M-5242

DOE/OR/01-1501&D1

ORNL/M--5242

Removal Site Evaluation Report for the Isotope Facilities at Oak Ridge National Laboratory, Oak Ridge, Tennessee

Advanced Sciences, Inc.

contributed to the preparation of this document and should not be considered an eligible contractor for its review.

PREFACE

This document, *Removal Site Evaluation Report for the Isotope Facilities at Oak Ridge National Laboratory, Oak Ridge, Tennessee* (DOE/OR/01-1501&D1) was prepared in accordance with requirements under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980. This work was performed under Work Breakdown Structure 1.6.6.2.10.2, "Oak Ridge National Laboratory Isotopes Facilities," and Activity Data Sheet Number 6504IS, "Oak Ridge National Laboratory Isotopes Facilities Shutdown Program." Publication of this document provides the Environmental Restoration Program with information necessary to evaluate whether hazardous and/or radiological contaminants in and around the Isotopes Facilities pose a substantial risk to human health or the environment and if remedial site evaluations or removal actions are required.

CONTENTS

FIGURES

ABBREVIATIONS

ACM	asbestos containing material
CFR	*Code of Federal Regulations*
D&D	Decontamination and Decommissioning
FPDL	Fission Products Development Laboratory
HAZMAT	hazardous material
HEPA	high-efficiency particulate air (filter)
HSRD	Health Sciences Research Division
IFDP	Isotopes Facilities Deactivation Project
KEF	Krypton-85 Enrichment Facility
LBP	lead-based paint
LLLW	liquid low-level (radioactive) waste
LMES	Lockheed Martin Energy Systems, Inc.
ORNL	Oak Ridge National Laboratory
PCB	polychlorinated biphenyl
RAD	radiologic
RCRA	Resource Conservation and Recovery Act
RDL	Radioisotope Development Laboratory
RmSE	removal site evaluation
RSE	remedial site evaluation
S&M	surveillance and maintenance
TCLP	Toxicity Characteristic Leaching Procedure
WAG	waste area grouping
WOC	White Oak Creek

EXECUTIVE SUMMARY

This removal site evaluation report for the Isotope Facilities at Oak Ridge National Laboratory was prepared to provide the Environmental Restoration Program with information necessary to evaluate whether hazardous and/or radiological contaminants in and around the Isotopes Facilities pose a substantial risk to human health or the environment (i.e., a high probability of adverse effects) and if remedial site evaluations or removal actions are, therefore, required. The scope of the project included (1) a review of historical evidence regarding operations and use of the facility; (2) interviews with facility personnel concerning current and past operating practices; (3) a site inspection; and (4) identification of hazard areas requiring maintenance, removal, or remedial actions.

The results of the removal site evaluation indicate that no substantial risks exist from contaminants present in the Isotope Facilities because adequate controls and practices exist to protect human health and the environment. There are, however, several maintenance actions being undertaken or proposed:

- Building 3026-C—The crawl space at the southwest corner of the facility is posted as a radiological hazard area. Openings in the foundations could allow wind or small animals to carry contamination away from the area. Repairs are scheduled for completion by the end of July 1996.
- Buildings 3026-C and D—Paint from exterior walls and cell ventilation duct work is peeling off and has fallen to the ground. The paint is assumed to be lead based, and this poses a potential direct impact to the soil below and an indirect impact to surface water. A maintenance action will be necessary to prevent further deterioration and dislodging of the paint. Also, a remedial site evaluation should be conducted to determine whether lead from fallen paint chips has impacted the soil.
- Building 3026-D—Zinc-bromide leaking from viewing windows is being recycled back into the windows. The windows should be repaired and the leaks stopped.
- Building 3034—Paint from exterior piping is peeling off and has fallen to the ground. The paint is assumed to be lead based, and this poses a potential direct impact to the soil below and an indirect impact to surface water. A maintenance action will be necessary to prevent further deterioration and dislodging of the paint. Also, a remedial site evaluation should be conducted to determine whether lead from fallen paint chips has impacted the soil.
- Building 3047—An emergency diesel generator outside the facility may generate small quantities of fuel during repairs. Maintenance personnel have been reminded of the precautions that need to be taken to prevent spills during repairs.
- Building 7025—An underground collection tank outside the facility was reportedly the discharge point for the hot sink located in the tritium hood within the building. Reportedly, the hood did not generate liquid waste, and the contents of the tank have been removed. While no evidence of a leak exists, an internal tank inspection will be conducted by September 30, 1996.

The recommended corrective actions from the removal site evaluation are being conducted as maintenance actions; accordingly, this removal site evaluation is considered complete and terminated.

1. INTRODUCTION

This removal site evaluation (RmSE) report for the Isotope Facilities at Oak Ridge National Laboratory (ORNL) was prepared to provide the Environmental Restoration Program with information necessary to evaluate whether hazardous and/or radiological contaminants in and around the Isotopes Facilities pose a substantial risk to human health or the environment (i.e., a high probability of adverse effects) and if remedial site evaluations (RSEs) or removal actions are, therefore, required. The scope of the project included (1) a review of historical evidence regarding operations and use of the facility; (2) interviews with facility personnel concerning current and past operating practices; (3) a site inspection; and (4) identification of hazard areas requiring maintenance, removal, or remedial actions.

The results of the RmSE indicate that no substantial risks exist from contaminants present in the Isotope Facilities because adequate controls and practices exist to protect human health and the environment. The recommended corrections from the RmSE (see Buildings 3026-C and D, 3034, 3047, and 7025) are being conducted as maintenance actions; accordingly, this RmSE is considered complete and terminated.

2. SUMMARY OF REMOVAL SITE EVALUATIONS

2.1 BUILDING 3026-C—KRYPTON-85 ENRICHMENT FACILITY

Building 3026-C is currently in an inactive, standby mode awaiting entry into the Decontamination and Decommissioning (D&D) Program. There are no current, on-going operations in this building other than surveillance, maintenance, and deactivation activities. The building is accessed periodically by personnel to conduct various surveillance and maintenance (S&M) and deactivation activities; otherwise, the building remains secured from public access.

There were no imminent hazard areas requiring removal actions identified inside Building 3026-C during this RmSE. Radiologic (RAD) hazard areas, asbestos containing materials (ACMs), and items containing polychlorinated biphenyl (PCBs) are marked and isolated as necessary to ensure worker safety and inadvertent release within the facility. In addition, a combination of engineering and administrative controls are in place and are enforced within the facility for worker and environmental protection. Current actions being taken to prevent further release of contamination and ensure worker safety within Building 3026-C are considered adequate until D&D activities begin.

There were, however, two external imminent hazard areas identified to be associated with Building 3026-C. One involved the crawl space area located at the southwest corner of the facility. The area is posted as a RAD hazard area due to contaminated soil. Openings in the foundation surrounding the crawl space were observed during the site inspection. Soil in the crawl space appeared dry, with a loose surface layer. As a result, strong air movement through this area due to winds could potentially disturb the loose soil and carry contaminated particles away from the crawl space. This poses an exposure potential to personnel who might be in the immediate area during a wind episode. Additionally, these foundation openings allow access to small animals, which could become contaminated and leave the crawl space carrying contamination away from the area. Regarding the recommended maintenance action to control air movement and access in this area, a request for repair of the opening to the crawl space under Building 3026-C was prepared and is scheduled for completion by the end of July 1996.

The other imminent hazard area involves deteriorating painted, wooden exterior walls and cell ventilation duct work surfaces adjacent to the north side of the building. The paint in this building has been assumed to contain lead by the ORNL Lead Management Program based on the age of the facility. Paint in the areas mentioned is peeling off, posing a potential direct impact to the soil below and an indirect impact to surface water as a result of runoff with storm water. The paint on the building has been sampled, and the analysis is expected by the end of June 1996. If the paint contains lead, a maintenance action will be necessary to prevent further deterioration and dislodging of this paint. In addition, an RSE should be conducted to determine whether lead from fallen paint chips has impacted the soil in the immediate area. (See the Building 3026-C RmSE information form for additional information concerning these areas.)

2.2 BUILDING 3026-D—SEGMENTING HOT CELL FACILITY

Building 3026-D is currently in an inactive, standby mode awaiting entry into the D&D Program. There are no current, on-going operations in this building other than surveillance, maintenance, and deactivation activities. The building is accessed periodically by personnel to

conduct various S&M and deactivation activities; otherwise, the building remains secured from public access.

There were no imminent hazard areas requiring removal actions identified inside Building 3026-D during this RmSE. RAD hazard areas, ACMs, and items containing PCBs are marked and isolated as necessary to ensure worker safety and inadvertent release within the facility. In addition, a combination of engineering and administrative controls are in place and are enforced within the facility for worker and environmental protection. Current actions being taken to prevent further release of contamination and ensure worker safety within Building 3026-D are considered adequate until D&D activities begin.

There was, however, one external imminent hazard area identified to be associated with Building 3026-D. This is an area involving deteriorating painted, wooden exterior walls and cell ventilation duct work surfaces adjacent to the north side of the building. The paint in this building has been assumed to contain lead by the ORNL Lead Management Program based on the age of the facility. Paint in the areas mentioned is peeling off, posing a potential direct impact to the soil below and an indirect impact to surface water as a result of runoff with storm water. The paint on the building has been sampled, and the analysis is expected by the end of June 1996. If the paint contains lead, a maintenance action will be necessary to prevent further deterioration and dislodging of this paint. In addition, an RSE should be conducted to determine whether lead from fallen paint chips has impacted the soil in the immediate area.

It should also be noted that zinc-bromide is leaking from some of the viewing windows in the east cell bank. These leaks are currently controlled by collecting leaking fluid in a drum and pumping it back into the window. While this provides a temporary means of control and does not present an immediate threat, it is recommended that either the leaking windows be repaired and the leaks stopped or that the fluid be drained and disposed of if it is no longer needed. This will reduce or eliminate the potential for an inadvertent hazardous material (HAZMAT) release within the facility. (See Building 3026-D RmSE information form for additional information concerning these areas.)

2.3 BUILDING 3028—ALPHA POWDER FACILITY

Building 3028 is currently in an inactive, standby mode awaiting entry into the D&D Program. There are no current, on-going operations in this building other than surveillance, maintenance, and deactivation activities. The building is accessed periodically by personnel to conduct various S&M and deactivation activities; otherwise, the building remains secured from public access.

