

State of Idaho

INEL Oversight
Program

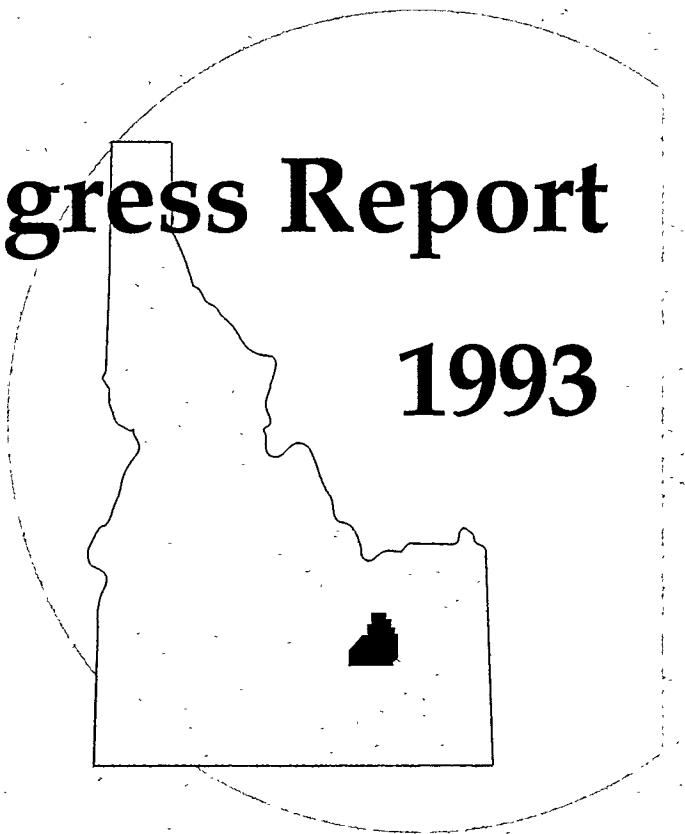
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Progress Report

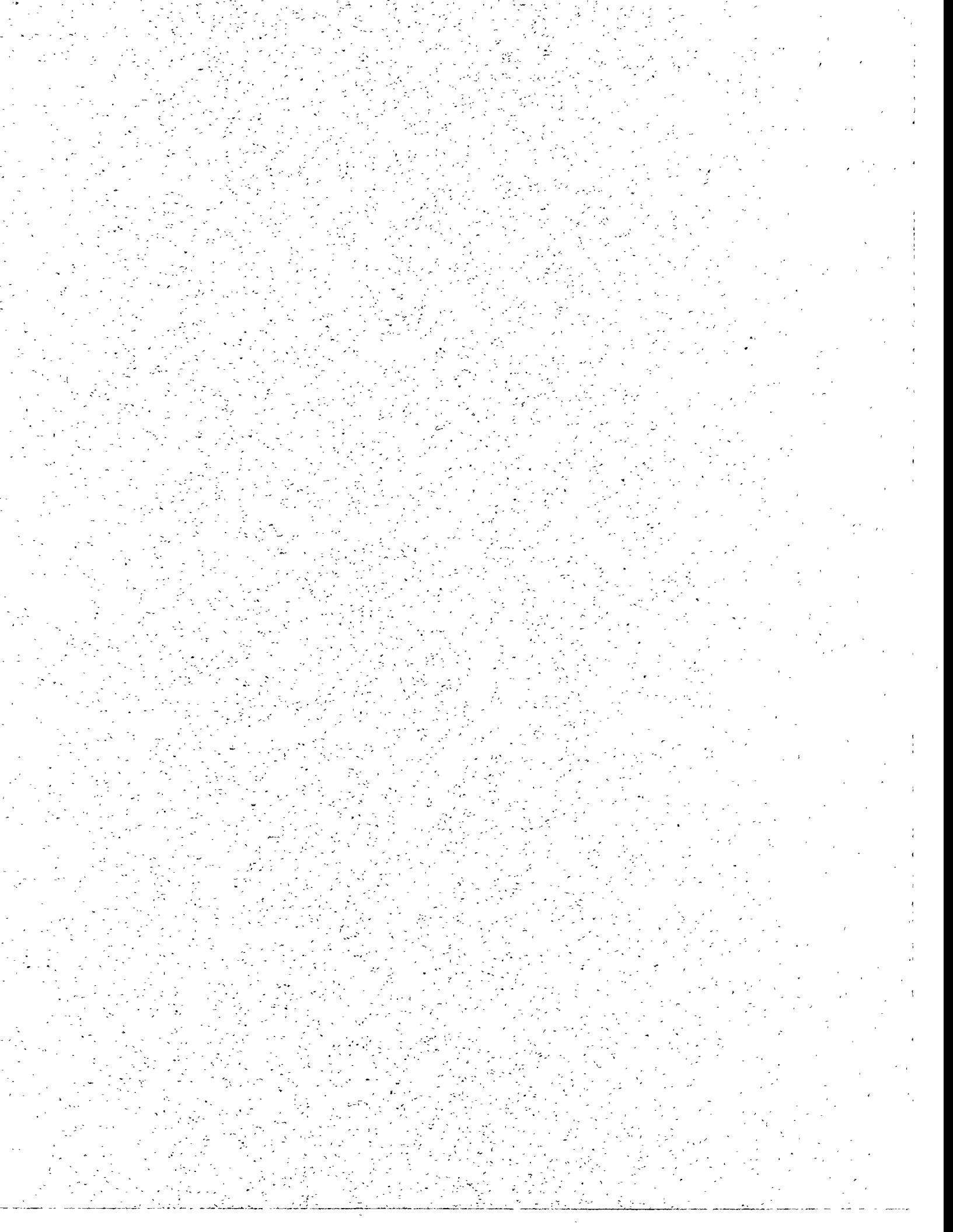
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INEL Oversight Program

Progress Report

1993



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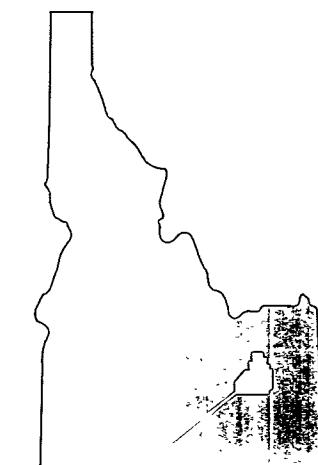
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GOVERNOR'S MESSAGE

Today, more than ever, operations of the Idaho National Engineering Laboratory are under careful scrutiny so we can ensure that the public health and environment of Idaho are protected. The INEL is critical to the nation's nuclear research and development program, and the surest way for the laboratory to retain its preeminence is to make certain that operations fully comply with state and federal environmental laws.

We will continue to demand accountability and responsibility from the U.S. Department of Energy and its contractors to ensure environmental protection and public health.

In 1993, I ordered reorganization of the State's INEL Oversight Program to better reflect the priorities all Idahoans share. The INEL Oversight Program now coordinates all state efforts to track, analyze and influence, when appropriate, all critical issues that affect Idaho and the INEL. Communicating these issues to the public is an integral part of that job. Priorities for state efforts at the INEL are:

1. environmental accountability and regulation;
2. environmental cleanup and restoration;
3. management, treatment and disposal of waste material already located on the site;
4. independent environmental surveillance and facility review;

5. public health and safety; and
6. commerce and employment to ensure economic health of the region.

State staff from all involved agencies now are meeting regularly to carry out these critical priorities. We are committed to improved interagency communication as well as an ongoing dialogue with the public, the Legislature and other key decision-makers, and to increased public involvement on INEL issues. Summaries of the State's efforts to address these key issues are contained in this report.

The mission remains clear — to provide unbiased information and independent analysis of INEL data and related issues to the people of Idaho. Only through continued vigilance on public health and environmental concerns can we preserve the INEL's critical research role and economic contribution to the State.

Sincerely,



Cecil D. Andrus
Governor



Cecil D. Andrus

EXECUTIVE SUMMARY

→ **Maximum Contaminant Level:** The maximum permissible concentration of a contaminant in environmental media according to regulation. For example, the U.S. Environmental Protection Agency has set the maximum contaminant level for tritium in drinking water at 20,000 picocuries per liter.

Idaho's successful lawsuit over shipments of spent nuclear fuel is a major milestone for 1993. The challenge forced the U.S. Department of Energy to cease all shipments of spent nuclear fuel to the Idaho National Engineering Laboratory until a site-wide environmental impact statement is completed. This agreement is a significant victory in Idaho's battle to hold the federal government responsible for its actions and force compliance with applicable laws.

Much of the State's INEL-related activity in 1993 focused on ensuring that INEL operations are conducted in a manner that protects public health and the environment.

Highlights were:

- Monitored initial transfer of spent nuclear fuel from the aging Building 603 to a newer, safer storage facility at Building 666.
- Moved ahead on cleanup of the INEL by meeting all enforceable deadlines under the *Federal Facilities Agreement/Consent Order*.
- Signed the *Record of Decision* for cleanup of Pit 9 at the Radioactive Waste Management Complex. Proof-of-process testing began to demonstrate feasibility of selected cleanup technologies.
- Consolidated Oversight Program environmental surveillance into a single, comprehensive unit.
- Analyzed data from samples of contaminated deep perched-water zone at the High-level Liquid-waste Tank Farm. Further investigation of the perched zone is being conducted under overall INEL cleanup program.
- Data from groundwater sampling near the Test Reactor Area showed declining levels of tritium and chromium contamination.
- Data from groundwater sampling near the southern boundary of the INEL showed no contamination exceeding maximum contaminant levels.
- Continued hydrologic studies to learn more about water and contaminant flow in the Snake River Plain aquifer.
- Found no contamination related to INEL activities in the Magic Valley through an ongoing groundwater quality sampling program.
- Concluded the water inventory study at the Idaho Chemical Processing Plant initiated by the Oversight Program. Initial results indicated no major leaks from the Chemical Processing Plant water-distribution system.
- Recommended DOE discontinue use of the Subsurface Disposal Area at the Radioactive Waste Management Complex.
- Continued involvement in data retrieval phase of the INEL Dose Reconstruction Study.

- Signed a memorandum of understanding with the DOE providing for federal assistance, if needed, in the event of a radiological incident in Idaho outside the INEL boundaries.
- Updated the *Idaho Hazardous Materials Incident Command and Response Support Plan* to incorporate a radiological incident response component. The new plan identifies the INEL Oversight Program as the State's provider of radiological incident assistance.

Communication among the Oversight Program, other State officials and agencies, and the public was emphasized in 1993. State personnel met regularly to maintain and communicate consistent policies, goals and actions involving the INEL. Increased opportunities for dialogue were presented to the public. The Oversight Program continued to gather and distribute the information necessary to ensure public health and the environment are protected.



Assistant Professor Gary Johnson, University of Idaho hydrologist under contract to the Oversight Program, examines water-level data via computer link from the straddle-packer apparatus. The state-of-the-art equipment has been used the past two summers in wells near the Idaho Chemical Processing Plant to examine characteristics of the Snake River Plain aquifer. The study provides information on how aquifer properties and groundwater chemistry vary with depth, and will provide valuable insights into potential contaminant migration in the aquifer.

ENVIRONMENTAL ACCOUNTABILITY AND REGULATION

In its June 28 opinion, the U.S. District Court:

- Ordered DOE to analyze all transportation, receipt, processing and storage of spent nuclear fuel at the INEL, including cumulative impacts to public health and the environment.
- Ordered DOE to study, develop and describe all appropriate options to these activities, including alternatives of "no action" and storing the spent fuel at sites other than the INEL.
- Barred DOE from any further transportation, receipt, processing and storage of spent nuclear fuel at the INEL until the environmental impact statement is completed, reviewed, and any challenges to the statement are resolved.

For several years, the State has asserted that no one had a clear understanding of the environmental issues presented by spent-fuel-related activities and overall operations at the INEL. Through recent litigation, the State successfully has forced the U.S. Department of Energy to conduct a site-specific, comprehensive study of such environmental impacts at the INEL. The environmental impact statements being prepared by the U.S. Department of Energy for the proposed Nuclear Weapons Complex Reconfiguration and the national Environmental Restoration and Waste Management programs also will help define proposed future actions and their related environmental impacts at the INEL.

