale Computations of Multiscale Magnetohydrodynamics for Fusion Plasmas	$584715
3211-2130	"In-Situ, Time-Resolved, Neutron Diffraction Study of Materials Behavior Under Severe Thermomechanical Deformation"	$188136
3211-2131	Development of Lightweight Lead-Acid Batteries	$249223
3211-2132	Effects of Confinement on the Statistical Physics of Nanoparticles -- From Idealized Models to Real Materials: Application to Antiferromagnetic Oxides	$202696
3211-2133	Advanced Overhead Transmission Conductors	$258744
3211-2134	An Integrated Experimental and Modeling Approach for the Study of Microbial Biofilm Communities	$307464
3211-2135	Inhalation Exposure to Processed Nanoparticles: Exploring a Nanotechnology and Biological Link	$257146
3211-2136	A Deuteration Facility for In Vivo H-D Isotopic Labeling of Biological Macromolecules for Neutron Structural Biology and Soft Matter Science	$188008
3211-2137	Radioimmunotherapy Using Oxide Nanoparticles: Radionuclide Containment and Mitigation of Normal Tissue Toxicity	$169034
3211-2138	Petascale Computation in Condensed Matter Physics	$180594
3211-2139	Interfacial Solids: Functionality from Atomic-Scale Charge Transfer at Stacked Interfaces	$136886
3211-2140	Confocal Scanning-Tunneling Electron Microscopy for Three-Dimensional Atomic-Resolution In-Situ Imaging	$235973
3211-2141	Systems-Biology Framework for Post-Genomic Microbiology	$254878
3211-2142	Molecular and Cellular Imaging	$340011
3211-2143	"Imaging Molecules, Active Sites, and Reactions on Nanocatalysts"	$216013
3211-2144	Carbon Fiber Composite Monoliths as Catalyst Supports	$92441
3211-2145	"Mass Spectrometry Beyond 100 Kilodalton, A New Generation of Mass Spectrometers to Solve a New Generation of Problems"	$227114
3211-2146	Fog Vortices with Electrospray Mass Spectroscopy for Detection of Chemical and Biological Agents	$185945
3211-2147	Deformation Mechanisms in Nanocrystalline Metals	$203051
3211-2148	High-Resolution Imaging of Biological Samples in a Wet Environment	$74937
3211-2149	Genome-Enabled Detection of Differential Mortality in a Northern Temperate Forest Ecosystem	$71764
3211-2150	Optimization Studies for ISOL-Type High-Powered Targets	$183655

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2005

Total # of Projects for ORNL: **131**   **Total Cost for ORNL:**   **$16545531**

PNNL - Pacific Northwest National Lab		
Project ID	**Project Name**	**FY Total**
PN03004/1667	Advanced Information Analysis and Processing	$100403
PN03018/1681	Cooperative Multiagent System for Data Mining and Fusion	$115029
PN03021/1684	Detection of Chemical Weapon-Related Chemicals in Rivers and Coastal Environments Using Bivalves	$122100
PN03024/1687	Development of a Salmonid Based DNA Microarray for Toxicological Testing of Environmental Contaminants	$110618
PN03030/1693	Elucidating Cell Signaling Networks in Shewanella oneidensis MR-1	$169406
PN03034/1697	Framework for Climate Modeling Using Superparameterization Techniques	$333549
PN03039/1702	Highly Selective Monolayer Sorbents for Advanced Analytical Applications	$90676
PN03040/1703	High-Speed Three-Dimensional Visualization of Intercellular and Intracellular Signal Transduction in Complex Cell Structures	$241072
PN03044/1707	Implementation of Parallel Solver in Coupled Fluid, Energy, and Solute Transport Computer Code	$30302
PN03045/1708	Imprinted Media for Highly Selective Separation of Explosives, Chemical Warfare Agents, and Biological Warfare Surrogate Organisms	$54984
PN03046/1709	In situ Magnetic Resonance Investigations of Metabolism and Mass Transport in Biofilms	$207491
PN03048/1711	Influence of Gd and Sm Doping on Atomic and Ionic Transport Properties of Novel Nanostructured Ceria-Zirconia Multilayers	$164109
PN03057/1720	Multiple Sensor Data Integration and Decision Analysis - Chemical Signature Detection	$47981
PN03063/1726	New Thin-Film Electroactive Materials for Enhanced Separations	$54199
PN03067/1730	Novel Near-Infrared Laser Absorption Spectrometer Development	$94301
PN03068/1731	On-line Measurement of Particulate Organics in Diesel Exhaust by Chemical Ionization Mass Spectrometry	$30123
PN03075/1738	Preconcentration of Organic Signatures Based on Carbon Nanotube Composites	$142687
PN03078/1741	Real-Time Detection and Multidimensional Characterization of Single Air-Borne Microorganisms	$99949
PN03083/1746	Single Enzyme Nanoparticles on Nanostructured Matrices	$184475
PN03085/1748	Sonoluminescence Following Acoustically Driven Bubble Collapse	$150749

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2005

PNNL - Pacific Northwest National Lab

Project ID	Project Name	FY Total
PN03086/1749	Stress Activated Control Mechanisms Underlying Signal Transduction Networks	$240701
PN03090/1753	Synthesis and Characterization of Novel Nanoporous Transition Metal Phosphates with Inherently High Anion Adsorption Properties	$40105
PN03091/1754	Transcriptional Profiling of Microbial Syntrophic Systems	$294504
PN03094/1757	Using High Frequency Pulsed Ultrasound at Sub-Cavitation Conditions as a Mechanism to Enhance Energy Efficiency and Selectivity in Heterogeneous Catalytic Chemistry	$26003
PN04001/1760	A Toxigenomic Approach to Quantitative Structure-Activity Relationships Modeling	$112982
PN04002/1761	Active Disk for Proteomics	$52368
PN04003/1762	Advanced Materials for Preconcentration and Sensing	$37070
PN04004/1763	Aftertreatment Systems Effectiveness	$75006
PN04006/1765	Array Technologies for Quantification of Proteins	$262712
PN04007/1766	Atomistic Modeling of Defects and Transport Processes in Oxides	$64591
PN04008/1767	Background Characterization and Sensitivity Analysis for Detection of Threats to Marine and Freshwater Environment	$36486
PN04009/1768	Biological Data Fusion and Visualization	$148393
PN04010/1769	Biological Markers in Nasal Secretion: An Application of Proteomics for Human Health Risk Assessment	$99978
PN04013/1772	Chemically and Mechanically Stable Bipolar Membranes for Electrodialytic Desalination	$39718
PN04014/1773	Chemostat Research Using Filamentous Fungi	$139846
PN04018/1777	Concurrent Single-Program-Multiple-Data (SPMD) Tasking in Global Arrays and its Application to Electronic Structure Calculations on Systems with Thousands of Processors	$139122
PN04020/1779	Coupled Proton-Electron Dynamics in Iron Containing Phyllosilicates: An experimental and theoretical investigation using neutron scattering	$86409
PN04023/1782	Design and Demonstration of Integrated Biologically Based Risk Modeling Framework	$125417
PN04024/1783	Development of a Novel Approach for Imaging Inhaled Particulates	$96633
PN04025/1784	Development of High Throughput Global Metabolomics Based Upon Mass Spectrometry	$155051

PNNL - Pacific Northwest National Lab		
Project ID	**Project Name**	**FY Total**
PN04027/1786	Ecological Sensors Using Enzymes Immobilized in Functionalized Nanoporous Silica Chips	$73342
PN04028/1787	Electronically Excited States in Amorphous Solid Water	$125070
PN04030/1789	Evaluation of Engineered Vadose Zone Bioremediation versus Natural Attenuation	$45928
PN04031/1790	Fast, Two-Dimensional Gas-Phase Separations for Ultrahigh-Throughput Global Analyses	$100733
PN04032/1791	Identification of Particles by Surface-Enhanced Raman Scattering Spectroscopy	$33866
PN04033/1792	Information Fusion for Structured, Guided Analyses	$253688
PN04034/1793	Integrated Data Structures for Mapping Cellular Networks	$256592
PN04035/1794	Integrated Demonstrations of Threat Detection and Early Warning Systems	$198991
PN04037/1796	Kinetics of Carbon Mineralization Using In Situ X-Ray Diffraction	$24918
PN04040/1799	Mechanisms of Regulated Ligand Shedding	$293639
PN04042/1801	Microcantilever-based Sensing	$93906
PN04045/1804	Nanophase Materials and Catalysts for Hydrogen Storage	$194989
PN04046/1805	Natural Fiber Surface Modification	$109944
PN04047/1806	Network Inference Testbed	$162931
PN04048/1807	Next-Generation Chemistry-Aerosol-Meteorology Model for Addressing Climate Change and Air Quality Interactions	$204614
PN04049/1808	Novel Structured Monolith Reactors for Gas-Liquid-Solid Reactions	$39946
PN04052/1811	Protein Cross-Linking in Solid State Designated for Identification and Characterization of ?Intact? Protein Complexes	$224904
PN04053/1812	Proteome and Bioenergetic Analysis of Growth States in a Syntrophic Co-Culture	$262972
PN04054/1813	Proteomics of Filamentous Fungi	$139764
PN04055/1814	Proteomics of Membrane Protein Complexes Relating Calcium Signaling and Oxidative Stress	$294360
PN04056/1815	Quantifying Uncertainty in Complex Scientific Simulations Using Iterative, Adaptive Response Modeling (Beyond Monte Carlo)	$209487
PN04057/1816	Research into the Causes of Independent Component Analysis Selectivity	$102852

PNNL - Pacific Northwest National Lab

Project ID	Project Name	FY Total
PN04058/1817	Saliva as a Non-Invasive Biomonitoring Matrix for Determination of Exposure to Chemical and Biological Agents	$105294
PN04059/1818	Selective Inhibition of Gene Function in Cells	$149752
PN04060/1819	Small Metabolite Imaging	$114635
PN04061/1820	Spatial and Temporal Characterizations of Single-Enzyme Catalysis under Nanoscale Confinements	$142397
PN04062/1821	Statistically Rigorous Quality Control for Proteome Analysis	$189120
PN04063/1822	Stimulus Controlled Catalysis	$110113
PN04064/1823	Structural Characterization of Molecular Machines	$94088
PN04065/1824	Synchrotron X-Ray Spectroscopy of Novel Organic Diphosphine Light-Emitting Materials	$67079
PN04067/1826	Template Synthesis of Highly Nanocrystalline SiC with High Surface Area	$84981
PN04068/1827	Toxicoproteomics-Based Core Analytic Capability for Chemical Toxicology and Environmental Sentinel Studies	$155478
PN04069/1828	Transmodulation of Cellular Responses to Epithelial Cells	$174422
PN05001/1829	A Computational Framework for the Simulation of Macromolecule-Environment Interactions in Environmental Biosensor Applications	$29994
PN05002/1830	A Field Programmable Gate Array Code Synthesis Framework for High-Performance Network Flow Solvers	$74557
PN05003/1831	A Framework for Development of Fault Resilient Computational Chemistry Algorithms	$42791
PN05004/1832	A Novel Carbon Dioxide Capture Process Using Organometallic Clathrates	$90004
PN05005/1833	A Signature Approach to Homology Detection and Annotation	$142585
PN05006/1834	Acid Dissolution in Water Clusters	$49791
PN05007/1835	Advanced Ultra-Sensitive Radiation Analyzer	$70827
PN05008/1836	Analysis of Protein Function in Living Cells	$190020
PN05009/1837	Application of Hierarchy Theory to the Improved Analysis, Accuracy, and Efficiency of Multiscale Simulation Models	$48623
PN05010/1838	Bioinformatics Resource Manager	$177874
PN05011/1839	Biomarker Monitoring Tool: A Chironomus-Based Microarray for Detecting a Genetic Response to 90Sr Exposure	$65997

