

LIQUID AND GASEOUS WASTE OPERATIONS PROJECT
ANNUAL OPERATING REPORT
CY 1999

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ACRONYMS

BJC	Bechtel Jacobs Company LLC
CY	Calendar Year
DAS	Data Acquisition System
DCS	Distributed Control System
DMC	Documentation Management Center
DMS	Documentation Management System
DOE	Department of Energy
EC	Environmental Compliance
FY	Fiscal Year
GI	Generator Interface
HEPA	High Efficiency Particulate Air
HFIR	High Flux Isotope Reactor
LCB	Life Cycle Baseline
LCO	Laboratory Certification Official
LFABB	Laboratory Facility Authorization Basis Board
LGWO	Liquid and Gaseous Waste Operations
LGWOP	Liquid and Gaseous Waste Operations Project
LLLW	Liquid Low-Level Waste
LMER	Lockheed Martin Energy Research
LW-GIE	Liquid Waste - Generator Interface Equivalent
MOU	Memorandum of Understanding
MVST	Melton Valley Storage Tank
NCS	Nuclear Criticality Safety
NCSA	Nuclear Criticality Safety Approval
NPDES	National Pollutant Discharge Elimination System
NTS	Nevada Test Site
OEP	Office of Environmental Protection
ORNL	Oak Ridge National Laboratory
ORO	Oak Ridge Operations
OSR	Operational Safety Requirements
OTE	Out-of-Tank Evaporation
PLC	Programmable Logic Controller
PW	Process Waste
PWTC	Process Waste Treatment Complex
RCRA	Resource Conservation and Recovery Act
SLLW	Solid Low-Level Waste
SLS	Solid-Liquid Separation
STP	Sewage Treatment Plant
SWSA	Solid Waste Storage Area

ACRONYMS (continued)

USQD	Unreviewed Safety Question Determination
VR	Variance Request
WAC	Waste Acceptance Criteria
WCO	Waste Certification Official
WOCC	Waste Operations Control Center
Y2K	Year 2000

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**LIQUID AND GASEOUS WASTE OPERATIONS (LGWO) PROJECT
ANNUAL OPERATING REPORT
CALENDAR YEAR 1999**

1.0 OPERATING ACTIVITIES

1.1 Process Waste System

A total of 5.77×10^7 gallons (gal) of liquid waste was decontaminated by the Process Waste Treatment Complex (PWTC) - Building 3544 ion exchange system during calendar year (CY) 1999. This averaged to 110 gpm throughout the year. An additional 3.94×10^6 gal of liquid waste (average of 8 gpm throughout the year) was decontaminated using the zeolite treatment system due to periods of high Cesium levels in the influent wastewater. A total of 6.17×10^7 gal of liquid waste (average of 118 gpm throughout the year) was decontaminated at Building 3544 during the year. During the year, the regeneration of the ion exchange resins resulted in the generation of 8.00×10^3 gal of Liquid Low-Level Waste (LLLW) concentrate and 9.00×10^2 gal of LLLW supernate. See Table 1 for a monthly summary of activities at Building 3544. Figure 1 shows a diagram of the Process Waste Collection and Transfer System and Figure 2 shows a diagram of the Building 3544 treatment process. Figures 3, 4 5, and 6 show a comparison of operations at Building 3544 in 1997 with previous years. Figure 7 shows a comparison of annual rainfall at Oak Ridge National Laboratory (ORNL) since 1995.

A total of 1.83×10^8 gal of liquid waste (average of 348 gpm throughout the year) was treated at the PWTC - Building 3608. Of this amount, 1.79×10^7 gal was treated by the precipitation/clarification process for removal of heavy metals. Sixty-six boxes (6.34×10^3 ft³) of solid sludge generated by the precipitation/clarification process were removed from the filter press room. Building 3608 receives wastewater from Building 3544, the metals/nonmetals pumping station (collects wastewater from the 1505 and 2000 areas), the 190 pumping station (collects wastewater from the 4500 complex area), and the Melton Valley MV process waste collection tanks. Building 3608 removes particulates, heavy metals, and organics, as well as adjusts the pH of the wastewater, before discharge to White Oak Creek. In addition, the softening process (precipitation/clarification) for water requiring radiological treatment at Building 3544 is located at this facility. See Table 2 for a monthly summary of activities at Building 3608. Figure 8 shows a diagram of the Building 3608 treatment process. Figures 9 and 10 show a comparison of operations at Building 3608 in 1997 with previous years.

1.2 LIQUID LOW-LEVEL WASTE (LLLW) SYSTEM

The A2 and 2A2 evaporator systems operated normally during the year. A total of 4.39×10^5 gal of LLLW was processed through the A2 evaporator system and 3.16×10^5 gal of LLLW was processed through the 2A2 evaporator system. There was 13.25×10^3 gal of concentrate

transferred from the A2 system and 9.96×10^3 gal concentrate transferred from the 2A2 system to the waste storage tanks. Figure 11 shows a diagram of the LLLW Collection and Transfer System. See Table 3 for a monthly summary of activities at the evaporator systems. Figure 12 shows a graphical representation of the amount of concentrate presently stored at ORNL awaiting disposal. See Figure 13 (for a graphical comparison of the generation of LLLW at ORNL over the last five years) and Figures 14 through 27 for a comparison of the generation of LLLW by individual sources over the last five years.

1.3 GASEOUS WASTE SYSTEM

The gaseous waste system operated normally during the reporting period. Normal operations means that continuous ventilation service was provided to all customer facilities except during scheduled maintenance periods. A schematic of the Gaseous Waste System is shown in Figure 28.

2.0 UPGRADE AND SPECIAL PROJECT ACTIVITIES

Several upgrade activities were underway during the year. Personnel completed the Readiness Assessment for Building 7877 Triad Operations and began joint operations with Chemical Technology Division personnel during the year (see Section 2.2.1). Personnel also worked throughout the year to complete upgrades to the Data Acquisition System and Distributed Control System to meet Year 2000 Compliance (see Section 2.3). The upgrades to the Data Acquisition System were particularly challenging due to the system not having undergone any upgrades since 1987 and only one of the original programmers still being alive. Descriptions of the various activities are given in the following sections, with a month by month description of activities immediately following the project description.

Personnel continued efforts to maintain LGWO procedures as up-to-date, usable documents. There were several upgrades in documentation due to the work-force transition in early 1999 from Lockheed Martin Energy Research (LMER) to Bechtel Jacobs Company LLC (BJC) and preparations for the transition to a subcontractor in early January 2000. One hundred and six revisions were approved and issued during the year to existing LGWO procedures. One new procedure was issued and four procedures were canceled. Five document change directives were issued for LGWO procedures and an additional twenty-two procedures underwent their scheduled two-year review but did not require any revisions. Four revisions were issued for LGWO administrative guides and conduct of operations guides. Seventy-six new procedures for Instrumentation Maintenance personnel were issued after the existing Instrumentation and Controls procedures were revised to meet LGWO format requirements.

2.1 Process Waste (PW) System

No upgrades or special projects were performed during the reporting period.

2.2 Liquid Low-Level Waste System

2.2.1 Building 7877 Triad Operations (Cesium Removal, Out-of-Tank Evaporation (OTE) System, Solid-Liquid Separation (SLS) System)

Personnel completed modifications at Building 7877 for installation of the OTE and Cesium Removal Systems. Personnel also completed the installation of the SLS System (Building 7887) to assist personnel in preventing the transfer of suspended solids during transfers of supernate from Building 7830 to Building 7856 storage tanks. After installation, the facility operations underwent a successful 2 part Readiness Assessment by Bechtel Jacobs and Department of Energy - Oak Ridge Operations (DOE-ORO) personnel. The systems were then placed in service in May and continued batch campaigns throughout the year using different combinations of the three processes.

January

Plant and Equipment personnel continued installation of the Cesium Removal system at Building 7877 (LLLW Solidification System). Modifications to allow usage of the OTE and/or the Cesium Removal System as needed continued. LGWO personnel supported MK-Ferguson personnel entering the Building 7830 Pump/Valve Vault performing decontamination activities and collected the washdown water in the LLLW Tanker. The tanker's contents were then transferred to the LLLW Collection and Transfer System for future treatment.

March

LGWOP personnel assisted in the cleanup of Building 7877 and supported the flush of the SLS System suction line prior to Chem Tech personnel beginning cold testing of the new system. Personnel were preparing the facility for joint operation of the Cesium Removal and OTE Systems.

April

LGWOP personnel supported Chem Tech personnel in functional testing of the SLS System and in decontamination activities inside Building 7877. LGWOP personnel also supported MK-Ferguson personnel working in the Building 7830 Pump/Valve Vault by transferring the sump's contents to the LLLW tanker.

The independent readiness assessment team began review of the readiness evidence for Phase 1 (OTE/Cesium Removal) operations. Reviewers provided several comments to project personnel, who were hoping to resolve the comments during the first week of May.

May

LGWOP personnel supported Chem Tech personnel in functional testing of the SLS System and in decontamination activities inside Building 7877. Project personnel continued activities in preparation for the upcoming Cesium Removal/OTE campaign by completing procedure revisions (including procedure walkdowns). The internal review for Phase 1 activities was completed and formally presented to DOE-ORO reviewers on the afternoon of May 13th. Seven requests were made to expand the existing evidence files or to provide clarification on documentation to DOE-ORO personnel. Informal discussions were held on May 14th to complete these requests and the final closure evidence was scheduled to go to DOE-ORO personnel on Monday, May 17th to support startup on May 18th.

Received DOE-ORO approval on May 17th for Phase 1 operations to begin. Personnel from LGWOP and Chem Tech began operation of the Cesium Removal system on May 18th, with the treated effluent going to tank W-33 at the Melton Valley Storage Tanks Annex (Building 7856).

Personnel also began the internal review of Phase 2 (SLS System) operations. Several comments were provided to project personnel, and the project's review schedule was extended due to resource conflicts with the Gunite Tanks Readiness Assessment that was also underway. The DOE review was rescheduled for June 2nd.

Completed the first campaign using the Cesium Removal System on May 25th. Approximately 19,150 gallons of supernate from tank W-30 were processed thru the system, with approximately 7,750 gallons of treated supernate going to tank W-33 and 11,400 gallons going to tank W-34. On May 25th personnel then proceeded to begin the second campaign which included the use of the OTE System. Thru May 28th, personnel had transferred approximately 4,650 gallons from tank W-29 to Building 7877, with the concentrate from the treatment system going to tank W-34. Personnel were achieving an approximate 25% volume reduction in the supernate volume. Campaign operations were delayed on May 25th on day shift due to transfers from the Gunite Tanks project in Bethel Valley to the Melton Valley Storage Tanks. These transfers, scheduled to occur for 1-2 days each month, would require a shutdown of Triad operations during the transfer operations.

One operational problem during the first week was the failure of the transfer module pump at Building 7830 used to supply supernate to Building 7877. The pump was replaced by LGWOP Mechanical Maintenance personnel with a minimal impact on operations.

For Phase II operations using the SLS System, personnel completed the internal readiness assessment activities and provided the review files to DOE-ORO personnel for their evaluation. DOE-ORO personnel were scheduled to arrive on-site June 1 for personnel interviews and to hear a formal presentation from the BJC/LMER review team on June 2nd.

June

Completed the second campaign using the Cesium Removal System on June 4th (approximately 2 weeks ahead of the operating schedule). Personnel transferred a total of approximately 23,130 gallons from tank W-29 and approx. 1,070 gallons from tank W-30 to Building 7877, with the concentrate from the treatment system going to tank W-34. Personnel were achieving an approximate 20% volume reduction in the supernate volume.

For Phase II operations using the SLS System, DOE-ORO personnel arrived on-site June 1 for personnel interviews and heard a formal presentation from the BJC/LMER review team on June 2nd. The review evidence was well received by the DOE-ORO personnel, and only a few minor items required additional evidence to be provided. The closure evidence was given to DOE-ORO personnel on June 4th, with approval for startup expected on Monday, June 7th.

During the first week of June, operation of the SLS feed supply system with water showed evidence of a leak which was quickly located and repaired by the MK Ferguson work crew. Leak testing after the MKF repairs also revealed a problem with a pressure relief valve which was lifting from its seat prematurely. The supplier of the relief valve was able to locate a replacement valve, and arranged for testing and delivery in 3 days. The valve was installed and leak checked the day it was delivered on Friday, June 4.

Personnel received approval from DOE-ORO personnel to begin Phase II operations on June 7th and personnel placed the SLS system in service that day. Shortly after startup of Triad Campaign 3, two maintenance problems were encountered which required about 10 hours of down-time to address. The system was restarted on June 8 at 10:30 am and continued to operate with essentially no down-time until June 10th, when personnel had to shut down due to personnel having to begin a pressure test for the transfer from W-9 to the Melton Valley Storage Tanks (MVSTs). The SLS system was initially operated in total recycle until the quality of the filtrate was acceptable for further treatment by ion-exchange and evaporator systems. After about 9 hours of recycle operation, the filtrate was determined to be acceptable (< 100 Bq/mL gross alpha). All three processes were then operating in series and thru 6/25 personnel had transferred approximately 27,820 gallons from feed tank W-31. Approximately 9,749 gallons of LLLW were evaporated using the OTE system and the remaining 18,071 (approx.) gallons were transferred to tank W-34 at the MVST Annex (Building. 7856). Volume reductions increased to approximately 35.0% as the overall system was fine-tuned. Late on June 25th processing thru the SLS System was discontinued and personnel began campaign 4 using only the OTE System.

Operation of the OTE System (Triad Campaign 4) continued throughout the month. Thru July 2nd, personnel had processed approx. 8,570 gallons from tank W-29 and transferred approx. 4,339 gallons to tank W-35 at the Melton Valley Storage Tanks Annex (Building. 7856). Personnel were achieving a volume reduction of approx. 50.6%.

A request was made to revise the sampling plan for the spent Cesium Removal resin to take credit for accumulated process knowledge so that the overall costs of sampling could be decreased.

July

Operation of the OTE System Campaign IV was completed on July 15th. This campaign processed approx. 20,640 gallons from tank W-29 and transferred approx. 11,650 gallons to tank W-35 at the Melton Valley Storage Tanks Annex (Building 7856). Personnel achieved a volume reduction of approx. 43.6%. Personnel then decontaminated the treatment systems in preparation for some maintenance activities. After completion of the maintenance activities, personnel began Triad operations Campaign V during late July. By the end of the month, personnel had transferred approx. 4,430 gallons from tank W-26 and evaporated approx. 3,005 gallons. Approx. 1,425 gallons of concentrated LLLW supernate were transferred to tank W-35 at Building 7856.

August

Completed Triad operations Campaign V at the end of the month. Personnel had transferred approx. 16,810 gallons from tank W-26 and evaporated approx. 10,083 gallons (volume reduction of 60.0%). Approx. 6,727 gallons of concentrated LLLW supernate were transferred to storage at Building 7856.

September

Personnel continued Campaign VI throughout the month using a combination of the OTE process and Cesium Removal System. During Campaign VI, personnel have processed a total of 12,550 gallons from tank W-30 and transferred approx. 7,665 gallons to W-34. A total of 4,885 gallons of evaporator overheads have been collected for transfer to the Process Waste Collection and Transfer System for future treatment.

October

Completed Triad Campaign VI during the month. Assisted Chem Tech personnel in clearing a plugged line and in replacing a relief valve in the Triad operations system.

November

Chem Tech personnel continued maintenance activities on the Triad System throughout the month. The first campaign of FY2000 was begun near the end of the month.

December

Due to a clogged standpipe for the level float in the OTE System, personnel will not resume campaign operations until January 10th. Efforts to clear the standpipe have met with limited success. Personnel have been able to operate the system for only a few hours before the clogging reoccurs and interferes with the level float. During this time personnel will fabricate and install a new spool piece fabricated with a stand pipe which will enter into the top of the shell and will be used to measure the level in the shell directly using the existing float system.

2.2.2 Tanks C-1 and C-2 Sludge Mobilization Activities

Personnel successfully cleaned out existing sludges from tanks C-1 and C-2 during early 1999 using the AEA Technologies sludge mobilization system. Personnel then decontaminated the equipment and relocated part of the system to Building 7856, where an AEA sludge mobilization system is scheduled to be installed in tank W-35 by mid-2000.

January

Issued a Configuration Change Memo to document field changes in the upcoming AEA Sludge Mobilization Project for the C-1 and C-2 Tanks. The Readiness Assessment process continued throughout the month. An all day presentation was given to the Readiness Board and all have been actively working "go dos" since. Provided LGWO orientation training to AEAT personnel.

February

Completed the DOE-ORO Readiness Assessment and mixing operations began on February 3. The first mixing cycle was completed with the transfer of approximately 16,4700 gallons of suspended sludges from tank C-2 to W-23 on March 8. Personnel then transferred approximately 33,000 gallons from W-23 to tanks W-27 and W-28 at Building 7830 (Melton Valley Storage Tanks) on March 9. Personnel then transferred approximately 1,000 gallons from C-1 to C-2 and began the second mixing cycle. At the conclusion of the second mixing cycle, personnel transferred approximately 8,782 gallons from C-2 to W-23 on March 11, and then transferred approximately 16,212 gallons from W-23 to W-27. Personnel estimated that approximately 80% of the sludge had been removed from C-2. The third mixing cycle was completed with the transfer of approximately 3,728 gallons of suspended sludges from tank C-2 to W-23 on March 16. Personnel then transferred on March 17 approximately 9,710 gallons from W-23 to tanks W-24 and W-27 at Building 7830 (Melton Valley Storage Tanks). Personnel then transferred approximately 600 gallons of acidic waste from Building 3544 to C-2 to assist in the dissolving of remaining sludges in the tank. Personnel completed the final transfer from tank C-2 of approximately 4,000 gallons to tank W-23. Personnel then moved to tank C-1 to begin sludge removal operations. Personnel completed the first transfer from C-1 of approx. 12,000 gallons to W-23 and began the second cycle in the tank. Personnel transferred approximately 20,000 gallons from W-23 to W-24 (located at the Melton Valley Storage Tanks - Building 7830). Personnel also transferred approx. 35,000 gallons from tank W-25 and W-26 at Building 7830 to W-35 at the Melton Valley Storage Tanks Annex (Building 7856) in preparation for additional transfers from W-23. Personnel were transferring suspended sludges from the C-tanks to W-23, where the existing AEA mixing system was used to maintain the sludges in suspension until they could be transferred to the Melton Valley Storage Tanks (these tanks are being used to consolidate the storage of sludges from throughout the LLLW System).

March

Mixing operations to remove the sludge in tank C-1 continued throughout early March. Personnel completed the second transfer on March 1 from tank C-1 of approximately 5,442 gallons to tank W-23. Personnel then added approx. 120 gallons of acidic waste to C-1 to assist in the removal of sludge. Personnel transferred approximately 10,623 gallons on March 2 from W-23 to W-25 (located at the Melton Valley Storage Tanks - Building 7830). On March 5 personnel completed the third transfer from tank C-1 of approximately 2,075 gallons to tank W-23. Personnel then

proceeded to transfer approximately 3,489 gallons from W-23 to W-26 at Building 7830. Personnel added additional acid to tank C-1 prior to restarting sludge mobilization activities. Personnel completed the fourth (final) transfer on March 8 from tank C-1 of approximately 2,665 gallons to tank W-23. Personnel then transferred approximately 3,861 gallons on March 8 from W-23 to W-26 (located at the Melton Valley Storage Tanks - Building 7830) and 926 gallons from W-23 to W-37 (located at the Melton Valley Storage Tanks Annex - Building 7856). Personnel then added approx. 200 gallons of acid to tank W-23 prior to restarting sludge mobilization activities in this tank (to remove residual sludges that may have settled out during the past month of operations). After evaluation, personnel added an additional 100 gallons of acid to assist in the sludge removal. Personnel completed the final transfer of approximately 2,520 gallons from W-23 to W-25 (located at the Melton Valley Storage Tanks - Building 7830) on March 15. The final transfer from W-23 revealed approximately 250 gallons of sludge remaining in the tank. Personnel then began assisting in the demobilization of the AEA personnel and rinsed out the demister on the C-1/C-2 skid to assist in decontamination activities. After seven flushes, the radiation levels were reduced from 2.5 R/hr on the air handling system component to single digit mR/hr levels. Reusable components were then transported to Melton Valley, for the upcoming installation at the Melton Valley Storage Tanks Annex (Building 7856), with the exception of the jet pumps. Upon determination of the contamination associated with the pumps, they could then be transported to an appropriate storage area in Melton Valley.

Met with personnel from AEAT and BJC to review the scope of the upcoming work to install sludge mobilization equipment at the Building 7856 (Melton Valley Storage Tanks Annex) facility.

April

Demobilization activities continued during the month. Reusable components were transported to Melton Valley, for the upcoming installation at the Melton Valley Storage Tanks Annex (Building 7856), with the exception of the jet pumps. Upon determination of the contamination associated with the pumps, they could then be transported to an appropriate storage area in Melton Valley.

2.2.3 Miscellaneous

September

Inactive Tank Transfer Support - Reviewed and discussed the design of a new manhole cover for the W-23 LLLW Evaporator Service Tank. In order to allow the transfer of slurry from the GAAT project, as well as other FFA projects to the Melton Valley LLLW Collection Tanks, special fittings are required. The manhole cover is being designed to provide these fittings.

2.3 WOCC Data Acquisition System (DAS) and Distributed Control System (DCS)

2.3.1 DCS Year 2000 Software Concerns

Personnel worked throughout the year to upgrade the DCS in preparation for the Year 2000 (Y2K) date rollover. Upgraded hardware and software were received and personnel were trained on the new system in early 2000. The software for the Process Control Units was upgraded in stages, due to the usage of a new software package that was several releases ahead of the previous software (procured in 1994). Personnel had to regenerate all of the process control graphic displays since the old displays were not compatible with the new software. Several new features were also added to take advantage of improvements in the system. By the end of the year, successful Y2K tests had been performed and personnel were trained on the replacement systems.

January

Three of the four system consoles being used to monitor Building 7856 were upgraded to Y2K compliance. The replacement DCS systems purchased from Bailey Controls were received and in the process of being checkout against shipping invoice at the end of the month. Classes were scheduled for 4 LGWO personnel to take during the months of January through March. The firmware upgrade arrived in partial shipments. A schedule of events for the upgrade was being prepared. Personnel also completed some preliminary work in converting the existing OIS database into a format that Composer/Conductor will recognize. At the end of the month the systems were being relocated to Building 2649 for hookup and testing.

February

Personnel completed setup of the new consoles with Composer (field equipment programming software) and Conductor (operator console programming software). Personnel received all EPROM's for upgrade of field hardware in the near future. Personnel completed the initial restructuring of the software associated with the Process Control Units used throughout the Distributed Control System. The software was then transmitted to personnel attending an off-site training course, who completed the initial conversion of the software for use with the new "Composer" software. Personnel estimated that this completed approximately 50% of the software activities associated with the Process Control Unit upgrades required to ensure Y2K compliance. Personnel would begin debugging the errors in the compilation next month while other personnel continued training on programming the new operator consoles (this programming will begin in early March). This upgrade was the first upgrade to the existing Distributed Control System software in over five years.

March

Composer/Conductor PC systems were completed and set up in Building 2649 to configure and test. Three LGWOP personnel have completed training by the vendor. Database and CAD drawing were converted and loaded onto the Composer system. These new systems were connected to the existing fiber optic Infi-90 communications loop and personnel verified monitoring of data point from existing field hardware. Symbols, color templates, and graphics programming would begin in April.

April

Software updates were installed on the Conductor Server and Redundant Server. At the end of the month personnel were working on the OPC Server portion which will control and monitor Building 7856. This would replace the existing DCS System monitoring Building 7856 and provide better reliability. Also installed Windows NT Server on both the Conductor Server and the Redundant Conductor Server.

May

Conductor NT Server and the redundant server were loaded with the current NT Conductor software and the tag database from the existing Bailey Controls system. Graphics and database tags were being developed for Building 7856 on a priority basis so that personnel can migrate from the increasingly unreliable system being used for remote monitoring operations. Two LGWOP personnel made additions to the program for the Allen Bradley programmable logic controller (PLC) at Building 7856 to send signal conditioned data to Conductor NT Workstation OPC tag database. Personnel expected to have this facility in service on the new consoles by June 30, 1999.

June

The Conductor NT server and redundant server had the tag database from the existing DCS system installed. Personnel had been focusing on Building 7856 due to the increasing instability in that facility's monitoring software. The graphic displays and database were approaching completion, and were expected to be completed by the end of July. The other facilities monitored by the DCS should be converted on a much quicker schedule since they did not use a third party programmable logic controller for monitoring and control.

July

Completed conversion of the graphic displays and database for Building 7856 from the existing DCS serving this facility. This conversion was given priority due to the increasing failures

associated with this system. Personnel would begin conversion of the other facilities in early August with completion scheduled by late September.

August

Personnel completed the initial conversion of graphic control screens for the following facilities: Buildings. 2099, 2175, 2537, 2568, 2600, 3092, 3544, 3608, 7961, 7966, and the Process Waste Collection and Transfer System. At the end of the month personnel still had to convert the Building 2649 graphic control screens and develop the trend displays for the system. Help screens had been constructed for approximately ½ of the graphic control screens. Personnel are planning to complete the initial conversion and provide a system for operator comments by the end of September. Efforts would then focus on verifying graphic displays and control functions as well as ensuring consistency between the screens built by different programming personnel.

September

Personnel successfully completed Y2K testing on the upgraded DCS. Personnel were then concentrating on cleaning up the new display screens for operating personnel in preparation for training in the near future.

October

Personnel continued shakedowns of the new display screens for operating personnel in preparation for training in the near future. Personnel also began markups of operating procedures (estimated to be approximately 30 total) requiring revisions due to the system upgrade for Y2K compliance.

November

Personnel continued shakedowns of the new display screens for operating personnel in preparation for training in the near future. Personnel also began revisions of operating procedures (estimated to be approximately 30 total) due to the system upgrade for Y2K compliance.

December

Personnel completed shakedowns of the new display screens for operating personnel in preparation for training in the near future. Personnel also completed revisions of operating procedures (24 in total) due to the system upgrade for Y2K compliance. On Dec. 27th, personnel shut down the old Operator Interface Station consoles for the DCS and placed the replacement consoles in full operation. The consoles were replaced to meet Y2K requirements. Personnel have been using the replacement consoles for the past 2 months alongside the old consoles during a training and shakedown period.

2.3.2 DAS Year 2000 Software Concerns

Personnel worked throughout the year to complete the Y2K upgrades for the DAS. Personnel contracted with the surviving original programmer to assist in the conversion. The process was complicated by the fact that no upgrades had been performed on the software since 1986 and the hardware was also several generations old. Hardware and software compatibility problems were worked throughout the year. By the end of the year, successful Y2K tests had been conducted and the upgraded system was placed in service.

February

Completed the loading of system software upgrades for the DAS after the vendor completed conversion of all previous data. The system was then undergoing testing for functionality. Possible problems might still exist as it was found that the original system's vendor incorporated modified changes in standard DEC instructions for various drivers. These changes could have unexpected results on the new platform. At the end of the month personnel were evaluating each subroutine to determine the extent of customized drivers.

March

System had all software loaded and system seemed to be running with no errors; however, personnel had been unable to determine why command and display graphics did not seem to be working. Personnel began a line-by-line examination of the suspected subroutine Fortran code. If this examination was unsuccessful, personnel would begin arrangements to obtain the surviving original programmer of the DAS.

April

Continued efforts to trouble-shoot the Fortran code for the DAS, however personnel were having no success in identifying the cause of the problem. Personnel continued efforts to obtain the services of one of the original programmers for the DAS.

May

A requisition was placed to bring in the original surviving programmer for the display screens due to problems in migrating his original code to the Y2K compliant system.

June

The surviving original programmer for the DAS was subcontracted and arrived on site to assist personnel in resolving problems with the Y2K upgrades that have been underway. Some graphic

display problems were resolved, but conflicts with program overlays resisted attempts to solve them. Personnel were in discussion with the vendor who assisted in the software conversion earlier in the year.

July

LGWOP and the subcontractor resolved the majority of problems associated with the graphic displays. Personnel were working with the operating system vendor to resolve the other problems. Personnel were planning for a year 2000 rollover test in late August or early September.

August

Personnel completed efforts to modify the system program to provide graphic displays on the Y2K compliant system. Personnel also resolved problems with the keyboard function key interface. At the end of the month personnel were checking the program for any other problems prior to conducting a system Y2K test using Data Concentrator 6 in early September.

