**IDAHO CHEMICAL PROCESSING PLANT
SITE DEVELOPMENT PLAN****DISCLAIMER**

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ACRONYMS

CSSF	Calcine Solids Storage Facility
D&D	decontamination and decommissioning
DOE	U.S. Department of Energy
EIS	Environmental Impact Statement
FPR	Fuel Processing Restoration project
FSV	Fort St. Vrain (fuel)
FY	fiscal year
HLLW	high-level liquid waste
HLW	high-level waste
ICPP	Idaho Chemical Processing Plant
INEL	Idaho National Engineering Laboratory
LI	line item
NWCF	New Waste Calcining Facility
OSHA	Occupational Safety and Health Act
RAL	Remote Analytical Laboratory
RCRA	Resource Conservation and Recovery Act
TRU	transuranic
TSD	treatment, storage, and disposal
WIF	Waste Immobilization Facility
WINCO	Westinghouse Idaho Nuclear Company, Inc.

1.0 EXISTING MISSIONS, WORKLOAD, AND SITE POPULATION

1.1 Mission and Program

The Idaho Chemical Processing Plant (ICPP) mission is to receive and store spent nuclear fuels and radioactive wastes for disposition for Department of Energy (DOE) in a cost-effective manner that protects the safety of Idaho National Engineering Laboratory (INEL) employees, the public, and the environment by:

- Developing advanced technologies to process spent nuclear fuel for permanent offsite disposition and to achieve waste minimization.
- Receiving and storing Navy and other DOE assigned spent nuclear fuels.
- Managing all wastes in compliance with applicable laws and regulations.
- Identifying and conducting site remediation consistent with facility transition activities.
- Seeking out and implementing private sector technology transfer and cooperative development agreements.

Prior to April 1992, the ICPP mission included fuel reprocessing. With the recent phaseout of fuel reprocessing, some parts of the ICPP mission have changed. Others have remained the same or increased in scope.

1.2 Workload

Fuel Reprocessing Phaseout - The decision was made on April 28, 1992, to cease all DOE reprocessing of nuclear fuels. This decision will lead to phaseout of all fuel dissolution, solvent extraction, Rare Gas Plant operations, and product denitration at the ICPP. The reprocessing facilities will be converted to a safe and stable shutdown condition awaiting future decontamination and decommissioning (D&D).

Fuel reprocessing phaseout is assumed to cover:

- Final process operations including a final uranium sweepdown needed to convert in-process materials to a stable storage form; and
- Process system clean-out necessary to provide an adequate level of safety to the public, in-plant workforce, and environment.

The Fuel Processing Restoration (FPR) project, a new separations facility under construction, was designated to be placed in a lay-up posture for preservation and possible future use. The structural subcontracts were 100% complete upon closeout, and the total project including the systems and components were over 50% complete upon closeout.

Fuel Receipt and Storage - The scope of the fuel receipt and storage function has increased to provide storage for a greater quantity of fuel than was previously planned. The storage capability will be exceeded before newly developed fuel dispositioning technologies can be implemented. The fuel storage facilities are approximately 50% full. The fuel storage inventory at the ICPP [4Q fiscal year (FY) 1993] is 965 metric tons. This spent fuel mass contains 14.8 metric tons of enriched uranium and 34.2 metric tons of depleted uranium.

Fuel receipts have averaged 40 metric tons mass per year for the past 10 years. The future fuel receipt forecasts show an average of 80 metric tons total mass for the next 36 years. The total inventory in 2013 is anticipated to be 47 metric tons of enriched uranium.

A substantial inventory is expected to accumulate before any alternative disposal method can be established. To support the increase in storage requirements, a storage configuration change must be accomplished.

Waste Management - Waste management includes management of the high-level liquid waste (HLLW) in the tank farm, conversion of the HLLW to calcine, storage of the calcine in the Calcine Solids Storage Facilities (CSSFs), and management of D&D and restoration generated wastes.

Research and Technology Development - Research and technology development has expanded greatly and has become a separate functional area. In April 1992, the DOE-ID Field Office released the Draft Spent Fuel and Waste Management Technology Development Plan, which outlines the strategy for management of fuels and wastes at ICPP. This new function encompasses eight areas: (1) systems analysis; (2) radioactive, sodium-bearing liquid waste processing; (3) calcine immobilization; (4) graphite fuel conditioning; (5) special fuel conditioning; (6) development facilities; (7) conversion of existing facilities; and (8) recycle metal/waste minimization.