PNNL - Pacific Northwest National Lab

Project ID	Project Name	FY Total
PN05012/1840	Biophotolytic Production of Hydrogen from Water	$49609
PN05013/1841	Biophysical Characterization of Membrane Proteins	$100025
PN05014/1842	Biosensing Devices Based on Functionalized Nanomaterials	$102894
PN05015/1843	Ceramic-Based Microchannel Reactors	$44977
PN05016/1844	Characterization of Bioaerosols by Real-Time Aerosol Mass Spectrometry	$39428
PN05017/1845	Chemical Printing of Complex Electrode Structures	$81910
PN05018/1846	Complex Queries	$150260
PN05019/1847	Computational Biology and Bioinformatics Tools for Understanding the Role of Membrane Proteins in Diurnal and Circadian Processes of Prokaryotes	$49965
PN05020/1848	Computational Complexities Associated with HPC Architectures	$99210
PN05021/1849	Computational Tools for Proton Transport Through Complex Materials	$109178
PN05022/1850	Controlled Cultivation, Molecular Biology, and Advanced Imaging of Microbial Biofilms	$195181
PN05023/1851	Controlled Modification of Surfaces with Peptide Ions	$119899
PN05024/1852	Crosstalk Between Receptor Signaling Pathways	$192423
PN05025/1853	Cyanobacteria Membrane Biology Grand Challenge: Systems Analysis of the Dynamics of Membrane Architecture, Composition, and Function -- Proteomic, Metabolomic, and Metallomic Characterization	$169600
PN05026/1854	Cytochrome and Whole Cell Interactions With Iron Oxides	$192690
PN05027/1855	Data Assimilation, Visualization, and Mining	$39017
PN05028/1856	Data Integration and Pattern Recognition	$63656
PN05029/1857	Desulfurization of Diesel Fuel by Selective Oxidation	$60003
PN05030/1858	Desulfurization of Hydrocarbon Fuels Using Nanostructured Carbon Materials	$19982
PN05031/1859	Detecting Biomarkers in High-Dimensional Data in the Presence of Unobserved Confounding Variables	$39951
PN05032/1860	Detection Directed Chemical Separations with Enhanced Tracer Infrastructure	$218354
PN05033/1861	Develop Characterization Methods for Urban Surfaces Contaminated by Radioactive Dispersal Devices	$54748
PN05034/1862	Discovery of a Biomarker Signature in Response to Nanoparticle Exposure	$48464
PN05035/1863	Discovery of Novel Volatile Organic Metabolic Signatures for Early Immune Response or Inflammatory Conditions	$97840

PNNL - Pacific Northwest National Lab		
Project ID	**Project Name**	**FY Total**
PN05036/1864	Discovery of Plant Biomarkers of Plant-Mycorrhizae Symbiosis	$19740
PN05037/1865	Early, Validated Biomarkers of Infectious Diseases in Humans	$52721
PN05038/1866	Ecophysiological Investigation of Cyanobacteria using Controlled Cultivation	$51011
PN05039/1867	Electrical Loads that Consume Non-Fundamental Electrical Power Pollution	$68490
PN05040/1868	Emerging Architectures and Technologies for Data Intensive Computing	$97348
PN05041/1869	Enhanced Hydrogen Production Via Separation of CO2 from Gasified Coal	$104709
PN05042/1870	Environmental Transmission Electron Microscopy for Catalytic Studies Under Relevant Pressure Conditions	$40088
PN05043/1871	Experimental Assessment of the Causes of Spectral Peak Broadening	$88456
PN05044/1872	Formalized Materials Discovery for Radiation Materials	$123204
PN05045/1873	Fundamental Investigations for Novel Acousto-Optics	$89616
PN05046/1874	Fundamental Investigations of Heterogeneous Catalysis Using Steady-State Isotopic Transient Kinetic Analysis	$186858
PN05047/1875	Fundamental Understanding of Catalytic Depolymerization of Cellulose	$205375
PN05048/1876	High Power Density Solid Oxide Fuel Cell	$69943
PN05049/1877	High Speed Ion Mobility Spectrometry for Multi-Dimensional Gas Chromatography	$74693
PN05050/1878	High Throughput Screening of Protein Localization	$262470
PN05051/1879	Homogeneous Organometallic Catalysts Tethered to Carbon Nanotubes	$30069
PN05052/1880	Identification of Cellular Markers of Response to Vaccination in Non-Human Primates as Correlates of Protection	$52484
PN05053/1881	In Situ Probe of Oxidation at Environmental Interface	$50974
PN05054/1882	Integrated Information Architectures	$179540
PN05055/1883	Integrated Microbial Forensics	$189952
PN05056/1884	Interspecies Exposures in Toxicoproteomics-Based Core Analytical Capability for Chemical Toxicology and Environmental Sentinel Studies	$26177
PN05057/1885	Investigation of Novel Fieldable Platforms for Large Volume Air Collection	$101120
PN05058/1886	Low Cost Small-Scale Hydrogen Production from Natural Gas	$85983
PN05059/1887	Low Cost Hydrogen Permeation Barriers	$55492
PN05060/1888	Magnetic Resonance Imaging for Understanding Water Management in Proton Exchange Membrane Fuel Cells	$92824

PNNL - Pacific Northwest National Lab

Project ID	Project Name	FY Total
PN05062/1890	Mixed Conducting Hydrogen Separation Membranes	$85489
PN05063/1891	Model Nanoparticles for Discovery/Validation of Particulate Matter Biomarkers	$34561
PN05064/1892	Modeling of Energy Transfer and Associated Variance in Gamma Ray Detector Materials	$135124
PN05065/1893	Models and Measurement for Intrinsically Secure Computing	$116236
PN05066/1894	Modular Architectural Advanced Technology Structures	$49570
PN05067/1895	Molecular Modeling of Cytochromes, Surfaces, and Organisms	$153530
PN05068/1896	Morphological, Functional and Redox Studies of Synechocystis 6803 and Cyanothece 51135 Bacterial Membrane Complexes by Methods of Electron Microscopy	$44799
PN05069/1897	Multicellular Models for Cell-Cell Communication	$45789
PN05070/1898	Multiscale Modeling and Uncertainty Quantification for Bioremediation	$158408
PN05071/1899	Mutagenesis and Functional Characterization of Shewanella oneidensis Genes Involved in Fe(III) and Mn(IV) Oxide Reduction	$155909
PN05072/1900	Nanoparticles for Enhanced Biothreat Separation and Detection	$159724
PN05073/1901	Nanoscale Enzyme Reactors in Mesoporous Media	$50010
PN05074/1902	Noninvasive Biofilm Characterization Using Acoustic Microscope	$149464
PN05075/1903	Non-Invasive Real-Time In Situ Spectroscopic Monitoring of Macrophage-Particulate Matter Interactions	$82559
PN05076/1904	Novel Micromanipulation Methods for Radioactive Particle Isolation and Characterization with Energy-Filtered Electron Microscopy	$49928
PN05077/1905	Ontology-Facilitated Extraction, Transfer, and Integration of Image-Derived Information	$242000
PN05078/1906	Origins of Nonlinear Spectral Response in Semiconductor Radiation Detectors	$73781
PN05079/1907	Overcoming Heterogeneity induced Bypassing in Subsurface Remediation by Mobility-Controlled-Flooding	$22938
PN05080/1908	Particulate Matter Exposure and Respiratory Effects Biosignature Discovery	$62516
PN05081/1909	Pore Scale Measurement and Modeling for Reconstructing Fabric and Porometry in Random Packs of Irregular Shapes	$49985
PN05082/1910	Power System Wide-Area Real-Time Simulation	$78630
PN05083/1911	Predictive Proteomics for Biosignature Discovery	$34230

PNNL - Pacific Northwest National Lab

Project ID	Project Name	FY Total
PN05084/1912	Probing the Dynamics of the Interacellular Membrane Systems of Synechocystis 6803 and Cyanothece 51142 cells by Site-specific Near-Field Scanning Raman Microscopy and Fluorescence Lifetime Imaging	$45430
PN05085/1913	Purification and Biophysical Characterization of MR-1 Redox Proteins	$189294
PN05086/1914	Radiation Detection Scenario Analysis	$224454
PN05087/1915	Raising Computational Efficiencies of Massively Parallel Software	$171484
PN05088/1916	Rapid Risk Assessment Integration and Feedback Research	$71431
PN05089/1917	Reconfigurable Computing	$35201
PN05090/1918	Retrospective Analysis of Access Grid Events	$93306
PN05091/1919	Rfr-Domain Protein Family Characterization in Cyanothece 51142	$111019
PN05092/1920	Single-Pair FRET for Studying Molecular Interaction Dynamics Between Spatially Confined Proteins in the Living Cell	$53542
PN05093/1921	Structural Characterization of Membrane Proteins	$75138
PN05094/1922	Supporting Temporal Analysis Using Signatures for Scenarios	$83936
PN05095/1923	Synchrotron-Like Radiation for Advanced Sample Characterization	$91070
PN05096/1924	Synthesis of Functional Mesoporous Carbons for Mercury Removal	$35306
PN05097/1925	The Dynamic Changes in the Molecular Interactions along the Circadian Rhythm	$60899
PN05098/1926	Theoretical Assessment of the Causes of Spectral Peak Broadening	$60190
PN05099/1927	Towards a Semantic Data Grid for Systems Science	$187047
PN05100/1928	Ultra-Fast Nuclear Magnetic Resonance Structural Determinations of Proteins and Other Macromolecules	$85120
PN05101/1929	Unraveling the Molecular Biology of Host-Pathogen Interactions	$177312
Total # of Projects for PNNL:	**173** **Total Cost for PNNL:**	**$19260116**

PTX - Pantex Plant

Project ID	Project Name	FY Total
PX03001	High-Precision Non-Contact White Light Digitizing Sensor	$11669
PX03002	Enhanced Analysis Capability Supporting Accelerated Aging Studies	$106875
PX03004	Formation and Detection of Pores in Polymeric Materials	$161105
PX03006	GMR Eddy Current System	$7245
PX03008	Neutron Non-Destructive Imaging of Weapons Materials	$226178
PX04002	Pit Measurement System for Vertical Arrays	$6204
PX04003	Characterization of Corrosion Mechanisms	$137010
PX04005	Advanced Radiation Alarm Monitoring System (ARAMS)	$36159
PX04008	Pilot Plant Solids Addition Capability	$26362
PX04010	Particle Size Control in Explosive Precipitation Processes	$128829
PX04012	Fiber Optic Probe Development for Laser Spectroscopy	$45062
PX04013	Characterization of Explosives in Solvents	$57325
PX04015	Pilot LABSOSC System Evaluation & Application for Specific Gamma Spectrometry	$15029
PX05001	Development of A Method to Melt/Disfigure (Sanitize) Weapon Components Using Microwave Technology	$184997

Total # of Projects for PTX:	**14**	**Total Cost for PTX:**	**$1150049**

SNL - Sandia National Lab		
Project ID	**Project Name**	**FY Total**
41193	Bio MicroFuelCell	$941147
41194	Augmented Cognition: Next-Generation Intelligent Systems	$3474122
50065	TALON	$805965
52523	Atomic Layer Deposition of Highly Conformal Tribological Coatings	$391556
52524	Assembly of Microsystems using Exothermic Multilayer Thin Films	$339167
52526	Intelligent Interaction Control as Applied to Metrology and Assembly of Micro-Scale Components	$378683
52527	Rapid Prototyping High-Density Circuitry (RpHdc)	$361935
52528	Elucidating the Mysteries of Wetting	$420260
52531	Assembly and Actuation of Nanomaterials Using Active Biomolecules	$508476
52532	Modeling Biomembranes	$353152
52533	Reverse Engineering Biological Networks: Applications in Immune Responses to Bio-Terrorism Threats	$385764
52536	High Throughput Identification of Molecular Machines Involved in Membrane Signaling and Toxin Pathways	$279372
52537	Coupled Solid-fluid-mechanical Computational Modeling of Fracture and Fragmentation in Geomaterials, Such as Hard and Deeply Buried Targets (HDBT)	$304616
52538	Sequestration of Pathogens on Nanoengineered Surfaces	$557926
52539	A Combined Preconcentrator and Sensor for Live Water-borne Pathogens	$300267
52541	A Parallel Circuit Simulator for Cell Biology	$222770
52542	Developing a Computationally Efficient Dynamic Multilevel Hybrid Optimization Scheme using Multifidelity Model Interactions	$220325
52543	Robust Large-Scale Parallel Nonlinear Solvers for Simulations	$96534
52544	Development of Computational Algorithms and Inversion Capabilities for Transport/reaction Simulations of Chemical/biological/radiological Terrorist Attack Scenarios in Support of Homeland Security	$715844
52548	Active Photonic-Crystal Devices for Integrated Photonics and Silicon Photonics	$359473
52551	Functionalized Nanoparticles for Sensor Applications	$426395
52552	Novel In Situ Mechanical Testers to Enable Integrated Metal Surface Micro-machines	$422712
52554	An Integrated, Stacked System-on-a-chip	$385937