There were no imminent hazard areas requiring removal actions identified to be associated with Building 3028 during this RmSE. RAD hazard areas and ACMs are marked and isolated as necessary to ensure worker safety and inadvertent release within the facility. In addition, a combination of engineering and administrative controls are in place and are enforced within the facility for worker and environmental protection. Current actions being taken to prevent further release of contamination and ensure worker safety within Building 3028 are considered adequate until D&D activities begin.

2.4 BUILDING 3029— SOURCE DEVELOPMENT LABORATORY

Building 3029 is currently in an inactive, standby mode awaiting entry into the D&D Program. There are no current, on-going operations in this building other than surveillance, maintenance, and deactivation activities. The building is occupied by personnel who are responsible for conducting

various S&M and deactivation activities. There were no imminent hazard areas requiring removal actions identified to be associated with Building 3029 during this RmSE. RAD hazard areas, ACMs, and items containing PCBs are marked and isolated as necessary to ensure worker safety and inadvertent release within the facility. In addition, a combination of engineering and administrative controls are in place and are enforced within the facility for worker and environmental protection. Current actions being taken to prevent further release of contamination and ensure worker safety within Building 3029 are considered adequate until D&D activities begin.

2.5 BUILDINGS 3030, 3031, AND 3118—ISOTOPES PRODUCTION LABS C, D, AND H

Buildings 3030, 3031, and 3118 are currently in an inactive, standby mode awaiting entry into the D&D Program. There are no current, on-going operations in these buildings other than surveillance, maintenance, and deactivation activities. The buildings are accessed periodically by personnel to conduct S&M and deactivation activities; otherwise, the buildings remain secured from public access.

There were no imminent hazard areas requiring removal actions identified to be associated with Buildings 3030, 3031, or 3118 during this RmSE. RAD hazard areas, ACMs, and items containing PCBs are marked and isolated as necessary to ensure worker safety and inadvertent release within these facilities. In addition, a combination of engineering and administrative controls are in place and are enforced within these facilities for worker and environmental protection. Current actions being taken to prevent further release of contamination and ensure worker safety within Buildings 3030, 3031, and 3118 are considered adequate until D&D activities begin.

2.6 BUILDING 3032/(3099)—RADIOISOTOPES PRODUCTION LABORATORY E

Building 3032 is currently in an inactive, standby mode awaiting entry into the D&D Program. There are no current, on-going operations in this building other than surveillance, maintenance, and deactivation activities. The building is accessed periodically by personnel to conduct S&M and deactivation activities; otherwise, the building remains secured from public access. Building 3099 is actually a concrete pad adjacent to the west side of Building 3032 which is used for temporary storage of many different items, from equipment to containerized radioactive materials and wastes.

There were no imminent hazard areas requiring removal actions identified to be associated Building 3032 or the adjacent concrete storage pad (3099) during this RmSE. RAD hazard areas and ACMs are marked and isolated as necessary to ensure worker safety and inadvertent release within the facility. In addition, a combination of engineering and administrative controls are in place and are enforced within the facility for worker and environmental protection. Current actions being taken to prevent further release of contamination and ensure worker safety within Building 3032 are considered adequate until D&D activities begin.

2.7 BUILDING 3033/(3093)— KRYPTON AND TRITIUM FACILITY

Building 3033 is currently in an inactive, standby mode awaiting entry into the D&D Program. There are no current, on-going operations in this building other than surveillance, maintenance, and deactivation activities. The building is accessed periodically by personnel to conduct S&M and deactivation activities; otherwise, the building remains secured from public access. Building 3093

is a small permanent krypton storage enclosure adjacent to the northwest corner of Building 3033 which houses three empty krypton storage tanks.

There were no imminent hazard areas requiring removal actions identified to be associated Building 3033 or the adjacent concrete storage enclosure (3093) during this RmSE. RAD hazard areas and ACMs are marked and isolated as necessary to ensure worker safety and inadvertent release within the facility. In addition, a combination of engineering and administrative controls are in place and are enforced within the facility for worker and environmental protection. Current actions being taken to prevent further release of contamination and ensure worker safety within Building 3033 are considered adequate until D&D activities begin.

2.8 BUILDING 3033-A—ACTINIDE FABRICATION FACILITY

Building 3033-A is currently in an inactive, standby mode awaiting entry into the D&D Program. There are no current, on-going operations in this building other than surveillance, maintenance, and deactivation activities. The building is accessed periodically by personnel to conduct S&M and deactivation activities; otherwise, the building remains secured from public access.

There were no imminent hazard areas requiring removal actions identified to be associated Building 3033-A during this RmSE. RAD hazard areas and ACMs are marked and isolated as necessary to ensure worker safety and inadvertent release within the facility. In addition, a combination of engineering and administrative controls are in place and are enforced within the facility for worker and environmental protection. Current actions being taken to prevent further release of contamination and ensure worker safety within Building 3033-A are considered adequate until D&D activities begin.

2.9 BUILDING 3034—RADIOISOTOPE AREA SERVICES BUILDING

Building 3034 is currently in an inactive, standby mode awaiting entry into the D&D Program. Building 3034 was reportedly never used for operations involving radioisotopes, although some isolated low-level areas of residual surface contamination exist. The building is being prepared for use as office space in addition to continuing to house the electrical distribution station for the Isotopes Circle area until its entry into the D&D Program. There were no imminent hazard areas requiring removal actions identified within Building 3034 during this RmSE. RAD hazard areas and ACMs are marked and isolated as necessary to ensure worker safety and inadvertent release within the facility. In addition, a combination of engineering and administrative controls are in place and are enforced within the facility for worker and environmental protection. Current actions being taken to prevent further release of contamination and ensure worker safety within Building 3034 are considered adequate until D&D activities begin.

There was, however, one notable, exterior, imminent hazard area identified to be associated with Building 3034. This is an area involving deteriorating, painted exterior piping adjacent to the east side of the building. The paint in this and surrounding buildings has been assumed to contain lead by the ORNL Lead Management Program based on the age of the facilities. Paint on the piping is peeling off and has fallen to the ground below. This poses a potential direct impact to the soil below and an indirect impact to surface water as a result of runoff with storm water. The paint on this piping should be sampled and analyzed for lead content to determine if, in fact, a hazard exists. If so, a maintenance action will be necessary to prevent further deterioration and dislodging of this paint. In addition, an RSE should be conducted to determine whether lead from fallen paint chips has impacted

the soil in the immediate area. (See the Building 3034 RmSE information form for additional information concerning this area.)

2.10 BUILDING 3038 (AHF, E, M)—ISOTOPE DEVELOPMENT LABORATORY

Building 3038 is currently in an inactive, standby mode awaiting entry into the D&D Program. There are no current, on-going operations in this building other than surveillance, maintenance, and deactivation activities. The building is occupied by personnel who are responsible for conducting various S&M and deactivation activities.

There were no imminent hazard areas requiring removal actions identified to be associated with Building 3038 during this RmSE. RAD hazard areas, ACMs, and items containing PCBs are marked and isolated as necessary to ensure worker safety and inadvertent release within the facility. In addition, a combination of engineering/administrative controls are in place/enforced within the facility for worker and environmental protection. Current actions being taken to prevent further release of contamination and ensure worker safety within Building 3038 are considered adequate until D&D activities begin.

2.11 BUILDING 3047— RADIOISOTOPE DEVELOPMENT LABORATORY

Building 3047 is currently in an inactive, standby mode. All isotopes activities within Building 3047 are shut down with the exception of waste removal and transloading of radioactive material in the beta/gamma hot cells. However, a large number of different work items are currently performed within this facility. Although portions of the building are being deactivated, Building 3047 has been removed from the Isotopes Facilities Deactivation Program (IFDP), and its future use was uncertain at the time of the RmSE. The building is occupied by personnel who are responsible for conducting S&M, deactivation, and various other activities.

There were no imminent hazard areas requiring removal actions identified within Building 3047 during this RmSE. RAD hazard areas, ACMs, and items containing PCBs are marked and isolated as necessary to ensure worker safety and inadvertent release within the facility. In addition, a combination of engineering and administrative controls are in place and are enforced within the facility for worker and environmental protection. Current actions being taken to prevent further release of contamination and ensure worker safety within Building 3047 are considered adequate.

There was, however, one notable, exterior, imminent hazard area identified to be associated with Building 3047. This is an area involving the emergency diesel generator adjacent to the north side of the facility. A follow-up inspection of the diesel generator was conducted, and no leak was found. During routine maintenance, small quantities of fuel may be generated. Maintenance personnel have been reminded of precautions that need to be taken to prevent spills of fuel while performing repairs to the generator. No other actions are planned. (See the Building 3047 RmSE information form for additional information concerning this area.)

2.12 BUILDING 3517—FISSION PRODUCTS DEVELOPMENT LABORATORY

Building 3517 is currently in an inactive, standby mode awaiting entry into the D&D Program. There are no current, on-going operations in this building other than surveillance, maintenance, and

deactivation activities. The building is occupied by personnel who are responsible for conducting various S&M and deactivation activities.

There were no imminent hazard areas requiring removal actions identified to be associated with Building 3517 during this RmSE. RAD hazard areas, ACMs, and items containing PCBs are marked and isolated as necessary to ensure worker safety and inadvertent release within the facility. In addition, a combination of engineering and administrative controls are in place and are enforced within the facility for worker and environmental protection. Current actions being taken to prevent further release of contamination and ensure worker safety within Building 3517 are considered adequate until D&D activities begin.

2.13 BUILDING 7025—TRITIUM TARGET FACILITY

Building 7025 is currently in an inactive, standby mode awaiting entry into the D&D Program. There are no current, on-going operations in this building other than surveillance, maintenance, and deactivation activities. The building is accessed periodically by personnel to conduct S&M and deactivation activities; otherwise, the building remains secured from public access.

There were no imminent hazard areas requiring removal actions identified to be associated with Building 7025 during this RmSE. RAD hazard areas and ACMs are marked and isolated as necessary to ensure worker safety and inadvertent release within the facility. In addition, a combination of engineering and administrative controls are in place and are enforced within the facility for worker and environmental protection. Current actions being taken to prevent further release of contamination and ensure worker safety within Building 7025 are considered adequate until D&D activities begin.

