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REACTOR PLANT DEACTIVATION HISTORY

100-KE AND K PLANT

by

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K Plant Section

Operations Division

May 20, 1971

DOUGLAS UNITED NUCLEAR, INC.

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REACTOR PLANT DEACTIVATION HISTORY
100-KE AND K PLANT

I. INTRODUCTION

This report describes the main phases of the K Reactor Plant Deactivation (RPD) programs, including postshutdown surveillance and maintenance action requirements. It also contains references to manuals, logs, letters, and other material where program details may be found.

Overall planning, preparation of deactivation instructions, and budgeting for both reactors were completed at different times and under the direction of separate Deactivation Councils. The KW Council was presided over by a representative of the Douglas United Nuclear, Inc., Engineering Section, and the KE Council by a member of the K Plant Section management. Members included representatives from the Engineering, Process, Technology, Manufacturing Engineering, Financial, and K Plant Sections. Project representatives were also delegated to serve on Design Councils to consider potential capital work related to Plant Deactivation.

Implementation of plant forces type work was performed by the K Plant Section, utilizing the plant forces in the component which had operating responsibility for the specific area to be deactivated. Certain work of a Project nature was performed by Vitro Engineering and the J. A. Jones Construction Company.

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II. SUMMARY

The KW Reactor Plant Deactivation Council was formed shortly after the AEC-RL notified Douglas United Nuclear, Inc., in early January, 1970, to shut down and deactivate KW Reactor and facilities. Planning proceeded on a crash basin, permitting final reactor shutdown at 11:58 p.m., on January 31, 1970. Major work at KW Reactor was completed by May 15, 1970.

A KE Reactor Plant Deactivation Council was assembled after the reactor was shut down at 4:00 p.m., on January 28, 1971. Reactor layaway commenced on February 5, 1971, with the start of reactor discharge; and work was largely completed by April 16, 1971.

Specified K Plant facilities involving fire and sanitary aspects, lunchrooms, cooling water supplies to the storage basins, building heat, etc., were left in service pending transshipment of the fuel elements to ARHCO and planned Project action. Shipping and surveillance action has been assigned to the Reactor Plant Services Subsection. The irradiated fuel storage basins, transfer areas, and associated facilities will have to be laid away at a later date.

Project work to protect expensive electrical equipment against damage from moisture condensate and fire has been initiated and is estimated to be completed by January, 1972.

The deactivation of K Plant is otherwise essentially complete, with the exception of minor cleanup and facilities occupied by BNW. Their Corrosion Research and Engineering Section (1) continues to occupy office

space in the 1704-K Building, operating laboratory facilities consisting of the entire 1706-KER Building and one room in the 1706-KE Building, and the Corrosion Product Transport Facility (CPTF) located in the 105-KE Building. BNW was informed (2) that continuance of requested K Plant services after the irradiated fuel has been shipped from the K Plant storage basins would have to be agreed to by the AEC-RL.

Nuclear and personnel safety received prime attention throughout the two deactivation programs. There were no employees overexposed or incidents of a nuclear or radiation nature. Although the work performed was generally of a non-routine nature, there were no disabling injuries and very few employee medical treatment injuries.

Overall costs of the engineering, services, planning, and plant forces portion of the deactivation programs were estimated at $4,219,000. Company and AEC overhead, as well as inventory reserves, are not included in this figure. Project work was estimated at $160,000 for both reactors, and completion costs are expected to be within that estimate. This excludes $10,000 for backfilling the waste trench, which was included in a separate budget for similar work in other deactivated areas.

III. DISCUSSION

A. Overall Planning and Scheduling - Including Budgets

The deactivation planning for both reactors was on a standby basis. Shutdown work requirements were based on minimum costs, and no extensive preservation actions were included. Accordingly, the primary planning was directed generally toward removal of process materials; drainage of equipment, vessels and lines; cleanup of

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shutdown equipment; removal and fixing of contamination and zone barricading; and maximum reduction of service systems to minimize surveillance requirements.

The overall planning, preparation of deactivation instructions, and budgeting were completed under the direction of Coordinator and Planning Directors and Plant Deactivation Councils. The detailed planning and scheduling, performance, and auditing of plant forces type work were largely completed by K Plant Section, which had operating responsibility for the plant. Construction type work was assigned, according to routine plant policy, to the plant construction forces, the J. A. Jones Construction Company. Project Engineering provided management services for the construction type work and prepared necessary Project Proposals.

Overall budgeting was divided into major categories, such as deactivation planning and engineering; shutdown activities, which included work directly applied to deactivation activities and surveillance; construction type work; and manpower training. Financial control was arranged through issuance of work orders for work in each facility or system and other major jobs or activities.

At the time KE Reactor was deactivated, a master work order was also issued for the final layaway work at 100-B Area, including 108-B, the metal examination facility at 105-C, and the 185-B Building. Code 5L40 was still valid for receiving final deactivation costs at D Area. (3). Control was maintained by weekly detailed review of the work and work order runs.

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B. RPD Organization

The KW Reactor Deactivation Council was chairmanned by a representative from Engineering, and the KE Reactor Deactivation Council by a member of KE Plant management. In fact, the KE Reactor work was divided between two managers: one to direct overall K Plant layaway, and the other to oversee work in the zones outside the perimeter fence, including the other deactivated plants.

The RPD Councils consisted of groups that varied in number, depending upon the needs, but were based on approximately 12 key engineers, technicians, and managers. The overall committee consisted of functional managers; Technology Section representatives; senior engineers; and persons with electrical, mechanical, and instrument training and/or maintenance, operational, and radiation control experience. During field implementation, personnel from this group were used to supplement the field organization.

The RPD field organization consisted of functional managers and planners and schedulers from Power, Processing, and Maintenance. Persons were delegated to coordinate the overall schedules, and work meetings were periodically held to update them as necessary.

Processing and Power supervisors and Maintenance foremen from K Plant electrical, instrument, and mechanical were assigned the prime responsibility for completing work as outlined in the Deactivation Procedures Manuals (4).

Supervisors and engineers with instrument, electrical, mechanical, processing, and power experience were given responsibility for auditing

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deactivation work. Instructions for interpretation of instructions and procedures, as well as approval of changes in the deactivation progress, were issued.

C. Scope of Studies

K Plant management was informed of the pending KW Reactor shutdown during early January, and the final control rod insertion occurred on January 31, 1970. KE Reactor was shut down on January 28, 1971, and the instructions to deactivate were received soon thereafter. Because of the brief time element, the basic assumptions used for the deactivation of DR, H, F, and other reactors were accepted after review in regard to preservation of equipment, etc.