UNITED STATES OF AMERICA V. ANDRUS

For the first time, the U.S. Department of Energy has been forced to cease critical high-risk activities at the INEL until certain legal requirements are satisfied to determine the full impact of ongoing and proposed actions.

Idaho has demanded for years that the DOE comply with the National Environmental Policy Act and conduct a comprehensive, site-wide analysis of the INEL's environmental impacts. On June 28 U.S. District Judge Harold Ryan ordered DOE to halt all shipments of spent nuclear fuel to the INEL, including Naval fuel. The ban would be in effect until a comprehensive environmental impact statement for the INEL is prepared, as required by the National Environmental Policy Act.

The State had been seeking this action in court since early 1991, arguing that spent-fuel storage conditions at the INEL are unsafe. The court agreed, stating that the risks of serious environmental contamination and loss of life may increase as additional spent fuel is brought to INEL under these conditions.

The court also ordered the DOE to study options to storing spent fuel at the INEL and to study any impacts associated with transportation, receipt and storage of those fuels.

Following the ruling, the DOE and the Navy entered into negotiations with the State. The Navy had been seeking a congressional exemption from the National Environmental Policy Act for the shipments.

After weeks of intense negotiations, an agreement was hammered out improving safety conditions at the INEL. This agreement accelerated processing of nuclear waste and ensured the required environmental impact statement is completed in a timely manner. At the same time, the agreement authorized limited, selected shipments of spent Navy fuel to the INEL over two years. DOE and the Navy must certify the shipments are required to support research and development activities.

Governor Cecil Andrus, Energy Secretary Hazel O'Leary, and Navy Secretary John Dalton signed the agreement on Aug. 9.

In the agreement:

- DOE agreed to move all spent fuel from storage at the 42-year-old Building 603 to the newer Building 666 by 2000. Actual fuel transfer from the north and middle basins of Building 603 to Building 666 began in November.
- DOE agreed to accelerate activities to treat and process high-level radioactive waste, both in liquid and calcine-powder form. DOE must calcine all high-level liquid radioactive waste that does not contain sodium by January 1, 1998. DOE must calcine or otherwise process as much sodium-bearing liquid waste as DOE and the State agree is feasible by January 1, 1998. On Nov. 15, as required in the agreement, DOE identified three potential treatment methods that will be evaluated for feasibility to calcine sodium liquid waste. They are: 1) freeze crystallization, 2) radionuclide partitioning, and 3) precipitation.
- The Navy agreed to participate fully in preparation of the site-wide environmental impact statement.
- The State agreed to allow 19 containers of spent Navy fuel to be shipped to the INEL over the next two years. For nine of those containers, the Navy must certify that prompt examination of the fuel is required to support research and development activities.
- DOE agreed to work with the State and the Eastern Idaho Economic

Development Council to encourage regional economic development. DOE will provide financial support through a grant to the state to support technology transfer, worker retraining, local business development, and other economic activities.

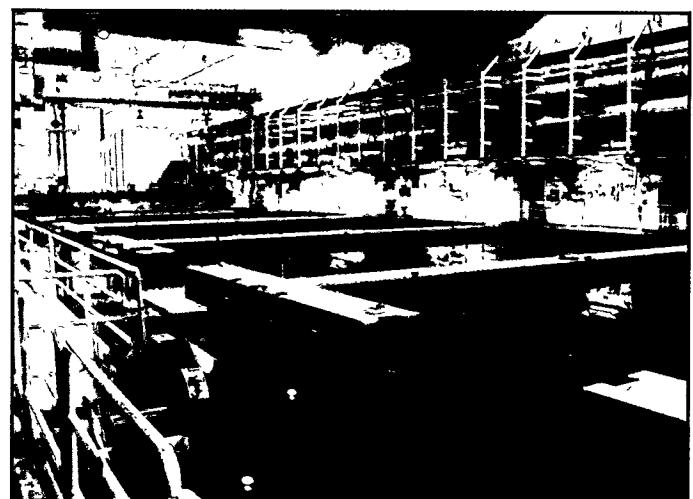
Judge Ryan approved the agreement on Dec. 22.

Spent nuclear fuel from aging storage pools at Building 603 was being transferred to the newer Building 666 by the end of 1993. When completed, this will greatly reduce safety concerns at the Idaho Chemical Processing Plant spent-fuel storage facilities.

ENVIRONMENTAL IMPACT STATEMENTS

In response to the district court's order in *United States of America v. Andrus* and the stipulation, DOE revised the scope of the INEL comprehensive site-wide environmental impact statement. On Sept. 3, DOE announced its intent to expand the scope of the document to include a DOE complex-wide review of the alternatives for managing spent nuclear fuel, including Naval spent fuel.

At the same time DOE is conducting a site-wide environmental impact study



By the end of 1993, 18 spent-fuel units were transferred from storage pools in Building 603 to the more modern Building 666, shown here. Evidence of extensive corrosion of fuel containers in Building 603 storage pools was revealed in 1993.

These charts summarize the purpose of each environmental impact statement, describe DOE's changing approaches to spent-fuel management decision-making in the environmental impact statement process, and list the key milestones.

at the INEL, it also is conducting two nationwide environmental impact studies required under the National

Environmental Policy Act. These programmatic studies look at issues at all DOE facilities across the country.

Major Documents Required under the National Environmental Policy Act

<i>INEL Comprehensive Site-wide Environmental Impact Statement</i>	Purpose: DOE will identify and assess the potential environmental consequences of activities at the INEL involving environmental cleanup and waste management, including spent nuclear fuel transportation, storage and processing.
<i>Environmental Restoration and Waste Management Programmatic EIS</i>	Purpose: DOE will study the impacts of various approaches to developing an integrated environmental restoration and waste management program at various DOE sites, including the INEL. Strategies will be developed for: land use, new technology applications, selection of cleanup levels under the Comprehensive Environmental Response, Compensation, and Liability Act, and configuration of waste-management facilities.
<i>Weapons Complex Reconfiguration Programmatic EIS</i>	Purpose: DOE will re-evaluate: 1) the appropriate size of future weapons complex facilities; 2) the capabilities and functions required for the complex; 3) the siting alternatives for each weapons function analyzed; and 4) the technology alternatives for new tritium supply capacity.
<i>Foreign Fuels Environmental Impact Statement</i>	Purpose: DOE will identify and evaluate the impacts associated with long-term storage of U.S.-origin foreign research reactor spent nuclear fuel. The EIS will include alternative storage sites identical to those identified in the Programmatic Spent Nuclear Fuel Management volume of the INEL site-wide environmental impact statement.
<i>Foreign Fuels Environmental Assessment</i>	Purpose: DOE studied the impacts associated with storage of limited amounts of U.S.-origin foreign research reactor spent nuclear fuel. DOE proposed receiving limited quantities from reactors demonstrating the urgent relief of existing storage capacity was necessary. The document was submitted for public comment and a final decision was pending at the end of 1993.

MILESTONE	INEL CLEANUP/WASTE MGMT. EIS (Site Specific)	DOE HQ CLEANUP/WASTE MGMT. PEIS (National)	DOE HQ WEAPONS COMPLEX PEIS (National)
Published Notice of Intent	10/92	10/90	2/91
Revised Notice of Intent	-	-	7/93
Public Scoping Meetings	11/92	12/90-2/91	10/13/93
Public Comments Due	10/4/93	-	10/29/93
Issue Draft Implementation Plan		1/92	
Public Comment on Implementation Plan		1st Quarter 92	
Issue Final Implementation Plan	11/1/93	2nd Quarter 93	
Issue Draft EIS/PEIS	6/30/94	2nd Quarter 94	
Public Hearings & Comments on Draft PEIS		3rd Quarter 94	
Issue Final EIS/PEIS	4/30/94	1st Quarter 95	
Publish Record of Decision	6/1/95	1st Quarter 95	

Changing Approaches to Spent Fuel Management Decision-making

Before June 28 Court Order	Following June 28 Court Order	As Recommended by Idaho
ENVIRONMENTAL RESTORATION AND WASTE MANAGEMENT PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT Low-level Waste Hazardous Waste Mixed Waste Transuranic Waste High-level Waste <i>Spent Nuclear Fuel¹</i>	ENVIRONMENTAL RESTORATION AND WASTE MANAGEMENT PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT Low-level Waste Hazardous Waste Mixed Waste Transuranic Waste High-level Waste	ENVIRONMENTAL RESTORATION AND WASTE MANAGEMENT PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT Low-level Waste Hazardous Waste Mixed Waste Transuranic Waste High-level Waste <i>Spent Nuclear Fuel⁴</i> <i>Foreign Research Reactor Fuel⁴</i>
INEL SITE-SPECIFIC ENVIRONMENTAL IMPACT STATEMENT Environmental Restoration Waste Management	INEL SITE-SPECIFIC ENVIRONMENTAL IMPACT STATEMENT Environmental Restoration Waste Management <i>Spent Nuclear Fuel²</i>	INEL SITE-SPECIFIC ENVIRONMENTAL IMPACT STATEMENT Environmental Restoration Waste Management <i>Specific Spent Fuel Shipments⁵</i>
	FOREIGN FUELS ENVIRONMENTAL IMPACT STATEMENT AND ENVIRONMENTAL ASSESSMENT <i>Foreign Research Reactor Spent Nuclear Fuel³</i>	

¹ Originally, DOE's spent nuclear fuel management alternatives were to be addressed in this programmatic environmental impact statement.

² Following the June 28 court order, DOE transferred the programmatic spent nuclear fuel component to the INEL site-specific environmental impact statement.

³ On October 18, DOE announced that foreign research reactor spent nuclear fuel alternatives would be addressed in a separate environmental impact statement and environmental assessment.

⁴ Idaho recommended to DOE that all spent nuclear fuel options be considered in one programmatic document.

⁵ Proposed actions and alternatives to shipping spent nuclear fuel to INEL must be evaluated in the site-specific environmental impact statement.

ENVIRONMENTAL REGULATION

The Department of Health and Welfare, Division of Environmental Quality regulates INEL activities to ensure compliance with state air quality, water quality and hazardous waste standards. Regulatory control is exercised through four complementary programs:

1. a permit to construct program;
2. an operating permit program;
3. a compliance assurance program; and
4. an enforcement program.

Summary of 1993 activities:

Construction Permits

During 1993, the Department issued or modified permits-to-construct for these five INEL facilities: 1) Test Area North Boiler Replacement, 2) Naval Reactors Facility Dry Cell Project, 3) Hazardous Chemical Radioactive Waste Building, 4) Specific Manufacturing Capability, and 5) Test Reactor Area Evaporation Pond.

As a result of the court ruling halting shipment of spent nuclear fuel to the INEL, the Department suspended the previously-issued permit to construct the Expended Core Facility at the Naval Reactors Facility, where Navy spent fuel is examined. The Department also suspended the U.S. Department of Energy's application for a permit for the Fuel Storage Area Rack

Reconfiguration Project at the Fluorinel and Storage Building, Idaho Chemical Processing Plant.

The Department issued two draft permits for wastewater land-application for operation of the percolation ponds and trenches at the Idaho Chemical Processing Plant. Final State action on the permit is anticipated by early 1994, after review by DOE.

In August, the INEL also submitted to the Department an application for a wastewater land application permit for the Central Facilities Area.

Operating Permits

The Division of Environmental Quality is in the third year of a multi-year plan to conduct a comprehensive air-pollution emission inventory at the INEL in preparation for issuing a site-wide operating permit. Federal law mandates that the operating permit be issued no later than Nov. 15, 1998. In the interim, the INEL is required to comply with all regulations, even those not formally set forth in a permit.

Hazardous-waste permits are designed to strictly control the storage, treatment, incineration and disposal of hazardous and mixed wastes. There are no operating hazardous-waste disposal facilities at the INEL. The Department's strategy for permitting the over 100 treatment and storage units at the INEL is to separate them into more manageable, partial-permit phases.

The Department reviewed hazardous-waste permit applications in 1993 for the following facilities:

- Radioactive Sodium Storage Facility, Radioactive Scrap and Waste Facility, and Hazardous Waste Storage Facility;
- Hazardous Chemical Waste Handling and Neutralization Facility;
- Waste Experimental Reduction Facility;
- Liquid Effluent Treatment and Disposal Facility, Fluorinel and Fuel Storage Facility, New Waste Calcining Facility Evaporator Tank System, and New Waste Calcining High Efficiency Particulate Air Filter Leaching System;
- Radioactive Waste Management Complex, Waste Isolation Pilot Plant Waste Characterization Cell; and
- Reactives Storage and Treatment Area, and Intermediate Level Transuranic Storage Facility.

