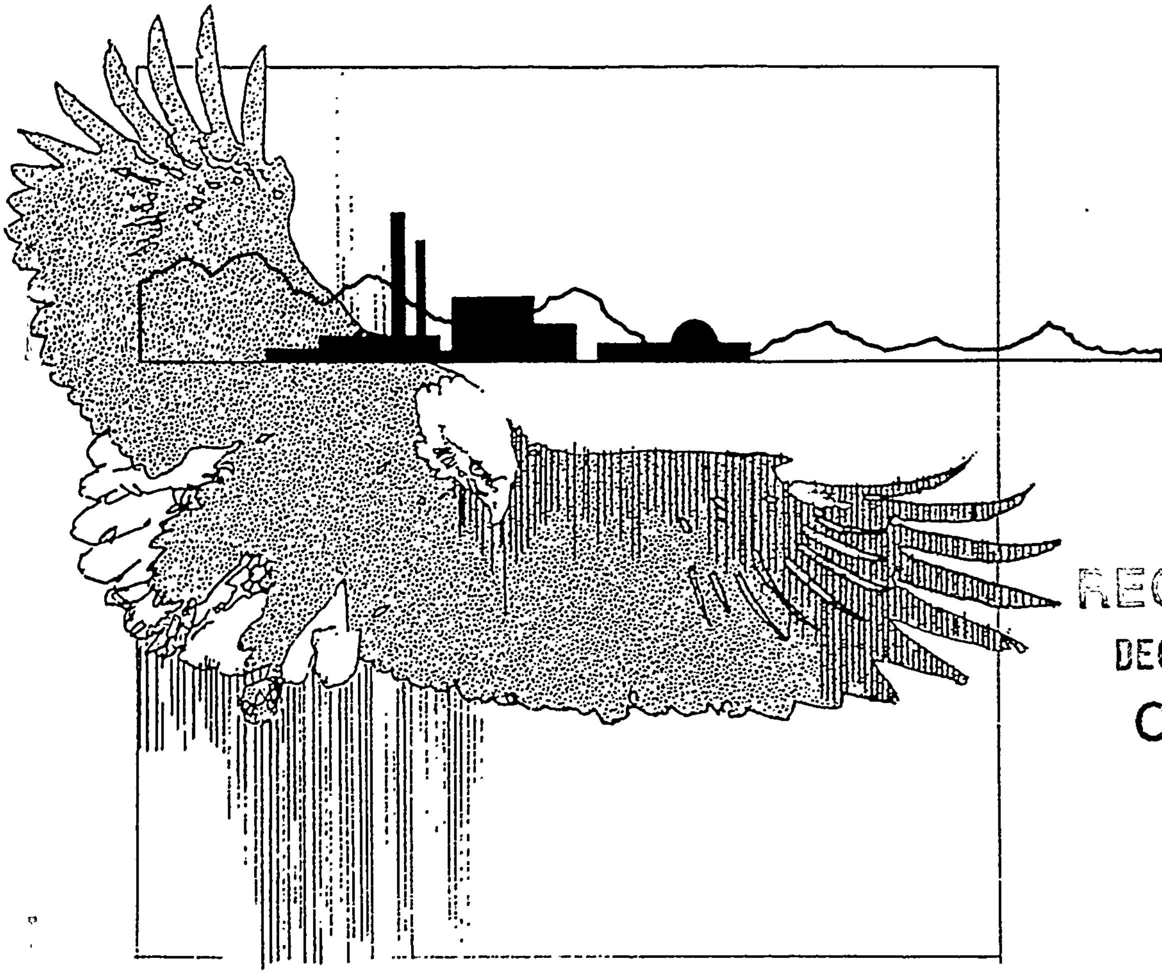
IDAHO NATIONAL ENGINEERING LABORATORY



INEL-94/0165

October 1994


M. W. Patterson




# Nuclear Fuel Reprocessing Deactivation Plan for the Idaho Chemical Processing Plant

Idaho National Engineering Laboratory

Lockheed Idaho Technologies Company


Work performed under
DOE Contract
No. DE-AC07-94ID13223

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UC-510

# Nuclear Fuel Reprocessing Deactivation Plan for the Idaho Chemical Processing Plant


Facility Transition and Restoration
M. W. Patterson, Lead Writer


October 1994


Lockheed Idaho Technologies Company

PREPARED FOR THE
DEPARTMENT OF ENERGY
IDAHO OPERATIONS OFFICE
UNDER CONTRACT DE-AC07-94ID13223


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## DISCLAIMER

## Executive Summary

Introduction

The decision was announced on April 28, 1992 to cease all United States Department of Energy (DOE) reprocessing of nuclear fuels. This decision leads to the deactivation of all fuels dissolution, solvent extraction, krypton gas recovery operations, and product denitration at the Idaho Chemical Processing Plant (ICPP). The reprocessing facilities will be converted to a safe and stable shutdown condition awaiting future alternate uses or decontamination and decommissioning (D&D).

This ICPP Deactivation Plan includes the scope of work, schedule, costs, and associated staffing levels necessary to achieve a safe and orderly deactivation of reprocessing activities and the Waste Calcining Facility (WCF). Deactivation activities primarily involve shutdown of operating systems and buildings, fissile and hazardous material removal, and related activities. A minimum required level of continued surveillance and maintenance is planned for each facility/process system to ensure necessary environmental, health, and safety margins are maintained and to support ongoing operations for ICPP facilities that are not being deactivated.

Management of the ICPP was transferred from Westinghouse Idaho Nuclear Company, Inc. (WINCO) to Lockheed Idaho Technologies Company (LITCO) on October 1, 1994 as part of the INEL consolidated contract. This revision of the deactivation plan (formerly the Nuclear Fuel Reprocessing Phaseout Plan for the ICPP) is being published during the consolidation of the INEL site-wide contract and the information presented here is current as of October 31, 1994. LITCO has adopted the existing plans for the deactivation of ICPP reprocessing facilities and the plans developed under WINCO are still being actively pursued, although the change in management may result in changes which have not yet been identified. Accordingly, the contents of this plan are subject to revision. In particular, staffing, retraining, stakeholder communication and management plans can be expected to undergo further development. Changes resulting from the consolidation which affect this plan will be incorporated in the next update.

Planning Guidance

The overall deactivation plan was prepared based on DOE direction received in the Action Memorandum, "A Decision on Phaseout of Reprocessing at the Savannah River Site (SRS) and the Idaho National Engineering Laboratory (INEL) is Required" [Memorandum, R. A. Claytor, April 28, 1992, see Appendix A].

Based on the cited memorandum and other direction from DOE, Office of Defense Programs (DP), this plan addresses the transfer of surplus facilities to DOE, Office of Environmental Restoration and Waste Management (EM) control. This transfer became effective at the beginning of fiscal year 1993.

Plan Objectives

For the purposes of this document, deactivation is assumed to cover:

- Final process operations, including final uranium collection and solidification, needed to convert in-process materials to a stable storage form and achieve a final accountability measurement, and
- Process system clean-out necessary to ensure the safety of the public, the in-plant work force, and the environment.

Although detailed characterization of facility status is not included in this plan, substantial process knowledge has been used to determine when a facility can be considered safe and stable.

This plan does not address, in detail, the personnel impacts resulting from cessation of reprocessing. Proposals for utilization of personnel displaced by the cessation of reprocessing are addressed in the Idaho Chemical Processing Plant Transition Plan (March 1994) and are consistent with current understandings of possible new programs and missions. Training and job placement services, as covered by Public Law 101-189 (see 42 USCA 7274 b (a)), are addressed in the transition plan.

This plan does not address associated issues which arise from the decision to stop reprocessing activities. These include:

- Storage, treatment and ultimate disposal of spent nuclear fuels
- Ultimate disposition of recovered uranium trioxide ($UO_3$) product.

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

| | |
|---|---|
| CPP-601 | (Separations Facilities, except the WG/WH Waste Tanks and parts of the Process Make-Up Area) |
| CPP-602 | (Denitrator area only) |
| CPP-604 | (Rare Gas Plant only) |
| CPP-627 | (Hot Chemistry Lab only) |
| CPP-631 | (RALA Off-Gas Blower Room) |
| CPP-633 | (Waste Calcining Facility) |
| CPP-640 | (Headend processes, principally ROVER) |
| CPP-666 | (Fluorinel Dissolution Process (FDP) section only) |
| CPP-685 | (PMCS computer building) |
| CPP-691 | (Fuel Processing Facility) |
| CPP-1614 | (FDP Acid Pumphouse) |
| CPP-1633 | (Sample Station/VES-CS-169) |

Tables 1, 2, 3, and 4 in the Plan Description section describe the expected end condition for each of these facilities following deactivation.

Physical Work Scope

Major actions included in the ICPP Deactivation Plan are:

- Conversion of uranium-bearing or uranyl nitrate solutions presently in the CPP-601 processing systems to solid uranium trioxide ($UO_3$) and packaging this material for long-term on-site storage or off-site shipment.

- Removal and disposition of residual fissile materials and hazardous chemicals from process systems. Where appropriate, systems will be or have been isolated by insertion of blind flanges or blanks. Removal of fissile materials from the process system and the final uranium accountability is considered to be the last process step.

- Clean-up of temporary out-of-cell radiation zones in affected facilities and stabilization of permanent radiation zones to preclude radiological migration to the environment.

- Shutdown and surveillance, as necessary, of ICPP systems that will not be required to be operational after flushing and cleanout.

- Removal or stabilization of mixed waste at the WCF.

- Removal and excess of unnecessary process chemicals and spare parts.

Status

Significant progress has been achieved since the inception of reprocessing deactivation at the ICPP. The Second/Third Cycle Extraction and Product Denitration Process campaigns have been successfully completed at CPP-601/602. These processes were run as the final stages of the uranium sweepdown in CPP-601 for fissile material accountability. The majority of the system flushes have been completed and mechanical removal of the residual uranium trioxide in the denitrator is in progress.

Two facilities have completed the transition to deactivation. The Rare Gas Plant is deactivated and in a safe and stable shutdown mode requiring minimal monitoring. The Hot Chemistry Lab has also been deactivated and CPP-627, which housed the HCL, is being evaluated for alternate uses. A third facility, the Fuel Processing Facility, which was never finished, is also undergoing evaluation for alternate uses. A fourth facility, the Fluorinel Dissolution Process, has been deactivated with the exception of HEPA filter removal and the disposition of approximately 3000 gallons of unused hydrofluoric acid reagent. The hydrofluoric acid is scheduled to be shipped off-site as a commercial product for use in other industries by the end of November, 1994.

The conceptual design for uranium removal in the ROVER Process was completed in FY-94. Cell entries were made to obtain material samples to support uranium removal and planning for asbestos and filter media disposition. Resolution of these technical issues, in addition to the resolution of accountability and sampling issues, will be used to complete the advanced conceptual design for uranium removal in FY-95.

The feasibility study for the Waste Calcining Facility deactivation plan was completed in FY-94. Additionally, remote inspections of selected WCF cells, vessels, and piping systems were performed in May and June of 1994 and the results are summarized in the Waste Calcining Facility Remote Inspection Report (August, 1994). The results of the feasibility study and remote inspections are being used to prepare a conceptual design for facility deactivation in FY-95.

## Plan Review and Confirmation

The budget and staffing levels cited in this plan were prepared by WINCO via resource loading of schedules and support activities. WINCO sought input from other DOE facilities undergoing deactivation. Hanford N-Reactor and PUREX representatives have reviewed and commented on the plan. Representatives from Fernald and Savannah River (F-Canyon and H-Canyon) have also provided comments.

The budget figures included in the initial deactivation document (dated October 1992) were validated by WINCO review. WINCO review was followed by DOE-ID and DOE-HQ reviews. The budget figures included in this revision are based on information and experience gained since the initial plan was approved.

## High-Level Waste Generated During Deactivation

Deactivation activities will generate both low- and high-level liquid radioactive wastes. Low-level wastes are boiled down in the Process Equipment Waste (PEW) Evaporator. The low-level wastes generated from deactivation will be primarily water and will not contribute significantly to high-level waste after boil-down in the PEW Evaporator. The high-level wastes will consist of nitric acid solutions, which will be stored in the tank farm for eventual solidification in the New Waste Calcining Facility (NWCF). Significant sources of low-level and high-level liquid wastes resulting from deactivation are summarized below.

| Facility/Activity | Low-Level Liquid Waste (gallons) | High-Level Liquid Waste (gallons) |
|---|---|---|
| CPP-601/Acid Stripping & Extraction | 13,000 | 4,600 |
| CPP-602/Denitration | 150,000 | 0 |
| CPP-601/Sweepdown Rinses | 5,500 | 2,400 |
| CPP-666/Sweepdown Rinses | 1,500 | 100 |
| CPP-633/Deactivation | 171,000 | 37,350 |
| Totals | 341,000 | 44,450 |

Assumptions

The key assumptions used to prepare this report are listed below. Any change to the assumptions could alter the required schedule or budget. Other general assumptions are listed in appropriate chapters of the report and supplement the key assumptions.

Key assumptions upon which this plan is based are:

1. Activities that will be performed during deactivation are adequately covered by existing National Environmental Policy Act (NEPA) documentation and it will not be necessary to develop additional NEPA documents. This includes stabilization of the WCF, although RCRA closure of the WCF will require additional NEPA support which is being developed as part of the ER&WM EIS. All activities will be further evaluated for NEPA and, if necessary, analyses will be conducted to determine whether or not the proposed action is an allowable interim action under 40 CFR 1506.1 and, therefore, eligible as an interim action under the ER&WM EIS or the EM Programmatic EIS.

2. The existing ICPP Final Safety Analysis Report (FSAR) and Technical Specifications/Standards (TS/S) describe the safety envelope for cleanout operations in the FDP and Separations areas, and will not require rewrite for deactivation. After deactivation, the FSAR will be revised to reflect the shutdown status of FDP and Separations processes and equipment. The deactivation of WCF will require a revision to the FSAR.

3. The Land Disposal Restriction (LDR) extension (O. D. Green [Idaho DEQ] letter, November 27, 1992, to M. B. Hinman [DOE Environmental Support Division]) or an equivalent agreement allowing uranyl nitrate solution processing, flushing of cells and other LDR waste generating activities, will remain in effect for the duration of deactivation activities. Land Disposal Restrictions are described under Plan Description, Section 1 - Environmental Regulatory Status.

4. Operational Readiness Reviews (ORR) will be required prior to final process operations (e.g. Second and Third Cycle Extraction and denitrator). ORRs are not required for system component flushes. LITCO

will conduct internal process validation review(s) prior to initiating flushes.

5. Special nuclear material will remain on the ICPP site and its secured storage will be maintained. Some material may be shipped off-site at DOE's discretion.

6. The workforce will not be significantly affected. Displaced staff/workforce supporting the defense mission will conduct deactivation activities and then transition to the spent fuel technology and waste management activities or other available ICPP or INEL work.

Further discussion of these key assumptions can be found in the Introduction.

Funding

Funding dedicated to deactivation activities consists of those funds used to bring surplus facilities and processes to a safe and stable shutdown condition awaiting future alternate uses or decontamination and decommissioning (D&D). Surplus facilities and processes at the ICPP currently consist of those activities described above in "Plan Objectives," whose historical missions have been terminated or suspended by DOE. Other ICPP missions such as spent fuel and waste management, and support functions such as utilities, will not be deactivated. Hence, they are not addressed in this plan. Broader impacts of the deactivation are addressed in the Idaho Chemical Processing Plant Transition Plan (March 1994). The funding plan for the ICPP deactivation work is described in the Activity Data Sheets (ADS) ID-6324, "Deactivation and Compliance," and ID-6323, "Surveillance and Maintenance." Funding for deactivation comes from EM-60. A summary of major funding sources and the ICPP's total operating funding are presented below:

Projected ICPP Funding Allocation

| Operating Expense | FY-94 | FY-95 | FY-96 | FY-97 |
|---|---|---|---|---|
| | $ M | $ M | $ M | $ M |
| EM-30 | 96.9 | 95.1 | 103.9 | 97.3 |
| EM-60 | 79.1 | 84.0 | 83.5 | 78.5 |
| DP | 8.3 | 9.1 | 8.5 | 8.8 |
| ICPP TOTAL | 184.3 | 188.2 | 195.9 | 184.6 |

(For capital equipment and project funding requirements, see Section 11)

The budgets planned by program for the ICPP are shown on the following page.

Idaho Chemical Processing Plant
Operating Expenses and FTEs by Program

| Program | FY 94 (Actual) | | FY 95 (Budget) | | FY 96 (Budget) | | FY 97 (Budget) | |
|---|---|---|---|---|---|---|---|---|
| | FTE | $M | FTE | $M | FTE | $M | FTE | $M |
| Utilities | 125 | 19.6 | 146 | 19.4 | 145 | 18.9 | 149 | 18.1 |
| Support Services | 412 | 48.7 | 414 | 49.6 | 412 | 48.5 | 423 | 46.3 |
| Facility Deactivation | 111 | 12.7 | 150 | 16.2 | 117 | 17.2 | 112 | 15.2 |
| Fuel Receipt and Storage | 251 | 30.8 | 211 | 29.2 | 235 | 31.8 | 223 | 29.8 |
| Waste Operations | 320 | 39.5 | 368 | 43.9 | 412 | 48.1 | 390 | 45.1 |
| Spent Fuel and Waste Management | 143 | 24.7 | 114 | 20.9 | 126 | 22.8 | 120 | 21.3 |
| Security Services | 36 | 8.3 | 35 | 9.1 | 37 | 8.6 | 37 | 8.8 |
| TOTAL | 1398 | 184.3 | 1438 | 188.3 | 1484 | 195.9 | 1454 | 184.6 |

## Budget Risks

Some key budget/cost risks for this plan cannot be quantified at this time. These unquantified budget/cost risks are: (1) additional work may be required by DOE or DNFSB reviews; (2) possible added, new NEPA supporting documentation would have an impact; (3) new regulatory or legal restrictions on waste generation or related deactivation activities could significantly affect the deactivation schedule; and (4) final disposition for ROVER and WCF have not been completely determined and the initial cost estimates of the alternatives under consideration vary widely.

## Retraining/Staffing

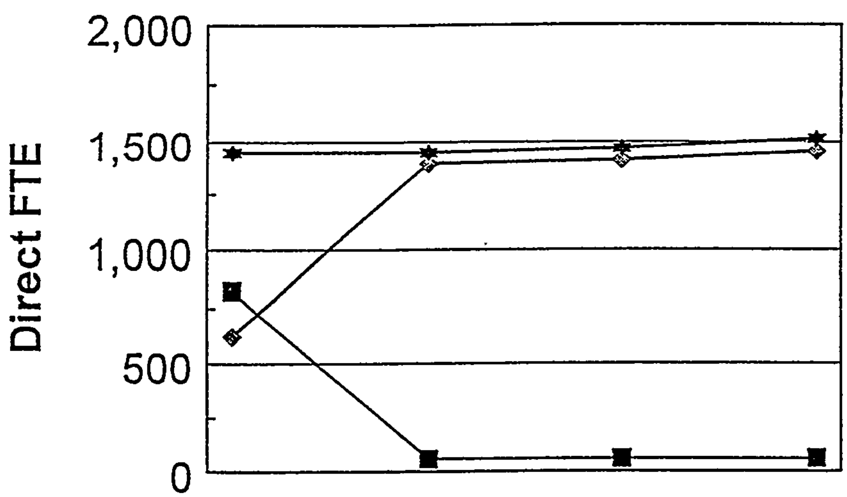
ICPP personnel who are no longer needed as a result of deactivation will be retrained wherever possible to work on other activities. Potential activities include: 1) Enhanced staffing for Fuel Handling Areas to support required fuel movement from CPP-603, 2) Utilization of personnel to support the Spent Fuel/Waste Management Technology Development Program, and 3) Replacements for personnel turnover in the Waste Processing and Utilities areas. Current estimates project little growth in the total workforce, although the skill mix is expected to shift slightly in favor of more engineers and scientists.

Staffing

The composite staffing, by DOE program, is shown below. Only direct charging personnel are included. Direct personnel are assigned to a specific charge account as opposed to the approximately 300 indirect personnel who are assigned to overhead functions. Workforce numbers for 1993 and 1994 are based on actual figures and future numbers are based on the assumption that out-year budgets meet projected levels. Reorganization under consolidation may affect these numbers significantly, and future comparisons will be difficult as many of the personnel counted here will be matrixed in a broader, site-wide organization.

**Idaho Chemical Processing Plant**

Direct Staffing




| | FY 93 | FY 94 | FY 95 | FY 96 |
|---|---|---|---|---|
| DP ■ | 825 | 58 | 59 | 61 |
| EM ◆ | 623 | 1,393 | 1,410 | 1,454 |
| TOTAL ✱ | 1,448 | 1,449 | 1,469 | 1,515 |

## Acronyms and Abbreviations

| | |
|---|---|
| ALARA | As Low As Reasonably Achievable |
| CAMP | Capital Asset Management Plan |
| CAS | Criticality Alarm System |
| CCA | Criticality Control Area |
| CE | Capital Equipment |
| CFSGF | Coal Fired Steam Generating Facility |
| D&D | Decontamination and Demolition |
| DEQ | Department of Environmental Quality for the State of Idaho |
| DNFSB | Defense Nuclear Facilities Safety Board |
| DOE | United States Department of Energy |
| DOG | Dissolver Off Gas |
| DP | Defense Programs |
| DPSE | Data Processing Enhancement System |
| EA | Expenditure Authorization |
| EIS | Environmental Impact Statement |
| EM | Environmental Restoration and Waste Management Program |
| EPA | Environmental Protection Agency |
| ER&WM | Environmental Restoration and Waste Management |
| FAST | Fluorinel and Storage Facility |
| FDP | Fluorinel Dissolution Process |
| FPF | Fuel Processing Facility |
| FPR | Fuel Processing Restoration Project |
| FSA | Fuel Storage Area |
| FSAR | Final Safety Analysis Report |
| GPP | General Plant Project |
| HCL | Hot Chemistry Lab |
| HEPA | High Efficiency Particulate Air |
| HLLW | High-Level Liquid Waste |
| HQ | Headquarters |
| HVAC | Heating, Ventilation and Air Conditioning |
| ICPP | Idaho Chemical Processing Plant |
| IFSF | Irradiated Fuel Storage Facility |
| INEL | Idaho National Engineering Laboratory |
| LDR | Land Disposal Restricted |
| LET&D | Liquid Effluent Treatment and Disposal Facility |
| LI | Line Item |
| LITCO | Lockheed Idaho Technologies Company |
| MHC | Mechanical Handling Cave |

| | |
|---|---|
| NEPA | National Environmental Policy Act |
| NWCF | New Waste Calcining Facility |
| OREs | Operational Readiness Evaluations |
| ORR | Operational Readiness Review |
| OSHA | Occupational Safety and Health Act or Administration |
| PEW | Process Equipment Waste |
| PM | Preventive Maintenance |
| PMCS | Process Monitoring Computer System |
| POG | Process Off Gas |
| RAL | Remote Analytical Laboratory |
| RCRA | Resource Conservation and Recovery Act |
| RGP | Rare Gas Plant |
| ROVER | Headend process for ROVER rocket fuel |
| RWMC | Radioactive Waste Management Complex |
| S&M | Surveillance and Maintenance |
| SNM | Special Nuclear Material |
| SRS | Savannah River Site |
| TIF | Task Identification Fact Sheet |
| TRU | Transuranic Waste |
| TSA | Technical Safety Appraisal |
| TS/S | Technical Specifications and Standards |
| UNH | Uranium bearing solutions |
| $UO_3$ | Uranium trioxide |
| WCF | Waste Calcining Facility |
| WINCO | Westinghouse Idaho Nuclear Company, Inc. |
| WO | Work Order(s) |

## TABLE OF CONTENTS

## Introduction

### 1. Description of the Plan

The decision to cease reprocessing of DOE-assigned nuclear fuels leads to the deactivation of all fuel dissolution, solvent extraction, krypton gas recovery operations, and product denitration. The reprocessing facilities, as well as the WCF, which ceased operations in 1981, will be configured in a safe and stable shutdown condition awaiting future alternate uses or D&D.

This plan outlines the actions that have been, or will be taken, at the ICPP to deactivate all reprocessing facilities and the WCF. The plan is built around projected schedules for the primary processes and system layups as balanced with available personnel and estimates of support levels required by other ICPP and INEL programs.

Where other proposed programs exist, suggested retraining and redeployment of personnel to these programs will be discussed. Implementation of these, or alternate programs, requires specific budget and programmatic approvals and can be assumed to utilize some or all of the personnel displaced by the decision to cease reprocessing of spent nuclear fuels.

Management of the ICPP was transferred from Westinghouse Idaho Nuclear Company, Inc. (WINCO) to Lockheed Idaho Technologies Company (LITCO) on October 1, 1994 as part of the INEL consolidated contract. This revision of the deactivation plan (formerly the Nuclear Fuel Reprocessing Phaseout Plan for the ICPP) is being published during the consolidation of the INEL site-wide contract and the information presented here is current as of October 31, 1994. LITCO has adopted the existing plans for the deactivation of ICPP reprocessing facilities and the plans developed under WINCO are still being actively pursued, although the change in management may result in changes which have not yet been identified. Accordingly, the contents of this plan are subject to revision. In particular, staffing, retraining, stakeholder communication and management plans can be expected to undergo further development. Changes resulting from the consolidation which affect this plan will be incorporated in the next update.

### 2. Work scope

Major actions included in the ICPP Deactivation Plan are:

- Conversion of all uranyl nitrate solutions presently in the CPP-601 processing systems to solid uranium trioxide ($UO_3$) and packaging this material for long-term on-site storage or off-site shipment.

- Removal and disposal of residual fissile materials and process chemicals from process systems. Where appropriate, systems will be or have been isolated by insertion of blind flanges or blanks. Removal of fissile materials from the process system (including the final uranium accountability) is considered to be the last process step.

- Assessment of radiation zones to justify existence/elimination. Clean-up temporary out-of-cell radiation zones in affected facilities and stabilize in-cell permanent radiation zones as needed to preclude radiological migration to the environment.

- Shutdown and surveillance, as necessary, of any ICPP operating systems that are not required to be operational after deactivation.

- Removal and disposition of unnecessary process chemicals and spare parts.

- Removal or stabilization of mixed waste at the WCF.

- RCRA closure of five Part A permitted units in WCF.

## 3. Assumptions

The key general assumptions used to prepare this report are listed below. Any change to the assumptions could alter the schedule or required budget. Specific process-related assumptions are included in the appropriate sections of the Plan Description.

1. Activities performed during deactivation (with the exception of WCF deactivation) are covered adequately by existing NEPA documentation and it will not be necessary to develop additional NEPA documents.

   Discussion

   The majority of activities planned for deactivation (uranium solidification, process sweepdown, product packaging and storage, etc.) have been routinely performed in past ICPP operations and do not constitute any new challenges to the environment. Selected activities (e.g., WCF deactivation) will require separate NEPA evaluation. All activities will be assessed for NEPA and, if necessary, analyses will be conducted to determine whether or not the proposed action is an allowable interim action under 40 CFR 1506.1 and therefore eligible as an interim action under ER&WM EIS or the EM Programmatic EIS.

   A decision to prepare additional NEPA documentation will result in delays to the deactivation schedule, depending on the scope and type of documentation required.

2. The existing Final Safety Analysis Report (FSAR) and Technical Specifications/Standards for the ICPP describe the safety envelope for flushing operations and will not require substantial rewrite for deactivation. (This includes WCF stabilization, although RCRA closure of the WCF is a possible exception.) The FSAR will not be revised to the specific format outlined in DOE Order 5480.23 prior to deactivation activities. After deactivation, the FSAR will be revised to reflect the shutdown status of processes and equipment. The revised FSAR will comply with DOE Order 5480.23 via the ICPP implementation plan for this order, which was issued in October 1992.

Discussion

The FSAR and Technical Specifications/Standards are written in such a manner that applicable parameters are defined during both operation and shutdown. Flushing conditions correspond to operating and/or shutdown activities, which are included in these documents.

3. The LDR extension described in Plan Description, Section 1 - Environmental Regulatory Status, (or an equivalent agreement allowing uranyl nitrate processing, flushing of cells, and other LDR waste generating activities) must remain in effect throughout the duration of deactivation activities.

   Discussion

   Currently, the liquid produced by deactivation activities is considered necessary by DOE-ID and the subsequent generation is supported by the State of Idaho. The DEQ sanctioned LDR waste generation to support deactivation in the O. D. Green letter (dated November 27, 1992) to M. B. Hinman (DOE Environmental Support Division). The letter stated that "The DEQ believes that the flushing effluent, after treatment in the process equipment waste evaporator (PEW) and Liquid Effluent Treatment and Disposal (LET&D) facility, represents a reduced risk to human health and the environment when compared to the alternative of leaving the fuels in the process equipment. Therefore, the DEQ agrees that phaseout [deactivation] activities should proceed..."

4. Operational Readiness Reviews (ORR) are required prior to final process operations (e.g. Second and Third Cycle Extraction and denitrator). ORRs are not required prior to initiating system component flushes. LITCO will conduct internal process validation review(s) prior to initiating flushes.

   Discussion

   Second and Third Cycle Solvent Extraction and denitrator ORR's were conducted over the past few years. The ROVER ORR will be extensive but can be completed in the available time.

   Sweepdown of systems and components is a routine operation with minimal environmental or safety risk. An evaluation of operator training and special procedure reviews were conducted as part of an internal process validation review.

   Requiring longer ORR's than shown in the schedule will delay deactivation accordingly.

5. SNM will remain on-site and its secured storage must be maintained. Some SNM may be transported off-site at DOE discretion.

   Discussion

   LITCO is currently storing special nuclear materials (SNM) in special storage facilities at the ICPP. The following possible changes could affect this assumption, (1) SNM could be consolidated, lessening security needs. (2) SNM could be relocated to another site, lessening security needs, or (3) SNM from other sites could be relocated to the ICPP, requiring continuation of security provisions.

6. The workforce will not be significantly affected. Staff/workforce that supported defense missions in the past will conduct deactivation activities and will transfer to spent fuel technology activities or other on-going activities.

   Discussion

   The Spent Fuel/Waste Management Technology Development programs, as described in the section titled "New Programs," if funded as anticipated, will employ most displaced personnel. If funding is decreased, significant reductions in force could occur.

General Assumptions

1. Fuel Processing activities at the ICPP will be shut down and facilities brought to a safe condition with no special provisions made to maintain a restart capability.

2. All buildings will be maintained in a safe, stable condition for the workers, public, and the environment.

3. Regulations, requirements, and commitments in formal agreements will be met. This includes such things as OSHA, RCRA and other federal regulations, State of Idaho agreements, emergency preparedness regulations, and safety and security requirements.

4. Compliance with applicable DOE Orders will be maintained.

5. LDR waste curtailment must be resolved prior to any resumption of uranium nitrate solution processing or flushing of cells. (ICPP was granted LDR relief for deactivation in December 1992.)

6. The ammonium nitrate must be flushed from the main ICPP stack prior to resumption of uranium nitrate solution processing or flushing of cells and to support startup of the Liquid Effluent Treatment and Disposal (LET&D) facility needed for environmental compliance. (The ammonium nitrate flush of the main stack was completed in October, 1992, and the LET&D facility was placed in operation in January, 1993.)

7. It is assumed that the DOE off-site shipping moratorium will not impact the removal and shipment of process chemicals to an off-site facility, if required.

## Description of Surplus Facilities

The following is a description of the major facilities at the ICPP that will be surplused as a result of cessation of the nuclear fuel reprocessing mission. Small support facilities, such as the electrolytic dissolution rectifier building, will not be described in this section, but are accounted for in the deactivation planning that follows in this document. Buildings that will be deactivated are shown in Figure 1.

The Fluorinel Dissolution Process Facility (CPP-666)

The Fluorinel Dissolution Process (FDP) was one of the headend processes at the Idaho Chemical Processing Plant for the recovery of enriched uranium. FDP occupies about 41,700 $feet^2$ in the Fluorinel and Storage (FAST) Facility, CPP-666. This facility was put into hot operation in 1986 and has been operated for two successful campaigns.

The dissolution process and most supporting operations took place in the FDP area, which is on the east side of the FAST Facility. Figure 2 shows the relationship of the FDP to the FAST Facility. The upper left hand corner of Figure 3 shows the FDP layout within the floor plan of CPP-666. The FDP area has five levels:

1. Access (-31 level): 31 feet below ground level--for lower cell access, chemical waste handling, and cell off-gas filter changeouts.

2. Service (-13 level): 13 feet below ground level--for solid waste loadout, liquid nitrogen addition, lower cell remote changeouts; location of cell-wall block valves, delayed-neutron interrogator, and North Utilities Interface.

3. Operating (0'0" level): ground level--for fuel charging and interrogation, upper cell remote changeouts, process liquid sampling, major process piping and valving, and the Fluorinel Makeup (FM) Area.

4. Transmitter (+17 level): 17 feet above ground level--for instrument transmitter enclosure, hydrogen-oxygen analyzers, and the crane/PaR control modules.

5. Cell Maintenance (+28 level): 27.5 feet above ground level--for chiller systems, cell maintenance crane, cell off-gas cooling coils, and shielding door equipment enclosure.

The dissolution process occurred in the parallel operation of three independent and operationally identical dissolution systems or trains. Each of the three trains in the dissolution cell includes a dissolver and a complexer with associated instrumentation and piping. Figure 4 shows the floor plan view of the FDP Cell.

The FDP Cell walls are constructed of 5 foot thick, reinforced concrete and are furnished with shielded viewing windows for remote operations.