1.3 Population

Westinghouse Idaho Nuclear Company, Inc. (WINCO) employs approximately 1,800 employees to work at the ICPP. During the day the ICPP site population is approximately 1,200. Four rotating twelve hour shift crews are assigned to operations.

About 40% of the daytime population is involved in operations activities. The remaining 60% of the population is engaged in support activities including environmental compliance, safety, engineering, projects, technical support and development, quality assurance, finance, and human resources.

2.0 SITE AND REGIONAL INFORMATION

2.1 Existing (or potential) Conditions

The Idaho National Engineering Laboratory's (INEL) history of safe operation, and the large number of people in southeast Idaho who are associated with it, produce a strong reservoir of support near the INEL's home base. However, support in other regions of Idaho has eroded in

recent years, creating an opportunity for improved relationships in areas like Twin Falls, Boise, and Moscow. This loss of confidence is largely attributable to actions taken by the State of Idaho and Idaho citizen concerns about water quality in the Snake River Aquifer.

Late in 1988, the governor of Idaho banned further shipments to the INEL of defense-related transuranic (TRU) waste from the Rocky Flats Plant and spent fuel from the Fort St. Vrain (FSV) commercial reactor, both located in Colorado. The Shoshone-Bannock Tribes at Fort Hall also opposed FSV shipments across their reservation. DOE agreed to stop importing TRU waste and will not attempt more FSV shipments until a Site-wide Environmental Impact Statement (EIS) is completed in 1995.

The ICPP is the nation's only interim storage facility for spent Navy reactor fuel. The governor obtained a Federal court injunction banning more Navy fuel shipments until completion of the INEL's EIS, which also considers alternate sites for Navy fuel storage. However, the Navy and DOE have appealed a portion of this injunction. Therefore, whether the ICPP will continue to receive Government-owned fuels for interim storage after 1995 is unclear.

The DOE nationwide complex is undergoing significant changes because of reductions in defense needs and increased focus on environmental restoration (cleanup). The DOE Office of Facility Transition, within DOE Environmental Restoration and Waste Management, has been formed to manage facilities that no longer have an identified mission and must undergo a transition to a new use or be decommissioned. The transition process, administered by this new office, covers the change from current mission to deactivation, decontamination, and disposition. Disposition may result in reuse by DOE, release to non-DOE users, or decommissioning.

The future of the INEL will greatly influence the economic growth of southeast Idaho. Both commerce and industry leaders clearly recognize the INEL's economic force and the impact of a substantial reduction in employment due to a change in mission. They will support new, environmentally conscious missions that help INEL transition from defense to civilian goals.

2.2 The ICPP Facilities

2.2.1 Condition of Facilities

The condition of the ICPP facilities generally corresponds to the age of the building or structure. Many structures and processes have been upgraded or replaced during the past 10 years, but several facilities designed and constructed in the 1950's do not meet the requirements imposed by current regulations for environmental compliance, seismic qualifications, or employee safety. Structural upgrades to many of these facilities are cost prohibitive; therefore, several new facilities are planned to correct known deficiencies. See section 5.0, Special Considerations, for more information.

When the phaseout is complete, the following facilities will have been placed in a safe, stable shutdown condition:

- CPP-601 (except the deep tanks and parts of the process makeup area).
- CPP-602 (denitrator area only).
- CPP-627 (hot chemistry lab only).

- CPP-640 (Rover process phaseout will continue beyond FY-94).
- CPP-631.
- CPP-685.
- CPP-604 (Rare Gas Plant only).
- CPP-633 (Waste Calcining Facility).
- CPP-1614.
- CPP-1633.

2.2.2 Conditions That Would Enhance or Deter Establishing New Missions

Existing, new, and proposed program assumptions and forecasts are based on several INEL long-range planning documents, such as the INEL Institutional Plan, Environmental Restoration Five-Year Plan, Environmental Restoration and Waste Management Site Specific Plan, etc. A review of these documents indicates that the existing capabilities at the ICPP will need enhancement to meet the expected program requirements. Some of the existing facilities and equipment are old and in need of replacement. Program requirements will be accomplished by constructing new buildings, expanding existing facilities, and upgrading ICPP utility systems.