Upon receipt of notification that KW Reactor was to be deactivated, engineering (5) and technological studies were initiated. This was done to determine the scope of work required to effect the shutdown of KW Reactor and its associated support facilities and still provide the required coolant backup for KE Reactor. Facilities and services affected included last-ditch water, sanitary water, service water, and emergency electrical service. The services left intact were subsequently reviewed and revised in conjunction with the deactivation of KE Reactor (5), hence K Plant. The final status will be detailed later in the report.

Planning for KE Reactor deactivation was primarily based on updated KW procedures and additional engineering studies (5). It, of course, also considered services such as heat, electricity, fire and sanitary water, and misscellaneous fire protection for the to-be-deactivated facilities,

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as well as coolant backup while the graphite temperature stabilized and adequate water supply to the storage basin. Final plant status will also be detailed later in the report.

In essence, however, plans for both reactors were formulated entailing minimum costs and no upgrading of existing facilities or systems.

D. Safety: Radiological and Nuclear Considerations

Primary consideration during the deactivation processes was given to maintaining K Plant in a safe status at all times and performing deactivation work in such a manner that equipment life would not be adversely affected. Particular attention during deactivation of KW Reactor was directed toward assurance that the operational safety of KE Reactor was not compromised.

Considerable attention was given during deactivation of both reactors to control of radioactive materials and safeguarding of irradiated fuel in the storage basins. A letter, "Radiological Termination Guide for Single Pass Reactor," F. E. Owen to J. T. Baker (6), exemplified the first, and unclassified document DUN-7548, Rev. 1, entitled "Nuclear Safety Criteria for Spent Fuel Storage at Deactivated Reactors," exemplified the second (7).

1. Personnel Safety

A weekly inspection of safety and housekeeping conditions was made by the K Plant Health and Safety Specialist. He also attended the weekly deactivation meetings. In addition, the format of the Instructions and Procedures making up the Deactivation Manuals

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included a special column devoted to safety considerations. As previously indicated, guidance regarding nuclear safety and modified Process Standards was provided by the Technical Division.

2. Emergency Coolant Supplies

Deactivation of KW Reactor and associated boiler systems significantly affected the coolant adequacy status of KE Reactor in the event of concurrent loss of both primary and secondary power systems. An engineering study was made (8), and consequent steps were taken to provide the necessary coolant source. Last-ditch coolant criteria were rewritten, additional storage capacity was provided, tests were run, and procedures were developed to implement an alternate means of providing reactor coolant within a seven-day period (9). A KW Reactor boiler remained on the line until these were completed and tested.

Two Process Standards (10) were written for each KW Reactor and KE Reactor to cover both final discharge of the reactors and aspects following reactor discharge. These contained such precautions as backup coolant until the graphite temperature stabilized, and two sources of coolant supply to the storage basin, monitoring of graphite and storage basin temperatures, etc. Requirements stipulated in the Process Standards were met.

3. Fissionable Material

Detailed operating plans were written to supplement the Process Standards and Deactivation Manuals for complete reactor discharge, including positive confirmation that the reactor process tubes

were empty. Transshipping of fuel elements was made from both reactors to allow working room in the storage basins. Movement of irradiated fuel elements was controlled by locking procedures. Special materials are properly spaced with mechanical devices and protected with additional locks and lists completed for future action. Existing Process Standards (11) were applicable for this phase of the work.

A supplemental nuclear safety criterion for spent fuel storage at deactivated reactors was also developed and action taken. It basically confirmed previous criteria, but made them more stringent because fewer trained personnel would be available to respond to emergencies. The major changes involved provisions for confinement filtering of exhaust air and handling of effluent from the storage basins. A system for weekly radiological sampling of effluent from the KE and KW Reactor storage basins was established until all irradiated fuel has been shipped to ARHCO for processing.

4. Radioactive Materials Control

Criteria were developed by Radiological Engineering for control in a deactivated area. In essence, dose rates were to be accurately identified and kept within limits, and radioactive contamination was to be controlled so that it could not be spread to the environs. It included within buildings, burial grounds, and effluent systems controls.

Final radiological status reports were completed for the two 105 Buildings and issued in a separate report. An addendum has been

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attached to the 105-KE radiological report, recording the status of the K Plant burial ground after final layaway.

5. 107 Effluent Retention Basins, Trench and Crib

The three KW retention tanks were deactivated in a manner to provide contamination control but leave them available to provide effluent control flexibility for KE Reactor. The basins were supplied with a two-inch line from the fire and sanitary water systems to keep the bottom of the tanks covered, and observable leaks were sealed with cement. It was anticipated that flaking of the side walls would also fall into this pool of water and prevent contamination from becoming airborne. Surveillance was provided by KE Reactor personnel to assure that the bottom of the tanks remained covered with water. Wire was placed over the inlet pipe openings for wildlife control. At a later date, B tank at KW was provided with a vibrator and A-C tanks with high frequency whistles on a time cycle, to frighten wildlife from the immediate vicinity.

When KE Reactor was shut down, it was decided that all six retention tanks (three at KE and three at KW) would be carefully drained, the walls washed down, and approximately two feet of dirt placed on the bottom of the basins. All open inlet and exit piping was covered to prevent entry of wildlife in potentially contaminated pipes.

The KE crib was deactivated during March, 1970, by covering all exposed side walls and the bottom with dirt. This same general

criteria were used with two sections of the effluent trench, while the inlet section was covered with wire and water maintained in the bottom. All sections were subsequently filled in with dirt as part of the K Plant deactivation activities.

6. Contaminated Waste Burial Grounds

The KE-KW burial ground was deactivated following layaway of KE Reactor. All materials stored above ground were disposed of, and all trenches were backfilled. Currently, the burial ground is being administered by the Reactor Plant Services Subsection.

E. Procedures

Deactivation manuals containing Systems Instructions and Detailed Procedures for each building were compiled. In addition, there were auxiliary guides for records disposition (12), transfer or release of government property (13), termination internal exposure evaluation (14), library books control (15), release of equipment and movable property (16), guidelines for charging deactivation work orders for training (17), document control and messenger service (18), work order control, etc. Similar letters and procedures were issued at the time KW was deactivated, although the reference list primarily pertains to KE Reactor.

F. Budget Planning and Control

A budget plan and control program was established for both reactors by the Finance and Administration Division. In general, the overall budget was divided into capital work, which covered project costs;

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shutdown work, which included deactivation planning and engineering; and standby or work performed by plant forces. Project and shutdown costs were controlled by in-place accounting methods, while standby work costs were accumulated through work orders.

G. Corrosion and Preservation

It was decided to follow the preservation treatment policies prescribed for deactivation of D, H, and F Areas. They had been developed after thorough investigation of methods in use for preservation of many types of government, military, and industrial equipment under wide ranges of environment.