September

Personnel performed several Y2K tests on the DAS during the month. By the end of the month, personnel declared that the Y2K software revisions were completed, but several modifications to the code due to updated hardware interfaces with the software were identified. Fine-tuning of the software after upgrading the hardware and software by approximately 15 years was expected to be required.

October

Personnel completed several modifications to the code due to updated hardware interfaces with the software that were identified last month. Fine-tuning of the software after upgrading the hardware and software by approximately 15 years was also begun.

November

Personnel completed several modifications to the code due to updated hardware interfaces with the software. Fine-tuning of the software after upgrading the hardware and software by approximately 15 years was also continued.

December

Personnel completed several modifications to the code due to updated hardware interfaces with the software. Fine-tuning of the software after upgrading the hardware and software by

approximately 15 years was also continued. Due to problems with the tape drives, replacement tape drives were ordered and installed. This improved the system's performance and eliminated the multiple failures per week that had been occurring.

2.3.3 DCS System Monitoring Building 7856

This system was a source of continuing problems throughout the year. The system continued to crash unexpectedly and the manufacturer finally ended any effort to support this product. Personnel made patches to keep the system operational until it was finally replaced with the Y2K upgrades for the main Distributed Control System (see Section 2.3.1).

January

Several problems arose during month. The system was not functioning properly. A process program "DbClient" was failing when two or more machines were booted. Upgraded UNIX operating system for ORNLALF3 to UNIX 4.0D. Two systems (ORNLALF1 and ORNLALF2) were booting up running the control system software, however problems with startup scripts were still a concern. Startup scripts had been written for a SUN SPARC Workstation and not a DEC Workstation. Unix Operating Systems are somewhat different from a SUN SPARC workstation and could be causing some of the problems. Personnel did not upgrade the operating system for ORNLALF4 (located at Building 7856) until personnel get some word back from the vendor on the status of startup scripts for a DEC workstation. Personnel had also not received any suggestions from the vendor for "DbClient."

Configured one system administrator's home system to communicate to the Building 7856 DCS. This would enable personnel to monitor system software, reboot, transfer files, etc. from home instead of requiring a person to come in on off-shifts during a system crash. Operators at the WOCC would only have to manually connect the modem in the WOCC control room to the phone line when remote access is needed.

February

Several problems arose during the month. The system was not functioning properly. A process program "DbClient" continued to fail when two or more machines were booted. All systems were upgraded to UNIX 4.0D in an effort to eliminate the problem, however the problem continued. No response was received from the software vendor's Technical Support personnel. This system was scheduled to be replaced in the next 6 months as the DCS Y2K upgrades were completed.

Personnel also had to replace the optical disk on console ORNLALF3 after the optical platter was filled. Since these platters are two sided, personnel simply turned the platter over and remounted

disk. Personnel also ordered a new disk and formatted each disk. Personnel also mounted a disk in console ORNLALF4 to archive it's data.

March

Several problems arose during the month. The system was not functioning properly. A process program "DbClient" was failing when two or more machines were booted. All systems were upgraded to UNIX 4.0D in an attempt to resolve this problem, but no success was achieved. Vendor personnel have been extremely unresponsive. Personnel began preparations to migrate these systems to the Y2K upgraded Bailey Controls Distributed Control System which can be better supported. Personnel also removed console ORNLALF2 from service. This redundant machine was no longer needed with the migration to Bailey DCS hardware/software underway.

2.3.4 Miscellaneous

January

WOCC control room furniture – The replacement furniture was ordered and was due to arrive around February 8th.

February

WOCC control room furniture - Equipment was received and was in the process of being scheduled for installation.

PC Support - Installed CD-ROM read/write units on two PC's. Responded to a PC virus sent through email. Placed order to upgrade one LGWOP PC to work as an engineering workstation for the DCS upgrades being installed.

April

WOCC Furniture Improvements - The furniture was assembled in the maintenance bay at Building 2649 and was ready to be installed at the WOCC in early May.

May

WOCC Furniture Improvements - The new furniture was installed at Building 3130 during the month.

2.4 Occurrence Reporting

July

ORO-BJC-X10WSTEMRA-1999-0002, Personnel Contamination on Company-Issued Shoes in Building 2568 at X-10, July 16, 1999, off-normal occurrence.

October

ORO-BJC-X10WSTEMRA-1999-0003, Legacy Contamination Found at Building 7966 at ORNL, October 13, 1999, off-normal occurrence.

December

ORO-BJC-X10WSTEMRA-1999-0004, Worker Contamination at South Tank Farm, December 8, 1999, off-normal occurrence.

2.5 Facility Authorization Basis

Personnel continued efforts to maintain LGWO Authorization Basis documents current. The new Safety Analysis Report and Technical Safety Requirements documents for Building 7877 operations were approved in the spring and replaced several older documents. A revised draft Safety Analysis Report for the LLLW System was submitted to DOE-ORO in January based on informal review comments. At the end of the year, no comments on the draft document had been received from the DOE reviewers. Personnel also continued to perform all required annual reviews of documents and to develop Unreviewed Safety Question Determination (USQD) Change Packages to evaluate changing activities within LGWO.

January

Issued the USQD Change Package for Tanks C-1 and C-2, Building 2531, Operation of the AEAT Fluidic Pulse Jet Mixing System (WM-LGWO-USQD-1998-16, Rev. 0) for controlled distribution.

Presented the revised LLLW System Safety Analysis Report and Technical Safety Requirements to the Laboratory Facility Authorization Basis Board. This revision, which was in response to DOE-ORO reviewer comments, was approved with a few editorial comments. The revised documents were then transmitted to the DOE-ORO for review/approval on Jan. 29th.

Issued the Revised Building 7877 Safety Analysis Report and Technical Safety Requirements to the Laboratory Facility Authorization Basis Board. This revision was in response to DOE-ORO

reviewer comments and to incorporate changes being made by Chem Tech personnel to the treatment systems to support upcoming campaigns.

Completed the annual submittal of USQDs to the Office of Nuclear Safety for transmission to DOE-ORO. The LGWO generated 18 USQDs during CY1998, with 16 of the USQDs being implemented during the year.

February

Completed the annual review of 18 nonnuclear LGWOP facility safety documents. No changes were identified during the review.

A meeting was held on 2/5/99 between LGWOP and DOE-ORO Safety personnel to discuss the 1/29/99 resubmittal of the LLLW System Safety Analysis Report and Technical Safety Requirements documents. The changes made to address the DOE reviewers' comments were reviewed and favorably received by the DOE-ORO Safety personnel. Personnel then transmitted the revised Safety Analysis Report and Technical Safety Requirements for Building 7877 (LLLW Solidification Facility) to DOE-ORO personnel for review/approval.

Received comments on revision 9 of the LLLW System Operational Safety Requirements and revision 2 of the Building 7856 Technical Safety Requirements documents from the Laboratory Facility Authorization Basis Board and issued the document for approval. These page changes were then transmitted to DOE-ORO personnel for review/approval. These revisions were being made to assist in demonstration projects planned at Building 7877 later this year.

March

Issued the following documentation through the LGWOP Documentation Management Center:

- USQD Change Package for Evaporator Service Tanks, Building 2537, TRU Sludge Mixing Demonstration and Transfer (WM-LGWO-USQD-1997-10, Rev. 1)
- Change Package for Collection Tanks T-1 and T-2, Building 7567, Access Upgrade (WM-LGWO-USQD-1999-2, Rev. 0)
- USQD Change Package for Connection of the new Transfer Pipeline from the South Tank Farm (WM-LGWO-USQD-1999-6, Rev. 0).

Continued work on resolving DOE-ORO reviewer comments on the Safety Analysis Report and Technical Safety Requirements for Building 7877 in preparation for several demonstration projects by EM-50 and EM-30 later this year. One comment concerning access controls to back road

areas and possibly redefining the location of accident exposures to off-site workers has been elevated as an issue affecting all ORNL facilities and will require resolution prior to approval of the documents. A meeting was held with the DOE-ORO reviewers on March 19th to discuss planned comment resolutions. No problems were identified with LGWOP's approach and the document revision began at the end of the month.

April

Issued the following Unreviewed Safety Question Determination change packages as controlled documents:

- WM-LGWO-USQD-1999-3, Rev. 0 "USQD Change Package for LLLW Collection Tank WC-20, Building 7569, Access Upgrade"
- WM-LGWO-USQD-1999-5, Rev. 0 "USQD Change Package for Operation of the LLLW Solid-Liquid Separation System"
- WM-LGWO-USQD-1999-6, Rev. 0 "USQD Change Package for Connection of the new Transfer Pipeline from the South Tank Farm"
- WM-LGWO-7877-USQD-1999-1, Rev. 0 "USQD Change Package for Out-of-Tank Evaporation/Cesium Removal Systems Procedure Revisions"

Received the approved LLLW System Operational Safety Requirements (WM-LGWO-LLLW-OSR, Rev. 9) and the Building 7856 Technical Safety Requirements (WM-LGWO-7856-TSR, Rev. 2) from DOE-ORO. These page changes were made to support long duration, small flow rate transfers such as those conducted by the Waste Triad operations. Personnel began modification of LGWO procedures to implement these changes.

May

Approved Nuclear Criticality Safety Approval #46, Minor Modification B to support the upcoming Waste Triad operations at Building 7877.

Received the approved Safety Analysis Report (WM-LGWO-7877-SAR, Rev. 0) and Technical Safety Requirements for Building 7877 (WM-LGWO-7877-TSR, Rev. 0) operations. These documents, which were the outcome of the Safety Analysis Report Upgrade Program begun 9 years ago, were implemented on May 13 to support the Triad activities preparing to begin operations at Building 7877. As a result of these documents being approved, the following documents were retired as active Facility Authorization Basis documents

- Safety Study - Liquid Low-Level Waste Solidification Facility, ORNL/ENG/SS2, Rev. 2

- Limiting Conditions Document for the Liquid Low-Level Waste Solidification Project, WM-LGWO-7877LCD, Rev. 3
- Hazard Screening for Building 7877 operations, HS/7877/F/1/R2
- Technical Safety Requirements - LLLW Solidification Facility, Building 7877, Out-of-Tank Evaporation System, TSR/7877-WMRAD/SSE-R1
- System Safety Analysis - LLLW Solidification Facility, Building 7877, Out-of-Tank Evaporation System, SSA/7877-WMRAD/SSE-R1
- Technical Safety Requirements (Building. 7877) - Cesium Removal Project, TSR/7877-WMRAD/SSE-2/R0
- System Safety Analysis (Building. 7877) - Cesium Removal Project, SSA/7877-WMRAD/SSE-2/R0
- Basis for Interim Operation - Liquid Low-Level waste Solidification Facility, Building 7877, ORNL/WM-LGWO/7877/BIO/R0
- USQD for the LLLW Solidification Facility, Building 7877, USQD/7877-WMRAD/SSE-2/R0
- USQD for Removal of the Concentrate Tank Vent Condenser Vent Line HEPA Filter, WM-LGWO-USQD-7877-1997-3, Rev. 0
- USQD Screening for new sample data for the MVST's and BVEST's, WM-LGWO-USQD-7877-1997-4, Rev. 0
- USQD for modifications to the OTE System in support of future campaigns, WM-LGWO-USQD-7877-1997-2, Rev. 0

Implemented the revised LLLW System Operational Safety Requirements (WM-LGWO-LLLW-OSR, Rev. 9) and the Building 7856 Technical Safety Requirements (WM-LGWO-7856-TSR, Rev. 2) to support the Triad activities preparing to begin operations at Building 7877.

Approved a revision to the USQD Change Package for Transfer of the South Tank Farm Sludges to the Melton Valley Storage Tanks (WM-LGWO-USQD-1999-1, Rev. 1).

Approved the following authorization basis documents:

- USQD Change Package for the Change in the Operating Contractor, Radiation Protection Program, and Occurrence Reporting, WM-LGWO-USQD-1999-10, Rev. 0.
- USQD Screening Change Package for CAM Interlock Bypass during Sluicing, WM-LGWO-7877-USQDSCREEN-1999-2, Rev. 0
- USQD Screening Change Package for Addition of Pressure Switch at W-6 Test Pit to Intervalley Transfer Line Annulus, WM-LGWO-USQDSCREEN-1999-7, Rev. 0
- USQD Screening Change Package for Addition of Valve HV-443 to SLS Process Water Supply, WM-LGWO-USQDSCREEN-1999-11, Rev. 0

June

Submitted the revised Operational Safety Requirements for the LLLW System (WM-LGWO-LLLW-OSR, Rev. 10) to the Laboratory Facility Authorization Basis Board (LFABB) for review and approval prior to submittal to DOE-ORO. This draft removed controls for inactive LLLW tanks that had recently been incorporated in an Auditable Safety Analysis for inactive tank systems at ORNL. At the end of the month, approval from the LFABB had been received and the document was transmitted to BJC safety personnel for approval prior to transmittal to DOE-ORO for review/approval.

Approved a revision to the USQD Change Package for Transfer of the South Tank Farm Sludges to the Melton Valley Storage Tanks, WM-LGWO-USQD-1999-1R2 at the request of South Tank Farm personnel.

July

Transmitted the revised Operational Safety Requirements for the LLLW System (WM-LGWO-LLLW-OSR, Rev. 10) to DOE-ORO personnel for review/approval. This draft removed controls for inactive LLLW tanks that had recently been incorporated in an Auditable Safety Analysis for inactive tank systems at ORNL.

Approved a revision to the USQD Change Package for Transfer of the South Tank Farm Sludges to the Melton Valley Storage Tanks, WM-LGWO-USQD-1999-1, Rev. 3 to support upcoming transfer activities.

August

Approved the Unreviewed Safety Question Determination Change package for Cesium Removal System usage of Material Monitoring for High Integrity Container Volume Control (WM-LGWO-7877-USQD-1999-3).

Retired the Preliminary Hazard Screenings from LGWO Project document control for the following tanks that were recently transferred to the Surveillance and Maintenance organization WC-5, WC-6, WC-8, WC-14, WC-19, W-12, and 3002-A.

September

Received the Safety Evaluation Report and approval of the Liquid Low-Level Waste System Operational Safety Requirements (WM-LGWO-LLLW-OSR, Rev. 10). Revised the affected procedures so the Operational Safety Requirements revision could be implemented approximately 12 calendar days after receipt. This revision deleted Buildings 7567 and 7569 from the scope of

the LLLW System so that they could be transferred to the Surveillance and Maintenance Program for inactive tanks.

Approved Nuclear Criticality Safety Approval (NCSA) No. 46, Minor Modification C to transfer the Nuclear Criticality Safety Approval for the active LLLW System from the ORNL program to Bechtel Jacobs.

Approved NCSA No. 60, Minor Modification A to transfer the Nuclear Criticality Safety Approval for sludge transfers and storage in the active LLLW System from the ORNL program to Bechtel Jacobs.

Approved USQD Screening Change Package for removing check valve internals and bypassing feed tank feed ring at the Building 7877 Triad operations (WM-LGWO-7877-USQDSCREEN-1999-4, Rev. 0).

October

Approved USQD Change Package for adding flushing connections to the Cesium Removal transfer pumps, WM-LGWO-7877-USQD-1999-5.

November

Approved the following safety documents for LGWO Project activities

- Preliminary Hazard Screening - LGWOP Maintenance Support Offices (Building 7505), ORNL/WM-LGWO/7505/PHS/R0
- Preliminary Hazard Screening - LGWOP Maintenance Support Shop (Building 7506), ORNL/WM-LGWO/7506/PHS/R0
- Preliminary Hazard Screening - LGWOP Storage Building (Building 3518A), ORNL/WM-LGWO/3518A/PHS/R0
- USQD Change Package for Removal of the Continuous Air Monitors from Buildings 2531 and 7830, WM-LGWO-USQD-1999-12
- USQD Change Package for Pipe Connections for the Evaporator Service Tank W-23, Building 2537, WM-LGWO-USQD-1999-13
- USQD Change Package for Adding Coriolis Meter to SLS Filtrate Recirculation Line, WM-LGWO-USQD-1999-15

2.6 3039 Stack Area

No activity reported for the reporting period.

2.7 Liquid Waste Certification Official

January

A total of five variance requests were worked during the month. These were:

- VR98-12: Written to accept an ongoing (short term) solution of an acid etching solution generated in the Metals and Ceramics Division.
- VR98-29: Written to accept an hot cell window cleaning solution
- VR98-30: Written to accept a legacy waste solution. (This variance was subsequently canceled at the generator's request.)
- VR99-01: Written to accept a waste solution being generated within the Metals and Ceramics Division. (This variance was also subsequently canceled.)
- VR99-02: Written to accept an ongoing solution of waste being generated from operations at the High Flux Isotope Reactor.

Two generators had waste solutions containing glycol. Both were evaluated and it was determined that they could be sent to the Sewage Treatment Plant for disposal.

Evaluated analytical information on waste solutions from four other generators. Upon review it was determined that each solution met the WAC for one of the LGWO systems; therefore, no variances were required.

Performed a training class for Liquid Waste Generators at ORNL.

Reviewed and provided comments on a proposed "Store-for-Decay" procedure.

Documented the amount of RCRA regulated waste discharged to LGWO systems during last year and forwarded the information to Environmental Compliance personnel.

February

An MOU (#MOU99-01) was initiated to allow for the discharge of Ethylene Glycol into the Sewage Treatment Plant (STP).

Prepared and approved a revision to the LGWOP operating systems WAC. The primary intent of this revision is to more clearly detail training requirements and to give additional guidance to generators who send wastes containing F-listed RCRA constituents.

Met with personnel from the Nuclear Criticality Safety section to discuss concerns over a VR to dispose of legacy wastes into the LLLW system. Following this meeting it was requested from the Waste Assay and Examination Facility to provide additional characterization information on fissile isotopes in the waste.

March

One variance request (#XVR970401) was worked during the month. The variance was granted an extension.

Collected the Annual LLLW reports from ORNL Liquid Waste - Generator Interface Equivalents.

Updated the list of ORNL LW-GIEs and sent a copy to the Waste Management Training Section per the requirements of ORNL-WM-008.

Evaluated analytical information on waste solutions from four generators. Upon review it was determined that each solution met the WAC for one of the LGWO systems; therefore, no variances were required.

Prepared and issued the 1st Quarter (FY) 1999 Liquid Waste Certification report to the Laboratory Waste Certification Official.

Two Memorandums of Understanding (MOUs) were worked during the month. These were:

- MOU# 98-16: This MOU was written last year to allow for disposal of small quantities of several different waste solutions. Approval was given after the generator provided additional input from the original request.
- MOU# 98-15: This MOU, which was initiated last November, was cancelled. Through discussions with the Generator Interface working this MOU, it was decided to cancel it since the generator had not generated the waste and it was unsure if it ever would be generated.

A sample was taken from the zeolite columns at Seep D and sent to the Chemical and Analytical Sciences Division for analysis. The results of this analysis will be used as the basis for characterization of the Seep D zeolite resin over the next year.

Reviewed and provided comments to the Environmental Management Group on a Scope of Work Document to remediate Tank W1-A.

Reviewed and provided comments on a new Web based training module for liquid waste generators at ORNL.

Provided Life Cycle Baseline waste volume estimates to Environmental Management personnel for all secondary waste streams originating from the LGWOP

Worked with LM and BJC Nuclear Material Accountability personnel to give approval for the transfer of LM waste containing Special Nuclear Material to the LGWOP system.

Assisted in making training arrangements for a new LW-GIE for the Analytical Sciences Division. The new LW-GIE will replace the retiring LW-GIE from this division.

Reviewed and provided comments to the sampling and analysis plan for the upcoming Triad Projects.

April

Two variance requests were worked during the month. They were:

- VR99-01: Initiated at the first of the year for disposal of some metal etching waste to the LLLW system.
- VR99-03: Written to cover upcoming GAAT Project waste water solutions.

Revised the ORNL Liquid Waste - Generator Interface Equivalent and the ORNL Liquid Waste Generator lists and forwarded to Training personnel in accordance with the requirements of ORNL-WM-008.

Evaluated analytical information on waste solutions from four generators. Upon review it was determined that each solution met the WAC for one of the LGWO systems; therefore, no variances were required.

Collected samples from tanks W-22 (at Building 2537) and L-11 (at Building 3544) and submitted them for analysis. This is done annually to provide characterization data for LLLW Waste streams generated by the LGWOP.

Revised MOU# 99-01 to allow for the addition of 10 gallons of propylene glycol. The MOU was originally written to accept 250 gallons of ethylene glycol at the ORNL STP.

Provided input to Environmental Safety and Health personnel to address compliance of the LGWOP operating systems with 40CFR68, Clean Air Act requirements.

Provided guidance to personnel in the Chemical and Analytical Sciences Division for analysis to be performed on samples recently delivered for analysis. The results of the analysis will be used as characterization data for waste streams originating from the LGWOP.

Provided input to EC personnel on new sanitary drain labels that were being ordered. Drain labeling was required by procedure EPM 1.2. The new labels would accurately reflect current titles and positions.

May

Worked two variance requests during the month. They were:

- VR99-03: Initiated last month in support of upcoming GAAT project work, was approved.
- VR99-04: Written for a nitric acid containing wastewater from the HFIR area, was initiated and approved.

Revised the list of ORNL Liquid Waste Generators to reflect a change for one of the Chemical and Analytical Sciences Sections and forwarded to Training personnel in accordance with the requirements of ORNL-WM-008.

Evaluated analytical information on waste solutions from four generators. Upon review it was determined that each solution met the WAC for one of the LGWO systems; therefore, no variances were required.

Evaluated and compared the discharges at outfall X-12 to the limits established by the DOE's Derived Concentration Guidelines.

Provided support to an employee in the EC group who is writing a WAC for the ORNL STP. In addition to providing requirements for waste going to the STP, the WAC will also contain a link to the LGWOP WAC for discharging of liquids to its treatment facilities.

Met with personnel from the EC group to discuss requirements of regulations in relation to the discharge of PCBs to the LGWOP operating systems. There is concern that the regulated levels may be more restrictive than originally believed. This issue is being elevated to the DOE field office for interpretation.

Performed a surveillance on an LMER LW-GIE from the Chemical and Analytical Sciences Division. The surveillance (#NV-S-X10-99-04) is one that is periodically conducted to help assure those participating in liquid waste disposal activities do so in compliance with the program described in LMER and BJC procedures.

Completed the Liquid Waste Quarterly Report for the months of January thru March and distributed it to the Laboratory Certification Official (LCO) and others after the final logsheets were received from two Generator Interface Equivalents. The report is done in accordance with requirements imposed by the Nevada Test Site WAC and the ORNL Implementing Procedure (ORNL-WM-008).

June

Worked one variance request during the month. It (#VR99-05) was written to allow acceptance of wastewater generated from a heat exchanger project at the HFIR.

Provided final review and comments on the draft WAC for the ORNL STP. This WAC is being prepared by Office of Environmental Protection personnel and should now be ready for issue.

Reviewed the requirement of adding adsorbent to filter press sludge at Building 3608. A checklist was developed to facilitate this operation.

Evaluated a proposed waste stream from personnel working on the planned Spallation Neutron Source project. Waste for the analysis provided would be classified as LLLW. A Sr-90 equivalent evaluation was also done on the waste to ensure it was within the WAC limit for that requirement.

Assisted a generator from the Chemical and Analytical Sciences division who is beginning a project which will generate waste scintillation solutions. Information was given to the generator on acceptable containers and acceptable scintillation formulas.

Worked one MOU during the month. The MOU (MOU98-09), an ongoing MOU was extended for another year.

Provided flow rate data information to personnel from the BJC Strategy and Regulatory Analysis group on waste waters treated through the LGWOP systems over the past 7 months.

Evaluated analytical information on waste solutions from four generators. Upon review it was determined that each solution met the WAC for one of the LGWO systems; therefore, no variances were required.

At the suggestion of personnel in the Chem Tech Training section, reviewed the current training requirements of liquid waste generators and LW-GIEs. It was determined that two modules (one for the generators and one for the LW-GIEs) are so similar that they can be combined into one module. This will simplify training in that there will now be one less class to track, it can be accomplished without lengthening the current module and it will provide a slightly larger spectrum of waste certification responsibilities to those taking the class.

Reviewed data to determine the amount of fissile isotopes disposed in the LLLW system. Documented the information and forwarded this to supervision so an annual report could be provided to the Office of Nuclear Safety. All disposals were found to be well within the limits established for fissile isotopes.

Attended a meeting to review the required data for the ongoing waste volume, Life Cycle Baseline (LCB) project. This project is tasked with developing waste volume forecasts for future years for all waste streams on the ORR. The purpose of this meeting was to better define data requirements needed to complete the LCB submittals and develop a schedule for when the submittals will be required.

Reviewed and provided comments on the revised Sampling and Analysis Plan for the Building 7877 Cesium Removal operations at ORNL.

Received approval which will allow consideration for disposal and treatment of wastes containing small amounts of mercury at the PWTC. Variance Requests will be used to document and evaluate all requests for these disposals. This approval resolves a long standing request for clarification on disposal regulations of "newly generated" mercury at the ORNL.

July

Two variance requests were worked during the month. They were:

- VR98-24: Initiated in November of last year, it was written to accept a waste solution containing trace amounts of mercury from the Environmental Science Division was finally approved. Resolution of an ongoing issue (see last item for the month of June) permitted closure of this variance.
- VR99-06: Written and approved to accept several small bottles of LLLW waste from the Metals and Ceramics Division.

Evaluated analytical information on waste solutions from two generators. Upon review it was determined that each solution met the WAC for one of the LGWO systems; therefore, no variances were required.

Reviewed and provided comments on the revised Sampling and Analysis Plan for the Building 7877 Cesium Removal operations at ORNL.

Participated in a surveillance performed by the ORNL Waste Certification Official (WCO). The surveillance was performed on documentation related to the disposal of boxes of PWTC-3608 filter cake. All requested information was provided to the WCO and a favorable review is expected.

Initiated and approved VR99-06 for disposal of several small bottles of LLLW waste. The waste was generated by personnel from the Metals and Ceramics Division and contained small amounts of several heavy metals.

Walked down the facilities managed by the LGWOP to inventory B-25 boxes and drum waste storage containers. Approximately 100 containers were located and most were able to be traced to the original requester/generator. Personnel from the BJC-Legacy Waste Operations at ORNL are currently working to ensure proper ownership is assigned to each box.

August

Three variances were worked during the month. They were:

- VR99-07: Written to accept a solution with slightly elevated nitrates. (Final approval pending.)
- VR99-08: Written to accept a waste solution being generated from the TANK Focus Cesium Removal Project.
- VR98-24: Written last year to allow for disposal of research waste water from the Environmental Sciences Division, two extensions were granted this month.

Evaluated analytical information on waste solutions from two generators. Upon review it was determined that each solution met the WAC for one of the LGWO systems; therefore, no variances were required.

Prepared and issued the 3rd Quarter (FY) 1999 Liquid Waste Certification report to the Laboratory Waste Certification Official.

Reviewed three BJC waste certification related documents (WM-A-2010, -B-2011 and BJC/OR-57R1) and provided responses to the responsible document sponsor.

Reviewed analytical data of wastewater from two tanks being remediated under the FFA project. Direction was given to the project manager on how to dispose of the wastewater.

Provided support to the 4411 Well project by performing calculations of potential increases in Sr-90 concentrations that would result in filtercake at the PWTC-3608.

Provided submittals to BJC waste tracking personnel of projected waste generation rates of the LGWOP (both solid and liquid) for FY'2000.

MOU# 99-03 was initiated and approved to accept a solution of propylene glycol for disposal into the STP.

Initiated a request with Compliance personnel to do a quarterly sampling and analysis run on filter cake generated from Process Waste Operations. This was done to satisfy a commitment to the Nevada Test Site.

September

Six variances were worked during the month. They were:

- VR99-03: Written and approved earlier in the year to allow acceptance of waste water resulting from the GAAT project, clarification was issued this month on the allowable solids concentrations.
- VR99-05: Initiated earlier in the year to accept a cleaning solution from a heat exchanger clean out at the HFIR was also approved.
- VR99-06: Written to allow for the disposal of machining fluids generated in the Metals and Ceramics Division. (This variance was reviewed extensively by Environmental Compliance personnel and was approved next month.)
- VR99-08: Initiated last month to accept waste from the Tank Focus Cesium Removal project was approved.
- VR99-09: Written to allow acceptance of a research related solution, this variance was initiated and approved this month.
- XVR-090897: Written in 1997, this variance was reinstated to allow acceptance of wastewater in support of the 4411 Well project.