Compliance Assurance

Compliance inspections of the following facilities were conducted:

- Idaho Chemical Processing Plant (main stack);
- Fluorinel Dissolution and Fuel Storage Facility (stack);
- Hazardous Waste Storage Facility;
- Waste Experimental Reduction Facility;
- Test Area North (paint booth);
- Argonne National Laboratory — West (paint booth); and
- 32 boilers (sources of sulfur dioxide and nitrogen oxides).



An air quality compliance inspection of the Idaho Chemical Processing Plant main stack was conducted by the State in 1993.

Enforcement

In February 1993, the Department issued a notice of violation to the U.S. Department of Energy concerning hazardous-waste violations observed during a May 1992 site-wide compliance evaluation inspection. Inspectors found primarily procedural violations, including outdated emergency procedures, inaccessible closure plans, and improper record-keeping. The Department anticipated completing review and issuing a final consent order to resolve these and other violations early in 1994.

The 1993 hazardous-waste compliance evaluation inspection at the INEL was conducted in September. The inspection report was being compiled by Department staff in

1993 and results were expected to be available early in 1994.

The consent order signed by the DOE in October 1992 for water-quality violations was amended for a second time in November 1993. The latest amendment adjusted deadlines for reviewing wastewater land-application permits for sewage trenches and percolation ponds at the Idaho Chemical Processing Plant. DOE will have 30 days for review once the draft permits are issued.

Under another consent order, The Department collected a \$10,000 fine from the INEL in 1992 for violations of its air quality permit-to-construct at the Idaho Chemical Processing Plant's Hazardous Chemical/Radioactive Waste Facility. The DOE had satisfied all conditions of the consent order through 1993.

ENVIRONMENTAL CLEANUP AND RESTORATION

During 1993, much progress was made toward cleanup of the INEL under the *Federal Facilities Agreement/Consent Order*. All enforceable milestones in the agreement were met. The agreement, signed by Governor Cecil Andrus; the U.S. Environmental Protection Agency, and the U.S. Department of Energy, was in its second year of implementation.

Major cleanup projects under way were:

TEST AREA NORTH

Injection Well Groundwater Contamination — Site preparation completed and construction of the groundwater pumping and treatment facility begun. Two wells were installed to monitor effectiveness of the cleanup and possibly to be used as extraction wells. Actual pumping and treatment of groundwater is set to begin in February 1994.

Groundwater Contamination — Investigation confirmed that groundwater was contaminated with organic and radioactive compounds in excess of maximum contaminant levels. Remedial investigation/feasibility study for final action was being reviewed at the end of 1993. Proposed cleanup plan was scheduled to be presented to the public early in 1994.

TEST REACTOR AREA

Warm Waste Pond — Contaminated pond sediments from the larger cell of the pond were consolidated to the

two smaller cells, and a soil cover was placed over the contaminated sediments in accordance with the *Record of Decision* signed in November 1991. The cleanup action was expected to be completed in early 1994.

Perched-water System — The *Record of Decision* signed in December 1992 determined the contaminated perched water at the Test Reactor Area presents no unacceptable risk to public health. However, monitoring will continue to ensure protection of human health and the environment.

IDAHO CHEMICAL PROCESSING PLANT

Vadose Zone — A subsurface investigation of the perched-water zone at the Idaho Chemical Processing Plant was developed and initiated.

Other — Three cleanup actions to prevent or mitigate potential release to the environment were completed. Investigations were completed at the former sewage treatment plant and tank farm area.

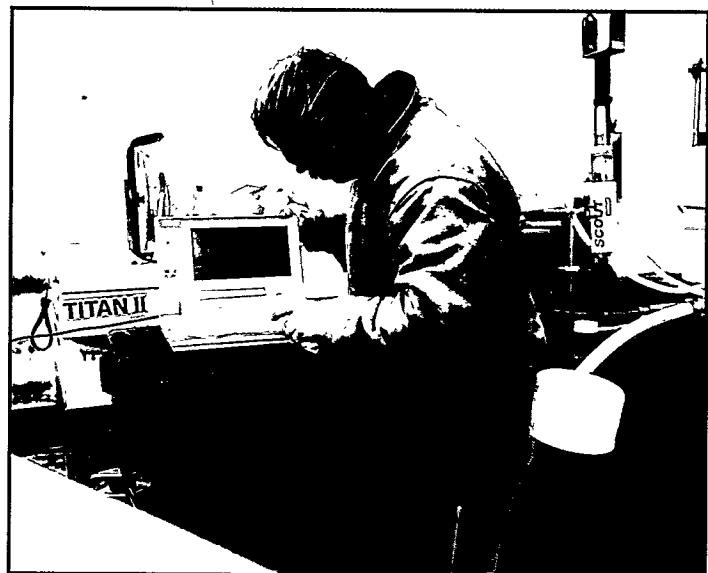
CENTRAL FACILITIES AREA

Landfills — An investigation and supporting field studies began in the spring of 1993.

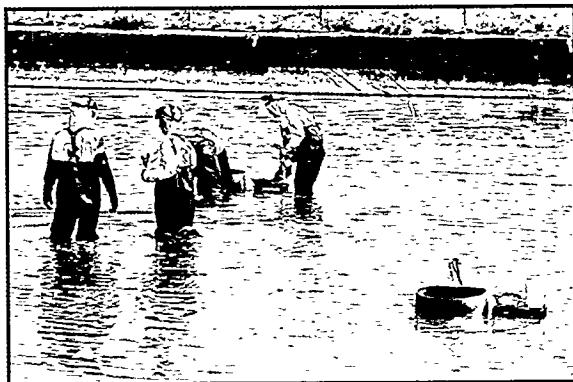
→ **Remedial Investigation:**
The process of characterizing the nature and extent of contamination.

→ **Feasibility Study:**
The evaluation of potential cleanup options.

Sampling of the groundwater at Test Area North was conducted as part of the investigation to determine the size of a contaminant plume and contaminant concentrations in the Snake River Plain aquifer. Here a technician examines computerized results of the sampling. (INEL photo)



AUXILIARY REACTOR AREA/POWER BURST FACILITY



Sampling crews collect pond sediments before removing "hot spots" during a cleanup action to reduce the potential of exposure to chromium and low-level radionuclides at the Power Burst Facility pond. (INEL photo)

Corrosive Waste Sump and Evaporation Pond — The design phase for cleanup of contaminated sediments was nearing completion.

Stationary Low-power Reactor-1 Burial Ground — An investigation was initiated and scheduled for completion in 1994.

RADIOACTIVE WASTE MANAGEMENT COMPLEX

Pit 9 — The *Record of Decision* was signed in October. Selected cleanup treatment for wastes in Pit 9 was a physical separation/chemical extraction/stabilization process. Proof-of-process testing by two contractors was completed late in 1993 and was scheduled to be evaluated by the agencies early in 1994. Technology developed for Pit 9 cleanup will have valuable application for other INEL projects and other U.S. Department of Energy sites.

Pad A — The public comment period was completed in August. The preferred alternative was contouring and slope correction and maintenance and monitoring of existing cover. Following the *Record of Decision*, set for completion in early 1994, monitoring was scheduled to be performed to provide early detection of potential releases to the environment.

Vadose Zone — Vapor vacuum extraction tests were completed in support of the remedial investigation/feasibility study for organic contamination of the vadose zone.

NAVAL REACTORS FACILITY

Exterior Industrial Waste Ditch — A draft remedial investigation report was reviewed in 1993. Agencies agreed to evaluate the risk associated with known areas of high concentration of contamination to help provide basis for cleanup decisions.

ARGONNE NATIONAL LABORATORY — WEST

Experimental Breeder Reactor-2 Leach Pit — An action to remove radioactively contaminated sludge from the leach pit using a remote vacuum truck was completed.

MISCELLANEOUS SITES

Unexploded Ordnance — Ordnance searches, soil sampling and soil remediation near completion. TNT fragments, boosters and an anti-tank mine found were demolished in the detonation area in August.

Radioactively-contaminated Soils — Phase I sampling of wind-blown soils was completed in August for site-wide facilities. This information will lead to the completion of a focused draft report on the remedial investigation and risk assessment.

WASTE MANAGEMENT TREATMENT AND DISPOSAL

There are several national nuclear waste-management issues that affect Idaho and the INEL. The INEL Oversight Program tracks these developments to assess their potential effects on Idaho's citizens and environment.

CIVILIAN NUCLEAR WASTE DISPOSAL STRATEGY

Yucca Mountain

The INEL stores significant quantities of spent nuclear fuel from commercial and research sources. Such storage was designed to be temporary until a permanent waste repository could be opened.

The current federal strategy for disposing civilian spent nuclear fuel is to achieve rapid, full-scale disposal in an underground geologic repository. The only site under consideration for the repository is at Yucca Mountain at DOE's Nevada Test Site. U.S. Department of Energy's Office of Civilian Radioactive Waste Management is charged with developing and implementing the strategy.

Rising costs, missed deadlines and continued public opposition to the current strategy prompted DOE to form a task force on an alternative program strategy for disposing civilian spent fuel. The task force's alternative strategy was released this year. It still focuses on Yucca Mountain as the disposal site, but seeks to overcome the problem of balancing a huge investment risk with the seemingly irreversible momentum to open Yucca Mountain.

The task force recommended DOE change the goal from rapid, full-scale disposal to early development and licensed demonstration of the capability for full-scale disposal. The alternative strategy assumed no urgent need for rapid, full-scale disposal. It based this on a Nuclear Regulatory Commission finding that nuclear wastes can be stored safely in temporary configurations for up to 100 years. DOE had not responded to the Task Force recommendations.

The same cost and schedule problems that prompted DOE to propose an alternative strategy raised concerns by the Western Governors' Association. In June, the Association passed a resolution recommending a thorough, independent review of DOE's high-level radioactive waste program under the Nuclear Waste Policy Act. The Association recommended the review "be comprehensive and involve exploration of a comprehensive range of alternatives to the current effort and examination of lessons to be learned from programs in other countries where nuclear waste management efforts are progressing."

Meanwhile, DOE was ready to begin full-scale tunneling at Yucca Mountain to perform underground tests of the site.

INTERIM NUCLEAR WASTE STORAGE

Monitored Retrievable Storage

With a permanent repository far from opening, U.S. Department of Energy is faced with what to do with nuclear

Rising costs, missed deadlines and continued public opposition to the current strategy prompted DOE to form a task force on an alternative program strategy for disposing civilian spent fuel.

❖

More than 128,600 barrels of transuranic waste — about 60 percent of the nation's transuranic waste — is stored at the INEL.

❖

Much of the transuranic waste located at the INEL is stored in air support buildings such as this one at the Radioactive Waste Management Complex.

waste in the interim. DOE in the past has proposed using federal facilities for interim storage of civilian spent fuel. Idaho continues to object to such use for the INEL, based on its lack of spent fuel storage capacity, the fact that other options are available, and that such use is inconsistent with the INEL mission.

DOE's Office of the Nuclear Waste Negotiator has been conducting a nationwide search for a voluntary host site for a Monitored Retrievable Storage facility. This would serve as "temporary" storage until a permanent site could be opened. Idaho opposes such a facility in the state because it cannot be temporary unless real progress is being made on a permanent site.