SNL - Sandia National Lab

Project ID	Project Name	FY Total
52555	Micro Mass Spectrometer on a Chip	$211350
52556	Quantum Coherence in Semiconductor Nanostructures for Improved Lasers and Detectors	$361591
52566	Micro Optical Gyroscope Via Monolithic Active/Passive Optical Integration	$376771
52570	Materials Physics and Device Development for Improved Efficiency of GaN HEMT High Power Amplifiers	$402474
52571	Leaky-mode VCSELs for Photonic Logic Circuits	$380039
52582	Compact TeraHertz (THz) Sources for Emerging Threats Applications	$383884
52585	Improving Human/System Interactions in Systems-of-Systems	$520164
52587	Secure Chaotic Communications	$364431
52590	Micro Flame-Based Detector Suite for Universal Gas Sensing	$353019
52591	Beyond Nanoparticles - Attack on a Chemical "Holy Grail"	$240374
52592	Advanced Proton-Exchange Materials for Energy Efficient Fuel Cells	$406191
52595	Real-time Discriminatory Sensors for Water Contamination Events	$312538
52596	Advanced High Efficiency Direct Cycle Gas Power Conversion Systems for Small Special Purpose Nuclear Power Reactors	$386083
52598	Novel Catalysts For Hydrogen Fuel Cell Applications	$299709
52606	Linking Optimization and Simulation in Critical Infrastructure Systems	$408478
52698	Decomposition of Contaminants Using Photochemically Active Nanoparticles	$460822
52699	Thermally Cleavable Surfactants	$304893
52700	Transition-metal Catalyzation of Complex-hydride Absorption/desorption Reactions	$201213
52701	Quantification of Environments and Surfaces within Micro-Packages	$414624
52702	Assembly of Ordered Electro-Optical and Bioactive Materials and Composites	$394788
52703	Advanced Packaging / Joining Technology for Microsystems	$381923
52705	Magnetostrictive Elastomers for Actuators and Sensors	$146460
52706	Development of a High-Throughput Microfluidic Integrated Microrray for the Detection of Chimeric Bioweapons.	$183385
52711	Detailed Modeling and Simulation of Contaminant Transport in Architectural Spaces	$355615
52717	Ultra High Temperature Ceramics for Hypersonic Vehicle Applications	$234089

SNL - Sandia National Lab		
Project ID	**Project Name**	**FY Total**
52724	Ion Mobility Spectrometer-Mass Spectrometer	$310477
52726	Characterization, Performance and Optimization of PVDF as a Piezo-electric Film for Advanced Space Mirror Concepts	$357738
52727	Predictive Accelerated Aging of Microsystems: The Science of Dormancy	$567830
52728	Surety and Accountability Enhancements for Storage Containers	$289460
52729	Nuclear Safety Weaklinks for Thermal and Mechanical Environments	$448169
52732	Novel and Robust Environmental Sensing Devices (ESDs)	$441762
52733	Advanced Neutron Monitors for JTA and Stockpile Monitoring	$300169
52738	Laser Triggering of Water Switches in Terrawatt Class Pulse Power Accelerators	$182748
52739	Experimental and Computational Study of Liquid-Solid Transition in Tin	$95917
53586	Geophysical Subsurface Imaging and Interface Identification	$245665
55079	Near Real Time Characterization for Assured HDBT Defeat	$3370358
55086	Prompt Global Response	$3706701
55087	Winning the War: A Systems Approach to Defending Our Borders	$2236759
57308	Friction in Micromachine Interfaces	$40000
57309	Lipid Microarray Biosensor for Biotoxin Detection	$50000
57310	Advanced Manufacturing Techniques Using Rapid Prototyping	$47906
58907	Active Photonic Nanostructures	$500372
59916	A Method of Evaluating Research Using New Innovation, Risk, and Impact Indicators	$270126
62827	Non-Lethal Technologies for the War on Terrorism	$88335
64811	Agent-Based Control of Distributed Infrastructure Resources	$319981
66450	Advanced Techniques for Multi-Objective Discrete Optimization	$20000
66809	Non-radioactive Safety & Performance Issues with Supercritical Water (SCW) Reactor Safety Technologies	$25000
66810	Neutron Irradiation of Supercritical Water	$25000
67004	Rapid Prototyping to the Nanometer Scale	$283820
67005	Robust Manufacturing of Gel-based Components for Nuclear Weapons	$96207
67006	Meso-/Micro-Optical System Interface Coupling Solutions	$299063
67007	Injection Molding of Net-Shape Active Ceramic Components	$327810

SNL - Sandia National Lab		
Project ID	**Project Name**	**FY Total**
67008	Macro-Meso-Microsystems Integration in LTCC	$475674
67010	Studies of Signaling Domains in Model and Biological Membranes Through Advanced Imaging Techniques	$361486
67011	Imaging Self-Organization of Proteins in Membranes by Photocatalytic Nano-Tagging	$299527
67012	Protein Microarrays for Biowarfare Agent Detection and Characterization	$346894
67013	Interaction of Proteins with Lipid Films	$243987
67014	New Technologies for Understanding Membrane Protein Recognition and Signaling	$94254
67015	Massively Parallel Scalable Atmosphere Model	$221803
67016	High Performance Processing Architecture	$194981
67017	Substructured Multibody Molecular Dynamics	$220988
67018	Enhancing Simulation Performance on Clusters with Configurable Auxiliary Devices	$197302
67020	Penetrator Reliability Investigation and Design Exploration (PRIDE)	$386681
67021	Topology Optimization for Improving Sensor Performance	$178623
67022	Characterization and Application of Dielectrics with Controlled Leakage	$303398
67023	Nano-g Accelerometers Using Nanophotonic Motion Detection System	$509674
67024	Bragg Fiber Development	$305588
67025	Microwave to Millimeter-wave Electrodynamic Response and RF Applications of Semiconductor Quantum Nanostructures	$359350
67026	Development of GaN 20-100 Watt Ku-Band Power Amplifiers for Micro-SAR	$315671
67027	Evanescent Wave Planar Photonic Biosensor	$316481
67028	Passive Electronically Steerable Array (PESA) for Miniature Synthetic Aperture Radar (miniSAR), Precision Guidance, and Intelligence/Surveillance/Reconnaissance (ISR)	$328256
67029	Advancements in Sensing and Perception using Structured Lighting Techniques and an Innovative Design Tool	$249939
67030	Biophysics of BW-Warhead Defeat with a Kinetic Interceptor	$337782
67032	Weaponization of Thermobaric Explosives	$350076
67033	Development of an Enterprise-Scale Agent-Based Autonomic Logistics Simulation Model	$300249

SNL - Sandia National Lab

Project ID	Project Name	FY Total
67034	Mobile Node Authentication in a Wireless Ad hoc Environment	$120505
67035	Novel Processing, Affordable Motion Compensation, and Mode Multiplexing for Miniaturized Synthetic Aperture Radar	$432698
67036	Coilgun Technology Demonstration Testbed	$260147
67037	Enhanced Perception for Remote 3D Mapping of Unknown Indoor and Outdoor Environments	$348997
67038	A Modular Micromagnetic Accelerometer-in Support of the mTalon Vision	$278559
67039	MICROFUZE Integration	$464739
67041	Analysis of Technology Impacts on Operations in Complex Environments	$502334
67042	CBW Cloud Knockdown and Neutralization	$292345
67044	Adaptive Force Feedback Surface Control	$234359
67046	High-Capacity Earth Penetrator Instrumentation	$292820
67047	Systems Analysis of Networked Sensors	$293003
67048	Deployable Object Tracker for NMD Flights	$100000
67049	Continuous-Flow Detector for Rapid Pathogen Identification	$259347
67050	Biological-Security Decontamination Technology -- Reducing the Threat of Infectious Agent Spread	$96768
67051	Consequence Management, Recovery, and Restoration after an Intentional Contamination Event	$97885
67052	Fully Integrated System Dynamics Toolbox for Water Resources Planning	$328241
67053	Predicting System Performance of Proton-Exchange-Membrane Fuel Cells: Computational Modeling with Experimental Discovery and Validation	$353035
67055	Silicon Field Emission Electric Propulsion Arrays (FEEP) Powered by Orbital Nuclear Reactors	$379999
67056	Advanced Fuel-cell Reactor for the Direct Cogeneration of Electricity During Selective Partial Oxidation of Hydrocarbons	$349418
67057	New Hydrogen Storage Material: Metal-N-H system	$101200
67058	Intrusion Detection for Wireless Networks	$323931
67059	Membranes for H2 Generation from Nuclear Powered Thermochemical Cycles	$262258
67060	Microfabricated BTU Monitoring Device for System-Wide Natural Gas Monitoring	$100152
67061	"Tunable" Ion Conductors for Low Temperature Oxide-based Fuel Cells	$208828

SNL - Sandia National Lab

Project ID	Project Name	FY Total
67062	Nuclear Nano-Batteries: on-board power for independent MEMS devices	$94579
67063	Integrated Tunable Light Sources for Miniature Sensors	$103203
67064	Ray Model of High Frequency Cavity Scarring	$134759
67067	Noncontact Surface Thermometry for Microsystems	$301856
67068	High Speed Interferometric Deformation Measurements	$167185
67069	Fundamentals of Nanofluidics	$288050
67070	Simulating Self-assembly and Growth of Biological Nanostructured Materials	$228862
67074	Electrochemically Switchable Materials for (Bio)Microfluidics	$198063
67075	Modeling of Friction-Induced Deformation and Microstructure	$506444
67076	Reversible Antibody Trapping for Selective Sensor Devices	$204799
67077	Correlated and Comprehensive Analytical Techniques for Homeland Defense	$504423
67078	Development of High Energy Density Dielectric Materials for Integrated Microsystems	$315193
67079	Nanolithography Directed Materials Growth and Self-Assembly	$468273
67080	Development of a Novel Technique to Assess the Vulnerability of Micro-Mechanical System Components to Environmentally Assisted Cracking	$158373
67081	3D Optical Sectioning with a New Hyperspectral Deconvolution Fluorescence Imaging System	$452016
67082	The Science of Solutes: Transition Metals in LIGA Nickel	$315795
67083	Novel Gel-Based Technology for Sensors and Weapons	$98890
67084	Coupled Nanomechanical Oscillator Arrays for the Study of Internal Dissipation in Nano-scale Structures and Collective Behavior in Large Systems	$301393
67085	Precisely Controlled Picoliter Vessels with Rapid Sample Preparation for Trace Biotoxin Detection	$302457
67087	Infrastructural Development for Flexible Network of Devices	$375100
67088	Monolithic Reconfigurable Radio-Frequency Microelectromechanical (RF MEMS) Antennas	$334091
67089	Next-Generation 3D Inspection System for Facility Monitoring	$265633
67090	Risk Assessment Meta Tool	$194979
67091	Featureless Spread-Spectrum Waveform Design and Processing	$199088
67092	Tracking Slow-Moving Objects in a GPS-Denied Environment	$371308

SNL - Sandia National Lab

Project ID	Project Name	FY Total
67093	Optical Communications	$139953
67094	A Unique Vibration-Based Miniature Power Generator for National Security Applications	$304207
67096	Vulnerability Assessment with Dynamic Reverse Engineering of Embedded Processors through Innate Debug Mechanisms of System-on-Chip Integrated Circuits	$303797
67098	Nonlinear Optical Detection of Biological and Chemical Aerosol Agents Using Femtosecond Lasers	$515425
67099	Polymer Electronic Devices and Materials	$253886
67101	Small Circuits for Cryptography	$97716
67104	Transceiver for Ultra-Low Power Wake-up and Command	$119257
67107	Reconstruction Algorithm Development and Assessment for a Computed Tomography Based-spectral Imager	$197791
67109	Dispersive Diffractive Optical Elements for the Infrared	$401618
67111	Atmospheric Propagation of THz Radiation	$107963
67113	High-Confidence Estimation of Relative Event Locations from Space-Based Sensors	$172065
67114	Critical Infrastructure System of Systems Assessment Methodology	$451336
67116	Inflatable Antenna with Adaptive Actuators	$193594
67118	MEMS / Fuze Diagnostic Extraction in High-G Environments	$169541
67120	Efficient Implicit Multigroup Radiation Calculations	$149530
67121	Model for Channel Resistance in Water Breakdown	$88752
67122	Embeddable Shock Physics Sensors	$285370
69145	Molecular Simulation of Beta-amyloid (A-beta) Peptide Interaction with Phospholipid Membranes.	$49999
69146	Nanoscale Testing of Deformation and Fracture in Engineering Materials	$51125
69156	System Dynamics Modeling to Assist Regional Water Planning: Modeling the Non-Market Value of Water	$25000
69157	Interactive Water Quality Modeling to Assist Regional Water Planning	$25000
69158	Microbe-Exuded Polymers and the Enhanced Corrosion of Carbonate Materials	$50000
69163	New Self-Assembled Nanocrystal Micelles for Biolabels and Biosensors	$97823
69166	Adaptive Algorithms for Use in the Rejection of Periodic Disturbances of Unknown Frequency	$25000