In general, corrosion prevention was carried out through draining, drying, and removal of corrosive chemicals. The piping and associated equipment were left open to the atmosphere for additional drying and draining. Thin film coatings, dessicants, and special preservative lubricants were used sparingly.

Design criteria (19) were developed for the moisture condensation protection of expensive switchgear considering the eventual complete deactivation of K Plant. A Project Proposal (20) was then prepared providing, among other things, electric unit heaters in the 105-KE, 105-KW, 165-KE and 165-KW control rooms and the 165-KE and 165-KW switchgear rooms. There are also provisions for fire detection installation in the 105-KE and 105-KW control rooms and No. 1 Electrical Equipment Rooms and in the 165-KE and KW control and switchgear rooms, plus an area fire protection system. The fire protection concept was agreed upon by the AEC-RL (21). Action is still pending.

The glycol heating system is being kept available as needed until all fuel elements are shipped and the project implemented.

H. Manpower Planning

All significant jobs to be done were listed and divided into building groupings and then further designated as to functional group responsibility. Each job was estimated as to actual manhours, and an appropriate overall master schedule was established. This was supplemented by weekly work schedules established through group meetings.

I. Project Activity

Design for a fire protection system at KW Reactor was being formalized at the time KE Reactor was shut down. This subsequently was incorporated in the project for eventual complete deactivation of the K Plant and KE Reactor. Project Proposal DAP-549, "Deactivation of KE Reactor and 100-K Area - Hanford," is awaiting final AEC approval. As previously mentioned, it mainly provides electric unit heaters and electric strip heaters, installation of fire detection systems, and includes an area fire protection system. The original provision to modify one steam boiler was broken down into two parts. One involves moving and installing the cold start equipment, which was subsequently declared non-capitol work and performed on a work order. The second part, involving the modification of boiler controls to operate in the range of 3,000 to 20,000 pounds of steam per hour, and added safety devices, is still in the Project Proposal.

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J. Special Tests

Production Test Authorization 214 (22), "Low Flow Demonstration Test, KE Reactor," document DUN-6906, was run in conjunction with the KW Reactor deactivation. It was a test designed to determine the minimum water flow to the KE Reactor in the event of total electrical power loss for a maximum of seven days.

A test, "Demonstration Test - Cold Startup of KW Boiler," document DUN-7491 (9), was run to test the facility and procedures to provide raw water to the 182 diesel pumps and to extend the existing seven days' coolant supply for KE Reactor. It proved the feasibility of using a newly-installed 750 kw diesel-driven generator at 105-KW to backfeed electrical power to 165-KW for distribution to selected systems in K Plant. This test was run during the week of November 30, 1970.

A test was also run on approximately May 14, 1970, to test a waste-effluent tie line. In association with KE Reactor shutdown, tests were run on March 8, 1971, and March 11, 1971, to determine if specific backup systems meet requirements of Process Water Standards - K Water Plant (HW-27155, Rev. 1, Appendix). The results indicated the system to be fully adequate to meet the Standards.

K. Metal Storage and Shipping Plans

All special, irradiated metal loadings were removed from the KW Reactor storage basin, except for thoria, in preparation for the final outage. The final discharge at KW Reactor was subsequently accounted for and stored in the KW basin. In addition, considerable metal from the KE Reactor storage basin was transshipped and is now stored in KW, C and

B basins. The KE Reactor discharge was accounted for, and the records transferred to the Reactor Plant Services Subsection. At the present time, the shipment of regular metal from 105-KW has been completed, and regular metal shipping is in progress from 105-KE to ARHCO.

L. Records

All classified records controlled by DUN Document Control Center were returned to their files. All record charts as listed in document DUN-2974 (23) were returned to Document Control Center. All other classified records were disposed of. Pertinent unclassified records, such as front face orifice pattern, HCR and VSR history, were stored in a file in the 105-KW and KE Reactors control rooms, as were the Master Deactivation Procedure books and status records. Individual shutdown log books for mechanical, instrument, electrical, maintenance, and Processing Subsection operations are also stored in this file, as well as the Master Shutdown Log books. The Power Subsection also has stored its deactivation log book and other pertinent records in this file.

K Plant Engineering's complete file of microfilms, BPF's, and prints was left intact at 1704-K Building for the continued use of Reactor Plant Services. The files are scheduled to be stored in the 105-KE Building following complete deactivation of K Plant and the other deactivated areas.

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M. Security

During the deactivation program, no changes were made in previously assigned security responsibilities. As deactivation work was completed within a facility, the doors were either barricaded or provided with a locking device. Warning and informational signs have been placed on certain building doors, and a large warning sign has been placed at the entrance to the area.

Building locks in both 105 buildings were changed to a new system for tighter postdeactivation control. The two buildings were also partitioned to allow selective access to various sections. Keys are strictly controlled.

N. Property Control and Equipment Listing

Hand tools and equipment that was declared as excess have been excessed according to procedure. Removal of the remaining equipment must first have the approval of the Manager, Fuels Manufacturing Subsection, and probably at a later date by the Manager, Reactor Plant Services. Records are maintained on all equipment that has been removed to meet emergency plant needs.

O. Surveillance

After the KE Reactor deactivation activities were confined to the 8-4 shift, on March 22, 1971, Monday through Friday, operators from the Power Subsection were assigned to inspect the 105-KE and KW Buildings on a once-per-shift basis. The Manager, KE Processing Subsection remained custodian.

Surveillance responsibility for the KE shutdown facilities was later assigned to the Reactor Plant Services Manager, who had originally been assigned custodianship for KW Reactor. This responsibility included custodian control, visits to shutdown facilities, status of contamination and radiation zones, and operating service systems.

IV. KE REACTOR AND K PLANT DEACTIVATION COSTS

	Costs Thru March 1971*	Estimated To Complete 1971*	FY 1972 Estimate*	Total Indicated Costs*
Capital Costs				
DAP-549 Deactivation of KE Reactor & 100-K		50	110	160
Operating Expense				
Plant Forces (includes material & purchased electricity)	1,299	1,991	360	3,650
Services From Others (includes Technical & Engineering costs)	84	375	110	569
Inventory Reserves				2,300
SUBTOTAL	1,383	2,366	470	6,519
Company & AEC Overhead	298	510	101	909
TOTAL Capital & Expense Costs	1,681	2,926	681	7,588

* Dollars in thousands

NOTE: Figures do not include planned surveillance activity.