The State urged DOE to refocus its interim storage efforts on at-the-reactor dry storage in commenting on the Office of Civilian Radioactive Waste Management report on adequacy of

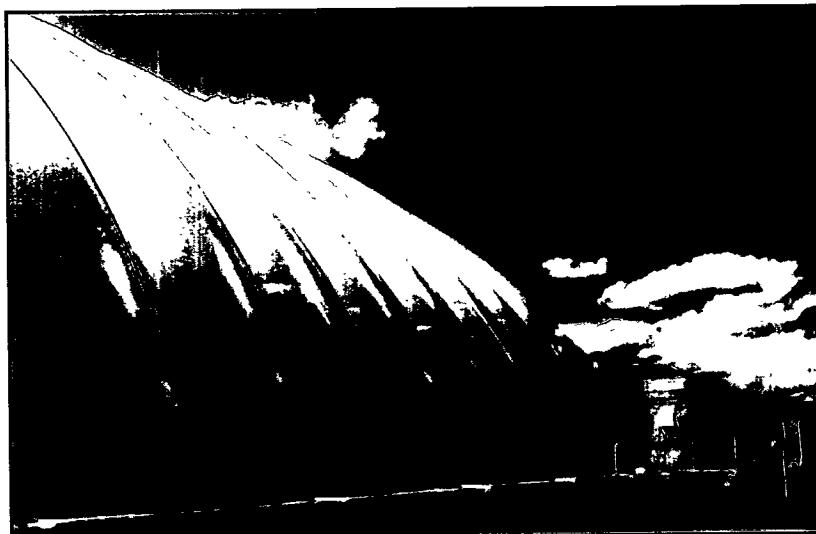
DOE's plan to manage spent nuclear fuel and high-level waste. Idaho also recommended deletion of federal facility interim storage from the report as a management option, a view shared by the Western Governors' Association.

TRANSURANIC NUCLEAR WASTE DISPOSAL

Waste Isolation Pilot Plant

Test-phase plans for the Waste Isolation Pilot Plant, an experimental disposal facility in New Mexico for federally generated transuranic waste, were changed in October.

Originally, the U.S. Department of Energy planned to conduct underground tests at the plant using actual waste from the INEL. In response to concerns raised by the scientific community, DOE announced that these tests will be conducted in DOE laboratories, such as Los Alamos, N.M., or the INEL, rather than at the plant. Tests



must be completed before the Waste Isolation Pilot Plant can begin accepting waste from the INEL and other sites for permanent disposal.

Governor Andrus has pressed DOE to conduct transuranic waste tests at the INEL. He also urged DOE to use actual waste from the INEL in the testing, whether it is conducted in New Mexico or the INEL. In addition, he asked DOE to consider moving the Waste Isolation Pilot Program office from Washington, D.C., to eastern Idaho if testing occurs at the INEL. If tests demonstrate the plant can meet federal standards, DOE could begin shipping waste to New Mexico in 1998.

The Oversight Program monitored the INEL's program to characterize waste destined for the Waste Isolation Pilot Plant. Staff tracked the development of gas generation tests, storage bin tests and alcove storage tests.

NUCLEAR WASTE TECHNOLOGY

Four mixed-waste technology development projects at the INEL were identified in 1993 as potential pilot projects to demonstrate innovative cleanup technologies. The potential demonstration projects were selected by a working group representing the Western Governors' Association's Federal Advisory Committee to Demonstrate On-site Technologies.

Idaho is represented on the mixed-waste working group of the committee. The working group focuses on waste that includes radioactive and

hazardous materials. The group separated proposed technologies into three categories: characterization, treatment and disposal.

From over 80 proposals, the working group recommended nine projects for consideration by the Committee. Four of those are planned to be demonstrated at the INEL in 1994: the radioactive and hazardous materials measurement systems, the rapid transuranic monitoring lab, the dig face characterization, and the fixed plasma hearth. The first three are mixed-waste characterization projects, and the fourth is a mixed-waste treatment technology.

In 1992, the Western Governors' Association waste task force, co-chaired by Governor Andrus, agreed to establish demonstration projects at several federal facilities in western states to test innovative waste-cleanup technologies. The goal was to help get the facilities cleaned up faster while developing technologies that could be applied elsewhere.

The Association's on-site technology committee was chartered to:

1. identify and prioritize technology needs at federal facilities in western states;
2. identify and assess emerging waste management and cleanup technologies for possible demonstration projects;
3. assess the effectiveness of the technology selection process; and

The ultimate goal is to help get the facilities cleaned up faster while developing technologies that can be applied elsewhere and even sold abroad.

Idaho has assumed a leadership role among the states on mixed-waste issues

4. recommend technology demonstrations at selected host sites that address the highest priority cleanup needs.

Members of the Committee are the secretaries of Defense, Interior and Energy, the administrator of Environmental Protection Agency, and the governors of Idaho, Nevada, Arizona and California.

MIXED-WASTE TREATMENT

The year saw completion of the first step to resolving the long-standing problem of how to treat wastes contaminated with both radioactivity and hazardous waste (mixed waste). The U.S. Department of Energy has prepared conceptual plans for treatment of mixed waste at 48 sites in 22 states, including the INEL, where such wastes are produced or stored. Treatment facilities for mixed waste are needed to comply with land-disposal restrictions of the Resource Conservation and Recovery Act.

The next step is to prepare site treatment plans. DOE is preparing these in response to the recently enacted Federal Facility Compliance Act, which makes federal facilities subject to fines and penalties for violating the Resource Conservation and Recovery Act.

The treatment strategies may include developing new technologies, building facilities to treat the waste, or shipping waste to other facilities when it cannot be handled on-site for

technical, economic or other reasons. The Site Treatment Plans may consider centralized, regional, on-site treatment, or any combination.

The National Governors' Association is coordinating discussions about Site Treatment Plans among the states, DOE, Environmental Protection Agency and tribal representatives.

Idaho has assumed a leadership role among the states on mixed-waste issues through interaction with the DOE and other states where DOE projects are located. The land-disposal restriction section of the Department of Health and Welfare's Division of Environmental Quality has two members serving on the National Governors' Association's mixed-waste technical group.

The land-disposal restriction section develops and implements activities related to the Federal Facilities Compliance Act. Its duties include review and analysis of INEL radioactive land-disposal-restricted waste stream inventories, treatment and storage facilities, plans and proposals. The section closely monitors land-disposal-restricted mixed-waste issues, facility operation and technology development at the INEL.

As required by the Federal Facility Compliance Act, DOE also published the *National Inventory of DOE Mixed Wastes and Treatment Technologies and Capacities* in April. The report provides information on more than 1,600 mixed-waste streams.

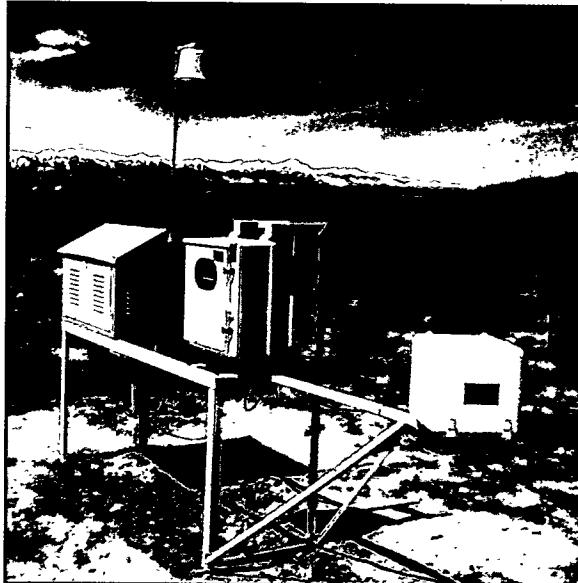
ENVIRONMENTAL SURVEILLANCE AND MONITORING

In 1993, the Oversight Program consolidated its environmental surveillance efforts for the INEL into a single, comprehensive program. Data from air, water and terrestrial sampling on-site and in the INEL vicinity are analyzed and interpreted. The analytical results are reported to other monitoring agencies, to State decision-makers and to the public. Results are presented quarterly and summarized annually.

The Oversight Program's integrated system does not monitor all possible contaminants at all possible locations. Instead, the resulting system samples for contaminants related to INEL operations in the highest priority locations. The system was designed to provide independent data, complement monitoring performed by others, satisfy risk-assessment processes and offer improved emergency response information.

AIR MONITORING

In July, the Oversight Program air-monitoring network of five permanent monitoring stations became fully operational. The independent system was designed to detect the presence of high-priority radioactive airborne contaminants migrating beyond the INEL boundaries. The five strategically selected perimeter locations are at Atomic City, Mud Lake, Montevieu, Howe and the Highway 26 Lost River Rest Area. In November, a background station was put on line in Idaho Falls to provide a comparison with the perimeter stations. An addi-



This Oversight Program air monitoring station, located at the State Transportation Department shed in Mud Lake, is one of five such stations located on the perimeter of the INEL. The stations provide rapid access to gamma radiation data via computer modem hookups with the Idaho Falls Field Office.

tional perimeter station operated by solar power will begin in an area west of Big Southern Butte in 1994.

The equipment at each station allows collection of airborne particles, precipitation, tritium in water vapor and radioiodine. Background gamma radiation is measured quarterly through the use of thermoluminescent dosimeters, while high-pressure ionization chambers can record gamma exposures on a minute-by-minute basis.

The gamma data can be transmitted quickly by radio modem to the Oversight Program Idaho Falls Field Office, providing data needed to respond to emergencies. Health physicists at the Idaho Falls Field Office can combine real-time gamma radiation data with weather information from the National Oceanic and

Examination of air monitoring data revealed alpha and beta activity within the range expected from naturally-occurring radioactivity. No radioactive isotopes of iodine or manmade radioactivity were detected.

Atmospheric Administration, and accident source term data provided by U.S. Department of Energy contractors at the INEL. Computer models equipped with the data can project how contaminants will disperse and what radiation dose will result to people in the pathway.

Examination of the data revealed alpha and beta activity within the range expected from naturally-occurring radioactivity. No radioactive isotopes of iodine or man-made radioactivity were detected.

Air Plume Study

Oversight Program staff and Idaho State University students participated in an airborne tracer-gas plume study in October and November. The study was designed and coordinated by the National Oceanic and Atmospheric Administration Air Resources Laboratory Field Research Division in Idaho Falls.

Information from the study was being examined to gain a greater understanding of some of the atmospheric conditions that affect air quality and plume dispersion in southeast Idaho. The data will aid in the evaluation of environmental monitoring location selection and results, including those from the Oversight Program environmental surveillance. The information also will be used to examine the validity of computer models and assumptions used to project contaminant plume dispersion for emergency response.

The study consisted of four field tests. Each test included a several-hour release of an inert gaseous tracer, sulfur hexafluoride, into the atmosphere from the National Oceanic and Atmospheric Administration facility on the INEL. Twelve sequential one-hour air samples were then collected at each of approximately 100 carefully surveyed ground locations.

Doug Walker, Oversight Program health physicist, gathers data from an air sampler during one of the field tests conducted as part of a 1993 air plume study. The study will provide information related to how atmospheric conditions affect air quality and plume dispersion in southeast Idaho.



Oversight personnel provided assistance in the location, placement and servicing of the samplers. Idaho Falls Field Office staff and Idaho State University students utilized National Oceanic and Atmospheric Administration global positioning satellite system receivers to accurately position the samplers. Depending on the wind direction on each test day, samplers were deployed to the north of the INEL in an array extending nearly to the Montana border, or to the south extending as far as American Falls, Minidoka and Richfield.

To enhance the usefulness of the study, the National Oceanic and Atmospheric Administration used an aircraft equipped with a continuous real-time trace-gas analyzer to gather data during each test. The agency also made special measurements of atmospheric winds and turbulence for later analysis of plume behavior.

Results of the plume study were expected to be available in 1994.

IDAHo STATE UNIVERSITY MONITORING VERIFICATION PROGRAM

Idaho State University operates an environmental monitoring program under a 1989 contractual agreement with the U.S. Department of Energy. When DOE or the U.S. Geological Survey are collecting samples at some locations, ISU collectors obtain a portion of the sample (split sample) or a simultaneous sample of air, water, soil or food items.

Samples are analyzed by ISU for gross alpha, gross beta, tritium or gamma activity as appropriate. Analysis for plutonium, americium-241 and iodine-129 is subcontracted by ISU to another laboratory. The results are reported quarterly to DOE, the State of Idaho and other interested audiences.

Air Sampling

Idaho State University air-monitoring stations are located next to the U.S. Department of Energy samplers off-site at Atomic City, Craters of the Moon, and on the INEL at Van Buren Avenue and the Experimental Field Station.

Air-sampling results for alpha and beta activity were within the range expected from naturally-occurring radioactivity. No radioactive isotopes of iodine were detected. Analysis results for gamma activity revealed only the presence of a small quantity of the naturally-occurring beryllium-7.

No plutonium or americium were detected at the two sites selected for analysis, Atomic City and the Field Station. Only background levels of tritium were detected at three sites: Atomic City, Van Buren Avenue and the Field Station.