Revised the LW-GIE list to add a new representative from the Physics Division; and revised the ORNL Liquid Waste generator list to reflect changes in the Chem Tech and Physics Divisions. The lists were forwarded to training personnel in accordance with the requirements of ORNL-WM-008.

October

Memorandum of Understanding #MOU99-07, written to allow acceptance of a waste solution generated in the Metals & Ceramics Division was initiated and approved.

Met with personnel from the EC Group to determine proper drain labeling practices at ORNL.

Evaluated analytical information on waste solutions from two generators. Upon review it was determined that each solution met the WAC for one of the LGWO systems; therefore, no variances were required.

Met with oversight and certification personnel from LMER to discuss interface responsibilities as pertains to liquid waste certification at ORNL due to the new M&I contract. Protocol on handling the interface was established.

November

Two variances were worked during the month. They were:

- VR99-05: Written to allow acceptance of waste water from the HFIR, the variance was reinstated to accept additional solutions.
- VR99-10: Written to allow acceptance of waste from the Tank W-1A remediation project, this variance was initiated and approved.

Evaluated analytical information on waste solutions from one generators. Upon review it was determined that the solution could not be accepted at ORNL.

Continued support of the 4411 Well project. Following weeks of preparation, pumping of water from the well to the PWTC was initiated. During this run, analytical data is being gathered on the filter cake (a secondary waste stream at the PWTC) to determine the impacts of the 4411 Well water.

The FY 4th quarter FY'99 Quarterly Report was issued and distributed to the Waste Certification Official. This report, is issued to document the quantities of waste reported via generator Low

Level Waste Log Sheets and compared to actual volumes received at the headworks. The report also documents any variances written during the quarter.

Initiated a process which will keep a running total of fissile isotopes which are discharged to the LGWOP LLLW system. The process will keep track of these isotopes from waste streams which, if the total quantity was large enough would require "denaturing", however, due to their small quantity denaturing will not be required.

December

Three variances were worked during the month. They were:

- VR98-17: Written in 1998 to allow acceptance of area well waters, it was determined that the variance was still active.
- VR99-05: Written earlier in the year to allow acceptance of a heat exchanger cleaning solution from the HFIR, this variance had to be canceled due to impacts it was having at the PWTC and at the X-12 outfall.
- VR99-12: Written to allow acceptance of a solution high in chlorine and sulfates, from the Environmental Sciences Division, the variance was initiated and approved.

Memorandum of Understanding #MOU99-08, written to allow the acceptance of some propylene glycol in the ORNL STP was initiated and approved.

Sent notice to all LW - GIEs of LGWOP preparations for Y2K readiness. These plans include working down inventories to the maximum extent. LW-GIEs were requested to evaluate their processes over the next couple of weeks and provide responses so it could be assured that LGWOP could support ORNL missions and accomplish its Y2K readiness goals.

Continued support of the 4411 Well project. Influent waste water sampling data and analytical data from filter cake generated at the PWTC-3608 while 4411 Well water is running through the system was provided, as well as, calculations to determine the potential acceptability of this waste at the Nevada Test Site and Envirocare.

Provide Life Cycle Baseline input to LCB project personnel. This input consists of estimates of waste generated at LGWOP facilities over the life of the facilities.

Reviewed and approved training for ORNL Liquid Waste Generators. The training will become part of ORNL's GET module.

2.8 Command Media

January

Approved revisions to two LGWO Conduct of Operations guides: WM-LGWO-CO8, Rev. 5 and WM-LGWO-CO9, Rev. 4.

Approved revisions to the LGWO procedure for Transfers from Tanks C-1 and C-2 and Sumps C-3 and C-4 (WM-LGWO-611.2.3, Rev. 6).

February

Approved a revision to the LLLW Evaporator Operations procedure (WM-LGWO-611.2.5).

March

Approved revisions to the following seven LGWOP procedures based on comments during their two year review:

- Electrical Systems, WM-LGWO-603.3.3, Rev. 2
- Cation-Exchange Water Softener, WM-LGWO-602.2.7, Rev. 4
- Nitric Acid Storage and Transfer System, WM-LGWO-602.2.8, Rev. 8
- Sodium Hydroxide Storage and Transfer System, WM-LGWO-602.2.11, Rev. 8
- Bethel Valley Process Waste System, WM-LGWO-610.2.2, Rev. 13
- Radiation Monitors, WM-LGWO-610.3.2, Rev. 5
- Radiation Monitors, WM-LGWO-611.3.2, Rev. 5

Cancelled the Melton Valley Process Waste System procedure (WM-LGWO-610.2.5) during the month.

April

Approved revisions to the following seven procedures and one conduct of operations guideline:

- Record Management and System Documentation for the PWTC - Building 3544, WM-LGWO-602.6, Rev. 3
- Caustic Metering System Operation, WM-LGWO-603.2.1.2, Rev. 6
- Record Management and System Documentation for the PWTC Collection System, WM-LGWO-603.6, Rev. 3
- Record Management and System Documentation for the PWTC - Building 3608, WM-LGWO-604.6, Rev. 5

- Shift Turnover Procedure, WM-LGWO-606.2, Rev. 10
- General Sampling Procedures for LLLW Tanks, WM-LGWO-608.7.1, Rev. 4
- Maintenance Work Procedure, WM-LGWO-606.4, Rev. 4
- Control of Equipment and System Status, WM-LGWO-CO8, Rev. 6

Cancelled procedure WM-LGWO-608.13 (Out-of-Tank Evaporation System). This operation is being combined in the Waste Triad project procedures being developed by Chem Tech Division personnel.

May

Approved the following drawing packages for controlled distribution

- Building 2568 - Instrumentation Drawings, Rev. 1
- Building 2568 - HVAC Drawings, Rev. 0
- Building 2568 - Piping Drawings, Rev. 0
- Building 2568 - Architectural, Civil, and Structural Drawings, Rev. 0
- Building 2568 - Electrical Drawings, Rev. 0
- LLLW Evaporator Facility - Electrical Drawings (Evaporator System 2A2, Tanks W-21, W-22, and W-23), Rev. 0
- LLLW Evaporator Facility - Instrumentation Drawings - Evaporator System 2A2, Tanks W-21, W-22, and W-23, Rev. 3
- Building 7856 - Instrumentation Drawings, Rev. 1
- Waste Operations Control Center (Building. 3130) - Instrumentation Drawings, Rev. 0

Approved revisions to the following procedures to implement the revised LLLW System Operational Safety Requirements (OSR) Rev. 9 and the Building 7856 Technical Safety Requirements, Rev. 2

- Transfers to the MVST Facility, WM-LGWO-611.2.6, Rev. 7
- Building 7856 Operations, WM-LGWO-610.2.9, Rev. 2

Approved the following revisions to LGWOP operating procedures based on comments from their 2-year reviews:

- Melton Valley Process Wastewater Hot Tanks and Sump Operation, WM-LGWO-603.2.1.4, Rev. 3
- L-1 Clarifier, L-15 Filter Press and Chemical Addition Systems, WM-LGWO-602.2.2, Rev. 11
- Building 3518 Acid Neutralization System, WM-LGWO-602.2.9, Rev. 5
- PWTC - Building 3544 Radiation Monitor Checks, WM-LGWO-602.3.1, Rev. 3
- Manhole 190 Diversion Box and Pump Station, WM-LGWO-603.2.2.7, Rev. 4
- 3544 Wet Well, WM-LGWO-603.2.2.8, Rev. 3

June

Approved revisions to nine LGWOP procedures based on comments during their 2-year review:

- Diesel Generator System for the Process Waste Collection and Transfer System, WM-LGWO-603.3.4, Rev. 4
- Building 3518 Transfer to Process Wastewater Treatment Complex - Building 3608, WM-LGWO-603.2.2.9, Rev. 4
- Building 3608 Caustic Storage and Feed Operations, WM-LGWO-604.2.1, Rev. 8
- Dual Media Filters, WM-LGWO-604.2.6, Rev. 7
- Effluent Holding/Backwash Operation, WM-LGWO-604.2.9, Rev. 9
- Electrical System, WM-LGWO-604.3.3, Rev. 5
- Process Waste Tanker, WM-LGWO-607.1, Rev. 3
- Air System Failure, WM-LGWO-604.4.5, Rev. 5
- Electrical System Failure, WM-LGWO-604.4.3, Rev. 7

Approved revisions to three additional LGWOP operating procedures during the month:

- WOCC Operator Duties, WM-LGWO-609.2.1, Rev. 23
- Bethel Valley LLLW System, WM-LGWO-610.2.1, Rev. 19
- Configuration and Equipment Change Procedure, WM-LGWO-606.5, Rev. 6

Approved Document Change Directives for the following LGWOP training procedures:

- Selection, Qualification, and Continuing Training, WM-TR-102R3-DCD1
- WMRAD Service Subcontractor Safety and Health, WM-TR-103R2-DCD1
- Data Base Recordkeeping Maintenance for WMRAD, WM-TR-105R3-DCD1
- Training Examinations and Remediation, WM-TR-107R1-DCD1
- Conduct of Classroom and On-the-Job Training, WM-TR-109R1-DCD1

Approved a revision to the Building 2099 Electrical Drawings set (Rev. 2).

July

Approved revisions to the following procedures:

- WOCC Operator Duties, WM-LGWO-609.2.1, Rev. 23
- Bethel Valley LLLW System, WM-LGWO-610.2.1, Rev. 19
- Configuration and Equipment Change Procedure, WM-LGWO-606.5, Rev. 6
- Record Management and System Documentation for the WOCC, WM-LGWO-609.6, Rev. 3
- Bethel Valley LLLW System, WM-LGWO-610.2.1, Rev. 20

- Melton Valley Storage Tanks Facility, WM-LGWO-610.2.4, Rev. 7
- Cell Ventilation procedures for the LLLW Evaporator Facility, WM-LGWO-611.3.1, Rev. 10

Completed the 2-year review of the following fifteen procedures during the week. No revisions were identified during the review.

- Logbook Entry Procedure, WM-LGWO-606.1 Rev. 6
- Liquid Low-Level Waste Dumpster tank Operating Procedure, WM-LGWO-608.2, Rev. 7
- LLLW 1,000-Gallon Tanker Transporting and Draining Operating Procedure, WM-LGWO-608.3, Rev. 6
- LLLW 1,000-gallon Tanker Filling Operating Procedure, WM-LGWO-608.4, Rev. 5
- Bottled LLLW Pickup and Transport, WM-LGWO-608.5 Rev. 6
- Leak Testing Pressurized Pipelines, WM-LGWO-608.11, Rev. 1
- Melton Valley Ventilation and Compressor Systems, WM-LGWO-610.3.1, Rev. 6
- Cooling Tower Operations, WM-LGWO-611.2.4, Rev. 10
- ORR Cell Ventilation System Operation, WM-LGWO-612.2.1, Rev. 7
- 3500 Cell Ventilation System Operation, WM-LGWO-612.2.2, Rev. 8
- 4500 Cell Ventilation System Operation, WM-LGWO-612.2.3, Rev. 8
- 3025/3026 Cell Ventilation System Operation, WM-LGWO-612.2.4, Rev. 7
- Isotope Area Cell Ventilation System Operation, WM-LGWO-612.2.5, Rev. 7
- Diesel Generator Operation, WM-LGWO-612.3.1, Rev. 6
- Record Management and System Documentation for the 3039 Stack Ventilation System, WM-LGWO-612.6, Rev. 5

Approved a revision to the Building 2099 Electrical Drawings set (Rev. 2).

August

Approved the following revisions to LGWOP procedures:

- Ion Exchange System and L-5 Clearwell, WM-LGWO-602.2.4, Rev. 10
- Evaporation System and Transfers to the LLLW System, WM-LGWO-602.2.5, Rev. 8
- Sulfuric Acid Storage and Transfer System, WM-LGWO-602.2.12, Rev. 7
- Melton Valley Process Wastewater Hot Tanks and Sump Operation, WM-LGWO-603.2.1.4, Rev. 4
- Bethel Valley Influent Pumping Station, WM-LGWO-603.2.2.1, Rev. 4
- Equalization Tanks and Transfer Pumps, WM-LGWO-604.2.3, Rev. 16
- Shift Turnover Procedure, WM-LGWO-606.2, Rev. 11
- WOCC Operator Duties, WM-LGWO-609.2.1, Rev. 24
- Bethel Valley LLLW System, WM-LGWO-610.2.1, Rev. 21
- Cooling Tower Operations, WM-LGWO-611.2.4, Rev. 11

Approved the first revision to instrumentation maintenance procedures since Instrumentation Maintenance personnel were transferred to LGWOP Operational Check of Acid/Caustic Tank Control Valve System, WM-LGWO-614.1, Rev. 0.

Approved revisions to the following drawing series for controlled distribution

- Valve Boxes 1, 1A, 1B, 2, 2A and Interconnecting Pipeline - Instrument Drawings, Rev. 2
- Valve Boxes 1, 1A, 1B, 2, 2A and Interconnecting Pipeline - Civil Drawings, Rev. 2
- Building 2099 - Civil Drawings, Rev. 1
- LLLW Evaporator Facility - General, Electrical, and Instrument Drawings (Phase II Work), Rev. 1
- Melton Valley Storage Tanks (Building 7830) - Piping Drawings, Rev. 1

Approved the baseline entry of the Building 3544 - Instrumentation Drawings set for controlled distribution.

Approved the baseline entry of Building 3518 Drawings to the Document Management Center for controlled distribution.

September

Approved revisions to ten LGWO Project procedures for operations during the month:

- 1505 Pumping Station, MH208 DB, and F-4005 Operation, WM-LGWO-603.2.2.6, Rev. 5
- Sulfuric Acid Storage and Feed Operations, WM-LGWO-604.2.2, Rev. 10
- WOCC Operator Duties, WM-LGWO-609.2.1, Rev. 25
- Melton Valley LLLW System, WM-LGWO-610.2.3, Rev. 12
- Melton Valley Storage Tanks Facility, WM-LGWO-610.2.4, Rev. 8
- Transfers to the MVST Facility, WM-LGWO-611.2.6, Rev. 8
- Building 2099 MCS, WM-LGWO-610.2.6, Rev. 8
- Building 7966 Operations, WM-LGWO-610.2.8, Rev. 2
- Building 7856 Operations, WM-LGWO-610.2.9, Rev. 3
- Bethel Valley Influent Pumping Station, WM-LGWO-603.2.2.1, Rev. 5

Approved the following drawing series for controlled distribution:

- Building 3544 Electrical Drawings, Rev. 0
- LLLW Evaporator Facility - Electrical Drawings for Phase 1 Work, Rev. 0
- Hot Off-gas Condensate Tank (F-2175) Drawings, Rev. 1

October

Provided information to personnel from Hanford on LGWO Project procedure handling and usage requirements as well as information on Facility Authorization Basis requirements for LLLW tank transfers. This is to assist their personnel in a benchmarking process they are conducting.

Approved the PWTC - Bethel Valley Collection System - Electrical Drawings, Rev. 0 drawing series for controlled distribution. This series combined drawings for the Building 2600 (Process Waste Storage Tanks) and the Volume Reduction Piping Modification project into a single series for ease of use. Personnel also added drawings for the Process Waste Monitoring Stations to the series.

Approved the PWTC - Bethel Valley Collection System - Piping and Flow Drawings collection for controlled distribution. This consolidated and updated several previously controlled drawing collections.

Also approved the following drawing series collections for controlled distribution:

- Hot Off-gas Condensate Tank (F-2175) Drawings, Rev. 1
- LLLW Evaporator Facility - Electrical Drawings Phase 1 Work (includes evaporator A2 System and Tanks C-1 & C-2), Rev. 0

Approved the new procedure for Development and Usage of Work Packages, WM-LGWO-606.12 for controlled distribution. This developed a formal work control package for non-proceduralized activities within LGWO.

Approved revisions to the following LGWO procedures for controlled distribution:

- Disposal of Bottled Liquid Low-Level Waste, WM-LGWO-608.6, Rev. 8
- Post Maintenance Testing, WM-LGWO-606.11, Rev. 2

November

Completed a review of LGWO Project's 602, 603, 604, 606, 609, and 610 series procedures to identify any changes related to the upgrades to the Distributed Control System that are underway. Markups of affected procedures are being prepared and personnel are also using this review to verify the new graphic displays contain the proper commands and signals as required for the procedure operations.

Completed the 2-year annual review of the following procedures, with no comments or revisions identified as being required

- General Sampling Procedure, WM-LGWO-606.3, Rev. 3

- Operation of the LR-56 LLLW Tanker, WM-LGWO-608.12, Rev. 4
- Building 2649 Operations, WM-LGWO-610.2.7, Rev. 4
- Building 7966 Utility Systems, WM-LGWO-610.3.5, Rev. 1
- Transfers from Tanks W-21, -22, -23, WM-LGWO-611.2.2, Rev. 5
- Miscellaneous Operations (at the LLLW Evaporator Facility), WM-LGWO-611.2.7, Rev. 0
- Independent Verification, WM-LGWO-CO10, Rev. 4

Approved a new procedure for LGWO Project for controlled distribution:

- Calibration of Endress+Hauser Analyzer for Relative Humidity RH-Plus 2250, WM-LGWO-614.2, Rev. 0

Approved revisions to the following LGWO Project procedures for controlled distribution:

- L-1 Clarifier, L-15 Filter Press and Chemical Addition Systems, WM-LGWO-602.2.2, Rev. 12
- Polishing Filters, WM-LGWO-602.2.3, Rev. 6
- Ion Exchange System and L-5 Clearwell, WM-LGWO-602.2.4, Rev. 11
- Evaporation System and Transfers to the LLLW System, WM-LGWO-602.2.5, Rev. 9
- Cation-Exchange Water Softener, WM-LGWO-602.2.7, Rev. 5
- Bethel Valley Process Wastewater Storage Tanks Intertank Transfers, WM-LGWO-603.2.2.5, Rev. 5
- Caustic Storage and Feed Operations, WM-LGWO-604.2.1, Rev. 9
- Equalization Tanks and Transfer Pumps, WM-LGWO-604.2.3, Rev. 17
- Shift Turnover Procedure, WM-LGWO-606.2, Rev. 12
- Bethel Valley Process Waste System, WM-LGWO-610.2.2, Rev. 14

Cancelled two procedures during the month:

- Analytical Procedures and Routine Operations, WM-LGWO-602.2.10, Rev. 11
- Analytical and Sampling Procedures, WM-LGWO-604.2.11, Rev. 11

December

Approved the Management Plan for the Liquid and Gaseous Waste Operations Project, WM-LGWO-MP, which replaced the old Management Plan for the Waste Management Operations Division.

Approved a revision to the LGWO Shift Turnover Procedure, WM-LGWO-606.2, Rev. 12 for controlled distribution.

Approved a revision to the procedure for Submitting a Document for Entry into the Document Management System (DMS), WM-LGWO-102, Rev. 0 to incorporate changes in organizational structure since the previous revision was issued 2 years ago.

Approved revisions to the following five LGWO Project procedures for controlled distribution

- Bethel Valley LLLW System, WM-LGWO-610.2.1R22
- System Management Procedure for the Data Acquisition System, WM-LGWO-609.2.3R3
- Distributed Control System, WM-LGWO-606.7R3
- Building 2099 MCS, WM-LGWO-610.2.6R9
- Building 2099 MCS Utility Systems, WM-LGWO-610.3.3R3

Approved the following 74 Instrumentation Management procedures for controlled distribution. These were revised from the old Instrumentation and Controls Division procedures to update the current LGWO Project organizational structure and to delete out-of-date references.

- Operational Checks and Calibration of STD7200 Flow Computer, WM-LGWO-614.25
- Calibration of Action Instruments, Model 4300, Voltage to Current Converters, WM-LGWO-614.26
- Calibration of Current to Current Converters, WM-LGWO-614.27
- Calibration Procedure for Action Instruments Model 4300 Current to Voltage Converters, WM-LGWO-614.28
- Calibration Procedure for Action Instruments Model 4300 Current to Current Converters, WM-LGWO-614.29
- Calibration of Frequency to Current Converters, WM-LGWO-614.30
- Calibration of Voltage to Current (E to I) Converters, WM-LGWO-614.31
- Calibration of M-system Model JFX Linearizer, WM-LGWO-614.32
- Calibration of Pressure to Current Converters, WM-LGWO-614.33
- Calibration of Current to Pressure Converters, WM-LGWO-614.34
- Calibration of Pressure Gauges, WM-LGWO-614.35
- Calibration of Pressure Indicator/Gauges, WM-LGWO-614.36
- Calibration of Magnehelic Gauges, WM-LGWO-614.37
- Calibration of Foxboro Model 7601SB Single Station Micro Indicator, WM-LGWO-614.38
- Calibration of Photohelic Gauges, WM-LGWO-614.39
- Electronic Calibration and Source Checkout of Particulate Alpha Radiation Monitoring Systems at 3029, 3039, and 7503 Stacks, WM-LGWO-614.40
- Electronic Calibration and Source Checkout of Particulate Beta-gamma Radiation Monitoring Systems at 2026, 3020, 3039, and 7503 Stacks, WM-LGWO-614.41
- Routine Maintenance and Quarterly Checkout of Gaseous Waste Monitors at 2026, 3020, 3039, and 7503 Stacks, WM-LGWO-614.42

- Verification of Detector Efficiency for Continuous Gamma Radiation Monitors, WM-LGWO-614.43
- Calibration Procedure for Count-rate-meter (CRM) Models Q-3020A and Q3020A-2531, Alarm Module Q-3021A and Meter Module Q-3023, WM-LGWO-614.44
- Calibration of Sierra Monitor Corporation Model 5100 Gas Monitoring System, WM-LGWO-614.45
- Operational Test of TSA Systems Limited Model VM-250SP Portal Monitor, WM-LGWO-614.46
- Calibration of Robertshaw Model 185-a Level Monitors, WM-LGWO-614.47
- Calibration of Ronan, Model X80, RTD Three-wire Transmitters, WM-LGWO-614.48
- Calibration of Digital Panel Meters, WM-LGWO-614.49
- Calibration of Dixson Programmable Bargraph Panel Meters, WM-LGWO-614.50
- Calibration of Signet Scientific Model 8510 Flow Meter, WM-LGWO-614.51
- Calibration of Fischer-Porter Model 50XM1000 Magnetic Flowmeter, WM-LGWO-614.52
- Calibration Procedure for Electronic Recorders, WM-LGWO-614.53
- Calibration of Pneumatic Recorders, WM-LGWO-614.54
- Calibration of Drexelbrook 401-1000 Series Current Relays, WM-LGWO-614.55
- Calibration of Pressure/electrical Switches, WM-LGWO-614.56
- Calibration of Endress Hauser LTC 1220 Capacitance Level Transmitters, WM-LGWO-614.57
- Calibration of L&n Model 7082 pH Transmitter, WM-LGWO-614.58
- Calibration of Smar Model Ld301 Intelligent Pressure Transmitter, WM-LGWO-614.59
- Calibration of Mts Systems Model LT420 Analog Level Transmitter, WM-LGWO-614.60
- Calibration of Krohne Model IFS5000 Flow Transmitter, WM-LGWO-614.61
- Calibration of Honeywell Model 924 Smart Transmitter, WM-LGWO-614.62
- Calibration of Drexelbrook Series 508 Two Wire Level Transmitter, WM-LGWO-614.63
- Calibration of Thermocouple Input Temperature Transmitters, WM-LGWO-614.64
- Calibration of Rosemount Model 3051 Smart Pressure Transmitters, WM-LGWO-614.65
- Calibration of Vaisala Model 230 (Series) Humidity Transmitter, WM-LGWO-614.66
- Calibration of Pneumatic and Electronic Differential Pressure Transmitters, WM-LGWO-614.67
- Calibration of Valvcon Electronic Valve Positioner, WM-LGWO-614.68
- Calibration of Valvcon Electro-pneumatic Valve Positioner, WM-LGWO-614.69
- Verification of Moore Industries Model Mds I/O Equation Station, WM-LGWO-614.70
- Operational Check of a Saab Model 294 Radar Tank Gauge, WM-LGWO-614.71
- Functional Test of Stacks 3039, 7920, and 7930 Duct Radiation Monitors, WM-LGWO-614.72
- Operational Tests of the Liquid Low-level Waste Evaporator Facility Instrumentation, WM-LGWO-614.73

- Operational Check of a Saab Model 294 Radar Tank Gauge at Building 7856, WM-LGWO-614.78
- Operational Check of Fluid Components International Models GF90, AF88/89 & MT86 Flowmeters, WM-LGWO-614.75
- Operational Check of a Rosemount Model 244P Temperature Transmitter, WM-LGWO-614.74
- Operational Check of Vacuum Relief Valve on Central Off-gas System in the 3039 Stack Area, WM-LGWO-614.76
- Checkout of the Interlocks at Bldg 7856, WM-LGWO-614.77
- Calibration Procedure for Laboratory pH Analyzers, WM-LGWO-614.7
- Calibration of L&n Model 7084 pH Analyzer/Controller, WM-LGWO-614.8
- Calibration Procedure for Barnstead Thermolyne Deionizers, WM-LGWO-614.9
- Calibration Procedure for Myron L Company Model EP10 Conductivity Meter, WM-LGWO-614.10
- Calibration of Signet Model 9859 Conductivity Analyzer, WM-LGWO-614.11
- Calibration of Teledyne Model 102 Combustible Gas Analyzers, WM-LGWO-614.12
- Calibration of MSA Model 20 Combustible Gas Indicator, WM-LGWO-614.13
- Calibration of General Monitors Combustible Gas Analyzer, WM-LGWO-614.14
- Calibration of Rochester Instrument Systems Model ET-1215 Dual Input Voltage/current Alarms, WM-LGWO-614.15
- Calibration of Rochester Instrument Systems Model ET-1214 Single Input Voltage/current Alarms, WM-LGWO-614.16
- Calibration of Single Input Current Alarms, WM-LGWO-614.17
- Calibration Procedure for Moore Thermocouple Alarm Trip Model TCA/J-MV/SX1/117AC[EX] Located in the 3039 Stack Area, WM-LGWO-614.18
- Calibration Procedure for Sorteberg Control Corp. Model U, Type D, Pneumatic Analog Computer, WM-LGWO-614.19
- Calibration Procedure for Drexelbrook 506-4000 Series Multipoint Level Controls, WM-LGWO-614.20
- Calibration of Foxboro 130 Series Pneumatic Control Controller, WM-LGWO-614.21
- Calibration of Watlow Model 988 Temperature Controller, WM-LGWO-614.22
- Calibration of Foxboro Model 135T Manual Controller, WM-LGWO-614.23
- Calibration of the ORNL/Q6585 Count Rate Meter, WM-LGWO-614.24
- Calibration of Resistive Temperature Detector (RTD) Temperature Transmitters, WM-LGWO-614.5
- Functional Test and Sensitivity Adjustment of Q2330 Liquid Level Alarm, WM-LGWO-614.6
- Calibration of Watlow Controls, Model 945, Microprocessor-based Control Unit, WM-LGWO-614.3

Approved the following revisions to 24 LGWO Project procedures for controlled distribution to reflect recent upgrades to the Distributed Control System for Y2K compliance

- Caustic Metering System Operation, WM-LGWO-603.2.1.2R7
- Melton Valley Influent Wet Wells Operation, WM-LGWO-603.2.1.3R3
- Melton Valley Process Wastewater Hot Tanks and Sump Operation, WM-LGWO-603.2.1.4R5
- Melton Valley Cold Tanks and Sump Operation, WM-LGWO-603.2.1.5R3
- Bethel Valley Influent Pumping Station, WM-LGWO-603.2.2.1R6
- BV Storage Tanks and Sump Operation, WM-LGWO-603.2.2.2R5
- Bethel Valley to Melton Valley Transfer, WM-LGWO-603.2.2.4R6
- Manhole 190 Diversion Box and Pump Station, WM-LGWO-603.2.2.7R5
- 3544 Feed System, WM-LGWO-602.2.1R8
- Evaporation System and Transfers to the LLLW System, WM-LGWO-602.2.5R10
- Acid Fume Scrubber, WM-LGWO-602.2.6R7
- Building 3518 Transfer to Process Wastewater Treatment Complex-Building 3608, WM-LGWO-603.2.2.9R5
- 3544 Wet Well, WM-LGWO-603.2.2.8R4
- Sulfuric Acid Storage and Feed Operations, WM-LGWO-604.2.2R11
- Equalization Tanks and Transfer Pumps, WM-LGWO-604.2.3R18
- F-1007 Clarifier System, WM-LGWO-604.2.4R9
- Filter Press Operation, WM-LGWO-604.2.5R14
- Dual Media Filters, WM-LGWO-604.2.6R8
- Air Stripper Operation, WM-LGWO-604.2.7R8
- Granular Activated Carbon Columns, WM-LGWO-604.2.8R9
- Effluent Holding/backwash Operation, WM-LGWO-604.2.9R10
- F-1006 Clarifier System Operation, WM-LGWO-604.2.12R3
- Building 7966 Operations, WM-LGWO-610.2.8R3
- Building 7966 Utility Systems, WM-LGWO-610.3.5R2

2.9 Documentation Management Center

February

Assumed responsibility for Documentation Management after the transfer at the beginning of the month from Lockheed Martin Energy Research to Bechtel Jacobs LLC.