Figure 1

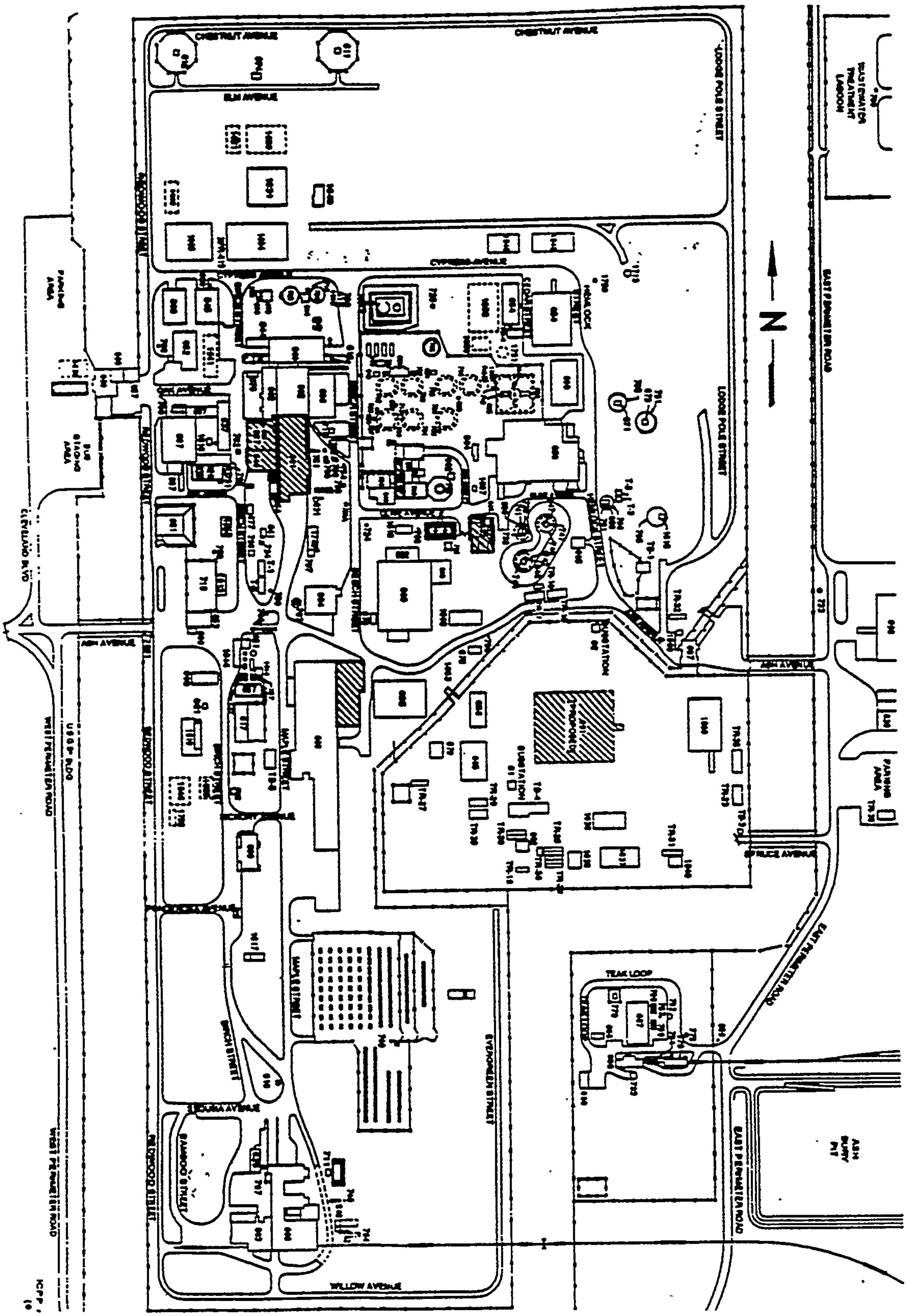
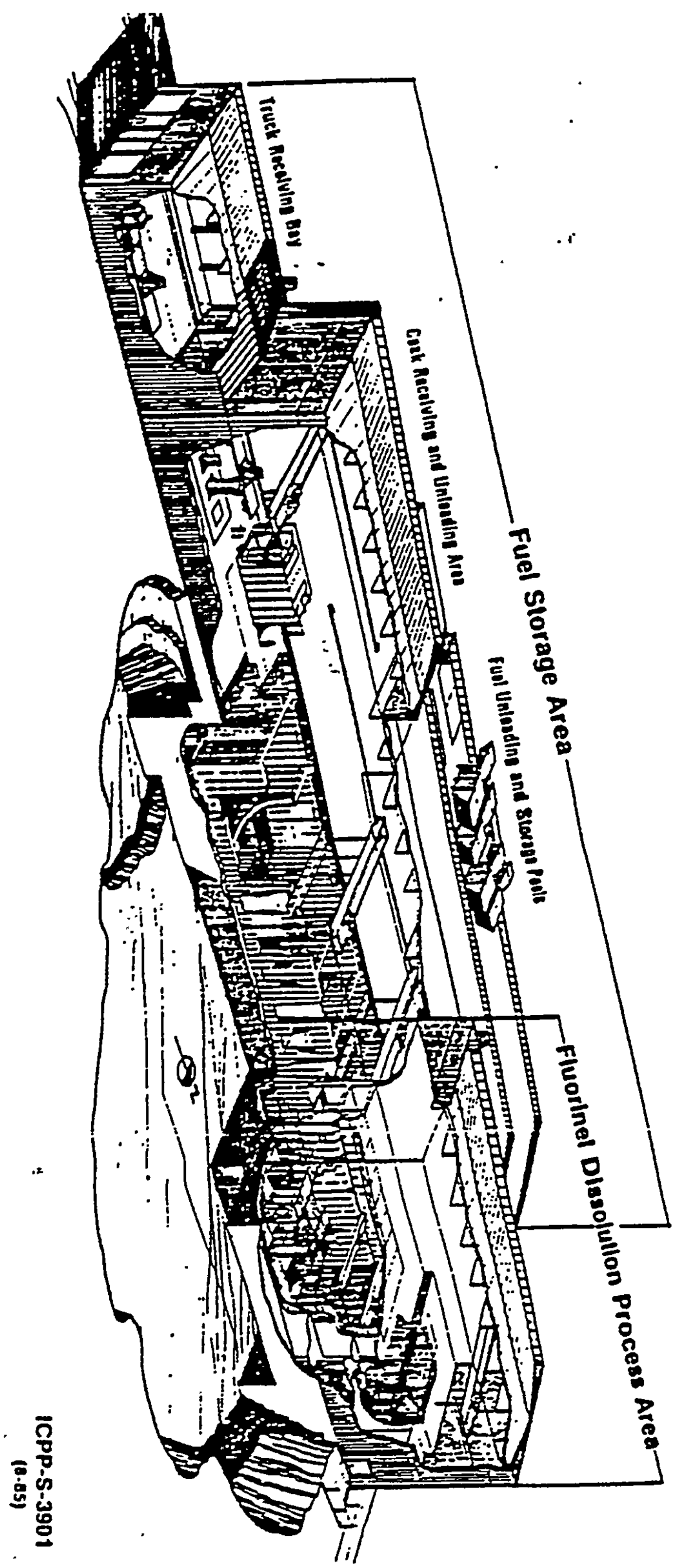
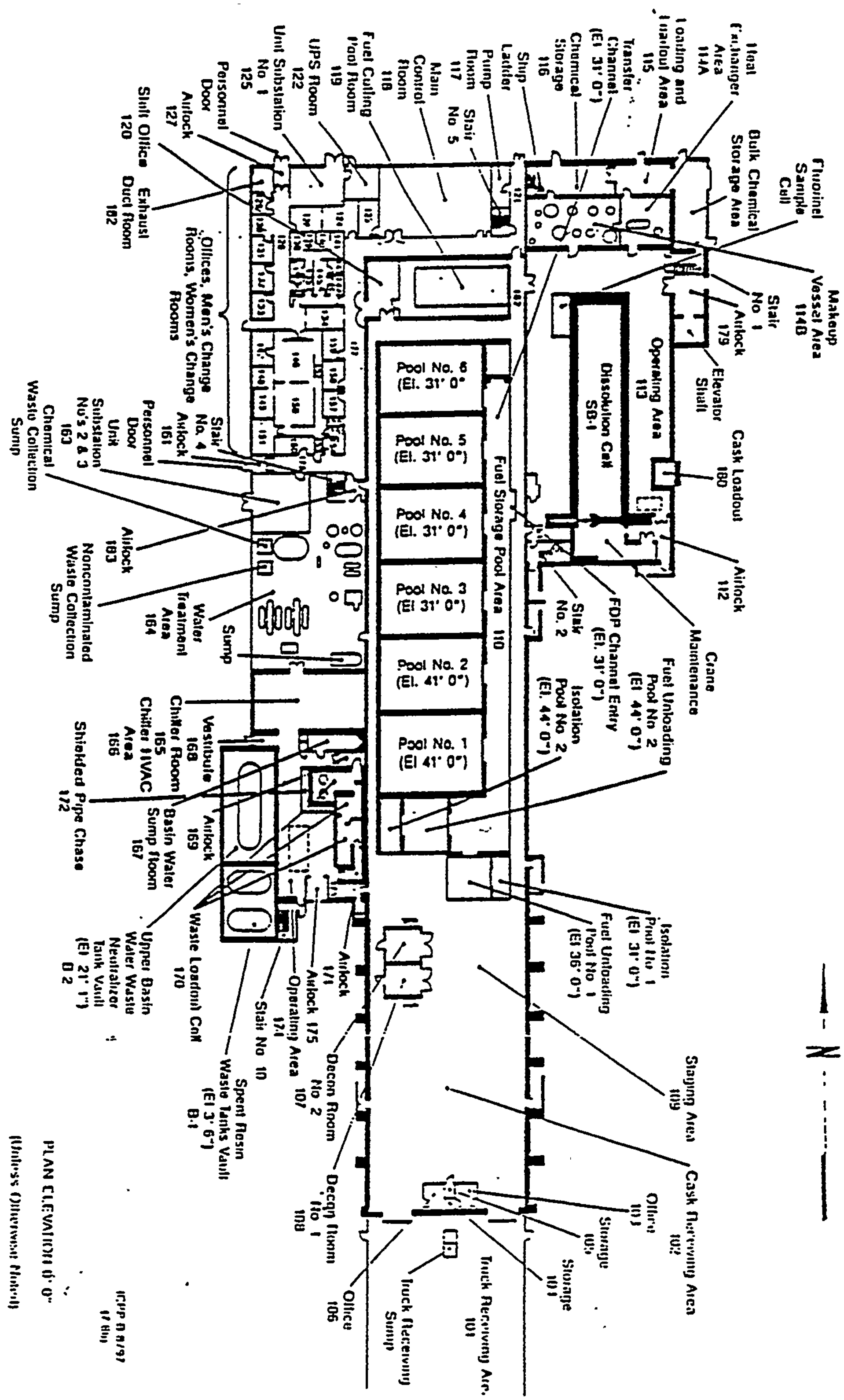


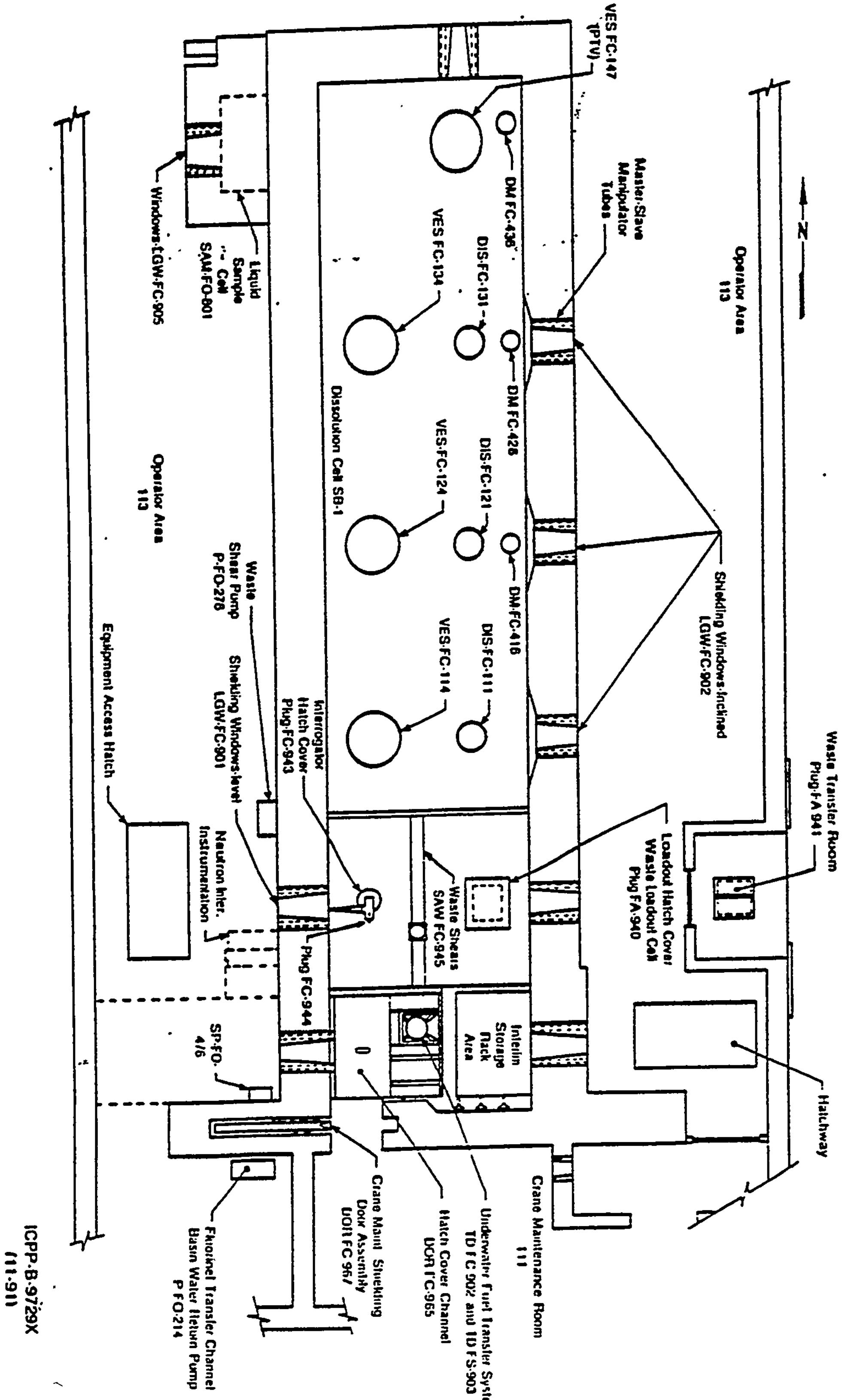
Figure 2


Truck Receiving Bay
Cask Receiving and Unloading Area
Fuel Storage Area
Fuel Unloading and Storage Pools
Fluorinel Dissolution Process Area
ICPP-S-3901
(8-85)

## Figure 3


Pool No. 6 (El. 31' 0")
Pool No. 5 (El. 31' 0")
Pool No. 4 (El. 31' 0")
Pool No. 3 (El 31' 0")
Pool No. 2 (El. 41' 0")
Pool No. 1 (El 41' 0")
Fuel Storage Pool Area 110
Dissolution Cell SB-1
Operating Area 113

## Figure 4



VES FC-147 (PTV)
DM-FC-436
VES FC-134
DIS-FC-131
Master-Slave Manipulator Tubes
Operator Area 113
N
Liquid Sample - Cell SAM-FO-801
Windows-LGW-FC-905
DM-FC-426
VES-FC-124
DIS-FC-121
Dissolution Cell SB-1
Operator Area 113
Shielding Windows-Inclined LGW-FC-902
DM-FC-416
DIS-FC-111
VES-FC-114
Waste Shear Pump P-FO-276
Shielding Windows-level LGW-FC-901
Interrogator Hatch Cover Plug-FC-943
Equipment Access Hatch
Neutron Inter. Instrumentation
Plug FC-944
Waste Shears SAW-FC-945
Loadout Hatch Cover Waste Loadout Cell Plug FA-940
Hatch Cover Waste Transfer Room Plug-FA-941
Hatchway
Interim Storage Rack Area
SP-FO-476
Crane Maintenance Room 111
Underwater Fuel Transfer System TD FC-902 and TD FS-903
Hatch Cover Channel DOR FC-965
Crane Maint. Shielding Door Assembly DOR FC-967
Fluorinel Transfer Channel Basin Water Return Pump P FO-214
ICPP-B-9729X (11-91)

The cell was designed for remote operation and remote replacement of most equipment. The top of the cell is high enough to provide space for manipulating fuel units in the cell and for removing process vessels. Cranes, master-slave manipulators, and an electromechanical (PaR) manipulator were used for remotely charging the fuel and for performing routine equipment changeouts in the dissolution cell.

The FDP process vessels were heated or cooled as required, by two independently operated heat-transfer loops--one for heating and one for cooling. The heat-transfer medium was water poisoned with enriched boron. This enriched-boron solution was continuously circulating through the headers and was available for heating or cooling the dissolver and complexer jackets, and for cooling condensers and the off-gas scrubbers.

The reagents used in the Fluorinel Dissolution Process were hydrofluoric acid (HF), aluminum nitrate ($Al[NO_3]_3$), nitric acid ($HNO_3$), and cadmium-sulfate ($CdSO_4$) poisoned water. The HF and $HNO_3$ were used for the dissolution of the fuel elements and $Al[NO_3]_3$ for complexing the free HF in the product solution. The poisoned water was used for rinses or dilution. HF is poisoned with fluoboric acid ($HBF_4$) and the nitric acid and aluminum nitrate were poisoned with cadmium nitrate ($Cd[NO_3]_2$). A poison monitoring system (PMS) monitored the poison concentrations of the different reagents.

These reagents were prepared for process use in the Fluorinel Makeup (FM) area. The FM area is located just north of the FDP Cell. The FM area occupies the operating (0'0") and transmitter (+17) levels in the northeast corner of the FAST Facility.

Room 114C houses the bulk chemical storage vessels for cadmium nitrate and cadmium sulfate and is designed for safe handling of the cadmium solutions. The two bulk chemical storage vessels, VES-FM-170 and VES-FM-179, sit within a 5-foot-deep stainless-steel-lined containment area that holds 10% more volume than the capacity of either tank. The floor of the containment area slopes to the pump pit, located just north of VES-FM-179. The drum-unloading station sits over a stainless-steel-covered pan in the containment area, which drains leak solution to the pump pit.

The bulk chemical storage vessels for hydrofluoric acid, fluoboric acid, aluminum nitrate, and nitric acid, are located outside the FAST building on the northwest side. Each of these vessels sits within a lined secondary containment.

The FDP liquid waste handling system contains facilities for the collection of all liquid wastes produced during reagent makeup, fuel processing, and decontamination or cleanup operations. The FDP produced radioactive liquid wastes disposed of through equipment in the FDP Cell and nonradioactive waste that was transferred to either the high-fluoride waste tank (VES-FA-141) or the cadmium waste tank (VES-FA-142). Each of the liquid waste systems includes equipment to transfer the FDP waste to existing ICPP waste treatment facilities.

Separations Facilities (CPP-601)

A floor plan view of the CPP-601 facility is shown in Figure 5. The Process Building contains 29 process cells, (most of which are typically about 20 foot square and 28 foot deep), numerous corridors, and auxiliary cells that house equipment and controls. The bottom of each cell is lined with stainless steel, and most of the equipment is stainless steel. Most of the processing equipment in the building is located in heavily shielded cells and must be operated remotely. The entire plant was designed with a direct-contact maintenance philosophy, i.e., maintenance is performed by direct manual contact only during periodic shutdowns, and then only after the particular cell and equipment have been decontaminated to reduce radiation fields. The process equipment is simplified (a minimum of moving parts) as much as possible to minimize breakdowns and to facilitate decontamination.

Architecturally, CPP-601 consists of two levels. The lower level (largely below ground) is constructed of reinforced concrete, and the upper level (aboveground), of Transite and structural steel. The building is rectangular: 244 x 102 feet and a maximum of 95 feet 3 in. high, extending from 57 feet 6 in. below grade to 37 feet 9 in. above grade at the peak of the roof. [The grade elevation at ICPP, assigned 0 feet 0 in. elevation, is equivalent to 4917 feet above mean sea level.]

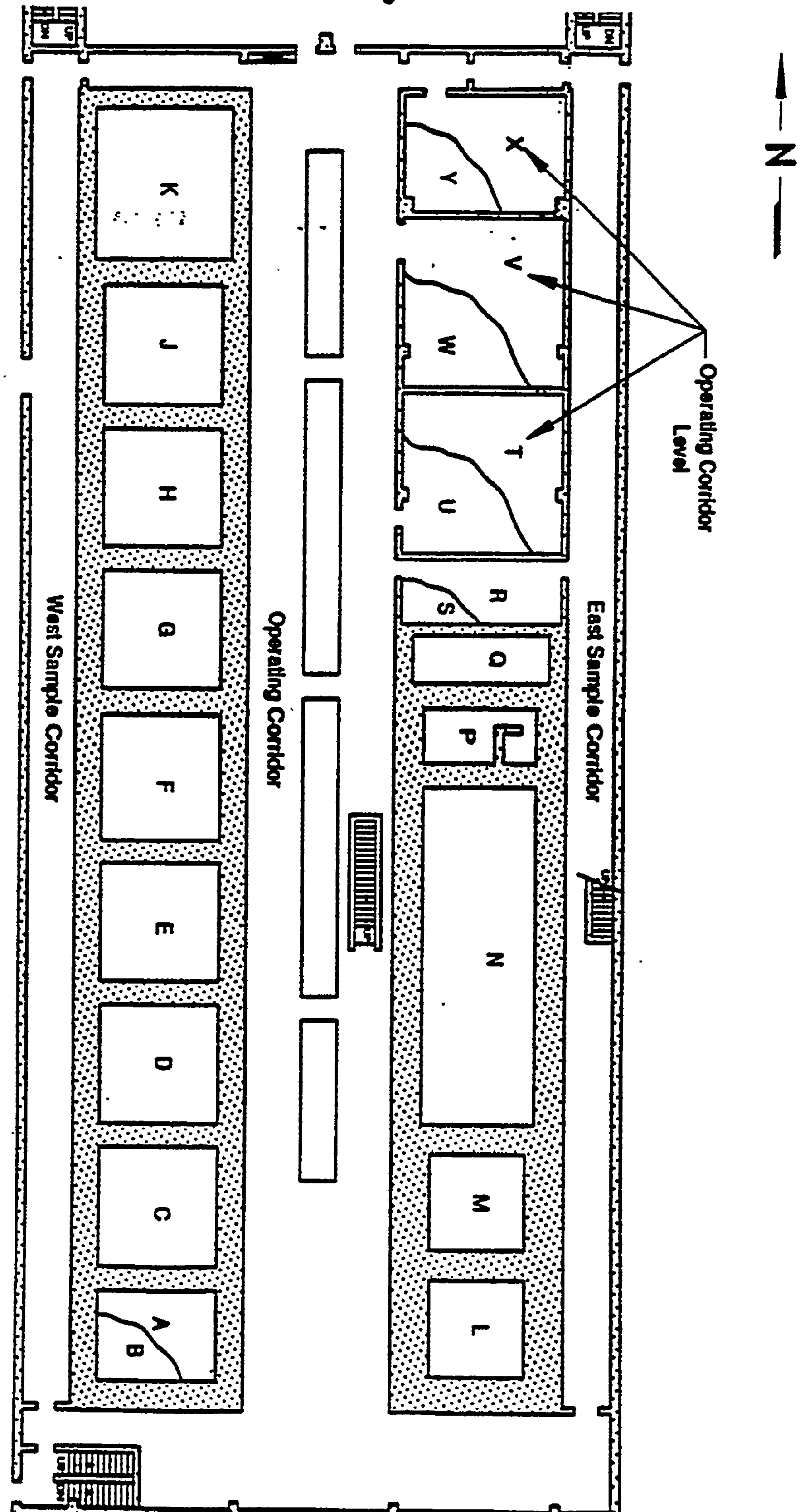
The in-cell equipment is controlled from an operating corridor, which runs the length of the building between cells and contains graphic control panels, control and monitoring instrumentation, and pneumatic-valve-control stations for regulating the flow of liquids through the process. Below the operating corridor is the service (piping) corridor and cell access corridor; sampling and cell ventilation corridors are located outside the row of cells. The top story of the building is an unpartitioned area for reagent storage and makeup and for charging of fuel elements into the cells.

Previously Decontaminated and Decommissioned Systems (Cells A, B and D)

Operations in Cells A, B and D were discontinued many years ago. In the late 1970s and early 1980s these cells were decontaminated and decommissioned (D&D) and presently contain no process equipment. Little effort, aside from a water flush of the cell floor and sump is planned for these cells.

A-Cell is approximately 15 feet by 19 feet by 16 feet high. B-Cell is approximately 15 feet by 19 feet by 17 feet high. A-Cell is directly above B-Cell. D-Cell is 20 feet by 19 feet by 28 feet high.

Figure 5


N
Operating Corridor Level
West Sample Corridor
Operating Corridor
East Sample Corridor
K
J
H
G
F
E
D
C
A
B
X
Y
V
W
T
U
R
S
Q
P
N
M
L

Original Zirconium Dissolution (E-Cell)

The equipment for the original semicontinuous zirconium process is located primarily in E-Cell with utility and chemical makeup facilities in the process makeup (PM) area. A schematic for this dissolution system is shown in Figure 6.

E-Cell, the fourth cell on the west side of the process building (CPP-601), has floor dimensions of 20 by 19 feet and is 28 feet high. The walls between the cells and the process access and process operating corridors are 5 feet thick. Personnel access to the cell is through a labyrinth from the process access corridor, while equipment access is through a 5 x 5 foot hatch in the ceiling. The floor and lower 9-1/2 feet of the cell walls are lined with stainless steel. The cell is vented to the west vent tunnel (cell off-gas system or COG) through a louvered vent in the west cell wall.

Feed Clarification System (F-Cell)

The feed clarification system is located in F-Cell and contains centrifuge equipment. F-Cell is 19 feet by 20 feet by 28 feet high. The cell floor is covered with a stainless steel liner that extends 10 feet 2 in. up each wall. The cell wall adjacent to the operating corridor is honeycombed with offset pipe sleeves for the entrance and exit of utility, process, and instrumentation lines. The cell floor is pitched so that solution will drain to the geometrically favorable sump. The sump is instrumented with a liquid level alarm and equipped with jets to transfer the sump contents to the Process Equipment Waste (PEW) system. A schematic of the feed clarification system is shown in Figure 7.

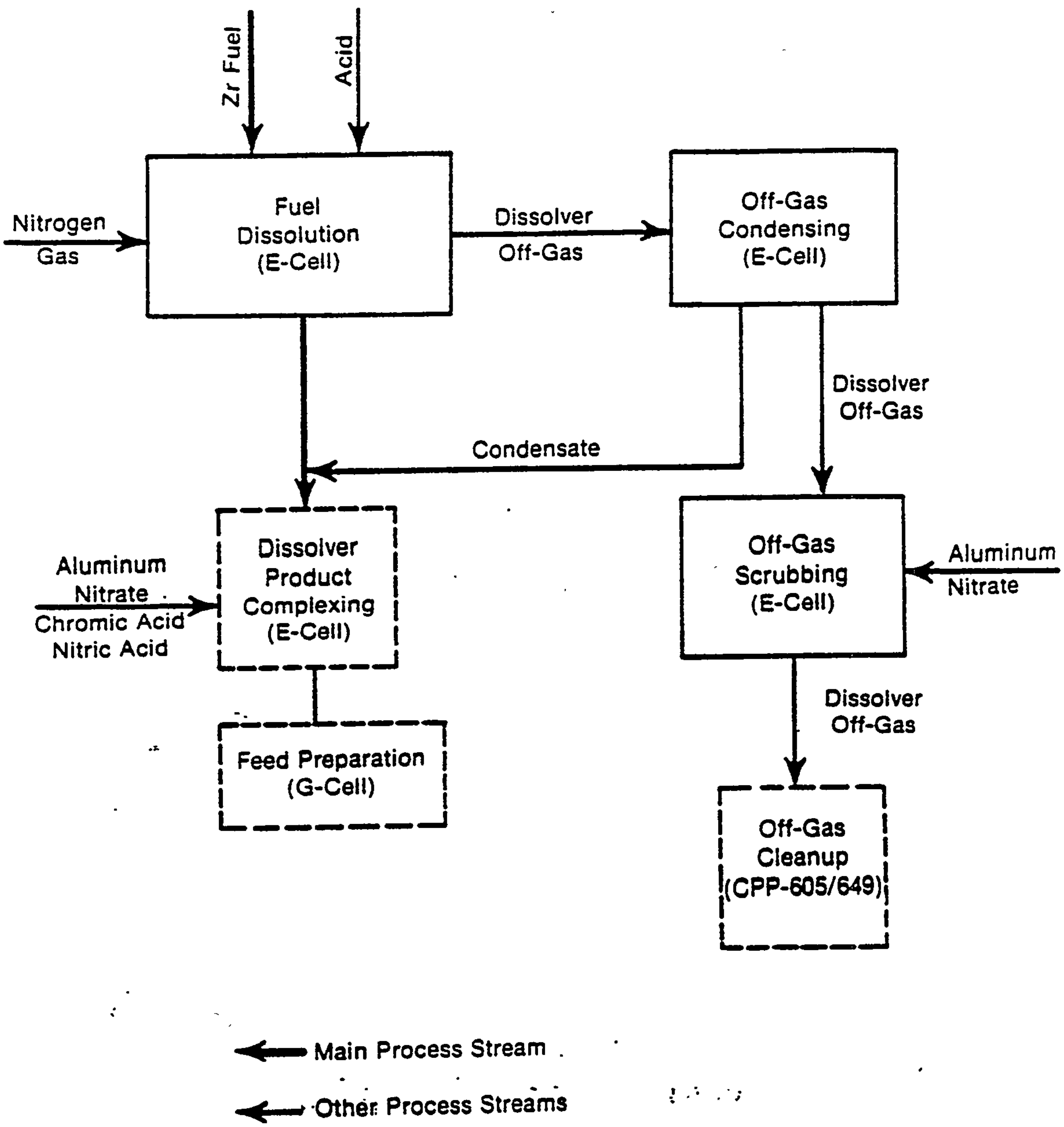
Aluminum Dissolution (G-Cell)

The continuous aluminum-alloyed fuel dissolution equipment is located principally in G-Cell and the heated digestion tanks are located in E-Cell of building CPP-601. Chemical makeup facilities for the process are located above G-Cell in the process makeup (PM) area. A schematic diagram of the process system showing major components and instrumentation is shown in Figure 8.

G-Cell is 20 feet by 19 feet by 28 feet in height. The north and south walls are each 4 feet thick, and the east and west walls and the ceiling are 5 feet thick; all are constructed of reinforced concrete to provide shielding of personnel from radiation emitted by fission products in the fuel.

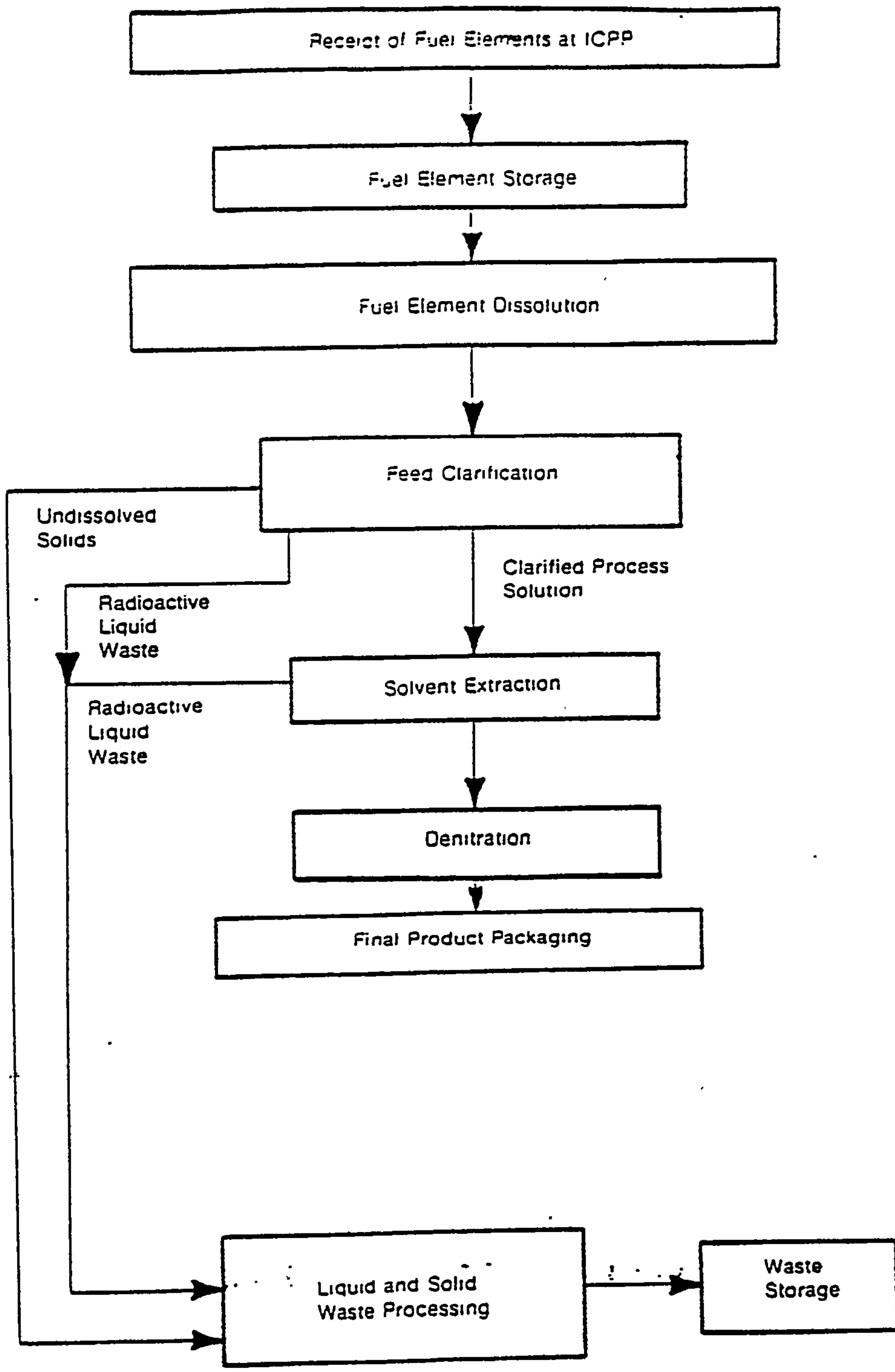
Personnel access to the cell is through a labyrinth from the access corridor and equipment access is through a 5 by 5 feet hatch in the cell ceiling. The walls, to a height of 10 feet 2 in., and the floor of G-Cell are stainless steel lined. The cell is vented to the west vent corridor.

Figure 6



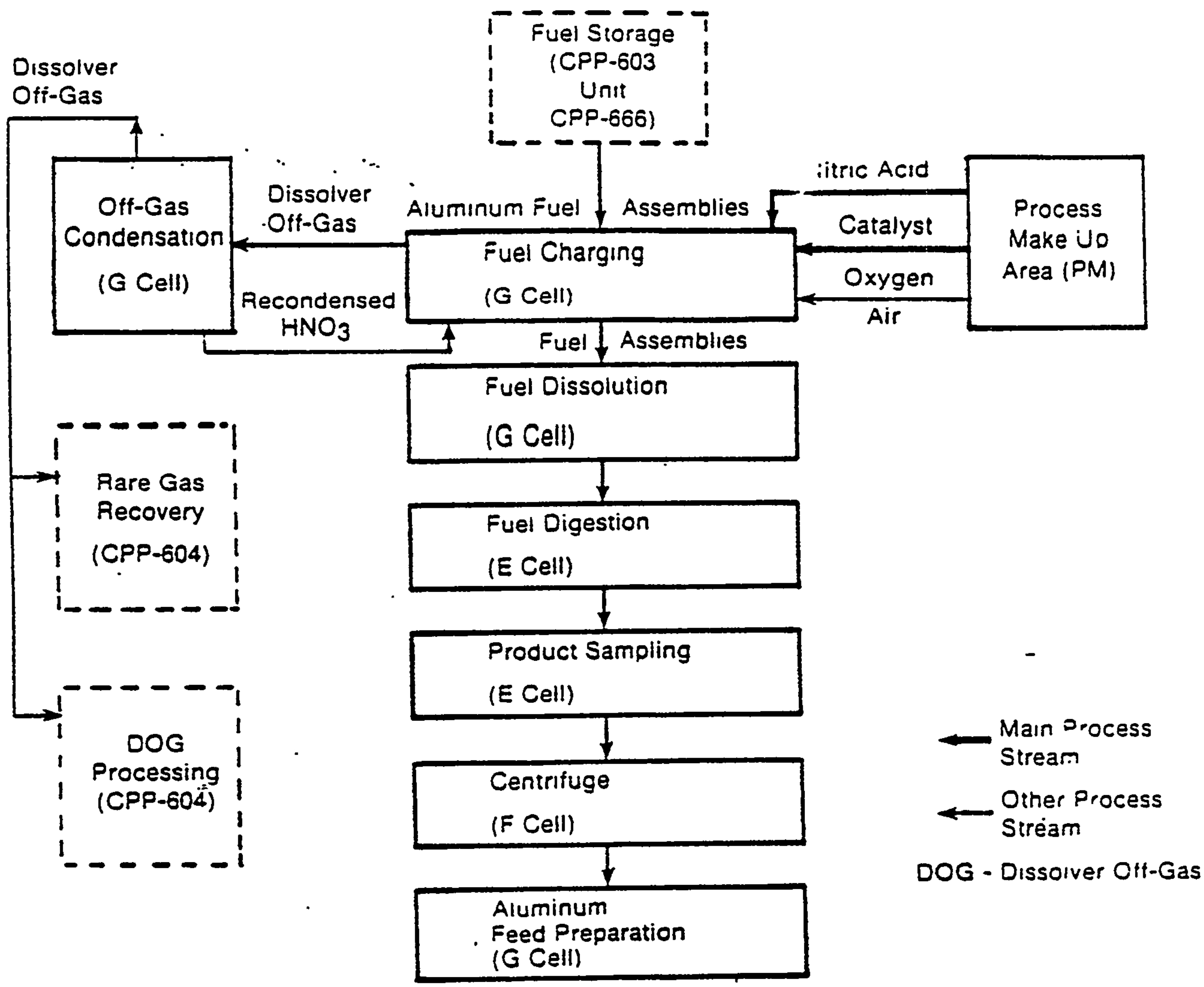
Zr Fuel
Acid
Nitrogen Gas
Fuel Dissolution (E-Cell)
Dissolver Off-Gas
Off-Gas Condensing (E-Cell)
Dissolver Off-Gas
Condensate
Aluminum Nitrate
Chromic Acid
Nitric Acid
Dissolver Product Complexing (E-Cell)
Off-Gas Scrubbing (E-Cell)
Aluminum Nitrate
Dissolver Off-Gas
Feed Preparation (G-Cell)
Off-Gas Cleanup (CPP-605/649)
Main Process Stream
Other Process Streams

## Figure 7



Receipt of Fuel Elements at ICPP
Fuel Element Storage
Fuel Element Dissolution
Feed Clarification
Undissolved Solids
Clarified Process Solution
Radioactive Liquid Waste
Solvent Extraction
Radioactive Liquid Waste
Denitration
Final Product Packaging
Liquid and Solid Waste Processing
Waste Storage

## Figure 8



Fuel Storage (CPP-603 Unit CPP-666)
Dissolver Off-Gas
Aluminum Fuel
Assemblies
:itric Acid
Catalyst
Oxygen
Air
Process Make Up Area (PM)
Off-Gas Condensation (G Cell)
Dissolver Off-Gas
Fuel Charging (G Cell)
Recondensed HNO3
Fuel
Assemblies
Fuel Dissolution (G Cell)
Rare Gas Recovery (CPP-604)
Fuel Digestion (E Cell)
Product Sampling (E Cell)
DOG Processing (CPP-604)
Centrifuge (F Cell)
Aluminum Feed Preparation (G Cell)
Main Process Stream
Other Process Stream
DOG - Dissolver Off-Gas

Uranium Rework Systems (C-, J- and L-Cells)

Out-of-specification uranium solutions are reworked in C- and L-Cells. A schematic for uranium rework is given in Figure 9. J-Cell was set up to receive out-of-specification PEW streams, but has not been used since the L-Cell and C-Cell were revamped in the early 1980s.

L-Cell is 16 feet by 17 feet by 37 feet high. The floor of the cell is 10 feet below the access corridor floor. Personnel entry is via a pit in the access corridor floor. The cell floor is sloped to a favorable geometry sump (L-116) and the floor is covered with Raschig rings for criticality control. The sump is 18 inches deep with a 5 inch diameter and is critically safe by geometry. The cell is completely lined with stainless steel.