Air-sampling Field Study

In 1993, Idaho State University concluded a field study for the Oversight Program to examine sampling error and directional effect of air-sampler-head orientation. To study sampling error, four air-sampler heads were

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An ongoing study to determine if contamination from the INEL has migrated to the Magic Valley area has detected no contamination related to activities at the INEL.

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positioned in identical orientation. At least five consecutive weekly samples were collected. The results showed some difference among the samplers, but it was small in comparison to the weekly variation of alpha, beta and beryllium-7 activity.

To determine directional dependency, four sampler heads were oriented to different horizontal directions. Samples were collected for at least five weeks. The data indicated no evidence of directional dependency.

Water Sampling

Water in the Twin Falls area was sampled quarterly at Alpheus Springs, Clear Springs and the Bill Jones Hatchery. In addition, samples were collected from water supplies in the communities of Minidoka and Shoshone. At each site, the water was sampled simultaneously by both Idaho State University and the U.S. Department of Energy sample collectors. These samples were analyzed for alpha, beta, gamma and tritium activity.

During the year, no man-made radioactivity was detected in any of the samples collected. For all samples and analysis, there was no significant difference between the data reported by Idaho State University and the data reported by DOE.

Quarterly or semiannual samples of groundwater were collected from 14 wells on-site or near the INEL. At each well, the water was sampled simultaneously by both Idaho State University and U.S. Geological Survey collectors.

Concentrations of tritium were found in all samples collected from eight of the wells. The contamination in those wells can be attributed to sources at the Test Reactor Area, the Radioactive Waste Management Complex and the Idaho Chemical Processing Plant. The concentrations of tritium found in 1993, when compared to historical values, were decreasing.

No man-made gamma activity or alpha activity was detected in any of the samples collected from the 14 wells. The only positive indication of beta activity was found in the samples collected from well USGS 112 south of the Idaho Chemical Processing Plant.

Milk Sampling

Milk samples were collected once a month from dairies in the Montevieu, Blackfoot and Rupert-Mnidoka areas. Samples were analyzed for tritium, iodine-129 and gamma-emitting radionuclides, including iodine-131. There was no evidence of man-made radionuclides in any of the samples.

OFF-SITE GROUNDWATER SURVEILLANCE

An ongoing study to determine if contamination from the INEL has migrated to the Magic Valley area has detected no contamination related to activities at the INEL. Since 1989, the Idaho Department of Water Resources and the U.S. Geological Survey have been conducting a groundwater quality monitoring study in the Snake River Plain aquifer between the southern boundary of the INEL and

the Thousand Springs area near Hagerman (see map this page).

Approximately one-third of 50 selected wells and five springs are co-sampled each year by the Idaho Department of Water Resources and U.S. Geological Survey. The samples are analyzed by the U.S. Geological Survey's National Water Quality Laboratory.

ON-SITE GROUNDWATER MONITORING

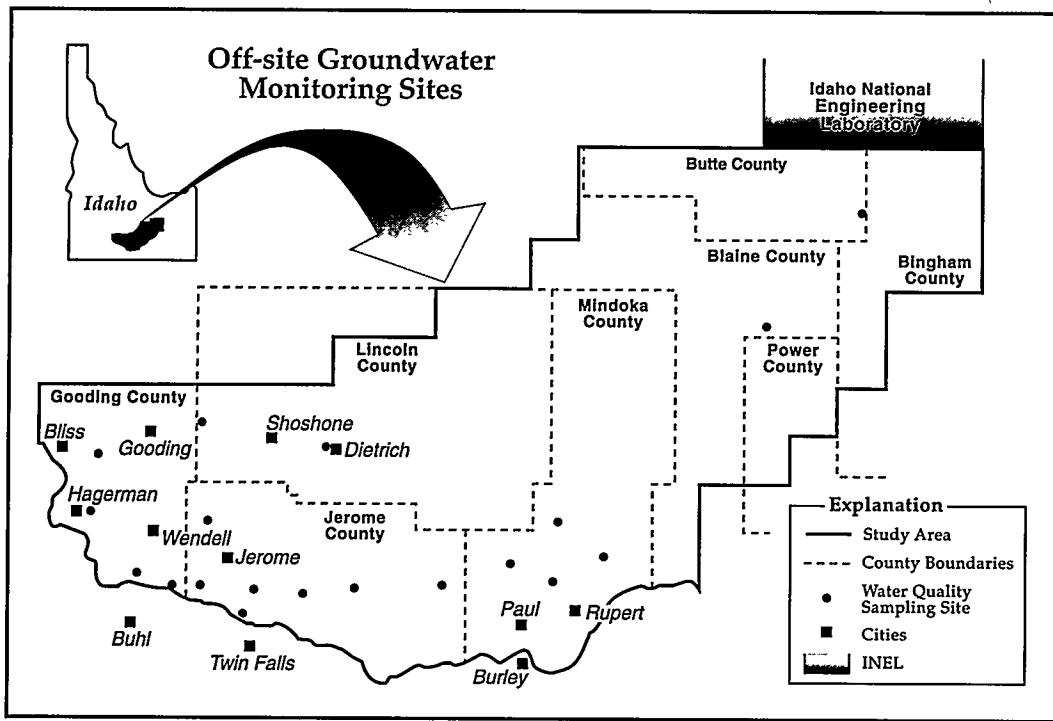
Strontium-90 Plume Idaho Chemical Processing Plant

Results from a 1992 sampling at the Idaho Chemical Processing Plant were released in 1993. Wells USGS 47 and USGS 85 were sampled by the Over-

sight Program to check on the southern extent of the strontium-90 contaminant plume revealed by previous U.S. Geological Survey investigations. The wells were sampled for strontium-90 and gross beta activity only.

Well 47 is an aquifer well inside the Idaho Chemical Processing Plant a few hundred feet south of well 50. Results show both strontium-90 and gross beta levels in well 47 to be above maximum contaminant levels. Well 47, however, is not used as a drinking water source.

Well 85 is an aquifer well approximately 2 miles southeast of well 47. Strontium-90 and gross beta activities were below maximum contaminant levels.

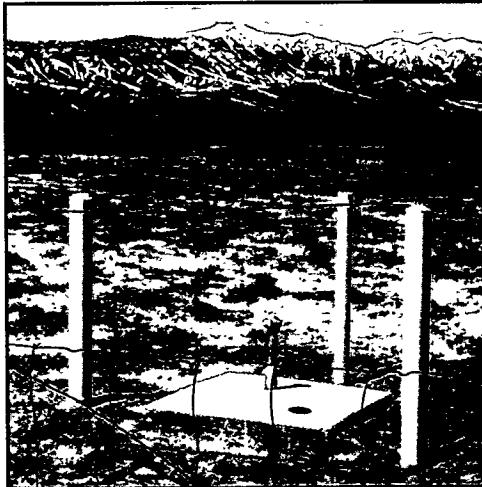


Monitoring wells, such as this one near Test Area North, are used throughout the INEL site to study water quality and check for contamination. Data were made available in 1993 from 1992 Oversight Program water sampling at the Idaho Chemical Processing Plant, Test Reactor Area, and the southern boundary of the INEL.

Deep Perched-water Zone High-level Liquid-waste Tank Farm

Well USGS 50 monitors a deep perched-water body at the Idaho Chemical Processing Plant beneath the tank farm. The water is approximately 370 feet beneath the surface, but perched above the Snake River Plain aquifer. Data from sampling conducted in 1992 by Westinghouse Idaho Nuclear Co., an INEL contractor, was made available in 1993. Mercury, lead, sodium, tritium, strontium-90 and gross beta radiation were detected above maximum contaminant levels. Tritium and strontium-90 levels have been historically elevated in well 50, but have shown a decreasing trend in recent years.

This perched-water body was under study as outlined in the *Federal Facilities Agreement/Consent Order* to determine if future cleanup action will be needed. The State recommended to the DOE contractor that limited monitoring be enhanced to



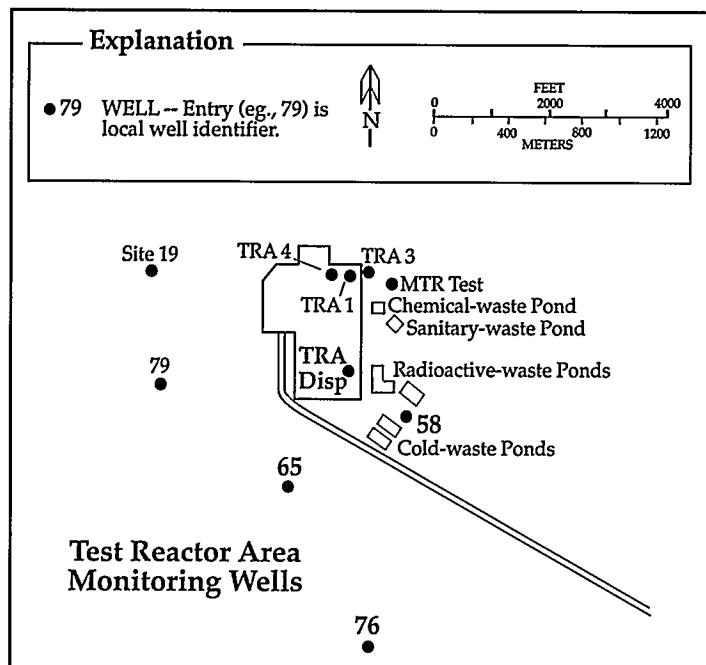
verify human health and the environment are not being harmed.

Test Reactor Area

Results of a 1992 sampling project at the Test Reactor Area were released in 1993. The project investigated the effect of historical waste disposal at the Test Reactor Area on the normal water chemistry of the Snake River Plain aquifer. More than 200 water samples were collected from 26 wells in the vicinity of the Test Reactor Area, including seven aquifer wells, 16 perched-water wells, and four "background" wells.

Analytical results generally were similar to those published by DOE contractors from their background sampling in the area. Tritium was the only radionuclide detected in aquifer samples. Above-background levels were found in four aquifer wells closest to the Test Reactor Area waste water disposal ponds. Samples from well USGS 65, an aquifer well about one-quarter mile south of the ponds, had the highest tritium levels for any aquifer wells. By comparison, the levels were roughly twice Environmental Protection Agency drinking water limits. Concentrations for the other aquifer wells were less than one-fourth Environmental Protection Agency limits.

Chromium was also detected at levels more than three times EPA limits in samples from USGS 65. Well USGS 65 is used only for aquifer monitoring. Production wells for the Central Facilities Area, about three and one-



half miles south of the Test Reactor Area, are the nearest drinking-water wells down-gradient from USGS 65.

Results of the U.S. Department of Energy's environmental surveillance monitoring show that levels for tritium and chromium have been declining for Test Reactor Area wells. Tritium levels have been declining for Central Facilities Area production wells and are currently below maximum contaminant levels.

The distribution of contaminants in perched water and the Snake River Plain aquifer beneath the Test Reactor Area strongly suggest that aquifer water quality is impacted by contaminated perched water. The greatest impact is shown in wells "TRA Disposal" and USGS 58 directly

below the perched water, and wells USGS 65 and USGS 76 down-gradient of the Test Reactor Area. Well USGS 65 shows the greatest impact from this contaminated perched water.

Southern Boundary

Eight aquifer wells along the southern boundary of the INEL were sampled in

1992 to determine if any groundwater contamination is moving off-site. Data available in 1993 showed that all parameters analyzed were below maximum contaminant levels with most being below levels detectable in the laboratory.