It should be noted, however, that an underground collection tank exists adjacent to the east side of the facility. This tank was reportedly the discharge point for the hot sink located in the tritium hood within the facility. It was also reported that the processes in this hood did not generate liquid waste; therefore, the sink was only used by personnel for washing and decontamination. The contents have reportedly been removed, and the tank currently sits empty. No evidence was identified during this RmSE to indicate whether or not the tank has leaked. An internal tank inspection will be conducted by September 30, 1996. Based upon this inspection, additional actions may be merited. (See the Building 7025 RmSE information form for additional information concerning this area.)

3. BUILDING 3026-C—KRYPTON-85 ENRICHMENT FACILITY

ORNL FACILITY RmSE INFORMATION FORM

General Information

Area/Facility Name (and aliases): Building 3026-C
Krypton-85 Enrichment Facility (KEF)

Organization responsible for area/facility (include specific person and phone number if possible): R.E. Eversole (576-7483), IFDP Project Manager, ER Program, LMES

Status (active/inactive): Inactive, Standby Mode

Years of Operation: ≈ 45

Description of Operation:

There are no current operations, other than surveillance, maintenance, and deactivation activities, on-going in this building. Historical operations included development of methods for isolating fission products and radioisotope processing for research and medical purposes. Waste from processing irradiated reactor fuel elements for uranium and plutonium recovery in Building 3019 was piped directly to Building 3026-C where it was processed to isolate short-lived isotopes. Radiologic elements processed in Building 3026-C included ^{129}I, ^{131}I, ^{79}Se, ^{107}Pd, ^{147}Pm, ^{137}Cs, ^{90}Sr, ^{60}Co, ^{3}H, ^{85}Kr, ^{188}W, and ^{191}Os. Radioisotope processing and handling was performed primarily in contained hot cells and lab hoods. Resulting primary waste streams from these processes included exhausted air and liquid process waste.

Physical description of area/facility:

- Building 3026-C was originally constructed in 1943.
- This facility is a two-story, wooden frame building. Portions of the exterior of the building are sided with metal. Paint on metal exterior surfaces is in good condition. Paint on exposed wooden exterior surfaces is deteriorating and in poor condition (particularly on the north wall).
- Paint on exhaust duct work located adjacent to the north wall of the building is deteriorating in localized areas.
- Building 3026-C is physically connected to Building 3026-D, which is to the east. The two buildings share utilities (electric, steam, plant air).
- Building 3026-C is located in an industrial area of ORNL, adjacent to Isotope Circle. The immediate area surrounding the facility is paved for the most part with some grassy areas, particularly on the north side of the building.
- The building contains office space, laboratories, hot cells, and process areas. There are two hot cell banks consisting of 4 cells each, located in the central portion of the building. The viewing windows of the hot cells were filled with zinc-bromide. The fluid from all but one window has been drained and removed from the facility. Floor drains in the cells discharge to the low-level liquid waste (LLLW) system (tanks W-17 and W-18). The cells are currently shutdown. Work with radioactive materials was performed in the hot cells, laboratories, counting room, and tritium facility.
- Some interior portions of the building are restricted access areas due to radiologic contamination. Generally, the interior of the building is in fair to good condition. Asbestos Containing Material (ACM), radiation (RAD) hazard areas, and polychlorinated bi-phenol (PCB) containing equipment are posted and/or labeled as appropriate.
- The hot cells are kept under negative pressure relative to the interior of the building. The building itself is not sealed.
- A building space diagram is attached to this form showing the locations of the various process areas and equipment.

Release Information

Description of release, or threatened release, and source:

Low levels of residual fixed and transferable radiologic surface contamination exist in areas of the facility as a result of historical operations. The contamination exists primarily in the hot cells and process equipment (vessels, hoods, piping, ventilation ducts, etc.). This contamination has accumulated from activities involving a variety of materials throughout the operating history of the facility and, therefore, cannot be attributed to a single release episode. The existing levels of RAD contamination in the facility are low and the presence of this contamination is not considered a significant hazard in its current state.

Hazardous materials (HAZMATs) (e.g., acids, hydraulic fluids, and other chemicals) were reportedly used in small quantities (i.e., less than 5 gallons or 100 pounds) during facility operations and currently for surveillance and maintenance (S&M) activities. According to available spill/release records and facility personnel interviews, no significant HAZMAT spills (i.e., spills having the potential to adversely affect human health and/or the environment) have been reported for this building. No current conditions were identified which present a potential for a significant HAZMAT release.

Hazardous substances present:

Hazardous substances remaining in Building 3026-C consist mainly of residual RAD surface contamination (α, β, γ), zinc-bromide, PCBs, and a small quantity of miscellaneous HAZMATs. Areas of fixed and transferable RAD contamination are associated primarily with the hot cells and process equipment. Zinc-bromide remains present in one hot cell viewing window. PCBs are present in electrical capacitors within the building. Hazardous materials present in the building are listed on the attached HAZMAT inventory sheet.

Estimate (if possible) of quantities of hazardous substances that have been released and that could be released:

The following represents the known quantities of substances currently existing in the facility. Radiologic surface contamination has accumulated from a legacy of many different programs and processes and cannot be attributed to a single release episode. It is only possible to quantify release amounts from contamination which currently exists in the facility and/or has been historically documented from past activities.

< 1 µCi α contamination in facility - not identified by individual isotope.
< 10 µCi fission products - including ^{137}Cs, ^{85}Kr and ^{60}Co.
< 100 µCi ^{3}H (tritium).
$\approx$ 50 gallons zinc-bromide (estimated based on size of viewing window).
$\approx$ 1.25 gallons PCBs.
$\approx$ 320 pounds total miscellaneous HAZMATs (see attached HAZMAT inventory sheet).

(Quantity estimates obtained from Building 3026-C Hazard Screening Report, ORNL PCB Large High- and Low-Voltage and Small Capacitor Inventory database, ORNL Hazardous Material Information System database.)

Other pollutants or contaminants:

Asbestos containing material, primarily in the form of thermal system insulation, has been confirmed present in this building. ACM observed is in fair to good condition and poses no immediate health threat. Based on the age of the facility, interior and exterior painted surfaces are assumed to be lead-containing. Verification samples are taken by ORNL Lead Management Program personnel on an "as-needed" basis to confirm the presence of lead in the paint (i.e., when work activities will disturb the paint, or paint is found to be deteriorating and poses a health or environmental threat). Interior painted surfaces observed are in fair to good condition and pose no immediate health threat. Paint on exterior wood surfaces (particularly the north side of the building) and exterior cell ventilation duct work is chipped and flaking off to the ground below in some areas. According to the ORNL Lead Management Office, no verification samples of this paint have been taken and analyzed; therefore, the area remains assumed to contain lead.

Groundwater

Are there any suspected impacts to groundwater? If yes, please describe. Include any impacts to drinking water sources.

Building 3026-C is located in Waste Area Grouping 1 at ORNL. Although no specific adverse spills or releases of hazardous substances were identified during this RmSE, it is suspected, based on available environmental studies conducted in WAG 1, that process and LLLW drains and associated piping may have leaked over the life of the facility. Buried process and LLLW piping and some drains have been found to be deteriorated and leaking in other facilities and areas of WAG 1. Studies have determined that groundwater in WAG 1 has been both radiologically and chemically contaminated. Numerous man-made radionuclides have been detected in WAG 1 groundwater samples including many of those processed in Building 3026-C. It is likely that liquid waste from activities involving radioisotopes in Building 3026-C have historically contributed to WAG 1 groundwater contamination. However, the radionuclides detected in the groundwater were common to the processes and activities in many other buildings in the area which makes it difficult to determine exactly which building is, or was, the source of contamination.

Because of the reported small quantities of chemicals historically used in this facility, it is unlikely that such usage has significantly contributed to WAG 1 groundwater contamination. As part of the facility shutdown process, inactive process and LLLW drains within the building have reportedly been plugged to prevent further release. However, no documentation was available at the time of this report to verify which drains have actually been plugged and which have not. Information on drain locations and discharge points is available from the ORNL Engineering Support Office.

Although it is not impossible, it is unlikely that groundwater has been, or will be, impacted by the flaking and chipping exterior paint located on the north side of the building if, in fact, it is lead-containing. Because of the depth to the water table in the area of Building 3026-C ($\approx$ 20 feet) and physical characteristics of soil in the area, it is doubtful that any significant amount of lead has, or will, reach the groundwater through percolation with storm water and vertical migration.

Other than the potential for historical impact to groundwater in WAG 1 via leaking process and LLLW lines external to the building, no existing immediate threat to groundwater was identified given the current status of the facility.

Surface Water

Are there any suspected impacts to surface water? If yes, please describe. Also describe the most likely surface water migration route(s), if applicable. Include any impacts to drinking water sources.

WAG 1 is essentially bound by Fifth Creek to the east, White Oak Creek (WOC) to the south, and First Creek to the west. First and Fifth creeks flow south into (WOC) which flows to the west and exits WAG 1 at the southwest corner. Stormwater (from surface runoff and stormwater drainage system) and treated water from the process waste system discharges into WOC. The only potential for direct impact to surface water from Building 3026-C in its current state would be from lead-containing paint chips which fall off the first and second story exterior painted surfaces and find their way into the stormwater drainage system and eventually to WOC. The apron around the north side of the building is gravel and grass below the areas of deteriorating paint. Peeling paint from the second story of the building in this area could fall off onto the first story roof and could get washed off the roof through the roof drains with stormwater. The roof drain in this area spills to the surface of the north-central portion of the building apron. This area of the apron is a restricted area and was not accessible during the building inspection. No storm drains were observed in this area from a distance; however, if a storm drain exists, there is a potential that paint chips could migrate to WOC through the stormwater drainage system.

Surface water may have also been indirectly impacted by leaking process and LLLW lines external to the building. Some of these lines are known to have shared a common trench with stormwater drainage piping. Contamination from leaking waste lines could potentially enter deteriorated stormwater piping and migrate to WOC. The three creeks bordering WAG 1 are groundwater discharge points. Therefore, groundwater contaminated by leaking waste lines could also potentially impact surface water in the area.