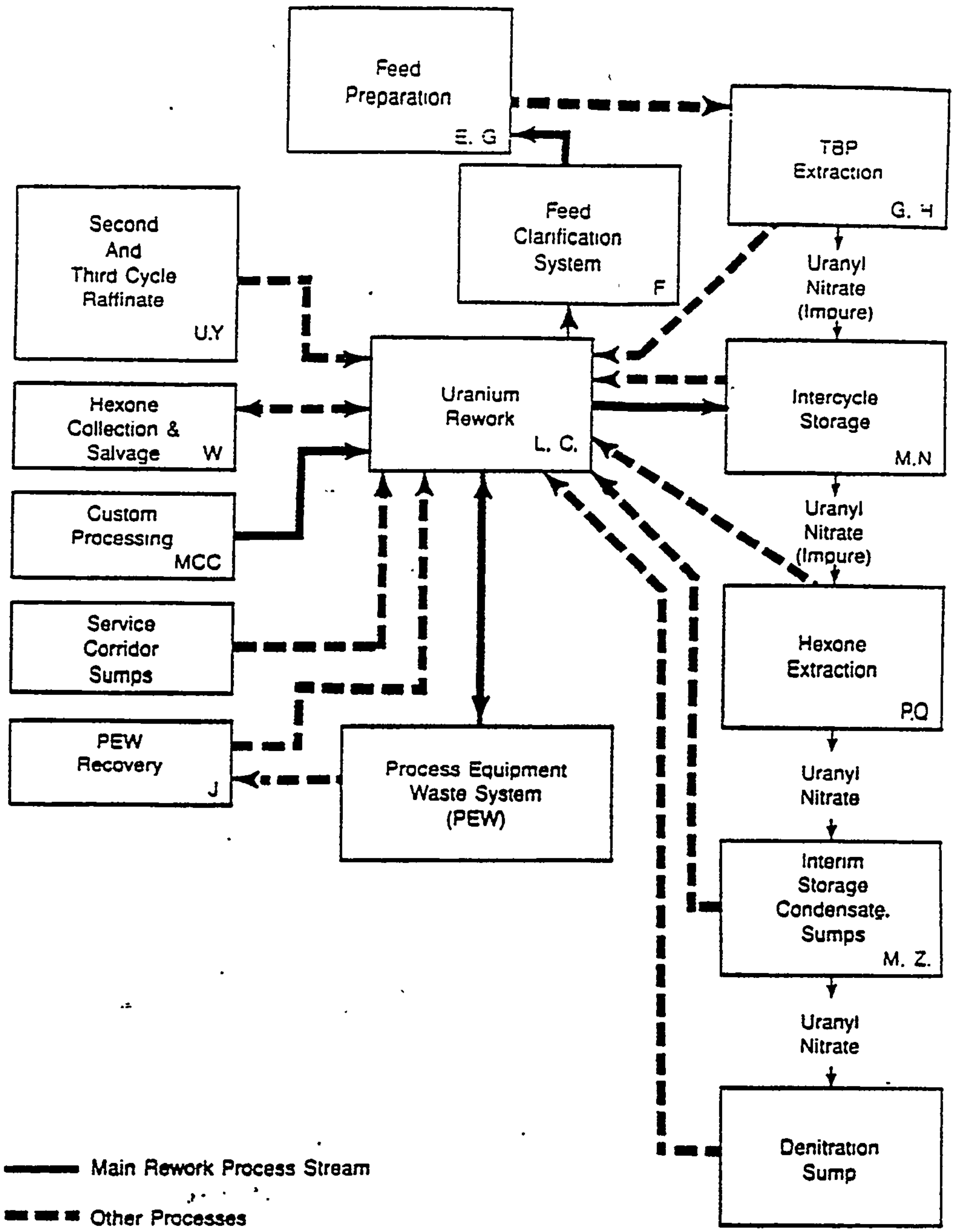
C-Cell is on the opposite side (west side) of the access corridor. Its floor is essentially at access corridor floor level and slopes to a geometrically favorable sump, (C-112), that is identical to the sump in L-Cell. C-Cell is 20 feet by 19 feet by 28 feet high with stainless steel lining on the walls to 9-1/2 feet above the floor. Floor drains near the sumps in both L-Cell and C-Cell are welded closed and are no longer accessible. Process piping from L-Cell to C-Cell is routed through the service corridor, which is above the access corridor.

J-Cell is 19 feet by 20 feet by 29 feet high. The cell floor is covered with a stainless steel liner that extends 3 feet up each wall. The J-Cell sump is instrumented with a liquid level alarm and equipped with jets to transfer the sump contents either to the rework collection tanks or to the PEW system.

First Cycle Extraction (G-, H-, and S-Cells)

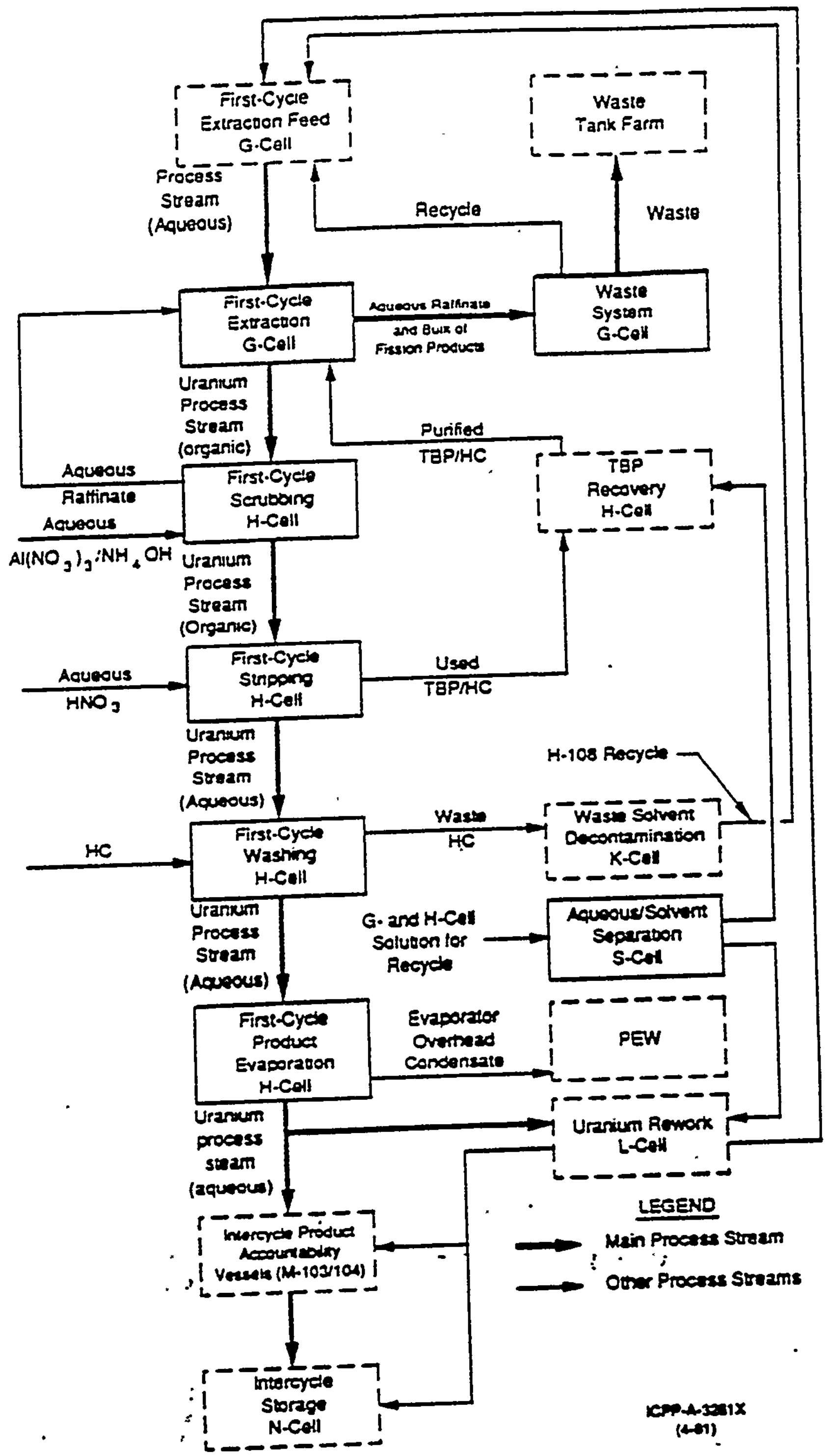
The First Cycle Extraction Process consists of four liquid-liquid extraction columns and supporting equipment. Dissolution product was fed into G-111 column where uranium was separated from waste fission products and dissolved fuel cladding by liquid-liquid solvent extraction with an organic tributyl phosphate solution. The uranium bearing stream was transferred to H-Cell and fed through the H-100 scrub column. Residual fission products were removed in H-100 and returned to G-111. From H-100, the uranium stream, which was an organic phase, was transferred to the H-103 column to strip uranium into an aqueous phase. The aqueous phase was then cleansed of organic in the H-134 column and concentrated in the H-130 evaporator. Process reagents were supplied to the extraction system from the overhead Process Makeup (PM) area. Equipment for pulsing solution through the column sieve trays is also located in the PM area. A first cycle extraction flowsheet is shown in Figure 10.

# Figure 9



Feed Preparation
E. G
TBP Extraction
G. H
Feed Clarification System
F
Second And Third Cycle Raffinate
U.Y
Uranium Rework
L. C.
Uranyl Nitrate (Impure)
Hexone Collection & Salvage
W
Intercycle Storage
M.N
Custom Processing
MCC
Uranyl Nitrate (Impure)
Service Corridor Sumps
Hexone Extraction
P.Q
PEW Recovery
J
Process Equipment Waste System (PEW)
Uranyl Nitrate
Interim Storage Condensate. Sumps
M. Z.
Uranyl Nitrate
Denitration Sump
Main Rework Process Stream
Other Processes

## Figure 10


First-Cycle Extraction Feed G-Cell
Waste Tank Farm
Process Stream (Aqueous)
Recycle
Waste
First-Cycle Extraction G-Cell
Aqueous Raffinate and Bulk of Fission Products
Waste System G-Cell
Uranium Process Stream (organic)
Purified TBP/HC
TBP Recovery H-Cell
Aqueous Raffinate
First-Cycle Scrubbing H-Cell
Aqueous Al(NO3)3/NH4OH
Uranium Process Stream (Organic)
First-Cycle Stripping H-Cell
Aqueous HNO3
Used TBP/HC
Uranium Process Stream (Aqueous)
H-108 Recycle
HC
First-Cycle Washing H-Cell
Waste HC
Waste Solvent Decontamination K-Cell
Uranium Process Stream (Aqueous)
G- and H-Cell Solution for Recycle
Aqueous/Solvent Separation S-Cell
First-Cycle Product Evaporation H-Cell
Evaporator Overhead Condensate
PEW
Uranium process steam (aqueous)
Uranium Rework L-Cell
LEGEND
Main Process Stream
Other Process Streams
Intercycle Product Accountability Vessels (M-103/104)
Intercycle Storage N-Cell
ICPP-A-3281X (4-81)

## Accountability Storage (M-Cell) and Intercycle Storage (N-Cell)

Production solutions from First Cycle Extraction were sent to M-Cell. M-Cell is located in the east row of cells in CPP-601. The principal function of the M-Cell was to provide temporary storage and sampling capability for concentrated uranium solutions. In this cell accountability of uranium solutions flowing from both First Cycle Extraction and Second/Third Cycle Extraction was maintained.

The inside dimensions of M-Cell are 16 by 17 by 37 feet high. A concrete shielding walk, 1-1/2 feet thick and 15-1/2 feet high, shields the pumps in the cell from the vessels. Penetrations at the base of the shielding walls allow any spilled solution to drain to the sump. The concrete walls between the cells are 5 feet thick; those between the cell and the process access and process operating corridors are 6 feet thick.

N-Cell is centrally located in the east row of cells in CPP-601. N-Cell is the largest of the process cells in CPP-601. The inside dimensions of the cell are 57 by 19 by 38 feet high. The floor of N-Cell is lined with stainless steel that extends 6 feet up the walls. Borosilicate-glass Raschig rings cover the floor surface for criticality control and extend up to the elevation of the overflow point (bottom of door). These Raschig rings will not be removed as part of deactivation because their presence is required for the cell to be critically safe. Since the final disposition of the cell has not been determined, but may require that the cell be critically safe, removal of the Raschig rings during the early part of deactivation would be premature.

## Pump Cell (O-Cell)

O-Cell is located adjacent to N-Cell and is entirely below the access corridor level. O-Cell is primarily an auxiliary equipment room for N-Cell. This cell is located west of the northwest corner of N-Cell. The internal dimensions of O-Cell are 20 by 9-1/2 by 10 feet high. The floor and walls are lined with stainless steel. The metal-plate roof is level with the floor of the access corridor.

## Second and Third Cycle Extraction (K-, P-, Q-, U-, W-, Y-Cells)

The Second and Third Cycle Extraction Processes will be operated as part of the deactivation plan for fuel reprocessing. This process, consisting of two essentially identical hexone extraction cycles, is located in P- and Q-Cells. Product from hexone extraction is collected in Q-Cell for transfer to product storage. Feed for the hexone extraction process is aqueous uranyl nitrate solution, which is stored temporarily in N-Cell after First Cycle Extraction. Liquid product from the hexone process is stored in Z-Cell before it is processed through the denitrator and shipped from ICPP as a solid. Figure 11 shows a schematic for the Second and Third Cycle Extraction Process.

Used hexone is collected in W-Cell, purified in K-Cell and recycled for reuse in the process. The aqueous waste streams containing transuranics and fission products are collected in U- and Y-Cells and transferred to the liquid waste tank farm to await eventual calcination. Figure 12 is a block diagram of the process, including the various steps and interrelationships with other processes.

Figure 11

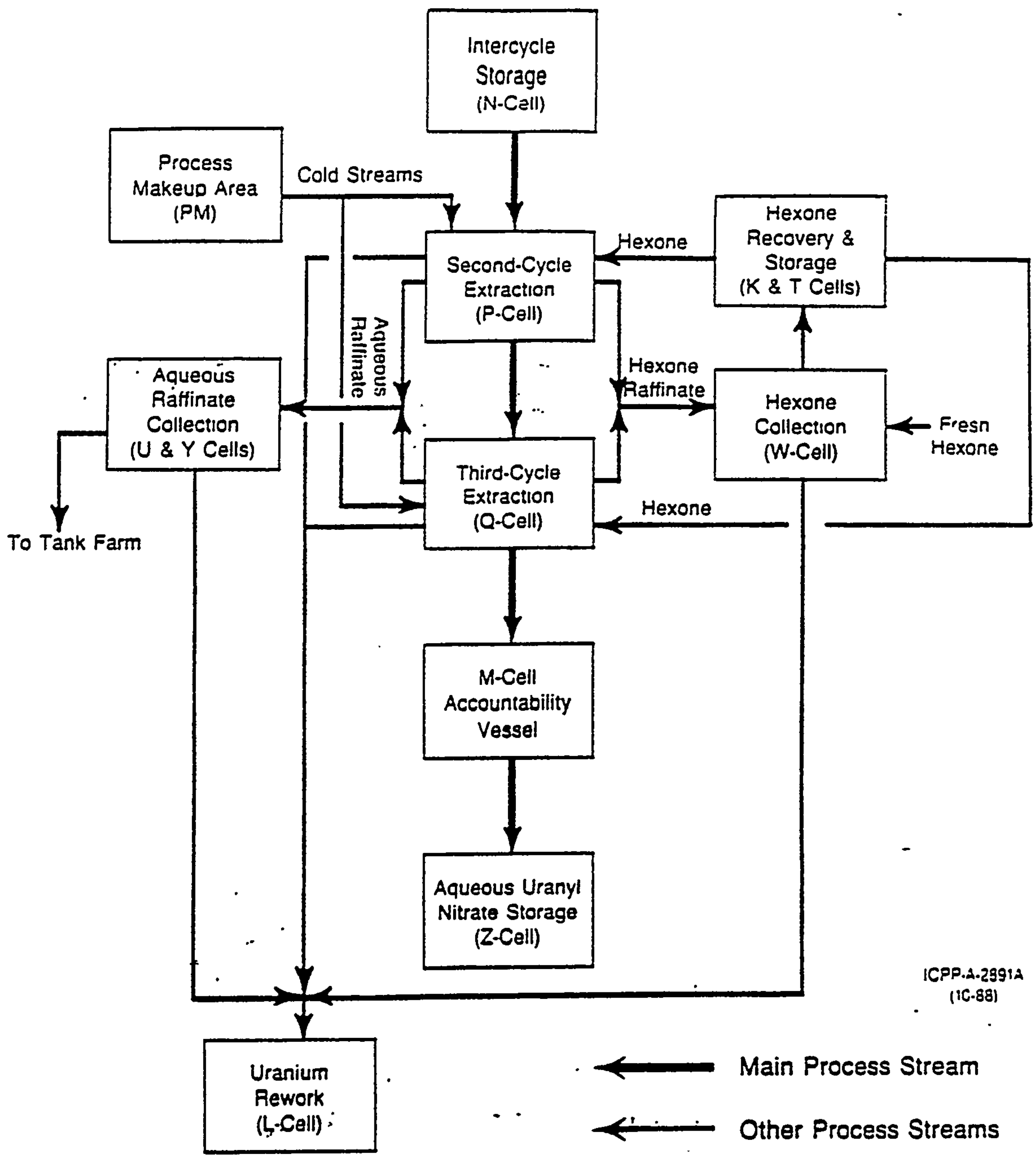
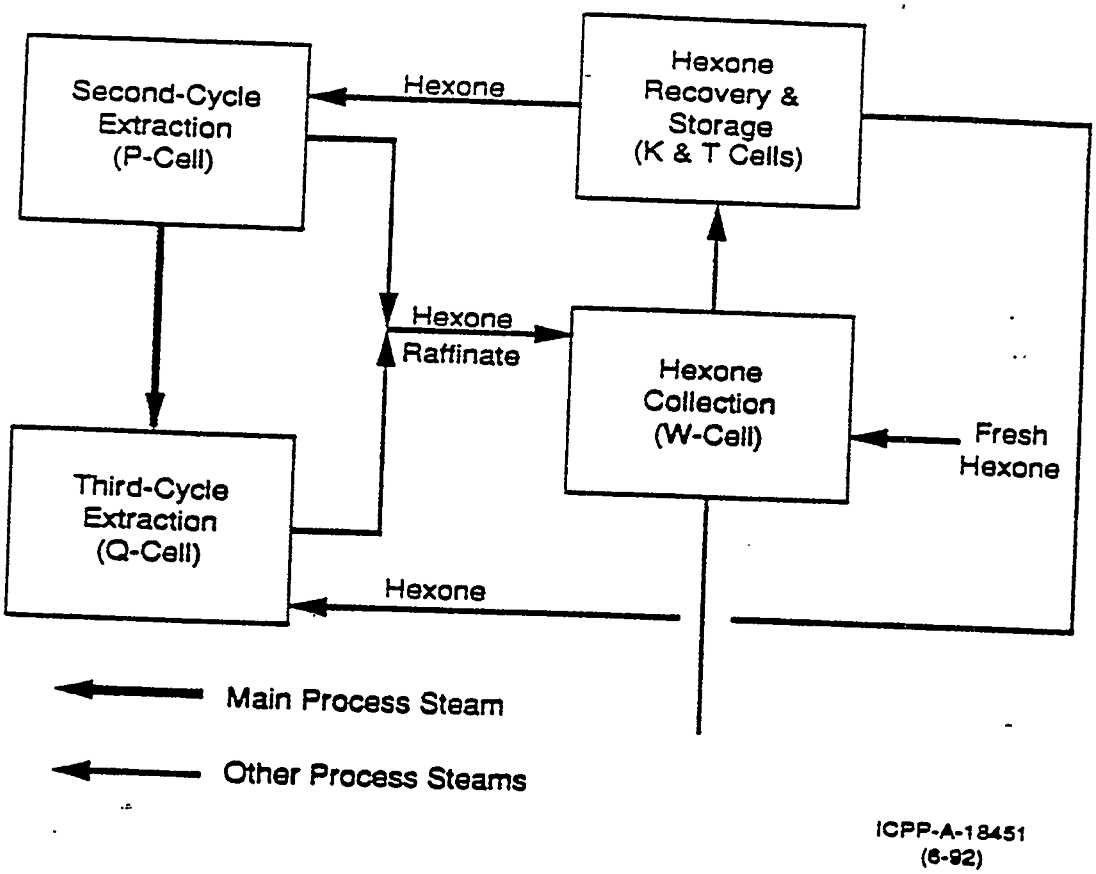

Intercycle Storage (N-Cell)
Process Makeup Area (PM)
Cold Streams
Second-Cycle Extraction (P-Cell)
Hexone
Hexone Recovery & Storage (K & T Cells)
Aqueous Raffinate
Aqueous Raffinate Collection (U & Y Cells)
Hexone Raffinate
Hexone Collection (W-Cell)
Fresn Hexone
To Tank Farm
Third-Cycle Extraction (Q-Cell)
Hexone
M-Cell Accountability Vessel
Aqueous Uranyl Nitrate Storage (Z-Cell)
ICPP-A-2891A (10-88)
Uranium Rework (L-Cell)
Main Process Stream
Other Process Streams

Figure 12


Second-Cycle Extraction (P-Cell)
Hexone
Hexone Recovery & Storage (K & T Cells)
Hexone
Raffinate
Hexone Collection (W-Cell)
Fresh Hexone
Third-Cycle Extraction (Q-Cell)
Hexone
Main Process Steam
Other Process Steams
ICPP-A-18451
(6-92)

Aqueous Uranyl Nitrate Storage (Z-Cell)

Final storage of aqueous uranyl nitrate is located in Z-Cell. The cell is a tall, narrow room housing nine critically safe storage tanks, a sampling station, two pumps, a vacuum pump, monitoring equipment, and fire-suppression system. The cell is 6 by 24 by 21 feet high. The floor and walls are lined with stainless steel to a height of 3.3 feet.

Separations Facilities Denitrator (CPP-602)

The denitration process, located in CPP-602, was operated as part of the deactivation plan to convert urynal nitrate (produced in the second/third cycle extraction process) to granular uranium trioxide ($UO_3$) in a heated fluidized bed. A layout of the denitrator area is shown in Figure 13. The granular product is packaged and stored in a vault adjacent to the denitration process, pending shipment to the CPP-651 Unirradiated Storage Facility or to off-site users. A schematic of the denitration process is shown in Figure 14.

Custom Processing Facilities (CPP-627)

To process nuclear materials that were not compatible with established ICPP dissolution facilities, small-scale custom dissolution systems were assembled in the Hot Chemistry Laboratory (HCL) located in CPP-627. However, this facility was not a production-scale dissolution system; only small quantities of reactor or other special fuel were processed in a given campaign.

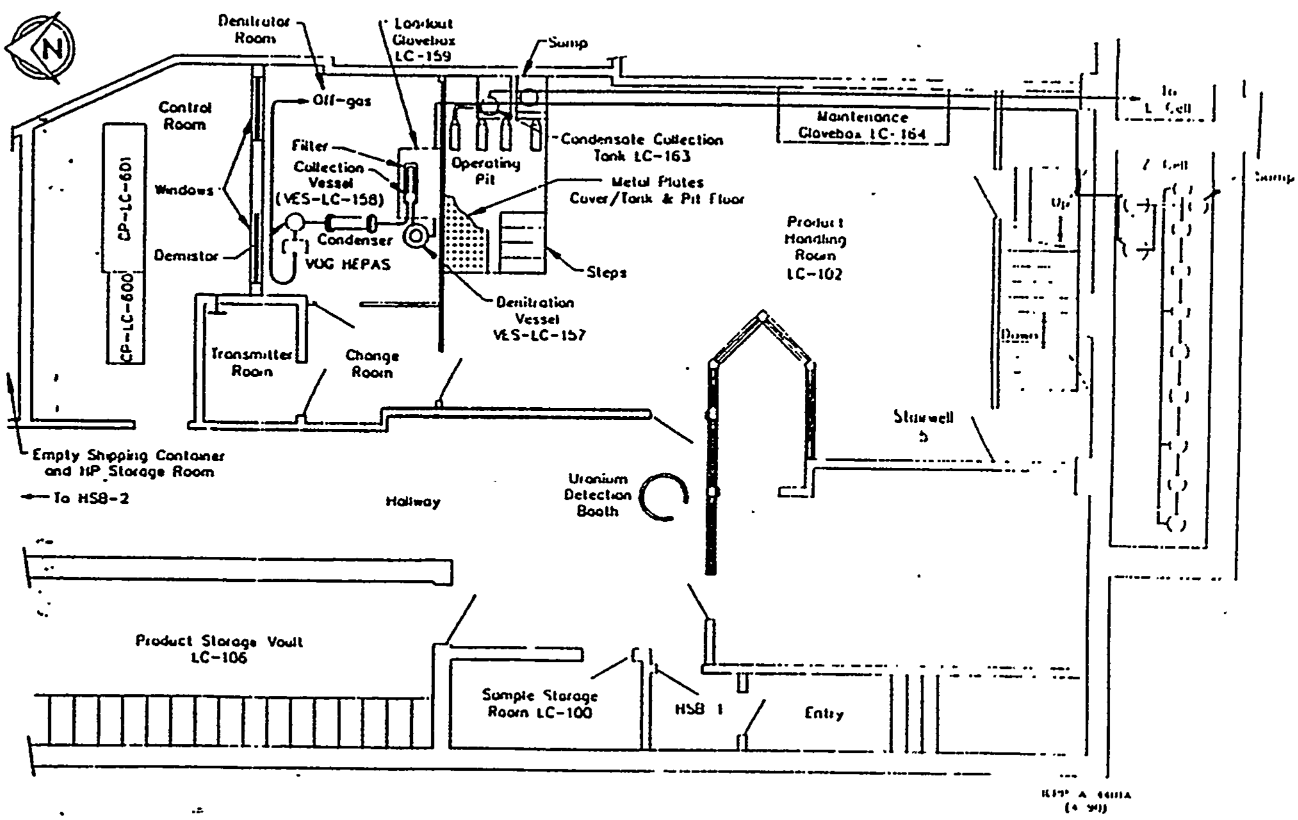
A floor plan view of the HCL (CPP-627) is shown in Figure 15. The HCL occupies an area 74 feet long by 32 feet wide by 19 feet high and comprises the Multicurie Cell (MCC), an anteroom to the MCC, and a radiochemistry laboratory room. The MCC is a heavily shielded cell once used to handle up to 100,000 curies of radioactive material. Shielded viewing windows are located on the north and east walls of the cell. Liquid waste tanks located in shielded cells at the lowest level of the building have been physically disconnected to provide RCRA compliance.

An anteroom provided for cask and personnel entry into the HCL and equipment storage. A walk-in hood, installed as part of the anteroom, provided protected space for operation of small-scale dissolution equipment for unirradiated fuel.

ROVER and Electrolytic Dissolution Facilities (CPP-640)

An isometric of the CPP-640 Headend Processing Plant (HPP) building is shown in Figure 16. The HPP facility is a five-level structure with each level containing at least one shielded process area. Five shielded process areas or cells were set aside for the ROVER Dissolution Process; one cell was used for the Electrolytic Dissolution Process.

## Figure 13



Denitrator Room
Loadout Glovebox LC-159
Sump
Off-gas
Control Room
Maintenance Glovebox LC-164
Condensate Collection Tank LC-163
Filter
Collection Vessel (VES-LC-158)
Operating Pit
Metal Plates Cover/Tank & Pit Floor
Windows
CP-LC-601
CP-LC-600
Demistor
Condenser
VOG HEPAS
Steps
Product Handling Room LC-102
Denitration Vessel VES-LC-157
Transmitter Room
Change Room
Stairwell 5
Empty Shipping Container and HP Storage Room
To HSB-2
Hallway
Uranium Detection Booth
Product Storage Vault LC-106
Sample Storage Room LC-100
HSB 1
Entry
Up
Down

Figure 14

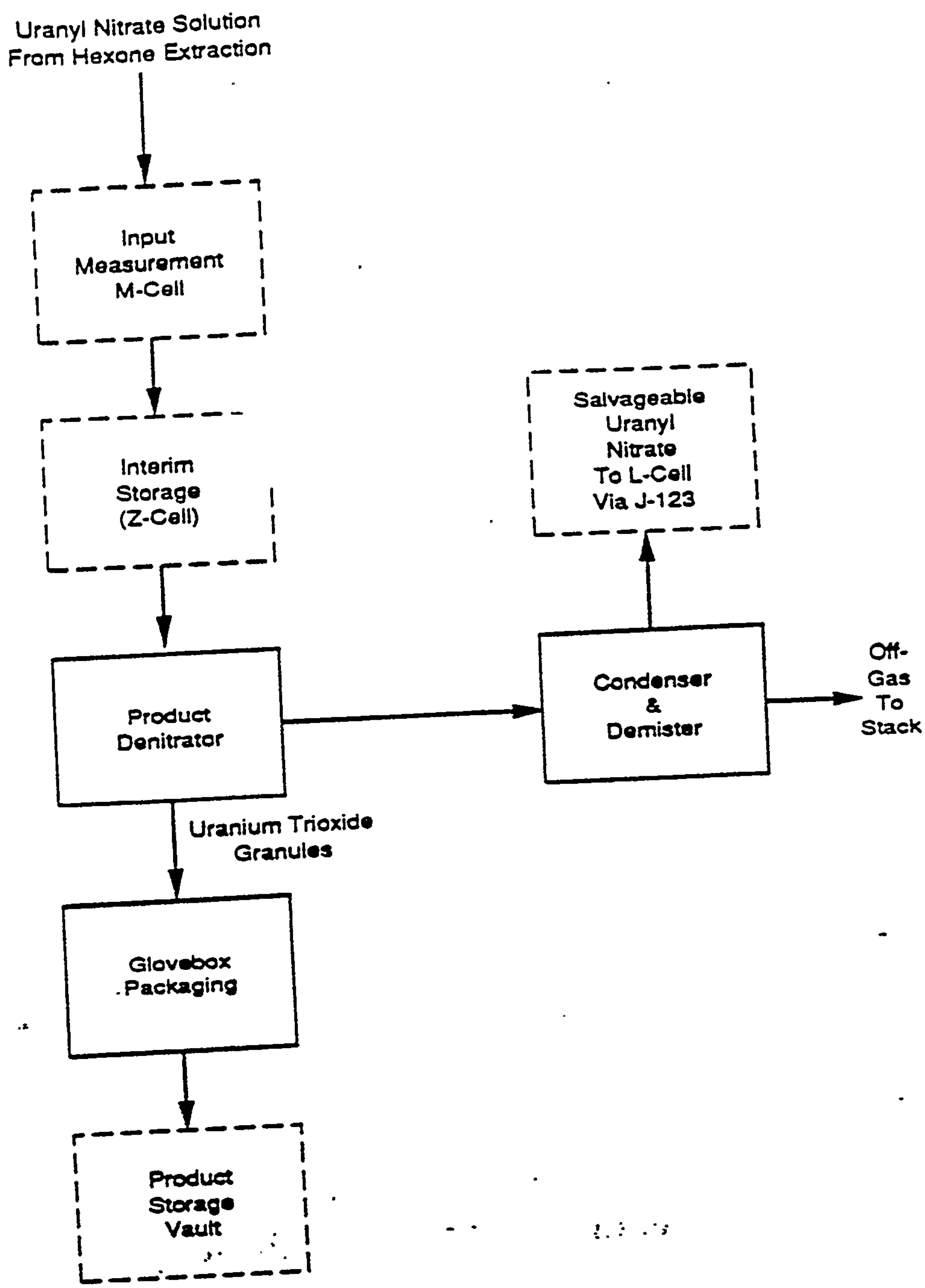

Uranyl Nitrate Solution
From Hexone Extraction
Input
Measurement
M-Cell
Interim
Storage
(Z-Cell)
Product
Denitrator
Condenser
&
Demister
Salvageable
Uranyl
Nitrate
To L-Cell
Via J-123
Off-
Gas
To
Stack
Uranium Trioxide
Granules
Glovebox
Packaging
Product
Storage
Vault

Figure 15

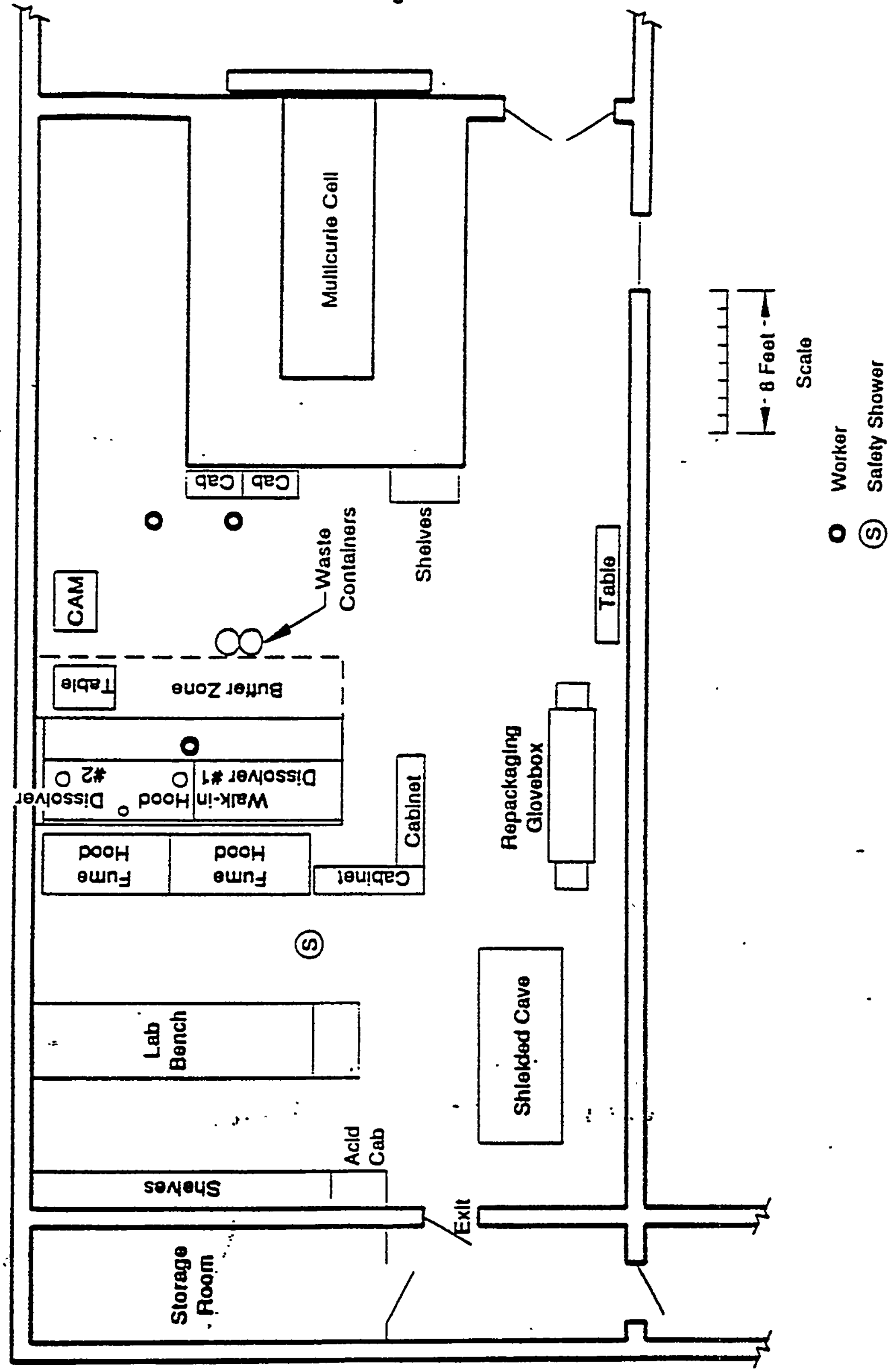
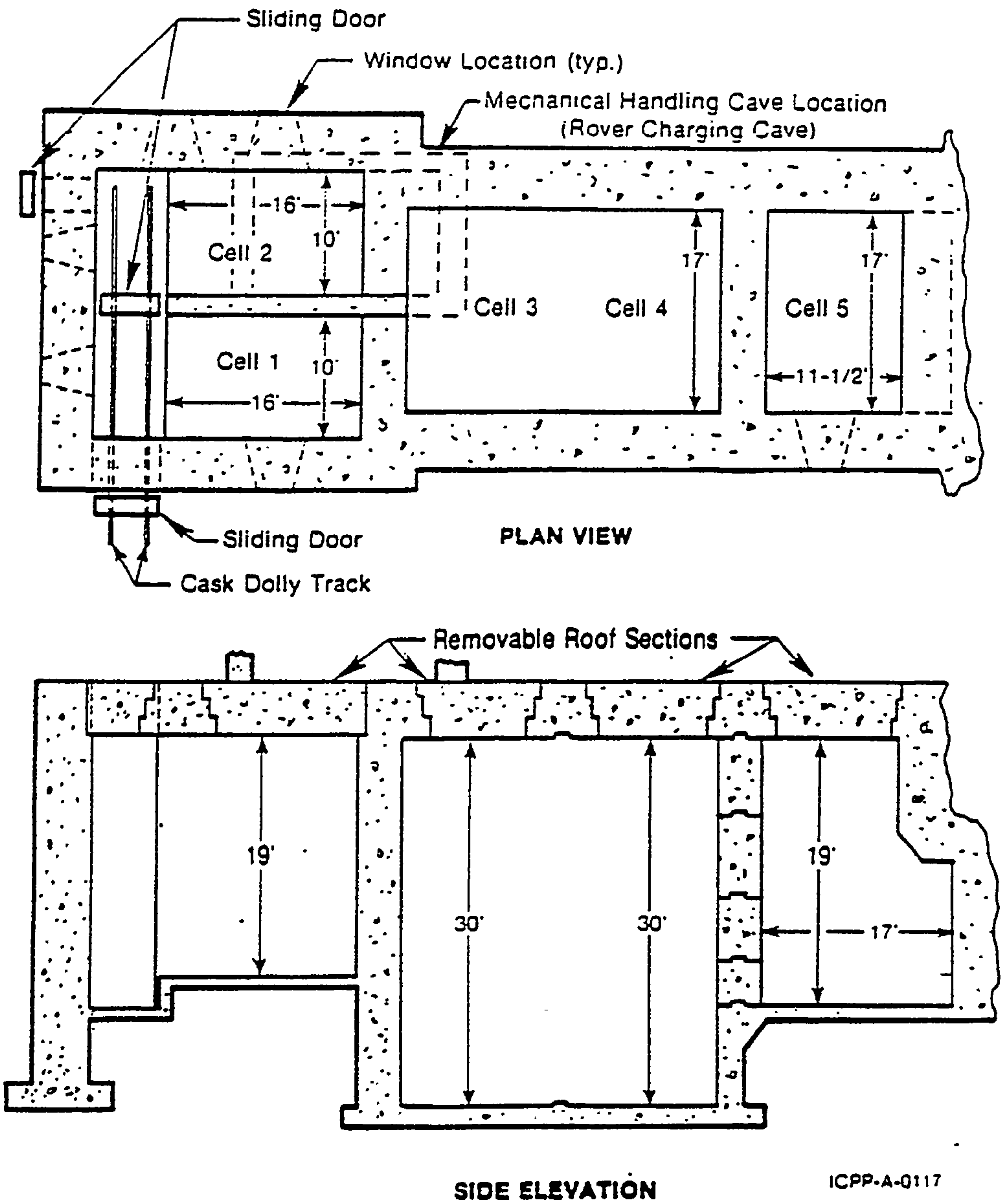

Multicurie Cell
Cab
Cab
Shelves
Waste Containers
CAM
Table
Buffer Zone
Table
Dissolver #1
Walk-in Hood
Dissolver #2
Dissolver
Fume Hood
Fume Hood
Cabinet
Cabinet
Repackaging Glovebox
Lab Bench
Shielded Cave
Acid Cab
Shelves
Exit
Storage Room
8 Feet
Scale
Worker
Safety Shower

Figure 16



Sliding Door
Window Location (typ.)
Mechanical Handling Cave Location
(Rover Charging Cave)
16'
10'
Cell 2
Cell 1
10'
16'
17'
Cell 3
Cell 4
17'
Cell 5
11-1/2'
Sliding Door
Cask Dolly Track
PLAN VIEW
Removable Roof Sections
19'
30'
30'
19'
17'
SIDE ELEVATION
ICPP-A-0117

ROVER

The ROVER process was used for the processing of graphite-based nuclear fuels. The ROVER shielded process area includes: (a) the Mechanical Handling Cave (MHC) and, (b) Cells 1 through 4. Cells 1 and 2 and the mechanical handling cave have manipulators and viewing windows for remote operations. Removable walls allowed two individual cells (Cells 3 and 4) to be combined into one larger unit. No future operation of the ROVER process is planned and deactivation of this facility is in progress.