March

- Processed 10 documents for controlled distribution.
- Processed 1 procedure cancellation.
- Received 66 level 3 documents for storage (primarily vending literature, operating and maintenance manuals, completed checksheets).

- Provided backup support to Legacy Waste DMC personnel.
- Began efforts to relocate all LGWOP documentation to Building 3127 in preparation for the physical split of the documentation management system database next month. Also relocated Legacy Waste records to Building 3047. LGWOP records included approximately 60 file cabinets of information.
- Recycled several containers of non record material from the Melton Valley Access Request program.

April

- Processed 12 documents for controlled distribution.
- Processed 1 procedure cancellation.
- Received 5 level 3 documents for storage (primarily vending literature, operating and maintenance manuals, completed check sheets).
- Provided backup support to Legacy Waste DMC personnel during vacations.
- Completed efforts to relocate all LGWOP documentation to Building 3127 in preparation for the physical split of the documentation management system database next month. Also relocated Legacy Waste records to Building 3047. LGWOP records included approximately 60 file cabinets of information.
- Completed the split of the documentation management system database and relocated the software and database on a server for the LGWOP. Also installed the LGWOP self-assessment program software and the personnel training scheduling software on this server.

May

- Processed 29 documents for controlled distribution.
- Processed 12 document cancellations.
- Received 99 level 3 documents for storage (primarily vending literature, operating and maintenance manuals, completed checksheets).
- Provided backup support to Legacy Waste DMC personnel during vacations.
- Began preparations to transfer files for completed Line Item and General Plant Projects to Laboratory Records for long-term storage. Approximately 30 file boxes were approved for transfer at the end of the month.
- Began preparations to transfer several boxes of files to the Environmental Restoration organization for facilities they have assumed responsibility for.

June

- Processed 10 documents for controlled distribution.
- Processed 5 document change directives that were distributed on the internal LGWOP web page.
- Received 4 level 3 documents for storage (primarily vending literature and completed checksheets).

- Processed 42 record copies of instrumentation procedures (including review documentation) for LGWOP that were formerly controlled by the Instrumentation and Controls organization.
- Provided backup support to Legacy Waste DMC personnel during vacations.
- Completed the first transfer of files for completed Line Item and General Plant Projects to Laboratory Records for long-term storage. Approximately 34 file boxes were transferred to ORNL Laboratory Records.
- Transferred several boxes of files to the Environmental Restoration organization for facilities they have assumed responsibility for.

July

- Processed 9 documents for controlled distribution.
- Received 3 level 3 documents for storage (primarily vending literature and completed checksheets).
- Began preparation of material for the second transfer of inactive documents to ORNL Laboratory Records for long-term storage. Approximately 728 sets of completed checksheets were identified for transfer. These sets are for non-nuclear facilities and checksheets over 3 years old for the LLLW System (and therefore no longer required to prove OSR compliance).

August

- Processed 20 documents for controlled distribution.
- Received 7 level 3 documents for storage (primarily logbooks and completed configuration change control memos).
- Continued preparation of material for the second transfer of inactive documents to ORNL Laboratory Records for long-term storage. Approximately 728 sets of completed checksheets were identified for transfer. These sets were for non-nuclear facilities and checksheets over 3 years old for the LLLW System (and therefore no longer required to prove OSR compliance). Approximately 11 boxes of material were ready for transfer at the end of the month.

September

- Processed 12 documents for controlled distribution.
- Continued preparation of material for the second transfer of inactive documents to ORNL Laboratory Records for long-term storage. Approximately 728 sets of completed checksheets were identified for transfer. These sets were for nonnuclear facilities and checksheets over 3 years old for the LLLW System (and therefore no longer required to prove OSR compliance). The final 74 boxes of material (85 boxes total) were readied for transfer during the month. On September 27th, these records were transferred to ORNL Laboratory Records.

- Transferred two file cabinets of records on the gunite tanks to project personnel responsible for those tanks.

October

- Processed 11 documents for controlled distribution.
- Began rearranging files in the file storage area due to last month's transfer of over 100 boxes to ORNL Laboratory Records for long-term storage.

November

- Processed 17 documents for controlled distribution.
- Continued rearranging files in the file storage area due to September's transfer of over 100 boxes to ORNL Laboratory Records for long-term storage.

December

- Processed 106 documents for controlled distribution (see list in Section 2.8). These documents account for approximately 55% of LGWO Project's operating procedures. During a normal year, only 100 procedure revisions are done during the entire year; however several new procedures were issued to bring Instrumentation Maintenance procedures into the LGWO system and other revisions were required due to recent Y2K computer upgrades.
- Processed 5 documents for long-term retention/storage.

2.10 Miscellaneous

January

Completed the *Liquid and Gaseous Waste Operations Section Annual Operating Report - Calendar Year 1998 (ORNL/TM-13749)* and issued it for approval and controlled distribution.

February

LGWO Section personnel (excluding chemical operators) were transferred from Lockheed Martin Energy Research to Bechtel Jacobs Company LLC on February 1st and became the LGWO Project. Training, Self-Assessment, and Records Management personnel were also transferred to LGWOP. Personnel spent considerable time this month with working out transition issues and preparing for the transfer of the chemical operators and six Instrumentation and Controls personnel on March 1st.

March

Distributed the *Liquid and Gaseous Waste Operations Annual Operating Report for CY1998 (ORNL/TM-13749)* after the document was returned from reproduction. This provided a detailed summary with a month-by-month breakdown of activities as well as summaries of the various treatment operation volumes that are managed by the LGWOP.

April

Placed the new LGWO Project internal home page in service on an internal server.

May

Reviewed and provided comments to project personnel on a report written about the recent C-Tank sludge mobilization project.

3.0 MAINTENANCE ACTIVITIES

3.1 Process Waste Treatment Complex (Buildings 3544 and 3608) and Collection System

January

Replaced a failed valve on the sulfuric acid unloading system at Building 3608.

Completed the monthly testing of the pumps associated with tank F-2103 at Building 2600 (Bethel Valley Process Waste Storage Tanks). This tank provides additional storage capacity during periods of heavy inflow to the Process Waste Collection and Transfer System.

February

Replaced valve FCV-634 (associated with Granular Activated Carbon Column F-1019) at Building 3608 after the valve operator had failed.

Repaired a steam leak on the L-10 evaporator's steam system at the PWTC - Building 3544.

Repaired the air conditioning unit in the Process Control Unit cabinet for Building 7961 (Melton Valley Process Waste Collection Tanks Facility).

Repaired the on-line monitoring system at the Manhole 243 Process Waste Monitoring station after the sample pump failed. This station is used to monitor the process waste effluent from the LLLW Evaporator Facility.

Began replacement of the J-2018 jet mixer at Building 7961. The jet mixers in the Process Waste collection tank facilities are being replaced as a maintenance item due to the age of the existing pumps.

Replaced a failed drain valve on the F-1009 dual-media filter at the PWTC - Building 3608.

Repaired the agitator for the F-1006 clarifier at the PWTC - Building 3608.

March

Continued replacement of the J-2018 jet mixer at Building 7961. The jet mixers in the Process Waste collection tank facilities are being replaced as a maintenance item due to the age of the existing pumps.

Began a major clean out of sludge from the F-1007 clarifier at the PWTC - Building 3608 in support of personnel repairing the broken sludge rake located in the bottom of the clarifier. The

clarifier is used to soften the process wastewater prior to transfer to Building 3544 for radiological treatment.

Repaired the water totalizer on the water addition line to the caustic tank at Building 3608. Water is used to dilute shipments of 50% caustic to 18% caustic for usage in LGWOP facilities.

Initiated a Configuration Change Memo to install a system to blow-out the LLLW transfer line from the L-11 tank and Building 3544. This will be used to purge residue from the piping after transfers.

April

Replaced the differential pressure switch for the L-3 filter at the PWTC - Building 3544. The old switch had developed a leak.

Performed a cleanup of the diked area at the Bethel Valley Process Waste Storage Tanks (Building 2600).

May

Began a clean out of the filter press room at the PWTC - Building 3608.

Replaced the inlet valve for wastewater going to the cold nonmetals tank at Building 7961 (Melton Valley Process Waste Collection Tanks Facility).

June

Relocated the fire extinguishers at Buildings 3518 and 3594 at the request of Fire Department personnel.

Repaired a leaking seal on the J-2018 jet mixer pump at Building 7961 (Melton Valley Process Waste Collection Tank Facility).

Cleaned up the area around Manhole 243. The area had been used as a staging area for decontaminating overheads from the LLLW Evaporator Facility using a temporary zeolite column to reduce the amount of cesium carryover to the Process Waste Collection and Transfer System.

The J-4005A & B transfer pumps at Building 2658 (F-4005 Monitoring Station) were replaced due to their 10 year age and excessive bearing wear. This station is used to transfer process wastewater from the 1505 and 2000 Areas to the PWTC - Building 3608 for future treatment. At the end of the month personnel were working to complete the associated electrical connections for the inline spare (J-4005A) pump.

July

Completed replacement of the J-4005A transfer pump at Building 2658 (F-4005 Monitoring Station) and began work on completing the associated electrical connections. The pumps are being replaced due to their 10 year age and excessive bearing wear. This station is used to transfer process wastewater from the 1505 and 2000 Areas to the PWTC - Building 3608 for future treatment.

Replaced a ball valve at the acid unloading station at the PWTC - Building 3608.

Replaced the check valve for pump J-1008B (filter feed pump) at the PWTC - Building 3608.

August

Performed repairs on the F-1050 tank at the PWTC - Building 3608. This tank, which serves as a surge tank for softened water to be transferred to Building 3544 for radiological treatment, had developed a leak in the side of the tank at the approximately 50% depth level. Personnel welded a patch over the leak site and are identifying coating material to be applied to the inside of the patch to prevent corrosion from causing another leak.

Completed the following maintenance activities at the PWTC - Building 3608

- Repaired a leak at the sample fitting for the nonmetals (F-1002) tank.
- Replaced a failed check valve on the sulfuric acid addition line to the air stripper .
- Repaired a sulfuric acid leak on the strainer for the J-1021 acid addition pump.

Began fabrication work to support the upcoming replacement of the J-2101 jet mixer at Building 2600 (Bethel Valley Process Waste Collection Tanks Facility). The jet mixer is used to ensure the contents of the tank are mixed and that any suspended solids do not settle in the tank prior to transfer to the PWTC for treatment.

September

Received one tanker load of sulfuric acid at the PWTC - Building 3608. Sulfuric acid is used to adjust the pH of the wastewater to within discharge limits prior to discharge to White Oak Creek.

Installed automatic blowdown valves on the steam turbine for the turbine-driven pump at the Influent Pump Station (F-4001). This pump is used as a backup transfer system in case there is a failure of the electric (normal and diesel generated) pumps at this pump station.

Repaired a leak on the L-13 condenser at the PWTC - Building 3544.

Evaluated the volume of ion exchange resins remaining in the L-4 columns at Building 3544 during the week. The performance of the columns has deteriorated over the past couple of years and the evaluation is being done to determine if the resins are exhausted or if something else is responsible for the decline in performance. The evaluation, which will also look at analytical data, will be ongoing for the next couple of weeks. The resin is used to remove contaminants (primarily Sr-90) from the wastewater prior to transfer to the PWTC - Building 3608 for further treatment.

Replaced the sample pumps for the Manhole 95 sampler system.

October

Replaced a failed solenoid valve for the steam supply to the J-4001C pump at the Influent Pumping Station.

Unplugged the sight glass on the L-12 tank at the PWTC - Building 3544.

Repaired a leaking pressure indicator valve on the J-1025A caustic pump at the PWTC - Building 3608.

Replaced two valves on the L-10 condensate line going to the L-13 condenser at the PWTC - Building 3544.

Completed scheduled testing of pumps at tank F-2103 located at Building 2600 (Bethel Valley Process Waste Storage Tanks Facility). This tank, which is used for additional storage capacity during periods of heavy inflow to the process waste system, has its equipment tested on a scheduled basis to ensure its continued operability.

November

Repaired a small leak on the J-1050 pump sulfuric acid transfer line at the PWTC - Building 3608.

Installed a temporary valve in the ion-exchange column regeneration line at the PWTC - Building 3544. The temporary valve will be replaced with an automatic actuated valve when the valve is received.

Completed the quarterly dike inspections at all LGWO Project facilities.

Performed decontamination work around the drain located at the Manhole 149 Monitoring Station.

Transferred one tanker load of LLLW from the PWTC - Building 3544 nitric acid recovery operations to the LLLW Collection and Transfer System for future treatment.

Completed the quarterly acid washing of the air stripper at the PWTC - Building 3608 to remove any growth on the tower packing.

December

Cleaned out the transfer line between tanks F-1060 and F-1070 at the PWTC - Building 3608.

Changed out the ion-exchange resin in C and D columns at the PWTC - Building 3544. The resin was replaced due to a continuing decline in the service life of the resin between regenerations. The ion-exchange columns are used to remove Sr-90 from the wastewater prior to discharge to Building 3608 for further polishing and discharge to White Oak Creek.

3.2 Liquid Low-Level Waste System

January

Added valve stops to the FROM 7966 Valve located in the South Parking Lot Valve Box to provide additional assurance of valve position.

Personnel installed packing glands at Valve Box 1A to eliminate inleakage into the valve box.

February

Replaced the WC-9 drywell sump pump after the pump failed.

Completed approved configuration change WM-LGWO-CM-1997-20 at Building 2099 (Monitoring and Control Station for Building 2026) to provide a more reliable method of calibrating the pH probe in place while minimizing the possibility of a leak from the system.

Repaired the air compressor at Building 7860 (New Hydrofracture Facility) after the after-cooler was found to be broken.

March

Completed annual maintenance on air compressors at Buildings 7830 (Melton Valley Storage Tanks) and 7860 (New Hydrofracture Facility).

April

Provided support to Instrumentation and Controls personnel during the quarterly test of the LLLW Evaporator Facility instrumentation systems.

Provided support to LGWO instrumentation personnel performing scheduled tests of the Buildings 2537 and 7830 pump discharge pressure over-pressurization shutdowns.

Provided support to carpenters relocating a fire extinguisher from the inside to the outside wall of the Evaporator Service Tanks control building (Building 2537) at the request of Fire Department personnel.

Completed a cleanup of the A2 evaporator sample room at the LLLW Evaporator Facility (Building 2531).

May

Supported LGWOP instrumentation maintenance personnel repairing the combustible gas analyzer at the Melton Valley Storage Tanks Annex (Building. 7856).

Personnel continued cleanup of the 2A2 evaporator system and were testing each steam coil to determine if one or more of the seven coils has developed a leak.

June

Provided support to LGWOP instrumentation maintenance personnel calibrating the combustible gas analyzer at tank WC-20 (Building 7569).

Supported LGWOP instrumentation maintenance personnel in the scheduled calibration of instrumentation at Building 7966 (Monitoring and Control Station for the Radiochemical Engineering Development Complex).

Replaced a leaking steam trap in the second floor equipment room at Building 2531 (LLLW Evaporator Facility).

August

Replaced the level measurement device for tanks W-24, -25, 26, 27, and -31 at Building 7830 (Melton Valley Storage Tanks) and tank F-1401 at Building 2099 (Monitoring and Control Station servicing Building 2026) with new Enraf brand devices. The Enraf s are being installed due to the increasing difficulty of obtaining spare parts for the existing devices. Seven other level devices are scheduled to be replaced with Enrafs.

September

Replaced the level indicators on tanks W-21 and W-22 at the Evaporator Service Tanks (Building 2537) facility with the new Enraf device. The level indicators are being replaced due to increasing difficulty in procuring spare parts for the existing devices.

Supported Instrumentation Maintenance personnel in calibrating equipment at Building 7877 and the 7830 Pump Module.

Insulated a process water line to the SLS System at Building 7830.

November

Repaired a shear pin on the hand wheel for valve HV-400-37 (tank W-37 inlet valve) at the Melton Valley Storage Tanks Annex (Building 7856).

December

Completed modifications to the fire sprinkler systems at Buildings 7505 and 7506 that had been requested by Fire Department personnel.

Replaced a section of contaminated piping that supplies nitrogen to the W-6 Valve Box for personnel to perform pressure tests on the intervalley pipelines.

3.3 Gaseous Waste System

January

Replaced a bad diaphragm on the Central Off-Gas System Ventilation control valve.

Removed the High Efficiency Particulate Air (HEPA) filters from inactive filter pits (Buildings 2533 and 2534) in preparation for the grouting of the pits.

February

Repaired a steam leak on the central off-gas steam-driven turbine. This turbine supplies backup off-gas service to the main ORNL Complex in Bethel Valley.

April

Assisted LGWO instrumentation personnel in the monthly checkout of the off-gas system vacuum break valve at Building 3092 (off-gas scrubber facility). This valve prevents from pulling too much of a vacuum on customer facilities.

Repaired a number of steam leaks at the steam control stations in the 3039 Stack Ventilation System.

May

Repaired several leaking steam traps throughout the 3039 Stack Area.

Relocated the filter gauges for the 4500 Area cell ventilation filters (Building. 3106) to a location north of the filters to provide easier access for personnel.

June

Changed out the HEPA filter in the ion-exchange column room at the PWTC - Building 3544. The new filter was then successfully DOP tested by Quality Engineering and Inspection personnel.

Changed out the HEPA filters at the PWTC - Building 3608 filter press room. The new filters were then successfully DOP tested by personnel from Quality Engineering and Inspection.

July

Replaced the HEPA filters at Building 2099 (Monitoring and Control Station serving Building 2026). The new filters were then successfully DOP tested by personnel from Quality Engineering and Inspection.

September

Supported Instrumentation maintenance personnel with scheduled calibrations in the 3039 Stack Area.

Changed out the South bank of HEPA filters at the Off-gas Scrubber facility (Building 3092). Off-gas is passed through these filters to remove particulates before discharge to the environment thru the 3039 Stack.

Performed the following maintenance activities for the Central Off-gas Turbine

- replaced the cooling water solenoid valve after it failed to open.
- replaced the pressure switch on the steam supply line after the switch was found to be leaking.

November

Cut and capped a drain line going into the ventilation trap for the cell ventilation system located at Building 3047.

Repaired a bearing problem on the Isotope Area blower in the 3039 Stack Area. Also repaired an instrument problem associated with the 4500 Area blower's bearing temperature. These blowers provides cell ventilation service to the Isotope and 4500 Complex Areas at the main Bethel Valley site.

Changed out the demister media at Building 3092 off-gas scrubber facility. This work was done (work package WM-GAS-3092-001) using the new work package procedure for LGWO Project (WM-LGWO-606.12).

Supported Quality Engineering and Inspection personnel performing DOP testing of HEPA filters at Buildings 2537 (LLLW Evaporator Service Tanks), 2568 (Off-gas and Cell Ventilation Filters for the LLLW Evaporator Facility), and 7830 (Melton Valley Storage Tanks).

Replaced a heater in the Central Off-gas System that had become plugged and was causing a high differential pressure drop across the HEPA filters.

Replaced the bearings on all of the blowers and turbines located in the 3039 Stack Area.

Supported Instrumentation maintenance personnel on the scheduled check of the Building 3092 (Off-gas scrubber facility) relief valve. This valve is used to prevent the off-gas system from pulling too much negative vacuum on the customer facilities.

4.0 OTHER ACTIVITIES

4.1 Training

January

Nineteen LGWO personnel completed the annual Emergency Squad/HAZWOPER refresher training.

Several LGWO personnel completed the annual Safety documentation refresher training.

February

Six LGWOP personnel completed the annual Emergency Squad/HAZWOPER refresher training.

Two LGWOP personnel completed a one-week off-site training course for the new Engineering Work Stations (Composer software) for the Distributed Control System. This system is undergoing upgrades to ensure Y2K compliance.

Two LGWOP personnel completed a two-week off-site training course for the new operator consoles (Conductor NT) software for the Distributed Control System. This system is undergoing upgrades to ensure Y2K compliance.

Eighteen LGWOP personnel completed their annual whole-body count.

Six LGWOP personnel completed the two-year Radiation Worker II refresher training.

Ten LGWOP personnel completed the annual HAZWOPER/emergency-squad refresher training.

LGWOP personnel completed two WEB training programs on Ethics and Standard of Conduct for Bechtel Jacobs Company LLC personnel.

March

All LGWOP personnel required to take the annual emergency squad training completed it.

All LGWOP personnel scheduled for General Employee Training and Radiation Worker II refresher training in the first quarter of CY1999 have successfully completed the courses.

Several LGWOP personnel completed Diversity in the Workplace and Violence in the Workplace training.

One LGWOP personnel completed the three week off-site training courses for the Bailey Controls Composer and Conductor software packages.

April

Completed Conduct of Operations training for six Instrumentation maintenance personnel assigned to the LGWOP.

Several LGWO personnel completed the Leadership Safety Training course.

Several LGWO personnel completed the Ladder Safety Training refresher course.

Three LGWOP staff member completed the Violence in the Workplace training. This completed this training course for LGWOP personnel.

One LGWOP personnel Completed the Hazardous Waste Characterization training module.

LGWOP day shift personnel attended training on the Waste Triad Operations and completed Procedure Use Exercises on the facility procedures.

May

Eight LGWOP personnel completed an emergency drill for the upcoming Triad operations at Building 7877.

All new personnel (those transferred from P&E to LGWOP on May 3, 1999) have completed "Preventing Violence in the Workplace Training."

Chem Tech personnel assigned to the Triad Project received "Job-Specific HAZCOM Training" and "Lockout/Tagout Training."

All Chem Tech personnel completed the Procedure-Use Examinations and Performance Documentation Checklists for the two procedures related to the operation of the SLS system.

One LGWOP personnel completed the annual HAZWOPER refresher training.

June

Seven LGWOP personnel completed the fork truck operator requalification training.

Three LGWOP personnel completed the 2 year Radiation Worker II refresher training.

Two LGWOP personnel completed the annual HAZWOPER refresher training.

LGWOP maintenance and day shift personnel went thru Integrated Safety Management System field training.

Six LGWOP personnel completed forklift requalification training.

One LGWOP personnel completed the 2-year USQD refresher training.

August

Two personnel attended Oak Ridge Reservation Waste Certification Awareness training.

Five LGWO personnel completed the additional 16 hour HAZWOPER training course.

One LGWO personnel completed the annual HAZWOPER refresher training course.

October

Two LGWOP personnel completed confined space entrant/attendant training.

One LGWOP personnel completed the 8-hour annual HAZWOPER refresher training.

Six LGWOP personnel completed the fire watch training.

All field operations and maintenance personnel completed the annual job-specific Hazard Communications refresher training.

November

Four LGWO Project personnel completed the annual HAZWOPER refresher training.

Twenty-three LGWO Project personnel completed Nuclear Criticality Safety level 0 training.

Nine LGWO Project personnel completed Nuclear Criticality Safety level 1 training.

One LGWOP personnel completed the initial HAZWOPER qualification training.

Five LGWOP personnel completed the two-year Radiation Worker II requalification training.

Sixteen LGWO Project personnel completed Fire Watch Training.

One LGWO Project personnel completed the 16 hour HAZWOPER training.

December

Ten LGWO Project personnel completed the 2 year Radiation Worker II refresher training.

Six LGWOP personnel completed Walking Working Surfaces and Fall Protection training.

Sixteen LGWOP personnel completed Fall Protection Personal Protective Equipment training and demonstration by a vendor.

Two LGWOP personnel completed NCS Level 0 Training.

Four LGWOP personnel completed LGWOP Conduct of Operations Training.

Fourteen LGWOP personnel completed Burning/Welding/Hot Work Permit Training.

Five LGWOP personnel completed Melton Valley Access Training.

Three LGWOP personnel completed the annual respirator fit testing.

4.2 Audits/Reviews/Tours

May

Supported a TDEC inspection at the PWTC - Buildings. 3544 and 3608. No problems were identified.

June

Provided an extensive tour of LGWO Project facilities to potential bidders for the subcontracting of the LGWO Project.

July

Participated on an internal Readiness Assessment board for two Bechtel Jacobs Waste Management Operations processes at the Y-12 site.

September

Completed the annual review of LGWOP air permits. No problems were identified during the review.

December

An Integrated Safety Management System audit was performed on work at the PWTC - Building 3608. No problems or concerns were identified.

4.3 Environmental Restoration Support Activities

January

Completed transfers of LLLW from inactive tank W-8 to the LLLW Collection and Transfer System for future treatment at the request of Environmental Restoration personnel. A total of 90,000 gallons was transferred over the last few weeks.

Reloaded a column with fresh zeolite for the Seep D Treatment System and used it to replace a spent column at the treatment system. This system is operated by LGWO personnel for Environmental Restoration personnel.

Transferred LLLW from inactive tank W-9 to W-8 in the South Tank Farm at the request of Environmental Restoration personnel.

February

Transferred 40,000 gallons from inactive LLLW tank W-9 to W-8 at the request of Environmental Restoration personnel.

March

Assisted personnel from the Environmental Management Group in the development of a Scope of Work Document for remediation of the Tank W-1A project.

Transferred water from the west pit in the South Tank Farm to the LLLW Collection and Transfer System at the request of GAAT project personnel. Personnel also supported the tie-in at the W-6 valve box to allow transfers of LLLW and suspended sludges to the Melton Valley Storage Tanks.

Transferred two tanker loads (approximately 10,000 gallons total) of water into the Old Hydrofracture Facility's Emergency Pond at the request of Environmental Restoration personnel.

Transferred approximately 200,000 gallons of process wastewater from the Old Settling Basin (Building 3513) to the Process Waste Collection and Transfer System at the request of Environmental Restoration personnel.

April

Transferred approximately 300,000 gallons of process wastewater from the Old Settling Basin (Building 3513) to the Process Waste Collection and Transfer System for future treatment.

Collected liquid samples from tanks T-1 and T-2 (located at the Central Pumping Station, Building 7567) at the request of Environmental Restoration personnel.

May

Collected sludge samples from tanks T-1 and T-2 (located at the Central Pumping Station, Building 7567) at the request of Environmental Restoration personnel.

Changed out one spent zeolite column at the Seep D treatment system with a column containing fresh zeolite resin.

Supported South Tank Farm personnel in testing newly installed pressure switches on the transfer line located in the W-6 Valve Box. This is to support the upcoming transfers from the South Tank Farm to the Melton Valley Storage Tanks (Building. 7830).

Transferred approximately 400,000 gallons from the Old Settling Basin (Building. 3513) to the Process Waste Collection and Transfer System for future treatment.

Supported South Tank Farm personnel in a demonstration transfer of the transfer system from inactive tank W-9 to the Melton Valley Storage Tanks. This is to support the upcoming transfers from the South Tank Farm to the Melton Valley Storage Tanks (Building. 7830).

Transferred the contents of the west pit in the South Tank Farm to the LLLW Collection and Transfer System for future treatment at the request of Environmental Restoration personnel.

Began transferring approximately 30,000 gallons from inactive tank W-8 to the active LLLW Collection and Transfer System.

Completed the first transfer from the Gunitite Tanks (tank W-9) to the Melton Valley Storage Tanks (tank W-26) on May 25th of approximately 9,700 gallons of liquid containing suspended sludges.

June

Prepared the inactive tanks W-19 and W-20 site for sampling activities beginning on June 14th and probed the sludge layers in inactive tanks W-19 and W-20 in preparation for pulling samples from the tanks.

Provided support to South Tank Farm personnel in the transfer from inactive tank W-9 to Building 7830 (Melton Valley Storage Tanks). On June 11th, personnel transferred approximately 21,060 gallons from W-9 to W-26 and approx. 4,850 gallons from W-9 to W-27.

On June 22nd transferred approximately 16,374 gallons from tank W-9 to tank W-27, approx. 2,320 gallons from W-9 to W-37, approx. 4,390 gallons from W-9 to W-24.

Provided support to personnel changing out the HEPA filters for tank W-8 located in the South Tank Farm.