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2005

SNL - Sandia National Lab

Project ID	Project Name	FY Total
69198	Poroelastic Wave Propagation Modeling and Inversion	$260486
70799	Developing the Foundation for Polyoxo-niobate Chemistry: Highly Tunable and Exploitable Materials	$208368
71943	Simulating Human Behavior for National Security	$399066
72716	Energy Systems Analysis Framework and Modeling	$610929
73185	Superhydrophobic Surface Coatings for Microfluidics and MEMS	$450298
73207	Micro Optical Radar (MOR) Facial Recognition Project	$720654
74548	Risk of Biological Terrorism to Water Distribution Systems	$130098
74759	Explicit and Implicit Measures in Human Aversive Classical Conditioning	$50000
75443	A Mathematical Method for Quantifying the Effectiveness of Management Strategies	$177724
75513	Developing Algorithms for Predicting Protein-protein Interactions from Experimental Constraints	$81648
75514	Instrumentation Development for Real Time Brain Wave Monitoring	$73617
75786	Maximally Autonomous Autodirective Antenna Array Technology	$25000
76306	Inactivation of Avian Influenza (Bird Flu) with Sandia Developed Decontamination Formulations	$30295
78783	Generalized Continuum Models for Inelasticity in Solids: Formulation of Theories, and Variational Methods for Computation	$50000
79737	The Observer	$379573
79738	Adaptive Software for Advanced Human/Computer Systems	$224655
79739	System Dynamics Modeling of International Border Permeability and Gradient Dynamics	$242665
79740	Understanding Human Interactions With Complex Adaptive Systems	$298771
79741	Design and Manufacture of Complex Precision Optics	$179732
79742	Development of a Manufacturing Capability for Production of Ceramic Laser Materials	$171155
79743	Direct Writing in PMMA Photoresist to Expose Free-form Geometries	$131236
79744	High Speed, Extended Depth of Field, Multi-spectral, 3D Imaging System for Real-time Micro Assembly of MEMS	$201221
79745	Integrated Genome-Based Identification of Biological Agent Proteins: A Microfluidic Module for Nanosquencing of Proteins and Peptides	$323051

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SNL - Sandia National Lab		
Project ID	**Project Name**	**FY Total**
79746	Tools for Characterizing Membrane Rafts and Toxin Interactions	$73817
79747	Integrated Nanosystems for Monitoring Cell-Signaling Proteins	$528586
79748	Advanced Microscopy: Time-Resolved Multi-Spectral Imaging of Single Biomolecules	$238826
79749	DNA-Based Intelligent Microsensors for Genetically Modified Organisms (GMO)	$263200
79750	Reverse-time Seismic and Acoustic Wave Propagation: High-fidelity Subsurface Imaging and Location of Energy Sources	$266628
79751	Multi-Spectral Detection of Microfluidic Separation Products	$203775
79752	A Mathematical Framework for Multiscale Science and Engineering: The Variational Multiscale Method and Interscale Transfer Operators	$396359
79753	Microprocessor Extensions to Accelerate Scientific Applications	$217096
79754	Data Mining on Attributed Relationship Graphs	$294384
79755	Multi-Physics Coupling for Robust Simulation	$272024
79756	Simulation of Neutron Radiation Damage in Silicon Semiconductor Devices	$235886
79757	Data Pipelining for Heterogeneous Data Fusion	$295376
79758	Recognizing Patterns in Massive Datasets	$169295
79759	Emergent Distributed Tracking and Identification from Features in Wireless Sensor Networks	$269204
79760	Novel Photonic Crystal Cavities and Related Structures	$244129
79761	Integrated NEMS and Optoelectronics for Sensor Applications	$380037
79762	Development of Advanced UV Light Emitters and Biological Agent Detection Strategies	$325339
79763	SMART micro-preconcentrator for integrated preconcentration and detection of chemical agents and explosives	$342686
79764	Investigation of Liquid Jet Break-up and Dispersion	$231684
79765	Accelerating DSMC Data Extraction Via Signal Processing	$148732
79766	Modal Analysis of Almost-Linear Structures	$262026
79767	Nano/Micro-Engineered Interfaces for Improved Performance and Reliability	$236710
79768	Electromagnetic Modeling of Photonic Band Gap Laminates for Tailored Emission	$198369
79769	Shock-Induced Explosive Chemistry in a Deterministic Sample Configuration	$120532

SNL - Sandia National Lab		
Project ID	**Project Name**	**FY Total**
79770	Micro Biomechanics	$115535
79771	Hydrodynamic Manipulation of Coalescence Dynamics	$226251
79772	Control of Zero-Energy Modes and Contact for Nonlinear Solid Mechanics	$239649
79773	Atomic-Scale Modeling of Phonon-Mediated Thermal Transport in Microsystems	$218443
79774	Multiphase Dynamics of Soft Biological Tissues	$253070
79775	Assessing Geopolitical Instability Caused by Global Climate Change	$347222
79776	Nano-Scale Optical and Electrical Probes of Materials and Processes	$103809
79777	Applying New Network Security Technologies to SCADA Systems	$300597
79778	Use of Composite Materials to Refurbish Our Civil and Military Infrastructure	$274829
79779	Desalination Utilizing Clathrate Hydrates	$295867
79780	Development and Application of the Dynamic System Doctor to Nuclear Reactor Probabilistic Risk Assessments	$189805
79781	Innovative Solar Thermochemical Water Splitting	$318560
79782	Ultraviolet Water Purification Systems for Rural Environments and Mobile Applications	$92618
79797	Physical Modeling of Scaled Water Distribution System Networks	$98594
79798	System Analysis of Carbon Sequestration with Clean Coal Technology	$144849
79800	MOCVD Synthesis of III-Nitride Heterostructure Nanowires for Solid-State Lighting	$100865
79801	Novel System for Zero-Emission Electricity and Hydrogen Production from Coal and Biomass	$251066
79803	Fuel Traps: Mapping Stability via Water Association	$103882
79805	Key Management and Encryption against Bounded-Storage Adversaries	$99669
79807	Risk-informed, Decision-making Methodologies for Robust Control of Complex Infrastructures	$350333
79808	Biological Paradigms for Malice Tolerant Computing Infrastructure Assurance	$101661
79812	Universal Continuous-flow Bioparticle Processor	$446184
79813	Security-enabled Programmable Switch for Protection of Distributed Internetworked Computers	$300613
79814	Rapid Onsite Measurement of Spore Viability	$174494
79815	Automated Terrorist Threat Detection System	$191711

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Project ID	Project Name	FY Total
79816	Ion-Induced Gammas for Photofission Interrogation of HEU	$152163
79818	Development of Ultraminiaturized Photomultiplier Detectors	$275861
79819	Software Architecture for Scalable and Adaptive State Management in Support of Decision Analysis Simulations	$301069
79820	Portable Medical Diagnostic System for Detection of Presymptomatic Biomarkers of Chem/Bio-agent Exposure	$323753
79821	Diatoms as Molecular Architects	$340985
79823	Novel Mechanisms of Nanomechanical and Transmembrane Actuaion	$363078
79824	Carbon Nanotube Sorting via DNA-Directed Self-Assembly	$287119
79825	Next-Generation Contact Materials for High-Reliability Microsystems Devices	$364928
79826	Controlled Fabrication of Nanowire Sensors	$452002
79827	Fundamental Enabling Issues in Nanotechnology: Stress at the Atomic Level	$303547
79829	Adaptive, Peircean Based Decision Aid	$308926
79830	Towards a Stochastic Foundation for Information Operations	$5267
79831	Design Tools for Complex Dynamic Security Systems	$433322
79832	Knowledge Discovery via Sensor Fusion in Structures and Ad-Hoc Networks	$294019
79836	UGS Concept and Technology Development for Enhancing Boost Phase Detection ISR SDAC Application	$253159
79837	Non-Inertial Electric Field Void Sensor (RF/VCSEL Void Sensor for Munition)	$138538
79838	Large-Area Metallic Photonic Lattices for Military Applications	$363454
79839	Network and Adaptive System of Systems Analysis Methodology	$227975
79840	A Pointable Platform for Acquisition, Sensing, and Tracking from a Target Booster Front Section	$218678
79842	Adaptive Optical Zoom Sensor	$200172
79843	Compensation of Ionospheric Errors for Geolocation	$301065
79844	Single-Photon-Sensitive Imaging Detector Arrays at 1600 nm	$334214
79845	Optimal Spectral Unmixing of Remotely Sensed Hyperspectral Images Without A Priori Knowledge of the Endmembers	$82789
79846	Fully-integrated Microfluidic Microthruster System For Micropropulsion Applications	$265956
79847	Standoff Detection of Explosives Using UV LIDAR Technology	$352677

SNL - Sandia National Lab

Project ID	Project Name	FY Total
79848	Fail-safe Infectious Substance Transport Packages	$208697
79849	Development of Entomologic Surveillance to Aid Early Disease Detection (EDD)	$149472
79850	Biological Risk Assessment Methodology (BioRAM)	$219200
79851	Extreme Response Composite Materials for Sensor Applications	$264988
79852	Laser-Induced Breakdown Spectroscopy for Remote Explosives Detection	$248746
79853	Assessment of the Next Generation of Pre-boot Firmware	$208821
79854	Discrete Field-Portable Identity Microarrays	$279487
79855	Profile-based Network Anomaly Detection	$196768
79856	Integrated Optical MEMS using Through-Wafer Vias & Bump-Bonding	$359530
79857	Defense Against Future Cyber Agents	$348170
79858	Infrastructural Development for Wireless Devices	$200000
79859	Stressed Glass Technology for Actuators and Removable Barrier Applications	$87321
79860	The Surety of Cyber Tools	$353062
79861	Terahertz Quantum Cascade Lasers for Standoff Molecule Detection	$351658
79862	Advanced Anti-Tamper Technologies for National Security Applications	$816882
79863	Forensic Tool Development for SCADA Systems	$299150
79864	Verification Through Process Monitoring	$142813
79865	Monolithically Integrated Micro-coolers for Sophisticated Sensor Systems	$158941
79866	Tunable Dielectric Films for Frequency Agile RF and Microwave Integrated Circuits.	$202132
79867	Micropolarizing Device for Long Wavelength Infrared Polarization Imaging	$232530
79868	Next Generation High-Voltage Switches for Capacitive Discharge Firing Systems	$200730
79869	Intelligent Fuzing for Hard Target Defeat	$328860
79870	A New, Cost-Effective Solution to Provide Radiation-Hardened Materials for Nuclear Weapons	$297925
79871	Micro- and Meso- Scale Detonics of Explosives	$242777
79872	Embedded Neutron Generator Health Microsensor	$155752
79873	Phased Antenna Arrays for JTA Systems	$115848
79874	Ion Neutron SIMulation - INSIM	$207514

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SNL - Sandia National Lab

Project ID	Project Name	FY Total
79875	A Miniaturized mW Thermoelectric Generator For NW Objectives: Continuous, Autonomous, Reliable Power For Decades	$349653
79876	Advanced Material Applications of Precision-Deposited and Free-Form-Fabricated Energetic Materials	$200422
79877	Characterizing the Emissivity of Materials Under Dynamic Compression	$146477
79878	Beyond the Local Density Approximation: Improving Density Functional Theory for High Energy Density Physics Applications	$316435
79879	Exploring Pulse Shaping for Z Using Graded-density Impactors on Gas Guns	$230993
79880	Thermo-physical Properties of Shocked Water for Modeling Pulsed Power Switches and Other HEDP Systems	$138973
79881	Triggered Low-inductance Gas Switching	$207903
79882	Adaptive-Responsive Nanostructures for Sensing Applications	$96195
79883	Achieving a New Paradigm in Software Technology	$371530
79884	Nano-Patterning of Electro-Active Polymers for Tunable Optics	$97464
79885	Ultra-Cold Molecule Production	$102718
79886	Sub-surface Measurements of Detonation Wave Structure	$99825
79887	Assembling Semiconductor Nanocomposites Using DNA Replication Technologies	$99158
79888	Building Cognition on Biology: Self-organization in the Brain	$53877
79889	Nanodielectrokinetic Chromatography (nanoDEKC): Rapid Separation and Classification for Biodefense and Biomedical Applications	$103166
79890	Quantum Computing Using Interacting Semiconductor Quantum Wires	$98434
79891	Cell-Directed Assembly of an Integrated Nanoelectronic/Nanophotonic Device for Probing Cellular Responses on the Nanoscale	$99806
79892	Self-Assembling Holographic Biosensors and Biocomputers	$99646
79893	Cohesive Zone Modeling of Failure in Geomaterials: Formulation and Implementation of a Strong Discontinuity Model Incorporating the Effect of Slip Speed on Frictional Resistance	$50000
80568	Development of Design and Simulation Models for Large-Scale Hydrogen Production Plant Using Nuclear Power	$349451
80590	Reconciling System and Application Logs	$25000
80591	Collaborative Distributed Transceiver Designs and Protocols for the Interface of Wireless Sensor Networks and Wireline Infrastructures	$25006