Other than the potential for historical impact, the only existing immediate threat to surface water identified during this RmSE is that from the assumed lead-containing paint at the north of the building.

Air

Are there any suspected impacts due to air emissions? If yes, please describe.

The Hazard Screening Report prepared for Building 3026-C indicates a slight potential for radiation exposure to personnel working inside and within the immediate vicinity of the facility exists due to potential airborne migration of radioactive particulates and physical contact with contaminated surfaces. Areas of RAD contamination are identified, marked, and controlled as appropriate throughout the facility to protect against inadvertent exposure to personnel. Air flow in the building is controlled by the design of the ventilation system which moves air from areas with a low potential for contamination through areas with a higher potential for contamination and exhausts the air through the Isotopes Circle cell ventilation system to stack 3039. Apart from catastrophic failure of the hot cells or cell ventilation system, it is unlikely that radioactive air emissions from Building 3026-C would impact personnel or the environment in its current state. An additional potential for air quality impact outside the building exists as a result of air movement through the crawlspace below the building (see discussion in Soil section of this report).

There is also a potential for impact to indoor air quality due to the presence of ACM and assumed lead-based paint (LBP) should these materials be disturbed. The ACM and assumed LBP remaining in the building are not considered to be immediate threats to indoor quality in their current state.

Soil

Are there any suspected impacts to soil? If yes, please describe.

The only existing immediate threat to soils identified in the area of Building 3026-C is located adjacent to the north side of the facility. Paint on the exterior of the north wall is badly deteriorated and is peeling off the building. Paint on the cell ventilation system duct work in this area also shows evidence of localized deterioration. This paint is assumed to contain lead by the ORNL Lead Management Office. The soil in this area is at risk of being impacted by lead contamination from paint that has peeled or chipped off the wall or duct work if, in fact, the paint does contain lead.

There is also evidence that soil beneath the building has been historically impacted by radiologic contamination. Postings at the entry points to the building's crawlspace indicate radioactive soil contamination in the crawlspace. Access to the crawlspace is restricted; however, it is not controlled. Access doors to the crawlspace were found to be open leaving the area easily accessible should the RAD warning sign be removed somehow (by strong wind, for example). In addition, soil in the crawlspace was observed to be very dry with a loose surface. Openings in the building's foundation can allow wind to enter the crawlspace stirring up potentially contaminated dust which can subsequently exit the crawlspace through these openings. This would pose a pathway for migration of radiologic contamination as well as a potential airborne contamination hazard to those in the immediate area during a wind episode. These openings could also allow small animals to enter the crawlspace and become contaminated internally and externally from dust. Contamination could then migrate from the crawlspace in the animals coat, fecal matter, urine, and decaying body upon death.

As stated for groundwater, there is also a potential for historical impact to soils in the area of Building 3026-C due to leaking process and LLLW drain piping. Previous environmental studies have identified a soil contamination plume in the Isotopes Circle area and soil samples collected from the plume have detected radioisotopes common to the processes performed in Building 3026-C. Whether waste from Building 3026-C has actually contributed to this contamination is unknown, given the information reviewed during this RmSE. It is unlikely that the small quantities of chemicals used in Building 3026-C have significantly impacted soil in the surrounding area.

Release Beyond Facility or Reservation Boundaries

Has or will the release migrate beyond the boundaries of the facility or reservation? If yes, please describe (including possible human or environmental receptors).

The following are considered potential scenarios where radiologic contamination could migrate beyond the facility or reservation boundaries:

- Contaminated dust in the building crawlspace becomes airborne and carried away due to wind blowing through openings in the foundation.
- An animal enters the crawlspace, becomes contaminated, and leaves carrying the contamination away.
- A person becomes inadvertently contaminated and leaves the facility/reservation undetected.
- Catastrophic failure of hot cells and/or contaminated equipment.

There is also a potential for assumed lead-containing paint which peels off the north side of the building to be carried away with surface runoff during a rain event. Though these potentials exist, they are considered slight and unlikely due to the current status of the facility and the engineering/administrative controls that are in place to protect again such an event.

Worker Safety

Could the release pose a threat to workers? If yes, please describe.

Radiologically contaminated areas are isolated and well marked. Good radiation practices and standard operating procedures are enforced for worker safety. Personnel exiting the facility are required to "frisk" themselves to detect the presence of RAD contamination. Monitors and alarms are in place to detect any radioactive release within the building. PCB containing equipment and ACM are appropriately labeled. However, even with these safeguards in place, a potential threat to workers exists if safety measures are overlooked. This potential is not considered significant given the current status and level of activity of the building.

Environmental Receptors

Does the release pose a potential threat to environmental receptors? If yes, please describe. Include natural resources impacts.

The following are the potential environmental receptors of contamination resulting from any potential releases discussed in this form:

- Animals — Vermin which find their way into the contaminated crawlspace.

The potential for impact to this receptor is considered slight.

No other existing conditions posing an immediate significant threat to environmental receptors, including natural resources, were identified to be currently associated with Building 3026-C.

Mitigation

What action(s) might be taken to abate/prevent release or impacts from release?

- Continued utilization and enforcement of engineering and administrative controls that are currently in place to protect workers and monitor conditions and activities in the building.
- Openings in the foundation surrounding the crawlspace should be boarded up and sealed to prevent vermin access and minimize air movement through the space.
- Exterior paint on the north wall of the facility and on cell ventilation system duct work in the area should be tested for lead content. If the paint is found to be lead-containing, a maintenance action will be required to eliminate areas of deteriorating paint. In addition, a remedial site evaluation will be necessary to determine whether the soil in this area has been impacted by lead from the peeling paint.
- Continue S&M activities per Procedure IP-900.

What actions are currently being taken to abate/prevent release or impacts from release?

Engineering and administrative controls are in place to control access to contaminated areas and to monitor conditions and activities within the facility for worker and environmental protection. Warning signs and labels are posted throughout the facility indicating RAD, ACM, and PCB hazard areas. Standard operating procedures are in place for building access and surveillance and maintenance activities to protect against inadvertent contact and disturbance of contaminated areas and materials. Radiologically contaminated areas are monitored periodically by ORNL health physics personnel. Personnel are "frisked" upon exit of the facility to detect the presence of radiologic contamination. The building is currently in surveillance and maintenance status awaiting entry into the D&D Program. Inactive waste drains are reportedly plugged in contaminated areas to prevent inadvertent discharge of contamination beyond the facility. A groundwater monitoring program is in place to monitor contamination levels and migration in groundwater underlying WAG 1. The building is inspected for structural changes after each natural incident (earthquake, tornado, or other severe storm), fire and/or man induced activity which could cause cracking, failure, or deterioration of the facility and/or equipment that may allow contamination to be released. No such conditions have been reported for Building 3026-C.

With the exception of the crawlspace and deteriorating areas of exterior paint, current actions being taken to prevent further release and ensure worker safety in Building 3026-C are considered adequate until D&D activities begin.

Other Environmental Authorities

Is the release or threatened release potentially subject to other environmental statutory actions? If yes, please explain.

If paint is found to be lead-containing and samples fail the Toxicity Characteristic Leaching Procedure (TCLP) analysis, the building could qualify as a hazardous waste generator point under the Resource Conservation and Recovery Act (RCRA).

Maintenance Actions

Are maintenance actions necessary to eliminate potential threats to human health and the environment? If so, explain.

Access to the contaminated crawlspace should be controlled. The area is presently marked with RAD warning signs at each access. While this should prevent human access, wind and vermin can still enter the area, potentially stirring up contaminated dust. All openings in the foundation surrounding the crawlspace should be sealed to prevent air movement and vermin access.

Samples should be taken of the exterior paint located on the north wall of the facility and adjacent cell ventilation duct work. The samples should then be analyzed to determine whether the paint does, in fact, contain lead. Such analysis should include TCLP (40 *CFR* 261, Appendix II) to determine whether Building 3026-C qualifies as a RCRA generator point. If the paint is found to contain lead, abatement actions will be required to prevent deteriorated areas of paint from dislodging and falling to the ground below, potentially having a direct impact on soil in this area.

No further potential hazards requiring maintenance actions were identified to be associated with Building 3026-C.

Removal Actions

Are Removal Actions necessary to eliminate immediate threats to human health and the environment? If so, explain.

No imminent hazards requiring removal actions per 40 *CFR* 300.415 were identified to be currently associated with Building 3026-C.

Remedial Site Evaluation

Is a Remedial Site Evaluation needed?

Pending confirmatory sampling and analysis results of the exterior paint in the north area of the facility, a Remedial Site Evaluation (RSE) should be conducted to determine whether the soil in this area has been impacted by lead from chipping paint and whether remediation of the soil is necessary.

Areas of radiologic contamination associated with Building 3026-C have been identified and marked as appropriate. However, it is suspected that process and LLLW drains and associated piping may have leaked beneath the slab of the building as a result of past practices. As a result, it is recommended that some type of remedial investigation be performed to assess the condition of the soil in this area before conducting any S&M or D&D activities which involve disturbing the slab.

ACM and PCB-containing equipment have also been identified, marked and documented. No further remedial investigation involving these hazards is considered necessary given the current status and future plans of this facility.

Based on the age of the facility, painted surfaces are assumed to contain lead. Samples of the paint should be taken and analyzed to verify the presence of lead prior to conducting any S&M or D&D activities which may disturb these assumed areas.

No Further Investigation

Is a finding of No Further Investigation appropriate? Please explain.

A finding of No Further Investigation implies that a facility or area is free from hazardous substances or contaminants that may threaten human health and the environment. Since Building 3026-C contains substances and materials which may become threatening if not properly controlled, handled and managed during the S&M cycle, a finding of No Further Investigation is inappropriate in this case.

Additional Comments

The following documents and databases were referenced for historical and hazard information related to Building 3026-C:

- Phase I Safety Documentation, The Krypton-85 Enrichment Facility, Building 3026-C, Hazard Screening, Document No. HS/3026-C/F/RT-4 (Rev. 0).
- Work Plan for the Isotopes Facilities Deactivation Project at Oak Ridge National Laboratory, Document No. ORNL/ER-249/R2.
- Building 3026-C Occurrence Reports, 1989 to present.
- Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory, Oak Ridge, Tennessee, Volumes 1 and 2, Document Nos. DOE/OR-1043/V1&D1 and DOE/OR-1043/V2&D1.
- ORNL Hazardous Material Information System Database.
- ORNL Drain System Survey Report for Building 3026-C.