Non-shielded process areas are located on two of the building levels and include the Truck Bay and the Waste Tank Control Room. The HPP also contains support equipment such as HVAC systems, an off-gas system, and a chemical makeup system.

Electrolytic Dissolution

The electrolytic dissolver and the equipment for the recirculation loop are located in Cell 5 of the Headend Process Plant, CPP-640 (HPP). This equipment was used for the dissolution of stainless steel clad nuclear fuel. A schematic showing the Electrolytic Dissolution Process is included in Figure 17. Supporting equipment for the dissolver system is installed outside the cell in the HPP sampling and operating corridors, in the process makeup area of CPP-601, and in the Rectifier Building (CPP-625). Cell-5 of the HPP is 11.5 feet wide at the top and 17 feet wide at the bottom, 17 feet long and 17 feet deep. The walls and ceiling are concrete; the floor and lower five feet of the walls are lined with stainless steel. The outside walls and ceiling of the cell are 4.5 feet thick concrete, and the removable wall between Cell 4 and 5 is 3.5 feet thick. The concrete wall surfaces inside the cell are painted with Phenoline #300 Series Protective Coating.

Rare Gas Plant (CPP-604 and CPP-605)

The Rare Gas Plant (RGP) was used to recover radioactive krypton-85 from dissolver off-gas streams. It is housed in three off-gas cells located on the west side of building CPP-604. An elevation of the RGP is shown in Figure 18 and a process flow diagram is shown in Figure 19. The cells are designated north, middle, and south off-gas cells. The north cell is 20 feet wide, 24 feet long, and 33 feet high. Its reinforced concrete walls and ceiling are 4 feet thick and its floor is 1 foot thick. Personnel entry is via an offset door from the access corridor, and equipment transfers are through two 6 feet square removable hatches in the ceiling. Located in the north cell are the trickle-bed catalytic system (for hydrogen removal from FAST dissolver off-gas), the Dissolver Off Gas (DOG) hold tanks (WN-100/101), the pre-heaters (WN-327/328), the rhodium catalytic converter units (WN-107/-108/-109), and condenser (WN-322), which condenses water vapor from the process gas stream.

The middle cell is 24 feet wide, 20 feet long, and 35 feet high. It has a 1 foot thick concrete floor, and 2 feet thick walls and ceiling, except for the wall it shares with the north cell, which is 4 feet thick. Personnel access is via a door from the access corridor, and equipment transfers are through two 8 by 6 foot hatches in the ceiling. This cell contains the Lectrodryer (WN-370), the smaller demister (WN-166), and the on-line hydrogen and oxygen analyzers.

Figure 17

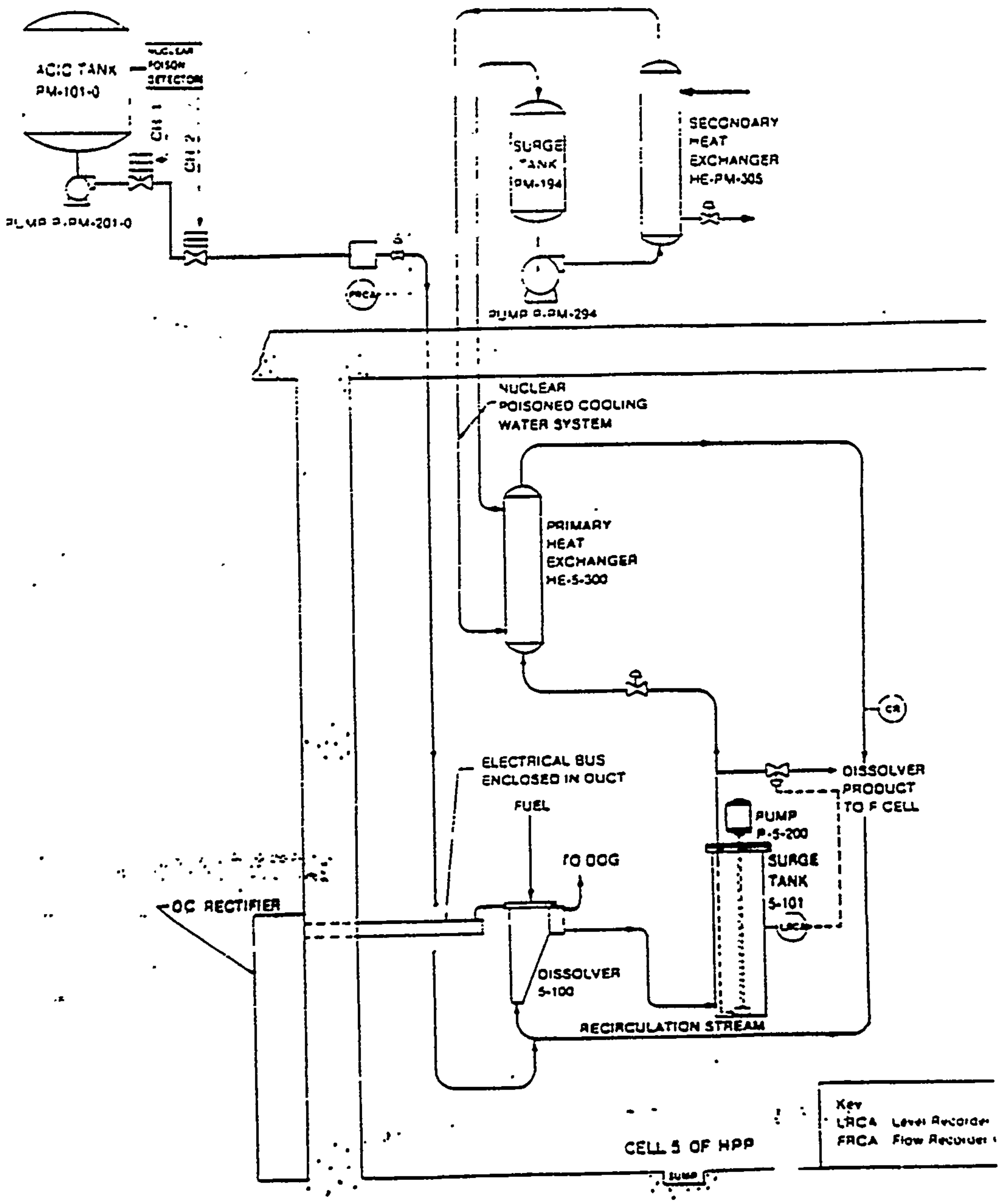

ACID TANK
PM-101-0
NUCLEAR POISON DETECTOR
PUMP P-PM-201-0
SURGE TANK PM-194
SECONDARY HEAT EXCHANGER HE-PM-305
PUMP P-PM-294
NUCLEAR POISONED COOLING WATER SYSTEM
PRIMARY HEAT EXCHANGER HE-5-300
ELECTRICAL BUS ENCLOSED IN DUCT
FUEL
TO DOG
DISSOLVER PRODUCT TO F CELL
PUMP P-5-200
SURGE TANK 5-101
DC RECTIFIER
DISSOLVER 5-100
RECIRCULATION STREAM
CELL 5 OF HPP
SUMP
Key
LRCA Level Recorder
FRCA Flow Recorder

Figure 18

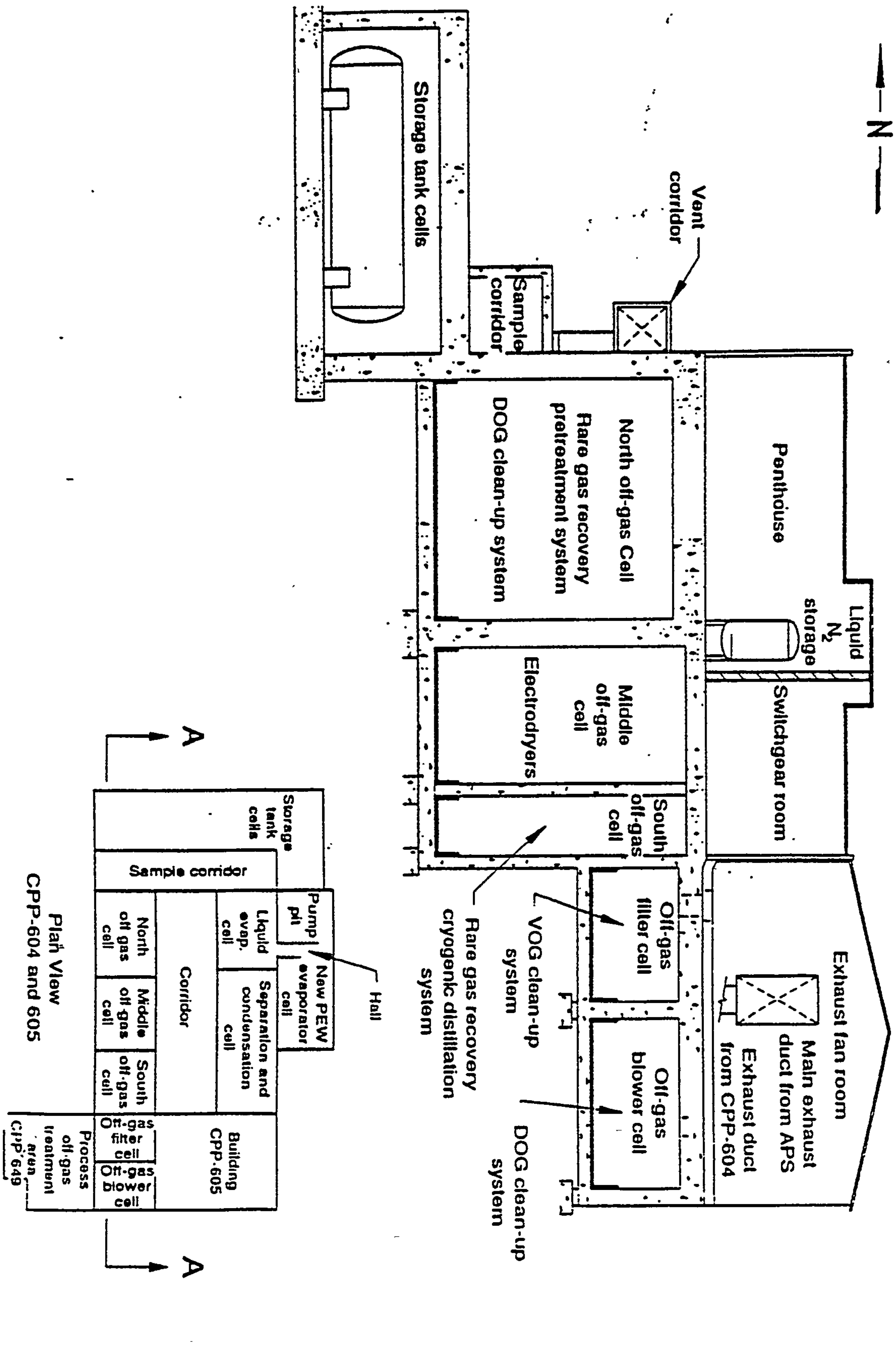
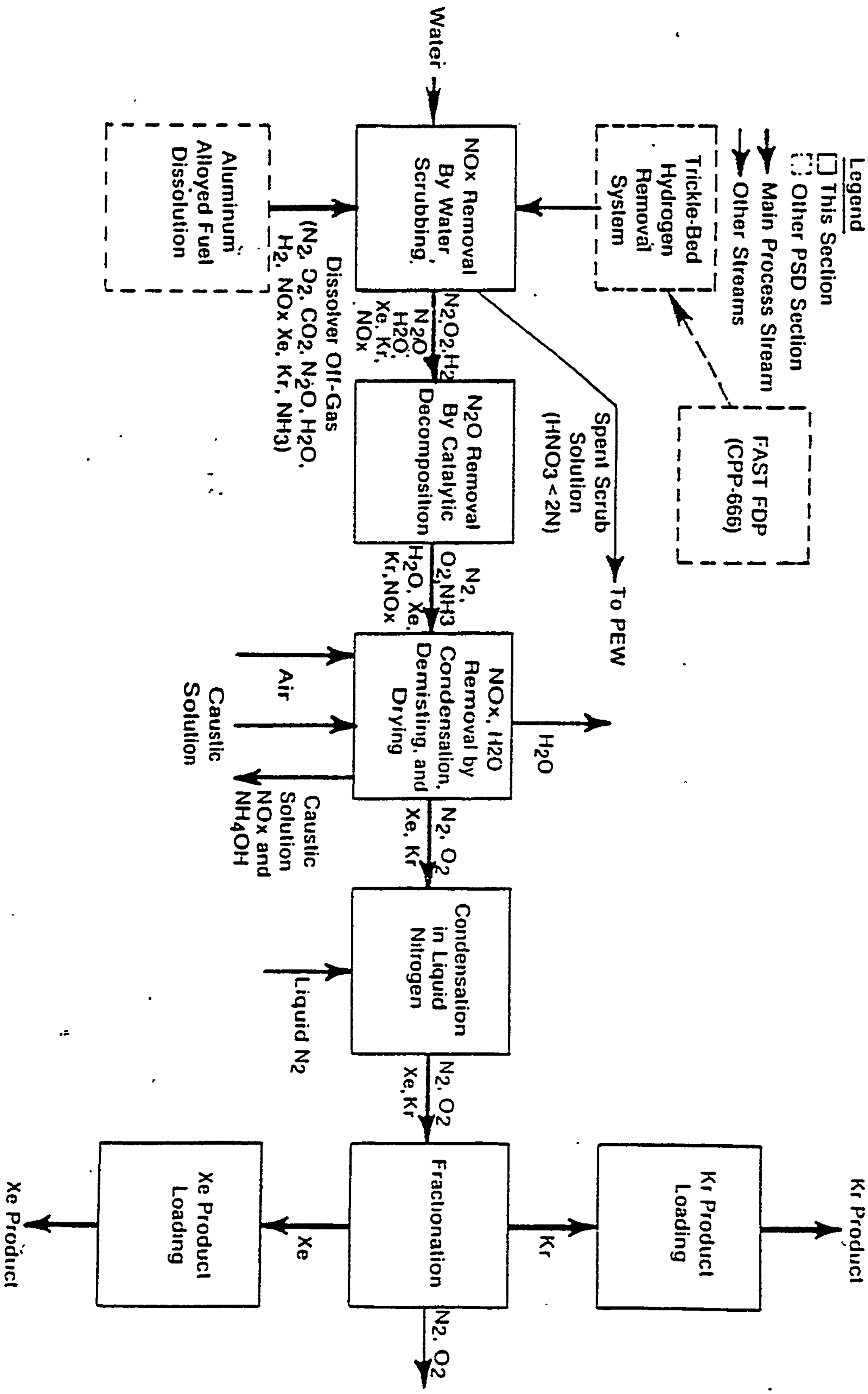

N
Vent corridor
Storage tank cells
Sample corridor
Penthouse
North off-gas Cell
Rare gas recovery pretreatment system
DOG clean-up system
Liquid $N_2$ storage
Middle off-gas cell
Electrodryers
Switchgear room
South off-gas cell
Exhaust fan room
Main exhaust duct from APS
Exhaust duct from CPP-604
Off-gas filter cell
Off-gas blower cell
VOG clean-up system
Rare gas recovery cryogenic distillation system
DOG clean-up system
A
A
Storage tank cells
Sample corridor
Pump pit
New PEW evaporator cell
Hall
Liquid evap. cell
Separation and condensation cell
Corridor
North off gas cell
Middle off-gas cell
South off-gas cell
Building CPP-605
Off-gas filter cell
Off-gas blower cell
Process off-gas treatment area CPP-649
Plan View
CPP-604 and 605

Figure 19



Legend
This Section
Other PSD Section
Main Process Stream
Other Streams
Water
NOx Removal By Water Scrubbing
Trickle-Bed Hydrogen Removal System
FAST FDP (CPP-666)
Aluminum Alloyed Fuel Dissolution
Dissolver Off-Gas (N2, O2, CO2, N2O, H2O, H2, NOx Xe, Kr, NH3)
N2,O2,H2 N2O H2O Xe, Kr, NOx
Spent Scrub Solution (HNO3 <2N)
To PEW
N2O Removal By Catalytic Decomposition
N2, O2,NH3 H2O, Xe, Kr,NOx
NOx, H2O Removal by Condensation, Demisting, and Drying
H2O
Air
Caustic Solution
Caustic Solution NOx and NH4OH
N2, O2 Xe, Kr
Condensation in Liquid Nitrogen
Liquid N2
N2, O2 Xe, Kr
Fractionation
Kr
Kr Product Loading
Kr Product
Xe
Xe Product Loading
Xe Product
N2, O2

The south cell is 24 feet wide, 9 feet long, and 35 feet high. The walls are 2 foot thick reinforced concrete. Personnel access is through two doorways from either the access corridor or the operating corridor, and there are two 3 foot square equipment hatches in the ceiling. This cell contains the cryogenic unit, consisting principally of: (a) the regenerators (WN-361N/361S) to cool the gases and remove residual impurities; (b) the primary column (WN-162), where krypton and xenon were fractionated; (c) the batch still (WN-164) where krypton product was enriched; and (d) ancillary equipment for separation of gaseous $N_2$ from the liquid-nitrogen reagent and for recycling $N_2$ gas. The south cell also houses the krypton product hold tanks (WN-158A/158B), the xenon product hold tank (WN-159), and the product load-out equipment. The product hold tanks serve as temporary storage of the respective RGP products until final transfer into shipping containers. The ventilated enclosure for the shipping containers is located in this cell as well as the final-product transfer line and WN-261 product compressor.

Some of the equipment is located outside the three off-gas cells. The two compressors (WN-207/-208), the cryogenic system compressors (WN-259/260), and the demister (WN-161) are located in the access corridor. Operating controls for the RGP are centered in the new Distributed Control System.

A glovebox, constructed of fiberglass, is located in the CPP-604 access corridor between the pump room and the entrance to the north cell. Four gas-sample lines and one liquid-sample line are connected to the glovebox. Adjacent to the glovebox is a switch box that contains the controls for the sample system solenoid valves. There is one air line for pneumatic supply. The glovebox contains manually operated sample valves, connections for a sample bomb (gas samples only), and a portable rinse bottle that is used for rinsing water samples. The glovebox enclosure is large enough to accommodate a 1/2-gallon container for sampling the TBR water. The glovebox drained to the service waste via the pump room floor drain. The exhaust ventilation from the glovebox (after passing through the HEPA filters) discharges into the pump room.

Caustic solution, used in the demister, was made up in equipment located in the penthouse above the north cell of CPP-604. Liquid nitrogen for the RGP (at 60 psig) was supplied from a liquid $N_2$ storage tank (WO-120), also located in the penthouse. Liquid nitrogen was vaporized to gaseous $N_2$ in the $N_2$ vaporizer (WO-121) and was piped into the RGP at a regulated pressure.

## Fuel Processing Facility (CPP-691)

The Fuel Processing Facility (FPF) was designed to recover highly enriched uranium from spent nuclear fuel. The Fuel Processing Restoration (FPR) Project (FPF construction project) was approximately 50 percent complete when the project was terminated as part of the overall deactivation of the Idaho Chemical Processing Plant (ICPP).

An elevation of FPF, as it was originally designed, is shown in Figure 20. The exterior structure is 100 percent complete and the inside of the structure has been completed to a point that it could be adapted to a number of uses. The structure contains the utility systems necessary to allow personnel to enter the building for surveillance and maintenance activities.

- Power: Power is provided to three motor control centers within the structure. From the MCCs, power is distributed to temporary load centers, which provide power to equipment and lighting within the building.

- Lighting: The interior lighting is made up of construction light strings. Emergency and exit lights used during construction have been left in place.

- Fire Protection: The fire protection system consists of a firewater system outside of the building, a dry standpipe system, and portable fire extinguishers through the building.

- HVAC: A temporary HVAC system is presently in place and functional. The system provides air movement in the primary access areas and corridors. A temporary steam line is in place to supply heat to the HVAC units. A temporary condensate line services the steam supply and drains into a condensate tank/pump in the ICPP utility tunnel.

- Water: A potable water line is located on the first level of the structure with a valve and hose connection for service.

There are over 160,000 square feet of floor space within the structure. Twelve functionally isolated cells are located below grade with shield walls up to five feet in thickness.

Waste Calcining Facility (CPP-633)

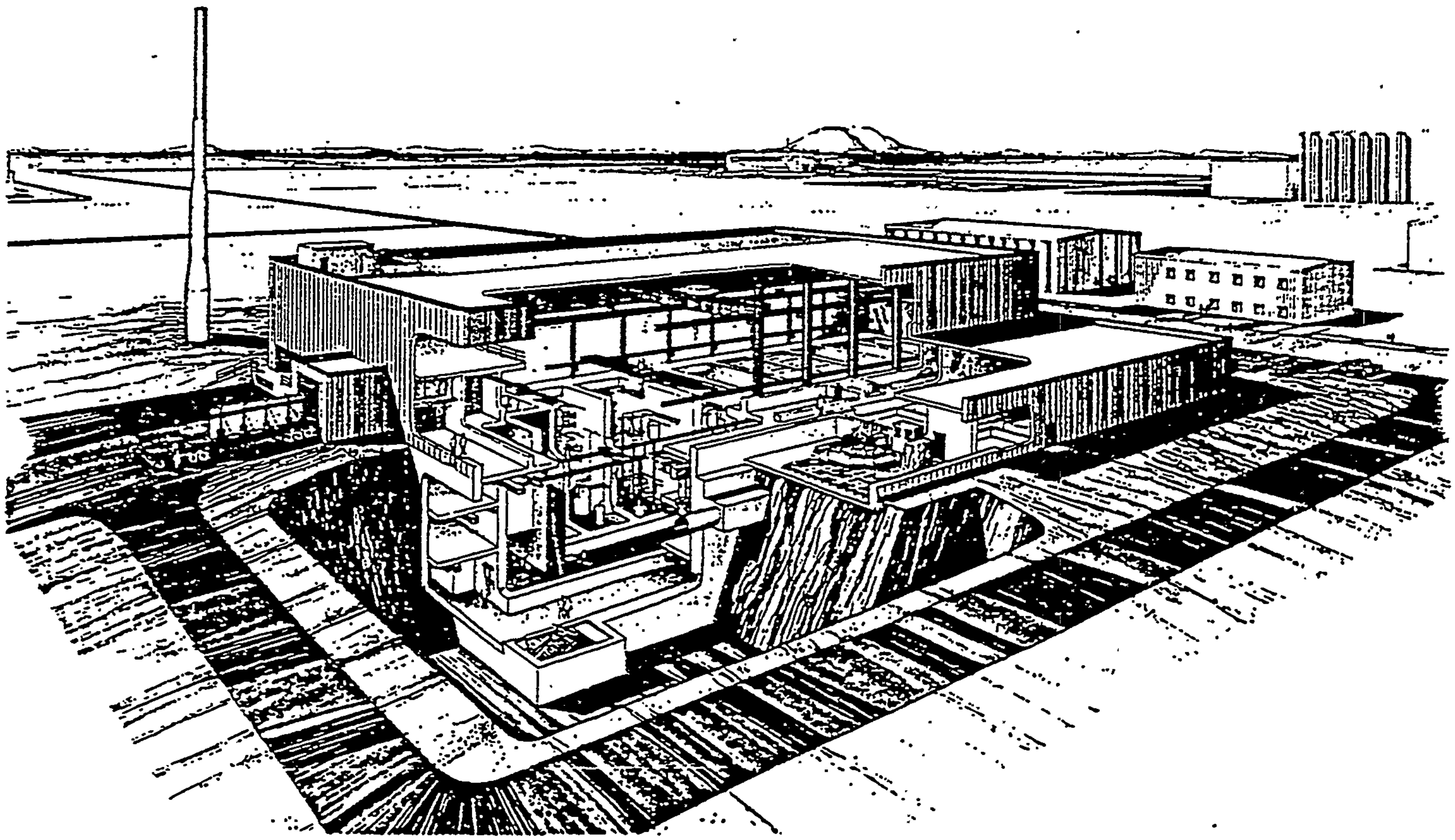
The WCF was the world's first plant-scale facility built to achieve safe, efficient stabilization of high-activity radioactive liquid wastes resulting from the reprocessing of nuclear fuels. The WCF converted high-level radioactive liquid wastes into granular solids which are less corrosive, more stable, and occupy less storage volume.

Operation of the WCF with radioactive wastes began in 1963 and terminated in 1981. During that time, over 4,000,000 gallons of aqueous waste were calcined, producing approximately 77,000 cubic feet of solids. Due to its deteriorated condition, the WCF was replaced by the New Waste Calcining Facility (NWCF), which was completed shortly after the WCF was shut down. The High-Level Liquid Waste Evaporator in the WCF was used until 1984.

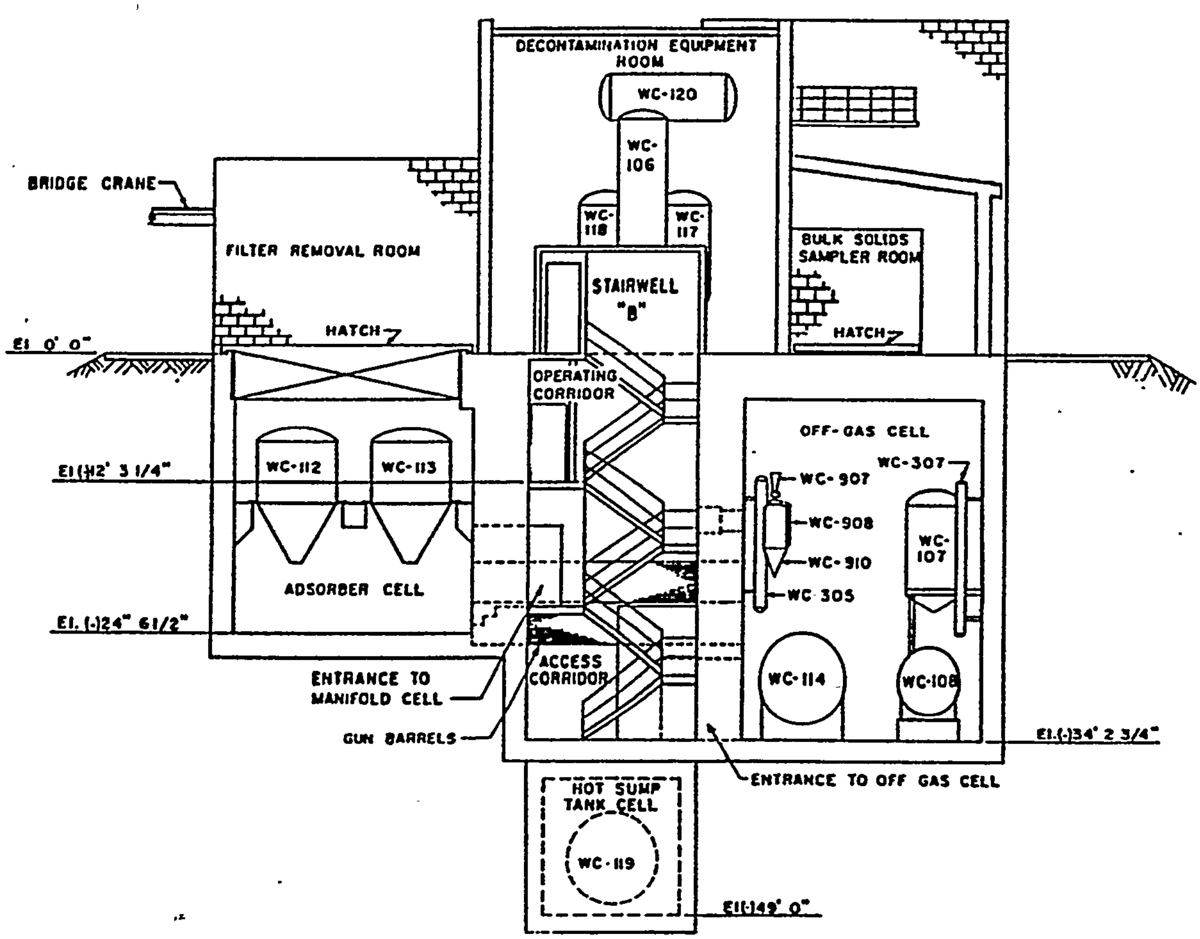
The facility is a concrete structure with approximately 20,000 square feet of floor space. The processing cells lie underground in two banks with the service corridor lying between them. Non-radioactive service areas for the facility are located in the concrete block-structure above grade. Elevations of the WCF are shown in Figures 21 and 22.

The facility currently contains a number of high-radiation areas and RCRA permitted units.

Figure 20

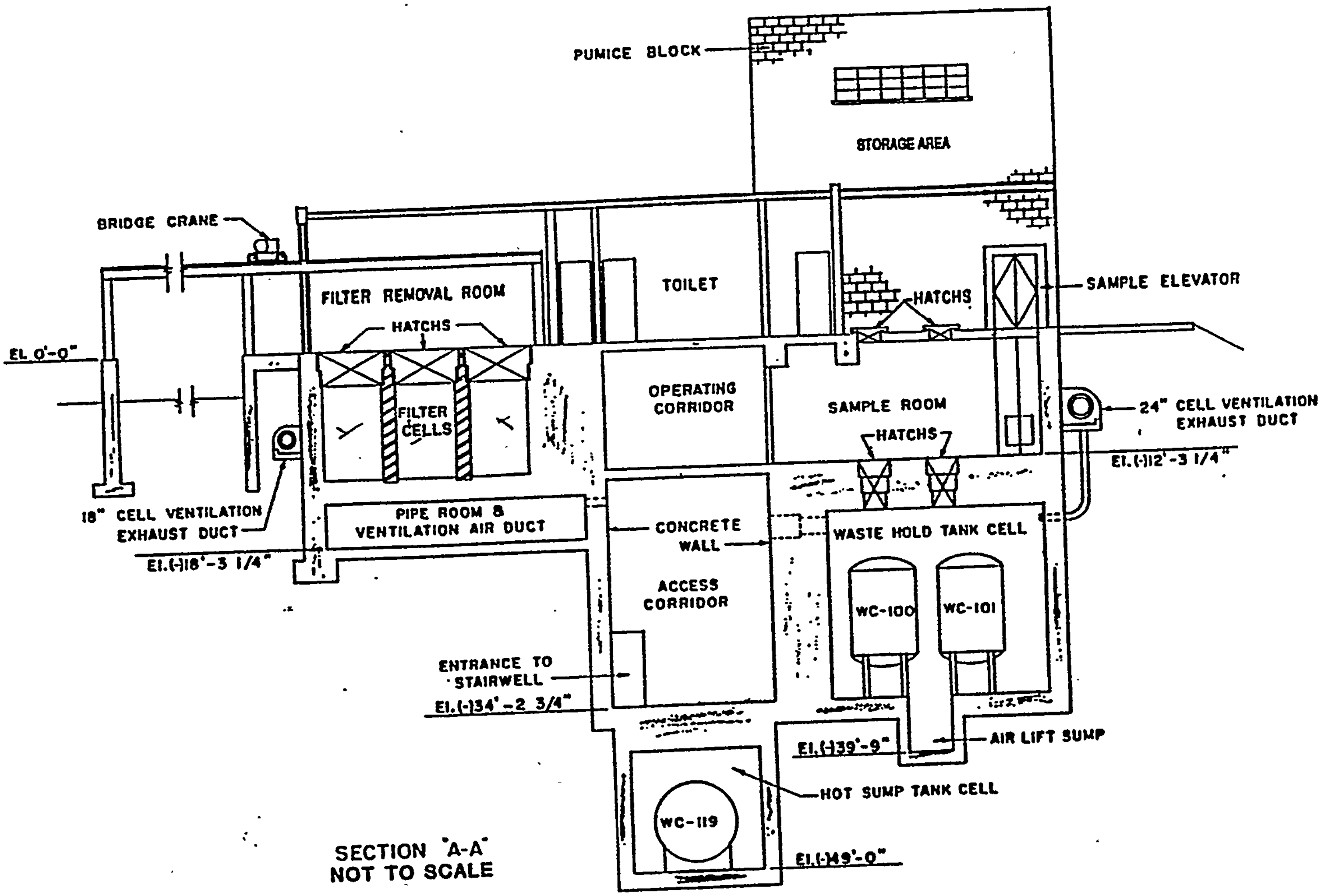


## Figure 21




SECTION "B-B"
NOT TO SCALE

Figure 22




SECTION "A-A"
NOT TO SCALE

## Plan Description

### Planning Guidance

The overall deactivation plan was prepared based on DOE direction received in the Action Memorandum, "A Decision on Phaseout of Reprocessing at the Savannah River Site (SRS) and the Idaho National Engineering Laboratory (INEL) is Required" [Memorandum, R. A. Claytor, April 28, 1992, see Appendix A].

Based on the cited memorandum and other direction from DOE, Office of Defense Programs (DP), this plan assumes full transition of ICPP Defense Program surplus facilities and operations to DOE, Office of Environmental Restoration and Waste Management (EM) control. This transition was accomplished on October 1, 1993. A brief analysis of deactivation options is briefly discussed in Appendix D.

### Plan Objectives

For purposes of this document, deactivation is assumed to cover:

> Final process operations needed to convert in-process materials to a stable storage form, and process system sweepdown necessary to complete uranium accountability and to remove hazardous chemicals in order to ensure safety to the public, the in-plant work force, and the environment.

Although detailed characterization of facility status is not included in this plan, substantial process knowledge has been used to determine when a facility can be considered safe and stable.

This plan does not address socio-economic impacts resulting from cessation of reprocessing. However, retraining of personnel displaced by the cessation of reprocessing is dealt with in a preliminary manner consistent with current understandings of possible new programs and missions. The subject of personnel training and job placement service, as required by Public Law 101-189, (see 42 USCA 7274 b (a) is dealt with in greater detail by the Idaho Chemical Processing Plant Transition Plan (March 1994).

This plan does not address associated issues such as:

- Storage, treatment and ultimate disposal of nuclear fuels
- Ultimate disposition of recovered uranium trioxide ($UO_3$) product.

When the deactivation is complete, the following facilities will have been placed into a safe, stable shutdown condition as previously defined:

CPP-601 (Separations Facilities, except the WG/WH Waste Tanks and parts of the PM area)
CPP-602 (Denitrator Area only)
CPP-604 (Rare Gas Plant only)
CPP-627 (Hot Chemistry Lab only)
CPP-631 (RALA Off-Gas Blower Room)
CPP-633 (Waste Calcining Facility)
CPP-640 (Headend processes, principally ROVER)
CPP-666 (Fluorinel Dissolution Process (FDP) section only)
CPP-685 (PMCS computer building)
CPP-691 (Fuel Processing Facility)
CPP-1614 (FDP Acid Pumphouse)
CPP-1633 (Sample Station/VES-CS-169)

Tables 1, 2, 3, 4, and 5 contain descriptions of the current and the planned end condition for each of these facilities following deactivation. Planned activities and milestones through FY-96 are listed on the Level I schedule contained in Appendix B.

NOTE: CPP-601 (separations processes), CPP-602 (denitration and Z-cell), and CPP-640 (ROVER and Electrolytic Dissolution) contain accountable levels of special nuclear materials (SNM). These processes will be flushed to remove SNM as part of the last processing operations. In the meantime, full safeguards and security requirements and controls are in force. All other facilities listed do not contain accountable levels of SNM.