Reviewed analytical isotopic data from waste being transferred as part of the GAAT project. Although the data wasn't as detailed as some seen in the past it appears that the waste being generated is in line with what was expected.

Transferred six tankers (5,000 gallons each) of water to the Old Hydrofracture Facility's Emergency Pond to provide shielding at the request of Environmental Restoration personnel.

Transferred the contents of the west pit in the South Tank Farm to the LLLW Collection and Transfer System for future treatment.

July

Transferred the contents of the west pit in the South Tank Farm to the LLLW Collection and Transfer System for future treatment.

Worked on developing a sampling method for inactive tanks W-19 and W-20.

Collected samples from the Seep C and D treatment systems at the request of Environmental Restoration personnel.

Changed out a spent zeolite column at the Seep D treatment system and installed a column with fresh zeolite. The spent zeolite was then unloaded from the old column and fresh zeolite was loaded.

Transferred approximately 27,820 gallons from inactive tank W-9 to tank W-28 at the Melton Valley Storage Tanks (Building 7830) and approximately 600 gallons of flush water to tank W-37 at the Melton Valley Storage Tanks Annex (Building 7856) on July 22nd.

Transferred approximately 26,628 gallons from inactive tank W-9 to tank W-31 at the Melton Valley Storage Tanks (Building 7830) and approximately 998 gallons of flush water to tank W-37 at the Melton Valley Storage Tanks Annex (Building 7856) on July 28th.

August

Transferred the following inactive tanks from the LGWO Project to the Federal Facility Agreement Surveillance and Maintenance Program WC-2, -3, -5, -6, -8, -9, -10, -11, -12, -13, -14, -19, W-12, -16, -17, -18, 3002-A, 2026A, HFIR tank, and T-14.

Transferred responsibility for the White Oak Dam (Building 7813) from the LGWO Project.

Collected liquid and sludge layer samples from tank WC-10.

Supported South Tank Farm personnel with performing sludge depth measurements.

Sampled the sludge layer in inactive tank W-9 at the request of South Tank Farm personnel. Personnel also transferred approximately 25,000 gallons from inactive tank W-8 to W-9.

Transferred approximately 41,962 gallons from the South Tank Farm to tanks W-27, W-25, and W-24 at Building 7830 at the request of Environmental Restoration personnel on August 17th.

Sampled inactive tanks W-19 and W-20 at the request of the Federal Facility Agreement program.

Transferred approximately 300,000 gallons of process wastewater from the old Settling Basin (Building 3513) at the request of Environmental Restoration personnel.

Replaced plugs in the pipeline from the Settling Basin to the weir box located on the southwest side of the Settling Basin at the request of Environmental Restoration personnel.

September

Collected sludge samples from the following tanks at the request of Environmental Restoration personnel

- W-1A
- F-501.
- WC-20

Transferred approximately 1,000 gallons from W-9 to tank W-37 at Building 7856 (Melton Valley Storage Tanks Annex), approximately 26,090 gallons from W-9 to W-31 at Building 7830 (Melton Valley Storage Tanks), and approximately 8,330 gallons from W-9 to W-28 at Building 7830 on September 9th.

Transferred approximately 2,473 gallons from inactive tank W-1 to the LLLW Collection and Transfer System for future treatment.

Changed out spent zeolite resin drums at the Seep C treatment system and installed drums loaded with fresh zeolite resin. Personnel also changed out one spent zeolite column at the Seep D treatment system and installed a column loaded with fresh zeolite resin. The Seep C and D treatment systems are operated by LGWO Project personnel at the request of Environmental Restoration personnel.

Transferred three tankers (approx. 15,000 gallons total) of water to the Emergency Pond at the Old Hydrofracture Site at the request of Environmental Restoration personnel.

Transferred approximately 1,920 gallons from inactive tank W-1 and approximately 1,868 gallons from inactive tank W-2 to the LLLW Collection and Transfer System for future treatment.

Transferred responsibility for Buildings 7567 (Central Pumping Station) and 7569 (tank WC-20) to the Surveillance and Maintenance group after these tanks were deleted from the LLLW System OSR in rev. 10 of the document.

Completed the following transfers from inactive tanks to the LLLW Collection and Transfer System for future treatment

- Approx. 1,589 gallons from W-11.
- Approx. 490 gallons from W-2.

Added approximately 100 gallons each to inactive tanks W-19 and W-20 and reinstalled their lids at the request of Environmental Restoration personnel.

Performed a video inspection of inactive tanks W-1, W-2, and W-11.

Transferred approx. 30,000 gallons from inactive tank W-8 to inactive tank W-9.

Transferred approximately 30,000 gallons from inactive tank W-9 to tanks W-26 and W-28 at Building 7830 (Melton Valley Storage Tanks).

October

Took sludge level readings in the W-8 tank at the request of GAAT personnel.

Collected a sample and video inspected the interior of tank TH-4 at the request of Environmental Restoration personnel.

Collected a sludge sample from inactive tank W-11 at the request of Environmental Restoration personnel.

Supported South Tank Farm personnel preparing to transfer tank W-9 to Building 7830 (Melton Valley Storage Tanks).

Changed out the HEPA filter for inactive tank W-9 at the request of Environmental Restoration personnel.

November

Collected sludge samples from tanks W-1 and W-2 at the request of Environmental Restoration personnel.

Changed out one spent zeolite column at the Seep D treatment system at the request of Environmental Restoration personnel.

Transferred approximately 25,000 gallons from W-8 to W-9 at the request of Environmental Restoration personnel.

Transferred approximately 1,320 gallons from W-9 to W-37 at Building 7856 (Melton Valley Storage Tanks Annex) and approximately 17,490 gallons from W-9 to tank W-24 and 4,940 gallons to W-25 at Building 7830 (Melton Valley Storage Tanks) on Nov. 17th.

December

Completed the following transfers on Dec. 7th from tank W-9 at the request of Environmental Restoration personnel

- approximately 1,000 gallons of LLLW to tank W-37 at Building 7856
- approximately 26,363 gallons of LLLW to tank W-31 at Building 7830
- and approximately 9,860 gallons of LLLW to tank W-27 at Building 7830.

Changed out one spent column of zeolite resin at the Seep D Treatment System and reloaded the column with fresh resin.

Transferred approximately 660 gallons from inactive tank WC-9 to the LLLW Tanker, which was then transported to the Central Waste Collection Header. The tanker's contents were then transferred to the LLLW Collection and Transfer System for future treatment.

Supported personnel measuring the sludge level in active tank W-9 at the request of Environmental Restoration personnel.

4.4 Miscellaneous

January

Collected a sample from tank W-31 at Building 7830 (Melton Valley Storage Tanks) and delivered to lab personnel for analysis to support the upcoming SLS System demonstration.

Collected approximately 500 gallons of LLLW from the HFIR (Building 7900) in the LLLW Tanker. The tanker was then transported to the Central Waste Collection Header, where it's contents were transferred to the LLLW Collection and Transfer System for future treatment.

Transferred the contents of the 4PRS sump at Building 7830 (Melton Valley Storage Tanks) to the LLLW Tanker to assist MK-Ferguson personnel in the decontamination of the pump and valve vault. The tanker was then transported to the Central Waste Collection Header, where its contents were transferred to the LLLW Collection and Transfer System for future treatment.

Transferred on Jan. 19th approximately 22,272 gallons of LLLW from tank W-35 at Building 7856 (Melton Valley Storage Tanks Annex) to tank W-21 at the LLLW Evaporator Service Tanks (Building 2537) for further treatment through the evaporator system.

Transferred on Jan. 26th approx. 27,376 gallons of LLLW from tank W-35 at Building 7856 (Melton Valley Storage Tanks Annex) to tank W-21 at the LLLW Evaporator Service Tanks (Building 2537) for further treatment through the evaporator system.

Transferred on Jan. 28th approx. 11,326 gallons of LLLW concentrate from tank W-23 at Building 2537 to tank W-35 at Building 7856 and approx. 16,860 gallons from tank C-2 at Building 2531 (LLLW Evaporator Facility) to tank W-35.

Installed a hose connection on the Building 2537 (LLLW Evaporator Service Tanks) prime water system to provide positive isolation capability for the water system.

Received one tanker load of sodium hydroxide (caustic) at the PWTC - Building 3608. Caustic is used to adjust the pH of the wastewater to assist in the water softening operations at the facility.

Video inspected the interior of the inactive HFIR LLLW Tank and collected a sludge sample at the request of Federal Facility Agreement personnel.

Provided support to Plant and Equipment personnel decontaminating the road surface in front of Building 3026. The road had been contaminated after excavation to repair a broken water main.

February

Transferred two LLLW tanker loads of decontamination water from the sump at Building 7830 (Melton Valley Storage Tanks) to assist MK-Ferguson personnel in the decontamination of the pump and valve vault. The tanker was then transported to the Central Waste Collection Header, where its contents were transferred to the LLLW Collection and Transfer System for future treatment.

Transferred the contents of WC-9 into the LLLW Tanker. The tanker was then transported to the Central Waste Collection Header, where its contents were transferred to the LLLW Collection and Transfer System for future treatment.

Transported the 3074 Dumpster tank to the Central Waste Collection Header, where its contents were transferred to the LLLW Collection and Transfer System for future treatment.

Received approximately 200 gallons of wastewater from the 800 Area and transferred the contents to the Process Waste Collection and Transfer System for future treatment at Building 3608.

Received one tanker load of sodium hydroxide (caustic) at the PWTC - Building 3608. Caustic is used to adjust the pH of the wastewater to assist in the water softening operations performed at the facility.

Received one tanker load of nitric acid (approximately 3,000 gallons) at the PWTC - Building 3544. Nitric acid is used in the regeneration of the ion-exchange columns at this facility.

Received one tanker load of sulfuric acid at the PWTC - Building 3608. Sulfuric acid is used to adjust the pH of the wastewater prior to discharge to White Oak Creek.

Completed the quarterly inspection of dikes at LGWOP facilities.

March

Transferred the contents of the Building 7830 (Melton Valley Storage Tanks Facility) pump/valve vault sump to the LLLW Tanker after MK-Ferguson washed down the pump room floor. The tanker was then transported to the Central Waste Collection Header, where its contents were transferred to the LLLW Collection and Transfer System for future treatment. MK-F is decontaminating the pump room as part of the installation activities underway to support installation of the solids/liquids separation module by Chem Tech personnel.

Received a tanker load of sodium hydroxide (caustic) at the PWTC - Buildings 3544 and 3608. Caustic is used to adjust the pH of the wastewater to assist in the water softening operations and to meet discharge limits prior to discharge to White Oak Creek.

Received a tanker load of sulfuric acid at the PWTC - Buildings 3544 and 3608. Sulfuric acid is used to adjust the pH of the wastewater prior to transfer to Building 3608 for further treatment.

Received one tanker load of nitric acid at the PWTC - Building 3544. Nitric acid is used during the regeneration of the ion-exchange columns used for removal of Sr-90 from the process wastewater.

Completed the annual Department of Transportation required inspections of three 5,000 gallon MC-307/312 specification process waste tankers.

Unloaded spent zeolite and then reloaded the column at the PWTC - Building 3544. The zeolite is used to remove cesium from the wastewater during periods of high cesium levels in the influent to Building 3544.

April

Transferred approximately 22,000 gallons of LLLW supernate from tank W-27 and approximately 30,000 gallons from W-28 at Building 7830 (Melton Valley Storage Tanks) to tank W-35 at Building 7856 (Melton Valley Storage Tanks Annex).

Transferred four tanker loads of LLLW from the 4PRS sump at Building 7830 to the LLLW Collection and Transfer System for future treatment.

Transferred one tanker load of LLLW concentrate from the PWTC - Building 3544 nitric acid recovery operations to the Evaporator Service Tanks (Building 2537) for long-term storage.

Completed the annual Department of Transportation inspection of the final 5,000 gallon MC-307/312 process waste tanker.

Began preparation of the acid tanker for its annual Department of Transportation requirements inspection.

Completed minor corrective actions associated with a recent safety walk-thru of LGWO facilities.

Received one tanker load of sodium hydroxide (caustic) at the PWTC - Building 3608. Caustic is used in the water softening operations and to meet pH discharge limits for the facility.

Received one tanker load of process wastewater (approximately 5,000 gallons) from the 7000 Area and transferred the wastewater to the Process Waste Collection and Transfer System for future treatment at Building 3608.

Reloaded one zeolite column at the PWTC - Building 3544 with fresh zeolite. The zeolite columns are being used to treat the wastewater for Cesium removal due to high concentrations of Cesium in the incoming wastewater.

May

Collected ten 5-gallon carboys of process wastewater from a generator in Building 1505 and transferred the contents to the Process Waste Collection and Transfer System for future treatment.

Transferred one tanker load of LLLW from tank WC-9 to the LLLW Collection and Transfer System for future treatment.

Received one load of sodium hydroxide (caustic) at the PWTC - Building 3608. Caustic is used for pH adjustment throughout the Process Waste System.

June

Completed the following intertank transfers on June 4th at Building 7830 (Melton Valley Storage Tanks) in preparation for the upcoming Waste Triad campaigns 3 and 4 to be conducted at Building 7877. Approximately 17,600 gallons were transferred from tank W-24 to W-30, approximately 5,650 gallons from W-26 to W-30, approximately 14,870 gallons from W-26 to W-29, and approximately 9,420 gallons from W-25 to W-29.

Transferred the contents of the 4PRS sump at Building 7830 (Melton Valley Storage Tanks) to the LLLW Tanker. The tanker's contents were then transferred to the LLLW Collection and Transfer System for future treatment.

Transferred one tanker load of LLLW concentrate from the nitric acid recovery evaporator operations at Building 3544 to the LLLW Collection and Transfer System for long-term storage.

Received dumpster tank load of LLLW from Building 3074 (Manipulator Shop) and transferred the dumpster tank's contents to the LLLW Collection and Transfer System for future treatment.

Transported three tanker loads (approx. 2,400 gallons total) from tank WC-9 and the WC-5 Pump Pit to the Central Waste Collection Header, where the tanker's contents were transferred to the LLLW Collection and Transfer System for future treatment.

Supported Federal Facility Agreement personnel with the grouting of inactive LLLW tank W-16. Support activities including salvaging level instrumentation from the tank for spare parts usage on other tanks with LGWO Project.

Collected samples from tanks W-26, -29, and -30 at Building 7830 (Melton Valley Storage Tanks) in preparation for future Waste Triad activities at Building 7877.

Collected a tanker load of process wastewater from various remote sites located throughout the Solid Waste Storage Areas. The wastewater was then transferred to the Process Waste Collection and Transfer System for future treatment.

Received one tanker load (approx. 4,000 gallons) of process wastewater from Triad Operations at Building 7877. The contents of the tanker were transferred to the Process Waste Collection and Transfer System for future treatment.

Transferred one tanker load of LLLW concentrate from evaporator operations at the PWTC - Building 3544 to the evaporator service tanks for storage.

A person from the Engineering group of BJC contacted the LGWOP to assess the influent sources of the PWTC-3608. Data was provided which showed a current and future break down of water entering the PWTC-3608.

July

Transferred approximately 20,980 gallons from tank W-27 to W-29 at Building 7830 on July 29th.

Transferred the contents of the 4PRS sump at Building 7830 to the LLLW Tanker. The tanker was then transported to the Central Waste Collection Header, where its contents were transferred to the LLLW Collection and Transfer System for future treatment.

Transported three tanker loads (approx. 2,400 gallons total) from tank WC-9 and the WC-5 Pump Pit to the Central Waste Collection Header, where the tanker's contents were transferred to the LLLW Collection and Transfer System for future treatment.

Transferred the contents of the Building 7830 (Melton Valley Storage Tanks) sump to the LLLW tanker. The tanker was then transported to the Central Waste Collection Header, where its contents were transferred to the LLLW Collection and Transfer System for future treatment.

Support Federal Facility Agreement personnel with the grouting of inactive LLLW tank W-16. Support activities including salvaging level instrumentation from the tank for spare parts usage on other tanks with LGWO Project.

Transferred two tanker loads of LLLW concentrate from evaporator operations at the PWTC - Building 3544 to the evaporator service tanks for storage.

Received one tanker load of process wastewater from OTE operations at Building 7877 and transferred the contents of the tanker to the Process Waste Collection and Transfer System for future treatment.

Received one tanker load of sodium hydroxide (caustic) at Building 3608. Caustic is used to adjust the pH of the wastewater to assist in the water softening operations at the facility.

Transferred one tanker load of sodium hydroxide (caustic) from the bulk storage tank at the PWTC - Building 3608 to the tank at Building 2099 (Monitoring and Control Station serving Building 2026). Caustic is used to maintain the contents of the LLLW Collection tank at Building 2099 at a basic pH prior to transfer to the LLLW Evaporator Facility for future treatment.

Transferred the contents of several drums from the 7000 Area to the Process Waste Collection and Transfer System for future treatment at the request of Plant and Equipment Division personnel.

Decontaminated the pad at Building 2568 (Off-gas and Cell Ventilation Filters for the LLLW Evaporator Facility) after a small water leak occurred in the system.

A person from the Engineering group of BJC contacted the LGWOP to assess the influent sources of the PWTC-3608. Data was provided which showed a current and future break down of water entering the PWTC-3608.

August

Transferred approximately 11,953 gallons from tank W-35 to W-36 at Building 7856 (Melton Valley Storage Tanks Annex) on August 17th.

Transferred approximately 29,700 gallons from tank W-31 and approximately 30,920 gallons from W-28 to tank W-35 located at Building 7856 (Melton Valley Storage Tanks Annex) on August 26th. Also transferred approximately 15,450 of collected line flush water from tank W-37 back to the LLLW Evaporator Facility for future treatment.

Transferred the contents of the 3074 Dumpster tank (servicing the ORNL Manipulator Shop) to the LLLW Collection and Transfer System for future treatment.

Picked up two LLLW bottle packages at Building 4500S. The bottles were then transported to the LLLW Evaporator Facility (Building 2531) where their contents were transferred to the LLLW Collection and Transfer System for future treatment.

Received one 5,000 gallon tanker load of process wastewater from the Waste Triad operations at Building 7877. The tanker's contents were then transferred to the Process Waste Collection and Transfer System for future treatment.

Prepared several B-25 boxes located on the East side of Building 3518 for transfer to Solid Waste Operations.

September

Received six LLLW bottle packages from generators at Building 4501 and transferred their contents to the LLLW Collection and Transfer System for future treatment.

Collected a liquid sample from tank W-35 at Building 7856 (Melton Valley Storage Tanks Annex) and submitted to laboratory personnel for analysis.

Began meetings with Waste Management Federal Services and Bechtel Jacobs personnel to assist in the transition of LGWO Project activities to Waste Management Federal Services.

Received one tanker load of sodium hydroxide (caustic) at the PWTC - Building 3608. Caustic is used for pH adjustment of wastewater throughout LGWOP facilities.

Transferred one tanker load (approx. 750 gallons total) of concentrate from the Building 3544 evaporator to the LLLW Collection and Transfer System for storage.

October

Transferred approximately 4,820 gallons from tank W-35 at Building 7856 (Melton Valley Storage Tanks Annex) to the LLLW Evaporator Facility for future treatment on October 6th. Personnel then transferred approximately 43,663 gallons from W-35 to W-37. On Oct. 8th personnel transferred approximately 30,432 gallons from W-31 at Building 7830 (Melton Valley Storage Tanks) to W-35 and approximately 18,160 gallons from W-27 to W-35. These transfers were in preparation for upcoming transfers to Building 7830 from the GAAT project.

Transferred approximately 5,000 gallons from tank W-37 at Building 7856 (Melton Valley Storage Tanks Annex) to the LLLW Evaporator Facility for future treatment. W-37 has been used to receive pipeline flush water to prevent using up concentrate storage space.

Met with personnel from Chem Tech to discuss the declining performance of the four Ion Exchange columns at building 3544. Information which had been gathered previously was presented. Although it was decided that chemical adjustments at the "front end" of the treatment process may be contributing to, if not causing, the decline in performance, it was decided to perform additional sampling of the waste stream prior to making any adjustments to the processing operations.

Received one tanker load of sodium hydroxide at the PWTC - Building 3608. Caustic is used at the facility to adjust the pH of the wastewater to aid in the water softening operations and to meet discharge limits to White Oak Creek.

Received one tanker load of nitric acid at the PWTC - Building 3544. Nitric acid is used to regenerate the ion-exchange columns used at the facility for removal of Sr from the wastewater.

Met with personnel from the Legacy Waste Project at ORNL. The purpose of the meeting was to review the status of pick ups of many B-25 boxes located on LGWOP facility sites. Plans are being made by the Legacy Waste Group to increase attention to these boxes, some of which have been filled for over 2 years, so they may be picked up soon.

November

Successfully completed the annual operational surveillances required by the Building 7856 Technical Safety Requirements document.

Transferred on 11/3/99 approximately 16,660 gallons from W-24 to tank W-30 and approximately 8,170 gallons from W-25 to W-30 in preparation for upcoming activities at Building 7830.

Completed the following transfers from W-37 to tank W-22 at the Evaporator Service Tanks for future treatment. Tank W-37 is being used to collect line flush water that is used after every intervalley transfer and the wastewater is being brought back to W-22 to be volume reduced at the LLLW Evaporator Facility to reduce the amount of concentrate storage space used at the facility.

- On 11/15 transferred approximately 5,102 gallons
- On 11/24 transferred approximately 4,961 gallons.

Transferred one tanker load from the 4PRS and 4VS27 sumps at Building 7830 (Melton Valley Storage Tanks) to the LLLW Collection and Transfer System for future treatment.

December

Received one tanker load of sodium hydroxide (caustic) at Building 3608. Caustic is used throughout LGWO facilities for pH adjustment.

Completed the following transfers:

- On Dec. 6th, transferred approximately 23,583 gallons from tank W-31 at Building 7830 to tank W-35 at Building 7856
- On Dec. 6th, transferred approximately 28,600 gallons from tank W-35 to tank W-37 at Building 7830
- On Dec. 8th, transferred approximately 26,828 gallons from tank W-28 and approximately 11,531 gallons from tank W-26 to tank W-35.
- On Dec. 20th, transferred approximately 10,000 gallons from tank W-37 at Building 7856 to tank W-22 at Building 2537 for future treatment thru the LLLW Evaporator. Tank W-37 had been used to collect flush water used after intervalley transfers and was now being transferred back for volume reduction to provide additional storage capacity at the facility.

Collected one LLLW Bottle Package from a generator in Building 4500S and transported the package to the LLLW Evaporator Facility, where its contents were transferred to the LLLW Collection and Transfer System for future treatment.

Transferred two tanker loads of LLLW concentrate from nitric acid recovery operations at the PWTC - Building 3544 to the LLLW Collection and Transfer System for long-term storage.

Received one tanker load of sulfuric acid at the PWTC - Building 3608. Sulfuric acid is used for pH adjustment of the wastewater prior to discharge to White Oak Creek.

Transferred one tanker load of sodium hydroxide (caustic) to Building 7961 (Melton Valley Process Waste Collection Tanks Facility) from the storage tank at Building 3608. Caustic is used

to maintain the wastewater from the 7900 area at a high (basic) pH prior to its transfer to Bethel Valley for future treatment.

Received one tanker load of sodium hydroxide (caustic) at the PWTC - Buildings 3544 and 3608. Caustic is used to adjust the pH of the wastewater to assist in the water softening operations and prior to discharge to White Oak Creek to meet discharge limits.

Began reducing the amount of process wastewater awaiting treatment in preparation for the upcoming new year. Personnel are working to provide as much free space as possible as part of the LGWO Project's Y2K contingency planning.

5.0 APPENDIX

5.1 TABLES

1. Process Waste Treatment Complex - Building 3544 operations.
2. Process Waste Treatment Complex - Building 3608 operations.
3. LLLW operations.
4. Rainfall at ORNL.

5.2 FIGURES

1. Diagram of the Process Waste Collection and Transfer System. (ORNL-DWG. 96-3390R1)
2. Flow diagram of Building 3544. (ORNL-DWG. 96-3391R1)
3. Process waste treated at ORNL. (ORNL-DWG. 97-5448R3)
4. Sludge generation at Building 3544. (ORNL-DWG. 97-5449R3)
5. Dilute LLLW from Building 3544. (ORNL-DWG. 97-5450R3)
6. LLLW concentrate from Building 3544. (ORNL-DWG. 97-5451R3)
7. Rainfall at ORNL. (ORNL-DWG. 97-5452R3)
8. Flow diagram of Building 3608. (ORNL-DWG. 96-3397R1)
9. Nonradiological waste treated at ORNL. (ORNL-DWG. 97-5453R3)
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11. Diagram of the LLLW Collection and Transfer System. (ORNL-DWG. 96-3400R1)
12. Used storage space versus time. (ORNL-DWG. 97-5455R3)
13. LLLW generation at ORNL. (ORNL-DWG. 97-5456R3)
14. Building 2026 LLLW generation. (ORNL-DWG. 97-5457R3)
15. Building 3019 LLLW generation. (ORNL-DWG. 97-5458R3)
16. Building 3025 LLLW generation. (ORNL-DWG. 97-5459R3)
17. Building 3026-C LLLW generation. (ORNL-DWG. 97-5460R3)
18. Building 3026-D LLLW generation. (ORNL-DWG. 97-5461R3)
19. 3039 Stack Area LLLW generation. (ORNL-DWG. 97-5463R3)
20. Building 3074 LLLW generation. (ORNL-DWG. 97-5464R3)
21. Building 3517 LLLW generation. (ORNL-DWG. 97-5466R3)
22. Building 3544 LLLW concentrate generation. (ORNL-DWG. 97-5468R3)
23. 4500 Complex LLLW generation. (ORNL-DWG. 97-5470R3)
24. Isotopes Area LLLW generation. (ORNL-DWG. 97-5471R3)
25. WC-5 Pump Pit (inactive tank WC-9) LLLW generation. (ORNL-DWG. 97-5474R3)
26. HFIR (Building 7900) LLLW generation. (ORNL-DWG. 97-5475R3)
27. REDC (Buildings 7920 and 7930) LLLW generation. (ORNL-DWG. 97-5476R3)
28. Abandoned tank W-1A LLLW generation. (ORNL-DWG. 97-5477R3)
29. Diagram of the Gaseous Waste System. (ORNL-DWG. 96-3528)

TABLE 1 PROCESS WASTE TREATMENT COMPLEX - BUILDING 3544 OPERATIONS

	Waste treated by ion-exchange (gal)	Waste treated by zeolite (gal)	Total Process Waste treated (gal)	Sludge generated*	3544 generated LLLW concentrate to storage (gal)	3544 generated LLLW feed (gal)
				Drums		
January	6.75 x 10 ⁶	0	6.75 x 10 ⁶	0	550	0
February	2.57 x 10 ⁶	1.95 x 10 ⁶	4.52 x 10 ⁶	0	0	0
March	4.96 x 10 ⁶	1.38 x 10 ⁶	6.34 x 10 ⁶	0	780	0
April	4.45 x 10 ⁶	0.61 x 10 ⁶	5.06 x 10 ⁶	0	750	0
May	5.75 x 10 ⁶	0	5.75 x 10 ⁶	0	0	0
June	5.17 x 10 ⁶	0	5.17 x 10 ⁶	0	720	900
July	7.60 x 10 ⁶	0	7.60 x 10 ⁶	0	1,300	0
August	4.57 x 10 ⁶	0	4.57 x 10 ⁶	0	0	0
September	3.75 x 10 ⁶	0	3.75 x 10 ⁶	0	921	0
October	3.68 x 10 ⁶	0	3.68 x 10 ⁶	0	993	0
November	4.00 x 10 ⁶	0	4.00 x 10 ⁶	0	710	0
December	4.47 x 10 ⁶	0	4.47 x 10 ⁶	0	1,271	0
1999 Totals	57.72 x 10 ⁶	3.94 x 10 ⁶	61.66 x 10 ⁶	0	7,995	900

*Water-softening for radiologically contaminated wastewater was transferred to Building 3608 from Building 3544 in June 1997, with the water-softening system at 3544 being placed in standby.