The following personnel and offices were contacted and provided historical and current use/condition information for Building 3026-C:

- Mr. Karl Haff, Radiochemical Processing Department Head, ORNL Radiochemical Technology Section.
- Mr. Herman Phillips, Assistant Facilities Manager, ORNL Special Projects.
- Ms. Swati Wilson, Manager, ORNL Lead Management Program.
- Mr. Nathan Dunn, Hazardous Material Information System Office.
- Mr. Jade Thomas, ORNL Environmental Compliance Office.
- Mr. Joe Armento, ORNL Chemical Technology Division, Isotopes Facilities Shutdown Program.

The RmSE of this facility was conducted for LMES under contract by:

Advanced Sciences, Inc.
800 Oak Ridge Turnpike, Suite C-102
Oak Ridge, TN

Todd R. Grant — Evaluator's Signature

6/18/96 — Date

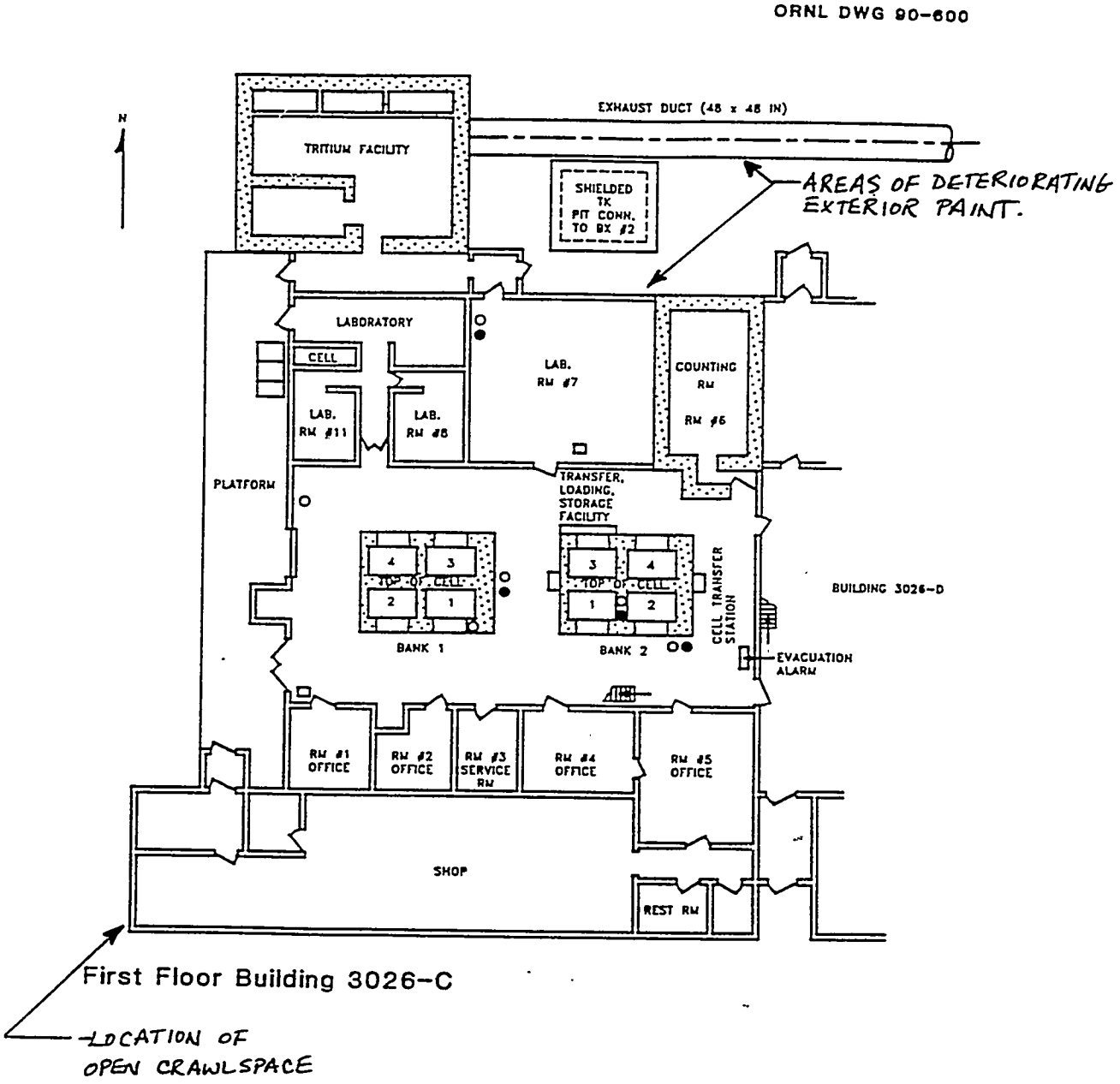

Fig. 1. Diagram of the first floor of Building 3026-C.

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03-28-1996
HAZARDOUS MATERIALS INFORMATION SYSTEM
Management Inventory Summary Report (by Building)

UNCLASSIFIED
Page: 1
Installation: ORNL

Plant: 3 Division: Department: Control Area: Building: 3026C Room: Area: WA Code:
Item ID: LIST: Ingredient: Mix Comp: to HAZ Class: HAZ Rating:
Date Expiration: Inv Status: MSDS Avail: Haz Mat Grp Cd: Phy State: Pressure Cd: Temp Cd: Cont Type Cd:

Building: 3026C

RECID	**	CASNO	Material Name	MMES C A	R T	Total LBS	Total KILOGRAMS	No of Items
A2379		NISS	ANALYTICAL PRODUCTS PH 10.00 CALIBRATING BUFFER	N	N	52.9104	24.0000	48
91609		NISS	BUFFER SOLUTION (BIPHTHALATE), PH 4 (JT BAKER)	N	N	23.1483	10.5000	21
91614		NISS	BUFFER SOLUTION (PHOSPHATE), PH 7	N	N	72.7518	33.0000	66
83616		NISS	BUFFER SOLUTION PH 10.00	N	Y	13.2276	6.0000	12
A0222			DEVCON 5-MINUTE EPOXY HARDENER(91081) AND RESIN(90	N	N	0.6510	0.2950	10
90784		NISS	HACH FORMAZIN TURBIDITY STANDARD 4000 NTU	N	N	9.9405	4.5081	9
A4163		NISS	HORIBA INSTRUMENTS POTASSIUM CHLORIDE SOLUTIONS	N	N	3.1955	1.4477	25
A0407		NISS	JOHNSON MATTHEY PALLADIUM ON ALUMINA	N	N	0.2204	0.0999	1
A9536		NISS	KESTER 970 FLUX	N	N	8.3452	3.7853	1
82502		NISS	MASTER MECHANIC AEROSOL	N	Y	0.5215	0.2365	1
B2688		NISS	MYRON L COMPANY TDS/CONDUCTIVITY STANDARD SOLUTION	N	N	31.2948	14.1951	3
04624		007727-37-9	NITROGEN	N	N	68.7032	31.1636	4
94913		NISS	PLATINUM ON ALUMINA, POWDER, -325 MESH (0.5-5.0% P	N	N	0.4408	0.1998	3
06541		NISS	POTASSIUM HYDROXIDE SOLUTIONS	N	N	0.4400	0.1980	20
91196		NISS	SUPER DELIMER	N	N	33.3811	15.1415	1
			Building 3026C Totals:			319.1721	144.7705	225

* indicates MSDS is not available
** indicates MSDS updated within last three months

4. BUILDING 3026-D—SEGMENTING HOT CELL FACILITY

ORNL FACILITY RmSE INFORMATION FORM

General Information	
Area/Facility Name (and aliases):	Building 3026-D Segmenting Hot Cell Facility
Organization responsible for area/facility (include specific person and phone number if possible):	R.E. Eversole (576-7483), IFDP Project Manager, ER Program, LMES
Status (active/inactive): Inactive, Standby Mode	*Years of Operation:* ≈ 40

Description of Operation:

There are no current operations, other than surveillance, maintenance, and deactivation activities, on-going in this building. Building 3026-D houses a high-level radioactivity storage facility and a Chemical Separation Laboratory in addition to the Segmenting Hot Cells Facility. Historically, the Chemical Separations Laboratory has served as a facility for the production of ^{32}P and ^{131}I; separation of numerous fission products; isolation of ^{99}T, ^{147}Pm, and ^{237}Np; and the isolation of ^{135}Xn for neutron cross-section determination. The Segmenting Hot Cells Facility was originally used to isolate large quantities of fission-produced ^{140}Ba for criticality testing purposes. The cells in the Segmenting Hot Cells Facility have been greatly modified since the ^{140}Ba process was discontinued. They now provide facilities for the segmenting, examination, and assembly of irradiated metallurgical specimens which remain in storage within the facility. Radioisotope processing and handling was performed primarily in contained hot cells. Resulting primary waste streams from these processes included exhausted air and liquid process waste.

Physical description of area/facility:

- Building 3026-D was originally constructed in the late 1940s.
- The facility is a three-story, wooden frame building. Portions of the exterior of the building are sided with metal. Paint on metal exterior surfaces is in good condition. Paint on exposed wooden exterior surfaces is deteriorating and in poor condition (particularly on the north wall).
- Paint on exhaust duct work located adjacent to the north wall of the building is deteriorating in localized areas.
- Building 3026-D is physically connected to Building 3026-C, which is to the west. The two buildings share utilities (electric, steam, plant air).
- Building 3026-D is located in an industrial area of ORNL adjacent to Isotope Circle. The immediate area surrounding the facility is paved for the most part with some grassy areas, particularly on the north side of the building.
- The building contains office space, changing rooms, process areas, hot cells, and associated equipment. The principle structure within the building is a two-story, 5-ft thick concrete cell block which is divided into two connecting radioactive material handling cells (hot cells) located in a north-south direction (Cell A and Cell B-1/2). The west face of the cell block is equipped with manipulators and zinc-bromide filled viewing windows. To the west of the cell block, located at floor level is the high-level radioactivity storage facility. This facility is connected to the south hot cell (Cell A) via a tunnel below the floor for material transfer purposes. Floor drains in the cells and hood hot sinks discharge to the low-level liquid waste (LLLW) system (Tank W-16). The cells are currently shut down. Work with radioactive materials was performed primarily in the hot cells.