TABLE 1. PLANNED GENERAL SEPARATIONS FACILITY STATUS AFTER DEACTIVATION

| Facility Area/System | Area/System Status Description |
|---|---|
| CPP-601 BUILDING | This is the main processing building in the separations area. |
| Process Cells | The walls of all the cells will be rinsed in order to remove any chemical residues. No resources will be expended specifically to lower radiation fields. |
| Process Vessels | Drainable/pumpable quantities of SNM bearing liquids have been removed. All process vessels will be emptied and flushed. Some process equipment will be disassembled to remove inventory. SNM accountability will be reconciled. |
| Sample Cubicles | All samplers will be flushed and remain in place. Off-gas systems will remain in service. |
| Operating Corridor | Instrumentation for monitoring sump levels and ventilation will remain in service. The computer monitoring systems will also remain in service. |
| Service Corridor | All process lines will be flushed. The walls and floor will be rinsed. |
| Process Makeup Area | Chemical inventory will be removed except for those chemicals needed to support other missions at the ICPP. Process vessels and headers no longer used will be flushed and drained. |
| Criticality Alarm System (CAS) | The CAS will be taken out of service. |
| Plant Protection System (PPS) | The PPS will be taken out of service. |
| WG/WH Liquid Waste System | This system will remain in service to support other missions at the ICPP. |
| HVAC & Safety Systems | HVAC & safety systems (safety showers, fire protection, etc.) for this building will remain in service. |

Table 1 (continued)

| Facility Area/System | Area/System Status Description |
|---|---|
| CPP-602 Building | |
| Denitrator | SNM will be removed. All process vessels will be emptied and flushed. Some process equipment will be disassembled to remove inventory. SNM accountability will be reconciled. |
| Vault LC-106 | All SNM will be removed from the area. Security force will be deleted for this area. |
| LC-204, 205, & 207 Sumps | These systems will remain in service to support other ICPP operations. |
| CPP-621 Building | All chemical storage and transfer equipment in this building will remain in service to support other missions at ICPP. |
| CPP-625 Building | This building houses three rectifiers used for the electrolytic dissolution process. No deactivation activities are planned for this building. |
| CPP-685 Building | This building houses the PMCS computer. No deactivation activities are planned for this building since the computer system will be needed for surveillance and operations that will be performed in the separations areas. |
| CPP-631 Building | No deactivation activities are planned for this building. |
| CPP-640 Building | |
| ROVER Wet | The process vessels will be flushed to remove any chemical residue and fissile material. |
| ROVER Dry | All SNM will be removed from the facility. The process vessels and piping will be disassembled as necessary to remove SNM and other process material. |
| Electrolytic | All process vessels and piping will be flushed in order to remove any chemical residues and fissile material. |

Table 1 (continued)

| Facility Area/System | Area/System Status Description |
|---|---|
| CPP-691 Building | No deactivation activities are planned for this building. |
| CPP-710 Building | This is a small material storage building. No deactivation activities are planned for this building. |
| CPP-1644 Building | This building is used for unloading bulk chemical tankers. No deactivation activities are planned for this building since tanker trucks will still be unloaded in order to support other missions at the ICPP. |

NOTE: No resources will be expended specifically to reduce the radiation levels of the cells once the SNM and chemical residues have been removed from the process vessels and piping.

TABLE 2. PLANNED GENERAL FDP FACILITY STATUS AFTER DEACTIVATION

| Facility Area/System | Area/System Status Description |
|---|---|
| Process Cell | The material accumulated during previous campaigns and maintenance turnarounds were removed. Since the cell is used for spent HEPA filter storage, cell lights will remain on until the filters are removed. |
| Process Vessels | The process vessels were flushed of solid material and verified empty by remote inspection. |
| Liquid Sample Cell | Materials were removed from the cell and the cell rinsed. |
| Operating Corridors | The process lines were flushed and the areas radiologically cleaned. |
| Crane Maintenance Area (CMA) | The CMA will be required to support remote handling of spent HEPA filters. This is a radiological area and will remain in this status. It is, and will be maintained, below decontamination trigger levels. |
| Remote Handling Equipment | The cell has a bridge crane and PaR manipulator that must be maintained in service until the spent HEPA filters are removed. Power will be removed once the filters are gone.<br><br>There are a total of 41 master-slave manipulators. All but 15 manipulators were deenergized. The remaining ones will be deenergized when the HEPA filters are removed. |
| Cell Maintenance Crane | The bridge crane on the +28 ft level must be maintained to support master slave removal/repair until the HEPA filters are removed from the cell. It will then be deenergized. |
| Remote Inspection Equipment | One pedestal-mounted camera and a PaR manipulator-mounted camera will remain in service until the HEPA filters are removed. |
| Process Cell Waste Loadout | The waste loadout cart and hoist will remain in service until the HEPA filters are removed. The shielded door and supporting equipment will also be kept in service until filter removal. |

Table 2 (continued)

| Facility Area/System | Area/System Status Description |
|---|---|
| Main Control Room (MCR) | FDP associated MCR panels were deenergized. The MCR will continue to be used as a control area for fuel storage operations. |
| Data Processing System (DPSE) | The DPSE was reduced in scope to reside in a PC-based computer system, monitoring only those parameters supporting fuel storage operations. |
| Plant Protection System (PPS) | The PPS was deenergized. |
| Criticality Alarm System (CAS) | The FDP CAS was physically separated from the fuel storage area CAS and deenergized. |
| Electrical Systems | All electrical circuit breakers were opened unless supplying essential loads, such as lighting, communications, HVAC, and radiation monitors. Lighting will continue to be reduced to the minimum required for safety. |
| Poisoned Water Makeup | Flushed and drained. Pumps deenergized. |
| Aluminum Nitrate Makeup | Flushed and drained. Pumps deenergized. |
| Hydrofluoric Acid Makeup | Flushed and drained. Pumps deenergized. |
| Nitric Acid Makeup | Flushed and drained. Pumps deenergized. |
| Decontamination System | Flushed and drained. Pumps deenergized. |
| Reagent Makeup Vessel Offgas | Scrubber drained and pumps deenergized. |
| Hydrofluoric Acid Storage | Reagent will be removed. Transfer lines are new and have not seen service. Scrubber drained and pumps deenergized. |
| Fluoboric Acid Storage | Reagent was removed. Transfer lines are new and have not seen service. Pump deenergized. |
| Cadmium Reagent Storage | Reagents were removed. Transfer lines flushed and drained. Pumps deenergized. |
| Bulk Aluminum Nitrate Transfer | Lines to FDP flushed. |
| Bulk Nitric Acid Transfer | Lines to FDP flushed. |
| Waste Collection Tanks | Vessels were flushed and drained. Fluoride waste vessel was isolated and taken out of service. Non-fluoride waste vessel will be kept in service for floor drains. |
| HVAC System | HVAC serves entire FAST building and will remain in operation. |

Table 2 (continued)

| Facility Area/System | Area/System Status Description |
| --- | --- |
| HVAC Chill Water | Will remain in operation to provide MCR cooling. |
| Cell Offgas System | Will remain in service to control radiological contamination in the cell. |
| Dissolver Offgas System | Scrubbers drained and scrub pumps pulled. Blowers drained of oil and deenergized. HEPA filters removed and stored in the cell. Nitrogen secured, offgas lines isolated from other offgas systems. |
| Process Heating/Cooling | Drained and flushed. Enriched boron transferred to PEW for use as a calcine blend. Pumps deenergized. |
| Process Chill Water | Oil drained from pumps and chillers. Freon-22 refrigerant will be vented to a collection system. |
| Potable Water | Maintained operable for safety showers and utility sinks. |
| Treated Water | Remains in service. |
| Instrumentation Air | Remains in service to supply instrument air to instruments kept in service. |
| Nitrogen | Remains in service to provide oil purge for shielded cell windows. |
| Steam and Condensate | Remains in service to supply HVAC and freeze protection equipment. |
| Fire Protection | Remains in service. |
| Freeze Protection | Remains in service. |
| Breathing Air | Remains in service to support fuel handling operations. |

TABLE 3. PLANNED GENERAL CUSTOM FACILITY STATUS AFTER DEACTIVATION

| Facility Area/System | Area/System Status Description |
|---|---|
| Multicurie Cell | Empty. This cell is a contamination area. |
| Walk-in Hood | Hood has been removed. |
| Laboratory Hoods | These hoods will be left as is. One hood is potentially contaminated. The other hood is not in service due to poor ventilation. |
| Vault | Will contain three empty shielded shipping casks. Radiologically clean. |
| Repackaging Glovebox | Cleaned to lower contamination levels. |
| Walk-in Hood Floor Drains | Drains have been capped. |
| HVAC | Supply and exhaust fans operating. Steam to space heater in service. |
| Fire Protection | A separate project installed sprinklers in this area. |
| Potable Water | Will remain in service for safety shower. |
| Lab Floor | Contaminated asbestos tile was removed. New epoxy floor coating has been applied. |

TABLE 4. RARE GAS PLANT FACILITY STATUS AFTER DEACTIVATION

| Facility Area/System | Area/System Status Description |
| --- | --- |
| CPP-604 BUILDING | The Rare Gas Plant occupies three cells in the west side of this building. |
| Process Cells | The walls of all the cells were rinsed with water in order to remove any residue chemicals. Lead will remain in the cell. |
| Collection Vessels | All process vessels that contained liquids were emptied and flushed. Gaseous vessels and systems will be left as is. |
| Process Makeup Area | The sodium hydroxide inventory was removed. Process vessels and headers no longer used were flushed and drained. |
| CPM DOG | System was isolated with blind flanges. |
| RGP and TBR Equipment | Utilities were disconnected. Vessel vents were blind flanged, where appropriate. Rhodium and platinum catalysts will remain in the vessels. |

TABLE 5. PLANNED GENERAL WCF STATUS AFTER DEACTIVATION

| Facility Area/System | Area/System Status Description |
|---|---|
| CPP-633 BUILDING | Waste Calcining Facility building which houses all of the original calcining cells and equipment. |
| Process Cells | The walls of all the cells will be cleaned to remove any hazardous materials. Bulk radioactive materials will be removed. Decontamination will be performed to support hazardous material removal. |
| Process Vessels | Process vessels will be flushed to remove any bulk materials. The remaining decontamination will be performed as directed by the conceptual design for deactivation. |
| Access Corridor | The access corridor will be cleaned. Loose debris will be removed, and the condensate system replaced. The process lines in the facility will be flushed to remove hazardous materials and to lower radiation fields for ALARA. |
| Sample Cubicles | Samplers will be decontaminated and removed. |
| Operating Corridor | Asbestos insulation was removed. The operating corridor will be cleaned and only equipment needed for long-term surveillance and maintenance will be left in service. Hazardous materials will be removed and any remaining instrumentation left inoperable. |
| Decontamination Makeup Area | Asbestos insulation was removed. Makeup vessels and piping will be flushed. |
| Silica Gel Absorbers | The silica gel media will be dispositioned as directed by the conceptual design for deactivation. The cell equipment will be cleaned of hazardous materials. |
| Off Gas Systems | The cell off-gas systems will be decontaminated when feasible. The system will remain in service until final disposition of the facility.<br><br>The process off gas systems will be decontaminated. Materials will be stored for future metals recycle or disposed of according to regulations. |

Deactivation activities will generate both low-level and high-level liquid radioactive wastes. Low-level wastes are boiled down in the Process Equipment Waste (PEW) Evaporator. The low-level wastes generated from deactivation will be water and will not contribute to high-level waste after boiling in the PEW evaporator. The high-level wastes will consist of nitric acid solutions and will be stored in the tank farm for eventual calcination. The low-level waste will be concentrated in the PEW System into high-level waste. The ratio of volume reduction is approximately 20:1, resulting in an additional volume of approximately 17,000 gallons of high-activity liquid waste.

NWCF feed rates vary, depending on the feed's sodium concentration and other feed composition variables. The expected volume of high-level waste generated from all deactivation sources other than the WCF can be processed through the NWCF in about four days. However, feed rates for the WCF high-level waste will be relatively low due to its sodium content if sodium decontamination techniques are not available. The total volume of high-level liquid waste from WCF will take approximately three months to calcine if it has high sodium content. Significant sources of low-level and high-level liquid wastes resulting from deactivation are summarized in Table 6.

TABLE 6. LIQUID WASTE GENERATION

| Facility/Activity | Low-Level Liquid Waste (gallons) | High-Level Liquid Waste (gallons) |
|---|---:|---:|
| CPP-601/Acid Stripping & Extraction | 13,000 | 4,600 |
| CPP-602/Denitration | 150,000 | 0 |
| CPP-601/Sweepdown Rinses | 5,500 | 2,400 |
| CPP-666/Sweepdown Rinses | 1,500 | 100 |
| WCF/Deactivation | 171,000 | 37,350 |
| TOTALS | 341,000 | 44,450 |

## 1. Environmental Regulatory Status

The items outlined below are the only known issues at the ICPP related to RCRA secondary containment compliance of tanks and lines. Although the regulatory agreements outlined below do not all directly affect the facilities being deactivated they do require close coordination to ensure that conflicts between meeting these agreements and deactivation activities do not occur. As an example, upgrading the WL-101/102 Vault may require that the PEW Evaporation System be shut down and therefore, it would not available to support flushing for deactivation.

Notice of Noncompliance (NON)

The NON Consent Order (DEQ letter dated April 7, 1992) includes a multitude of upgrade requirements for the tank farm in the area of secondary containment as follows:

| Violation Number | | Required Corrective Actions |
|---|---|---|
| 6.20.A.1 | - | Upgrade line or cease use by December 31, 1993. (Completed) |
| 6.20.A.2.a to j | - | Upgrade lines or cease use by December 31, 1995. |
| 6.20.A.3.a to d | - | Cease use of lines by March 31, 2009. |
| 6.20.A.4.a to j | - | Upgrade lines or cease use by June 30, 2015. |
| 6.20.A.5 | - | Restrict use of lines whenever possible. |
| 6.20.B.1 | - | Upgrade leak detection for valve box B10 by March 31, 1993. (Completed) |
| 6.20.B.2.a to n | - | Upgrade valve boxes by December 31, 1993. (Completed) |
| 6.20.B.3 | - | Upgrade tanks and vaults or cease use by March 31, 2009. |
| 6.20.B.4.a to g | - | Upgrade lines or cease use by March 31, 2009. |
| 6.20.B.5 | - | Upgrade tanks and vaults or cease use by June 30, 2015. |
| 6.20.B.6.a to h | - | Upgrade valve boxes or cease use by June 30, 2015. |
| 6.20.B.7 | - | Upgrade tanks by June 30, 1993. (Completed) |
| 6.20.C.1 | - | Completed prior to September 30, 1991. |
| 6.30.C.2 | - | Reroute valve box drain lines by December 31, 1993. (Completed) |
| 6.20.C.3 | - | Upgrade transfer lines by December 31, 1995. |
| 6.20.C.4 | - | Cease use of valve box A3C by December 31, 1995. |
| 6.20.C.5 | - | Cease use of valve boxes by March 31, 2009. |
| 6.20.C.6 | - | Upgrade junction boxes or cease use of by June 30, 2015. |
| 6.20.E | - | Operate NWCF on "hot" feed by January 1, 1993 (Completed). Do not discontinue NWCF operations for a period of three continuous years for the duration of the Consent Order. Failure to meet these will be cause for the state to re-open the Consent Order schedules for negotiation. |

Notice of Violation (NOV) (Hazardous Waste)

The NOV Consent Order (DEQ letter dated October 31, 1992) includes one RCRA secondary containment issue and the issue of discharge of hazardous and mixed wastes to the percolation ponds as follows:

| Violation Number | | Required Corrective Actions |
|---|---|---|
| 5.22 | - | Remove inlet lines to VES-WL-103, -104, and -105 from hazardous waste service and do not use for hazardous waste service until secondary containment has been installed. Install secondary containment on outlet lines by December 31, 1996. (Completed) |
| 6.1.A | - | Cease discharge of hazardous and mixed wastes to the percolation ponds by December 30, 1992 (Completed). |

Embedded Lines Equivalent Device

The State of Idaho has granted an equivalent device determination for a specific set of hazardous waste lines which run through concrete walls at CPP-601 and CPP-604. This equivalent device determination will expire on December 31, 1996.

Extensive laboratory testing by North Carolina State University and review by outside engineering firms determined that the embedded line configurations meet the regulatory requirements for secondary containment. This position was certified by two independent professional engineers. Subsequent to the engineering evaluation, discussions with the State of Idaho were initiated regarding the regulatory conformance of the embedded lines.

Land Disposal Restrictions (LDR)

Currently, the liquid produced by deactivation activities is considered necessary by DOE-ID and is supported by the State of Idaho. The DEQ sanctioned LDR waste generation to support transition in the O. D. Green letter (dated November 27, 1992) to M. B. Hinman (DOE Environmental Support Division). The letter stated that "The DEQ believes that the flushing effluent, after treatment in the process equipment waste evaporator (PEW) and Liquid Effluent Treatment and Disposal (LET&D) facility, represents a reduced risk to human health and the environment when compared to the alternative of leaving the fuels in the process equipment. Therefore, the DEQ agrees that phaseout [deactivation] activities should proceed..."

In addition to the above agreements, there are several other agreements including the Notice of Violation Consent Orders for Air and Water and the Federal Facility Agreement/Consent Order which do not have any effect on the deactivation programs.

The above requirements are independent from and should not conflict with any new ICPP missions. These requirements will remain in force regardless of future ICPP missions.

## 2. Separations Facilities - Immediate Actions and Deactivation

Hazardous chemicals have been used throughout the separations facilities and the resulting solutions and residues must be removed. The removal of these solutions and residues will be performed in the following sequence:

1. Transfer uranium bearing solutions from C- and E-Cell to L-Cell for acid stripping. (Completed)

2. Process the C- and E-Cell solutions through the Second & Third Cycle Extraction Process. (Completed)

3. Process uranyl nitrate which originated from the Fluorinel and Custom Processes through the Second & Third Cycle Extraction Process. (Completed)

4. Rinse all separations process cell equipment into L-Cell for collection of the last remaining amounts of uranium. (Completed) The rinse solutions will be discharged to PEW or sent through the denitrator, depending on uranium concentration.

5. Process all solutions containing significant quantities of uranyl nitrate through the product denitrator. (Completed)

6. Rinse L-Cell into the denitrator to solidify the last amount of uranium. (Completed)

7. Physically remove as much solid uranium from the denitrator as possible.

8. Acid flush the last several hundred grams of uranium from the denitrator and dispose of as waste upon completion of the accountability measurement.

9. Concurrent with the above operations, rinse process equipment to consolidate any remaining uranium in CPP-601 process equipment into accountability measurement vessels. (Underway)

10. Perform a uranium accountability measurement and resolve any discrepancies.

The need to process the C- and E-Cell uranium through an extraction system, coupled with the need to recycle the Fluorinel product required that the Second and Third Cycle Extraction System be operated. [Note: Fluorinel product was recycled through Second/Third Cycle Solvent Extraction Process to remove the U-232 daughter products that built up while awaiting denitrator restart. This reduced denitrator operator exposure in accordance with ALARA principles.

Certified operations personnel are required to perform the fissile material processing and hazardous material removal. Once the fissile material and hazardous materials are removed from the process equipment, staffing will be decreased to that required to provide facility surveillance and maintenance.

Maintenance will be performed only on those systems required to ensure the safety of personnel and the environment. To support reprocessing, 200 preventive maintenance jobs were performed every year. Approximately one half of these will be eliminated due to deactivation. Maintenance of instrumentation will also decrease due to deactivation. There are 1305 instrument loops in the separations facilities. Most of these instruments will be needed to complete equipment flushes and uranium removal. Upon completion of uranium removal and accountability, calibration and maintenance of 80% of the instrument loops will be discontinued.

Two process areas of the separations facilities and all building utilities will remain in operation during and after the deactivation. The four waste tanks located in the WG and WH vaults will continue to receive solutions from the laboratories in CPP-602 and CPP-684 (RAL). The Process Monitoring Computer System (PMCS), which provides automatic data logging and retrieval, will continue to be maintained operable to support the waste tank operation and general facility surveillance. The bulk chemical storage facility, CPP-621, will also remain in service. Nitric acid and aluminum nitrate from CPP-621 will continue to be used in the New Waste Calcining Facility (NWCF), the Liquid Effluent Treatment & Disposal Facility (LET&D), and in ICPP pilot plant facilities. Transfer of these chemicals is through the CPP-601 Process Make-up Area. Certified operators will operate these areas.

ORRs were completed for Second/Third Cycle Extraction and Product Denitration Process operation. The ORR for Second/Third Cycle Extraction was completed and approval for hot startup was received from DOE-ID on February 23, 1994. Second/Third Cycle Extraction was operated from March 3 to April 16, 1994. The denitrator ORR was completed and approval for hot startup was received from DOE-ID on August 28, 1994. Bed material was loaded into the denitrator vessel and the denitrator was operated from September 9 to October 15, 1994.

Details of the major deactivation activities for the separations areas are described below.

a. Transfer and Processing of C- & E-Cell Solutions

Facility Status

Approximately 12,000 liters of dilute uranium solution was stored in E-/C-Cells that was not compatible with the Second/Third Cycle Extraction Process.

A piping modification was completed to enable transfer of this solution to L-Cell where it was adjusted (acid stripped) to be compatible with Second/Third Cycle. After acid stripping, the solution was concentrated to reduce the volume. The solution was processed through the Second/Third Cycle Extraction Process in preparation for conversion to uranium trioxide. The FDP solutions stored in M-Cell were recycled through Second/Third Cycle in order to reduce the radiation levels, which increased since the time they were last processed through the extraction process due to the build-up of U-232 decay daughters.

The processing of these solutions generated approximately 4,600 gallons of high-level waste. The waste is RCRA characteristic mixed hazardous waste but it is not expected to contain listed constituents.

## Budget

| | FY 94 (Actual) | | FY 95 (Budget) | |
|---|---|---|---|---|
| | FTE | $ | FTE | $ |
| E-Cell Uranium Disposition | 0.0 | 0 K | 0 | 0 K |
| 2nd/3rd Cycle Operation | 14.0 | 1359 K | 3.5 | 0 K |
| Tailend ORR | 0.4 | 39 K | 0 | 0 K |

## b. Flushing of Process Cells and Equipment

### Facility Status

The function of the separations facilities was to recover enriched uranium from various types of spent nuclear fuels. It includes the following systems: 1) dissolution processes for aluminum, zirconium, stainless steel, and graphite matrix fuels, 2) three cycles of "liquid-liquid" extraction, 3) conversion of highly enriched uranyl nitrate solution to solid uranium trioxide ($UO_3$) powder, 4) uranium accountability systems, 5) off-gas and solvent clean-up systems, and 6) low-level radioactive liquid waste collection vessels. The majority of the vessels and connecting piping are located within approximately thirty-five shielded cells in the CPP-601, 602, and 640 buildings.

The current status of these processes is as follows:

| | |
|---|---|
| Zirconium Dissolution: | Most recent fuel dissolution was in 1981. |
| Stainless Steel Dissolution: | Most recent fuel dissolution was in 1982. |
| Graphite Dissolution (ROVER): | Most recent fuel combustion and dissolution was in 1984. |
| Aluminum Dissolution: | Most recent fuel dissolution was in 1985. A maintenance turnaround was completed in the late 1980s with plans to operate in the early 1990s. |
| First Cycle Extraction: | Most recent solution processing was in 1988. A maintenance turnaround including RCRA upgrades was completed in 1991. SO testing was in progress during 1992 and "hot" operation was to resume in 1992. |
| Second/Third Cycle Extraction: | Last solution processing campaign was completed in April 1994. |
| Product Denitration: | Most recent denitration was completed in October 1994. Presently undergoing |

| | |
|---|---|
| | mechanical cleanout of residual uranium trioxide. |
| WG/WH Waste System: | In operation to support plant activities. |
| Chemical Storage & Transfers: | In operation to support plant activities. |

Activities

A series of four flushes was performed through the liquid processing equipment in the CPP-601 building. Flushes will also be performed through the ROVER wet and electrolytic systems in CPP-640. The first of the CPP-601 flushes used nitric acid to remove any residual uranium from the equipment. After the acid flush, three water flushes were used to remove the acid and any chemical residue and ensure that there was no uranium left in the piping. Representative samples were obtained from selected process vessels. Procedures for similar flushes are being prepared for the ROVER wet and electrolytic systems. Additional flushes will be performed if uranium levels persist above Criticality Control Area (CCA) levels or if flush solutions are found to be characteristically hazardous. Upon completion of the vessel flushes, the walls and floors of the process cells will be rinsed in order to remove any uranium that may be present. The Raschig rings on the floors of L-, M-, N-, and O-Cells will be rinsed at that time.

Flush solutions were sent to L-Cell as needed to reclaim any uranium, or for eventual disposal to PEW or the tank farm. There is still approximately 570 liters of 1.4 gram/liter uranium waste solution in L-Cell which will be disposed of to the PEW system via C-Cell and the CPP-601 Deep Tanks. The solution does not meet the activity requirements for processing through the denitrator and the activity cannot be reduced without running it through the Second/Third Cycle Extraction Process, which is not economically justifiable. The solution will be disposed of to PEW using existing procedures during the denitrator cleanout when the demand for PEW throughput capacity is reduced.

Calculations for future operations and records from completed operations indicate that the total flush solution generated from all of these activities will be approximately 5,500 gallons of low-level waste from the PEW evaporator and 2,400 gallons of high-level waste. These will add only a few days of operation to the NWCF.

Assumptions

1. LDR restrictions will remain lifted for the duration of deactivation activities.

2. Operational staffing levels remain adequate through the flushing operations.

3. System vessels will undergo sweepdown to remove uranium materials. The uranium will be reduced to levels necessary to meet accountability criteria with the planned number of rinses.

4. Chemicals associated with nuclear fuel reprocessing will be removed from the ICPP, returned to vendors whenever possible, excessed, or disposed of as waste.

5. Spare parts associated with the nuclear fuel reprocessing systems will be removed from storage unless a future need for D&D is anticipated.

6. ORRs will not be required prior to initiating system component flushes.

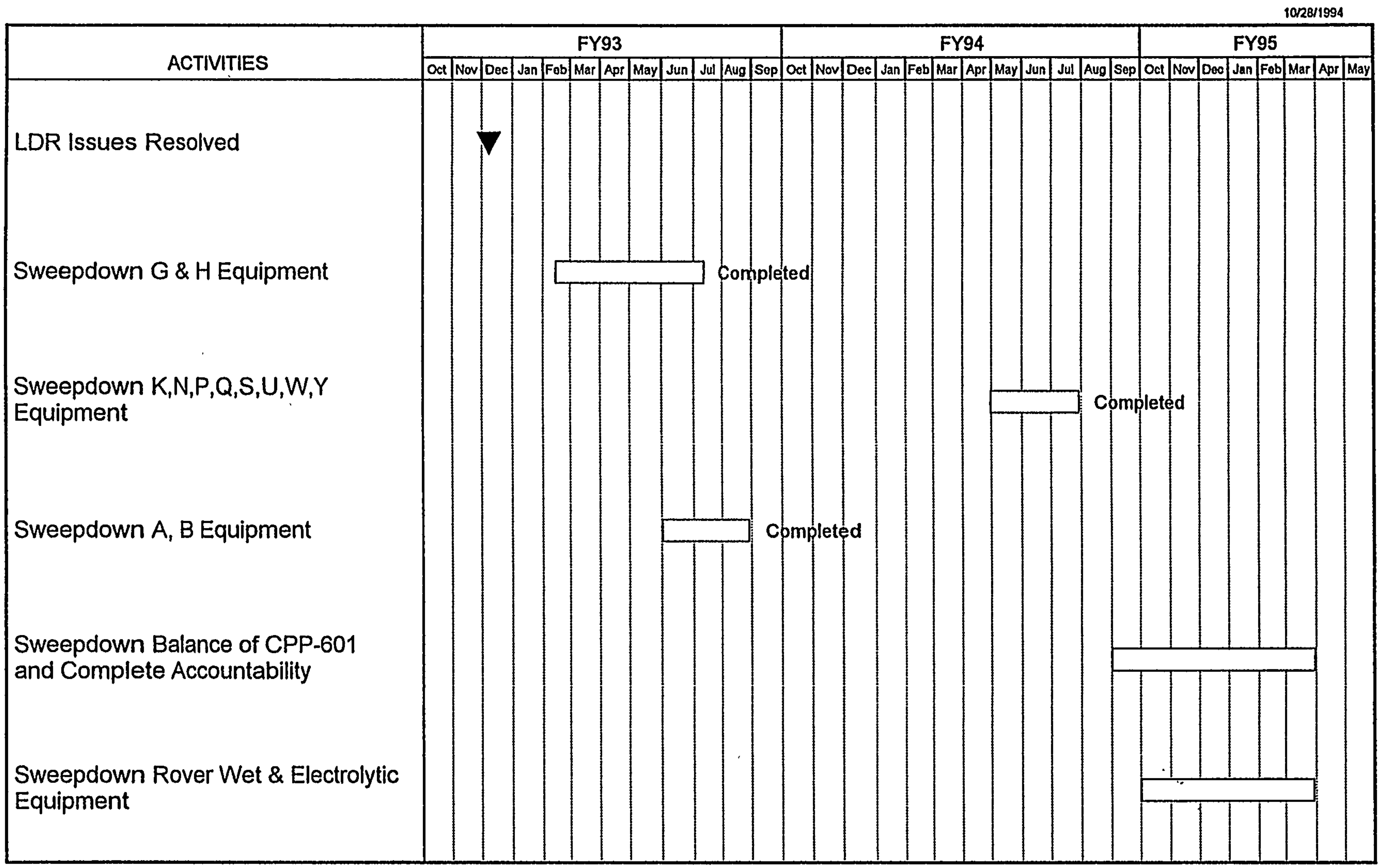
Schedule

The schedule for performing sweepdown of separations equipment in CPP-601, ROVER Dissolution Process (Wet), and the Electrolytic Dissolution Process equipment is shown on the following page.

Budget (CPP-601 equipment, ROVER and Electrolytic sweepdown)

| | FY 94 (Actual) | | FY 95 (Budget) | |
|---|---|---|---|---|
| | FTE | $ | FTE | $ |
| Prepare procedures and perform flushes | 1.8 | 173 K | 3.3 | 429 K |

# SEPARATIONS FACILITY SWEEPDOWN




SEPAIL3

c. Conversion of Uranyl Nitrate Solution to Solid Uranium Trioxide and Accountability

Facility Status

The Product Denitration Process was shut down in July 1991 due to violation of two technical standard limits. Since the shutdown, the denitrator systems have been acid flushed and considerable equipment maintenance has been completed. A final uranium accountability measurement for the separations area cannot be completed until uranium in the denitrator system is cleaned out.

Alternatives

The objective of the final run of the Product Denitration Process was to solidify in-process uranyl nitrate into uranium trioxide. A difficulty inherent to the denitrator is that residual uranium must be dissolved (acid flushed) out of the process equipment upon completion of a campaign. In the past, the acid flush solution, which contained significant quantities of uranium, was stored for future processing. Several alternative processing scenarios were evaluated to determine the best means of eliminating the generation of large amounts of uranyl nitrate after completion of denitrator operations.

The first alternative studied was to complete an acid flush of the denitrator, absorb the liquid, and dispose of the solid material as waste. This was rejected due to the lack of a safety analysis, a high-risk of alpha exposure during the operation, a lack of equipment to perform an absorbing operation, and a lack of an approved criticality alarm system in L-Cell to monitor an unshielded operation. The second alternative was to complete an acid flush of the denitrator, and solidify the liquid with a small scale evaporator. This was also rejected since an extensive safety analysis, new equipment, and considerable training and certification would be required. The third alternative was to disassemble the denitrator to remove solid uranium rather than perform an acid flush. The fourth alternative was to use mechanical methods to remove uranium from the assembled denitrator system to the maximum extent possible, perform an acid flush, and dispose of the small amount of remaining uranium to existing waste tanks.

The last two options were studied by a team of facility, technical, and safety analysis engineers to determine the best method. Disassembling the equipment would require an extensive change to the safety analysis which could identify unresolvable criticality control scenarios. Physical cleaning would generate high concentrations of uranium trioxide dust in the denitrator room. The dust would pose a considerable risk for internal exposures and very high risk for skin contaminations. Some equipment modifications would also be required to provide for moderator isolation from the room. The fourth method was chosen as the safest and used as the basis for this plan. A combination of vibrators, cameras, and air brushes and special tooling could be used to remove the bulk of the uranium trioxide from the vessels. The change to the safety analysis would be very minor to allow for removal of one line to provide camera access to the filter vessel. It was calculated that most of the uranium could be removed using mechanical methods. The rest would be removed with an acid flush and disposed of to waste per existing guidelines.

Remote video inspections of the denitrator internals were conducted which verified the feasibility of the fourth option. The safety document was subsequently changed to allow disconnecting an off-gas line for inspection as previously discussed to support this option.

Activities

All in-plant uranyl nitrate solutions were converted to solid uranium trioxide in the denitrator. Approximately five weeks was required to denitrate approximately 1770 liters of uranyl nitrate. The majority of the product left in the system is being removed from the denitrator system using mechanical means rather than acid flushing. It is estimated that all but about 600 grams of residual uranium can be removed. The residual uranium will be removed by acid flushing and will be disposed of to waste per existing controls.

Operation of the denitrator generated approximately 150,000 gallons of low-level radioactive waste that was boiled down in the PEW evaporator. An additional 50,000 gallons will be generated when the offgas system is run during the mechanical cleanout. No high-level waste will be generated during denitrator operations, although subsequent concentration of the low-level waste in the PEW System will create approximately 7500 gallons of high-level waste for eventual calcination. An accountability measurement of uranium inventory will be performed after the product is removed from the denitrator. The oxide product from the denitrator run will be temporarily stored in the Denitrator Product Storage Vault. The product will then be place into DOT containers and transferred to CPP-651 or shipped off-site, at DOE's discretion. The denitrator area will be emptied of all special nuclear material, which will relieve all security requirements and support.

Assumptions

1. Restrictions to generate LDR wastes will remain lifted for the duration of denitrator activities.

2. All but small quantities of uranium can be removed using mechanical means and the remaining $UO_3$ can be disposed of per existing controls.

3. All in-plant uranyl nitrate solutions will be processed through the Second and Third Cycle Extraction Process.

4. Postponement of regularly scheduled uranium accountability sweepdowns to support the denitrator deactivation schedule is approved by DOE.

Schedule

The schedule for denitrator operations and bed removal is shown on the following page.

Budget (Separations Deactivation)

| | FY 94 (Actual) | | FY 95 (Budget) | |
|---|---|---|---|---|
| | FTE | $ | FTE | $ |
| Product Denitration | 8.5 | 808 K | 9.8 | 970 K |
| Product Removal | 0 | 0 | 12.4 | 1268 K |
| Accountability | 0 | 0 | 1.8 | 181 K |
| Totals | 8.5 | 808 K | 24.0 | 2419 K |

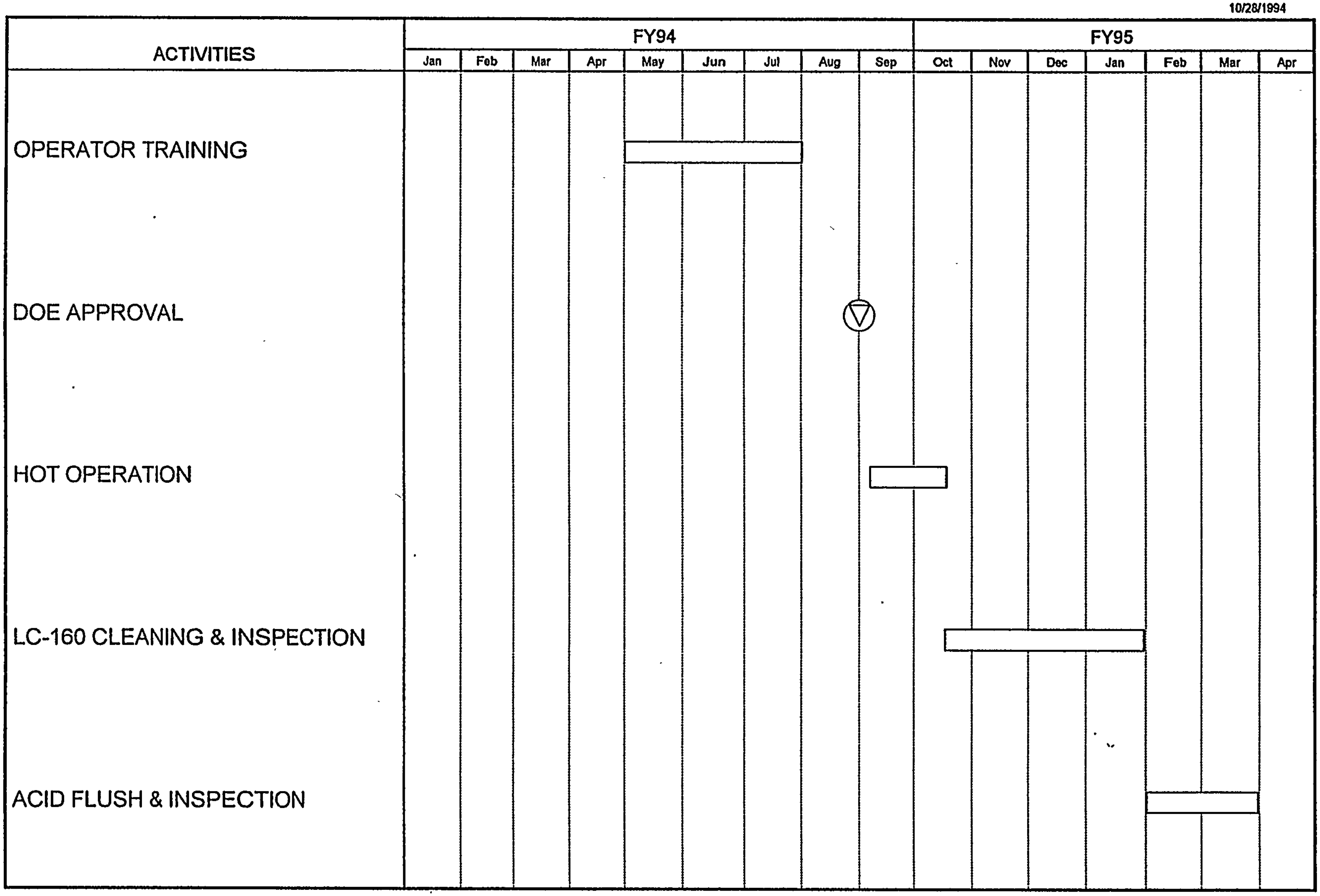
d. Fuel Processing Facility (CPP-691)

In response to the Secretarial Action Memorandum received in April 1992, the Fuel Processing Restoration (FPR) Project was terminated in September 1993 as a part of the overall deactivation of uranium reprocessing at the ICPP. The project was designed to replace the existing separations facilities (CPP-601/602) with a facility (CPP-691) called the Fuel Processing Facility (FPF).