An increased emphasis on safety and environmental issues will affect future project costs and schedules. WINCO is committed to comply with these laws, regulations, and requirements.

2.2.3 Factors That May Influence the Future Use of the Site

WINCO executes DOE-assigned programs and complies with applicable state and federal laws, regulations, and requirements as directed by DOE. Changes in ICPP mission and future site development are in accordance with the overall needs and guidance received from DOE. Facilities necessary to accomplish the ICPP mission are planned and constructed based on DOE funding and approval. The most current presentation of WINCO's overall site plan is contained in the Nuclear Fuel Reprocessing Phaseout Plan. Additional planning details are contained in the most recent issue of the following plans:

INEL High-Level Waste Issues and Resolutions Document;
Capital Asset Management Plan;
WINCO Strategic Plan;
Environmental Restoration & Waste Management Five-Year Plan; and
Materials Management Plan.

Future waste and spent fuel management activities will be addressed in an overall INEL environmental impact statement. Future actions involving waste management are defined and will vary only as a function of available funding levels and environmental exposure.

3.0 PROGRAM MISSION PROJECTIONS AND MISSION RESOURCE REQUIREMENTS

3.1 Mission Projections

The ICPP mission will continue to include fuel receipt, storage, and processing for disposition; waste processing for disposal in a repository; development and application of technologies to minimize waste generation and management of radioactive and hazardous wastes; and conducting site remediation work and facility D&D activities.

3.2 Mission Resource Requirements

Mission resource requirements are being extensively evaluated due to a recent DOE decision to discontinue reprocessing nuclear fuel at the ICPP. New staff levels are being developed based on the phaseout of fuel reprocessing and on the availability and timing of new programs and missions. Funding is expected to be reduced 10% in FY 1995. This may reduce ICPP employment from 1,800 to 1,600.

The Idaho Chemical Processing Plant Spent Fuel and Waste Management Technology Development Plan, July 1992, outlines the strategy for conducting a Spent Fuel/Waste Management Technical Development Program at ICPP. This program will produce the technology development and demonstration required to ensure that spent fuel and HLLW will be processed for disposal in a repository.

Projected production units for fuel receipt, HLLW generation, calcine production, and the estimated number of immobilized waste canisters prepared for shipping are described annually in materials management plans and Integrated Data Base documents.

3.3 Future Workload

The most important activities and projected events during the next 20 years include:

- Improve and increase fuel storage capacity;
- Develop the next generation of fuel and waste management technologies;
- Develop, construct, and operate a waste immobilization process;
- Develop dispositioning and conditioning technologies for spent fuel;
- Develop capabilities to dispose of special nuclear fuels and high-level waste (HLW);
- Provide Resource Conservation Recovery Act (RCRA)-approved treatment, storage and disposal facilities;
- Enhance chemical analysis capabilities to support waste management and environmental sampling;

- Reduce personnel radiation exposure;
- Conduct environmental compliance and Occupational Safety and Health (OSHA) training;
- Decommission targeted facilities;
- Minimize solid and liquid waste generation;
- Improve hazardous waste management;
- Remediate inactive waste sites;
- Provide adequate utility systems; and
- Build adequate operations support office space and improve warehouse capacity.

3.4 Personnel Loading at the Site

Increased emphasis on waste and spent fuel technology development, environmental and safety issues, training, and waste management will change the composition of the workforce. This, coupled with consolidation of the INEL contracts, will result in a redistribution of personnel. ICPP projected population in the year 2013 is 1,200 people.

4.0 MASTER PLAN

4.1 Goals

The goals listed below will help make the ICPP more effective in accomplishing its scheduled mission(s) during the next 20 years.

- Conduct operations in a manner to minimize environmental and safety risks to employees, the public, and the environment; and fully comply with applicable regulations;
- Construct or upgrade facilities to support mission requirements; and
- Upgrade utilities to adequately support existing and planned programs.

4.2 Facility and Land Requirements and Future Uses

Existing land use at the ICPP is illustrated on figure 1. The proposed configuration of the site in 20 years is illustrated on figure 2. Twenty-seven projects are planned at ICPP during this 20 year time frame. Although no additional leasing or land acquisition is required for siting of these facilities, alteration of the secured area may occur.