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V. DEACTIVATION EXPERIENCE SUMMARY

A. Significant Date Summary - Deactivation Work

105 Building

	KW	KE
1. Rods In	1-31-70 (11:58 PM)	1-28-71 (4:00 PM)
2. Reactor Discharged	2-15-70	2-24-71
3. Process Water Flow to Reactor Stopped	2-16-70	2-25-71
4. Layaway 105 Building Exclusive of Transfer Area	5-15-70	5-01-71
5. Metal Shipment Complete	12-01-71*	12-01-71*
6. Transfer Area Deactivated	12-30-71*	12-30-71*
7. 107 Basins Deactivated	6-30-71*	6-30-71*

* Estimated Dates

Water Plant and Power House

	KW	KE
1. 190 Building Shutdown	2-16-70	4-13-71
2. 181 Building Shutdown	3-30-71	3-30-71
3. 182 Building Shutdown	None	4-06-71
4. 183 Building Shutdown	3-01-71	4-13-71
5. 190 Building Deactivated	4-13-71	4-13-71
6. 165 Building Deactivated	5-01-71	4-13-71
7. 151 Building Deactivated	4-13-71	4-13-71

The above dates reflect the deactivation status of the listed buildings completed as per KE deactivation procedures. Any exceptions are listed in R. H. Hayward's deactivation and surveillance report, and

in the 105-KE Master Deactivation Book, and are in effect as of the issue of this report. This record is stored in the 105-KE files.

The 105-KE Building was deactivated and locked on May 1, 1971. Restricted zones will remain activated for use by Battelle Northwest and the Shipping Crews, as authorized by previous arrangement. Those sections of the KE Power operation required by Standards and DAP-549 will remain activated until final deactivation or plant abandonment. All KW Reactor facilities and Power operation buildings were deactivated and locked on June 1, 1971, with the exception of the 105-KW Transfer Area, which is still activated for metal shipment to ARHCO.

Plant Lockup - K Plant

Plant lockup at K Plant is estimated to be completed by January 1, 1972. Heat, water, steam, and sanitary facilities will be provided for BNW as long as metal is being shipped from K Plant. Upon completion of metal shipping, these services will be completely deactivated. The only remaining activity in K Plant will be the completion of approved deactivation Project work (DAP-549)

B. Projects

DAP-549 - Deactivation of KE Reactor and 100-K Area, Hanford

Item	Beneficial Use Date
1. Fire Protection System - Fire Lines	8-01-71*
2. Fire Detection Equipment	3-01-72*
3. Installation of Electric Heaters	3-01-72*
4. No. 3 Steam Boiler Revisions (Control)	10-01-71*

* Estimated Dates

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C. Design Changes

1. KE Reactor

Minor Design Change E71K-604-10 - "Storage Basin Alarms - 105-KW and 105-KE," by E. E. Mitchell, issued 2-26-71.

Minor Design Change E71K-604-10, Addendum No. 1 - "Storage Basin Alarms - 105-KW and 105-KE," by E. E. Mitchell, issued 3-16-71.

Minor Design Change E71K-0-11 - "125 Volt DC Power Supply for Switchgear, 105-KE," by P. E. Lindstrom, issued 2-23-71.

Minor Design Change M71K-0-12 - "Chlorine Rack Relocation to 183-KE," by D. K. Clem, issued 3-08-71.

Minor Design Change M71K-0-14 - "Filter Isolation, 183-KE," by D. K. Clem, issued 3-08-71.

Minor Design Change I71K-608-10 - "Storage Basin Temperature Recorder," by R. K. Gange, issued 2-17-71.

Minor Design Change M71K-0-13 - "Service Water to Sanitary Water System Intertie," by D. K. Clem, issued 3-01-71.

Minor Design Change E71B/C-603-15 - "Exhaust Fan Control Circuit Modification," by C. G. Jenkins, issued 3-22-71.

Design Change 1332 - "Diesel Pump Control Revision, 182-K," by R. K. Gange, issued 3-12-71.

Minor Design Change M71K-0-16 - "Storage Basin Water Supply Antisyphon Modification," by D. K. Clem, to be issued.

Minor Design Change M71K-0-17 - "Clearwell Isolation - 183-4-KW," by D. K. Clem, to be issued.

2. KW Reactor

Minor Design Change E70K-205-2 - "Removal of Diesel Engine Pump Control Circuits from KW Reactor," by P. E. Lindstrom, issued 2-11-70.

Minor Design Change M70K-JC-017-B - "Helium Car Unloading Piping Revision, 110-KW," by S. M. Moyers, issued 3-02-70.

Minor Design Change E70K-6-4-3 - "Storage Basin Alarms 105-KW," by P. E. Lindstrom, issued 3-16-70.

Minor Design Change E70K-0-4 - "Columbia River Telemetering Equipment Relocation, 165-KE," by P. E. Lindstrom, issued 2-17-70.

Minor Design Change I69IG-002-E Addendum - "184 HA and 184 DA Remote Boiler Alarms, 165-KE," by P. E. Lindstrom, issued 2-17-70.

Minor Design Change IB-029-69, Addendum - "105-B and 105-C Basin Radiation, Water Level, and Temperature Alarm, 105-KE, 165-KE, and 165-KW," by P. E. Lindstrom, issued 2-18-70.

Minor Design Change E70K-0-6 - "Annunciator and Pump Control Circuit Modifications for Deactivated Facilities, 165-KE, 183-KE, 165-KW and 181-KW," by P. E. Lindstrom, issued 3-04-70.

Minor Design Change E70K-0-10 - "125 Volt DC Power Supply for Switchgear 105-KW," by D. K. Clem, issued 4-20-70.

Minor Design Change M71K-TA-015-E - "165 to 150 Glycol Line Deactivation, 165-KW," by D. K. Clem, issued 5-07-70.

Minor Design Change M71K-HB-003-E - "Boiler Feedwater Line Drain Installation," by D. K. Clem, to be issued.