The FPR Project construction was approximately 50% complete when the memorandum was issued. To facilitate the orderly closing of the project, the FPR Termination and Lay-up Requirements document was developed. The document describes the action required to place the structure in "lay-up" status for preservation and potential future mission use at the ICPP. The actions described in this document were completed and the structure is currently in a low-cost surveillance and maintenance mode awaiting future use. Initiatives are in progress to determine possible uses for the structure.

# DENITRATOR OPERATIONS AND BED REMOVAL

10/28/1994

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## 3. Separations Facilities - Surveillance and Maintenance

### a. Separations Surveillance & Maintenance (S&M)

The overall objective of separations S&M is to provide the facilities with the minimum resources required to ensure that they do not become a threat to the safety of workers, the public, or the environment. S&M will also include the operation and maintenance of those systems (WG/WH waste tanks and chemical receiving/storage/make-ups/transfers) within the separations area that are required to support ongoing operations (NWCF, LET&D, RAL & 602 laboratories, pilot plants, etc.) at the ICPP.

#### Activities in FY-94 through FY-98

Surveillance requirements are determined by Technical Specifications and Standards (TS/S), RCRA inspections requiring data collection for operating systems, and compliance with OSHA or other safety standards such as DOE Orders for radioactive material and contamination control. Housekeeping and custodial duties for all separations facilities will continue to be performed by operations personnel.

Maintenance during the deactivation period will include corrective and preventive maintenance for the building structures and equipment still in operation and instrument calibrations for instruments still in service. As the systems are flushed and taken out of service, resources required to maintain the system will decrease.

Operation and maintenance for those systems that support other plant activities (WG/WH system and chemical storage/transfers) will continue after the deactivation is accomplished.

#### Assumptions

1. Restrictions to generate LDR wastes will remain lifted.

2. WG/WH tanks and the Chemical Storage Area (CPP-621) will remain in operation.

3. Buildings will be maintained in a safe condition for the workers, public, and the environment.

4. Maintenance will be continued only as needed to maintain safety, security, and to protect the environment. Special activities to maintain components for future D&D will not be conducted.

Budget (Separations Surveillance and Maintenance)

| | FY-94 (Actual) FTE | FY-94 (Actual) $ | FY-95 (Budget) FTE | FY-95 (Budget) $ | FY-96 (Budget) FTE | FY-96 (Budget) $ | FY-97 (Budget) FTE | FY-97 (Budget) $ | FY-98 (Budget) FTE | FY-98 (Budget) $ | FY-99 (Budget) FTE | FY-99 (Budget) $ | FY-00 (Budget) FTE | FY-00 (Budget) $ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Surveillance & Maintenance | 61.9 | 6101K | 62.3 | 6660K | 45.7 | 4750K | 45.7 | 4903K | 45.7 | 5057K | 45.7 | 5221K | 45.7 | 5391K |

b. Fuel Processing Facility (FPF) Surveillance and Maintenance

Facility Status

With the termination of the Fuel Processing Restoration (FPR) Project, surveillance and maintenance of the existing Fuel Processing Facility (FPF) structure provides for maintaining the building in a mode "laid up for future missions". Activities within the building are limited to surveillance, preventive maintenance, and storage of FPF materials.

Construction of the building was terminated prior to the completion of various critical components necessary for occupancy. Permanent electrical, lighting, fire protection, life safety systems, ventilation, and voice paging/evacuation systems were not completed. These systems are necessary for any occupancy other than the necessary activities to maintain the building in its current condition.

Activities

Operations personnel perform a daily surveillance check of the building. This inspection includes:

HVAC - Ensure temporary HVAC system is operational.

General - Tour area for abnormalities, housekeeping, and safety concerns.

Drain Collection System - Ensure solution is not accumulating in Cells 1, 2, and 4 sumps or in the drain collection vessel located in Cell 4. Solution levels are tracked remotely with the Process Monitoring Computer System (PMCS) in the CPP-601 building. If there is an increase in any of these levels, the solution is pumped into a compatible container per procedure, then transferred out of the building to be disposed of appropriately.

Freeze Protection - A data logger was installed in the building to facilitate freeze protection checks. Temperature probes are located throughout the building and are compiled and transmitted via phone line to the PMCS. These temperatures are monitored remotely via the PMCS in the CPP-601 building.

Maintenance activities include corrective and preventive maintenance for equipment and systems in service. Preventive maintenance activities will also be performed on major equipment that is currently out of service, such as installed cranes, hoists, shielding doors, and the diesel generator, which will prevent equipment degradation. Funding for FPF S&M is included in the budget for separation's S&M.

Assumptions

1. Building will be maintained in its current lay-up status for preservation and potential future use.

2. Maintenance activities will continue as needed to preserve equipment and maintain personnel safety.

## 4. Fluorinel Dissolution Facility

a. Deactivation

Facility Status

The FDP was last operated in 1988 after two campaigns. The process was in a maintenance turnaround status until the announcement that reprocessing would be discontinued (April 1992). Since April 1992 the FDP Facility has been in a deactivation status.

Of the four bulk chemical vessels, one still contains chemicals. The hydrofluoric acid storage vessel, VES-CS-169, contains approximately 3,000 gallons. VES-CS-169 will be emptied in early FY-95 and transferred off site to be used in other industries. The cadmium storage vessels, VES-FM-170 and 179 contained a total of 6,000 gallons of cadmium nitrate and cadmium sulfate solutions, but were emptied and returned to a vendor near the end of FY-94. The fluoboric acid storage vessel, VES-CS-113, has also been emptied and the fluoboric acid returned to the vendor.

The reagent makeup and feed vessels were emptied and flushed after the last campaign. The vessels and instrumentation have been taken out of service.

The three dissolvers and three complexer vessels located in the shielded cell contained residual solids following the last campaign. Sample analysis showed the composition of the solids to be typical of the process, with aluminum and zirconium the major constituents. Several chemical flushes were performed to dissolve the solids. The chemical flushes were followed by a series of water rinses to remove the hazardous constituents from the vessels. All hazardous constituents were removed.

The heating and cooling system contained approximately 4800 gallons of borated water. The borated water was transferred to the Process Equipment Waste (PEW) System for use as a calcine blend.

Since the last campaign, the waste collection vessels were rubber lined. At the time of their lining, they were free of hazardous constituents. Both vessels have been in service during vessel flushes. There have been no fluorides and only trace amounts of cadmium transferred to the vessels during flushes. Additional flushing should not be required. Documentation for RCRA closure has been completed and submitted to the State of Idaho.

The dissolver off-gas system has been isolated from the HVAC system and the HEPA filters have been removed and stored in the FDP Cell. The FDP Cell has been permitted to store the HEPA filters as mixed waste. Currently there are a total of 147 spent HEPA filters stored in the cell - 2 COG filters, 105 pre-filters from the DOG and 40 final DOG filters. The filters will be removed from the cell and processed through the Filter Leach Facility in FY-96 or FY-97.

A number of radioactive sources were used at FDP. Five americium-241 and beryllium sources were removed and disposed of as radioactive waste. A 2 curie californium-252 source, used in the delayed neutron interrogator, was leased from Oak Ridge National Laboratories (ORNL). This source was returned to ORNL in May of 1994.

Material that accumulated during the first two campaigns has been removed from the cell and disposed of as a mixed waste or radiological waste. The spent HEPA filters are the only waste that will remain in the cell until FY-96 when they will be processed through the Filter Leach Facility.

A minimum number of systems will remain in service indefinitely to provide adequate heating and ventilation, contamination control, fire protection, and basic utility service. All other process related systems have been removed from service. Most of the process instrumentation, the DPSE, and the PPS have been taken out of service. The CAS system had components shared by the FDP and basin side of FAST. The FDP side of the CAS system has been isolated from the basin side and taken out of service.

Most of the Technical Standards for FDP processing have been inactivated and will be canceled as the PSD for FAST is updated to reflect the current status. The operating and administrative procedures have been reviewed and rewritten or canceled. Many of the remote operating procedures have been retained for use as needed. Their use will be evaluated during annual reviews.

Budget (FDP Deactivation)

| FY-94 (Actual) | | FY-95 (Budget) | | FY-96 (Budget) | | FY-97 (Budget) | | FY-98 (Budget) | | FY-99 (Budget) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| FTE | $ | FTE | $ | FTE | $ | FTE | $ | FTE | $ | FTE | $ |
| 0 | 0 | 0 | 0 | 12.6 | 1252K | 12.6 | 1287K | 0 | 0 | 0 | 0 |

* Increases in FY-96 and FY-97 are due to activity resuming to remove HEPA filters from the FDP cell.
** FDP became an EM-30 funded account during FY-94.

b. Surveillance & Maintenance

Activities in FY-93 through FY-98

The overall objective of the FDP S&M is to provide the facility with the minimum resources to support the deactivation plan and to ensure that FDP does not become a threat to the safety of workers, the public, or the environment. As FDP deactivation activities are completed, fewer resources will be required to accomplish this objective.

S&M of the Fuel Storage Area (FSA) pools, which are also in CPP-666, will continue and will be unaffected by lowering surveillance in FDP.

### Surveillance

Minimum surveillance requirements are determined by TS/Ss, RCRA inspections, and data collection for operating equipment. Minimum surveillance also includes housekeeping. When the TS/S are revised and the systems used to support the flushes are inactivated the number of operations personnel required for surveillance will decrease. Also, when the systems are flushed clean of cadmium, periodic cadmium surveys can be reduced.

### Maintenance

Maintenance during the deactivation period has included corrective and preventive maintenance for equipment still in operation, and instrument calibrations for instruments still in service. Resources required to support corrective and preventive maintenance have significantly decreased since the systems used to support the flushes are inactivated. Nearly 600 instruments at FDP have been taken out of service since the system flushes were completed, leaving only 86 instruments requiring calibration in the shutdown condition. The need for maintenance personnel, facility support staff, and engineering support are minimal. There is now one operator and one support engineer specifically designated for activities at FDP.

### Assumptions

1. Plant drawings will be as-built to reflect configuration changes already made.
2. Transfer of spent HEPA filters to the Filter Leach Facility will occur in FY-96 or -97.
3. Revised TS/S will not require full-time surveillance of main control room.
4. Operations and facility support are shared by FDP and FSA.
5. Existing safety work orders will be funded by the OSHA account.
6. Future safety work orders will be funded by this account.

Budget (FDP Surveillance and Maintenance)

| FY-94 (Actual) | | FY-95 (Budget) | | FY-96 (Budget) | | FY-97 (Budget) | | FY-98 (Budget) | | FY-99 (Budget) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| FTE | $ | FTE | $ | FTE | $ | FTE | $ | FTE | $ | FTE | $ |
| 10.1 | 1264K | 3.2 | 429K | 0 | 0 | 0 | 0 | 12.6 | 1322K | 12.6 | 1359K |

* FDP became an EM-30 funded account during FY-94.

## 5. Custom Fuel Processing

### a. Deactivation

#### Facility Status

Custom processing in the CPP-621 HCL ended in February 1991 and the facility has been deactivated. All residual uranium was recovered and the contamination levels in the lab have been greatly reduced. Several bags of radioactive waste were generated as a result of the decontamination effort. This waste contains some plutonium, but is not considered transuranic (TRU) waste because the quantity of the plutonium is insufficient to merit the TRU classification. The custom processing equipment and walk-in hood have been removed. The asbestos floor tile was removed and replaced with an epoxy coating. The facility is currently being evaluated for alternate uses.

#### Activities

The overall objective of the Custom Process Deactivation Plan was to put the HCL into a condition that will no longer require routine surveillance. The HCL may be used for research and development work, and if so, new funding will have to be found to support future activities in the area. No continued surveillance and maintenance account is planned for this facility.

Approximately 25 liters of solution containing uranium were collected in carboys during the leach process in and around the walk-in hood. This solution was sampled and analyzed to determine the best disposal route. The solution was sent to M-Cell in CPP-601 for and processed through the Second/Third Cycle Extraction Process.

Decontamination efforts were ineffective on the walk-in hood, and therefore the hood was removed. The walk-in hood was enclosed in a tent to control contamination spread during removal of the hood. Waste was generated during the decontamination of the HCL and when the walk-in hood was disassembled. This waste was disposed of as radioactive waste after sampling to confirm that it was not transuranic (TRU) waste. (The cost to dispose of TRU waste is 200 times the cost to dispose of radioactive waste.)

The floor tile had been contaminated during past use. After the walk-in hood was removed, the floor tile was removed and an epoxy floor covering laid down.

## Assumptions

1. Restrictions to generate LDR wastes will remain lifted.

2. Breathing air will remain available to CPP-627 for respirator work.

3. There is no TRU waste.

### Schedule

All items on the Custom deactivation schedule - specifically, uranium solution disposition, walk-in hood removal and HCL floor replacement - have been completed. The facility is currently being evaluated for alternate uses.

### Budget (Custom)

| FY-94 (Actual) | | FY-95 (Budget) | | FY-96 (Budget) | | FY-97 (Budget) | | FY-98 (Budget) | | FY-99 (Budget) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| FTE | $ | FTE | $ | FTE | $ | FTE | $ | FTE | $ | FTE | $ |
| 0.2 | 61.0K | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Additional funding was required in FY-94 to complete deactivation of the HCL. Responsibility for deactivation was transferred to the Facility Transition Section and continued funding for the S&M will come from the Facility Transition Section's budget until the responsibility for the facility is transferred to another organization for alternate use/s.

## 6. Rare Gas Plant

### a. Deactivation

### Facility Status

The Rare Gas Plant (RGP) was last operated in July 1988, at which time it was shutdown concurrent with the end of the fuel processing campaign. After shutdown, the RGP's liquid system was flushed with water to remove tritium. The gaseous system was flushed with air to remove any trace krypton in preparation for maintenance work. During deactivation planning, it was determined that additional vessel flushes were needed to remove any remaining hazardous materials from the piping systems. The liquid from the flushes was processed through the PEW Evaporator.

The rhodium and platinum catalyst beds were left in place within the system. No effort to remove these catalysts is anticipated and metal recovery is not practical at the present time due to the radioactive contamination collected during operation.

The only chemical used for RGP operation, sodium hydroxide, was removed from the CPP-604 facility as part of deactivation.

All process modification and enhancement work has been terminated. Several other tasks were in various stages of design and procurement at the start of deactivation. These tasks were stopped and the designs were filed for future reference. Additionally, the equipment calibration and PM procedures have been filed for future reference. Work which was required for safety or regulatory compliance was continued and all outstanding problems have been corrected.

Prior to the start of deactivation, several process upgrades were installed but not tested or verified complete. That is still the status of these tasks. After construction and maintenance work was shut down, the actual physical configuration was documented in a new set of photographs taken and incorporated into the plant system. The final configuration of the RGP is also documented in as-built drawings.

There is currently no operational krypton monitor on the main stack. The cost of a check out/calibration of the "Train 2" stack Kr-85 monitor was included in the cost planning for the RGP deactivation, but the cost of a complete rebuild of this monitor was not included. As the deactivation progressed, it became apparent that the monitor was not needed to complete deactivation. Therefore, no efforts were made during the deactivation to place a krypton monitor in service since it was not needed.

The off gas lines and utility lines to the RGP have been blocked. The oxygen supply, water, steam, and air lines are cut and capped. The off gas line from FAST to the RGP was blinded and the off-gas line from CPP-601 was blocked by disconnecting the air supply to the normally closed block valve. The system (CPM DOG) which supplies off-gas filtering and vacuum for the Aluminum Dissolution operation (mainly G-Cell areas of CPP-601) is still operational because it is the only system which supplies ventilation to the G-Cell charging cave.

Minimal monitoring capabilities are now required for the RGP and are provided for on the DCS system in CPP-604.

Activities

Cell entries were made and all facility equipment was verified in a mode safe for shutdown and ready to support scheduled deactivation work (guards on compressors, pumps installed or replaced, etc.). Further, the areas were inspected for OSHA compliance and safety deficiencies.

Procedures were prepared, vessels and piping inspected for proper assembly, and instrument calibrations performed in preparation for equipment flushes. The pumps and compressors at the RGP had been idle for several years prior to deactivation and would have required extensive maintenance prior to operation. Therefore, the special procedures were developed and the flushes completed without operating the pumps or compressors.

The RGP hold tanks WN-100 and -101, Compressors WN-207, -208, -259, -260, and mist eliminator vessels WN-161 and-166 were flushed three times using plant treated water. Samples were taken after the last flush which indicated that no significant amounts of sodium hydroxide were left in the vessels and that there were no RCRA hazardous materials left in the RGP.

The flushing of VES-WN-157 was deleted from the deactivation work. Vessel WN-157 is the cryogenic unit waste gas surge tank. It was determined that the flushing of vessel WN-157 was not needed and the efforts required to perform the task would not be offset by any positive gains.*

The air purge of the krypton and xenon collection tanks, WN-158 and WN-159, to ensure the radioactive krypton had been removed from the gas bottling system, was also deleted from the original scope of work. This task was omitted since krypton is not a RCRA hazardous material and does not present a criticality problem or other safety hazard.*

* These work scope changes were approved by DOE-ID and resulted in a total savings of $112,000.

## Assumptions

1. Lead used for shielding and the process equipment will not be removed from the cell during the deactivation work.

2. The catalyst in the facility equipment is not mixed hazardous waste and will not be removed during the deactivation work.

## Budget (RGP)

| FY-94 (Actual) | | FY-95 (Budget) | |
|---|---|---|---|
| FTE | $ | FTE | $ |
| 0 | 0 | 0 | 0 |

## b. Surveillance & Maintenance

### Activities

The overall objective of RGP S&M is to provide the facility with the minimum resources to support the deactivation plan and to ensure that RGP does not become a threat to the safety of workers, the public, or the environment. Minimum surveillance requirements are determined by TS/S, RCRA inspections, and data collection for operating equipment. A minimum number of personnel will provide surveillance for facility systems. S&M will be covered in the normal off-gas system operation activities and budgets.

Future maintenance will include corrective maintenance, preventive maintenance, and instrument calibrations for equipment and instruments still in operation. The equipment and instruments required for routine operations are covered by normal off-gas systems operations. Resources required for additional work on the RGP will be minimal.

Assumptions

1. Catalyst beds will be left in place. Catalysts are not mixed hazardous wastes.

2. Lead used for shielding will not be removed from the facility.

3. Existing safety work orders will be funded by the OSHA account.

4. Future safety work orders will be funded by the Off-Gas account.

## 7. Removal of ROVER Dry Uranium

a. Facility Status

Operation of the ROVER headend process was completed in 1984. The process consisted of equipment for burning highly enriched graphite reactor fuel. The resulting ash contained uranium and niobium compounds. Ash was filtered from the off-gas and transferred to collection vessels. Hydrofluoric acid, nitric acid, and aluminum nitrate were added to the ash to dissolve the material and adjust the nitrate concentration in preparation for uranium separation in the First Cycle Extraction Process. Upon completion of the ROVER campaign in 1984, uranium was flushed from the "wet" side of the process, which consists of the vessels used for ash dissolution. The "dry" side of the process, which includes the graphite burners and ash collection vessels, could not be completely emptied of uranium due to plugged process lines. Accountable quantities of enriched uranium remain in the ROVER process equipment. The uranium is distributed among equipment in the CPP-640 Mechanical Handling Cave (MHC), Cell 3, and Cell 4.

b. Justification for Uranium Removal

The presence of enriched uranium in the ROVER process presents three safety concerns: criticality control, radiological contamination, and security of special nuclear material. Criticality controls have been maintained since ROVER operated in 1984. The process is designated a "Procedure Criticality Control Area" (PCCA), based on the amount of uranium-235 still in the process. As a result, surveillance is performed every eight hours to ensure all administrative controls for criticality and radiologic safety are met. These include strict limitations on moderator presence in the ROVER system, pressure differential requirements between vessels, and instrument operability requirements.

Radiological contamination controls have also been maintained since process activity ceased in 1984. The ash is difficult to contain, and events during ROVER operation resulted in contamination spread throughout the MHC and Cells 3 and 4. Localized radiation fields of up to 50 Rem per hour, complicated with moderator restrictions, have prevented decontamination activities from being completed. Ventilation and filtration controls have been established to prevent the spread of the contamination outside the process areas. Any disruption in ventilation air flows would result in a significant spread of contamination into clean areas and possibly to the environment.

Category II (level D) quantities of special nuclear material (SNM) within the ROVER process area require extensive security controls. (The category and level of SNM is a classification which combines the type, composition, quantity and ease of handling to reflect the relative attractiveness of SNM material as defined by the Nuclear Materials Control Information Manual - July, 1992.) This includes security force surveillance, intruder detection and alarm equipment, and certain equipment lockouts. These personnel and protection features must remain in place until the fissile material is removed and an accountability measurement completed.

It is not prudent or cost effective to complete final reprocessing deactivation activities without removing the fissile material from ROVER. Reduced personnel and budget resources would decrease the long-term safety margin associated with the ROVER process. Uranium removal plans must proceed.

c. Description of Approach

Activities

The safety analysis for removal of uranium bearing material from the ROVER process has been initiated. Criticality calculations are required to model configurations resulting from equipment dismantling, ash collection, and ash storage. This effort will produce a Draft Safety Analysis Report (SAR) and accompanying Technical Safety Requirements. As a prerequisite to the SAR, a uranium removal plan must be completed. The plan will consist of drawings and sequential steps for dismantling equipment containing uranium. The conceptual, advanced conceptual, and definitive designs, along with the uranium removal plan, will be prepared by an outside contractor. Remote equipment will be used as much as possible to reduce personnel exposure to radiation and contamination during uranium removal activities. Specialized equipment and remote tools for use in dismantling process equipment are currently being developed. The existing Environmental Statement (ES) was re-evaluated relative to planned activities and determined to adequately encompass deactivation in December, 1993. The existing safeguards and security plan will be updated to cover activities defined by the uranium removal plan. Changes to physical security equipment may be required.

The uranium removal work will require a Criticality Alarm System (CAS). The CAS engineering design, detector head location calculations, safety analysis, and installation is scheduled for FY-95. A neutron detection CAS that meets all ANSI requirements is currently available for installation in the ROVER process area.

Numerous equipment repairs must be completed in preparation for uranium removal. These repairs include cell off-gas (COG) and vessel off-gas (VOG) systems, master-slave manipulators, and the in-cell PaR. Repairs will be completed by LITCO craft personnel.

Equipment dismantling and uranium removal will be performed by LITCO operators and craft personnel. Operators and supervision will complete training and certification for the ROVER material removal. Formal procedures for equipment dismantling and uranium removal will be prepared, reviewed, approved and rigorously followed.

The uranium ash, which will be removed from the ROVER process equipment, will be packaged and transported to the Irradiated Fuel Storage Facility (IFSF) at CPP-603. It will then be transferred to the Peach Bottom Shipping Cask and transported to the Irradiated LWBR Fuel Storage Dry Wells (CPP-749).

Contractor and DOE ORRs for uranium removal will be performed. Upon completion of the ORRs and receipt of DOE approval, uranium removal activities will commence. Operators, maintenance crews, and crafts personnel will conduct the work. The bulk of the material will be removed by remote vacuuming. Following this process, the equipment will be dismantled to facilitate the removal of the balance of the in-process uranium. The most difficult portion of the work will be the cutting apart of vessels and piping which contain significant quantities of uranium. Although much of the work will be performed remotely, it will be necessary to rotate the operators and crafts personnel with other personnel to keep radiation doses within LITCO limits. Vessel dismantling and cutting is required to ensure all material is removed. Piping removed from the cells will be cleaned and inspected for uranium. All uranium bearing ash will be sampled for accountability measurement, loaded into critically safe containers, and transferred to the dry wells for storage. The operating and maintenance crews performing the uranium removal will require extensive support from health physics to provide protection against internal and external radiological exposures. Facility engineers will be assigned to control work scope and procedural changes. Analytical personnel will analyze ash samples to determine uranium content.

Once the uranium is removed from the ROVER process, all criticality control requirements, including moderator restrictions, will be lifted. Wet decontamination of the cell liners will be performed. This will be required to reduce future contamination potential. Security controls will also be lifted upon completion of uranium removal.

d. Assumptions

1. No unresolvable safety, criticality, or regulatory issues will arise.

2. Uranium will be stored in the CPP-749 Dry Wells.

3. No changes are required to the dry wells.

4. The ROVER burner beds and ash will be removed and packaged. This will require the partial dismantling of the dry systems. ROVER accountability will be completed.

5. Required funding will be available.

e. Schedule

The schedule for ROVER material removal is shown on the following page.

f. Budget (ROVER)

| FY-94 (Actual) | | FY-95 (Budget) | | FY-96 (Budget) | | FY-97 (Budget) | | FY-98 (Budget) | | FY-99 (Budget) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| FTE | $ | FTE | $ | FTE | $ | FTE | $ | FTE | $ | FTE | $ |
| 7.2 | 1167K | 17.0 | 4295K | 43.4 | 8099K | 40.8 | 4529K | 37.7 | 4283K | 36.9 | 4245K |

# ROVER MATERIAL REMOVAL PROGRAM

10/14/1994

| ACTIVITIES | Start | Finish |
|---|---|---|
| Advanced Conceptual Design MHC Cell 3 &4 Cleanout Equipment | 8/1 | 6/30 |
| Definitive Design - ROVER MHC Cells 3 &4 | 8/1 | 7/31 |
| Draft Safety Analysis Report (SAR) - 640/603/749 | | 10/31 |
| Draft Technical Standards / Requirements - 640/603/749 | 12/1 | 10/31 |
| DOE Approve SAR | 10/31 | 4/30 |
| DOE Approve TSR's | 10/30 | 4/30 |
| Write Operating Procedures | 1/1 | 2/8 |
| Procurement Capital Equipment | 1/1 | 1/30 |
| Mock-up, Test and Modify Equipment | 7/1 | 4/30 |
| Initial Training | 7/1 | 4/30 |
| Operational Readiness Review (Part 1-MHC and Part 2 - Cells 3 and 4) | 4/30 | 10/31 |
| Exterior Setup | 4/15 | 4/30 |
| Interior Set-up, Disassembly and Material Removal | 10/1 | 4/30 |
| Material Disposition, Packaging, Transport, Decontamination and Wrap-up | 10/1 | 4/30 |

## 8. CPP-633 Waste Calcining Facility (WCF)

### a. Facility Status

WCF was the world's first plant-scale facility built to achieve safe, efficient stabilization of high-activity radioactive liquid wastes resulting from the reprocessing of nuclear fuels. The WCF converted high-level radioactive liquid wastes into granular solids which are less corrosive, more stable, and occupy less storage volume.

Operation of the WCF with radioactive wastes began in 1963 and terminated in 1981. During that time, over 4,000,000 gallons of aqueous waste was calcined, producing approximately 77,000 cubic feet of solids. Due to its deteriorated condition, the WCF was replaced by the New Waste Calcining Facility (NWCF), which was completed shortly after WCF was shut down.

The High-Level Liquid Waste Evaporator in the WCF was used until 1984.

The facility is a concrete structure with approximately 20,000 square feet of floor space. The processing cells lie underground in two banks with service corridors lying between them. Non-radioactive service areas for the facility are located in the concrete block structure above grade.

The facility currently contains a number of high-radiation areas and RCRA permitted units.

### b. Justification for Deactivation

Minimal deactivation activities were conducted at the facility following the last calcination campaign. The calciner vessel was "dusted out" by increasing the air flow through the process, but chemical decontamination was never performed.

The deactivation activities will place the facility in a low-cost, safe and stable condition for S&M in which it will remain until final disposition. These required activities include the removal of bulk radioactive, hazardous, and mixed RCRA waste materials and RCRA closure of permitted units.

The facility currently contains an estimated 3300 curies of loose radioactive material and some RCRA materials not yet fully characterized. These materials make key issues of potential personnel exposure/contamination and the release of radioactive and RCRA mixed waste to the environment. Radiological contamination controls have been maintained since process activities ceased in 1984. The controls include filtering and controlling the air flow using HEPA filtered HVAC systems and the constant surveillance and control of entry into and out of radiological zones. Since cleanup activities began in 1991, over 2000 $ft^2$ of contaminated floor area has been cleaned and released from radiological control.

Radioactive contamination and hazardous materials in the facility must be removed to eliminate the potential for the release of material to the environment. The condition of the concrete cell walls and the stainless steel liners in the cells were inspected in FY-94 using remote inspection techniques. Although there is no immediate threat of structural failure, the concrete walls show signs of deterioration. In general, the stainless steel liners show no significant signs of deterioration - however, the video inspection provided only qualitative results. Also, the failure of the HVAC units could result in airborne contamination being released outside the facility.

A closure plan for the WCF has been submitted to the State of Idaho. This plan identifies the complete closure of the facility by 2006.

c. Description of Approach

Activities in FY-94

A feasibility study to determine the best approach to the deactivation and RCRA closure of the WCF was completed during FY-94. This study assessed the availability of improved decontamination and remote technologies while considering radiological conditions inside the cells, accessibility to the cells, regulatory constraints, cost, schedule, and personnel and environmental safety. Based on the results of the feasibility study, the NEPA strategy for the facility is being established for submission to DOE-ID for review and approval.

Remote inspections were also performed in FY-94. Inspections included visual and radiological inspections inside the clay vent pipe surrounding the WCF, in the waste hold cell, off-gas cell, adsorber manifold cell and calciner cell. A remote inspection of the calciner vessel was terminated because the pipe used to insert the camera was found to be sheared inside the cell. The results from these inspections are being used to support conceptual design activities.

S&M activities will continue to be performed in the facility. These include: routine instrument readings, routine radiological surveys, maintenance of facility equipment and proper HVAC flows, housekeeping, and compliance (e.g. RCRA) surveillance activities.

Activities in FY-94 through FY-06

Planned activities include the completion of remote inspections, completion of the conceptual design package for deactivation work, writing the Safety Analysis Report (SAR), initiation of bulk chemical and radioactive material removal, NEPA development and approval, facility deactivation, RCRA closure, and S&M of the remaining facility. The detailed schedule for outyear activities is being developed based partly on the feasibility study completed in FY-94.

Several waste minimization techniques were evaluated during the feasibility study and those selected will be employed for the wastes generated during the deactivation of the WCF. These may include segregation, characterization, compaction and/or incineration. Mixed waste removed from the WCF will be placed in containers and handled appropriately. Radioactive wastes will be sent to the Radioactive Waste Management Complex (RWMC) for disposal.

The deactivation of the WCF will include the initial flushing of process equipment and cell walls, removal of equipment for decontamination, RCRA closure of permitted units within the facility, and disposal of radioactive and hazardous waste materials from within the facility.

d. ALARA

All work will be performed in accordance with ALARA practices. This will be accomplished by utilizing preplanning of activities, shielding, and remote tools to the extent possible to reduce personnel exposure to radiation fields and contamination.

e. Budget (WCF)

| FY-94 (Actual) | | FY-95 (Budget) | | FY-96 (Budget) | | FY-97 (Budget) | | FY-98 (Budget) | | FY-99 (Budget) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| FTE | $ | FTE | $ | FTE | $ | FTE | $ | FTE | $ | FTE | $ |
| 4.7 | 1397K | 9.2 | 2038K | 12.1 | 2791K | 14.8 | 4218K | 12.8 | 3979K | 11.7 | 3905K |

These budget numbers include the WCF transition to deactivation.

## 9. Removal of Process Chemicals

The schedule for removal of process and decontamination chemicals is shown on the following pages. The products listed will no longer be used at the ICPP. Table 7 provides the volume and method of disposal for each chemical.

A chemical inventory of operating areas was completed to identify and record chemicals no longer required. Products that could not be consumed through a plant approved method were returned to vendors, offered in government exchange programs, or offered through a bid process to approved chemical brokers. Many of the products were over five years old and difficult to introduce into the market for reuse. Products not removed from inventory by use of the options listed above were sent to an established, permitted off-site disposal facility. Two process chemicals remain on-site pending final disposition.

There are approximately 2000 gallons of hydrofluoric acid (HF) and 750 gallons of hexone (methyl isobutyl ketone - MIBK) still awaiting final disposition. The HF is currently stored at the CPP-621 Chemical Storage Area and the hexone is stored in CPP-601 in T-Cell. The HF is scheduled for shipment off-site for commercial use by the end of November, 1994, and the hexone is scheduled to be barreled for storage and off-site shipment by the end of FY-95. The hexone will be classified as mixed waste when it is removed from T-Cell or per RCRA guidance at the completion of uranium accountability because of its use as a solvent during deactivation of CPP-601.

There are eleven 55 gallon drums of n-dodecane in flammable storage which was originally intended for use in the First Cycle Extraction Process. With the decision to cease reprocessing, the n-dodecane was designated for use at NWCF. The n-dodecane was not used in the 1993 NWCF campaign because the ICPP committed to use 21,000 gallons of solvent from Hanford at NWCF as part of a waste reduction and savings through sharing effort. The solvent shipment from Hanford was not received and the n-dodecane will be used at NWCF during future campaigns.