Figure 1. 1992 ICPP Facilities

Figure 2. 2012 ICPP Facilities

4.3 Future Major Facility Locations and Construction Programs

Several new facilities that require line item funding are identified for the planning period. A brief description of the issue(s), resolution(s), and impact(s) of planned line items for the upcoming 20 years is located in section 5.0, Special Considerations.

4.4 Utility Sources

The present utility systems will not supply projected utility demands. The utility tunnels and underground utilities have not been extended to areas designated for site development. As a result, new facilities are being located where utilities are available rather than in areas with other similar facilities that support efficient plant operations.

Numerous ICPP facilities are without sanitary sewer service connection to the sewage treatment plant. This situation conflicts with DOE and State of Idaho environmental compliance guidelines.

The electrical distribution system is outdated, overloaded and is not in compliance with DOE orders or national codes and standards.

A line item project is planned for FY96 to enhance and upgrade present utility systems capabilities. Numerous general plant projects are planned to improve various other utility systems including breathing air, potable water well, and sanitary waste lines.

4.5 Five-Year Construction Program

New construction, improvements, and upgrades during the upcoming five years are listed on Table 1. Also listed on the table is the funding type, proposed budget year, rough magnitude of cost, and tentative National Environmental Policy Act documentation for proposed modifications to the ICPP in the next five years. Table 1 is found at the end of this document.

5.0 SPECIAL CONSIDERATIONS

Listed below are specific site planning issues that need resolution. For each issue listed, a solution, resources commitments, and impact, if the issue is not resolved, is listed.

Table 1. ICPP FIVE-YEAR PROJECT SUMMARY.

FY-93 Projects	Funding Type	Rough Magnitude of Cost (ROM)	Anticipated NEPA Documentation
Minor GPP	GE-GPP	17K	CX
Sanitary Waste Lines Upgrade (construction)	GE-GPP	900K	CX Completed
CPP-603 Waste Tank Upgrade (design)	GE-GPP	150K	CX Completed
Potable Water Storage Tank Upgrade (design)	GE-GPP	100K	CX Completed
CPP-603 Corrosion Control Power Upgrade (design)	GE-GPP	300K	CX Completed
ICPP Protective Force Support Facility	GE-GPP	950K	CX Completed
Plant Street Lighting Replacement and Upgrade	GE-GPP	807K	CX Completed
Security Lighting Upgrade	GE-GPP	90K	CX Completed
Health and Safety Upgrade to Cafeteria (design)	GE-GPP	150K	CX Completed
Minor GPP	EW-GPP	100K	CX Completed
Isolate WL-102	EW-GPP	1,100K	CX Completed
Upgrade DVB-C-37, C-12, C-32 (construction)	EW-GPP	500K	CX Completed
Cathodic Protection System Upgrade	EW-GPP	1,000K	CX Completed
Install Leak Detection FT-534/548/549 (Basin Sumps)	EW-GPP	249K	CX Completed

CX - Categorical Exclusion
 EA - Environmental Assessment
 EIS - Environmental Impact Statement
 K - Thousands
 M - Millions

Table 1. ICPP FIVE-YEAR PROJECT SUMMARY (continued)

FY-94 Projects	Funding Type	Rough Magnitude of Cost (ROM)	Anticipated NEPA Documentation
Minor GPP	EW-GPP	129K	CX
Technology Development Facility	EW-GPP	1,100K	CX
CPP-603 Waste Tank Upgrade (construction)	EW-GPP	695K	CX Completed
Potable Water Storage Tank Upgrade (construction)	EW-GPP	500K	CX Completed
CPP-603 Corrosion Control Power Upgrade (construction)	EW-CPP	776K	CX Completed
CPP-679 Renovation	EW-CPP	150K	CX Completed
Construction Management Change/Lunch Rm. Facility (design)	EW-GPP	110K	CX Completed
Filter System Upgrade	EW-GPP	950K	CX Completed
CPP-621 Secondary Containment Shelter	EW-GPP	446K	CX Completed
Coal Storage Paving	EW-GPP	515K	CX Completed
Health and Safety Upgrade for Cafeteria (construction)	EW-GPP	950K	CX Completed
CPP-663 Second Floor Expansion (construction)	EW-GPP	580K	CX Completed
NWCF Feed System Modification (design)	EW-GPP	80K	CX Completed
New Above Ground Kerosene Tanks	EW-GPP	925K	CX
New Control Room for CPP-604 Operations (design)	EW-GPP	150K	CX Completed