SNL - Sandia National Lab		

Project ID	Project Name	FY Total
80592	Ultra-fast low-voltage MEMS Switches for Optics and RF Applications	$197326
80593	Catalyst Development and Micro Reformers for Fuel Processing	$25000
80594	Catalytic Membrane Development for Micro-scale Glucose Reforming	$25000
80595	Reliability of Materials in MEMS: Residual Stress and Adhesion in a Micro Power Generation System	$25000
80596	Modeling River-Aquifer Interaction with Application to the Rio Grande	$25000
80597	Optical Diagnostics for Aerosols and Other Particles	$40000
80598	Kinetics and Mechanisms of Nanowire Synthesis	$25000
80599	Rapid Chemical Analysis Using Micropower Gas Chromatographic Columns and Latching Microvalves	$50000
80600	A Generalized Simulation Environment for Particulate Systems	$50000
80601	Automated Assembly of Micro-Scale Devices	$50000
80602	MEMS Reconfigurable Intelligent RF Circuits	$25000
80603	Bayesian Inference for Inverse Problems, Model Structure, and Uncertainties	$198227
80604	Atomistic Modeling of Nanowires, Small-scale Fatigue Damage in Cast Magnesium, and Materials for MEMS	$50000
80667	Design, Analysis and Control of MEMS Devices for Micromanipulation Tasks	$25000
80838	Molten Salt-Based Growth of Bulk GaN and InN	$49977
81209	Randomness Complexity and Cryptography	$70000
81752	Integrated Fiber Lasers for Efficient High-Power Generation	$1852242
81753	Advanced Fusion Concepts: Neutrons for Testing and Energy	$1914213
81754	Microsystems-enabled Virtual Perimeter Security	$1620071
82854	Developing Novel Scaffolds for Biological Molecules by Solving the I-QSAR Problem Using the Signature Molecular Descriptor	$50000
84266	Effective Dispersion of Nanoparticles by Polymers	$201465
84267	Bead-based Multiplexed, Orthogonal, BW/ID (BioWarfare/Infectious Disease) Detection Microsystem and Technologies	$349890
84269	Supramolecular Structures of Peptide-Wrapped Carbon Nanotubes	$101057
84270	Robust Spore-based Detection System	$110562
84271	Terahertz Detectors for Long Wavelength Multi-Spectral Imaging	$390823

Project ID	Project Name	FY Total
	SNL - Sandia National Lab	
84272	Finite Temperature Self-consistent GW Approach-Applications to High Energy Density Physics	$104268
84273	Optics Integration into Microsystems using Electrostatically Steerable Fibers	$157532
84314	Acoustic Sensors for Cell Signaling Proteins	$76474
84315	Micropower Chemical Fuel-to-Electric Conversion: A "Regenerative Flip" Hydrogen Concentration Cell Promising Near Carnot Efficiency	$50059
84316	Thermal Accommodation of Carbon Nanotube Coatings	$75190
84317	Dynamics of Particulate Film Formation on Surfaces During Coating	$49930
84318	Electroforming of Bi1-xSbx Nanowires for High Efficiency Micro-Thermoelectric Cooling Devices on a Chip	$197892
84320	Advancement in Thermal Interface Materials for Future High-Performance Electronic Applications	$308019
84438	Capabilities for Design and Analysis of Fluid Structure Interaction for Active Aeroelastic Control	$101767
85512	File System Performance Optimization for Supercomputing Applications	$25000
85513	MEMS-based Arrays of Micro Ion Traps for Quantum Computation and Quantum Simulation Scaling	$324121
86358	Analysis of Bead Attached Ion Channels on Optically Addressable Micro-Fluidic Electrode Arrays	$25000
86360	Sensor for Remote Detection and Monitoring of Uranium Enrichment and Conversion Processes	$189603
86361	Terahertz Spectral Signatures: Measurement and Detection	$149962
86362	PCSS/Fiber-Optic Trigger System for Pulsed Power Switches	$192744
86363	Algorithms for Attention and Recognition of Humans and Threat Objects in Video	$147897
86364	Surety Enabled by Reduced Cost	$165996
86641	Detection of Contraband in Fuel Tanks	$54631
86801	Capture and Utilization of Prosody in Disambiguating Spoken Speech	$25000
87787	Exploratory Reseach into Pathogen Surface Interactions	$306032
89669	Diffusionless Fluid Transport and Routing Using Novel Microfluidic Devices	$65798
90493	Exploiting Interfacial Water Properties for Desalination and Purification Applications	$470253
90495	Static RF Cavity Experiment for Penetration Probe Communications	$51841

SNL - Sandia National Lab		
Project ID	**Project Name**	**FY Total**
90496	Human Performance Modeling of Soldiers for SoS Analytics	$49908
90497	Development of a Universal Fuel Processor	$324509
90498	Emulsion Technology for Sample/Contaminant Collection	$127744
90499	Visualizing Higher Order Finite Elements	$101145
90501	Rapid Updating of Stochastic Models Using Sensor Information	$109547
90502	Atomic Force Microscopy Measurements of Adhesive Forces for Interpreting Colloid Transport	$48376
90503	Interstitial Monitoring Technologies	$57660
90504	An Exploration of the Potential of Nanorobotics	$46694
90505	Extension of Interferometric Synthetic Aperture Radar to Multiple Phase-Centers	$59913
90506	Bioagent Detection Using Miniaturized NMR	$124346
90729	Analysis of Real-Time Reservoir Monitoring: Reservoirs, Strategies, & Modeling	$149530
90730	Merging Spatially Variant Physical Process Models Under an Optimized Systems Dynamics Framework	$190520
90731	MEMS Oscillators for RF Data Transmission During High-G Penetration Events	$91565
90732	Detection of Antennas	$129366
90733	Threat Mitigation via Direct Drive Currents	$79446
90797	Evaluation of a High Voltage Switch for Penetrator Fuzing	$61125
91312	Binary Electrokinetic Separation of Target DNA from Background DNA Primers	$29690
91663	Characterization of Rubber as a Light, Effective, Convenient Material for Armoring Light Military Vehicles	$58982
91664	Advanced Spectroscopic Sensors for Proliferation Prevention in Reprocessing Plants	$46810
91905	Science-Based Engineering and Cognition for Network Analysis	$48062
91991	Nanostructured Surfaces for Microfluidics and Sensing Applications	$13834
92368	Intrinsic Code Verification Signature Generation	$59705
93025	Smart Strike Weapon (SSW)	$13047
93032	Developing a Viable SCADA IO System Architecture	$156546
93033	Improved Radar-Pulse Detector For Radar-Responsive Tags	$52432

SNL - Sandia National Lab		
Project ID	**Project Name**	**FY Total**
93034	Nonproliferation Chem/Bio Scenarios	$49488
93035	Laser Propagation Analysis	$72036
93137	Fast, High-Accuracy Evaluation of Technology Insertion Scenarios via Mixed-Integer Programming	$69083
93349	Vulnerability Assessment Modeling of Extended Detection Systems	$88849
93361	Fundamentals of Embossing Nanoimprint Lithography in Polymer Substrates	$50000
93362	Rational Understanding and Control of the Magnetic Behavior of Nanoparticles	$50000
93364	MEMS Dual Backplate Capacitive Microphone	$25000
93365	Flow Control and Mixing in Microfluidic Devices	$20000
93366	Process Science and Engineering for Thermomechanical Nano-manufacturing	$20000
93367	Micromechanics Modeling of Multifunctional Nanocomposites	$20000
93369	Fabrication and Device Applications of Aligned Mesoporous Architectures	$50000
93390	Parasitic Power Generation in a MEMS Device	$74929
93652	Atmospheric Aerosols	$20000
93736	Characterization of Nanomagnetic Materials	$20000
94019	Hypersonic Submunition Dispense	$152354
94124	Assessment of Quantum Dot Photoluminescence Measurement Techniques	$2989
94235	Atomic Layer Deposition of Boron Nitride Films for Microsystems Lubrication Applications	$29713
94253	Feasibility Study on Using DoD Tech Demo Technologies	$44384
Total # of Projects for SNL:	**408** **Total Cost for SNL:**	**$108710400**

SRP - Savannah River Plant

Project ID	Project Name	FY Total
SR03001	Plasma Arc Process to Decontaminate Palladium for Recycle	$179271
SR03005	Fill Stem Decontamination Using Plasma and/or Atomic Oxygen	$47425
SR03006	Heat Transfer and Modeling of Next Generation Metal Hydride Beds	$105226
SR03008	Catalyzed Alkali Metal Borohydrides for Tritium and Hydrogen Storage	$61056
SR03014	Glass Microsphere Encapsulation of Hydrogen Absorbents	$99326
SR03029	Evaluation of Alternate Stainless Steel Surface Coatings and Methods for Passivation	$33410
SR03030	Evaluation of Non-Reactive, Permeation Resistant Materials for Tritium/Hydrogen Storage & Processing	$11929
SR03036	Tritium Reservoir Performance Prediction and Analysis Tools	$103244
SR03037	Pinch Weld Process Improvement Using Secondary Variable Analysis and Advanced Weld Controls	$153767
SR03038	Development of Stainless Steel Alloys with an Innate/Self-Healing Permeation Barrier	$14258
SR03046	Multiplexed Vapochromic Ammonia and Moisture Sensors for Tritium Process Monitoring	$82137
SR03052	Universal Tritium Transmitters	$143601
SR03060	Palladium on Ceramic as an Alternative to Palladium on Kieselguhr	$8661
SR04009	Detection and Measurement of He-3 Bubbles by Positron Annihilation Lifetime Spectroscopy	$34173
SR04011	Develop Low Cost, High Sensitivity Optical Gas Sensors using Surface Enhanced Raman Spectroscopy	$17941
SR04015	Improved material for methane cracking	$125369
SR05018	Separation and Measurement of Deuterium, Protium, and Tritium Using a Micro Gas Chromatograph	$1019
SR05020	Electrical Heat Standards for Calorimetry	$1164
SR05023	Modeling of Pressure Swing Adsorption Separation Process	$94489
SR05027	Low Cost, High Flux Ni-Ti-Nb Hydrogen Purification/Separation Membrane Development	$150508
SR05029	Synthesis of Metal Hydrides by Mechanical Alloying at Elevated Temperatures in a High Speed Attritor	$128837
SR05033	Create New Rigorous Thermal-Cycling Absorption Process Model	$253790
SR05041	Permeation-resistant Coated Gloves for Gloveboxes	$6937

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SRP - Savannah River Plant

Project ID	Project Name	FY Total
SR05043	Improved Fill Stem Bore Inspection Using Analytical Chemistry Methods	$4590
SR05047	Demonstration of Pressure Swing Adsorption (PSA) Separation Processes	$263093
SR05058	Cell Phone Detection Security Initiative	$19201
SR05061	Biocatalytic Separation of Isotopes of Hydrogen in the Aqueous Phase	$3216

Total # of Projects for SRP: **27**   **Total Cost for SRP:** **$2147638**

Y_12 - Y-12 Plant

Project ID	Project Name	FY Total
Y1201020	Rapid In-situ Identification of Fissile Material Type in Cans	$17887
Y1201021	Direct Electrolytic Reduction of Uranium Oxides	$104740
Y1202005	Hand-Held Enrichment Meter	$61622
Y1202009	Real Time Identification of Airborne Particles (Be, U, etc.)	$5406
Y1202014	Advanced Melting Process Using High Flux Density Infrared (IR)	$224536
Y1202015	Infrared (IR) Heating for Preheating Uranium Billets	$587074
Y1202036	Chromatographic Separation	$16638
Y1202039	Equal Channel Angular Processing	$172709
Y1202052	Advanced Analysis Engine	$2631
Y1202096	Zone Refining	$61289
Y1202101	Tool Tuning	$27016
Y1202102	Fisk Rad Detectors	$71287
Y1202103	Fuzzy Logic Analysis of Measurement	$95708
Y1202105	UNCC Hole Plate	$118998
Y1202106	UFL HSM	$108590
Y1202107	NCSU Artifact	$69285
Y1203001	Radiograph Archival	$38604
Y1203010	U-C Properties	$61283
Y1203014	High Accuracy, High Density	$61750
Y1203020	Holo Interferometry	$14695
Y1203021	Micro CT	$43111
Y1203023	SFM Process Monitoring	$5416
Y1203032	High Speed Machining	$7523
Y1203039	Advanced SDOR	$281670
Y1203043	ID of Ultra Fine Particles	$81317
Y1203050	Lugless Casting	$25535
Y1203051	Multizone Furnace	$6378
Y1203059	High Gradient Magnetic Filtration	$37722
Y1203065	Digital DU	$88642