Table 7: Chemical Disposition

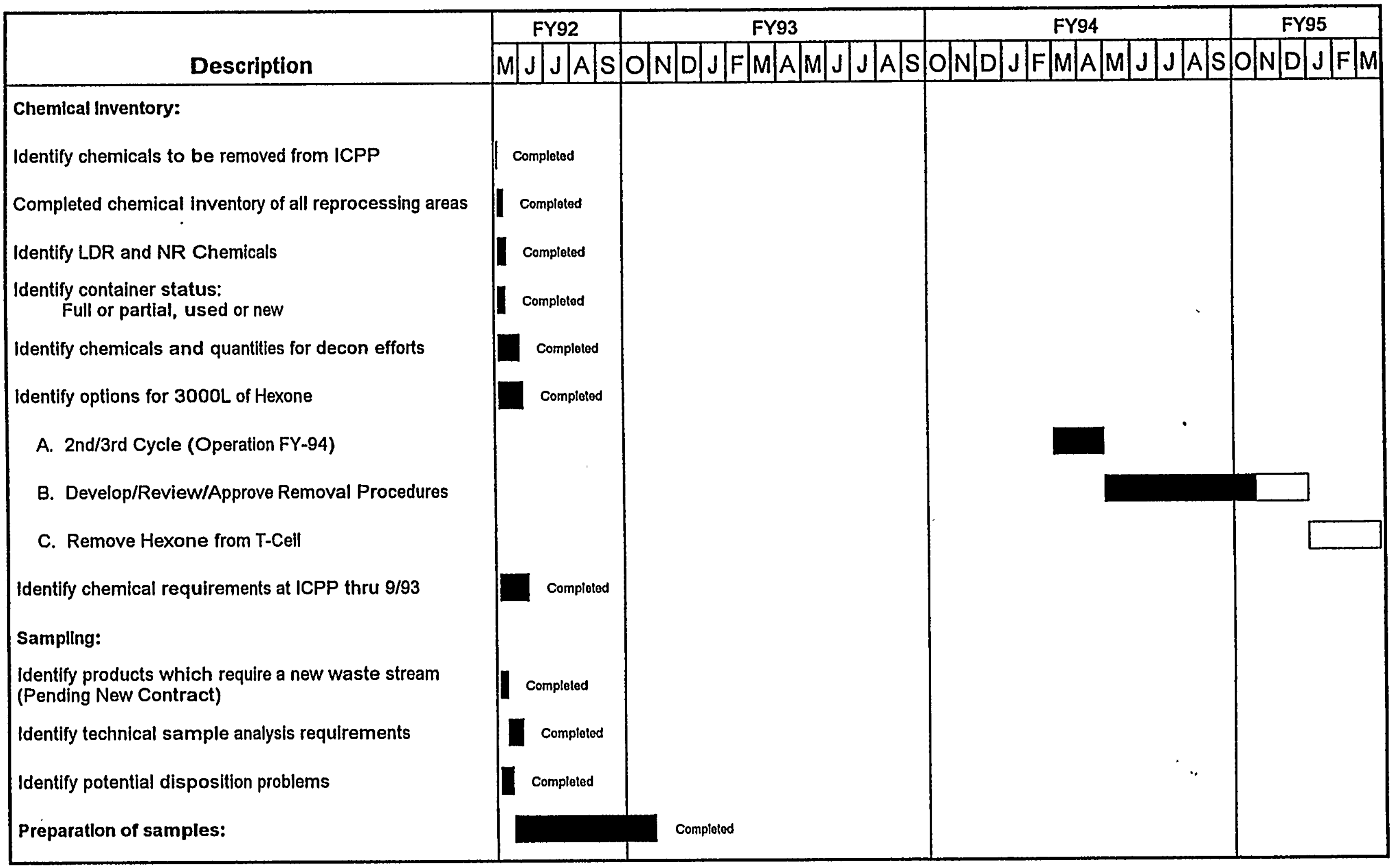
| NON-REGULATED CHEMICALS | RTV | ACB | CFA | PDF | ICPP |
|---|---|---|---|---|---|
| Citric Acid | | 1020 lbs | | | |
| Knox Gelatin | | | 150 lbs | | |
| Sodium Carbonate | | | 1800 lbs | | |
| Boric Acid - enriched | | | | | 1016 lbs |
| Boric Acid solution - enriched | | | | | 18,000 L |
| Gadolinium Oxide - enriched | | 1300 lbs | | | |
| Oxalic Acid | | | | | 2100 lbs |
| Tartaric Acid | | 1900 lbs | | | |
| Turco 4324 | | | 1750 lbs | | |
| **REGULATED CHEMICALS** | | | | | |
| Cadmium Nitrate - Bulk (D001, D006) | | 3000 gal | | | |
| Cadmium Sulfate - Bulk (D006) | | 3000 gal | | | |
| Turco 4502 (D002, D007) | | | | | 5500 lbs |
| Fluoboric Acid - 3 Molar (D002) | 270 gal | | | | |
| Fluoboric Acid - Bulk (D002) | 3700 gal | | | | |
| Hexone (D001) | | | | 750 gal* | |
| Hydrocarbon Diluent (D001) | | 1485 gal | | | |
| Hydrofluoric Acid (D001) | 4 drums | | | | |
| Hydrofluoric Acid - Bulk (UI34, D002) | | 3000 gal* | | | |
| N-dodecane (D001) | | | | | 605 gal |
| Potassium Permanganate (D001) | | | 65 lbs | | |
| Sodium Hydroxide (utilities) (D002) | 6800 lbs | | | | |
| Sodium Hydroxide (process) (D002) | | | | | 400 lbs |
| Tributyl Phosphate (D001) | 220 gal | | | | |

RTV: Return to vendor
ACB: Approved chemical broker
CFA: INEL central landfill
PDF: Permitted disposal facility
ICPP: Alternate use found at the ICPP

* Still awaiting specified disposition

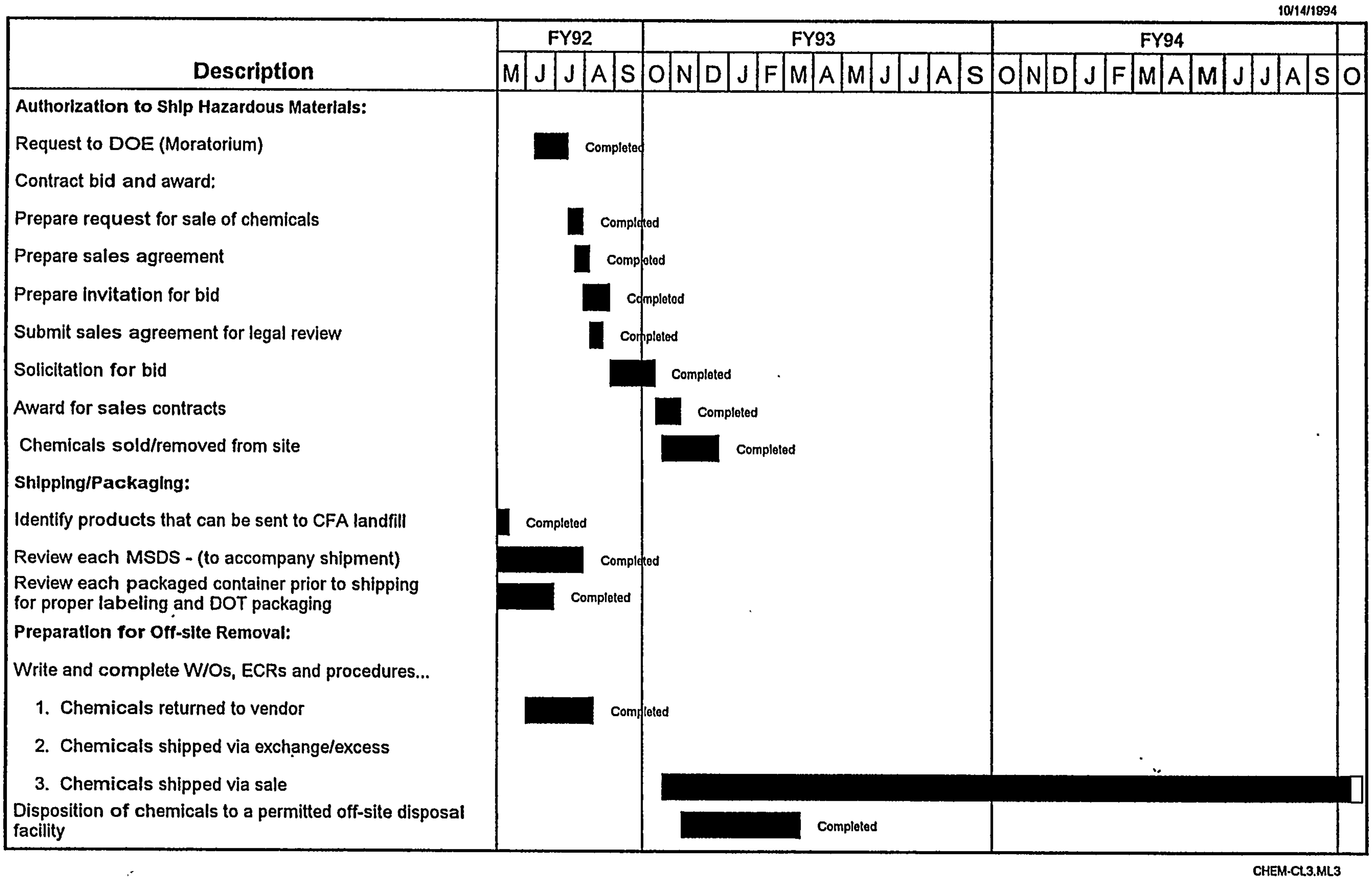
# CHEMICAL CLOSEOUT

10/28/1994



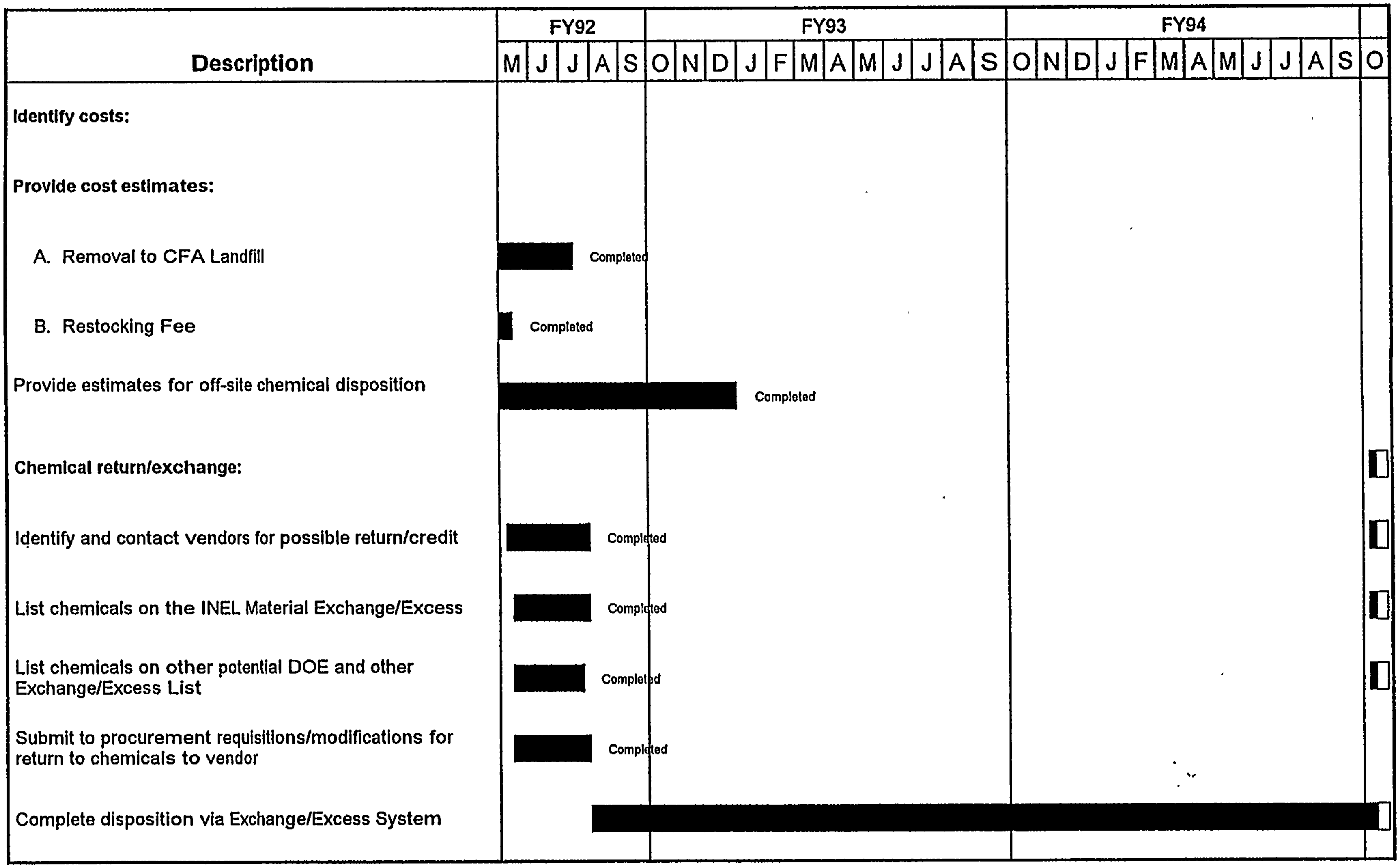

CHEM-CLO.ML3

# CHEMICAL CLOSEOUT



# CHEMICAL CLOSEOUT

10/14/1994




CHEM-CL2.ML3

## 10. Removal of Spare Parts

The cessation of nuclear fuel reprocessing makes many spare parts unnecessary. When the decision to cease reprocessing was made, a review of all fuel reprocessing spare parts was conducted on an item-by-item basis. A second review is currently being conducted.

The estimated cost value of the obsolete spares in storage, as of October 1992, was:

| | | | |
|---|---|---|---|
| (1) | Standard Spare Parts . . . . . . | $2,243,110 | (3217 parts) |
| (2) | Controlled Storage Items . . . . | $1,883,634 | (45 categories) |
| | | $4,126,745 | |

These parts will be retained until the end of deactivation and then excessed. This allows an evaluation of these spares for use in other ICPP locations, assessment of the need for these spares as part of the future D & D program or contacting of vendors to assess the possibility of returning for credit. The parts will be physically segregated and moved to a separate storage area pending completion of the above cited evaluations, completion of paperwork, and implementation of the financial adjustments necessary to remove the parts from the spares inventory.

## 11. Projects (General Plant Projects and Capital Equipment)

### Capital Equipment and General Plant Projects

Following the announcement of the mission change at ICPP, the prioritization committee met to address the ICPP capital equipment requirements during deactivation and after the facilities are placed in a safe standby condition. Items having a programmatic driver related only to reprocessing were eliminated. Projects which provide site-wide support have been continued. Examples of projects for site-wide support are safety and health upgrades, environmental compliance, security access, emergency communications, etc.

A summary of the funding requirements for ICPP Capital Equipment (CE) and General Plant Projects (GPP) appears below. Appendix C provides a prioritized listing for the General Plant Projects and Capital Equipment items, including those items for which funding has not yet been identified. Appendix C also includes specific funding requirements and the associated weighting from the Capital Asset Management Plan (CAMP) prioritization system for each year.

| | | FY-95 $ K | FY-96 $ K | FY-97 $ K |
|---|---|---|---|---|
| Capital Equipment | EM-30 | 14,426 | 12,419 | 10,330 |
| Capital Equipment | EM-60 | 2,643 | 1,360 | 1,350 |
| General Plant Projects | EM-30 | 2,948 | 4,910 | 4,910 |
| General Plant Projects | EM-60 | 3,125 | 3,195 | 3,195 |

## 12. Work Orders Evaluation

In order to more accurately determine the Engineering, Maintenance and supporting resources needed to accomplish deactivation, a review of the existing work orders for each facility has been conducted. This review categorized the work orders into those that should not continue (to be closed or canceled) and those that should be accomplished.

Many factors were used to separate the work orders, with the safety of personnel being a prime concern. The following table lists the work orders/reviews for each area and those closed or canceled.

| Area | Total WOs | Closed/Canceled |
|---|---|---|
| Rare Gas Plant | 70 | 31 |
| Fluorinel Dissolution Processing | 327 | 129 |
| Separations | 683 | 293 |

The effort to close out these jobs required detailing all activities performed, determining the disposition of materials, identifying the supporting documents that needed modifications (PMs and as-building) and developing the necessary records.

## 13. DOE Order Compliance (A Graded Approach)

A cursory review of DOE Orders was completed to determine if a graded approach should be taken for deactivation or post-deactivation activities. Based on that cursory review it was determined that all relevant DOE Orders should be implemented unless further study reveals a "phaseout" of applicability. It is expected that the applicability of several DOE Orders will decrease due to changes in process status. Personnel at the ICPP completed a review of applicable procedures and documents to assess DOE Order compliance for CPP-601 and FDP. Additionally, a field assessment was performed for these facilities to evaluate compliance. These assessments were completed in March, 1993. An evaluation of the applicability of some DOE Orders due to deactivation still needs to be performed. Examples of DOE Orders that may be dealt with via a graded approach are: 4330.3A; 5480.18; 5480.19; 5480.20; 5480.21; 5480.22; 5480.23; 5632.2A; 5633.3; and 5743.XXX.

## 14. Tiger Team, and Other Audit Finding Closeouts

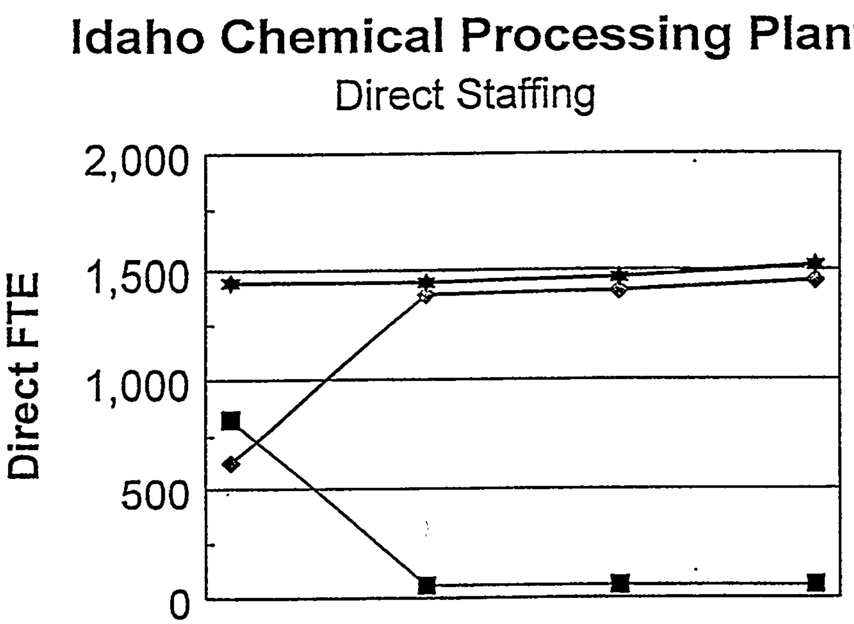
Corrective actions for the majority of audit and assessment findings in the fuel reprocessing areas have been completed. Open findings were reviewed to determine if any would not be applicable in light of the reprocessing deactivation. None were determined to be inappropriate for deactivation. All findings, including those of the Technical Safety Appraisal conducted in April/May, 1992, were determined to be applicable and will be addressed and closed out.

## Staffing

LITCO has adopted the existing plans for the deactivation of ICPP reprocessing facilities and the plans developed under WINCO are still being actively pursued, although the change in management may result in revisions which have not yet been identified. Accordingly, the contents of this plan are subject to revision and, in particular, staffing plans can be expected to undergo further development. Changes resulting from the consolidation which affect this plan will be incorporated in the next update.

### 1. Changes in Funding Profile

The graph shown below illustrates the labor resources required to execute major ICPP projects including the deactivation of the fuel reprocessing facilities. It shows the FTEs funded by DP and EM, but does not include FTEs supporting Environmental Restoration or other funded work. Total work force numbers for 1993 and 1994 are based on actual figures and future numbers are based on the assumption that out-year budgets are approved at target levels. Reorganization under consolidation will affect these numbers significantly, and future comparisons will be difficult as many of the personnel counted here will be matrixed in a broader, site-wide organization.




| | FY 93 | FY 94 | FY 95 | FY 96 |
|---|---|---|---|---|
| DP ■ | 825 | 58 | 59 | 61 |
| EM ◆ | 623 | 1,393 | 1,410 | 1,454 |
| TOTAL ✱ | 1,448 | 1,449 | 1,469 | 1,515 |

## New Programs

The site-wide consolidation will have a significant impact on new programs at the ICPP. Accordingly, the contents of this plan are subject to revision and, in particular, retraining, stakeholder communication and management plans can be expected to undergo further development. Changes resulting from the consolidation which affect these topics will be incorporated in the next update.

### 1. New Programs (EM-30)

#### Fuel Handling and Storage Activities

The DOE has stored spent nuclear fuel at ICPP since 1951. There are four facilities at the ICPP used for the storage of spent nuclear fuel. They are: CPP-603, Underwater Fuel Storage Facility; CPP-603, Irradiated Fuel Storage Facility (IFSF); CPP-666, Fuel Storage Area (FSA); and CPP-749, Underground Fuel Storage Area. The CPP-651 Unirradiated Fuel Storage Facility (UFSF) is used for the storage of unirradiated nuclear materials.

The decision to discontinue fuel reprocessing at the ICPP has a direct effect on fuel handling activities at the CPP-666 FSA and CPP-603 basins. Fuel handling activities were also affected when a federal court ruled that fuel could not be sent to the INEL until an Environmental Impact Statement had been completed to analyze the impact of receiving fuel shipments. A compromise on this issue was reached among DOE, the State of Idaho and the U.S. Navy, which allows limited fuel shipments to the ICPP. These limited fuel receipts may continue during implementation of the following activities.

At the CPP-666 FSA, the Rack Reconfiguration Project was approved to ensure the continued capability of the ICPP to receive and store fuel. Additionally, the schedule for re-racking fuel has been accelerated due to the deteriorating conditions at CPP-603 to ensure sufficient storage space for Naval and other government-owned fuel receipts. Work is in progress to move the fuel out of the CPP-603 North and Middle Basins by December 31, 1996. Additionally, fuel movement from the CPP-603 South Basin will commence by June 1, 1995 with the goal of removing all fuel from the South Basin by December 31, 2000.

Acceleration of the schedule has required resources in addition to those previously working on fuel handling activities. Resources which would otherwise have been displaced by the decision to discontinue reprocessing have been reallocated to provide support for these activities. Changes in staffing to support fuel handling activities are discussed in the Retraining section of this document.

ICPP Spent Fuel/Waste Management Technology Development

Reprocessing of spent fuels for uranium and other resource recovery has resulted in the production of 3500 $m^3$ calcine and an inventory of 1.5 million gallons of radioactive, sodium-bearing liquid waste. Also, 108 metric tons (MT) of graphite fuels, 420 MT of special fuels, and 240 MT Navy fuel are in inventory. Continued receipt of fuels, especially Navy fuels, will add to this inventory.

To date, a major activity at the ICPP has been the reprocessing of spent nuclear fuels to recover fissile uranium and dispose of spent fuel elements. With the changes in world events, the demand to recover and recycle this material has changed, and DOE has discontinued reprocessing fuels for the recovery of uranium. However, the need to properly manage this material remains a high priority.

In accordance with the Nuclear Waste Policy Act of 1982, as amended, DOE plans to dispose of spent fuel and high-level waste in geologic repositories. Accordingly, the emphasis of future ICPP activities will likely shift toward conditioning current and future spent fuels and wastes as appropriate for geologic disposal. Preparation of spent fuel/wastes for disposal may include mechanical, physical and/or chemical processes, and may differ for each of the various fuel and waste types in storage at the ICPP.

The Spent Fuel/Waste Management Technology Development Program will define the strategy to be pursued by DOE in the handling of spent fuels and ICPP radioactive stored wastes. This program will produce the technology development, and technology demonstration, that are required to ensure that the spent fuel and high-level waste will be processed as appropriate for disposal in a geologic repository.

(1) Description of Scope Changes (New Mission Work)

Efforts required to support the development program fall into three principal categories:

- Developing the basis for integrated strategic decision making for choosing among alternative technologies for waste and spent fuel conditioning and preparation for disposal.

- Developing conditioning and disposal technologies for radioactive, sodium-bearing liquid waste, calcine, and DOE owned spent fuels.

- Providing facilities necessary to develop and demonstrate candidate conditioning and disposal technologies.

The developmental effort described above will concentrate on seven principal elements:

1) Systems analysis
2) Radioactive, sodium-bearing liquid waste
3) Calcine immobilization
4) Fuel technology development
5) Dry storage demonstration
6) Facility support
7) Recycle metal/waste minimization

A description of the impact of staffing this program is discussed in the Retraining section of this document.

## 2. Retraining

### a. Work Force Concerns.

The ICPP deactivation will have a significant impact on the current work force, as will re-structuring under LITCO's consolidated contract. LITCO is committed to successfully and effectively managing deactivation. Deactivation will be performed through redeployment of the current work force to the maximum extent possible, consistent with business realities. Measures for meeting this commitment include the identification of LITCO's current and future skill mix requirements, aggressive attrition management, filling openings with existing personnel, and continued development of appropriate training and retraining programs for current employees.

Public Law PL 101-189 requires a Training and Job Placement Services Plan to be submitted to the Senate and House of Representatives not later than 120 days before a DOE defense nuclear facility permanently ceases all production and processing operations. Only a portion of ICPP facilities are directly affected by the change in mission. The majority of the ICPP facilities will continue to be operational to support continuing and new missions. Due to the minimum expected impact to workers and the community, it is concluded that the PL 101-189 requirements do not apply in this case at the ICPP. Application of the requirements of PL 101-189 will be reevaluated if changes in the ICPP deactivation occur.

### b. Skill Mix - Current and Projected

To successfully meet future needs while using current resources to the greatest extent possible, ICPP personnel conducted a skills assessment based on current staffing and skill mix. Skills were identified which will be required over time to accomplish a safe, environmentally sound deactivation of the reprocessing mission. In addition to the skills necessary for deactivation, baseline skills have been identified to support ongoing activities such as fuel receipt, handling and storage operations, reracking, and continuation of waste processing. The complete effects of consolidation on the required skill mix have not been fully quantified at this time.

The following table identifies the FY-94 ICPP skill mix and the annual turnover for each category based on experience. The skill mix is broken down into categories, each of which identifies skill groups where there is some potential for redeployment with minimal or limited training.

| | FY-94 | Estimated Annual Turnover |
|---|---|---|
| EXEMPT: | | |
| Management | 269 | 5 |
| Engineers | 453 | 33 |
| Scientists | 113 | 7 |
| Administrative | 269 | 17 |
| Total Exempt: | 1104 | 62 |
| NONEXEMPT: | | |
| Administrative | 181 | 11 |
| Technicians | 73 | 3 |
| Total Nonexempt: | 254 | 14 |
| BARGAINING UNIT: | | |
| Crafts | 197 | 4 |
| Operators | 165 | 4 |
| Analysts | 14 | 1 |
| Health Physics | 66 | 2 |
| Waste Handlers | 5 | 0 |
| Total Bargaining Unit: | 447 | 11 |
| ICPP TOTAL: | 1805 | 87 |

c. Skill Mix - Spent Fuel/Waste Management Technology Development

ICPP personnel developed a resource-loaded schedule of skills needed to support the Spent Fuel/Waste Management Technology Development Program. Some ICPP personnel directly affected by the change in mission already have appropriate backgrounds for redeployment to this program.

The objective of career advancement and technical training programs is to achieve the proper mix of skills and talents to support ongoing and new missions. The strategy is to provide the proper training for those who desire it or will need to pursue changes in their careers. As a whole, these types of programs, along with specialized technical training, will enable displaced staff to help meet new mission requirements.

As of February 28, 1994, 44 bargaining unit employees have been transferred out of positions affected by deactivation. These include:

- 17 operators transferred to Fuel Handling Activities
- 4 operators transferred to Utilities
- 12 operators transferred to other positions in Operations
- 1 operator transferred to Human Resources
- 8 operators transferred to Applied Technology
- 9 operators transferred to Radiation Safety

d. Analysis of Future Resource Needs

The ICPP developed an estimate of future personnel requirements in relation to our current skill mix. The current estimate demands aggressive training and staffing management in order to optimize the utilization of the current work force. A detailed breakdown of these numbers are shown in the following table with the projected turnover shown in the right-hand column.

| | FY-93 | FY-94 | FY-95 | Estimated Cumulative Turnover |
|---|---|---|---|---|
| EXEMPT: | | | | |
| Management | 269 | 279 | 279 | 15 |
| Engineers | 453 | 459 | 459 | 99 |
| Scientists | 113 | 121 | 121 | 21 |
| Administrative | 269 | 277 | 277 | 51 |
| Total Exempt: | 1104 | 1136 | 1136 | 186 |
| NONEXEMPT: | | | | |
| Administrative | 181 | 178 | 178 | 33 |
| Technicians | 73 | 92 | 92 | 9 |
| Total Nonexempt: | 254 | 270 | 270 | 42 |
| BARGAINING UNIT: | | | | |
| Crafts | 197 | 178 | 178 | 12 |
| Operators | 171 | 148 | 148 | 12 |
| Analysts | 14 | 14 | 14 | 3 |
| Health Physics | 60 | 54 | 54 | 6 |
| Waste Handlers | 5 | 5 | 5 | 0 |
| Total Bargaining Unit: | 447 | 399 | 399 | 33 |
| ICPP TOTAL: | 1805 | 1805 | 1805 | 261 |

## 3. Management Plans

Consolidation of the site-wide contract will significantly affect deactivation plans with respect to resource needs and availability. The complete impact of programs such as privatization, outsourcing, and the elimination of redundant functions cannot be fully quantified at this early stage of the consolidation. LITCO will continue to hold periodic meetings with stakeholders and use appropriate communications avenues to ensure the timely dissemination of information.

## 4. Summary

LITCO's approach to the mission transition is fundamental fairness to employees consistent with business reality. We believe that if (1) ongoing activities continue as anticipated, (2) the deactivation plan is executed, (3) the CPP-603 fuel relocation and CPP-666 reracking project continue as planned, and (4) the Spent Fuel/Waste Management Technology Development Program is continued, the deactivation and mission transition can be effectively and successfully managed. Consolidation of the site-wide contract will significantly impact the future approach to the ICPP's management of resources and personnel. Regardless of the approach eventually taken, LITCO is committed to the redeployment and fair treatment of its work force to the maximum extent possible consistent with business realities.

# APPENDIX A

## R. A. CLAYTOR MEMORANDUM

DOE F 1325.8
(8-89)
EFG (07-90)

United States Government

Received by
ID Manager's Office

Department of Energy

# memorandum

MAY 12 1992

DATE: MAY 05 1992

REPLY TO ATTN OF: DP-635:B. A. Smith:3-4026

SUBJECT: Phaseout of Reprocessing at the Idaho Chemical Processing Plant

TO: A. A. Pitrolo, Manager, DOE Idaho Field Office

As a result of the reduced demand for highly enriched uranium (HEU) required to support the nuclear weapons stockpile, there is no longer a need to recover HEU from reprocessing of spent nuclear fuels. In recognition of this, and to assure that the Department of Energy (DOE) carries out its missions in the most cost-effective manner, the Secretary has decided that HEU reprocessing programs at the Idaho Chemical Processing Plant (ICPP) and at the Savannah River Site should be phased out as soon as possible. An action memorandum implementing this decision was recently approved by the Secretary (copy attached).

To implement the Secretary's decision, I am requesting that you develop a plan that would define the actions necessary to phase out reprocessing activities at the ICPP. This plan should include the scope of work, schedule, costs, and associated personnel levels necessary to achieve a safe and orderly phaseout of reprocessing activities. The referenced action memorandum discusses the broad assumptions that should serve as guidelines in developing the plan. I recognize that in developing this plan, more specific assumptions will be necessary; and I ask that your staff work with my staff in defining these requirements.

I believe we must proceed expeditiously in defining our phaseout plan for the ICPP, and I am asking that you provide your final plan to me for approval by June 19, 1992. I appreciate the efforts of the Idaho Field Office and the Westinghouse Idaho Nuclear Company, Inc., in our deliberations on this complex issue.

If you have any additional questions or need additional information on this, please contact me or have your staff contact B. A. Smith (301-903-4026) of my staff.

Richard A. Claytor
Assistant Secretary
for Defense Programs

Attachment

cc:
L. P. Duffy, EM-1
W. H. Young, NE-1

United States Government | Department of Energy

# memorandum

ES - ________

**SECRETARIAL ACTION REQUESTED BY:**

Date: April 28, 1992

Orig. Office: DP-63:J. A. Ford:3-3782

Transmittal: ACTION: A Decision on Phaseout of Reprocessing at the Savannah River Site (SRS) and the Idaho National Engineering Laboratory (INEL) is required.

To: The Secretary

Through: Acting Under Secretary 4/28/2

Issue: In light of the Highly Enriched Uranium Task Force recommendations, a decision on the phaseout of reprocessing at SRS and INEL is required.

Timing: That the Secretary approve or disapprove the actions listed in this memorandum, based on the briefing to him on the referenced subject, which was held on April 16, 1992.

Discussion: As requested by your February 24, 1992, memorandum, and in light of the Highly Enriched Uranium Task Force report, the Office of Defense Programs (DP) has presented the site specific actions and timetables for the most practical and prompt phaseout of reprocessing activities at SRS and INEL. It is recommended that the phaseout of reprocessing at both SRS and INEL should take place. In order to most effectively implement this phaseout at both SRS and INEL, the following activities need to be undertaken.

As the Assistant Secretary for Defense Programs (ASDP), I will inform SRS and INEL of the reprocessing phaseout decision and request that phaseout plans be formally submitted to Headquarters for review and approval. For SRS, cessation of operations in the H-Canyon and associated facilities can only occur after stabilization by conversion to oxide of the plutonium (Pu)-242, Pu-239, and neptunium-237 (Np-237) solutions in H-Canyon and the stabilization by conversion to oxide of the uranyl nitrate hexahydrate solutions. These stabilization operations are expected to last for approximately 5 to 6 years. Since continuation of spent fuel reprocessing in H-Canyon, in parallel with stabilization, could be conducted with little incremental cost while providing the opportunity to recover additional Np-237 for potential Pu-238 production, the plan should include processing of existing inventories of aluminum clad fuel at SRS as well as fuel receipts while stabilization is being conducted. This will not significantly impact the schedule for the stabilization and cleanout activities and will result in less than a two percent increase in high-level waste to be processed through the Defense Waste Processing Facility. The strategy to reprocess fuel in parallel with stabilization activities will also relieve potential near-term fuel storage problems and will be subject to review based on the site specific action plan submitted and the spent fuel management plan being developed by the Assistant Secretary for Environmental Restoration and Waste Management (ASEM).

In developing the SRS phaseout plan, consideration should be given to activities that could be conducted in H-Canyon to accelerate transition of the F-Area reprocessing facilities to a standby condition. It is understood that completion of the Pu-238 processing activities to support the National Aeronautics and Space Administration's Cassini mission will also take place, and additional Pu-238 processing activities could be accommodated during this period, e.g., processing Russian Pu-238, consistent with the schedule for stabilization activities. In addition, the plan should include provisions for suitable storage for the Np-237 so as not to preclude its use for future production of Pu-238.

For the INEL, the phaseout plan should be based on no more dissolution of Navy or other program fuels, and current uranium product solutions should be stabilized by conversion to a solid form during FY 1992. The plan should, therefore, address activities beginning in FY 1993 leading to prompt phaseout of the reprocessing facilities as soon as practicable. This plan should also assume the termination of the Fuel Processing Restoration Project except to the extent that this facility be preserved in a condition for potential future use..

For both sites, all capital projects, general plant projects, and capital equipment acquisitions associated with reprocessing and not required to support the stabilization activities or transition to eventual decontamination and decommissioning should be canceled with the exception of the Actinide Billet Line and H-Canyon Frames projects at SRS. In addition, the plans for both sites should provide for cleanout of the facilities so that they can be maintained in a safe and secure condition indefinitely with minimum resources. It should be recognized that any phaseout activities that are not typical of ongoing or previous facility operations are subject to appropriate National Environmental Policy Act review. The SRS and INEL plans will be approved by me and concurred in by the ASEM by June 30, 1992, for DOE Idaho Field Office and September 30, 1992, for SRS. The Office of Defense Programs will consult with the Assistant Secretary for Nuclear Energy in the SRS plan to assure adequate consideration of Pu-238 program issues and options.

ATTACH

Comments on Phaseout of Savannah River Site (SRS)
and Idaho National Engineering Laboratory (INEL) Reprocessing

For Both SRS and INEL

- Phaseout plans have been requested from both SRS and INEL that will address putting these facilities into a safe configuration. The phaseout plans will cover cost savings and personnel reductions.

- These plans will be submitted by both sites to Headquarters and will be reviewed and approved during 1992.

- Personnel reductions at the Idaho Chemical Processing Plant (ICPP) in FY 1992 and FY 1993 are anticipated. Near term personnel reductions at SRS are not anticipated. The number of personnel affected by the ICPP and SRS phaseouts and timing of the reductions will be identified in the phaseout plans.

SRS

- Current uranium solutions in H-Canyon will be stabilized. These stabilization operations are expected to last for approximately 5 to 6 years.

- Because it is cost beneficial to do so, limited spent fuel reprocessing (dissolution of spent fuel) will take place in parallel with this stabilization. This will provide additional neptunium-237 for potential plutonium-238 (Pu-238) production and permit deferral of the need for new spent fuel storage facilities.

- Transition of the F-Area reprocessing facilities, where plutonium solutions are reprocessed, to a standby condition will be accelerated.

- Completion of the Pu-238 processing activities to support the National Aeronautics and Space Administration's Cassini mission will also take place and additional Pu-238 processing activities could be accommodated during this period, if necessary.

ID

- Uranium solutions will be converted to solid by October 1992. The fuel dissolution operations within the ICPP will no longer dissolve new spent fuel. Phaseout of the ICPP facilities will begin following the uranium solidification operations.

- The Fuel Processing Restoration Project will be phased-out. The remaining project efforts will be defined in the ICPP phaseout plan.

The FY 1993 budget amendment will reflect these phaseout decisions. Preliminary estimates indicate a potential savings in FY 1993 on the order of $84 million. Transfer of these facilities from DP to the Office of Environmental Restoration and Waste Management, including the associated spent fuel, will take place upon completion of the necessary stabilization efforts. Transition plans will be developed to effect a prompt transfer of spent fuel and associated facilities to the ASEM.

As requested in the February 24, 1992, memorandum, the ASEM should continue with the integrated long-term spent fuel management program addressing storage and treatment for ultimate disposition of all spent fuel. This plan will be a subject of a separate report from the ASEM as requested. In addition, by June 30, 1992, the ASEM, in cooperation with the Chief Financial Officer, Naval Reactors, and ASDP, should develop a proposal to modify the Navy billing rate.

Attached is a summary of information to be used by the Offices of Public Affairs and Congressional and Intergovernmental Affairs in preparing their notifications to affected parties. Also attached is the Communications Plan that identifies the proposed notifications for this decision.

Recommendation: That the Secretary approve the actions cited by signing this memorandum.