Table 1. ICPP FIVE-YEAR PROJECT SUMMARY (continued)

FY-95 Projects	Funding Type	Rough Magnitude of Cost (ROM)	Anticipated NEPA Documentation
Minor GPP	EW-GPP	20K	CX
ECF Dry Cell Cast Support Equipment	EW-GPP	1,100K	CX
Construction Mgmt Change/Lunch Room Facility (construction)	EW-GPP	950K	CX Completed
ICPP Retrievable Records Storage Area	EW-GPP	1,400K	CX
NWCF Feed System Modification (construction)	EW-GPP	575K	CX
Environmental Compliance Analytical Upgrade	EW-GPP	1,100K	CX
New Control Room for CPP-604 Operations (construction)	EW-GPP	950K	CX Completed
South CPP-621 Pipe Trench	EW-GPP	485K	CX
New Tool Crib	EW-GPP	500K	CX
Peach Bottom & FERMI Dry Vaults Renovate	EW-GPP	1,100K	CX
FH&D Paved Storage Area	EW-GPP	505K	CX
Security Facilities Upgrade	EM-LI	18.5 M	CX

FY-96 Projects	Funding Type	Rough Magnitude of Cost (ROM)	Anticipated NEPA Documentation
Replace CPP-621 Transfer Lines	EW-GPP	1,100K	CX
Renovation CPP-627 Analytical Laboratory	EW-GPP	1,100K	CX
Contaminated Fuel Handling Equipment Storage Bldg.	EW-GPP	1,100K	CX
FAST Facility Office at Maintenance Facility	EW-GPP	1,100K	CX
Electrical & Utilities Systems Upgrade	EM-LI	75M	CX or sitewide EIS

Table 1. ICPP FIVE-YEAR PROJECT SUMMARY (continued)

FY-97 Projects	Funding Type	Rough Magnitude of Cost (ROM)	Anticipated NEPA Documentation
Calcine Recovery System for Bin Set #1	EM-LI	50M	EIS
Fuel Canning & Dry Modular Storage	EM-LI	60M	EIS
Tank Farm Heel Removal	EM-LI	34M	EA
Laboratory Expansion & Upgrade Project	EM-LI	20M	CX

FY-98 Projects	Funding Type	Rough Magnitude of Cost (ROM)	Anticipated NEPA Documentation
Waste Immobilization Facility	EM-LI	1250M	Sitewide EIS

ISSUE	SOLUTION	REQUIRED RESOURCES	IMPACT IF NOT PROVIDED
1. ICPP tank farm does not meet RCRA secondary containment compatibility and some tanks do not meet DOE seismic resistancy.	Minimize waste generation and maximize NWCF operation in the short term, and design, construct and operate the Waste Immobilization Facility (WIF) in the long term.	Major system acquisition of WIF	Inability to meet the consent order with the State of Idaho. Potential fines for improper waste storage and prohibitions on waste generation.
2. Wastes processed at the New Waste Calcining Facility (NWCF) contain nitrate compounds which decompose to NO _x . NO _x abatement is required by State permits.	Pilot plant testing has confirmed that NO _x emissions can be effectively reduced. A full-scale facility should be constructed using this technology.	Construct a facility to reduce the release of NO _x gases to the atmosphere. LI - <u>NO_x Abatement Facility</u>	HLW processing rates at the NWCF may be restricted to meet State permit requirements. Waste inventories would continue to increase.
3. Several utilities are rapidly becoming inadequate; utility systems are inefficient, out of compliance, and will not support projected growth.	Upgrade electrical and utility systems to enhance reliability and availability, correct deficiencies, and provide adequate sizing for existing and planned facilities.	Upgrade or extend utilities to accommodate existing and planned plant growth. LI - <u>Electrical and Utilities Systems Upgrade</u>	Failure to implement these utility upgrades would significantly impact economical development at ICPP and perpetuate noncompliant electrical and utility systems.