D. Blanks Installed in Piping Systems

1. KE Reactor

190-KE

Service Water - High Lift Cooling Water

1 - 6" blank on loop to #1-2-3 pumps near header
1 - 6" blank on loop to #4-5-6 pumps near header
1 - 4" blank installed at isolation valve #1 high lift near header
1 - 4" blank installed at isolation valve #2 high lift near header
1 - 4" blank installed at isolation valve #3 high lift near header
1 - 4" blank installed at isolation valve #4 high lift near header
1 - 4" blank installed at isolation valve #5 high lift near header
1 - 4" blank installed at isolation valve #6 high lift near header
2 - 3" blanks installed at 3-way valve #1 recirculation line
2 - 3" blanks installed at 3-way valve #2 recirculation line
2 - 3" blanks installed at 3-way valve #4 recirculation line
2 - 3" blanks installed at 3-way valve #5 recirculation line
2 - 3" blanks installed at 3-way valve #6 recirculation line
1 - 6" blank installed #1 high lift cooling H_2O return to pumpwell at check valve
1 - 6" blank installed #2 high lift cooling H_2O return to pumpwell at check valve
1 - 6" blank installed #3 high lift cooling H_2O return to pumpwell at check valve
1 - 6" blank installed #4 high lift cooling H_2O return to pumpwell at check valve

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1 - 6" blank installed #5 high lift cooling H_2O return to pumpwell at check valve
1 - 6" blank installed #6 high lift cooling H_2O return to pumpwell at check valve

165-KE

1 - 8" thin blank installed in steam supply to #1 turbine-generator valve manifold - for vapor stop only, will not hold full steam pressure
1 - 8" thin blank installed in steam supply to #2 turbine-generator valve manifold - for vapor stop only, will not hold full steam pressure
1 - 8" thin blank installed in steam supply to #3 turbine-generator valve manifold - for vapor stop only, will not hold full steam pressure
1 - blank in service water supply to #1 boiler
1 - blank in service water supply to 1705-KE Building
1 - blank in 1705-KE raw water supply line located in 165-KE Building

183-KE

1 - blank installed in outlet of dichromate storage tank
1 - blank installed in outlet of water side of alum heat exchanger for east storage tank
1 - blank installed in inlet of water side of alum heat exchanger for east storage tank
1 - blank installed in inlet of alum side of alum heat exchanger for east storage tank
1 - blank installed in tie line between east and west alum feed systems
1 - blank installed in service water supply to east side basin drywells
1 - blank installed in #6 drywell service water supply line
1 - blank installed in #7 drywell service water supply line
1 - blank installed at valve in service water supply to east filter gallery
1 - blank installed at downstream side of #10 west surf-wash valve
1 - blank installed in the filter backwash control supply line between #10 and #11 filters
1 - blank installed in the filter effluent control supply line between #10 and #11 filters
1 - forged head installed on the 36" backwash header between #10 and #11 filters - head removed from end of backwash header
1 - forged head installed on the 36" backwash header just before #8 filter - head removed from end of backwash header
1 - 24" blank to be installed at the orifice in the raw water supply header to sedimentation basin #2
1 - 24" blank to be installed at the orifice in the raw water supply header to sedimentation basin #3

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:o be installed at the orifice in the raw water
er to sedimentation basin #4
:o be installed at the orifice in the raw water
ler to sedimentation basin #6
:o be installed at the orifice in the raw water
ler to sedimentation basin #7

ligh lift cooling water

n loop to #1-2-3 pumps near header
n loop to #4-5-6 pumps near header
nstalled at isolation valve #1 high lift near header
stalled at isolation valve #2 high lift near header
nstalled at isolation valve #3 high lift near header
nstalled at isolation valve #4 high lift near header
nstalled at isolation valve #5 high lift near header
nstalled at isolation valve #6 high lift near header
nstalled at 3-way valve #1 recirculation line
nstalled at 3-way valve #2 recirculation line
nstalled at 3-way valve #3 recirculation line
nstalled at 3-way valve #4 recirculation line
nstalled at 3-way valve #5 recirculation line
nstalled at 3-way valve #6 recirculation line
stalled #1 high lift cooling H_2O return to pumpwell
lve
stalled #2 high lift cooling H_2O return to pumpwell
lve
stalled #3 high lift cooling H_2O return to pumpwell
lve
stalled #4 high lift cooling H_2O return to pumpwell
lve
stalled #5 high lift cooling H_2O return to pumpwell
lve
stalled #6 high lift cooling H_2O return to pumpwell
lve

raw water header to softeners

front face riser pressurizer
:
to front face - west side of
: fill line - west side of valve
shield line at tee - west side
ion line near purge tank
ing single pass header - near

identified by a large red paint

ine 1' upstream check valve on

ream EP-5 valve
stream EP-4 valve

ader near Purge Tank

ne at valve in east side of valve
ne through valve pit division
ine at takeoffs from 12" header
ne in corridor outside Electrical
plugged at valve in corridor
ibs plugged at valve in west side
upply corridor - welded in blanks
torage area at west corridor out-
ducer in corridor outside blue
ain at Y in Exhaust Fan Room

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er - capped at main in Exhaust Fan Room
vater line plugged in Exhaust Fan Room - to
' level
er to hose bib in Exhaust Fan Room - plugged
oom
o Purge Room - blanked outside door
to vacuum producer in Exhaust Fan Room -

to sanitary water header in Exhaust Fan

r supply line to X levels - blanked
e to X levels - plugged
e to Mens' Restroom - plugged

nage Holes

HP crosstie line near the 105 valve pit
C" Platform HP flush line - east side of valve

iltered water line to "C" Platform - east side

olids feed line - east side of valve pit
rocess water line - west side of valve pit
in each of two front face riser pressurizer
de of valve pit
HP flush line to front face - west side of

C" elevator pit fill line - west side of valve

ottom thermal shield line at tee - west side of

urge pump suction line near purge tank
' supply lines for water treatment test facility
n low section of lines in near front riser pit
vater seal legs in #1 and #2 dryer rooms

ented toward complete deactivation of all sys-

ossible. There remained the need for heating,

e protection and facilities for BNW. Other

ire special attention.

eneral, specific, and miscellaneous items

specific attention is significant but not all

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corridor
to gamma room far

line to rear fog spray
ectionalizing valve
e
p of unit in isolation
door
oom - diesels, etc., in

om in isolation valve

ion valve near header

tunnel in sectionalizing

Room and reactor shield
lves H2 tunnel east wall
pit in isolation valve

nes upstream of the check

ves between EP valve and

are identified by a large

ar the 105 valve pit -

line - east side of valve

o "C" Platform - east side

ast side of valve pit
west side of valve pit

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inclusive. Experience could eventually lead to a revision and other items identified as the K Reactors' status changes from standby to some other category.

1. General

   a. Procedures must be developed to monitor deterioration of facilities and verify satisfactory preservation of equipment.

   b. Procedures must be provided to assure operability of equipment left in service. This is to include appropriate Equipment Maintenance Standards and a preventive maintenance system.

   c. Radiation monitoring procedures for periodic inspection of facilities to assure that radioactive materials are still confined.

   d. Emergency procedures for handling fires, earthquakes, storage basin leaks, etc., should be developed.

   e. Schedules for periodic inspection of all deactivated facilities must be developed.

2. Specific

   The listed facilities remain in service pending completion of projects and transshipping of fuel elements from the storage basins, or until final deactivation of the area. Routine surveillance and maintenance is required.

   a. KW Plant Facilities

      1) 105-KW Building

         a) #1 supply fan - damper blocked open.

         b) #2 exhaust fan - damper blocked open.