HYDROLOGIC STUDIES

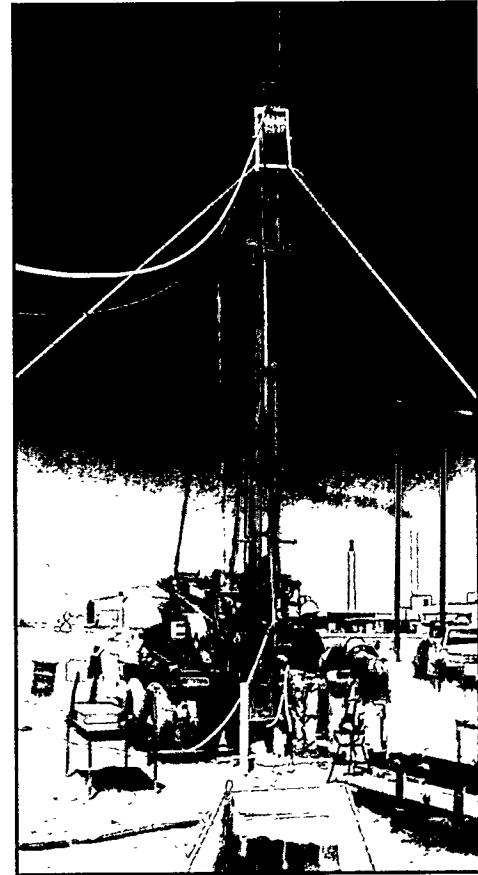
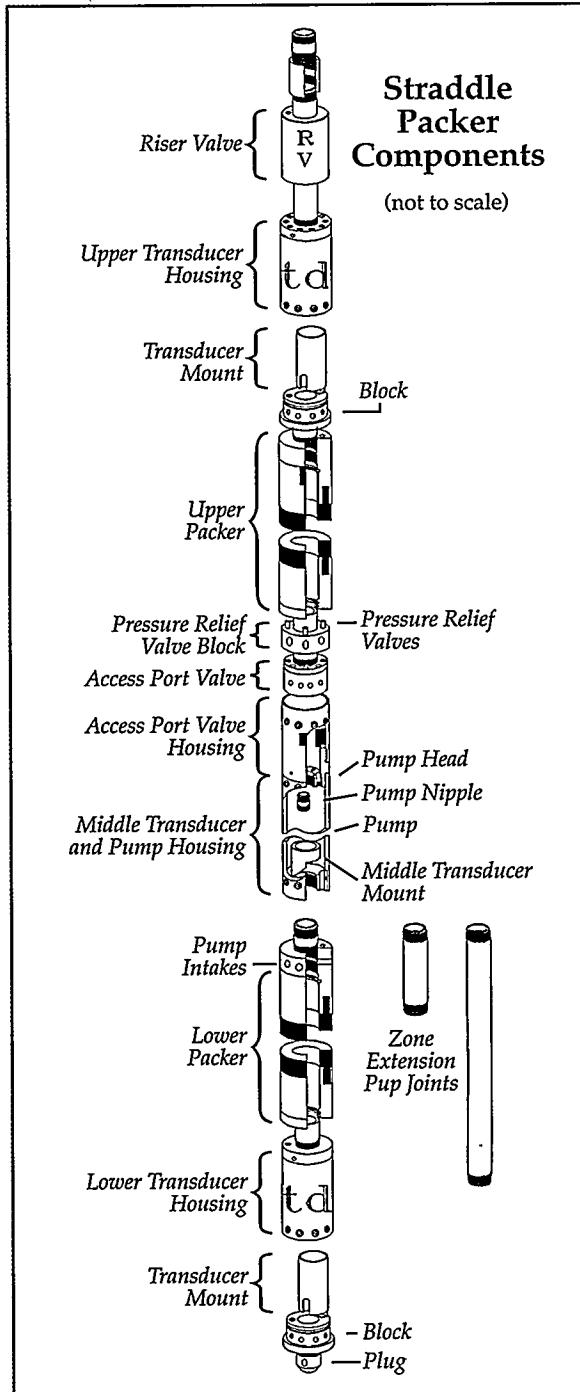
Studies designed to better understand groundwater flow and contaminant movement in the Snake River Plain aquifer continued in 1993. The Oversight Program's straddle-packer system is being used to isolate sections of the aquifer in selected monitoring wells, collect samples and conduct hydrologic tests. Information obtained will assist the Oversight Program in assessing the effectiveness of groundwater monitoring in the aquifer.

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The distribution of contaminants in perched water and the Snake River Plain aquifer beneath the Test Reactor Area strongly suggest that aquifer water quality is impacted by contaminated perched water.

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Information obtained from the hydrologic studies being conducted at the INEL using a straddle-packer system (photo far right and diagram right) will help the Oversight Program assess the effectiveness of groundwater monitoring in the Snake River Plain aquifer.



During the summer of 1993, the straddle-packer apparatus was used to test six separate intervals in well USGS 45, and seven intervals in well USGS 46. Both wells are near the Idaho Chemical Processing Plant (see map next page). Samples were collected and hydraulic testing was conducted on each interval. Preliminary review of sample analyses from well 45 indicates no unexpected contamination. Sample analyses from well USGS 46 were incomplete.

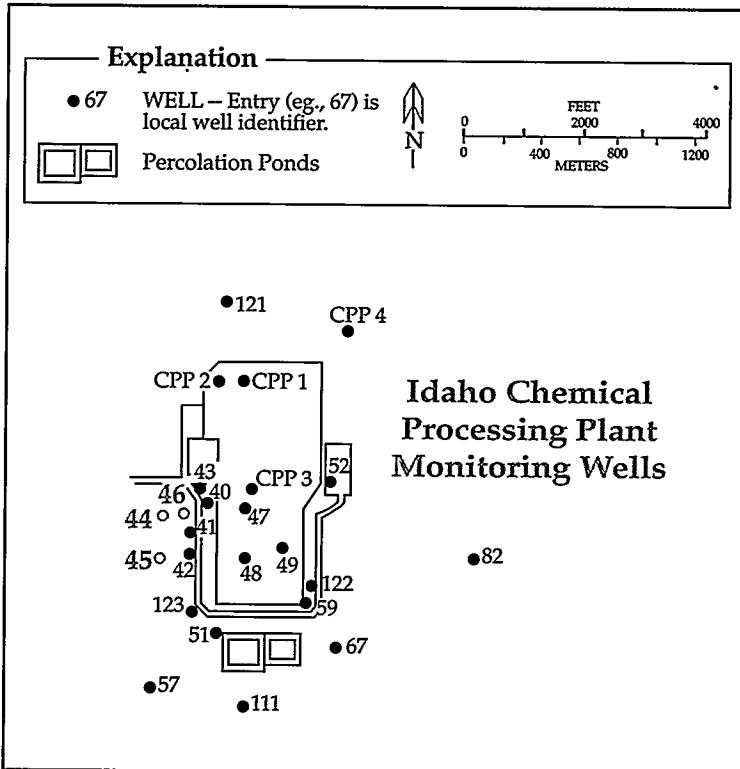
Hydrologic testing indicated that well 46 had zones of greatly varying permeability. Well USGS 44, tested in 1992, showed similar "layered" characteristics. Well USGS 45 had generally lower values of permeability. All three wells are affected by pumping of the production wells at the Idaho Chemical Processing Plant about one-half mile to the northeast.

The following agencies or universities participated with the Oversight Program in the straddle-packer project: Idaho State University, Boise State University, the University of Idaho, Idaho Geological Survey, U.S. Geological Survey at INEL, U.S. Geological Survey Borehole Geophysics Research Program from Denver, and EG&G Biotechnology Group.

UNSATURATED ZONE STUDIES

The University of Idaho has been working with the Oversight Program to provide information related to the unsaturated zone, the region between the land surface and the water table. Much of the contamination at the INEL is in the unsaturated zone or passes through it on the way to the aquifer.

A site-wide summary of unsaturated zone studies was published in a 1993 INEL Oversight Program technical report, *Abstracts and Parameter Index Database for Reports Pertaining to the Unsaturated Zone and Surface Water – Ground Water Interactions at the INEL* (OPTR 93-01). The summary was



based on a literature search and review of field, laboratory and modeling studies of the unsaturated zone and perched aquifers at the INEL. A related document, *User's Guide: Database of Literature Pertaining to the Unsaturated Zone and Surface Water – Ground Water Interactions at the INEL*, was published as technical report OPTR 93-02.

University of Idaho researchers have reviewed and evaluated computer models used by DOE contractors to predict movement of contaminated groundwater beneath the INEL.

Reports for each model critically reviewed will be available in 1994.

FACILITY REVIEW

Before the court-ordered spent fuel transfer began in November, Oversight Program staff:

- Verified storage positions and number of fuel-handling units stored in Building 603.
- Verified information on fuel storage capacity of Building 666.
- Tracked preparations for and observed full dress rehearsal and actual transfer of spent nuclear fuel from Building 603 to Building 666 to ensure compliance with the court order.
- Participated in safety reviews of planned fuel transfers conducted by DOE-Idaho and the Office of Nuclear Safety.
- Observed simulated accident and emergency response involving crane and loaded fuel cask.
- Participated in critiques of practice runs and emergency response exercises.

In its first full year, the Oversight Program's facility review group evaluated operations at INEL facilities to determine the possible impact on public health and the environment. The group assesses facility processes, radioactive source terms, release rates and generation rates.

During 1993, the Oversight Program staff focused much of its time on the Idaho Chemical Processing Plant, a facility where significant problems related to spent fuel storage were identified.

Project Highlights:

SPENT FUEL TRANSFER: IDAHO CHEMICAL PROCESSING PLANT

Constructed as a temporary storage facility in 1951, Building 603 at the Idaho Chemical Processing Plant has been used much longer than the five years it was intended to serve. Even the south basin, put into service in 1959, has exceeded the original 30-year design life for the basins.

Multiple problems exist. Incorrect spacing of some fuel handling units has been discovered. Corrosion and deterioration of underwater spent fuel storage equipment has reached dangerous proportions. For example, a routine video inspection of the south basin of Building 603 in November revealed "significant corrosion" on 14 spent fuel storage containers. Oversight Program staff participated in subsequent meetings with INEL personnel discussing

how to preserve the integrity of the spent fuel storage configuration. Detailed plans were developed by DOE contractors.

INEL proposes to address the overall storage problem by moving the fuel stored underwater to a newer facility, Building 666, or to the south basin of 603, and emptying the north and middle basins by Dec. 31, 1996. By Dec. 31, 2000, all fuel in the south basin would be moved to 666. Subsequently, the fuel would be dry-stored in a yet-to-be-constructed facility until a repository became available. Deadlines for these activities were established in the agreement signed in September. In November, fuel transfer began.

The goal of this project is to evaluate current and potential impacts of fuel handling and storage at the facilities, to determine and communicate the risk to the public, and ensure compliance with the court order.

WATER INVENTORY: IDAHO CHEMICAL PROCESSING PLANT

Questions raised by the Oversight Program about potential water loss near the high-level liquid-waste tank farm led to a major water inventory study at the Idaho Chemical Processing Plant in 1992-93. Large amounts of water could not be accounted for, excess water was present in the tank farm vault sumps, and a perched-water-table level beneath the tank farm was rising. The State expressed serious concern that significant leaks

in the tank-farm area could drive contaminants present in the soil down to the aquifer.

The water-inventory study was completed in 1993 and final results were scheduled to be released in January 1994.

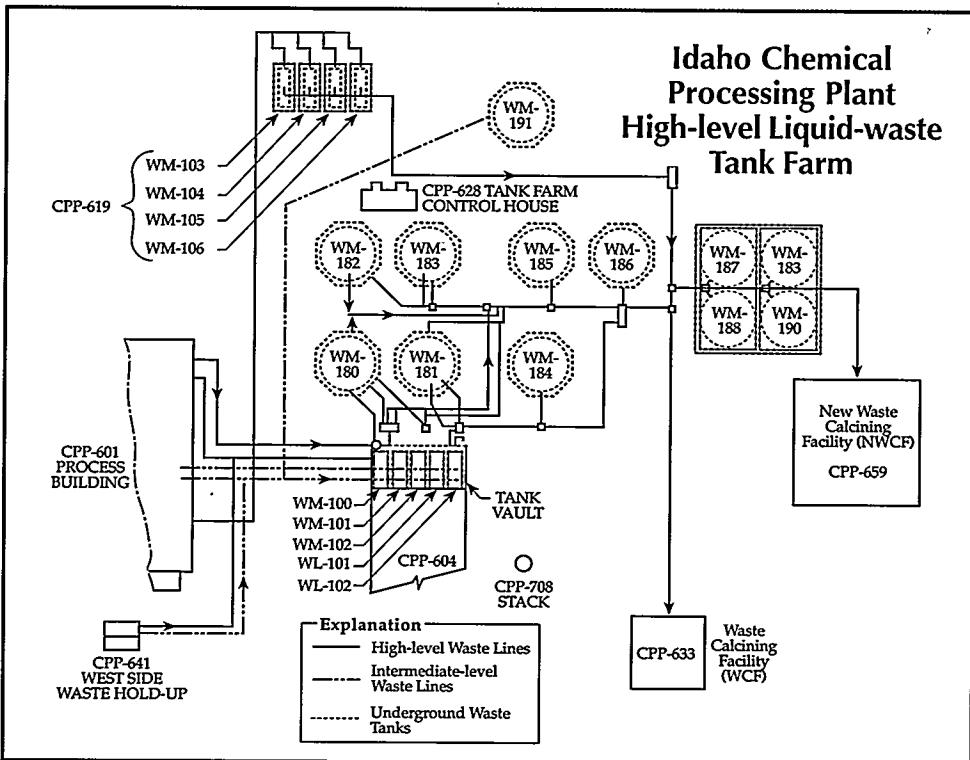
Preliminary results of the study:

- Pressure testing of water systems revealed a 16 gallon-per-minute leak in a valve in the fire-water system. No other significant leaks were detected.
- Tracer testing of the service-waste system was conducted. Initial test results indicated those portions of the system tested with the tracer were intact and there were no leaks. Final results were pending.
- The water-distribution metering system was upgraded with installation of new meters in key locations.
- Tank-farm sump sampling results indicated water in the vaults was not from the radioactive waste tanks, but was from sources such as the potable-water, raw-water, fire-water systems and precipitation.
- Seepage into the tank-farm vault receiving the highest amount of seepage was attributed to precipitation and a constant source, most likely lawn sprinkling.