Physical description of area/facility (Continued):

- Some interior portions of the building are restricted access areas due to radiologic contamination. Generally, the interior of the building is in poor to fair condition. Asbestos Containing Material (ACM), radiation (RAD) hazard areas, and polychlorinated bi-phenol (PCB) containing equipment are posted and/or labeled as appropriate.
- The hot cells are kept under negative pressure relative to the interior of the building. The building itself is not sealed.
- A building space diagram is attached to this form showing the locations of the various process areas and equipment.

Release Information

Description of release, or threatened release, and source:

Information concerning the extent of radiological contamination in Building 3026-D was found to be limited in availability during this RmSE. Information provided in the Hazard Screening Report prepared for the facility is not as detailed as that of other buildings evaluated, but does indicate the presence of radiologic contamination. Based on past practices and process in this facility and comparison with the condition of other Isotopes facilities, it can be assumed with some certainty that residual radiologic surface contamination exists in hot cells and process equipment (vessels, hoods, piping, ventilation ducts, etc.). This contamination would have accumulated from activities involving a variety of materials throughout the operating history of the facility and, therefore, cannot be attributed to a single release episode. Approximately 150 Ci (4,000 lbs) of ^{60}Co remains in the Storage Cell within the building. Storage of this material is considered a potential radiologic release source. The total existing levels of RAD contamination in the facility are unknown based on available information. However, the presence of this contamination is not considered a significant hazard in its current state.

Hazardous materials (HAZMATs) (e.g., acids, hydraulic fluids, and other chemicals) were reportedly used in small quantities (i.e., less than 5 gallons or 100 pounds) during facility operations and currently for surveillance and maintenance (S&M) activities. Additionally, zinc-bromide remains present in the cell viewing windows. This fluid is leaking from some windows of Cell A. The leaks are contained by collecting the leaking fluid in a drum or bucket and pumping it back into the window. While this does not stop the leak, it does provide interim control preventing the fluid from migration until either the windows are repaired or the fluid is removed. However, this presents a potential release source in that any fluid spilled or not captured in the collections drums could find its way to an active floor drain in the Operating Area adjacent to the east cell bank and migrate away from the building. The Operating Area was inaccessible during the facility inspection, and no drain location information was available for Building 3026-D at the time of this report; therefore, it is not known whether a floor drain is located in close proximity to the leaking windows. The potential for significant release of zinc-bromide is considered slight in this case. No other conditions were identified which present a potential for a significant HAZMAT release.

Hazardous substances present:

Hazardous substances remaining in Building 3026-D consist mainly of residual RAD surface contamination (α, β, γ), irradiated metal specimens, zinc-bromide, PCBs, and a small quantity of miscellaneous HAZMATs. Areas of fixed and transferable RAD contamination are associated primarily with the hot cells, storage cell, and process equipment. Zinc-bromide remains present in the hot cell viewing windows. PCBs are present in cell lighting ballasts within the building. Hazardous materials present in the building are listed on the attached HAZMAT inventory sheet.

Estimate (if possible) of quantities of hazardous substances that have been released and that could be released:

The following represents the known quantities of substances currently existing in the facility. Radiologic surface contamination has accumulated from a legacy of many different programs and processes and cannot be attributed to a single release episode. It is only possible to quantify release amounts from contamination which currently exists in the facility and/or has been historically documented from past activities.

≈ 150 Ci ^{60}Co.
≈ 2,000 gallons zinc-bromide.
< 5 gallons PCBs. Quantity estimated based on visual inspection (information on exact quantity was not available at the time of this report.)
≈ 139 pounds total miscellaneous HAZMATs (see attached HAZMAT inventory sheet).

(Quantity estimates obtained from Building 3026-D Hazard Screening Report, Visual Inspection of PCB Containing Equipment, ORNL Hazardous Material Information System Database.)

Other pollutants or contaminants:

Asbestos containing material, primarily in the form of thermal system insulation, has been confirmed present in this building. ACM observed is in fair to good condition and poses no immediate health threat. Based on the age of the facility, interior and exterior painted surfaces are assumed to be lead-containing. Verification samples are taken by ORNL Lead Management Program personnel on an "as-needed" basis to confirm the presence of lead in the paint (i.e., when work activities will disturb the paint, or paint is found to be deteriorating and poses a health or environmental threat). Interior painted surfaces observed are in fair to good condition and pose no immediate health threat. Paint on exterior wood surfaces (particularly the north side of the building) and exterior cell ventilation duct work is chipped and flaking off to the ground below in some areas. According to the ORNL Lead Management Office, no verification samples on this paint have been taken and analyzed; therefore, the area remains assumed to contain lead.

Groundwater

Are there any suspected impacts to groundwater? If yes, please describe. Include any impacts to drinking water sources.

Building 3026-D is located in Waste Area Grouping 1 at ORNL. Although no specific adverse spills or releases of hazardous substances were identified during this RmSE, it is suspected, based on available environmental studies conducted in WAG 1, that process and LLLW drains and associated piping may have leaked over the life of the facility. Buried process and LLLW piping and some drains have been found to be deteriorated and leaking in other facilities and areas of WAG 1. Studies have determined that groundwater in WAG 1 has been both radiologically and chemically contaminated. Numerous man-made radionuclides have been detected in WAG 1 groundwater samples including many of those processed in Building 3026-D. It is likely that liquid waste from activities involving radioisotopes in Building 3026-D have historically contributed to WAG 1 groundwater contamination. However, the radionuclides detected in the groundwater were common to the processes and activities in many other buildings in the area which makes it difficult to determine exactly which building is, or was, the source of contamination.

Are there any suspected impacts to groundwater? If yes, please describe. Include any impacts to drinking water sources (Continued).

Because of the reported small quantities of chemicals historically used in this facility, it is unlikely that such usage has significantly contributed to WAG 1 groundwater contamination. As part of the facility shutdown process, inactive process and LLLW drains within the building have reportedly been plugged to prevent further release. However, no documentation was available at the time of this report to verify which drains have actually been plugged and which have not. Additionally, no information was available to determine drain locations within the facility. Cell and hot sink drains reportedly discharge to Tank W-16 of the LLLW system.

Although it is not impossible, it is unlikely that groundwater has been, or will be, impacted by the flaking and chipping exterior paint located on the north side of the building if, in fact, it is lead-containing. Because of the depth to the water table in the area of Building 3026-D (≈ 20 feet) and physical characteristics of soil in the area, it is doubtful that any significant amount of lead has, or will, reach the groundwater through percolation with storm water and vertical migration.

Other than the potential for historical impact to groundwater in WAG 1 via leaking process and LLLW lines external to the building, no existing immediate threat to groundwater was identified given the current status of the facility.

Surface Water

Are there any suspected impacts to surface water? If yes, please describe. Also describe the most likely surface water migration route(s), if applicable. Include any impacts to drinking water sources.

WAG 1 is essentially bound by Fifth Creek to the east, White Oak Creek (WOC) to the south, and First Creek to the west. First and Fifth creeks flow south into (WOC) which flows to the west and exits WAG 1 at the southwest corner. Storm water (from surface runoff and storm water drainage system) and treated water from the process waste system discharges into WOC. The only potential for direct impact to surface water from Building 3026-D in its current state would be from lead-containing paint chips which fall off the first and second story exterior painted surfaces and find their way into the storm water drainage system and eventually to WOC. The apron around the north side of the building is gravel and grass below the areas of deteriorating paint. Peeling paint from the second story of the building in this area could fall off onto the first story roof and could get washed off the roof through the roof drains with storm water. The roof drain in this area spills to the surface of the north-central portion of the building apron. This area of the apron is a restricted area and was not accessible during the building inspection. No storm drains were observed in this area from a distance; however, if a storm drain exists, there is a potential that paint chips could migrate to WOC through the storm water drainage system.

Surface water may have also been indirectly impacted by leaking process and LLLW lines external to the building. Some of these lines are known to have shared a common trench with storm water drainage piping. Contamination from leaking waste lines could potentially enter storm water piping and migrate to WOC. The three creeks bordering WAG 1 are groundwater discharge points. Therefore, groundwater contaminated by leaking waste lines could also potentially impact surface water in the area.

Other than the potential for historical impact, the only existing immediate threat to surface water identified during this RmSE is that from the assumed lead-containing paint at the north of the building.

Air

Are there any suspected impacts due to air emissions? If yes, please describe.

It can be reasonably assumed, based on information provided in the Hazard Screening Report prepared for Building 3026-D that a slight potential for radiation exposure to personnel working inside and within the immediate vicinity of the facility exists due to potential airborne migration of radioactive particulates and physical contact with contaminated surfaces. Areas of RAD contamination are identified, marked, and controlled as appropriate throughout the facility to protect against inadvertent exposure to personnel. Air flow in the building is controlled by the design of the ventilation system which moves air from areas with a low potential for contamination through areas with a higher potential for contamination and exhausts the air through the Isotopes Circle cell ventilation system to stack 3039. Apart from catastrophic failure of the hot cells or cell ventilation system, it is unlikely that radioactive air emissions from Building 3026-D would impact personnel or the environment in its current state.

There is also a potential for impact to indoor air quality due to the presence of ACM and assumed lead-based paint (LBP) should these materials be disturbed. The ACM and assumed LBP remaining in the building are not considered to be immediate threats to indoor quality in their current state.

Soil

Are there any suspected impacts to soil? If yes, please describe.

The only existing immediate threat to soils identified in the area of Building 3026-D is located adjacent to the north side of the facility. Paint on the exterior of the north wall is badly deteriorated and is peeling off the building. Paint on the cell ventilation system duct work in this area also shows evidence of localized deterioration. This paint is assumed to contain lead by the ORNL Lead Management Office. The soil in this area is at risk of being impacted by lead contamination from paint that has peeled or chipped off the wall or duct work if, in fact, the paint does contain lead.