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c) 117 Building filters are in place with special provisions for manual inflation of the seals if required.

2) 181-KW Building

a) #11 submersible pump remains in position, with gas pressure being maintained on the oil system. The ball valve for this pump is deactivated in the closed position. This pump will be used for fire protection when the area is completely deactivated. (See KE Deactivation Engineering Report.)

b) The large pump motor heaters remain activated.

3) 183-KW Building

a) The service water headers will remain activated to furnish fire protection water and sanitary water.

b) An intertie line has been installed between the service water header and the sanitary water system to supply the area sanitary needs. (See Minor Design Change M71K-0-13.)

c) The sanitary water chlorine feeder remains activated. It will take its chlorine from 150-pound cylinders.

d) The main glycol headers from 190-KW to 183-KW will remain activated to furnish enough heat to prevent freezing of the service water and sanitary water headers.

e) The #2 4160V to 480V transformer will remain in service to supply the building lighting and power needs.

f) The toilet facilities and drinking fountain will remain activated. The hot water tank is deactivated.

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4) 190-KW Building

a) The heating and ventilating units will remain activated and available for service as needed. The high lift and low lift motor heaters are in service.

b) The bridge cranes will remain activated as long as a need for them exists.

c) The final deactivation will require the draining of the clearwells, the condenser water headers, the service water headers, and all lateral systems supplied by the service water headers.

5) 165-KW Building

a) The three glycol circulation pumps and both glycol makeup pumps will remain activated and available for service.

b) The main service water header will remain pressurized.

c) 13.8KV power will be supplied from the #2 230KV to 13.8KV transformer at 151-KE via the 13.8KV tie line. The following breakers will be closed to complete this circuit: C9X200, C9X6, C9X20, and C7X7.

d) Incoming transformer #3 will be in service and will supply bus "C", "D", "B", "A", and "M". Bus tie breakers #36, #22, #5, and #47 are closed.

e) Incoming transformer #5 will be in service and will supply bus "L".

f) The "B" battery set and rectifier will remain in service to supply the DC power needs for 165-KW and 105-KW. The DC power distribution panel bus tie is closed.

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g) No. 2 4160V to 480V station service transformer is in service and receives its power from bus "C".

h) The glycol heating equipment for the 165 Power House is available for service as needed.

i) The toilet facilities and the drinking fountain in the lunchroom will remain activated.

j) The following valves are deactivated in the open position: RWL, RW2, RC1, RC2, PD1, PD2, PD3, PD4, PD5, PD6, PS1, PS2, PS3, PS4, PS5, PS6, PSC2, FB3, FB4, EP1, EP5, EP6, and CWR1.

k) The following valves are deactivated in the closed position: RCEL, RCE2, HPC1, V70, SE1, SE2, RC3, SP1, SP2, SP3, SP4, FB1, FB2, and FB5.

l) The following valves will remain activated and will normally be in the open position: SW1, SW2, SW3, SW4, SC1, SS1, SS2, SS3, SS4, and SS5.

b. KE Plant Facilities

1) 105-KE Building

a) #1 supply fan - damper blocked open.

b) #1 exhaust fan - damper blocked open.

c) 117 Building particulate and charcoal filters: auxiliary nitrogen gas system installed to inflate filter seals if needed.

d) Instrument air system is in service.

e) CPTR facility (BNW).

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2) 181-KE Building

a) No. 8 and No. 11 submersible pumps are available for service to supply the 183-KE filter plant. Only one pump will be operated at a time.

b) No. 3 and No. 4 ball valves are equipped with local controls and will be used for raw water header pressure control.

c) Both traveling screens will remain activated and available for service.

d) Both raw water headers are in service. They will remain full and pressurized at all times.

e) The motor heaters for the large pump motors are in service.

f) The pipe heaters are available for service when needed.

3) 182-KE Building

a) The primary deactivation of this building is complete. The following equipment and facilities will remain activated and available for service. When there is no further need for this facility, it will be deactivated according to the applicable deactivation procedures.

b) The three diesel-driven pumps will remain available for service. They can be started only with the local push button control. (See Design Change 1332.)

c) The DC control power will be taken from the 165-KE battery set.

d) The electric-driven and diesel-driven compressors will remain in service and will be controlled by the pressure control switch on #3 engine.

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e) All six starting air receivers will remain in service.

f) The building heating and cooling facilities will remain available for service.

g) The HPC line will be pressurized from the service water system in 165-KE through the HPC1 valve and the V70 valve.

h) The building service water and sanitary water lines will remain activated.

i) The V71 valve at KE and the V71 valve at KW will remain activated to be used when flushing the HPC line.

4) 183-KE Building

a) No. 5 basin, with associated raw water supply header and limitorque flow control valve, will remain activated.

b) No. 9 and No. 10 filters and associated backwash facilities will remain in service. The effluent and backwash controls have been converted to a manual control system.

c) A rotometer and jet system has been installed for alum addition to the raw water.

d) The chlorinators have been equipped with small orifices and will take chlorine gas from one-ton cylinders. (See Minor Design Change M71K-0-12.)

e) The separan mix tank, storage tank, injection pump, and two feeding rotometers will remain activated.

f) Both service water supply headers will remain activated.

g) The main glycol headers and the needed space heaters will remain in service.

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h) The air compressors and associated receivers will remain activated.

i) No. 2 4160V to 480V transformer is in service with the MCC bus tie closed.

j) The alternate acid transfer pump will remain activated and available for use until all acid has been moved from storage.

k) The sanitary water headers and piping will remain activated.

l) One tank of dichromate is still stored until adequate disposal can be arranged.

m) One alum storage tank is still in service until adequate disposal can be arranged.

5) 190-KE Building

a) No. 2 and No. 3 service water pumps will remain activated for service to supply the 105-KE and 105-KW storage basin cooling water requirements, the power house requirements, area fire protection water, and area sanitary water needs. (NOTE: No. 3 pump can take power from "B" bus only.) The high lift and low lift motor heaters are in service.

b) Both backwash pumps will remain available for service.

c) Both clearwells and pump well will be kept full. The associated sluice gates will remain activated.

d) The heating and ventilating units will remain activated and available for service as needed.

e) The bridge cranes will remain activated as long as a need for them exists.

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f) The final deactivation will require the draining of the clearwells, the condenser water headers, and the service water headers, as well as all lateral systems supplied by the service water headers.