Y_12 - Y-12 Plant

Project ID	Project Name	FY Total
Y1203073	LiH Assessment	$188226
Y1203074	IWMS	$942183
Y1203075	Project 2	$36146
Y1203076	Tech Infusion	$52534
Y1204006	Cone Beam X-ray CAT scan	$226636
Y1204008	Mold Material	$13915
Y1204015	Chemistry Control Using Slow Solidification	$21683
Y1204019	Surface Metrology	$60055
Y1204036	Wireless Predictive Maintenance	$78267
Y1204037	Process Radiation Detector System	$98678
Y1204040	U Compatibility with Crucible Materials	$124144
Y1204041	Slag Reprocessing	$32422
Y1204045	Next Generation MW	$1674693
Y1204059	NMC&A Confirmatory Cart	$133011
Y1204062	Synergistic Casting Methodology	$13669
Y1204087	Direct Conversion to Oxide	$16559
Y1204102	Kathabar Alternatives	$186482
Y1204103	Precision Electroplating	$257646
Y1204110	Crucible Materials Thermo Modeling	$15789
Y1204118	Wireless Systems Security Assessment	$121213
Y1204126	Engineered Security Concepts	$65604
Y1204127	Integrated Machining & Inspection at GT	$87491
Y1204128	Source Model	$15361
Y1204132	Selected Material Sanitization	$4181
Y1204133	EMBOS	$459159
Y1204134	Tusk Fracture Toughness with SSM	$43854
Y1204135	UM - Optimet	$41777
Y1204136	Portable Metal Analyzer	$32895
Y1204137	UNCC Improving Machine Tool Productivity and Quality	$47086

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Y_12 - Y-12 Plant

Project ID	Project Name	FY Total
Y1204138	Machining Uranium and Uranium Alloys	$47365
Y1204139	Unique Mass Spectrometery Capabilities	$54086
Y1204140	Nanostructured Material Machine Tools	$11459
Y1204141	Ultrasonic Vibration of Molten Metals	$72999
Y1204142	ANIPM Evaluation	$80361
Y1205001	Reduce Holdup Measurement Uncertainty	$29944
Y1205004	Field Programmable Gate Array (FPGA) Solution for Near Real-time Processing of Digital Radiographs	$23244
Y1205005	High Speed Machining of Difficult to Machine Materials	$67739
Y1205008	Inventory Verification Using Time-of-Flight Measurements with Surface Acoustic Wave Transponders	$4196
Y1205012	Real-time Beryllium-in-Air Monitor Based on Passive Electric Spark	$59876
Y1205013	Mobile Neutron Probe	$24783
Y1205014	Metallographic Digital Image Control	$90661
Y1205020	Miniature NC Turning and Milling Machine Integration	$582324
Y1205023	Location and Geometry Improvement of Small Holes That are Non-normal to Part Surface	$11467
Y1205024	Methyl Chloroform Replacement	$22517
Y1205030	Inverse Vibration Modeling and Parameter Estimation	$144328
Y1205032	Microcantilever Transducers: Next Generation of Gas Diagnostics	$189283
Y1205033	Enhancing Inductively-Coupled Plasma Mass Spectrometry with Ion Mobility	$114613
Y1205040	Large Alpha-Uranium Single Crystals	$35466
Y1205042	Beryllium Specific Extraction Resin Development	$45518
Y1205043	Conversion of Uranium Metal to Oxide	$78598
Y1205045	Novel Material Synthesis (U)	$50849
Y1205046	Surface Preparation for LCSEM Analysis	$275764
Y1205047	Purification by Drip Casting	$446
Y1205048	Purification of Uranium by Electrorefining	$150044
Y1205055	Infrared (IR) Melt Casting	$5414
Y1205056	Moisture Generator Analysis for Field Calibrations	$148778

Y_12 - Y-12 Plant

Project ID	Project Name	FY Total
Y1205062	UO2 Precipitation Process Evaluation	$761
Y1205063	Interfacing Digital Radiography	$64346
Y1205064	Pin Extensions	$8654
Y1205069	Personal Radiation Detection Instrumentation (PRDI) Alternatives	$626977
Y1205072	Nanostructured Super Material Machine Tools	$232366
Y1205079	Optimization of Grain Boundary Structure	$111670
Y1205082	WiMaX Networking	$32729
Y1205084	Parylene Coating	$228895
Y1205086	Mechanical Properties of Uranium at Very High Temperatures	$28245
Y1205089	Advanced Hydrogen-Getter Analysis	$128470
Y1205091	Debonding	$40730
Y1205092	Material Cleaning Alternatives	$55291
Y1205093	Special Casting Requirements	$3383
Y1205094	Uranyl Nitrate Processing Evaluation	$44333
Y1205095	Primary Extraction System Improvements	$296329
Y1205096	Denitration Alternatives	$15585

Total # of Projects for Y_12: **101** **Total Cost for Y_12:** **$11931307**

Departmental Procedures

The Conference Report accompanying the Energy and Water Development Appropriations Act for Fiscal Year 2002 (H.R. 4733) requests the Secretary of Energy to include in the annual report to Congress for all Laboratory Directed Research and Development (LDRD) activities the affirmation included below. In response to and as support for the annual affirmation, the Department revised its procedures for handling LDRD program charges on other Federal agency funded Work for Others projects in fiscal year 2002. These procedures changed the Work for Others process to ensure proper notification of other Federal agencies as to the LDRD charges prior to funding work at the laboratory. Specifically, each new and/or revised Work for Others proposal provided to a Federal agency must indicate the amount of LDRD charges that will be collected. Furthermore, the proposal notifies the sponsor that, by providing funding, the agency is acknowledging LDRD activities are beneficial to their organization and consistent with appropriation acts providing funds to that agency. Subsequently, each Work for Others funding acceptance document also includes the LDRD estimate acknowledgement.

FY 2005 Secretarial Affirmation

Based on the information and acknowledgments provided to the Department of Energy and its contractors by other Federal agencies funding LDRD activities at DOE facilities, I affirm that all LDRD activities derived from funds of other Federal agencies have been conducted in a manner that supports science and technology development that benefits the programs of the sponsoring agencies and is consistent with the appropriations acts that provided funds to those agencies.

Samuel W. Bodman

26 Jan 06
Date

LDRD Legal Authority and Order

The LDRD program operates under the same statutory and Departmental guidance that it has in past years, and the laboratories work closely with DOE personnel to assure the careful Federal oversight that both the letter and spirit of the guidance intends.

Authorization Basis

The Atomic Energy Act (AEA) of 1954, as amended, 42 U.S.C. 2011 et seq., Section 31, directs DOE to exercise its powers to ensure the continued conduct of R&D and training activities and to assist in the acquisition of an ever-expanding body of theoretical and practical knowledge in the fields of energy, its production, uses, handling, and effects. This mission was initially the responsibility of the Atomic Energy Commission (AEC), then the Energy Research and Development Administration (ERDA) and subsequently that of DOE.

The current LDRD program is consistent with the mission of providing a program of conducting, assisting, and fostering research and development to encourage maximum scientific and industrial progress, contemplated in Section 3 of the AEA and confirmed in subsequent laws applicable to the successor agencies, ERDA and DOE. Public Law 95-39 (Section 303), dated June 3, 1977, authorized any laboratory under contract with ERDA, with the Administrator's approval, to "use a reasonable amount of its operating budget for the funding of employee-suggested research projects."

Section 3132(d) of the National Defense Authorization Act for FY 1991 (Public Law 101-510), set the funding limit for each Laboratory's program at 6 percent of the Laboratory's total operating and capital equipment budget. In FY 2000, Section 308 of the Energy and Water Development Appropriations Act (H.R. 2605) reduced the funding level to 4 percent with the additional restriction that none of the funds in the Environmental Management programs are available for Laboratory Directed Research and Development. The Energy and Water Development Appropriations Act for FY 2001 (Section 306) restored the funding limit to 6 percent, and the explanatory language of the accompanying Conference Report (106-988) requested the Department's Chief Financial Officer "to develop and execute a financial accounting report of LDRD expenditures by laboratory and weapons production plant." The 6 percent funding level remained in effect in FY 2005.

DOE Orders Governing the LDRD Program

With this authorization basis, the LDRD program, since its inception in FY 1991, has been under continual oversight by DOE to ensure compliance with Congressional requirements.

During 1991, the Department developed and implemented DOE Order 5000.4, *Laboratory Directed Research and Development,* establishing formal processes to manage and oversee the LDRD program. These processes have been subject to ongoing Departmental review and revision to ensure compliance with Congressional intent and with Departmental policies and requirements. On April 9, 1992, the DOE Order was revised to increase the emphasis on Departmental oversight of research and development activities. In 1993, individual program organizations provided additional instructions through a set of "Responsibilities and Guidelines." In 1997, DOE updated the 1992 DOE LDRD Order to DOE Order 413.2, *Laboratory Directed Research and Development,* [1] and more recently to DOE Order 413.2A, *Laboratory Directed Research and Development* [2] to include the new NNSA. An updated DOE LDRD order is being drafted to incorporate new Departmental and Congressional requirements as appropriate.

DOE Order 413.2A provides guidance in the following areas:

- General criteria for the selection of LDRD projects;
- Limitations on the duration of LDRD projects;
- Limitations on the total maximum annual funding for the LDRD program;
- Excluded activities under LDRD funding;
- Responsibilities of DOE offices (including field offices); and
- Contractor requirements, including annual planning and reporting documents.

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[1] DOE Order 413.2, March 5, 1997.

[2] DOE Order 413.2A, op. cit., p. 1.

DOE Program Management and Oversight

Overview

DOE's oversight of LDRD activities ensures that the objectives stated in DOE Order 413.2A, *Laboratory Directed Research and Development,* are accomplished by each laboratory's LDRD program. The objectives are to "maintain scientific and technical vitality of the laboratories; enhance the laboratories' ability to address future DOE missions; foster creativity and stimulate exploration of forefront science and technology; serve as a proving ground for new research; and support high-risk, potentially high-value research and development."

The oversight process is consistent with DOE's overall management approach and philosophy for all research and development activities, and includes annual planning and reporting documents and program and peer reviews. The Department followed a rigorous process in developing the LDRD policy and establishing the 6 percent maximum level. The 6 percent limit is a maximum and not an automatic provision. The Department approves a specific level of funding and a plan for each laboratory annually. In addition to the requirements and specific oversight mechanisms defined in DOE Order 413.2A, the Department conducts an annual evaluation of the full spectrum of science and technology at the laboratories as part of the overall appraisal of contractor performance. This evaluation spans all programmatic activities, and specifically includes LDRD, looking at its quality of science, strategic alignment, and relevance to DOE missions.

Much of the input to this retrospective evaluation comes from independent external peer review committees composed of scientific leaders from industry and academia as well as from the Federal research community including the laboratories themselves. The result of this science and technology evaluation is additional input for the Department in the assessment of the value and level of funding for LDRD activities.

The Office of Science (SC), the Office of Nuclear Energy, Science and Technology (NE), and the NNSA have established a common oversight process to ensure the laboratories effectively manage their LDRD programs in accordance with DOE Order 413.2A. The process is designed to allow flexibility to the laboratory in implementing its LDRD program, while ensuring effective DOE oversight and stewardship of the taxpayers' dollars.

Planning

Each laboratory is required to submit an annual LDRD Program Plan for approval to the cognizant Secretarial Officer and Site Office Manager before the start of the fiscal year.

The plan must include a requested funding level as well as a general description and justification of the LDRD program. It must describe how the LDRD program will contribute to and strengthen the laboratory's science and technology capabilities, support the laboratory's mission and benefit the Department and the Nation. In addition, each laboratory must establish and describe criteria for selecting and prioritizing projects. These criteria include utilizing internal peer and scientific management reviews that support and validate the innovative scientific and technological excellence of the program. The cognizant Site Office reviews the laboratory's proposed annual LDRD plan and funding level and provides its written recommendation to the cognizant Secretarial Officer.