Richard A. Claytor
Assistant Secretary
for Defense Programs

2 Attachments

APPROVE: ____

DISAPPROVE: ____

DATE: 4/28/92

Concurrence:

EH-1 4/15/92, EM-1 4/16/92, GC-1 4/15/92, NE-1 4/14/92, NE-60 4/14/92,

CR-1 4/14/92, CP-1 4/27/92, PA-1 dks 4-28-92

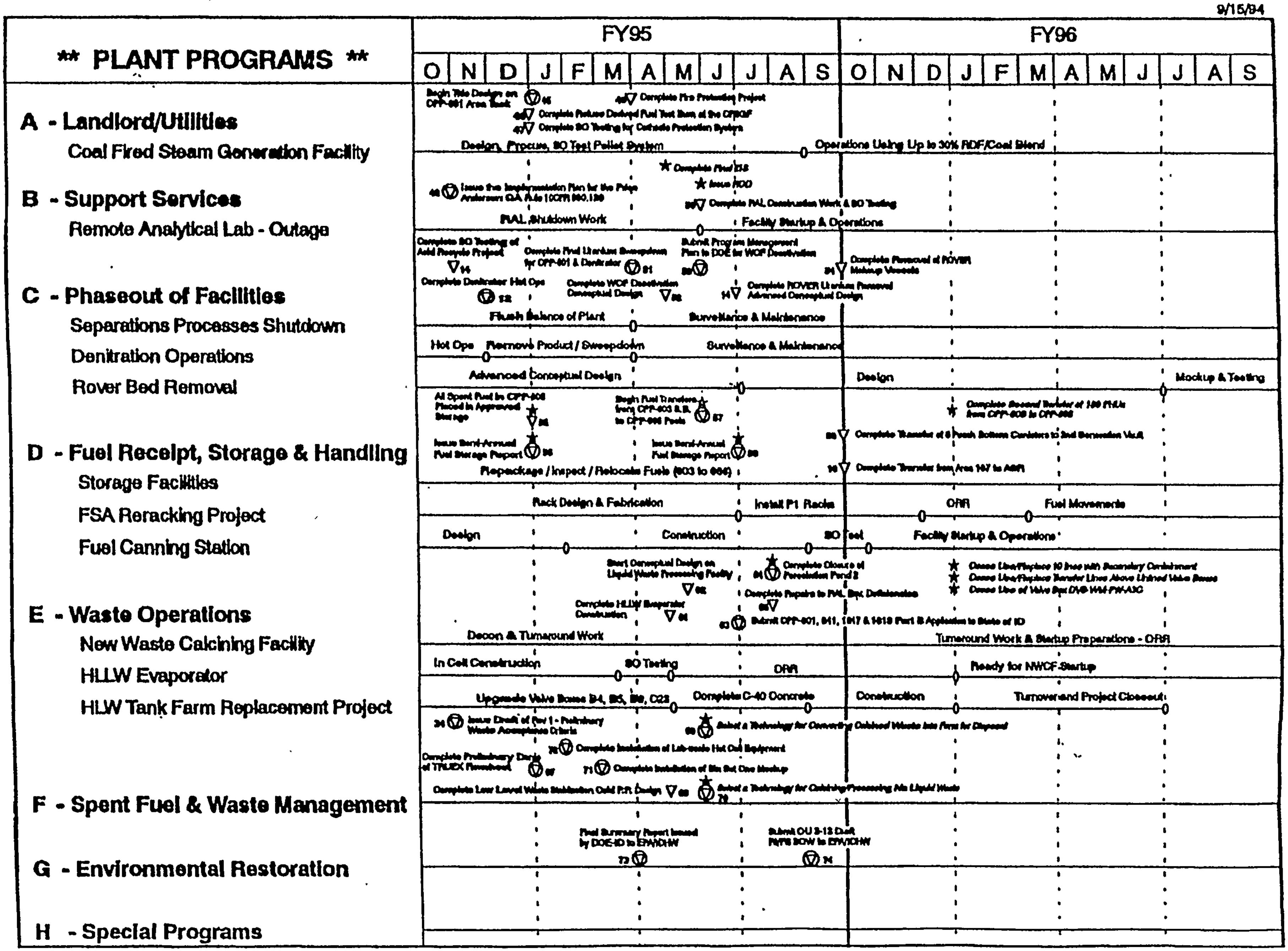
# APPENDIX B

# LEVEL ONE SCHEDULE

# FY-95 ICPP Level One Schedule

*Rev 7*

9/15/94



# FY-95 ICPP Milestones

## A. Utilities

| Number | Description | Baseline | Actual | Projected |
|---|---|---|---|---|
| *45 | Begin Title Design on CPP-651 Area Task | 01/02/95 | | |
| 46 | Complete Refuse Derived Fuel Test Burn at the CFSGF | 12/31/94 | | |
| 47 | Complete SO Testing for Cathodic Protection System | 12/31/94 | | |
| 48 | Complete Fire Protection Project - SO Test & Startup | 03/31/95 | | |

## B. Support Services

| Number | Description | Baseline | Actual | Projected |
|---|---|---|---|---|
| *49 | Issue the Implementation Plan for the Price Anderson QA Rule 10CFR 830.120 | 11/01/94 | | |
| 50 | Complete RAL Construction Work & SO Testing | 05/31/95 | | |

## C. Phaseout of Facilities

| Number | Description | Baseline | Actual | Projected |
|---|---|---|---|---|
| (14) | Complete SO Testing of Acid Recycle Project | 10/31/94 | | |
| *12 | Complete Denitrator Hot Operations | 11/30/94 | | |
| *51 | Complete Final Uranium Sweepdown for CPP-601 & Denitrator | 03/31/95 | | |
| 52 | Complete WCF Deactivation Conceptual Design | 04/30/95 | | |
| *53 | Submit Program Management Plan to DOE for WCF Deactivation | 05/31/95 | | |
| 14 | Complete ROVER Uranium Removal Advanced Conceptual Design | 06/30/95 | | |
| 54 | Complete Removal of ROVER Makeup Vessels | 09/30/95 | | |

## D. Fuel Receipt and Storage

| Number | Description | Baseline | Actual | Projected |
|---|---|---|---|---|
| 55 | All Spent Fuel in CPP-603 Placed in Approved Storage | 12/31/94 | | |
| *56 | Issue Semi-Annual Fuel Storage Report | 12/31/94 | | |
| *57 | Begin Fuel Transfers from CPP-603 South Basin to CPP-666 Pools | 06/01/95 | | |
| *58 | Issue Semi-Annual Fuel Storage Report | 06/30/95 | | |
| 59 | Complete Transfer of 8 Peach Bottom Canisters to 2nd Generation Vaults | 09/30/95 | | |
| 18 | Complete Transfer from Area 107 to ASR | 09/30/95 | | |

Note: The milestones with an * are DOE HQ milestones [illegible]

## E. Waste Operations

| Number | | Baseline | Actual | Projected |
|---|---|---|---|---|
| 61 | Complete HLLW Evaporator Construction | 04/30/95 | | |
| 62 | Start Conceptual Design on Liquid Waste Processing Facility | | 05/15/95 | |
| 63 | Submit CPP-601, 641, 1617 & 1619 Part B Application to State of ID | 06/30/95 | | |
| *64 | Complete Closure of Percolation Pond 2 | 07/30/95 | | |
| 65 | Complete Repairs to RAL Environmental Deficiencies | 07/31/95 | | |

## F. Spent Fuel and Waste Management

| | | | | |
|---|---|---|---|---|
| 34 | Issue Draft of Revision 1 on the Preliminary Waste Acceptance Criteria | 10/31/94 | | |
| *67 | Complete Preliminary Demonstration of the TRUEX Flowsheet in the Centrigal Contactor Mockup Using Simulated Sodium Waste | 12/31/94 | | |
| 68 | Complete Low Level Waste Stabilization Cold Pilot Plant Design | 05/01/95 | | |
| *69 | Select a Tech. for Converting Calcined Waste into Form for Disposal | 06/01/95 | | |
| *70 | Select a Technology for Calcining/Processing Na Liquid Waste | 06/01/95 | | |
| 71 | Complete Installation of Bin Set One Mockup | 02/28/95 | | |
| *72 | Complete Installation of Laboratory-scale Hot Cell Equipment for Vitrification Tests Using Radioactive ICPP Calcine | 01/31/95 | | |

## G. Environmental Restoration

| | | | | |
|---|---|---|---|---|
| *73 | Final Summary Report Issued by DOE-ID to EPA/IDHW | 03/31/95 | | |
| *74 | Submit OU 3-13 Draft RI/FS SOW to EPA/IDHW | 08/31/95 | | |

## H. Special Programs

To Be Determined

Note: The milestones with an * are DOE-HQ milestones C = Complete, B = Behind, OS = On Schedule

# APPENDIX C

# PROJECTS DESCRIPTION

## FY 1996 BUDGET REQUEST - GENERAL PLANT PROJECTS
## EM-60 - ADS 6322.02

**FY 1995**

| CAP | WT | TITLE | $000 |
|---|---|---|---|
| A214 | 99 | Minor GPP | 10 |
| A214 | 63 | CPP-633 Second Floor Expansion - Paint Shop | 560 |
| A214 | 54 | Const Mgmt Change/Lunchroom - Construction | 960 |
| A214 | 53 | ICPP Retrievable Records Storage Area | 1,595 |
| | | | ----- |
| | | TOTAL EM-60, FY 1995 | 3,125 |
| | | $2,342 FY-95 Funding + $783 Prior Year Contingency | 3,125 |

**FY 1996**

| CAP | WT | TITLE | $000 |
|---|---|---|---|
| A214 | 99 | Minor GPP | 35 |
| A214 | 53 | Radiochemical Counting Facility | 1,100 |
| A214 | 53 | ICPP Paving & Road Replacement | 400 |
| A214 | 52 | Environ Compliance Analytical Upgrade | 1,100 |
| A214 | 52 | CPP-663 Tool Crib/Locker Room Modification | 560 |
| | | | ----- |
| | | TOTAL EM-60, FY 1996 | 3,195 |
| | | FY 96 Projected Funding | 3,195 |

Note: Planning level only. No funding at Target Level

**FY 1997**

| CAP | WT | TITLE | $000 |
|---|---|---|---|
| A214 | 99 | Minor GPP | 195 |
| A214 | 58 | INEL Waste to Energy Facility | 1,000 |
| A214 | 52 | Remote Mockup & Test Facility | 1,800 |
| A214 | 48 | Renovate CPP-627 Analytical Lab - Design | 200 |
| | | | ----- |
| | | TOTAL EM-60, FY 1997 | 3,195 |
| | | FY 96 Projected Funding | 3,195 |
| | | Note: Planning level only. No funding at Target Level | |
| BELOW THE LINE EM-60 GPPs | | | |
| A214 | 48 | Renovate CPP-627 Analytical Lab - Construction | 900 |
| A214 | 43 | Treated Water System Upgrade | 1,900 |
| A214 | 40 | Purchase CPP-1645 & 1648 | 470 |
| | | | ----- |
| | | TOTAL | 9,660 |

## FY 1996 BUDGET REQUEST - GENERAL PLANT PROJECTS
## EM-30 - ADS 1003.01

**FY 1995**

| CAP | WT | TITLE | $000 |
|---|---|---|---|
| E214 | 99 | Minor GPP | 28 |
| D214 | 63 | IFSF Monitoring System | 450 |
| E214 | 53 | NWCF Feed System Modification - Construction | 215 |
| E214 | 52 | New Control Room for Waste Systems Ops - Construct | 1,025 |
| E214 | 52 | PAR Manipulator Repair Facility | 1,100 |
| E214 | 51 | S. CPP-621 Pipe Trench & Transfer Line Upg - Design | 130 |
| | | | ----- |
| | | TOTAL EM-30, FY 1995 | 2,948 |
| | | $2,500 FY 95 Funding + $448 Prior Year Contingency | 2,948 |

**FY 1996**

| CAP | WT | TITLE | $000 |
|---|---|---|---|
| E214 | 99 | Minor GPP | 50 |
| E214 | 51 | S. CPP-621 Pipe Trench & Transfr Line Upg-Construct | 1,805 |
| D214 | 50 | Peach Bottom & FERMI Dry Vaults Renovation | 1,450 |
| D214 | 49 | FH&D Paved Storage Area | 505 |
| D214 | 47 | Contaminated Fuel Handling Equip Storage Bldg | 1,100 |
| | | TOTAL EM-30, FY 1996 | 4,910 |
| | | FY 96 Projected Funding | 4,910 |

**FY 1997**

| CAP | WT | TITLE | $000 |
|---|---|---|---|
| D214 | 99 | Minor GPP & Undetermined Projects | 3,810 |
| D214 | 42 | FAST Office & Maintenance Facility | 1,100 |
| | | | ----- |
| | | TOTAL EM-30, FY 1997 | 4,910 |
| | | FY 97 Projected Funding | 4,910 |



10/11/94

## FY 1996 BUDGET REQUEST – CAPITAL EQUIPMENT
## EM–60 – ADS 6327

**FY 1995**

| CAP | WT | TITLE | $000 |
|---|---|---|---|
| A224 | 99 | Essential Minor Capital Equipment | 463 |
| A224 | 70 | Rover Uranium Removal | 1,480 |
| A224 | 62 | Load Center No. 13 – Installation | 700 |
| | | | ------ |
| | | TOTAL EM–60, FY 1995 | 2,643 |
| | | FY–95 Funding $1,346 + Uncommitted/Contingency $1,297 | 2,643 |

Delaying Boiler Feedwater Reverse Osmosis to FY–96 is $1,060

**FY 1996**

| CAP | WT | TITLE | $000 |
|---|---|---|---|
| A224 | 63 | Upgrade Boiler Control System | 300 |
| A224 | 59 | Boiler Feed Water Reverse Osmosis | 1,060 |
| | | | ------ |
| | | TOTAL EM–60, FY 1996 | 1,360 |
| | | FY–96 Funding + contingency $50 | 1,360 |

## FY 1996 BUDGET REQUEST – CAPITAL EQUIPMENT
## EM–30, ADS 1001, 1008 and 1010

**FY 1995**

| ADS/CAP | WT | TITLE | $000 |
|---|---|---|---|
| 1001/E224 | 99 | Essential Minor Capital Equipment | 1,000 |
| 1010/D224 | 73 | CPP–603 Fuel Canning Station – II | 2,500 |
| 1001/E224 | 72 | NWCF Calciner Vessel Slide Valves – Procure | 300 |
| 1010/D224 | 72 | Upgrade CPP–621 ANN Tanks | 600 |
| 1010/D224 | 70 | CPP–666 Pool 1 & 5 Reconfiguration – IV | 3,492 |
| 1001/E224 | 64 | LDUA Support Systems | 150 |
| 1001/E224 | 64 | LDUA End Effectors | 200 |
| 1006/ 224 | 63 | Rad. Hot Cell Equipment | 750 |
| 1006/ 224 | 63 | HLW Pretreatment | 550 |
| 1006/ 224 | 63 | LLW Pilot Plant | 1,000 |
| 1006/ 224 | 63 | Vitrification Pilot Plant | 1,000 |
| 1006/ 224 | 63 | SNF NDE Development & Equipment | 800 |
| 1001/E224 | 74 | Calciner Mist Eliminator Upgrade | 820 |
| 1010/D224 | 73 | CPP–603 Fuel Canning Station – I | 1,000 |
| 1001/E224 | 99 | Essential Minor Capital Equipment | 264 |
| | | TOTAL EM–30, FY 1995 | 14,426 |
| | | Items Below the Line Until Funding Identified | |
| 1001/E224 | 62 | Debris Rule | 1,400 |
| 1001/E224 | 60 | Replace Flash Column & Demister | 182 |
| 1010/D224 | 60 | ECF Cask Unloading Equipment – Design | 100 |
| 1001/E224 | 58 | RAL Waste Loadout Cart | 160 |
| | | | 16,268 |
| | | FY–95 Funding $15,926 – $1,500 | 14,426 |

**FY 1996**

| ADS/CAP | WT | TITLE | $000 |
|---|---|---|---|
| 1001/E224 | 99 | Essential Minor Capital Equipment | 1,086 |
| 1010/D224 | 73 | CPP–603 Fuel Canning Station – III | 1,000 |
| 1010/D224 | 62 | Peach Bottom Storage Canisters – II | 500 |
| 1001/E224 | 62 | CPP–604/605 Electrical Switchgear | 1,500 |
| 1010/D224 | 60 | ECF Dry Cell Cask Support Equipment – Construction | 825 |
| 1001/E224 | 58 | Essential Maintenance Equipment (Waste Operations) | 275 |
| 1010/D224 | 58 | Essential Maintenance Equipment (Fuel Handling) | 275 |
| 1001/E224 | 57 | Essential Analytical Environmental Equipment | 300 |
| 1001/E224 | 56 | Spare PEW Evaporator Condenser | 115 |
| 1001/E224 | 56 | Spare PEW Evaporator Reboiler | 200 |
| 1001/E224 | 56 | NWCF On–Line Particle Size Analyzer | 250 |
| 1001/E224 | 55 | NWCF Scrub Hold Tank Modifications | 950 |
| 1001/E224 | 55 | NWCF DCS Upgrade | 140 |
| 1001/E224 | 55 | Robotics and Remote System Mockup | 190 |
| 1001/E224 | 55 | Robotics and Remote Inspection Mockups | 150 |
| 1006/F224 | 54 | Laser Ablation Equipment/Module | 500 |
| 1001/E224 | 54 | LDUA TRIC System | 650 |
| 1001/E224 | 54 | Telescoping Deployment System | 125 |
| 1006/F224 | 53 | Decon Ion Exchange Cleanup | 100 |
| 1006/F224 | 53 | Mobile Decon Pad | 100 |
| 1006/F224 | 53 | Remote Cutting and Riser Attachment | 350 |
| 1006/F224 | 53 | Laser Ablation Equipment for Decon | 201 |
| 1001/E224 | 53 | Pipe Crawler | 155 |
| 1010/D224 | 53 | Load Indicating Systems for CPP–666 CRN–FR–903 | 220 |
| 1001/E224 | 53 | Upgrade Microprocessors in NWCF DCS Controllers | 150 |
| 1010/D224 | 53 | 3–D Viewing System for Remote Inspections | 150 |
| 1010/D224 | 52 | Electronic Work Control Upgrade (moved up per CARC) | 132 |
| 1010/D224 | 53 | Load Indicating Systems for CPP–603 Crane | 630 |
| 1001/E224 | 53 | APS Filter System Remote Changeout | 1,200 |
| | | | ----- |
| | | TOTAL EM–30, FY 1996 | 12,419 |
| | | FY–96 Funding | 12,419 |



10/11/94

**FY 1996 BUDGET REQUEST – CAPITAL EQUIPMENT**
**EM–60 – ADS 6327**

| FY 1997 | | | |
|---|---|---|---|
| CAP | WT | TITLE | $000 |
| A224 | 99 | Essential Minor Capital Equipment | 400 |
| A224 | 58 | CPP–601/602 Electrical Switchgear–Design | 450 |
| A224 | 53 | Essential Radiation Safety Equipment | 250 |
| A224 | 57 | CPP–601/602 Air Supply Unit Replacement – Design Only | 250 |
| | | TOTAL EM–60, FY 1997 | 1,350 |
| | | FY–97 Funding | 1,350 |

**FY 1996 BUDGET REQUEST – CAPITAL EQUIPMENT**
**EM–30, ADS 1001, 1008 and 1010**

| FY 1997 | | | |
|---|---|---|---|
| ADS/CAP | WT | TITLE | $000 |
| 1001/E224 | 99 | Essential Minor Capital Equipment | 1,220 |
| 1010/D224 | 70 | CPP–666 Pool 1 & 5 Reconfiguration V | 3,025 |
| 1001/E224 | 63 | NWCF Mercury Removal System (needed FY–98) | 400 |
| 1001/E224 | 57 | Mobile Boom Crane (need TBD after consolidation) | 960 |
| 1001/E224 | 52 | Upgrade Offgas Scrubber System | 75 |
| 1010/D224 | 52 | CPP–666 H&V Control Renovation | 250 |
| 1008/F224 | 51 | Hot Cell Spent Fuel Testing | 2,400 |
| 1001/E224 | 51 | Upgrade Storage Cell into Backup Decon Cell | 2,000 |
| | | TOTAL EM–30, FY 1997 | 10,330 |
| | | FY–97 Funding | 10,330 |

| FY 1997 Below the line | | | |
|---|---|---|---|
| CAP | WT | TITLE | $000 |
| A224 | 58 | CPP–601/602 Electrical Switchgear – Install | 1,550 |
| A224 | 57 | CPP–601/602 Air Supply Unit Replacement – Install | 800 |
| A224 | 52 | IRC Lab Exhaust Modifications | 90 |
| A224 | 52 | Purchase of Bucket Truck | 150 |
| A224 | 51 | Five–Ton Capacity Forklift | 70 |
| A224 | 51 | Purchase Sony Optical Drive System | 125 |
| A224 | 48 | Microprocessor Control Discharge/Charging Tester | 55 |
| A224 | 46 | Portable Piping Mapper | 250 |
| A224 | 45 | Upgrade the HP3000 Computer System | 120 |
| A224 | 45 | 6 mev X–Ray and Imaging Head Positioner | 220 |
| A224 | 45 | Vertical Surface Inspection Platform | 160 |
| A224 | 43 | Lab Mods for CPP–602, R212B & CPP–630 R–127 | 175 |
| A224 | 43 | ICPP FDDI Expansion | 120 |
| A224 | 43 | Characterization/ D&D Robotic Arm | 150 |
| A224 | 43 | FDDI Backbone Enhancement | 100 |
| A224 | 42 | Remotely Operated Support Systems for the CFSGF | 1,250 |
| A224 | 40 | Purchase TLD Reader, Analysis Equip, Work Station | 300 |
| A224 | 40 | HP3000 Upgrade WCB to Spectrum 950 Processor | 300 |
| A224 | 38 | Upgrade Video Editing System | 85 |
| A224 | 36 | Remote Survey System | 250 |
| A224 | 35 | Data Communications Network | 125 |
| A224 | 35 | Safeguards Computer System Upgrade | 150 |
| A224 | 35 | Procure 320 KV X–Ray Machine | 97 |
| A224 | 31 | ICPP Historian and Simulation Computer | 100 |
| A224 | 30 | Portable Metals Chemical Analyzer | 75 |
| A224 | 30 | Quick Count Whole Body Counter | 125 |
| | | TOTAL | 6,992 |

| FY 1997 Below the line | | | |
|---|---|---|---|
| CAP | WT | TITLE | $000 |
| 1001/E224 | 51 | Micro Robotic Vehicle | 150 |
| 1001/E224 | 50 | Bin Sets Ventilation Modifications | 200 |
| 1001/E224 | 48 | WL–210,211,213 Damper Upgrade | 600 |
| 1001/E224 | 46 | PLC Rapid Shutdown System for NWCF | 155 |
| 1010/D224 | 46 | FSA Basin Water Filter Improvement | 393 |
| 1001/E224 | 46 | Remote Inspection Noncontact Vehicle | 100 |
| 1001/E224 | 46 | Mobile Remote Inspection Vehicle | 100 |
| 1001/E224 | 45 | CPP–659 Decon Facility Makeup Tank VES–NCD–140 | 300 |
| 1010/D224 | 45 | Spare IFSF PAR Manipulator | 350 |
| 1001/E224 | 45 | Remote Inspection Support Equipment | 200 |
| 1001/E224 | 44 | Replace Decon Facility Sink Hoods | 225 |
| 1008/F224 | 42 | Dry Storage Demonstration | 2,600 |
| 1001/E224 | 42 | Upgrade NWCF DCS Engineering Console | 50 |
| 1010/D224 | 40 | Additional Mobile Underwater TV Camera | 85 |
| 1001/E224 | 36 | Spare Service Waste Main Discharge Pump | 60 |
| 1001/E224 | 35 | Upgrade 30–cm Calciner Pilot Plant | 225 |
| 1001/E224 | 33 | Solids Removal Capability | 600 |
| 1001/E224 | 33 | NWCF Control Room Monitoring of Remote Areas | 35 |
| 1001/E224 | 30 | Pilot Plant Acid Fractionator Column Upgrade | 250 |
| 1001/E224 | TBD | Upgrade Bailey Console Computers | 225 |
| 1010/D224 | TBD | New Fuel Receiving Cranes CPP–666 | 3,400 |
| | | TOTAL | 10,623 |

10/11/94

# APPENDIX D

## EVALUATION OF ALTERNATE PROCESSING SCENARIOS

INEL

Idaho National Engineering Laboratory

SMH-188-93

December 14, 1993

Mr. W. D. Jensen, Facility Manager
ICPP Operations
DOE Idaho Operations Office
785 DOE Place, MS 5121
Idaho Falls, ID 83401-1562

Subject: Alternatives for CPP-601/602 Phaseout

Reference: "Nuclear Fuel Reprocessing Phaseout Plan for the Idaho Chemical Processing Plant," dated October 1992

Dear Mr. Jensen:

In response to your verbal request, WINCO has evaluated several alternatives to the current Phaseout Plan methodology for deactivation and stabilization of the CPP-601/602 Separations Facilities. A brief analysis of these alternatives is presented in the attachment. The Phaseout Plan (referenced) calls for operation of the 2/3 Cycle Extraction and Product Denitration Processes in the traditional fashion to facilitate uranium removal. Alternatives were previously evaluated during the preparation of the plan, but were rejected based on several factors, including cost, schedule, safety, and human resource utilization.

The existing Phaseout Plan, issued in October 1992, was approved by DOE-HQ and the State of Idaho. WINCO has made substantial physical progress in accordance with this plan and strongly recommends that activities continue as per the plan.

If you have any questions, please contact K. E. Ryan at extension 6-4626.

Sincerely,

S. M. Hahupa
Vice President and Manager
Operations Department

/bl

Attachment

cc: M. J. Bonkoski, DOE-ID
S. A. Brennan, DOE-ID
C. R. Enos, DOE-ID



Westinghouse Idaho Nuclear Company, Inc. P. O. Box 4000, Idaho Falls, Idaho 83415

Attachment to
SMH-188-93

## Analysis of Alternatives for CPP-601/602 Deactivation and Compliance

Nine different alternatives for removal or stabilization of the uranium currently stored as liquid in CPP-601 have been evaluated. The alternatives are:

1. Do Nothing: Leave the uranium in CPP-601 in the current configuration and monitor indefinitely.

2. Phaseout Plan: Employ the currently approved Phaseout Plan methodology to remove uranium from CPP-601. This methodology entails operation of the 2/3 Cycle and Product Denitration Processes in the traditional fashion to remove uranium as $UO_3$ product.

3. Transfer to Tank Farm: Transfer the uranium bearing solutions to the ICPP Tank Farm and take whatever actions are necessary to safely manage the uranium in the waste processing areas.

4. Dilute Uranium to <20% Enrichment before Denitration: Mix the current CPP-601 uranyl nitrate solutions with depleted uranium solutions to bring overall uranium enrichment down to <20%, then process the solutions through the denitrator (and 2/3 Cycle if necessary to facilitate safe denitration).

5. Dilute Uranium to <20% Enrichment after Denitration: Operate the 2/3 Cycle and Product Denitration Processes in the traditional manner and then dilute the $UO_3$ product with depleted uranium product to bring overall enrichment down to <20%.

6. Bottle Uranium as Liquid without Further Processing: Bottle the current uranyl nitrate solutions in CPP-601 without additional purification and store the containers in CPP-601. The containers could ultimately be transported elsewhere for long-term storage and/or diluted with depleted uranium solutions.

7. Bottle Uranium as Liquid after 2/3 Cycle Processing: Run the current CPP-601 uranyl nitrate solutions through 2/3 Cycle and then bottle the product as liquid. The bottled solution could then be relocated and/or diluted as in #6.

8. Solidify Uranium inside Vessels: Add concrete or some other solidification agent to the current CPP-601 uranyl nitrate solutions and leave the uranium in the CPP-601 vessels in the solid form.

9. <u>Solidify Uranium outside Vessels</u>: Remove uranyl nitrate solutions from the CPP-601 vessels and solidify it in containers. Store containers inside CPP-601 or transport elsewhere for storage.

Each alternative has been evaluated on a 1-10 scale (10 high) for each of eight criteria. The results of this evaluation are given in the Table. No attempt has been made to assign relative weighing factors to the criteria, since such factors would vary considerably based on the specific interests of the reader. A summary of positive and negative points for each option is presented following the Table.

If all criteria are weighted approximately equally, it can be seen that the "Phaseout Plan" option is the most attractive, with "Dilute Uranium to <20% Enrichment after Denitration" coming in second. The latter is attractive because it can be done in addition to the Phaseout Plan option and also address the proliferation issue.

Comparison of Alternatives for CPP-601/602 Deactivation and Stabilization--Scale 1-10 (10 high)

| CRITERIA | DO NOTHING | PHASEOUT PLAN | TRANSFER TO TANK FARM | DILUTE U TO <20% ENRICHMENT: Before Denitration (As Liquid) | DILUTE U TO <20% ENRICHMENT: After Denitration (As Solid) | BOTTLE U AS LIQUID: Without Further Processing | BOTTLE U AS LIQUID: After 2/3 Cycle Processing | SOLIDIFY U: Inside Vessel | SOLIDIFY U: Outside Vessel |
|---|---|---|---|---|---|---|---|---|---|
| te Generation [1] | 6 | 5 | 6 | 1 | 5 | 6 | 5 | 4 | 4 |
| t/Schedule | 6 | 8 | 3 | 5 | 6 | 1 | 3 | 2 | 1 |
| liferation [2] | 6 | 5 | 10 | 10 | 8 | 5 | 4 | 9 | 9 |
| ironmental Compliance [3] | 3 | 10 | 5 | 7 | 8 | 3 | 3 | 2 | 1 |
| sonnel Safety [4] | 8 | 9 | 8 | 4 | 6 | 3 | 5 | 5 | 3 |
| g Term Safety/Stability | 2 | 9 | 2 | 8 | 10 | 3 | 5 | 3 | 9 |
| lic/Stakeholder Acceptability | 3 | 9 | 4 | 8 | 8 | 4 | 4 | 5 | 7 |
| an Resource Utilization [5] | 9 | 8 | 6 | 6 | 6 | 4 | 4 | 3 | 2 |
| AL | 43 | 63 | 44 | 49 | 57 | 29 | 33 | 33 | 36 |

nsiders quantity and type of waste generated.
nsiders potential and attractiveness for fissile material diversion.
PA and RCRA compliance are primary concerns.
dresses the immediate safety of the activity.
imarily addresses the ability to efficiently utilize the existing work force and release CPP-601/602 employees for higher priority work at ICPP.

Attachment to
SMH-188-93

## Positive and Negative Points of Each Alternative

### 1) Do Nothing

Positive:
1. Generates little waste over the short-term
2. Low cost over the short-term
3. Quickly releases operating people for other work at ICPP

Negative:
1. Raises significant environmental compliance issues. Compliance with NEPA is a question. RCRA compliance with regard to 90-day storage of potential waste and modification of TSD permit for CPP-601 may be issues.
2. Long-term safety and stability is poor.
3. Acceptance of a "do nothing" philosophy by the State of Idaho and other stakeholders is doubtful.

### 2) Phaseout Plan

Positive:
1. Plan has been reviewed and accepted by DOE-HQ and State of Idaho.
2. Very cost and schedule effective, since work is already well underway.
3. Has a high level of demonstrated environmental compliance. State of Idaho has specifically given an LDR exemption for phaseout work.
4. All operations are in accordance with existing, approved, and well tested safety controls.
5. Provides excellent long-term safety and stability.
6. Acceptable to other stakeholders.
7. Provides timely release of operating people for other work at ICPP.

Negative:
1. Produces a purified, enriched $UO_3$ product that would be moderately attractive for diversion.
2. Generates ~10,000 gal of liquid waste for the ICPP tank farm.
3. NEPA documentation adequacy questioned by some.

### 3) Transfer to Tank Farm

Positive:
1. Eliminates opportunity for fissile material diversion.
2. Immediate waste generation is low if initial dilution is not required.
3. Provides timely release of most operating people for other work at ICPP.

Negative:
1. Requires extensive safety analysis work to produce an adequate safety envelope for all waste storage and processing activities.
2. Requires increased TSR level controls on all waste storage and processing activities.
3. Requires additional criticality detection systems to be installed.
4. Delays removal of uranium from CPP-601 for an indefinite period of time while safety analysis work is being done.
5. Long-term safety and stability (e.g., through vitrification and repository) is questionable.
6. Environmental compliance issues may arise (e.g., NEPA documentation adequacy and 90 day RCRA waste storage issue for CPP-601).
7. Acceptance by State of Idaho and other stakeholders is questionable.
8. If done by dilution, large quantities of liquid waste are generated.

4. <u>Dilute Uranium to <20% Enrichment before Denitration</u>

Positive:
1. Eliminates attractiveness for fissile material diversion.
2. Good long-term safety and stability.

Negative:
1. Results in generation of large quantities of liquid waste.
2. Creates personnel safety questions for operating people.
3. Delays phaseout and release of operations people to other ICPP work.

5. <u>Dilute Uranium to <20% Enrichment after Denitration</u>

Positive:
1. Most positives of "Phaseout Plan" option apply.
2. Easily added on to current plan.
3. Eliminates attractiveness for fissile material diversion.
4. Could be done for all $UO_3$ product at ICPP and elsewhere.

Negative:
1. Requires additional funding and time relative to current plan.
2. Requires some additional safety analysis work.
3. Delays release of operations people to other ICPP activities.
4. Depends on availability of "clean" depleted $UO_3$.

6. <u>Bottle Uranium Liquid without Further Processing</u>

Positive:
1. Low initial waste generation.
2. May reduce or eliminate attractiveness for fissile material diversion.

Negative:
1. Entails large schedule delays and additional costs.
2. Requires extensive safety analysis work.
3. Requires new plant equipment.
4. Requires extensive procedure revision and personnel training.
5. Environmental compliance is questionable.
6. Poor long-term safety and stability.
7. Substantial radiation exposure to workers.

7. <u>Bottle Uranium as Liquid after 2/3 Cycle Processing</u>

Positive:
1. Involves familiar operation of 2/3 Cycle.
2. Waste generation no greater than current plan.
3. May eliminate attractiveness for fissile material diversion.
4. Moderate long-term safety and stability.

Negative:
1. Most "negatives" of Option #6 apply.

8. <u>Solidify Uranium inside Vessels</u>

Positive:
1. Eliminates diversion attractiveness of fissile material.

Negative:
1. Requires extensive process development work.
2. All "negatives" of Option #6 apply.

9. <u>Solidify Uranium outside Vessel</u>

Positive:
1. Eliminates diversion attractiveness of fissile material.
2. Good long-term safety and stability.
3. Good potential for acceptance by stakeholders.

Negative:
1. Same as those for Option #8.

INEL
Idaho National Engineering Laboratory

LFE-066-92

April 17, 1992

Mr. M. J. Bonkoski, Director
Materials Processing Division
U. S. Department of Energy
Field Office, Idaho
785 DOE Place, MS-1139
Idaho Falls, Idaho 83401-1562

Subject: Recommended Disposition of E-Cell and C-Cell Uranium Bearing Solutions

Dear Mr. Bonkoski:

Solutions containing approximately 5.5 kg of uranium continue to be safely stored in the E-Cell vessels pending recovery in the First Cycle Extraction Process (FCE). The uranium solutions are comprised of vessel rinse and raffinate solutions from the 2/3 Cycle Extraction Process and have uranium concentrations in excess of process disposal limits. An additional 263 grams of uranium are stored in solution in C-101. In all, about 13,000 liters of acidic solution are stored. Options for handling these solutions are discussed below.

**Option 1. Process through First Cycle Extraction (FCE)**

Solutions could be processed through FCE as contiguous feed or used to sustain FCE operation between batches of product from the Fluorinel Dissolution Process (FDP). The solutions are dilute enough that they could be fed to FCE at several hundred liters per hour, allowing them to be processed in a couple of days as contiguous feed. If used to maintain operation between FDP batches, less synthetic feed would be needed and the columns could be maintained in a more steady state, resulting in improved uranium recovery, reduced cold chemical costs, and less high-level liquid waste generation.

Special Considerations: Solutions would continue to be stored in E and C-Cells until approval is obtained to operate FCE. The product from FCE would need to be processed through 2/3 Cycle to decontaminate the uranium for handling as either a liquid or denitrated product.



Westinghouse Idaho Nuclear Company, Inc. Box 4000 — Idaho Falls, Idaho 83403

Option 2. Process through 2/3 Cycle

The solutions could be transferred to L-Cell for concentration and acid stripping to make them more compatible with the 2/3 Cycle process. Once the uranium has been processed through 2/3 Cycle, it would be combined with the solutions in M-Cell and subsequently denitrated. If the solutions in M-Cell are denitrated before the C and E-Cell solutions are salvaged, then the salvaged uranium could be combined with the denitrator acid flush solutions.

Special Consideration: Some of the solutions stored in E-Cell contain significant amounts of aluminum and iron (raffinates), which limit how much they could be concentrated in L-Cell. Actual volume reductions cannot be estimated until the solutions are transferred out of E-Cell and sampled. The length of time to concentrate and acid-strip the solutions would exceed the time it would take to process the solutions through FCE. Processing through 2/3 Cycle, after concentration, would take 2-4 weeks. An advantage of this option is that only one extraction process would have to be restarted to handle the solutions.

Option 3. Disposal

Inadequate information currently exists to determine whether or not disposal of acidic solutions containing kilogram quantities of enriched uranium is feasible. Continued safe storage of the solutions in E and C-Cells will be required while disposal alternatives are evaluated.

Special Considerations: Discarding large quantities of fissile material to the tank farm would require development of an appropriate safety analysis. The current safety analysis (PSD Section 8.2, Vol. II, 9.1.9), takes credit for process control to prevent kilogram quantities of U-235 from being discharged to the tank farm. Criticality safety would need to be evaluated for scenarios such as uranium precipitation in the tank farm, concentration in the calciner, calciner bed dissolution, storage in the calcine bin sets, and handling in the final waste form. No evaluations exist to estimate how well the uranium bearing solutions would mix with the existing contents of the receiving waste tanks or how long mixing would take. The mixing time would directly affect the criticality scenarios stated above. The safety documents and operational safety requirements would need to be revised and approved prior to transferring the uranium solutions to the tank farm.

Approximately 98% of the uranium is contained in 60% of the stored solution volume. The remaining 40% of the solutions contain about 130 grams of uranium in dilute solutions. These dilute solutions could be discharged to the tank farm without updating the safety analysis because it would not significantly increase the tank farm uranium concentration.

Recommendations

If the reprocessing mission of the Idaho Chemical Processing Plant (ICPP) is continued, it is recommended that the E and C-Cell solutions be processed through FCE as discussed in Option 1. The uranium would be subsequently processed through 2/3 Cycle and then denitrated with the product from the next campaign.

If the reprocessing mission of the ICPP is suspended or terminated, it is recommended that the E and C-Cell solutions be concentrated and acid-stripped in L-Cell, followed by processing through 2/3 Cycle, as discussed in Option 2, and handled with the denitrator feed or acid flush solution. The most dilute and least significant uranium bearing solutions (~130 grams of uranium in 5100 liters of solutions) could be discarded to the tank farm.

Sincerely,

L. F. Ermold

L. F. Ermold, Vice President and Manager
Production Department

/sm

cc: S. A. Brennan
C. R. Enos
R. M. Stallman
R. F. Wilbur