6) 165-KE Building

a) No. 3 boiler will be modified and made available to supply steam for the area heating needs.

b) No. 2 boiler will be maintained as an emergency backup unit for No. 3 boiler.

c) The No. 2 fuel oil system will be maintained for a cold start of a boiler.

d) The east No. 5 fuel oil storage bunker and day tank and associated heaters and transfer pump will remain activated.

e) The compressed air system, service water loop, water softeners, and chemical mix and injection equipment will remain activated as supporting equipment for an operating boiler.

f) Both 4160V to 480V station service transformers will remain activated to supply building lighting and low voltage power needs.

g) The "B" battery set and rectifier will remain in service. The DC power distribution panel bus tie will be closed. This battery set will also supply the DC power needs for 105-KE.

h) Incoming transformer #3 will remain activated and connected to bus "C", "F", "B", "A", and "M". Bus tie breakers #22, #5, and #47 are closed.

i) Incoming transformer #5 will remain activated and connected to bus "L" and bus "D". Bus tie breaker #55 is closed. NOTE: Incoming transformers #1-2-4-6 are de-energized, but are available for service by contacting ITT Electrical Distribution Dispatcher. DO NOT parallel IT3 and IT5 without the approval of ITT Electrical Distribution Dispatcher.

j) The following valves will remain activated and will normally be in the closed position: PD3, PD4, RW1 and/or RW2. (The position of RW1 and RW2 will be dependent on which of the two 181-KE raw water pumps is in service.)

k) The following valves will remain activated and will normally be in the open position: FB5, HPC1, V70, SE2, SW1, SW2, SW3, SW4, SS1, SS2, SS3, SS4, SS5, RE1, RE2, RC1, and RC2. NOTE: The flapper for the check valve associated with valve SE2 has been removed.

l) The following valves will be deactivated in the closed position: PD1, PD2, PD5, PD6, FB1, FB2, FB3, FB4, RCE1, RCE2, SE1, SP3, and SP4.

m) The following valves will be deactivated in the open position: EP1, EP5, EP6 and both process-to-service water valves.

n) The three glycol circulating pumps and the glycol makeup pumps will remain activated and available for service.

o) Both refrigerated air conditioning units will remain in service.

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p) Five of the eight evaporative-type coolers for the power house will remain in service.

q) All sanitary water and toilet facilities will remain in service.

7) 1706-KEL Building

All facilities in this building are still in use by Battelle Northwest, Corrosion Research Engineering Section.

8) 1706-KE-KER Buildings

Procedures have been completed to deactivate the 1706-KE-KER Buildings (and 1705-KE Building) as much as is practical and still maintain the capability of providing for or distributing the support services required by the following organizations: BNW, Corrosion Research Engineering Section; BNW, Ecosystems Department; DUN, Irradiation Services; and DUN, Reactor Materials. These organizations are engaged in active work projects for which termination dates are not known.

The systems in the 1706-KE-KER Building that have not been deactivated are as follows:

a) Compressed Air

b) -27' Level Sump Pump

c) Service Water - Some selective deactivation has been completed.

d) Sanitary Water

e) Steam and Glycol - Temporarily valve-out because of summer boiler shutdown.

f) Raw Water - Scheduled for deactivation in September, 1971.

g) Demineralized Water - Noted because of bulk chemical storage and #2 clearwell.

h) Electrical Supply - No change in status in the supply systems in the 165 and 105-KE Buildings; some individual circuits have been de-energized within the 1706-KE-KER Buildings' distribution centers.

i) Ventilation and Exhaust Systems - All systems are still in service.

j) Hoists - All systems are still in service.

k) Vacuum System

l) Miscellaneous test facilities, test laboratory, radioactive storage cave and office spaces.

9) 1704-K Building

Currently lights, heat, water, and sanitary services are activated.

10) 1720-K Building

Currently lights, heat, water, and sanitary services are activated.

11) 1717-K Building

Currently lights, heat, water, and sanitary services are activated.

3. Miscellaneous Items

a. Metal Storage Basins - Coolant Supplies & Instrumentation

The storage basin service water supply remains in service with diesel pumps available to supply filtered water under emergency conditions. The water is supplied through the eight-inch far

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side lines at both 105-KE and KW Buildings. One three-inch supply valve at each storage basin is locked and tagged in the full open position to provide sufficient coolant at all times. Both storage basins have temperature and level alarms which annunciate at 164-KE Building.

b. 105-KE Storage Basin - Special Materials

In addition to the natural and enriched metal stored in the basin, the list below includes all special and source material. Also, a list of zirc tubing and special dummies from 1706 tubes, planned disposition, and groups that are responsible for the material is also included.

Type of Material	Number of Pieces	Storage Basin Positions
1. Li Al	2352	2804 thru 2809
2. Pu Al	322	2810 thru 2836
3. Depleted	169 152	0830 0831
4. Americium	12 PT-171	0833

Items 1 and 2: A decision has not been made on pieces listed under these items, but disposition will require approval of R. L. Plum, Manager, Reactor Operations Branch, Production Programs Division, AEC.

Items 3 and 4: These items are covered on inventory by Production Scheduling (DUN) office, which will direct shipping or disposal of the material.

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c. 105-KW Storage Basin - Special Materials

Type of Material	Number of Pieces	Storage Basin Positions
1. Li Al	68 serial # 40-S & 41-S	458
2. Depleted	230 PT-093	464

Item 1: This material will be shipped and processed at Savannah River, when scheduled by the Production Scheduling (DUN) office.

Item 2: Depleted metal is covered by inventory by Production Scheduling (DUN) office, which will direct shipping and disposal of this material.

d. 105-KE-KW - Storage Basins Water Level

Should the metal storage basins be inadvertently overfilled, the overflow will drain to the exhaust air tunnel. A small volume of water can be handled by the tunnel floor drain. Amounts exceeding the capacity of the floor drain, or if plugged, will both interfere with building ventilation exhaust and backup through other below-ground-level floor drains. This condition can most easily be corrected by removing an inspection plate in the exhaust fan air duct (at the fan) and lowering a portable pump into the tunnel using a fire hose strung outside the building for discharge.

e. 105-KE-KW 3X Balls

During the deactivation of KE Reactor, the 3X Balls from both reactors were vacuumed from the hoppers, placed in metal drums, treated with desiccant, and stored in the respective inner rod rooms. They should be periodically inspected and the desiccant replaced as necessary.