A follow-up study of the perched-water zone in the area of the tank farm was planned under the Federal Facilities Act/Compliance Order.

WASTE MANAGEMENT: HIGH-LEVEL LIQUID- WASTE TANK FARM

The Oversight Program assessed and tracked waste-management practices at the Idaho Chemical Processing Plant's High-level Liquid-waste Tank Farm. At the beginning of 1993, more than 2 million gallons of high-level radioactive liquid waste was stored in 10 large underground tanks at the tank farm (see map this page). A campaign to process the liquid waste into a more-stable granular solid (calcine) had reduced the volume of liquid waste to 1.77 million gallons by the end of September.



It was determined that some of the liquid-waste tanks and surrounding concrete vaults do not meet certain legal or seismic requirements.

According to the August agreement between DOE and the State which resulted from the June court order:

- All non-sodium liquid waste must be calcined by Jan. 1, 1998.
- As much sodium-bearing liquid waste as DOE and the State agree is feasible must be calcined or processed by Jan. 1, 1998.

It was determined that some of the liquid-waste tanks and surrounding concrete vaults do not meet certain legal or seismic requirements. According to the court's decision, DOE must begin replacing tanks by 1996, and complete the job by 1999, if the environmental impact statement process "determines a need to construct replacement capacity for tanks ... that do not meet seismic standards or other applicable legal requirements."

In any case, the existing waste will be contained in the present tanks for many years before all of it can be calcined or otherwise safely disposed.

SUBSURFACE DISPOSAL: RADIOACTIVE WASTE MANAGEMENT COMPLEX

Solid low-level radioactive waste from INEL operations is disposed by burial in a subsurface pit at the Radioactive Waste Management Complex. Past disposal practices and three spring floods caused contaminants from the buried waste to migrate throughout the burial

site. Disposal practices have been improved, utilizing stabilized waste forms that are less likely to collapse or leach over time. However, questions of impacts to public health and safety and the environment still remain.

The Oversight Program conducted a review and evaluation of the subsurface disposal operations at the Radioactive Waste Management Complex to assess the risk they pose to the public. Subsurface Disposal Area operations were compared to Nuclear Regulatory Commission standards and State of Washington regulations on low-level waste disposal.

In a communication to the U.S. Department of Energy's Idaho Operations Office, the Oversight Program raised the following concerns about DOE's continued use of the Subsurface Disposal Area for low-level waste disposal:

- DOE's ability to monitor performance at the Subsurface Disposal Area is questionable. The existing monitoring system cannot distinguish whether detected contamination stems from waste buried at the Subsurface Disposal Area or from waste in other pits and trenches at the Radioactive Waste Management Complex. No monitoring points fulfill the requirement to maintain a monitoring system for operational facilities. Such a system would measure effluent releases and migration of radionuclides from the active disposal site. It also would be

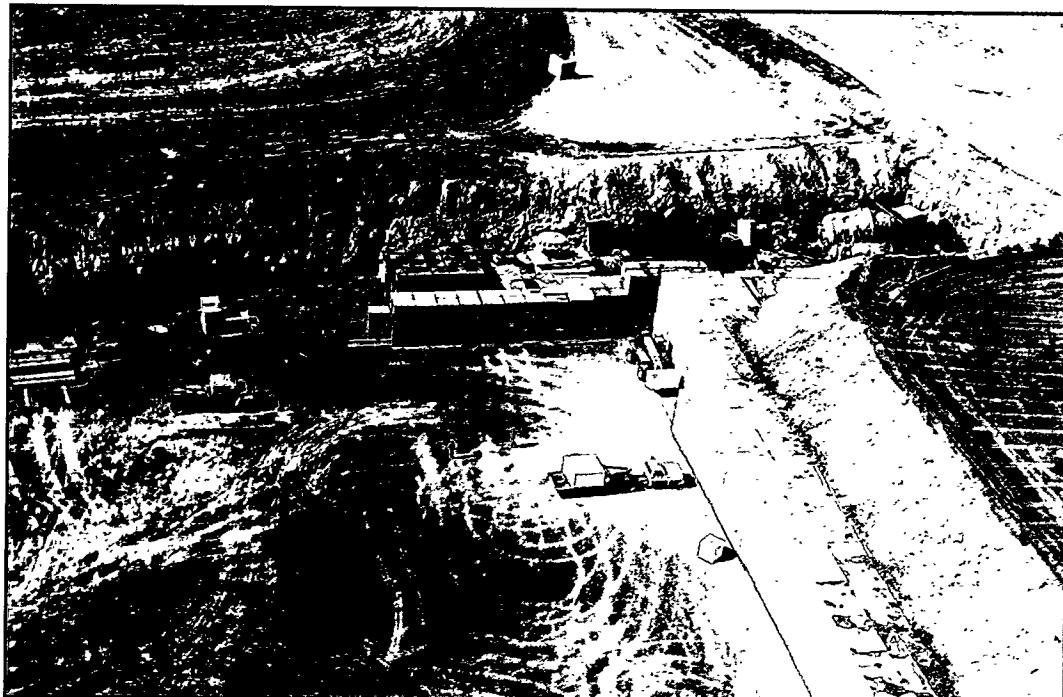
capable of detecting changing trends in facility performance.

- DOE's current waste-acceptance criteria document for disposal facilities does not address allowable radionuclide quantities and concentrations; internal heat generation; and the effects of radiation, microbial activity, chemical reactions and moisture.
- Remote-handled Navy waste disposed in soil vaults at the Subsurface Disposal Area may exhibit characteristics similar to "greater than Class C" waste. This is low-level waste generated by commercial firms that exceed Nuclear Regulatory Commission concentration limits for Class C low-level waste. If so, it is

being disposed of without a performance assessment as required by DOE orders.

- The Subsurface Disposal Area has no site-specific comprehensive closure plan as required by DOE orders for existing operating low-level waste disposal sites.

Other recommendations on implementing proposals and programs to improve waste-minimization and waste-reduction at the Subsurface Disposal Area were presented to DOE. The State plans to continue discussions with DOE to identify alternatives to the continued use of the Subsurface Disposal Area, a closure schedule for the facility and post-closure monitoring.



The State recommended DOE discontinue use of the Subsurface Disposal Area, used for burial of solid low-level radioactive waste.
(INEL Photo)

PUBLIC HEALTH AND SAFETY

DOSE RECONSTRUCTION STUDY

In 1993, the national Centers for Disease Control and Prevention continued the data retrieval and assessment phase of its dose reconstruction study. The purpose of the study is to calculate estimated doses to members of the public as a result of historical radiation and chemical releases to the environment during operations at the INEL.

The Centers' contractor, Sanford Cohen & Associates, published two newsletters and two fact sheets, and held a series of public meetings around the state. The meetings featured displays of database entry examples and one-on-one interaction between the public and contractor employees.

Release of the request-for-proposals for Phase II of the study was scheduled for October 1994. Phase II work likely will include calculation of source term estimates, environmental pathway analysis, preliminary work on environmental transport, and perhaps some collection of demographic data. Public comments on plans for Phase II will be sought before the request-for-proposals is released.

Citizens requested a federal advisory committee be established to facilitate public involvement in health-related studies conducted by the Centers for Disease Control and Prevention, the Agency for Toxic Substances and Disease Registry, and the National Institute for Occupational Safety and

Health. The agencies were attempting to obtain approval for the committee, although an executive order prohibiting formation of new federal advisory committees may inhibit this effort.

WORKER HEALTH AND SAFETY STUDY

The National Institute of Occupational Safety and Health laid the groundwork in 1993 for a three- to five-year study to examine any relationships between INEL worker deaths and past exposure to radiation and other toxins. Analysis of the INEL's 71,500 past and present workers is expected to help in understanding the effects of exposure to low levels of ionizing radiation.

A public meeting was held in September to explain preliminary plans for the study. The large number of people who have worked at the site, the availability of thorough records, and the fact that the study had not yet been done contributed to the decision to conduct the study. Governor Cecil Andrus and Sen. John Glenn of Ohio requested the study.

STATE WORKER HEALTH AND SAFETY

A site health and safety audit of the Oversight Program straddle-packer operation was conducted by staff from the Department of Health and Welfare's Office of Environmental Health in June. A September follow-up visit was utilized to more specifically characterize employee noise-exposure levels, and to observe the project under working conditions.

Citizens requested a federal advisory committee be established to facilitate public involvement in health-related studies...

During the visits, all employees were observed practicing safe work procedures, including the use of required personal-protective equipment.

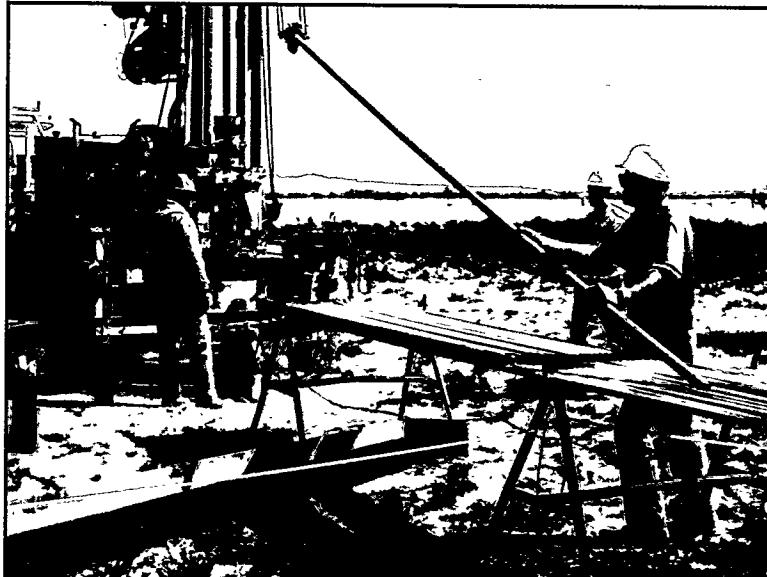
The Oversight Program site safety and health plan was reviewed and recommendations were provided. The recommendations provided in the 1992 audit report were implemented before the 1993 straddle-packer operation start-up.

MEDICAL SURVEILLANCE

State employees working at the INEL participate in both the Oversight Program and U.S. Department of Energy personal dosimetry programs. The Office of Environmental Health receives monthly reports from the DOE and Oversight Program listing all designated State employees and any external radiation dose received during the previous 30 days. There were no reported exposures in excess of maximum allowable doses during 1993.

In addition, the Office of Environmental Health administers the Medical Surveillance Program, a component of the State's Worker Health and Safety Program, as required by the Occupational Safety and Health Act.

The program serves approximately 39 State employees working at the INEL whose work puts them at risk for exposure to hazardous materials or noise levels. Employees receive baseline, periodic and post-exposure medical exams, administered by occupational physicians, to track any health changes that may be attributable to job-related exposures.