TABLE 2 PROCESS WASTE TREATMENT COMPLEX - BUILDING 3608 OPERATIONS

	Metals Wastewater treated (gal)	Nonmetals Wastewater treated (gal)	Total Wastewater treated and Discharged to White Oak Creek (gal)	Sludge generated	
				Boxes	Ft3
January	7.56 x 10 ⁵	1.58 x 10 ⁷	1.66 x 10 ⁷	4	384
February	15.04 x 10 ⁵	1.29 x 10 ⁷	1.44 x 10 ⁷	4	384
March	125.98 x 10 ⁵	0.39 x 10 ⁷	1.65 x 10 ⁷	15	1,440
April	1.12 x 10 ⁵	1.50 x 10 ⁷	1.51 x 10 ⁷	5	480
May	5.65 x 10 ⁵	1.57 x 10 ⁷	1.63 x 10 ⁷	5	480
June	3.20 x 10 ⁵	1.53 x 10 ⁷	1.56 x 10 ⁷	5	480
July	4.77 x 10 ⁵	1.88 x 10 ⁷	1.93 x 10 ⁷	5	480
August	2.90 x 10 ⁵	1.62 x 10 ⁷	1.65 x 10 ⁷	4	384
September	3.12 x 10 ⁵	1.37 x 10 ⁷	1.40 x 10 ⁷	5	480
October	2.46 x 10 ⁵	1.30 x 10 ⁷	1.32 x 10 ⁷	4	384
November	4.64 x 10 ⁵	1.24 x 10 ⁷	1.28 x 10 ⁷	5	480
December	2.42 x 10 ⁵	1.22 x 10 ⁷	1.24 x 10 ⁷	5	480
1999 Totals	178.86 x 10 ⁵	16.49 x 10 ⁷	18.27 x 10 ⁷	66	6,336

Water-softening for radiologically contaminated wastewater was transferred to Building 3608 from Building 3544 in June 1997. This resulted in the increased volume of sludge generated at Building 3608.

TABLE 3 LLLW OPERATIONS

	LLLW Generated (gal)	LLLW treated by Evaporator A2 (gal)	LLLW treated by Evaporator 2A2 (gal)	Concentrate transferred from A2 (gal)	Concentrate transferred from 2A2 (gal)
January	12.06 x 10 ⁴	4.79 x 10 ⁴	6.92 x 10 ⁴	580	3,100
February	1.28 x 10 ⁴	1.82 x 10 ⁴	0.36 x 10 ⁴	1,868	1,660
March	2.23 x 10 ⁴	0.50 x 10 ⁴	0.13 x 10 ⁴	453	3,376
April	1.38 x 10 ⁴	2.27 x 10 ⁴	0	0	0
May	4.44 x 10 ⁴	2.62 x 10 ⁴	0	0	0
June	3.89 x 10 ⁴	4.40 x 10 ⁴	0	2,584	0
July	4.35 x 10 ⁴	3.66 x 10 ⁴	1.62 x 10 ⁴	0	0
August	3.49 x 10 ⁴	1.87 x 10 ⁴	1.95 x 10 ⁴	0	0
September	2.33 x 10 ⁴	2.36 x 10 ⁴	0.31 x 10 ⁴	776	0
October	2.22 x 10 ⁴	1.96 x 10 ⁴	0	1,500	0
November	1.88 x 10 ⁴	1.15 x 10 ⁴	0.04 x 10 ⁴	1,820	1,720
December	4.30 x 10 ⁴	4.16 x 10 ⁴	0.61 x 10 ⁴	3,670	0
1999 Totals	43.85 x 10 ⁴	31.56 x 10 ⁴	11.94 x 10 ⁴	13,251	9,956

TABLE 4. RAINFALL AT ORNL
(Data collected at the ORNL Steam Plant, all results are in inches)

Year	January	February	March	April	May	June	July	August	September	October	November	December	Total
1989	8.04	5.17	5.36	0.00	6.34	0.00	4.26	4.26	11.02	1.93	5.25	2.96	54.59
1990	6.09	8.08	5.13	3.05	8.53	1.81	8.28	6.54	1.74	4.55	2.20	12.27	68.27
1991	2.93	9.01	7.56	3.56	4.41	6.57	4.20	3.75	2.14	1.73	3.85	9.75	59.46
1992	3.82	3.45	3.64	3.03	6.23	2.70	4.31	6.17	4.06	3.56	2.84	6.82	50.63
1993	4.08	3.65	5.75	4.54	3.35	2.89	1.45	4.42	4.72	2.67	3.74	7.89	49.15
1994	6.94	8.77	10.81	8.86	3.52	7.20	4.75	5.65	3.09	2.54	3.96	2.87	68.96
1995	7.02	4.37	3.53	2.65	6.86	2.78	3.05	2.84	3.41	4.30	6.80	5.62	53.23
1996	7.62	3.40	6.74	4.28	9.30	5.10	8.48	3.29	5.33	1.64	8.32	6.06	69.56
1997	5.51	5.00	6.60	5.79	6.92	5.99	3.59	3.01	3.46	3.44	2.69	3.29	55.29
1998	4.10	3.78	5.17	11.00	2.89	6.10	2.29	0.83	1.93	1.45	2.00	6.56	48.10
1999	7.52	3.49	4.50	4.43	6.51	8.51	10.06	1.63	0.86	2.25	3.11	1.69	54.56
Average	5.79	5.29	5.89	4.66	5.89	4.51	4.98	3.86	3.80	2.73	4.07	5.98	57.45

ORNL PROCESS WASTE SYSTEM

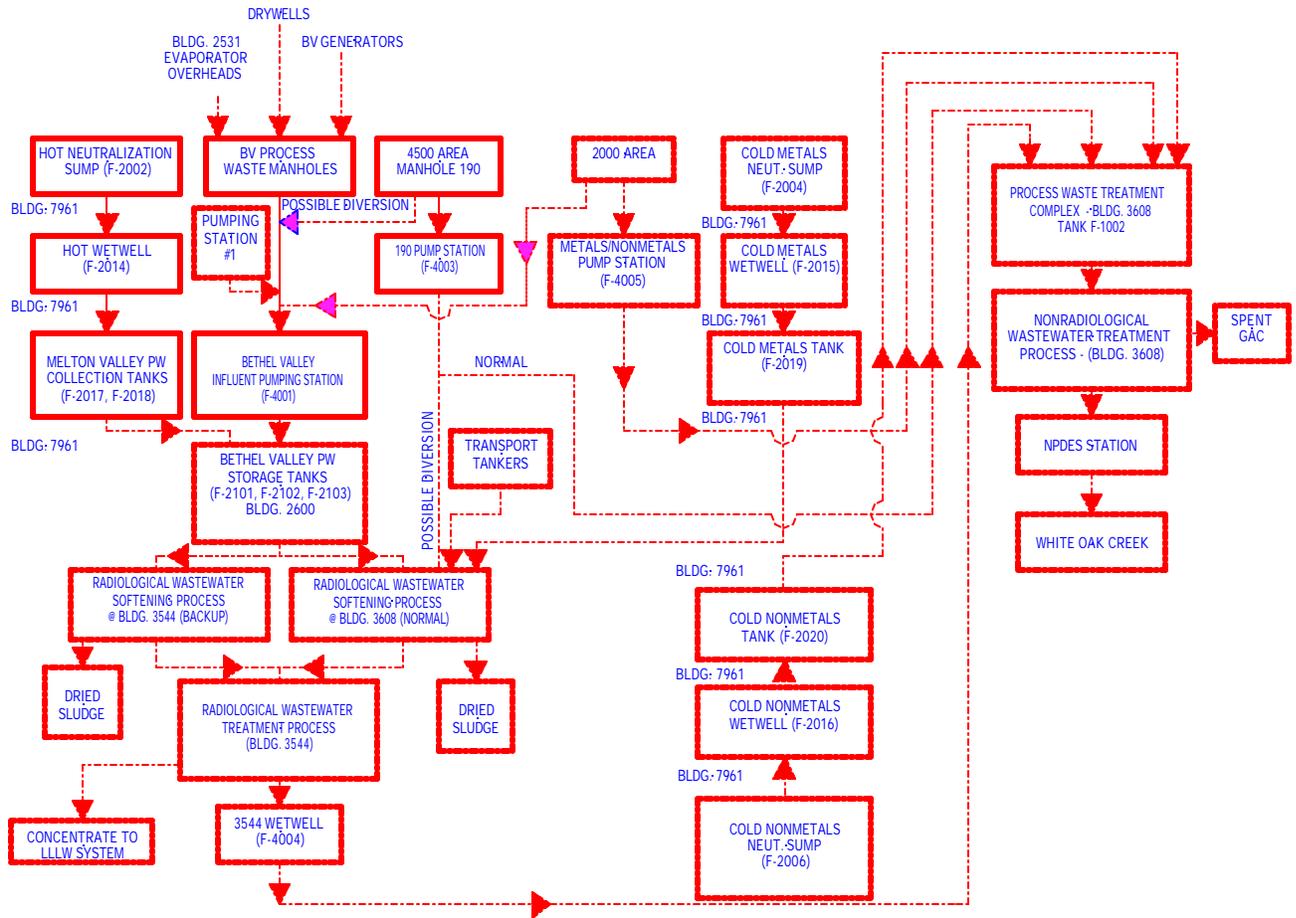
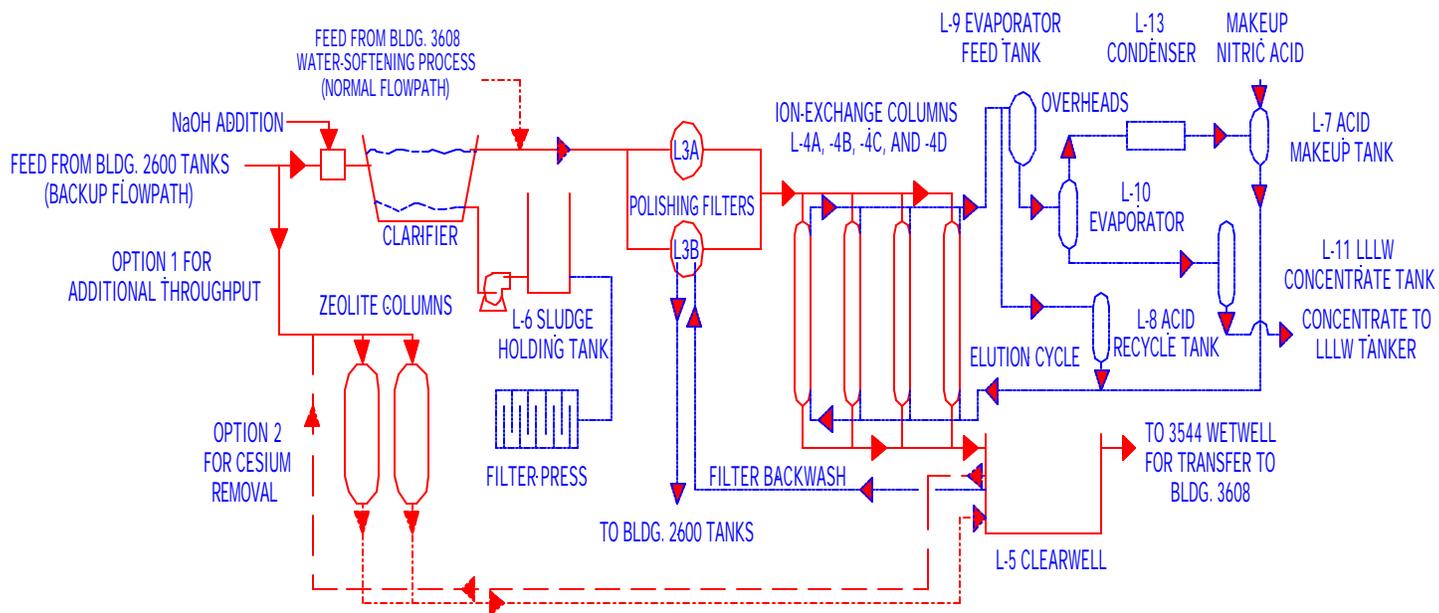


Figure 1. Diagram of the Process Waste Collection and Transfer System.
(ORNL-DWG. 96-3390R1)



BLDG. 3544 FLOW DIAGRAM

Figure 2. Flow diagram of Building 3544. (ORNL-DWG. 96-3391R1)

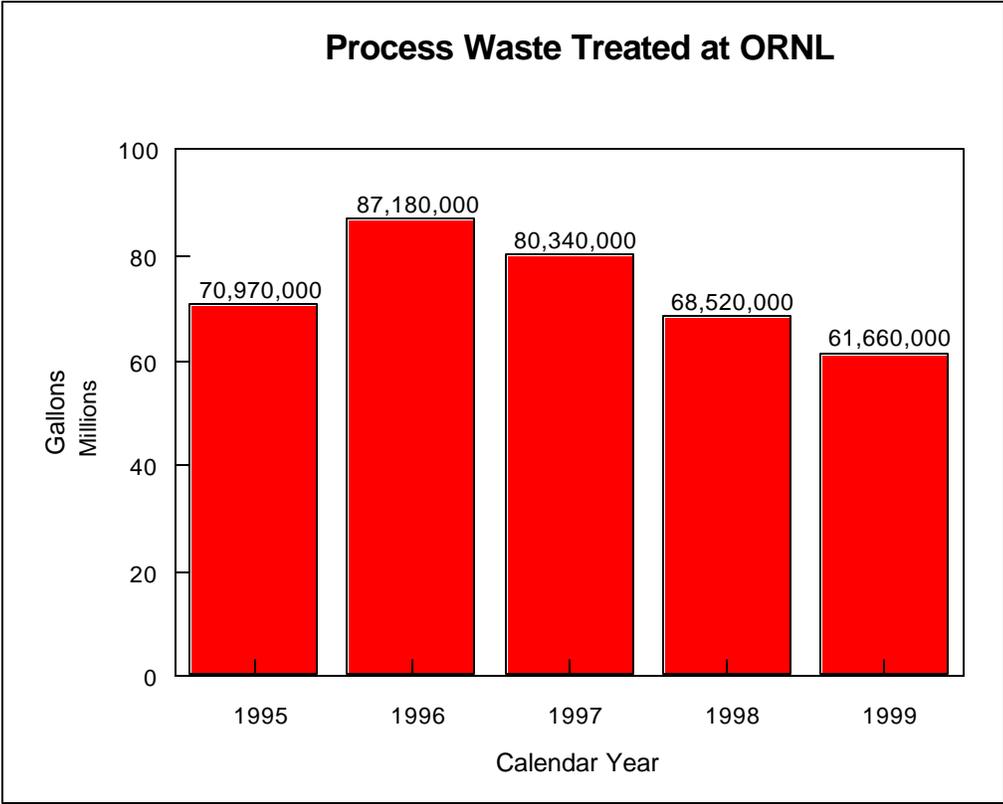


Figure 3. Process waste treated at ORNL. (ORNL-DWG. 97-5448R3)

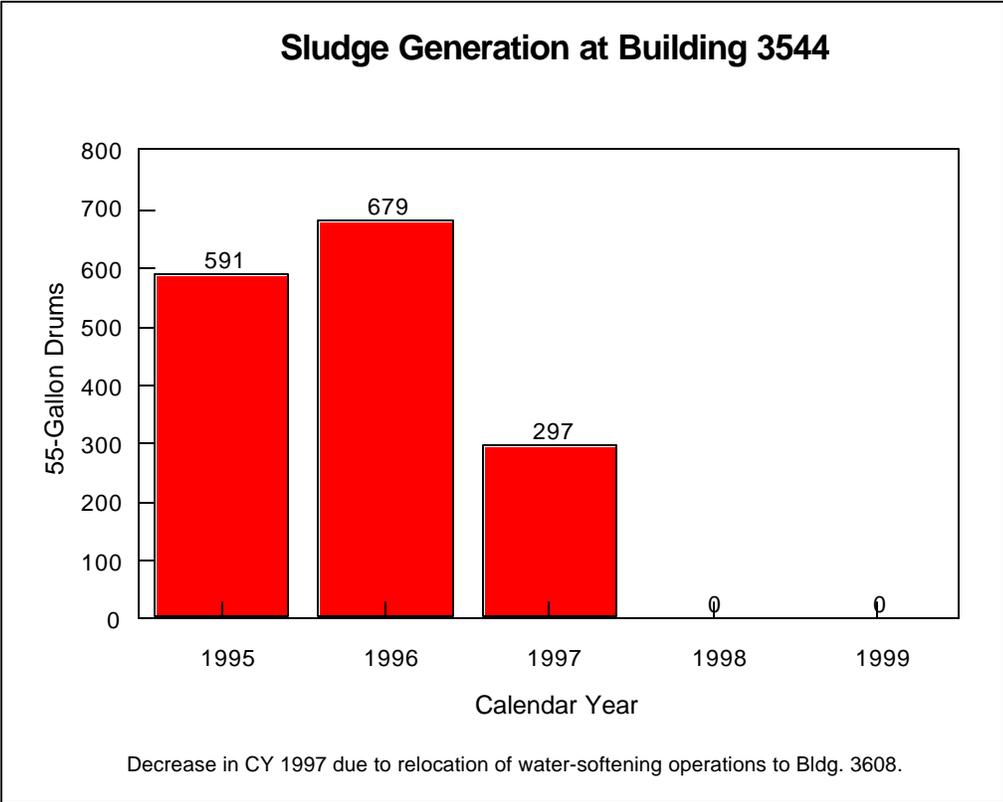


Figure 4. Sludge generation at Building 3544. (ORNL-DWG. 97-5449R3)

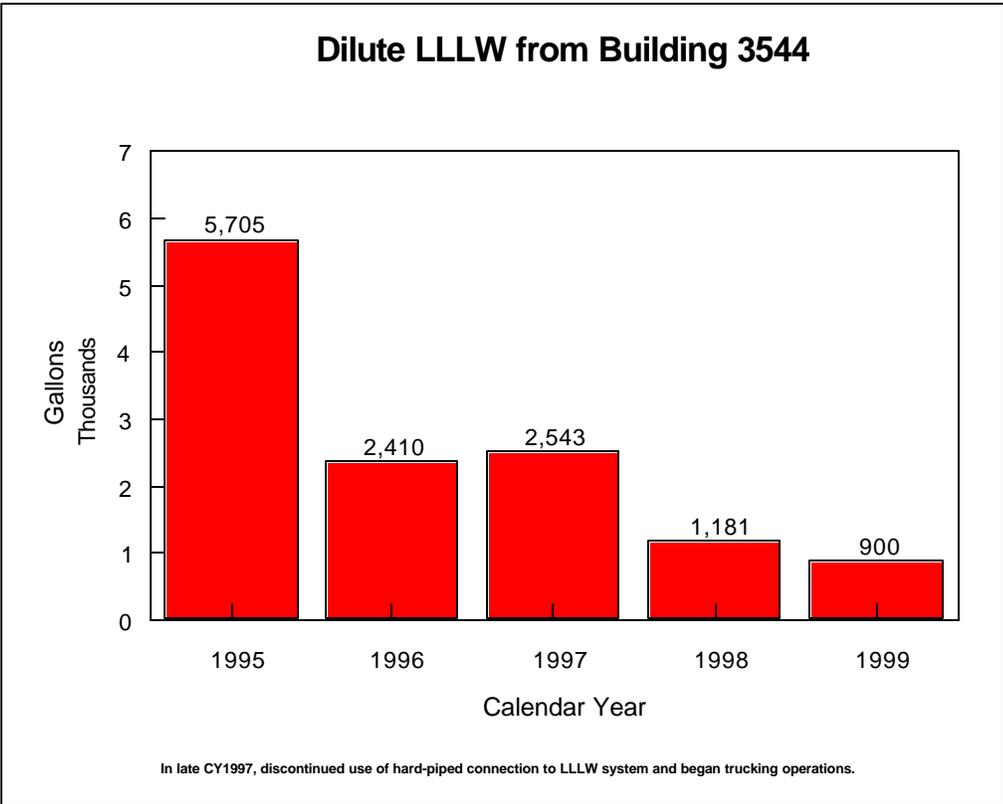


Figure 5. Dilute LLLW from Building 3544. (ORNL-DWG. 97-5450R3)

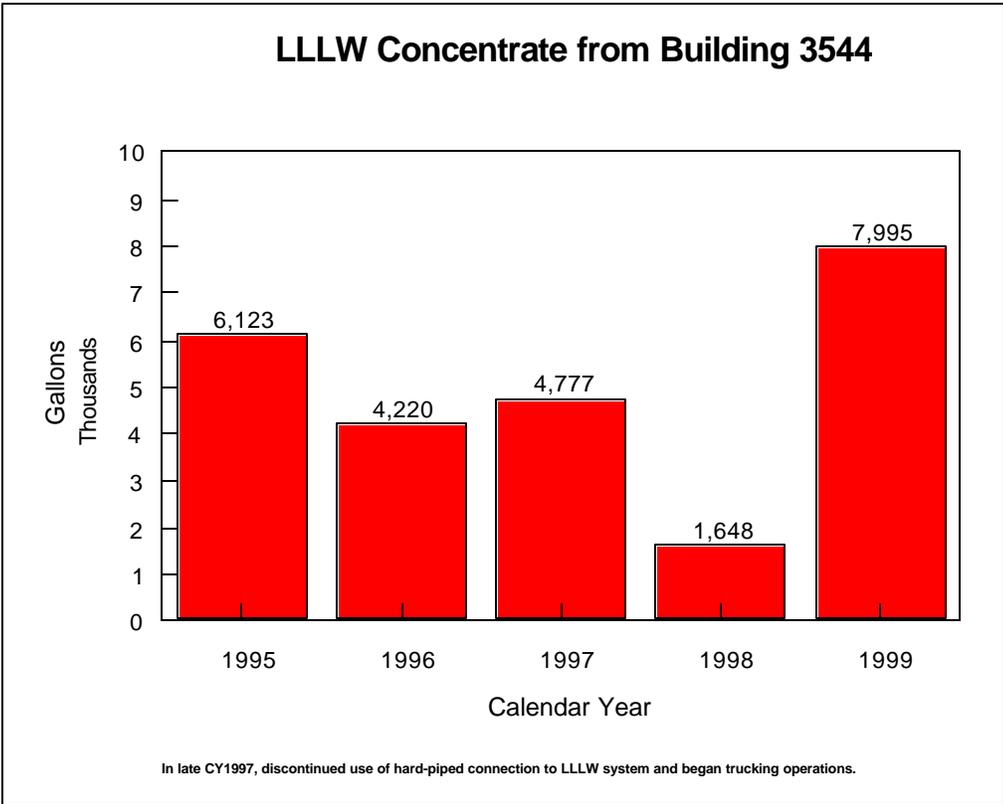


Figure 6. LLLW concentrate from Building 3544. (ORNL-DWG. 97-5451R3)

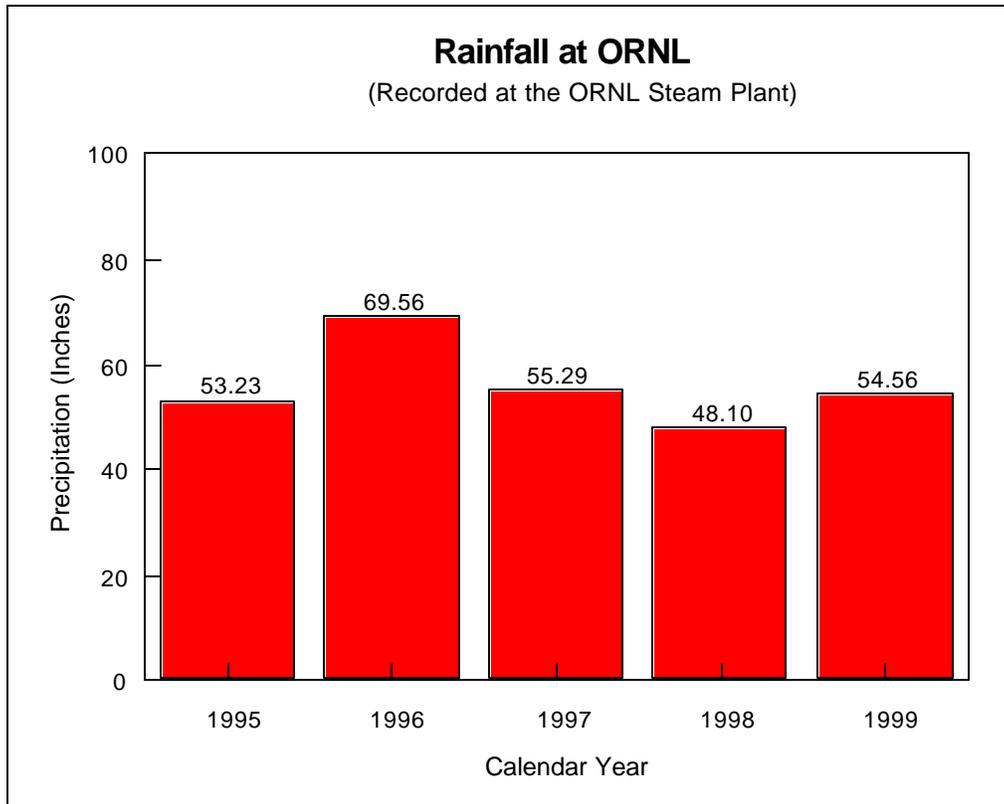


Figure 7. Rainfall at ORNL. (ORNL-DWG. 97-5452R3)

BLDG. 3608 FLOW DIAGRAM

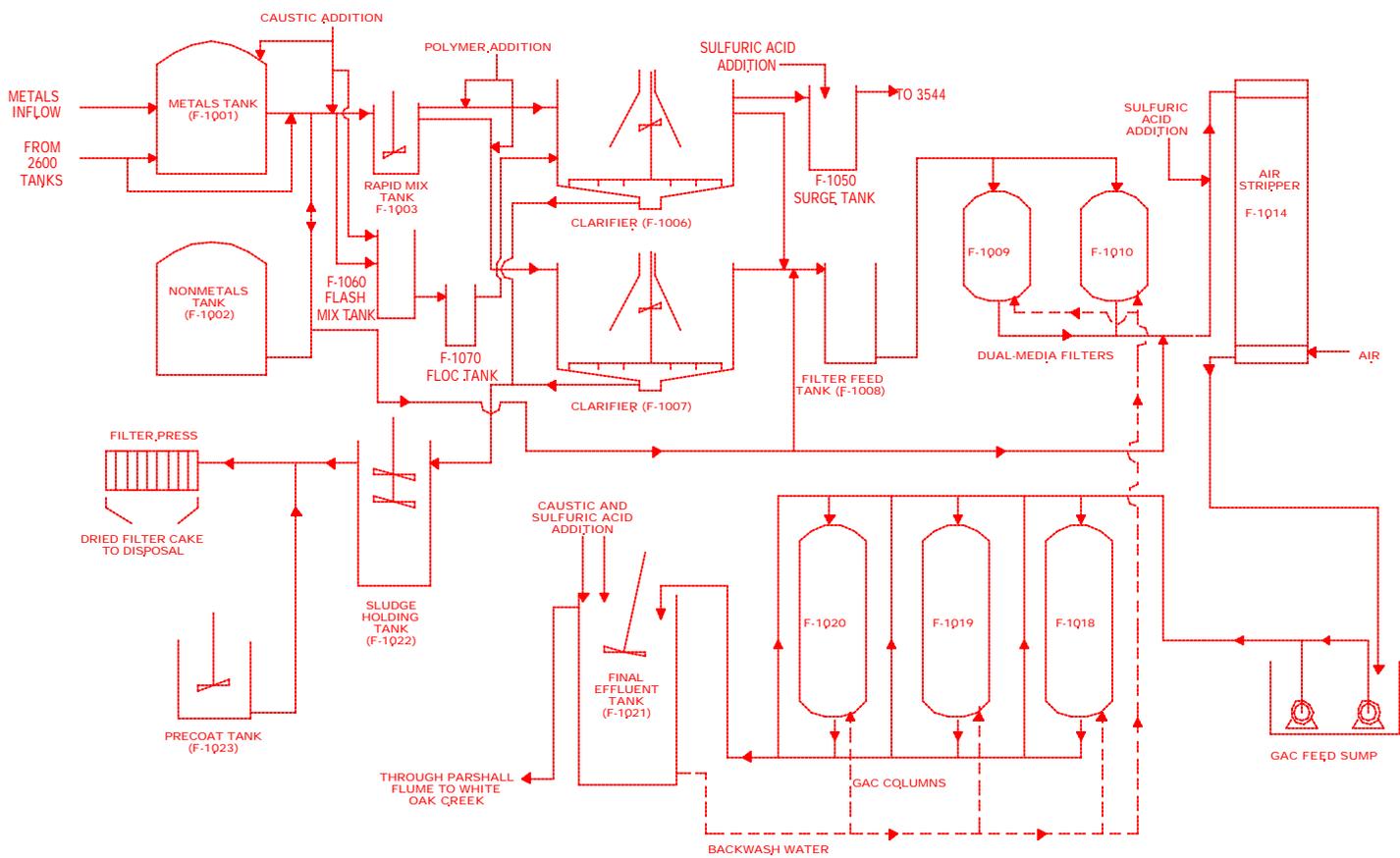


Figure 8. Flow Diagram of Building 3608. (ORNL-DWG. 96-3397R1)