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The irradiated balls were buried, so each reactor is approximately nine hoppers short of a full charge. This should be taken into consideration if the 3X Balls from other shutdown reactors are declared excess at some future date.

f. 107 Retention Tanks

The retention tanks can be returned to service by:

1) Rewelding cut-out sections of wall with double plates inside and out.
2) Removing inlet blanks.
3) Removing 66" dresser coupling and blanking pipe.
4) Cutting and blanking 35" line.
5) Installing 24" pipe into the side of the tank and running it into the 36" pipe ahead of the valve with two dresser couplings.
6) Installing concrete deflection pad at the end of the chute.

g. Sanitary Water Sampling

Sanitary water sampling is as it has been in the past (i.e., samples are taken at various locations in the area and sent to HEHF, one each week, for analysis).

h. Cobalt - Inner Tube - KW

At the time of KW Reactor deactivation, PT-126 authorized the insertion of a cobalt liner in a regular zirconium tube (1355). The test required the irradiation of this liner for a two-year period. At the time of the KW Reactor shutdown, the liner had

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been under irradiation for eight months. Current plans are to leave this liner in place; and, in the event of KW Reactor reactivation, complete the two-year irradiation before the liner is removed. In the event of KW Reactor abandonment, final disposition of this cobalt liner will require further evaluation.

i. Status of Dummies and Splines - 105-KE

An inventory has been made of all types of dummies that would be needed to load KE Reactor if it is reactivated (26). It is estimated that sufficient dummies are available for more than one full loading of KE Reactor. These dummies are stored in 105-KE, 111-B, and 300 Area permanent storage facilities. In addition to the items listed below, approximately 7,000 splines and spline cans are stored in the 111-B Building.

Listed below is a breakdown of the location, type, and number of each type of dummy.

Type	105-KE	300 Area	111-B	TOTAL
16" Expendables(S/S)	3,600	11,800 (7,358 anodized)		22,758
8" Tubulars(S/S)	50,000	12,602		62,602
8" Perfs (S/S)	10,000	4,935		14,935
8" Perfs(Smooth)	11,000		14,000	25,000
8" Tubulars(Smooth)	500		30,500	31,000
8" Solid Al(Smooth)	500		5,200	5,700
5" Perfs (Smooth)			24,200	24,200
			TOTAL	186,195

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1. Letter, "BNW Corrosion Research and Engineering Section Interests at 100-K Area," from T. F. Demmitt to A. R. Maguire, dated February 24, 1971.

2. Letter, "BNW Corrosion Research and Engineering Section Interest at 100-K Area," from A. R. Maguire to T. F. Demmitt, dated March 2, 1971.

3. Letter, "KE Deactivation Cost Recording," from R. W. Indermuehle, dated February 2, 1971.

4. a) 100-KW Reactor Deactivation Manual.

   b) 100-KE Reactor Deactivation Manual.

5. a) Unclassified Document, DUN-6891, "KW Reactor Deactivation Engineering Report," by L. B. Brinkman, dated May 4, 1970.

   b) Unclassified Document, DUN-7555, "Engineering Report - KE Reactor Deactivation," by L. B. Brinkman, dated March 12, 1971.

6. Letter, "Radiological Termination Guide For Single Pass Reactors," from F. E. Owen to J. T. Baker, dated February 23, 1971.

7. Unclassified Document, DUN-7548, Rev. 1, "Nuclear Safety Criteria for Spent Fuel Storage at Deactivated Reactors," by D. L. Renberger, dated February 25, 1971.

8. a) Letter, "Deactivation and Surveillance Reports - KW Area," from L. B. Brinkman to B. T. Rossiter, dated June 2, 1970. Attachments: Engineering Studies - KW Reactor Deactivation, and Corrosion Protection - KW Reactor Deactivation.

   b) Letter, "Deactivation and Surveillance Reports - KE Area," from L. B. Brinkman to B. T. Rossiter, dated April 8, 1971. Attachments: Engineering Studies - KE Reactor Deactivation, and Corrosion Protection - KE Reactor Deactivation.

9. a) Letter, "Emergency Coolant Supply - KE Reactor," from D. W. Peacock to R. L. Plum (AEC), dated April 6, 1970.

   b) Letter, "Water Flow Test Waste - Effluent Tie Line," from J. W. Frymier to Distribution, dated May 14, 1970.

   c) Unclassified Document, DUN-7491, "Demonstration Test - Cold Start of KW Boiler," by R. K. Wahlen, dated January 18, 1971.

10. Unclassified Document, HW-27155, Rev. 1, APP, "Process Standards - Water Plant - Reactor Deactivation - K Water Plant," by M. T. Lewis, dated February 26, 1971.

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11. Secret Document, HW-46000-K, "Process Standards - Reactor," dated August, 1957.

12. a) Letter, "Records Disposition Guide - Douglas United Nuclear, Inc.," from B. Schauss to Level III and Level IV Managers, dated February 10, 1971.

    b) "Records Disposition Guide - Douglas United Nuclear, Inc. - Supplement No. 1," dated February 10, 1971.

13. Letter, "Transfer or Release of Government Property," from W. Keith Hunt to Property Custodians, dated February 2, 1971.

14. Letter, "Termination Internal Exposure Evaluation," from Radiation Practices Engineering to Distribution, dated February 4, 1971.

15. Letter, "Library Books - 100-N Area Library," from B. Schauss to Level III and Level IV Managers, dated February 16, 1971.

16. Letter, "Release of Equipment and Movable Property," from B. T. Rossiter to J. T. Baker, et. al., dated February 17, 1971.

17. Letter, "Guidelines For Charging Deactivation Work Orders For Training of Transferred Employees - KE Deactivation," from R. W. Indermuehle to Distribution, dated March 2, 1971.

18. Letter, "Document Control and Messenger Service," from B. Schauss to Level III and IV Managers, dated March 18, 1971.

19. Document, DUN-7556, "Design Criteria, KE Reactor Deactivation," by L. B. Brinkman, dated March 1, 1971.

20. Document, DUN-7568, "Project Proposal, Deactivation of KE Reactor and 100-K Area, Hanford (Project No. DAP-549)," by A. A. Janos, dated April 6, 1971.

21. a) Letter, "Fire Protection - 100-K Area," from L. P. Forby to V. R. Holmquist, dated March 5, 1971.

    b) Letter, "DUN-7556, Design Criteria - KE Reactor Deactivation," from R. L. Plum (AEC) to R. C. Peterson, dated April 8, 1971.

22. Document, DUN-6906, "Production Test Authorization 216 - KE Reactor - Low Flow Demonstration Test," by L. C. Lessor, dated January 1, 1971.

23. Document, DUN-2974, "Security Classifications and Retention Requirements of Instrument Recorder Charts," by R. P. Rowe, dated July 3, 1967.

24. Letter, "KE and KW Storage Basin Water Disposal," from F. E. Owen to R. G. Clough, Jr., dated April 13, 1971.

25. Unclassified Document, HW-46000 KE SUP I, "Supplement I to Reactor Deactivation Process Standards for All 105 Buildings With Irradiated Fuel in Storage Basins, by M. T. Lewis, dated May 10, 1971.

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26. Letter, "Status of Dummies For 105-KE Reactor," from J. L. Goodenow to R. G. Clough, Jr., dated April 13, 1971.

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