The Office of Environmental Health receives summary results of the exams and forwards the information to the employee's supervisor. As required by federal law, the records will be maintained for 30 years after an employee's termination from the program.

EMERGENCY RESPONSE AND PREPAREDNESS

DOE Radiological Incident Response Assistance

The State of Idaho and the U.S. Department of Energy Idaho Operations Office signed an agreement in 1993 for federal assistance, if needed, in the event of a radiological incident in Idaho outside the INEL boundaries.

Under the memorandum of understanding, DOE-Idaho will provide federal radiological assistance to the State in accordance with the federal Radiological Assistance Plan. DOE

A site-safety audit of the Oversight Program straddle-packer operation near the Idaho Chemical Processing Plant revealed no unsafe conditions.

→ **Personal dosimetry** – The measurement of employee exposure to radiation. Guidelines for acceptable radiation exposure, including maximum allowable dose, are established by the National Council on Radiation Protection and Measurement.

The "Idaho Hazardous Materials Incident Command and Response Support Plan" identifies the Oversight Program as the State's provider of radiological response assistance.

will use its Idaho staff and contractor personnel, facilities, equipment, resources and information as needed to cope with radiological incidents. Such response may include: field-monitoring assistance, dose-assessment assistance, use of the aerial measuring system to track the migration of radioactive material, technical advice or other technical support as requested by the State.

The State has "first-response" responsibility for protecting public health and safety. This responsibility includes coordinating emergency actions at the incident scene, including radiological activities. The State also has overall responsibility for field monitoring and dose assessment.

State Radiological Incident Response

In 1993, the *Idaho Hazardous Materials Incident Command and Response Support Plan* was updated to incorporate a radiological incident response component. The new plan identifies the Oversight Program as the State's provider of radiological response assistance.

Under the plan, designated Oversight Program staff serve as communications moderators to assess the seriousness of off-site radiological incidents and recommend appropriate levels of response for the State. During on-site incidents, Oversight Program personnel assess information as it is received at the INEL's Emergency Operations Center in

Idaho Falls, then provide information to appropriate State agencies.

When on-scene during radiological incidents, staff can coordinate and direct the radiological environmental investigation in support of the incident commander, interpret data collected by others, and secure samples for laboratory analysis.

To implement this component of the plan, the Oversight Program in 1993 established radiological emergency response procedures. The procedures outline the steps the Oversight Program will take to provide professional health physics expertise for all Idaho radiological incidents or accidents.

TRANSPORTATION RISK ANALYSES

The Oversight Program performs various impact analyses related to the operation of facilities at the INEL. The results of scientific reviews are presented to the public and can influence changes at the INEL that may improve environmental protection and help ensure public health and safety.

The impact analyses conducted by the Oversight Program include risk assessments to determine the probability and consequence of events that may affect public safety. Radioactive materials in the form of waste and spent nuclear fuels are shipped across Idaho, and may originate or terminate at the INEL. For example, transuranic wastes from Hanford, Wash., and the

INEL may be shipped through Idaho to the Waste Isolation Pilot Plant in Carlsbad, N.M. Over a 20- to 25-year period, about 19,000 truck trips, or about 9,500 train trips, will be required to move transuranic waste through Idaho.

Oversight Program staff uses standard computer models to predict and quantify risks associated with transport of radioactive materials. The computer model input is customized with the most current and Idaho-specific data obtainable. The resulting risk estimates address the overall likelihood of an event serious enough to cause container damage or to require precautionary emergency response. If there is a correlation to areas where events are more probable, that information can be used to prioritize emergency preparedness efforts.

WASTE SHIPMENT TRANSPORTATION SAFETY

The Idaho Department of Law Enforcement contracted with Idaho State University researchers to conduct an opinion survey of Idaho residents along the Waste Isolation Pilot Plant transportation corridor through Idaho. The survey was designed to determine public perception of the hazards posed by the transportation of radioactive transuranic waste along the corridor, which includes both rail and highway routes leading to the INEL.

The survey will help ascertain how, and from what sources, the public acquires information about the Waste

Isolation Pilot Plant shipments, and will help identify methods the Department of Law Enforcement might use to best communicate to the public about the shipments.

Funding for the survey was made possible by a grant obtained by the State of Idaho under a cooperative agreement between the U.S. Department of Energy and the Western Governors' Association. The final report will be presented by Idaho State University to the Western Governors' Association Technical Advisory Group on Waste Isolation Pilot Plant Transportation early in 1994.

The Department of Transportation provided additional support to the Oversight Program to resolve emergency response issues concerning public use of the five state highways that cross the INEL.

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COMMERCE AND EMPLOYMENT

The State provided economic development and employment assistance to the INEL and the community of Idaho Falls to enhance the economic health of the southeastern Idaho region. Staff members from the departments of Commerce and Employment serve on the Governor's INEL Oversight Program coordinating committee.

COMMERCE

The Commerce Department assisted the INEL in commercializing operations and transferring technology to the private sector. Staff members visited Tennessee's Commerce Department, Oak Ridge Laboratory and universities to review technology transfer programs for application to the INEL.

The Idaho agency assisted the INEL in developing and implementing a new five-year technology transfer plan. Working with the Governor's office, the department facilitated development of select projects, involving, for example, bioremediation, radioisotopes and automated ports of entry.

The staff also worked with many regional and national organizations to commercialize technology. Organizations include: the Science and Technology Council of the States; and the State/Federal Partnership Colloquium, sponsored by the White House Office of Science and Technology Policy and the Carnegie Commission. The depart-

ment was involved with other State agencies to begin developing a state science and technology strategy.

The department helped the community of Idaho Falls raise \$2.7 million to fund INITIATIVE 2000, a professional economic development organization. The department provided assistance to this organization and the Idaho Falls Chamber of Commerce's Economic Development Committee in four major areas: retention and expansion of existing businesses; recruitment of new companies; development of agri-business; and maximizing the benefits of the INEL to the area's economy, including technology transfer and business spinoffs.

Grant development assistance was provided to the INEL and Idaho Falls to help secure the following:

- \$4.5 million Economic Development Administration grant proposal submitted for a new innovation center and technology park in Idaho Falls;
- \$300,000 proposal submitted for a Technology Reinvestment Project grant; and
- \$500,000 U.S. Department of Energy grant for economic development, stemming from the agreement reached between the State and the DOE. Governor Andrus appointed a committee to review and recommend economic development projects for eastern Idaho that will be funded by this grant.

The Commerce Department assisted the INEL in commercializing operations and transferring technology to the private sector.

EMPLOYMENT

The Idaho Department of Employment provided work-force transition-planning assistance for INEL contractors expecting employment reductions. The Idaho Chemical Processing Plant transition plan was reviewed and comments provided to DOE. The State is committed to helping Idahoans displaced by the INEL's changing mission locate alternative employment and training opportunities.

OTHER STATE AGENCIES: WILDLIFE MANAGEMENT

The Idaho Department of Fish and Game continued elk trapping and relocation as part of a depredation

and population control program at the INEL. Depredation of agricultural crops continued to be a problem to landowners near the site.

Small numbers of hunters were given special depredation permits to hunt the elk, but the hunt is not sufficient to control the population. All winter ranges in Idaho currently have all the elk habitat will support.

In 1993, 225 elk were removed from the site, including 145 which were sent to Texas A&M University for research to benefit wild elk herds throughout the United States and Canada. Fifteen elk were sent to a research center in Caldwell and 48 to vacant habitat in Nevada. Eight bulls were released near Salmon and nine other animals died.

***The State is committed
to helping Idahoans
displaced by the
INEL's changing
mission...***



Crop depredation near the INEL site boundaries by elk living on the site continued to be a problem. In 1993, 225 elk were removed from the site.

PUBLIC INVOLVEMENT

Providing Idahoans and their elected officials independent, factual analyses of INEL activities is a primary goal of the Oversight Program.

Highlights of 1993 public information activities:

AGREEMENT-IN-PRINCIPLE FORUM

The Oversight Program hosted a conference for states and tribes involved with U.S. Department of Energy facilities in April. Officials from 15 states and tribes visited Boise to discuss common issues and concerns.

Twelve of the states represented have formal agreements with the DOE. These allow the states access to the federal sites to ensure that public health and the environment are being protected. Oversight of DOE environmental monitoring, independent monitoring to validate DOE data, and state planning for responding to on-site emergencies are common elements of the agreements.

The Oversight Program organized this first-time forum under Idaho statute that instructs the State to "compare monitoring networks and state audit or evaluation systems for such networks at other U.S. Department of Energy facilities in the country."

INEL CITIZENS' ADVISORY BOARD

In 1993, the U.S. Department of Energy began forming citizen advisory groups at several pilot sites in the DOE complex, including the INEL. For some time, Idahoans have advocated a citizen board to provide direct comments to INEL management on critical issues.

The State will have an ex officio position on the advisory board. The board will work directly with the INEL site manager, providing a unique opportunity for representative citizen interaction with DOE decision-makers.

Richard Durante, Oversight Program senior health physicist, spoke on "Environmental Pollution and Health: Bridging the Gap between Policy and Science" at the 1993 Agreement-In-Principle Forum sponsored by the Oversight Program.



COORDINATION OF INEL PUBLIC INFORMATION

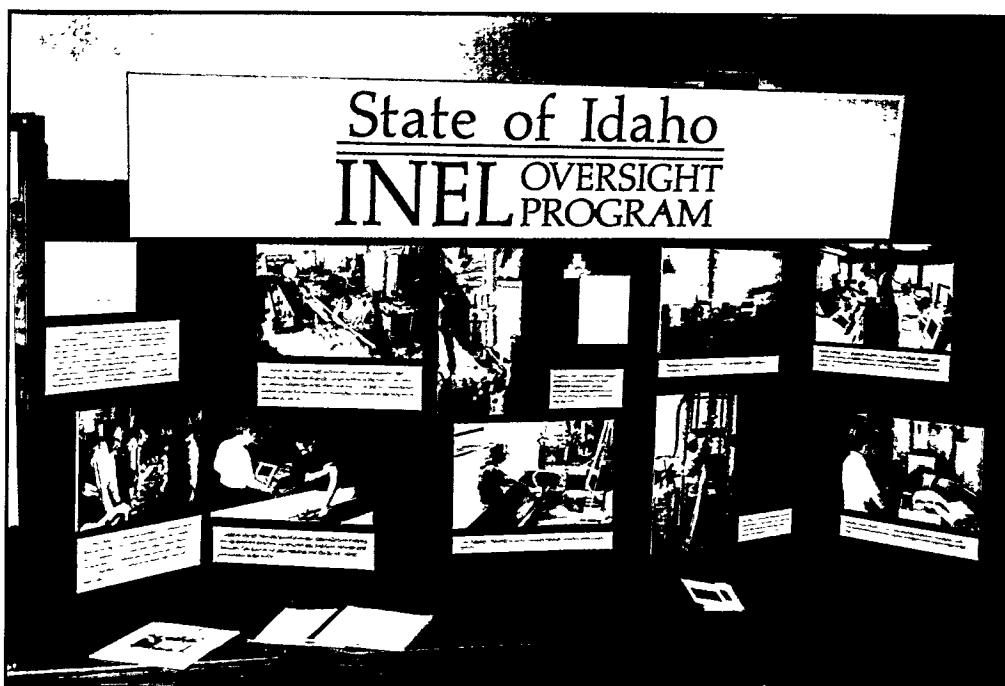
To ensure coordination among programs and projects, the INEL Oversight Program public information office was designated in 1993 to coordinate all INEL-related public information activities for the Department of Health and Welfare.

SPEAKER'S BUREAU/TOLL-FREE PHONE LINE

The INEL DIAL-LOG program was introduced in 1993 to provide Idaho citizens with the latest information on

the INEL's impact on public health and the environment. The program is designed to allow more frequent, less-formal opportunities for dialogue. The toll-free phone line, 800-232-INEL, provides immediate access to Oversight Program staff and information.

Oversight Program speakers addressed a variety of civic, school and citizen groups in 1993. Presentations were made in Coeur d'Alene, Nampa, Caldwell, Garden City, Boise, Horseshoe Bend, Twin Falls, Sun Valley, Ketchum, Pocatello, Blackfoot, and Idaho Falls.



Displays, publications, a speakers' bureau, and a toll-free hotline are tools used by the Oversight Program to communicate with a variety of audiences.

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