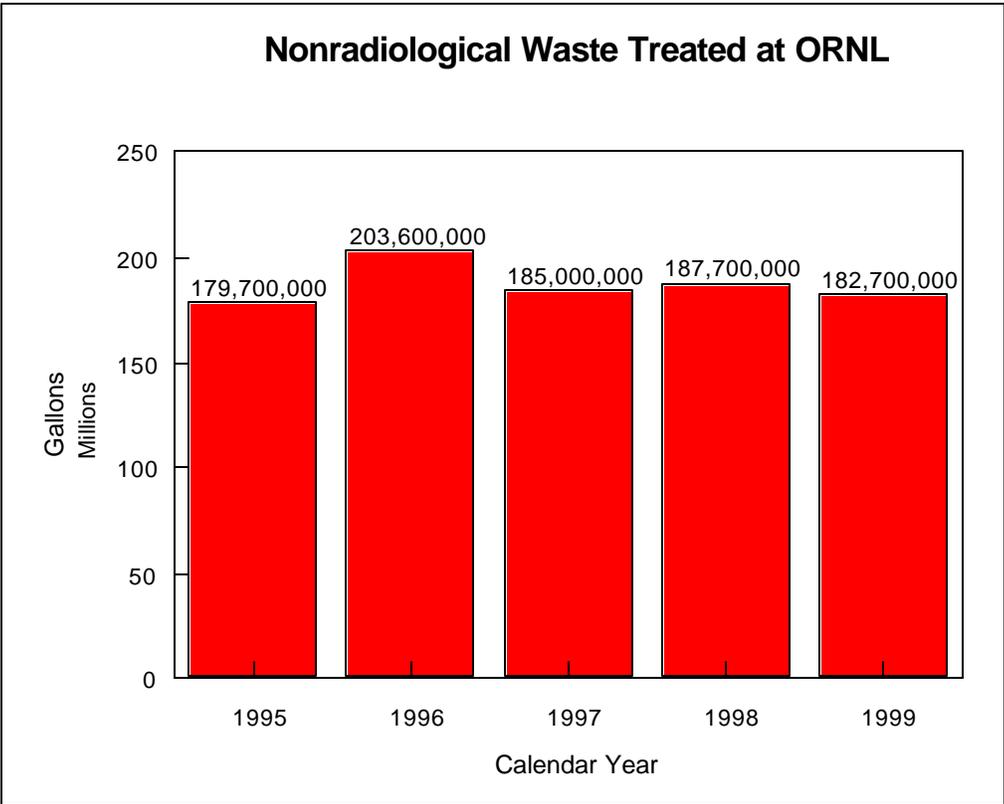


Figure 9. Nonradiological waste treated at ORNL. (ORNL-DWG. 97-5453R3)

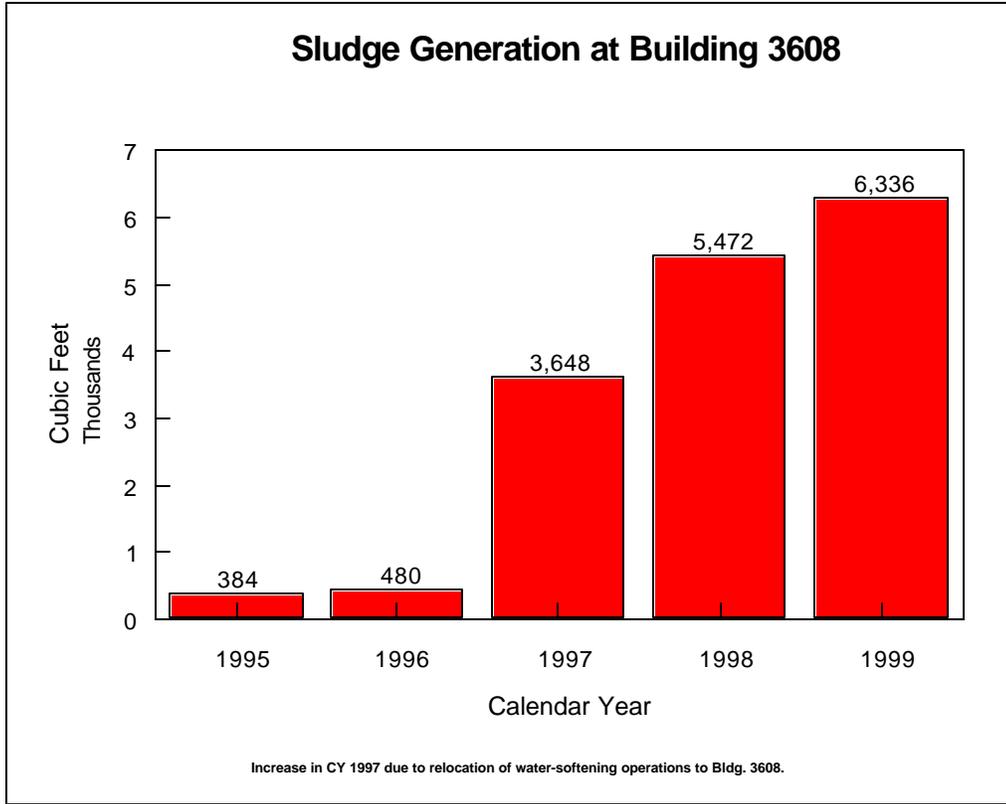


Figure 10. Sludge generation at Building 3608. (ORNL-DWG. 97-5454R3)

LLLW SYSTEM FLOW DIAGRAM

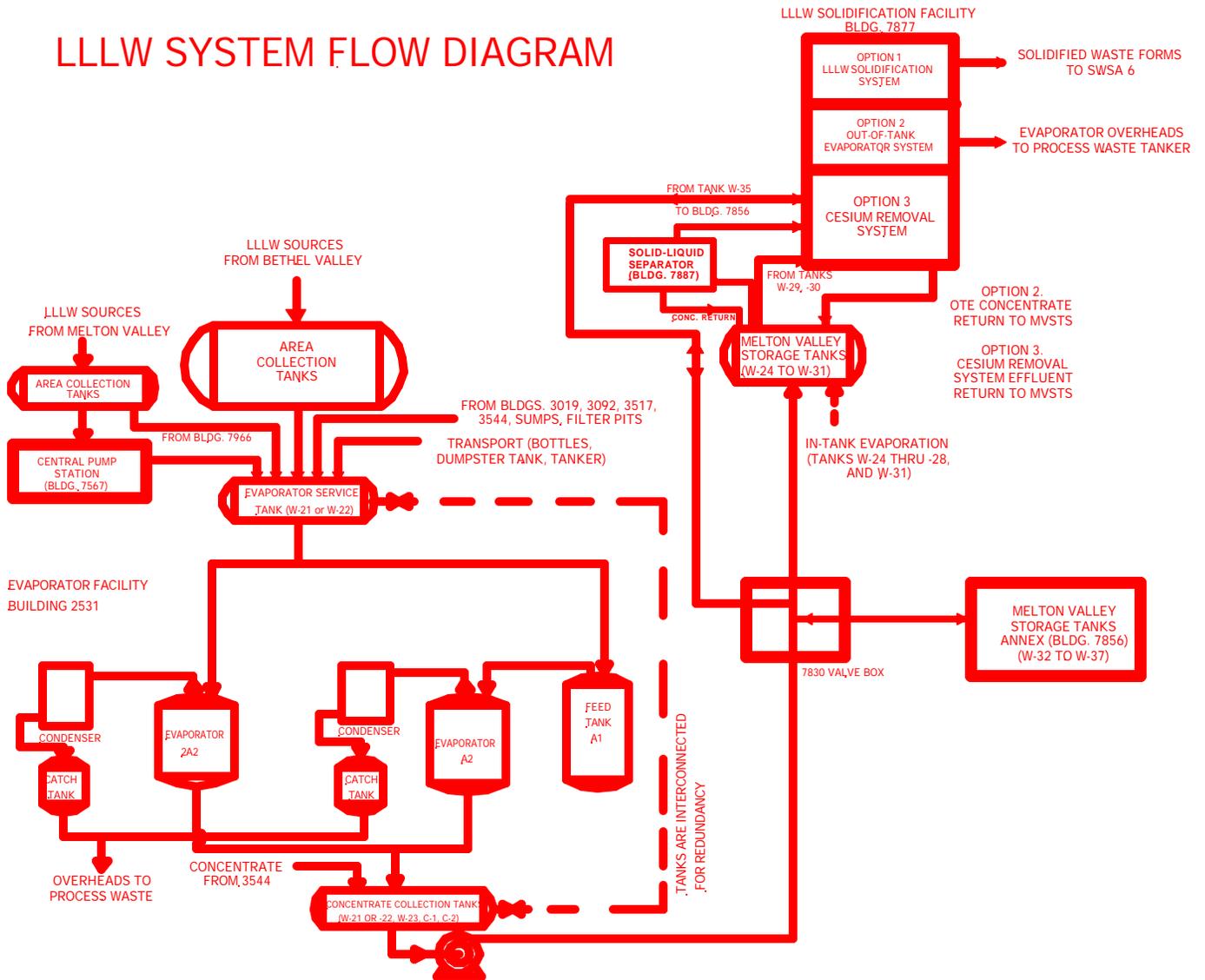


Figure 11. Diagram of the LLLW Collection and Transfer System.
(ORNL-DWG. 96-3400R1)

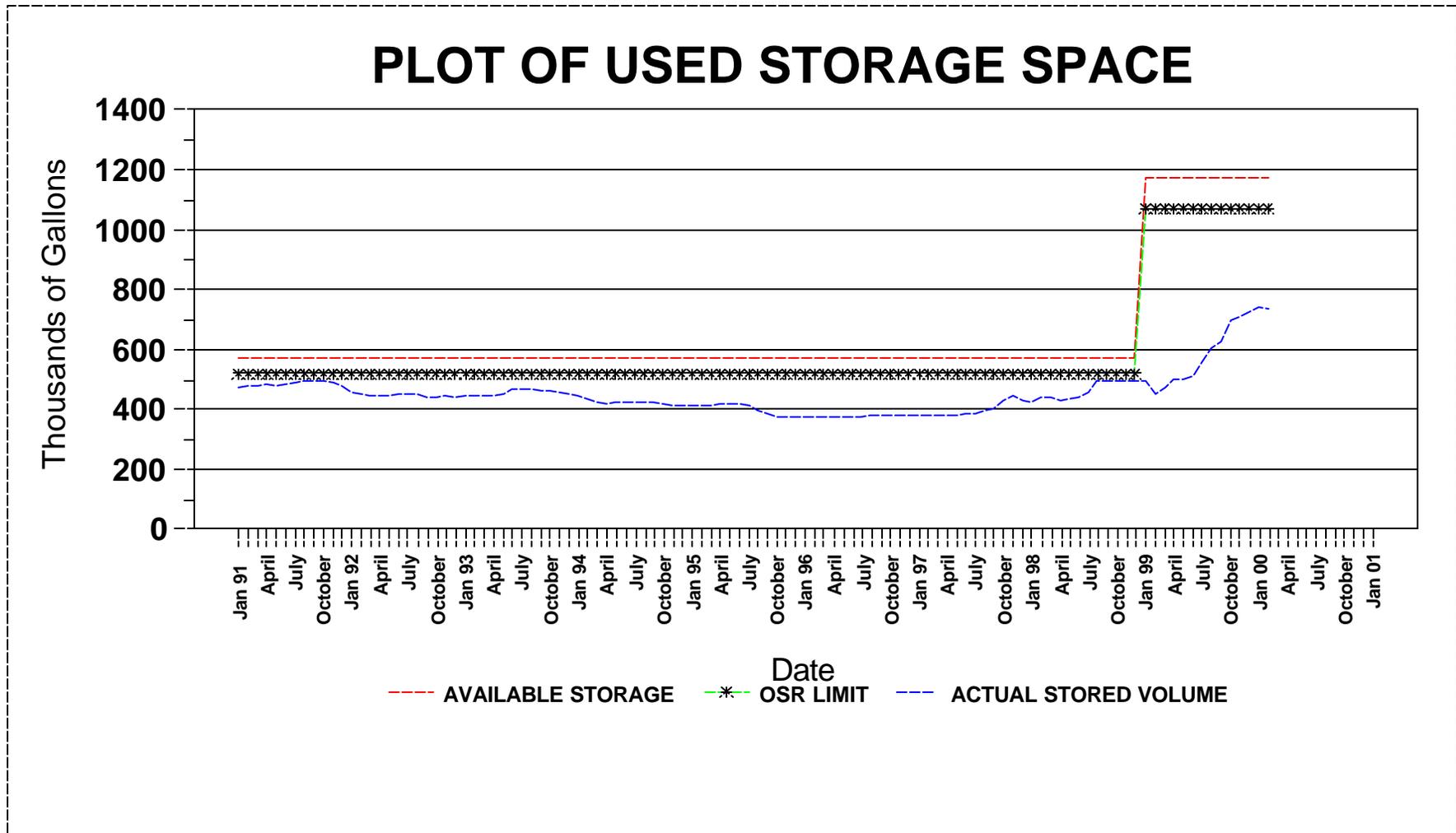


Figure 12. Used storage space versus time. (ORNL-DWG. 97-5455R3)

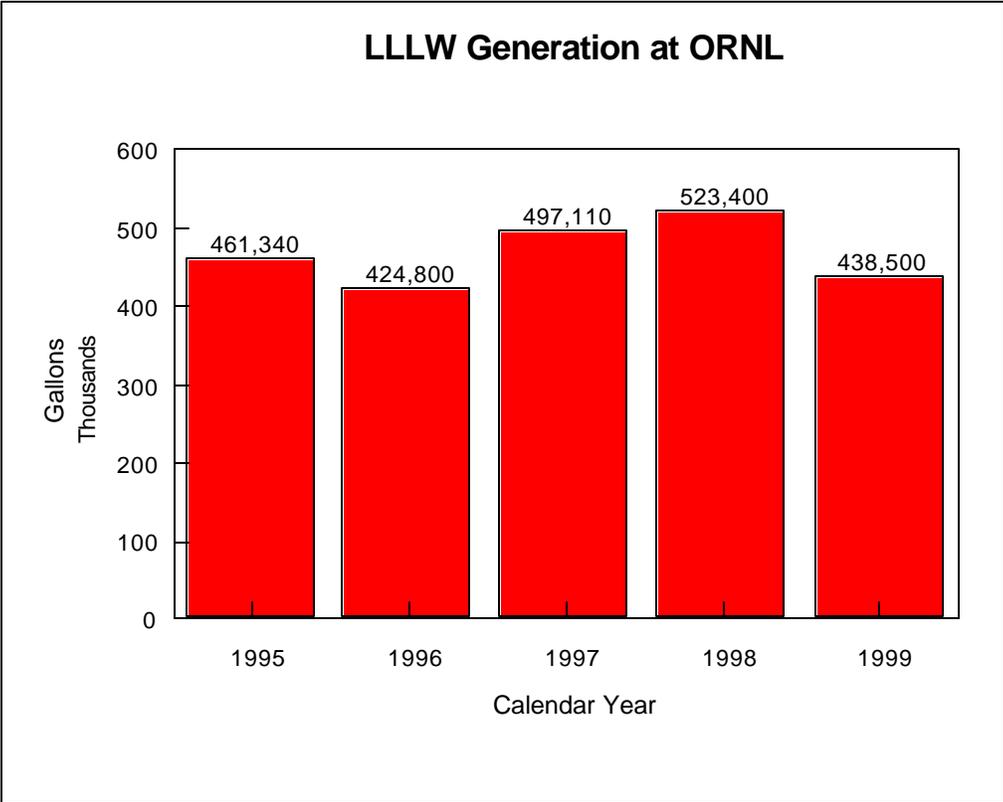


Figure 13. LLLW generation at ORNL. (ORNL-DWG. 97-5456R3)

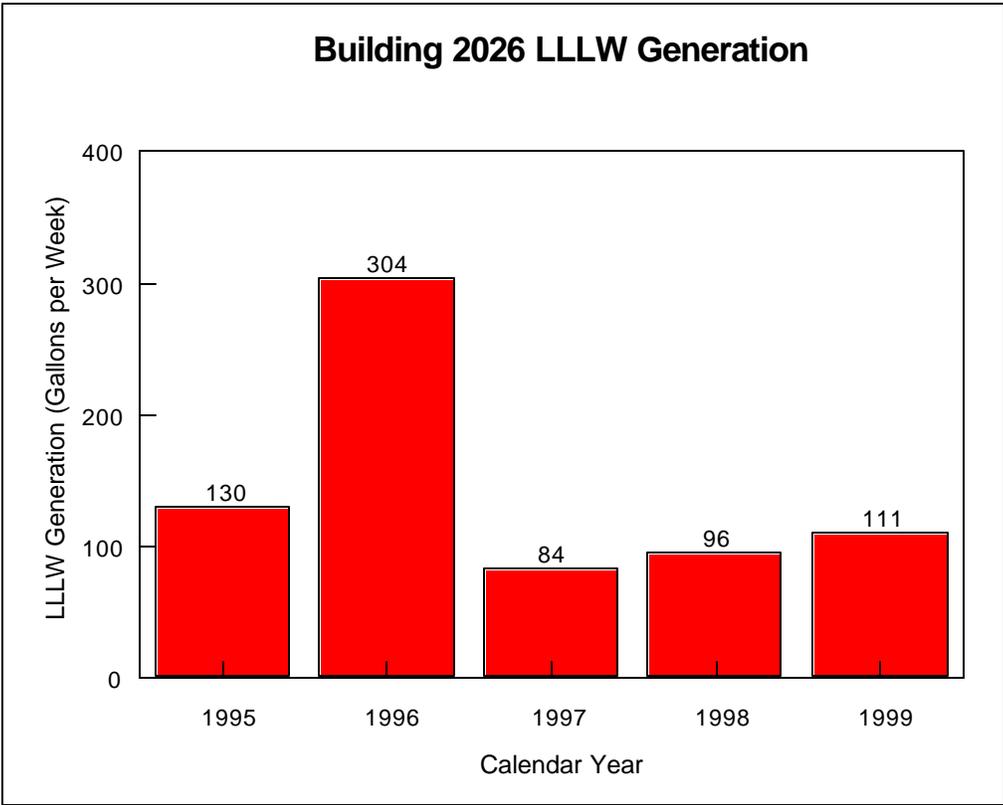


Figure 14. Building 2026 LLLW generation. (ORNL-DWG. 97-5457R3)

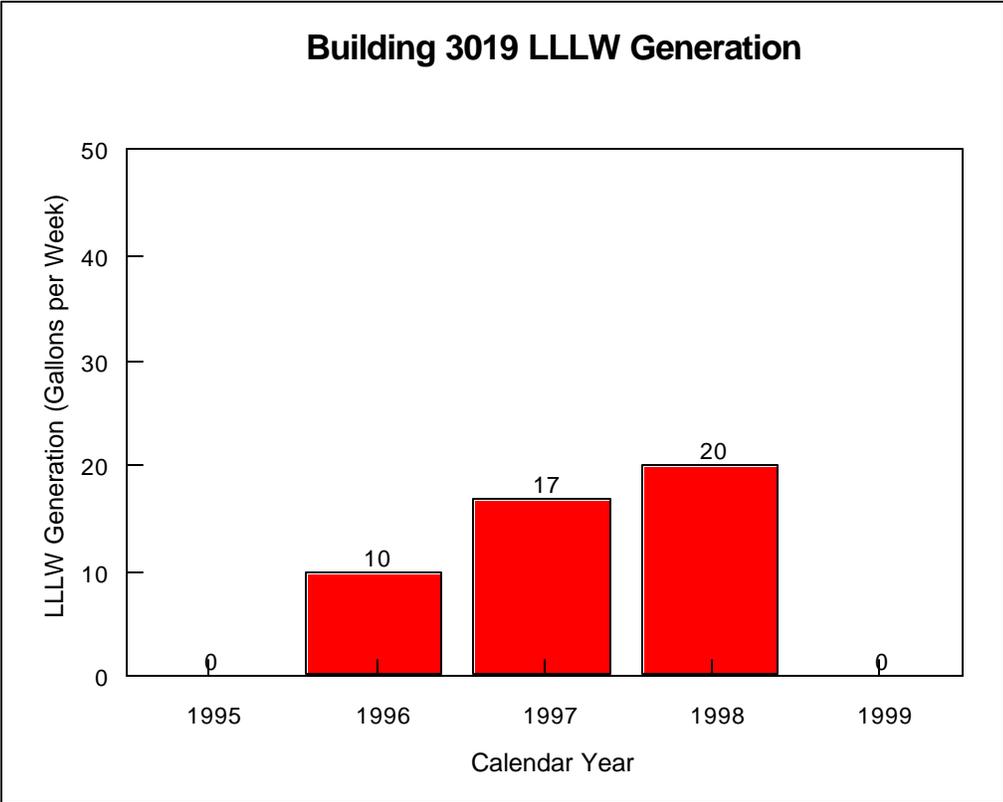


Figure 15. Building 3019 LLLW generation. (ORNL-DWG. 97-5458R3)

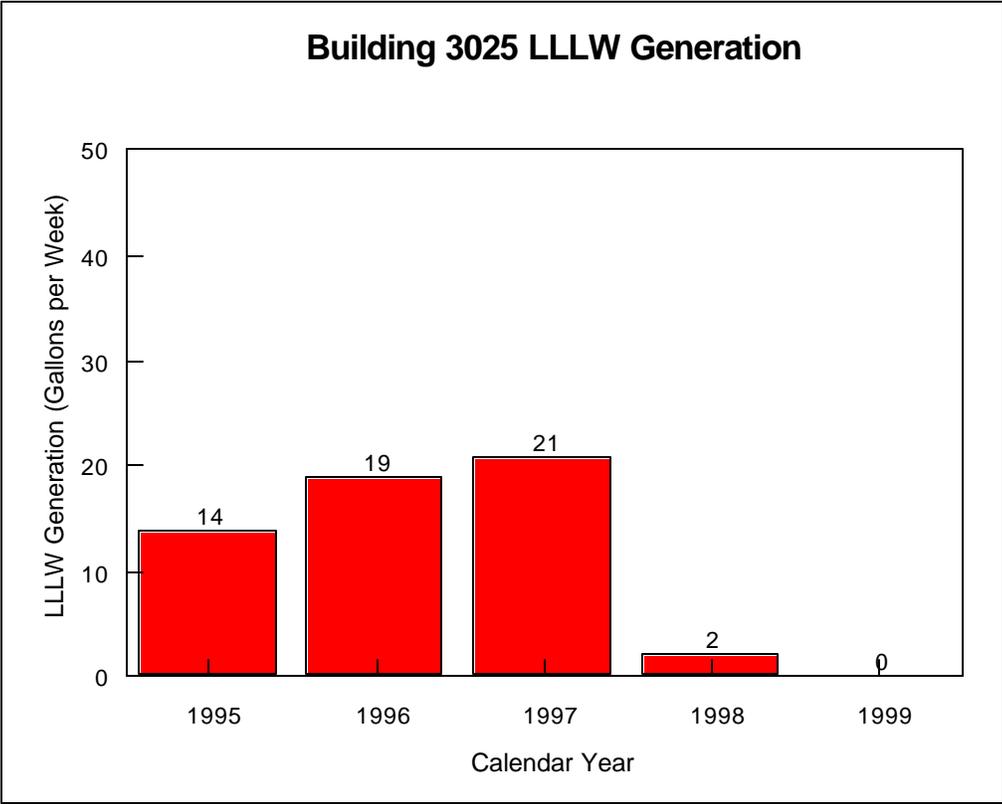


Figure 16. Building 3025 LLLW generation. (ORNL-DWG. 97-5459R3)

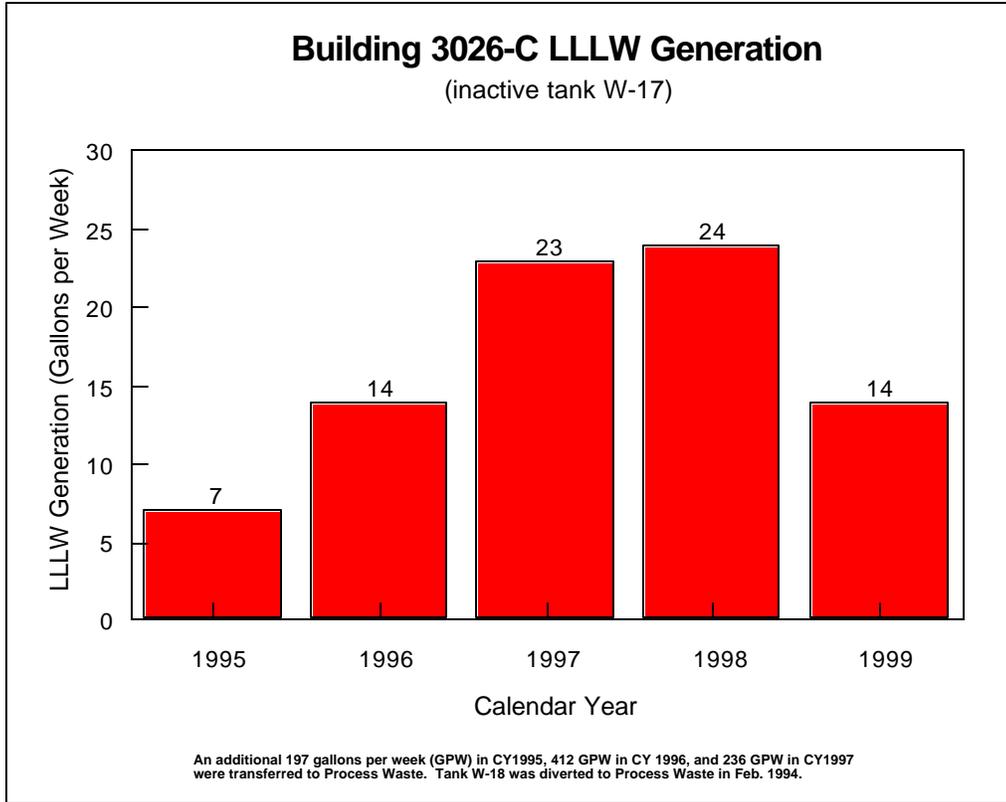


Figure 17. Building 3026-C LLLW generation. (ORNL-DWG. 97-5460R3)

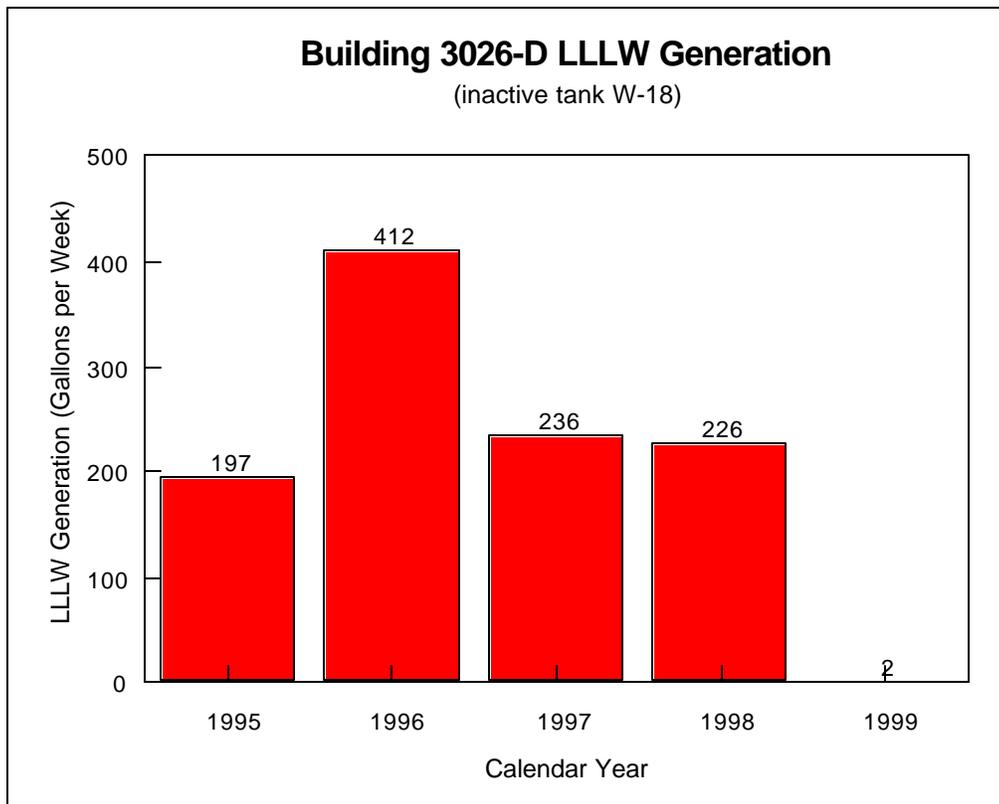


Figure 18. Building 3026-D LLLW generation. (ORNL-DWG. 97-5461R3)