As part of this recommendation, the Site Office Manager certifies that the laboratory's method for accumulating LDRD funds meets the requirements of DOE Order 413.2A. The Order requires Site Office Managers to annually review and certify to Headquarters that the laboratory's method for accumulating LDRD funds is consistent with the maximum allowable funding, and is in accordance with terms and conditions of the laboratory's contract. The Site Office LDRD managers, as well as the field financial managers, are involved in conducting these reviews in early summer of each year. Financial accountability, as demonstrated by these reviews, is a strong factor in the Site Office's recommendation to the Department of the LDRD funding level.

The cognizant Secretarial Officers annually approve each laboratory's LDRD plan and the maximum funding that may be expended on LDRD activities for the next fiscal year. This approval is based on the reasonableness of the documentation, the Site Office's recommendation, results from the prior year's review of the program, and the Laboratory's overall performance in managing its LDRD program. The approval also considers input from appropriate Departmental program managers. Throughout the fiscal year, DOE works closely with each laboratory and reviews any proposed LDRD program modifications or adjustments to ensure that the laboratories realize optimum mission benefits. No individual LDRD project may begin without concurrence from DOE.

Implementation

DOE has established management policies and processes to provide effective oversight of the LDRD program. The management processes ensure proper oversight of current research thrusts while maintaining flexibility to address future needs.

The laboratories implement the LDRD program in accordance with the requirements in DOE Order 413.2A. While the timing or details of discrete DOE oversight activities may differ somewhat from laboratory to laboratory, the oversight processes among all the DOE program offices have certain key elements in common. For example, all LDRD projects are reviewed and approved by the cognizant Federal official prior to any work starting. In addition, DOE conducts a review of each laboratory's LDRD program to ensure consistency with Department policy, and to review technical success and proposed research. In the case of the NE and the three NNSA

laboratories, the review is conducted late in the fiscal year (August/September), when DOE begins to review and concur on proposed research for the next fiscal year. SC conducts their LDRD program reviews earlier in the year (May/June), prior to completion of the research proposal review cycle, and consequently has a separate activity later in the year that involves DOE concurrence of the next year's research portfolio. Representatives from other laboratories, as well as appropriate Departmental program managers, are invited to participate in the LDRD program reviews, to share lessons learned, and to promote best practices and continuous management improvement across the laboratories. All the laboratories have processes to review and assess the performance of individual research projects, and DOE is involved in those processes at the field offices as well as Headquarters. Again, the timing and details of this activity may vary among the program offices, but the end result is the same: corrective actions resulting from the oversight are implemented as needed, including changes in project scope, emphasis, or funding.

In addition to the specific oversight mechanisms defined in DOE 413.2A, the Department and its contractors conduct an annual evaluation of the full spectrum of science and technology at the laboratories as part of the overall evaluation of contractor performance. This evaluation spans all programmatic activities, and specifically includes LDRD, looking at its quality of science, strategic alignment, and relevance to DOE missions. Much of the input to this evaluation comes from independent external peer review committees composed of scientific leaders from industry and academia. The results of this science and technology evaluation are additional input for Headquarters in assessing the value and determining the funding level for LDRD activities.

Reporting

Each laboratory is required to submit an annual LDRD report to the cognizant Secretarial Officer and Site Office Manager. The LDRD Annual Report includes a technical and financial overview of the program as well as a short summary of each funded project. The Annual Report, in conjunction with the LDRD Program Plan, contains a description of the laboratory's LDRD management process, a summary of how the laboratory's LDRD portfolio relates to DOE/Laboratory missions, initiatives, and strategic plans, a description of the peer review process under which the LDRD projects are evaluated along with any relevant results; and a summary of the metric data as success indicators. Aggregated performance indicators, such as patents, awards, and follow-on funding, collected on the LDRD portfolio at each Laboratory are useful in revealing trends on the overall productivity of the program over time, although some of the more measurable results occur years after project completion.

The Site Office and Cognizant Secretarial Officer review each laboratory's Annual Report to assess the laboratory's LDRD management systems, program performance, and adherence to established criteria for LDRD projects. As part of this review, SC, NNSA, and NE ensure that the appropriate Headquarters program managers are involved as questions related to their programs are discussed and resolved.

In its independent FY 2001 report to Congress, the Government Accountability Office stated,[3]

> "All the LDRD projects we reviewed at the …laboratories we visited met DOE's guidelines for selection [and] had created the internal controls necessary to reasonably ensure compliance with DOE's guidelines. The key controls in place included using DOE's guidelines to control and conduct the project-selection process …and ensuring appropriate DOE oversight and review of the results of the process."

In summary, DOE's oversight includes project approval, financial certification reviews, appraisal process reviews, Program Plan reviews (both in the field and at headquarters) and onsite reviews (both of technical content as well as management processes). Annually, DOE provides written approval for each laboratory's LDRD Program Plan and confirms the maximum LDRD funding level that may be used for the program. Throughout the fiscal year, DOE works closely with each laboratory and reviews any proposed additions or adjustments to the program to ensure compliance with the DOE Order and that optimum mission benefit is realized by both DOE and the laboratories.

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[3] GAO-01-927, *op. cit.*, p. 10.

Laboratory Program Management

Overview

The DOE laboratories have implemented similar processes to manage their LDRD programs and select projects for funding. These processes have three major components: (1) a top-level strategic planning process to identify science and technology areas for LDRD investment; (2) a call to the laboratory scientific and technical community for innovative and relevant proposals within the DOE mission areas; and (3) a scientific peer-review process to select an LDRD portfolio from these proposals, and a ranking process by senior management to prioritize the portfolio of projects for funding.

Strategic Planning

Early each fiscal year, laboratory directors and their senior management begin the LDRD cycle for the following year with a review of strategic directions, an assessment of the health of the science and technology underpinning laboratory missions, and an evaluation of the need for far-reaching fundamental research and development to maintain laboratory vitality for future missions. These activities identify the laboratory's strategic research and development needs. The review provides target allocations and determination of the LDRD program funding level as a percentage of the laboratory's total operating and capital equipment budget.

Within the LDRD program, priorities and budgets are set for three types of projects: (1) research and development demonstrations or proof-of-concept; (2) multifaceted research and development that has the potential to alter the laboratories' approach to solving programmatic challenges; and (3) long-range, high-risk fundamental research and development in broad science and technology areas underlying the laboratories' competencies and mission areas.

This process demonstrates the importance that laboratory senior management places on LDRD as a tool to maintain the vitality of the laboratories and to meet future programmatic needs and missions.

Call for LDRD Proposals

Once the strategic direction for the LDRD program is established, the laboratory LDRD program office issues calls for proposals to the scientific and technical community. This open call for proposals encourages the broadest participation from all laboratory scientific and technical staff, and ensures that the most innovative approaches are brought forward. Proposed projects range from those that focus strictly on strategic science and technology development to those highly innovative, creative projects that enhance the capabilities of the laboratories to accomplish their missions.

Selection of Projects for Funding

All proposals are subject to two types of review: scientific peer review and management review. The scientific peer review is based on criteria that include an evaluation of the proposal's innovation, impact, risk, programmatic and strategic relevance, scientific quality, feasibility, and quality of the project team. In a report reviewing the LDRD Program, the Government Accountability Office described the peer-review process as follows:

> "All laboratories used DOE's LDRD Order 413.2A as the primary guidance to review and select projects. Individuals involved in the review and selection of the projects had the requisite background and experience to provide credible review. Those individuals had wide-ranging scientific backgrounds—usually a Ph.D. in scientific research and practical experience in basic scientific research. When the subject matter of a project proposal was outside the knowledge base of the review team, the laboratories generally contracted with outside experts to provide reviews and recommendations on the merits of that proposal. In general, each laboratory established review panels comprising individuals from across the laboratory, which provided for diverse opinions to ensure that various points of view were brought to bear on the selection decision."

The management review includes participation by laboratory senior managers, program leaders, and leading scientists in selecting a portfolio of projects of the highest quality that are aligned with the strategic requirements of both DOE and the laboratories. Each laboratory Director is responsible for final portfolio balance and project funding decisions.

In addition, the laboratories conduct reviews to assess technical progress and track project costs. In the post-performance stage, separate and independent external peer review advisory committees consisting of subject matter experts from academia and industry conduct peer reviews of LDRD projects as an integral part of the Department's scientific program reviews. These scientific peer reviews are conducted for all technical divisions on a rotating basis as part of the contract mechanism and annual performance evaluation.

The various peer review and self-assessment processes described above are designed to ensure that the laboratories' LDRD programs comply with DOE requirements, represent innovative and creative science, strengthen technical capabilities, and contribute to each institution's pursuit of excellence in science and technology. The peer review process has evolved over several years of continuous improvement and is consistent with principles employed by other peer review processes performed by other agencies, such as the National Science Foundation and National Institutes of Health. The laboratories and DOE will continue to look for ways to improve these processes to enhance and strengthen the LDRD program.

Plant Directed Research, Development and Demonstration Site-Programs

Overview and Philosophy

The National Nuclear Security Administration (NNSA) Defense Programs (DP) Plant Directed Research, Development and Demonstration (PDRD) Site-Programs support science-based manufacturing related to the NNSA weapons mission. Projects emphasize applied science and technology that enhance the plant's technology development capabilities and core competencies. Technical staff at the plants have the opportunity to explore innovative scientific and technological opportunities that hold high potential for payoff in mission applications.

The PDRD Site-Programs described in this document are consistent with Congressional intent as stated in the Energy and Water Development Appropriations Act for FY 2001 (Section 310) and the Defense Authorization Act for FY 2001 (Section 3156) which authorized the establishment of a Plant Managers Research, Development, and Demonstration Program at the following sites:
- The Kansas City Plant (KCP), Kansas City, Missouri,
- The Y-12 Plant (Y-12), Oak Ridge, Tennessee,
- The Pantex Plant, Amarillo, Texas, and
- The Savannah River Plant (SRP), Aiken, South Carolina.

The conference agreement allows for a maximum of two percent of the plant's NNSA base operating budget to be utilized at each site for its PDRD Site-Program. The Authorization Act and Conference Report language instruct NNSA to establish and conduct an LDRD-type program for the nuclear weapons plants. The LDRD enabling legislation serves as a guide for PDRD. The authorization basis for LDRD as defined by Section 3132(d) of the National Defense Authorization Act for FY 1991 and the policy and guidance contained in DOE Order 413.2A will be followed to the extent practicable.

Each site will use the appropriate documents (NNSA strategic plans, NA-10 (Defense Programs) goals, Applied Technology Roadmap, Needs Forecast, Site Technology Plan, Ten-Year Comprehensive Site Plan, Readiness Campaign, Directed Stockpile Work, and Readiness in Technical Base and Facilities plans) as well as leverage unique opportunities to collaborate through strategic partnerships and complementary work in order to identify and prioritize the most important mid-and long-lead technology needs that align with and support its strategic direction.

Proposals selected for funding must "engage in research, development and demonstration activities with respect to the engineering and manufacturing capabilities" (Energy and Water Appropriations Act of FY 2001) related to the NNSA weapons mission. Per the Defense Authorization Act for 2001 (Section 3156) legislation, project activities may include:
"(1) replacement of obsolete or aging design and manufacturing technologies; (2) development of innovative agile manufacturing techniques and processes; and (3) training, recruitment, or retention of essential personnel in critical engineering and manufacturing disciplines."

Program Description - Roles & Responsibilities

Authority for PDRD is delegated from the Administrator, NNSA to The Assistant Deputy Administrator for Military Applications and Stockpile Operations, NA-12, as stated in the John Gordon memo dated July 16, 2001 "Plant Directed Research Development and Demonstration Program". Responsibility for the management of PDRD resides in NA-123, Office of Stockpile Technology. Each Site Office has a Federal PDRD liaison who provides oversight of the contractor program. The main elements and responsibilities for NNSA, CFO principles, and contractors are shown below.

A. The Assistant Deputy Administrator for Military Applications and Stockpile Operations is responsible for:
   1. Issuing a letter of compliance on the Site-Program effectiveness.
   2. Providing dispute resolution on project selection questions.

B. The NA-12 PDRD Manager is responsible for:
   1. Reviewing the projects selected for compliance to legislation and for cross integration across plants.
   2. Reviewing the Site-Program Self-Assessments and providing recommendation to NA-12 Assistant Deputy Administrator for letter of compliance.
   3. Participating in the NNSA/Plant Integration reviews and advising Site-Program Managers on project selection.
   4. Providing multi-site issue resolution on the CFO annual LDRD Report.

C. The NNSA Site Offices are responsible for:
   1. Reviewing the projects selected at their site and concurring that they are in compliance with the legislation.
   2. Accepting input from NA-123 for the Site Office Contracting Officer's formal concurrence letter.
   3. Reviewing the Site-Program Self-Assessments for compliance.
   4. Participating in Site-Program Reviews and NNSA/Plant Integration Reviews.
   5. Reviewing and concurring with the CFO report.