ISSUE	SOLUTION	REQUIRED RESOURCES	IMPACT IF NOT PROVIDED
4. Spent fuel management process development and fuel characterization is not complete and in some cases, has not been initiated.	Aggressively develop and implement spent fuel characterization to support dry fuel storage initiatives, and long term conditioning processes.	Expand pilot plant facilities to accommodate increased research and development activities. Fuel Canning and Characterization Facility Construct spent fuel dry storage demonstration unit. Modify current facility for characterization requirements.	Slow progress will jeopardize the State's confidence with DOE in addressing HLW and spent fuel issues, and delay progress on dry/fuel storage projects.
5. HLW storage is inadequate for spent fuel and immobilized waste.	Develop capabilities to repackage spent fuel for storage and disposal. Include interim storage in design of the Waste Immobilization Facility.	Construct a facility to repackage spent fuel. <u>LI - Fuel Canning and Dry Modular Storage Facility.</u> Provide interim storage in the <u>Waste Immobilization Facility</u> for the glass-ceramic product.	Failure to implement acceptable treatment and storage will likely lead to improper storage and RCRA violations.
6. Inadequate capability exists to characterize waste and environmental samples according to regulatory requirements.	Expand the existing ICPP Remote Analytical Laboratory (RAL). Upgrade CPP-602 Lab's and build two new Radiochemistry Counting Facilities.	Expand and construct suitable facilities for characterization and lab work. <u>LI - Laboratory expansion and upgrade project.</u>	Could be out of compliance with RCRA waste characterization requirements for treatment, storage, and disposal (TSD) facilities. May not receive permits for units if waste characterization methodologies are inadequate.

ISSUE	SOLUTION	REQUIRED RESOURCES	IMPACT IF NOT PROVIDED
<p>7. CSSF #1 may not meet DOE seismic resistancy.</p> <p>A calcine retrieval concept is developed, but no operational system exists.</p>	<p>Construct a new CSSF.</p> <p>Develop, demonstrate, and construct an operational system for calcine retrieval.</p>	<p>Build another CSSF.</p> <p>LI - <u>Calcine Bin Set #8</u></p> <p>Construct a calcine recovery system.</p> <p>LI - <u>Calcine Recovery for Bin Set #1</u></p>	<p>Corrective measures will not be available if another CSSF is not constructed and a retrieval system is not developed. This technology is also needed to transport calcine from all CSSFs to the Waste Immobilization Facility.</p>
<p>8. Recovery of isotope by-products from spent fuel has not been addressed.</p>	<p>Identify available uses and markets for isotope by-products. Determine the economic and safety implications of isotope usage.</p>	<p>Fund studies related to isotope recovery and use.</p>	<p>The loss of valuable isotope resources might be caused by inadequate evaluation of future applications.</p>
<p>9. Waste volumes for D&D and environmental restoration projects are not projected.</p>	<p>Develop plans for characterizing and projecting D&D waste volumes.</p>	<p>Define closure requirements.</p>	<p>Future TSD facilities may not have adequate capability to accommodate forecasted D&D projects.</p>
<p>10. Proposed DOE standards would eliminate the use of soil columns (percolation ponds) for disposal of waste water.</p>	<p>Develop an alternate disposal method for waste water.</p>	<p>Construct a system to provide cooling water to each major process facility along with disposal for existing chemical waste streams.</p> <p>LI - <u>Service Waste Cooling Water Closed Loop System</u></p>	<p>If regulations are enacted that require the elimination of soil columns, ICPP could be at risk of having no place to dispose of waste water.</p>
<p>11. Treatment options are not developed for HLW subject to RCRA land disposal restrictions.</p>	<p>Develop and implement processes to treat HLW to meet RCRA requirements.</p>	<p>Design and construct a facility suitable for immobilizing and storing HLW in a repository.</p> <p>LI - <u>HLW Waste Immobilization Facility</u></p>	<p>Failure to implement an acceptable HLW treatment process will likely lead to RCRA violations/fines.</p>

ISSUE	SOLUTION	REQUIRED RESOURCES	IMPACT IF NOT PROVIDED
12. RCRA Hazardous waste must be removed from the tank farm tanks after cease of use.	Develop and implement technology to clean the tanks.	LI - project for Tank Farm Heel Removal	State of Idaho fines for failure to treat and dispose of RCRA waste.

Figure 1.

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