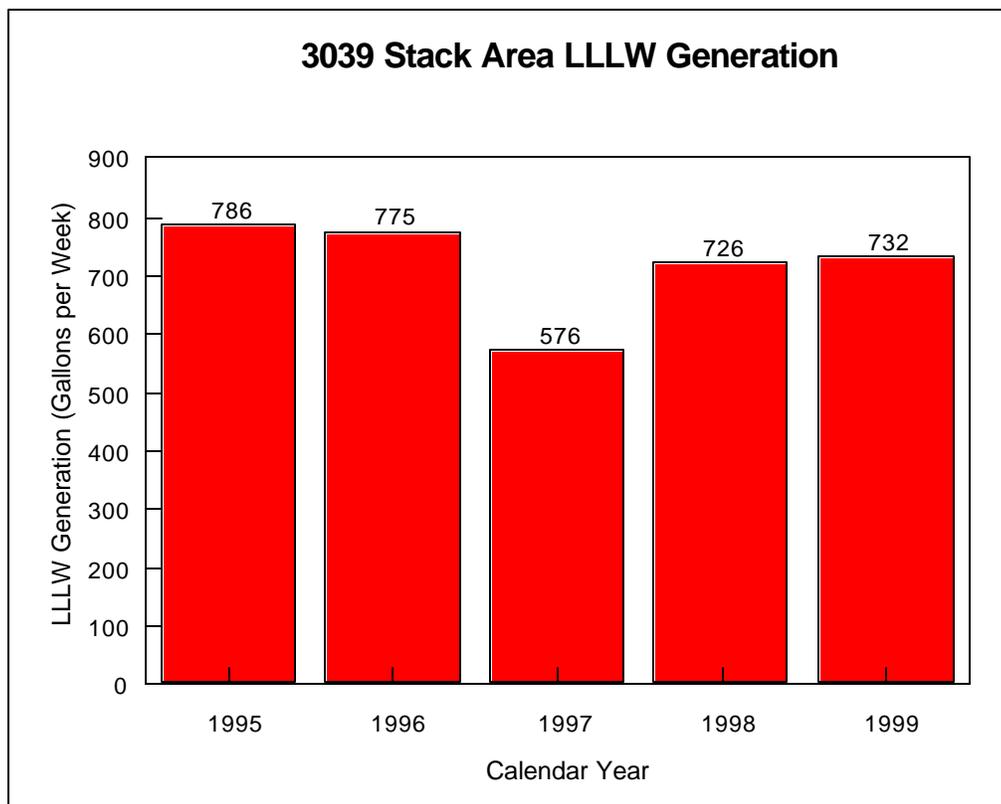


Figure 19. 3039 Stack Area LLLW generation. (ORNL-DWG. 97-5463R3)

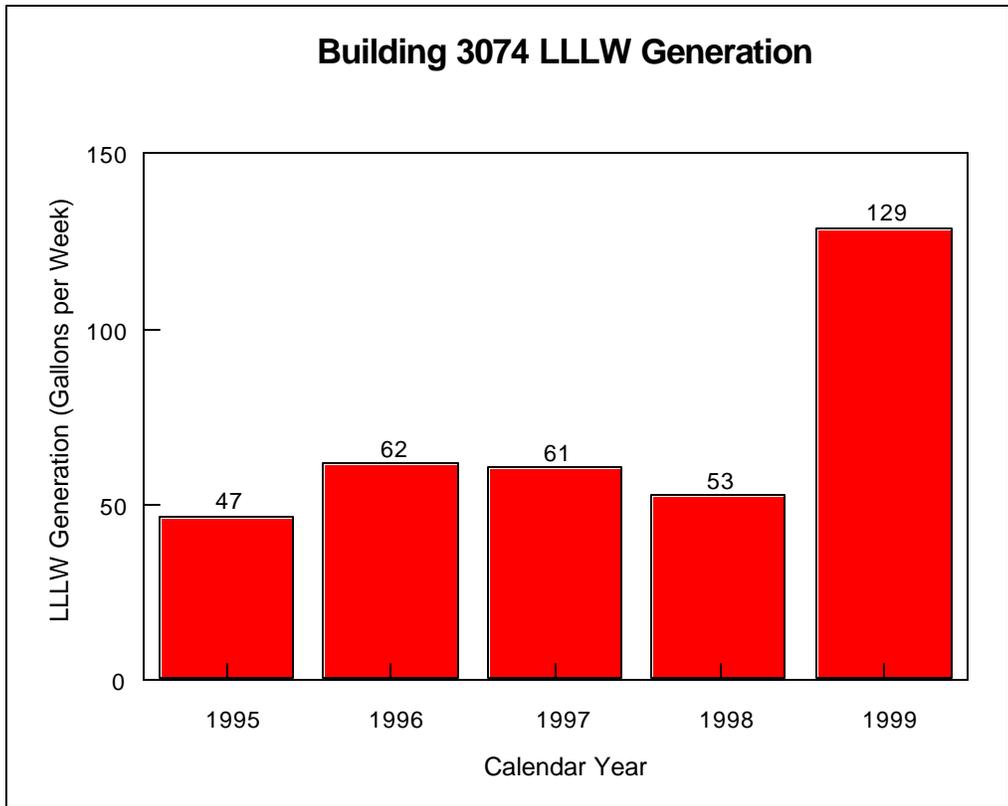


Figure 20. Building 3074 LLLW generation. (ORNL-DWG. 97-5464R3)

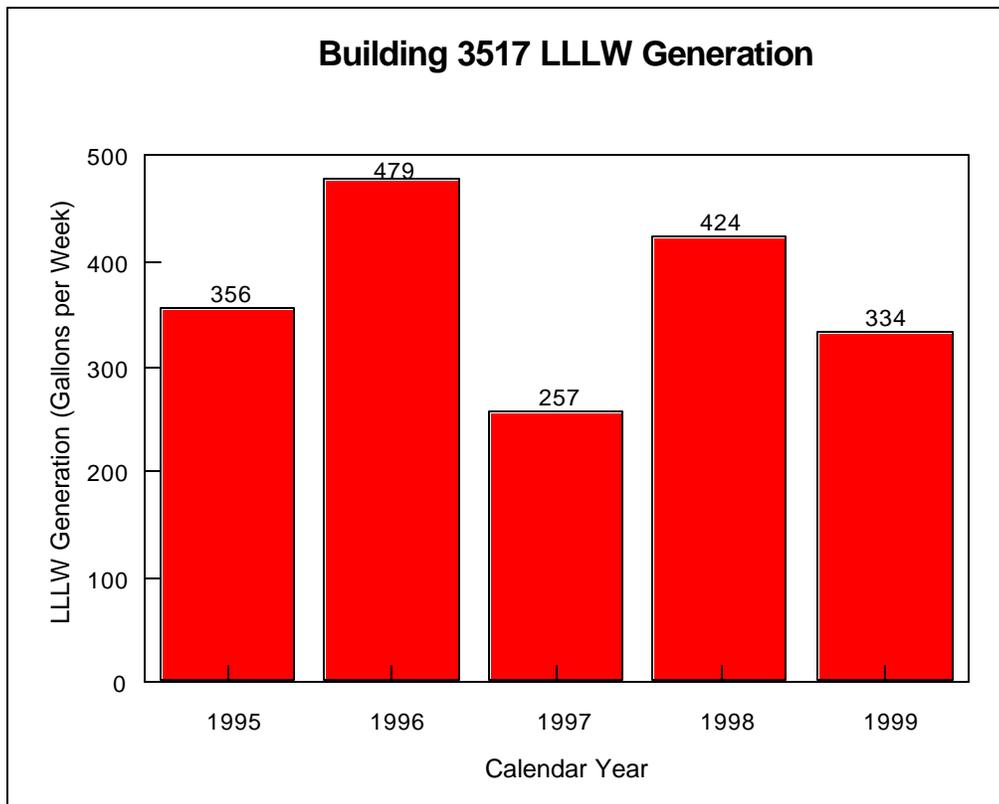


Figure 21. Building 3517 LLLW generation. (ORNL-DWG. 97-5466R3)

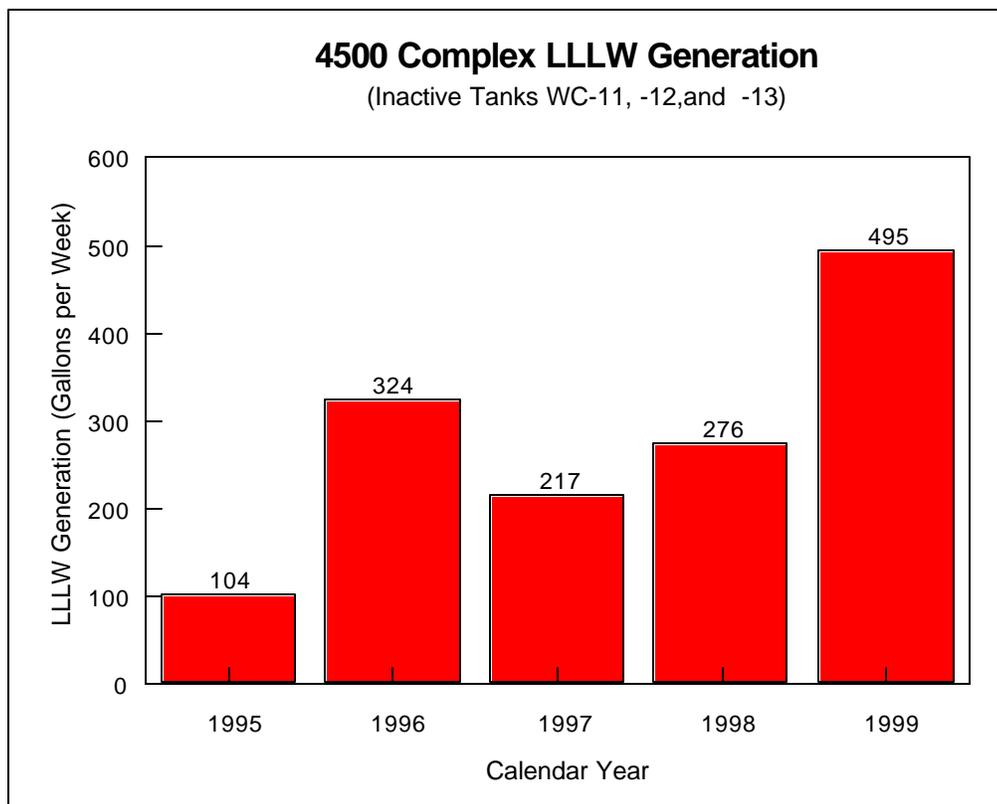


Figure 22. 4500 Complex LLLW generation. (ORNL-DWG. 97-5470R3)

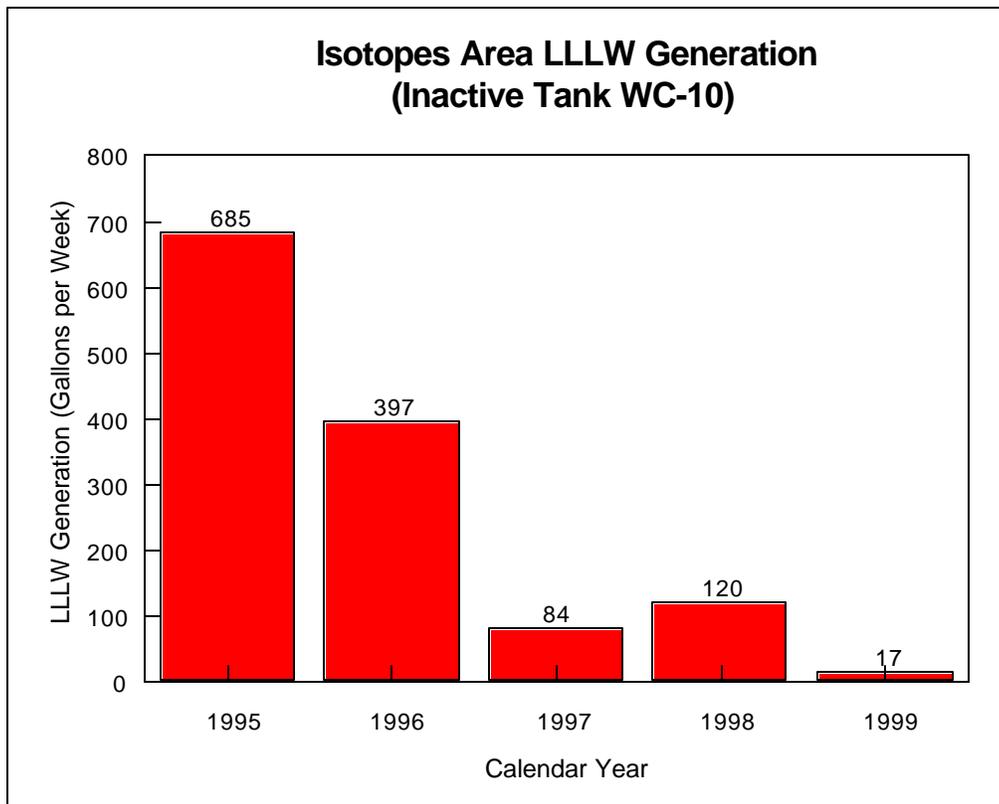


Figure 23. Isotopes Area LLLW generation. (ORNL-DWG. 97-5471R3)

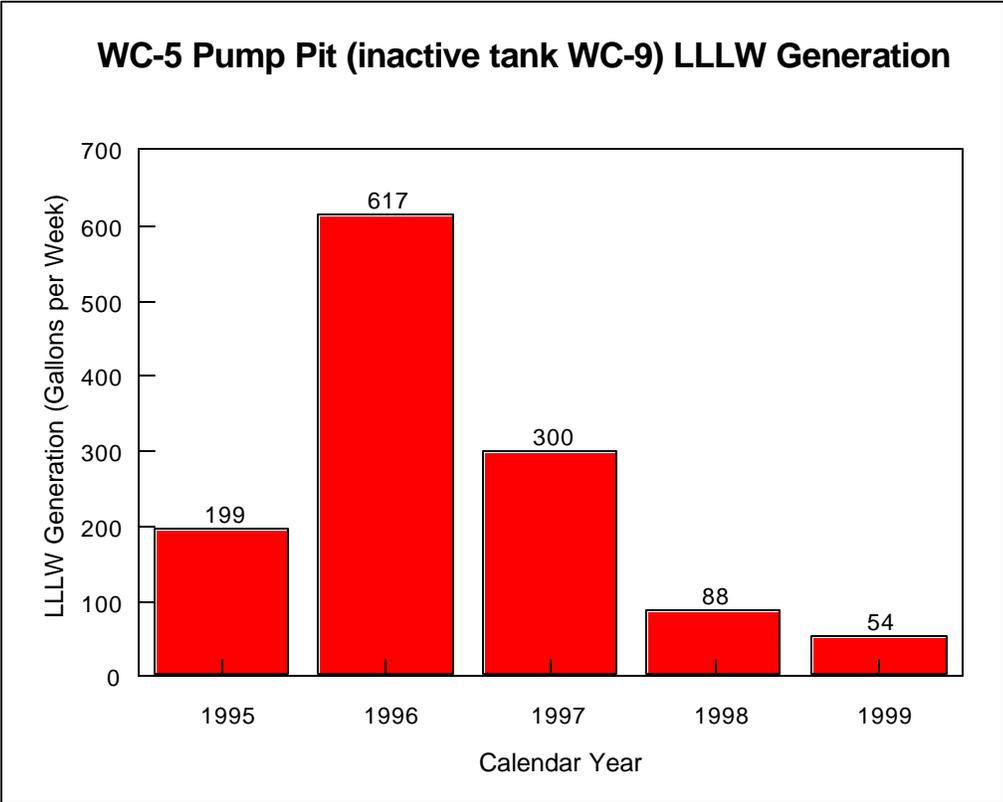


Figure 24. WC-5 Pump Pit (inactive tank WC-9) LLLW generation. (ORNL-DWG. 97-5474R3)

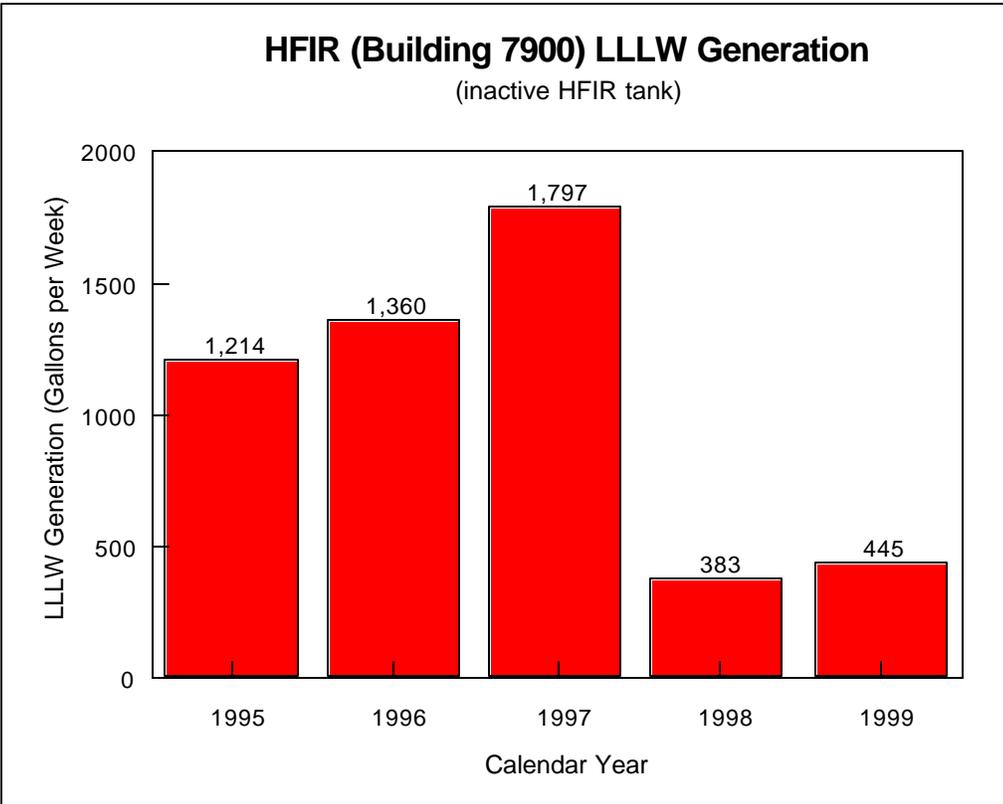


Figure 25. HFIR (Building 7900) LLLW generation. (ORNL-DWG. 97-5475R3)

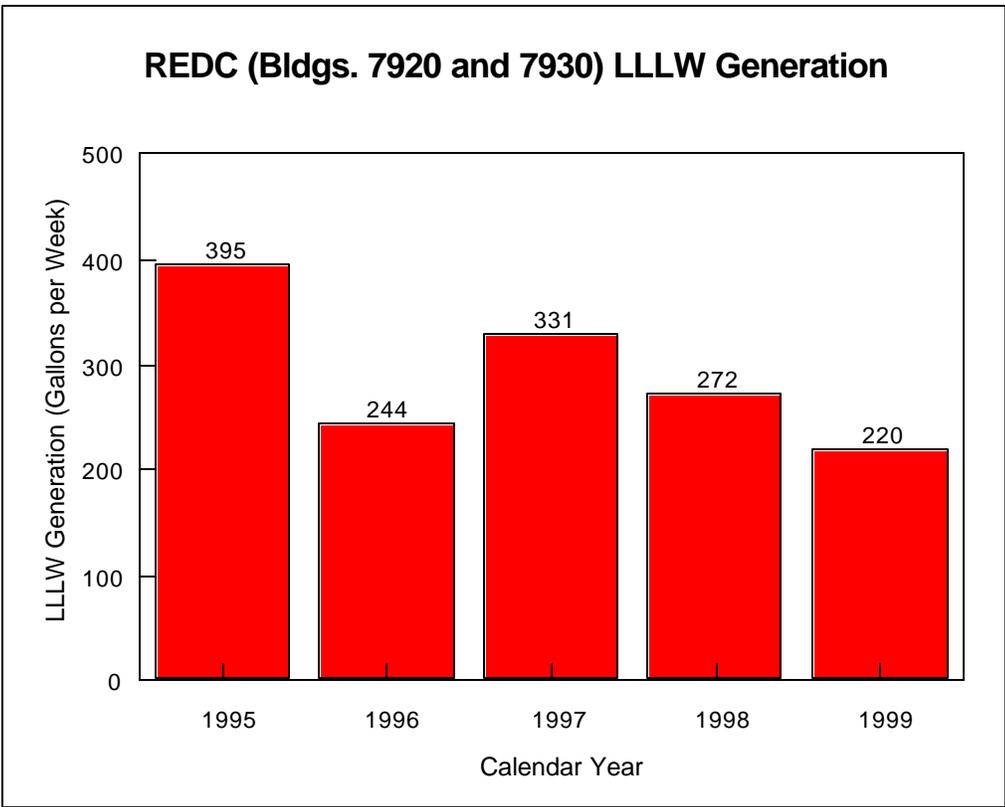


Figure 26. REDC (Bldgs. 7920 and 7930) LLLW generation. (ORNL-DWG. 97-5476R3)

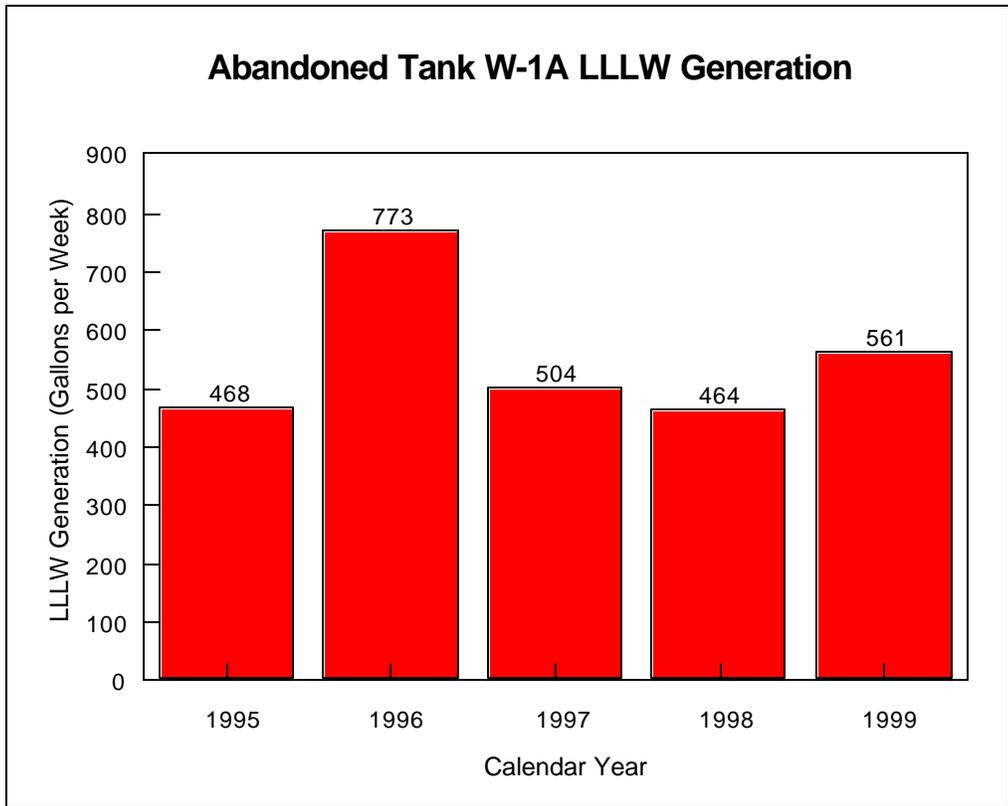


Figure 27. Abandoned tank W-1A LLLW generation. (ORNL-DWG. 97-5477R3)

3039 STACK CELL VENTILATION SYSTEM

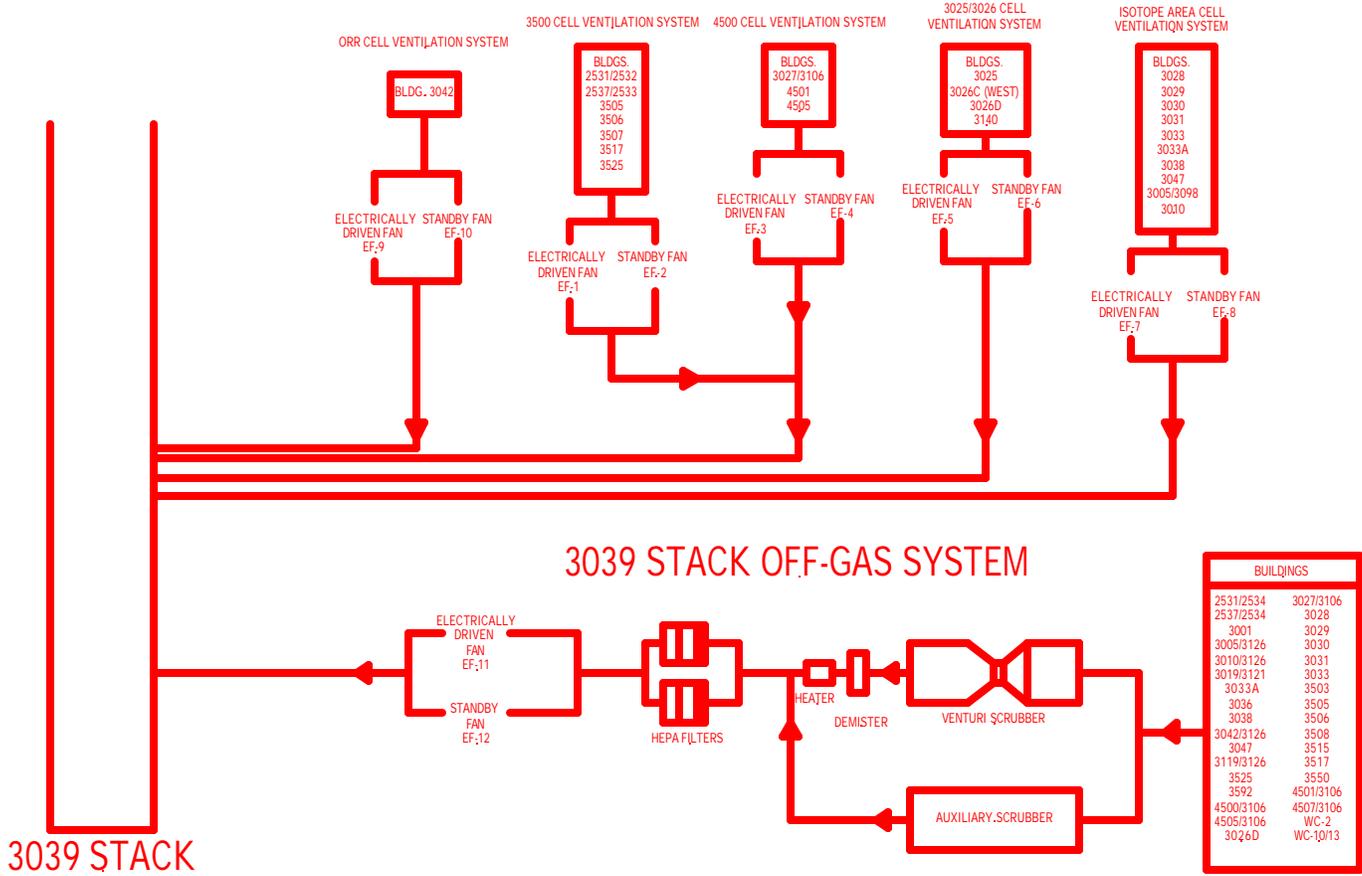


Figure 28. Diagram of the Gaseous Waste System. (ORNL-DWG. 96-3528)

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