D. The Contractor is responsible for:
   1. Selecting projects that comply with the requirements and principles of PDRD.
   2. Preparing the Site-Program Self-Assessment and submitting to NA-12.
   3. Preparing information for and participating in the Site-Program Reviews and NNSA/Plant Integration Reviews.
   4. Entering their project data into the PDRD/LDRD database controlled by the DOE Chief Financial Officer.
   5. Developing and maintaining the Site-Program execution plan.
   6. Providing oversight for project execution and utilizing project management tools to verify that projects meet their objectives.
   7. Utilizing metrics and measures to track the effectiveness of the Site-Program.

E. The CFO Principals are responsible for:
   1. Reviewing the information entered into the PDRD/LDRD database and approving/certifying that the data is in compliance with all applicable legislation.
   2. Documenting annual certification of site data and method for accumulating costs.

Site-Program Components

The PDRD Site-Programs at each of the four plants will consist of:

1. A top level program planning process that results in identification of strategic manufacturing science and technology areas for targeted investment; the plants participating in the program will provide to their Site Office a proposed program plan for the upcoming fiscal year. Both the Site Office and the Federal Program Manager will review and analyze the plan, taking into account NNSA policy, alignment with guidance, mission relevance, strategic planning, operational needs, and general program performance;
2. A call to plant scientific, engineering, manufacturing, and /or program management personnel for innovative and relevant proposals in the target investment areas;
3. A technical and management review process to select from the proposals a project portfolio for funding; and
4. A process for measuring and evaluating the program's effectiveness utilizing appropriate metrics and a site self assessment.

Fiscal Guidance

The maximum funding level established for PDRD must not exceed 2% of the Plant's base NNSA operating budget for the year. Expenditures shall be considered allowable cost in accordance with the terms and conditions of the operating contract and shall be identifiable and traceable within the accounting system. The funding in the following budget categories must be included when determining the Plant's base NNSA operating budget for the year: all Directed Stockpile Work, all Campaigns, all Readiness in Technical Base and Facilities plans, all Safeguards and Security, and all Facilities and Infrastructure Recapitalization Programs. The following is to be excluded when determining the Plant's base NNSA operating budget for the year: all line-item funding (Total Program Costs) irrespective of the budget category and Work for Others. This base is what will be used to determine the official and consistent percentage of plant funds reported as costed at year-end. The contractor site CFO shall determine the system of accrual.

PDRD funds may not be used to: (1) substitute for or supplement program funding for any tasks or projects required, planned or budgeted by the NNSA or any other agency to meet current mission needs; (2) fund any construction design (e.g., Title I); or (3) supplement a plant's general capital equipment budget.

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PDRD funds may be used to: (1) fund conceptual or preliminary designs that hold high potential for payoff for their mission applications; (2) fund capital expenditures for acquisition of general-purpose equipment as long as the equipment is required to complete the PDRD project, is not otherwise readily available from the plant inventory and outside sources for lease, or collaboration has been sought but found not to exist; (3) survey and evaluate the suitability of competing commercially available technical solutions in order to develop optimum procurement recommendations, as long as the intent is clearly not to justify or supplement the purchase of general or mission-specific plant equipment; and (4) train, recruit, or retain essential personnel in critical engineering and manufacturing disciplines.

The FY 2001 Energy and Water Development Appropriations Subcommittee Conference Report requested the Chief Financial Officer (CFO) to develop and execute a financial report of expenditures by site. To carry out this responsibility, an annual certification of site data is performed by the cognizant field CFO. Part of this certification includes written assurance that the method for accumulating funds is consistent with DOE guidance (Order 413.2A). In addition, this official assures that cost information reported by the site is in agreement with the site's financial records and is costed in accordance with the site's own contractually approved accounting procedures.

NNSA Site-Program Reviews and Project Integration

The Office of Stockpile Technology and the relevant Site Office will conduct periodic reviews during the year. In the August timeframe, each plant is to submit and present a summary of the projects that they have selected for execution during the upcoming fiscal year. This review will allow for (1) maximum synergy, (2) avoidance of duplication for the Nuclear Weapons Complex, and (3) timely NNSA concurrence/non-concurrence on newly proposed or follow-on projects based on the guidance. Site Office and NA-12 PDRD Program Manager concurrence is required prior to initiating work on any project. The mid-year review, held in the spring, should cover the site program status and results for each plant and selected technical presentations from the host site(s).

In the August timeframe, NA-123 will review the responses and backup documentation provided from each Plant's Self Evaluation and will prepare a formal written evaluation of the effectiveness of the site-program issued by NA-12, the designated program authority. This response will provide Plant management and the PDRD Manager with site-specific feedback from NNSA on (1) the overall performance of the Plant toward achieving the purpose and intent of PDRD, (2) the perceived ability of the Plant to follow the annual PDRD Guidance, as well as (3) areas for improvement. It will also be used to highlight areas of exceptional performance to be incorporated into the contractor performance evaluation.

Fiscal Year 2005 PDRD Expenditures

The following table shows FY 2005 PDRD expenditures by site. It should be noted that the table includes all PDRD costs including individual project costs listed in Note 1 and any administrative costs not specifically assigned to individual FY 2005 projects, if applicable.

Plant	NNSA/DP Funding ($M)	PDRD Costs ($M)	PDRD Fraction*
Kansas City Plant	370.2	3.9	1.06%
Pantex	519.2	1.3	0.26%
Savannah River	159.8	2.2	1.34%
Y-12	635.7	12.7	1.99%

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*Numbers may not compute due to rounding.

Site Directed Research, Development and Demonstration

Program Overview and Philosophy

The National Nuclear Security Administration (NNSA) Defense Programs (DP) Nevada Test Site Directed Research, Development and Demonstration (SDRD) program supports technology development related to the NNSA weapons mission. The program is administered by the Management and Operations contractor for the Nevada Test Site (NTS). Technical staff at NTS operational sites has the opportunity to explore innovative scientific and technological opportunities that hold high potential for payoff in mission applications.

Section 310 of Public Law 107-66, the Energy and Water Development Appropriations Act for FY 2002 states "*The Administrator of the National Nuclear Security Administration may authorize the manager of the Nevada Operations Office to engage in research, development, and demonstration activities with respect to the development, test, and evaluation capabilities necessary for operations and readiness of the Nevada Test Site: Provided, That of the amount allocated to the Nevada Operations Office each fiscal year from amounts available to the Department of Energy for such fiscal year for national security programs at the Nevada Test Site, not more than an amount equal to 2 percent of such amount may be used for these activities.*"

Furthermore, the Act and accompanying Conference Report authorizes NNSA to establish and conduct an LDRD-type program for the nuclear weapons plants. The LDRD enabling legislation serves as a guide for the SDRD program. The authorization basis for LDRD is defined by Section 3132(d) of the National Defense Authorization Act for FY 1991, and the policy and guidance contained in DOE Order 413.2A will be followed to the extent practicable.

By extension of the LDRD authorization basis, SDRD represents research, development and demonstration work of a creative and innovative nature selected by a senior management committee for the purpose of maintaining the vitality of the Site in mission-related scientific disciplines. SDRD provides Nevada Test Site managers the flexibility to invest in longer-term, higher-risk, and potentially higher-payoff research activities that enhance the science and technology capabilities.

In structuring the SDRD program to enhance and maintain the "vitality" of the technical base for carrying out the NTS DP mission, specific attention will be placed on the following areas:

- Retention and recruitment of individuals with critical skills;
- Maintenance of core competencies required for current and future technical missions; and
- Developing and demonstrating innovative, agile technology to replace outdated technology.

The program will be structured to incorporate NNSA National Security Response and Defense Programs' goals and will be consistent with the NNSA Strategic Plan.

Program Description - Roles & Responsibilities

The SDRD program is analogous to the LDRD program with appropriate differences to assure the program is focused on instrumentation and diagnostic technologies critical to the performance of the NTS stockpile stewardship and nuclear security response missions. The main elements and responsibility matrix for the SDRD program is given below. It should be noted that the SDRD program, like the LDRD program, provides NTS with broad flexibility for program implementation and NNSA's role is one of limited oversight and concurrence. Acting as the Cognizant Secretarial Officer designee, the Assistant Deputy Administrator for Research, Development and Simulation, through the DP Program Manager, has primary responsibility for the SDRD program. The Federal Site Office at NNSA/Nevada is responsible for implementation and oversight.

Program Components

The SDRD program will consist of three main components:

1. A top level program planning process that results in identification of strategic science and technology areas for targeted SDRD investment;
2. A call to scientific, engineering, and /or other technical personnel for innovative and relevant proposals in the target SDRD investment areas; and
3. A review process to select from the proposals a SDRD project portfolio for funding.

Program Planning. The SDRD program will use appropriate strategic plans and DP goals to identify strategic technology needs and establish SDRD objectives to address near-term, mid-term and long-term competence for assigned missions.

Call for Employee-suggested Proposals. Once the strategic direction is established, a call for proposals will be issued to the NTS scientific and engineering community. This broad-based call for proposals will result in participation of numerous scientists, engineers, and technicians yielding numerous innovative approaches to meeting the strategic SDRD objectives.

Review and Selection of Proposals for funding. All proposals are subject to two types of review, a technical review by scientists, engineers, and program management personnel, and an operational management review. The technical review is performed against criteria that include an evaluation of the proposal's balance of innovation, impact, and risk with programmatic and strategic relevance. The management review includes participation by senior functional and programmatic management to select sound technical proposals that are aligned with the strategic goals and objectives of the NTS mission.

Fiscal Guidance

The maximum funding level established for SDRD must not exceed 2 percent of the Site's base NNSA operating budget for the year. Construction line item projects are excluded. SDRD expenditures shall be considered an allowable cost in accordance with the terms and conditions of the operating contract and shall be identified in the accounting system.

The FY 2001 Energy and Water Development Appropriations Subcommittee Conference Report requested the Department's Chief Financial Officer (CFO) to develop and execute a financial report of SDRD expenditures by project. The CFOs of the Sites are responsible for preparing input for this report that includes written assurance that the method for accumulating SDRD funds is consistent with DOE Order 413.2A. In addition, CFOs shall assure that cost information reported by their Site is in agreement with the NTS financial records.

Defense Programs Oversight of the SDRD program

The SDRD oversight activities ensure that NTS carries out the objectives stated in the law enabling the Program. SDRD oversight is managed through the NNSA/Nevada Site Office (NSO) in a process that is consistent with the LDRD oversight process. The Site Office reviews the program and process to ensure that it adheres to NNSA policy and guidance, is consistent with DP mission needs, and recommends approval of the SDRD program plan for the upcoming year to the DP Program Manager.

As part of the appraisal of overall contractor performance, NNSA/NSO will conduct an annual evaluation of SDRD activities at NTS. This evaluation looks at the quality of the technical work, strategic alignment, and relevance to the NNSA missions. This annual evaluation relies heavily on the NTS self-assessment process. The result of this evaluation is additional input for DP in the assessment of the value and level of funding for the SDRD activities.

Technical program reviews to ensure that the SDRD program and individual projects are in support of the NNSA/NSO mission will be conducted in conjunction with LDRD working group meetings. Due to the similarities between the SDRD program and the Plant Directed Research Development and Demonstration (PDRD) program, SDRD Managers will also participate, when feasible, in PDRD working group meetings. The NTS SDRD Program Manager will schedule all Principal Investigators to present their work at least once during the life of their project.

Nevada Test Site will submit to NNSA/NSO and DP, a proposed SDRD program plan for the upcoming fiscal year. Both the Site Office and the DP Program Manager will review and analyze the plan, taking into account NNSA policy, alignment with guidance, mission relevance, strategic planning, operational needs, and general program performance. In coordination with the DP Program Manager, the Site Office resolves any outstanding issues with the proposed plan and provides a recommendation to the Cognizant Secretarial Officer or designee on the plan and

the program funding level. Prior to the beginning of a new fiscal year, the Cognizant Secretarial Officer or designee assesses the information submitted by the sites and issues a memorandum approving the SDRD program plan and the maximum percent of the site's operating budget that may be used to fund the program.

NNSA/NSO concurrence is required prior to initiating work on an SDRD project.

Fiscal Year 2005 SDRD Program Expenditures

The following table shows FY 2005 SDRD program expenditures. It should be noted that the table includes all SDRD costs including individual project costs and any administrative costs not specifically assigned to individual FY 2005 projects.

Site	NNSA Funding ($M)	SDRD Costs ($M)	SDRD Fraction*
Nevada Test Site	286.4	5.4	1.90%

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* Numbers may not compute due to rounding.