As stated for groundwater, there is also a potential for historical impact to soils in the area of Building 3026-D due to leaking process and LLLW drain piping. Previous environmental studies have identified a soil contamination plume in the Isotopes Circle area and soil samples collected from the plume have detected radioisotopes common to the processes performed in Building 3026-D. Whether waste from Building 3026-D has actually contributed to this contamination is unknown, given the information reviewed during this RmSE. It is unlikely that the small quantities of chemicals used in Building 3026-D have significantly impacted soil in the surrounding area.

Release Beyond Facility or Reservation Boundaries

Has or will the release migrate beyond the boundaries of the facility or reservation? If yes, please describe (including possible human or environmental receptors).

The following are considered potential scenarios where radiologic contamination could migrate beyond the facility or reservation boundaries:

- A person becomes inadvertently contaminated and leaves the facility/reservation undetected.
- Catastrophic failure of hot cells and/or contaminated equipment.

Has or will the release migrate beyond the boundaries of the facility or reservation? If yes, please describe (including possible human or environmental receptors). (Continued)

A potential also exists for assumed lead-containing paint which peels off the north side of the building to be carried away with surface runoff during a rain event. Additionally, a potential exists for zinc-bromide to migrate away from the facility if a floor drain is located in close proximity to leaking hot cell windows. Though these potentials exist, they are considered slight and unlikely due to the current status of the facility and the engineering/administrative controls that are in place to protect again such an event.

Worker Safety

Could the release pose a threat to workers? If yes, please describe.

Radiologically contaminated areas are isolated and well marked. Good radiation practices and standard operating procedures are enforced for worker safety. Personnel exiting the facility are required to "frisk" themselves to detect the presence of RAD contamination. Monitors and alarms are in place to detect any radioactive release within the building. PCB containing equipment and ACM are appropriately labeled. However, even with these safeguards in place, a potential threat to workers exists if safety measures are overlooked. This potential is not considered significant given the current status and level of activity of the building.

Environmental Receptors

Does the release pose a potential threat to environmental receptors? If yes, please describe. Include natural resources impacts.

No existing conditions posing an immediate significant threat to environmental receptors, including natural resources, were identified to be currently associated with Building 3026-D.

Mitigation

What action(s) might be taken to abate/prevent release or impacts from release?

- Continued utilization and enforcement of engineering and administrative controls that are currently in place to protect workers and monitor conditions and activities in the building.
- Exterior paint on the north wall of the facility and on cell ventilation system duct work in the area should be tested for lead content. If the paint is found to be lead-containing, a maintenance action will be required to eliminate areas of deteriorating paint. In addition, a remedial site evaluation will be necessary to determine whether the soil in this area has been impacted by lead from the peeling paint.
- Continue S&M activities per Procedure IP-900.

What actions are currently being taken to abate/prevent release or impacts from release?

Engineering and administrative controls are in place to control access to contaminated areas and to monitor conditions and activities within the facility for worker and environmental protection. Warning signs and labels are posted throughout the facility indicating RAD, ACM, and PCB hazard areas. Standard operating procedures are in place for building access and surveillance and maintenance activities to protect against inadvertent contact and disturbance of contaminated areas and materials. Zinc-bromide from leaking cell windows is collected and pumped back into the window. Radiologically contaminated areas are monitored periodically by ORNL health physics personnel. Personnel are "frisked" upon exit of the facility to detect the presence of radiologic contamination. The building is currently in surveillance and maintenance status awaiting entry into the Decontamination and Decommissioning (D&D) Program. Inactive waste drains are reportedly plugged in contaminated areas to prevent inadvertent discharge of contamination beyond the facility. A groundwater monitoring program is in place to monitor contamination levels and migration in groundwater underlying WAG 1. The building is inspected for structural changes after each natural incident (earthquake, tornado, or other severe storm), fire and/or man induced activity which could cause cracking, failure, or deterioration of the facility and/or equipment that may allow contamination to be released. No such conditions have been reported for Building 3026-D.

With the exception of the deteriorating areas of exterior paint, current actions being taken to prevent further release and ensure worker safety in Building 3026-D are considered adequate until D&D activities begin.

Other Environmental Authorities

Is the release or threatened release potentially subject to other environmental statutory actions? If yes, please explain.

If paint is found to be lead-containing and samples fail the Toxicity Characteristic Leaching Procedure (TCLP) analysis, the building could qualify as a hazardous waste generator point under the Resource Conservation and Recovery Act (RCRA).

Maintenance Actions

Are maintenance actions necessary to eliminate potential threats to human health and the environment? If so, explain.

Samples should be taken of the exterior paint located on the north wall of the facility and adjacent cell ventilation duct work. The samples should then be analyzed to determine whether the paint does, in fact, contain lead. Such analysis should include TCLP (40 *CFR* 261, Appendix II) to determine whether Building 3026-D qualifies as a RCRA generator point. If the paint is found to contain lead, abatement actions will be required to prevent deteriorated areas of paint from dislodging and falling to the ground below, potentially having a direct impact on soil in this area.

Although the leaking zinc-bromide windows do not present an immediate threat, it is recommended that either the leaking windows be repaired and the leaks stopped or that the fluid be drained and disposed of, if it is no longer needed. This will reduce/eliminate the potential for an inadvertent HAZMAT release within the facility.

No further potential hazards requiring maintenance actions were identified to be associated with Building 3026-D.

Removal Actions

Are Removal Actions necessary to eliminate immediate threats to human health and the environment? If so, explain.

No imminent hazards requiring removal actions per 40 *CFR* 300.415 were identified to be currently associated with Building 3026-D.

Remedial Site Evaluation

Is a Remedial Site Evaluation needed?

Pending confirmatory sampling and analysis results of the exterior paint in the north area of the facility, a remedial site evaluation (RSE) should be conducted to determine whether the soil in this area has been impacted by lead from chipping paint and whether remediation of the soil is necessary.

Areas of radiologic contamination associated with Building 3026-D have been identified and marked as appropriate. However, it is suspected that process and LLLW drains and associated piping may have leaked beneath the slab of the building as a result of past practices. As a result, it is recommended that some type of remedial investigation be performed to assess the condition of the soil in this area before conducting any S&M or D&D activities which involve disturbing the slab.

ACM and PCB-containing equipment have also been identified, marked and documented. No further remedial investigation involving these hazards is considered necessary given the current status and future plans of this facility.

Based on the age of the facility, painted surfaces are assumed to contain lead. Samples of the paint should be taken and analyzed to verify the presence of lead prior to conducting any S&M or D&D activities which may disturb these assumed areas.

No Further Investigation

Is a finding of No Further Investigation appropriate? Please explain.

A finding of No Further Investigation implies that a facility or area is free from hazardous substances or contaminants that may threaten human health and the environment. Since Building 3026-D contains substances and materials which may become threatening if not properly controlled, handled and managed during the S&M cycle, a finding of No Further Investigation is inappropriate in this case.

Additional Comments

The following documents and databases were referenced for historical and hazard information related to Building 3026-D:

- Hazard Screening, Segmenting Hot Cell Facility, Building 3026-D, Document No. HS/3026D/F/92/R0.
- Work Plan for the Isotopes Facilities Deactivation Project at Oak Ridge National Laboratory, Document No. ORNL/ER-249/R2.
- Building 3026-D Occurrence Reports, 1989 to present.
- Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory, Oak Ridge, Tennessee, Volumes 1 and 2, Document Nos. DOE/OR-1043/V1&D1 and DOE/OR-1043/V2&D1.
- ORNL Hazardous Material Information System Database.

The following personnel and offices were contacted and provided historical and current use/condition information for Building 3026-D:

- Mr. Karl Haff, Radiochemical Processing Department Head, ORNL Radiochemical Technology Section.
- Ms. Swati Wilson, Manager, ORNL Lead Management Program.
- Mr. Nathan Dunn, Hazardous Material Information System Office.
- Mr. Jade Thomas, ORNL Environmental Compliance Office.
- Mr. Joe Armento, ORNL Chemical Technology Division, Isotopes Facilities Shutdown Program.

The RmSE of this facility was conducted for LMES under contract by:

Advanced Sciences, Inc.
800 Oak Ridge Turnpike, Suite C-102
Oak Ridge, TN

Todd R. Grant 6/18/96

Evaluator's Signature Date

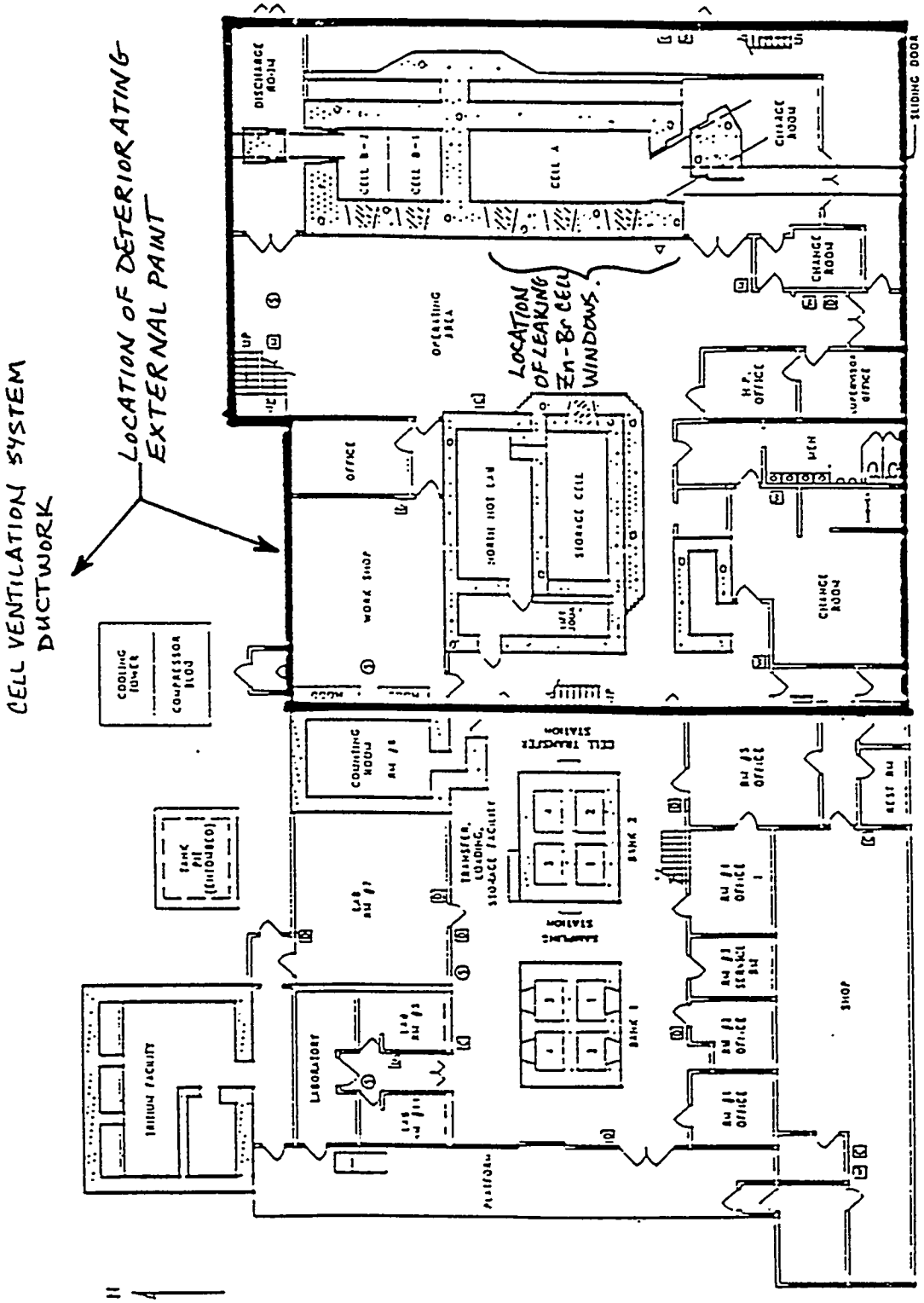

Fig. 2. Diagram of first floor of Building 3026-D (perimeter is in bold).

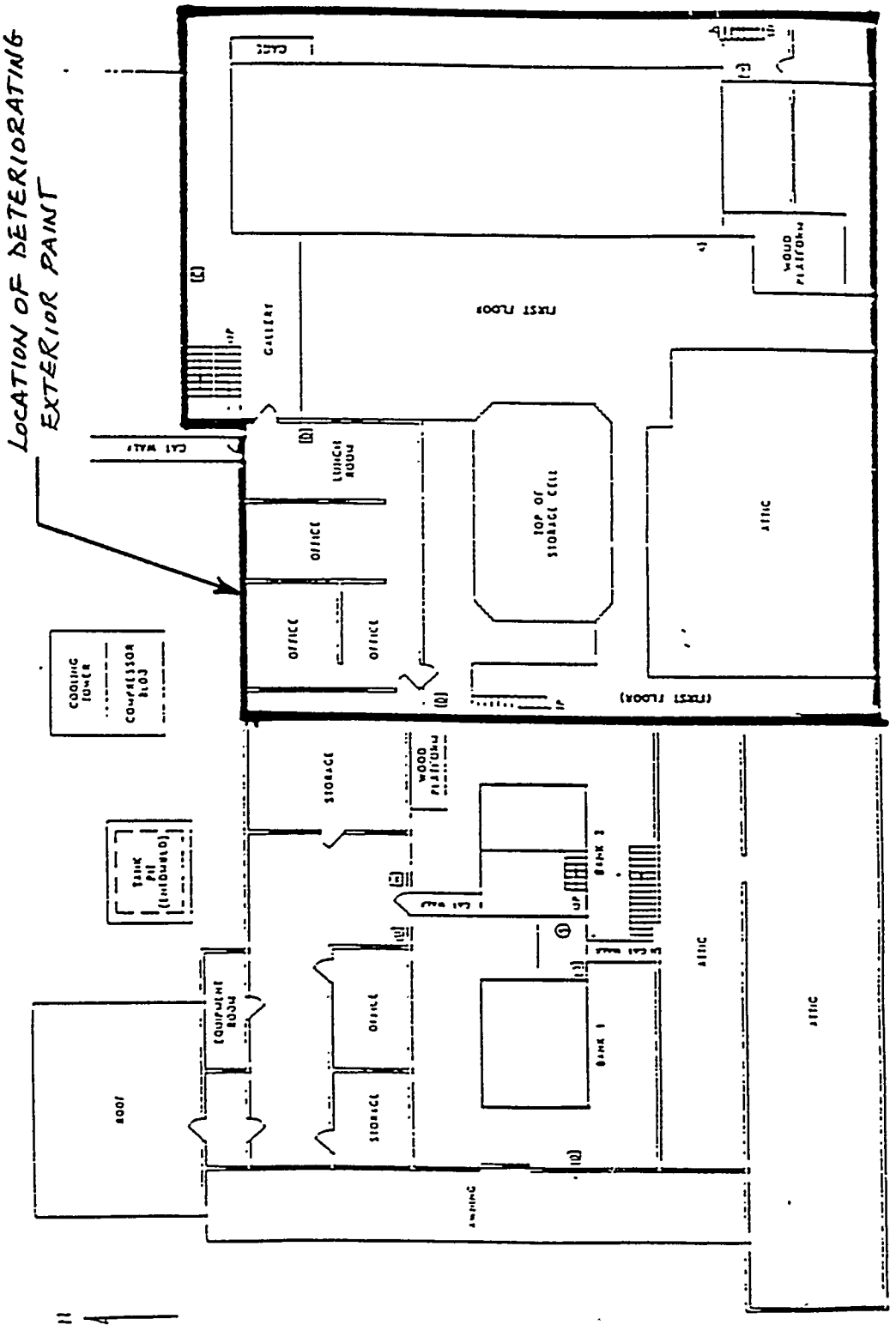

Fig. 3. Diagram of second floor of Building 3026-D (perimeter is in bold).

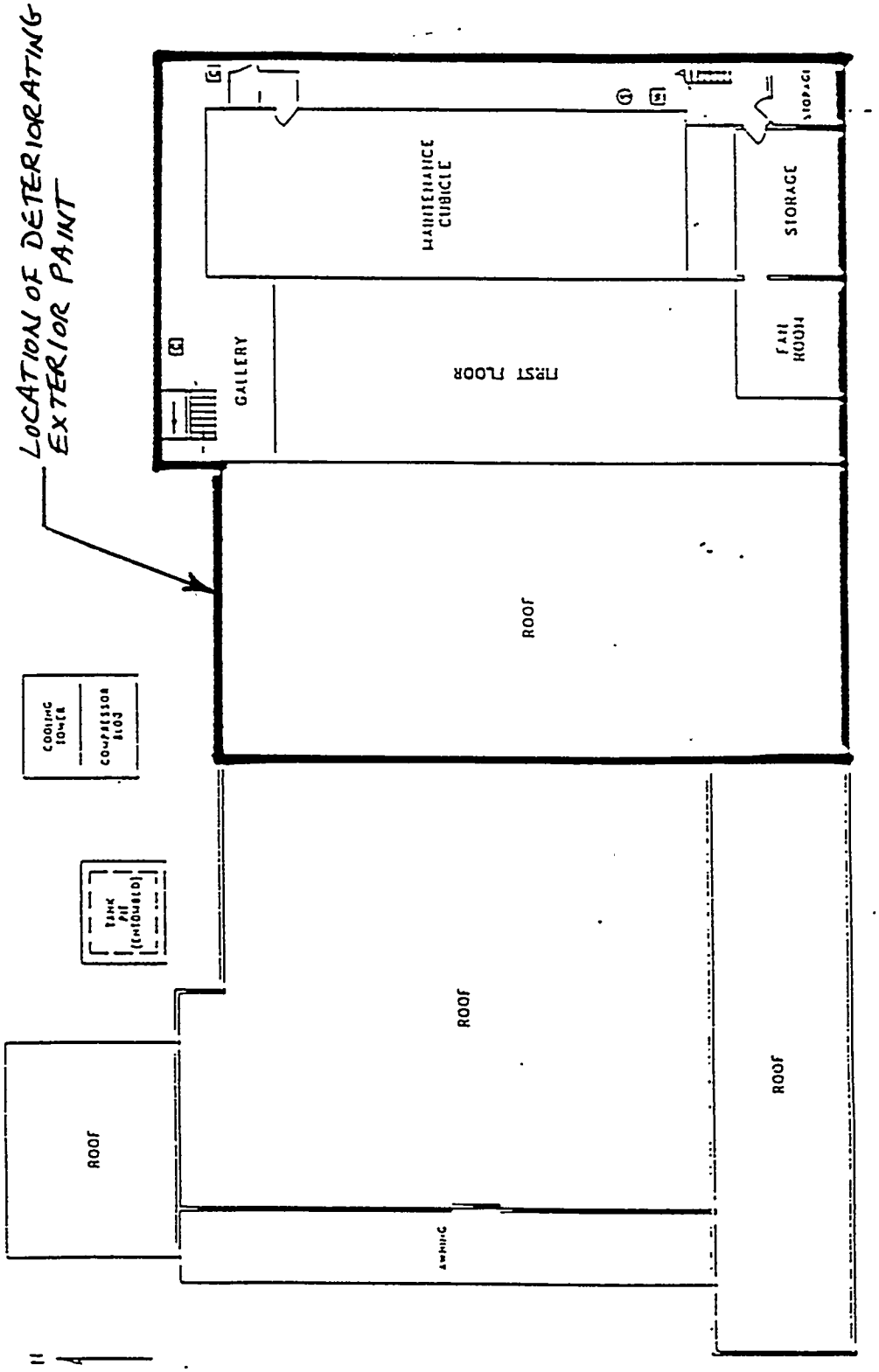

Fig. 4. Diagram of third floor of Building 3026-D (perimeter is in bold).

23b
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03-28-1996
HAZARDOUS MATERIALS INFORMATION SYSTEM
Management Inventory Summary Report (by Building)

UNCLASSIFIED
Page: 1
Installation: ORNL

Plant: 3 Division: Department: Control Area: Building: 3026D Room: Area: WA Code:
Item ID: LIST: Ingredient: Mix Comp: to HAZ Class: HAZ Rating:
Date Expiration: Inv Status: MSDS Avail: Haz Mat Grp Cd: Phy State: Pressure Cd: Temp Cd: Cont Type Cd:

Building: 3026D

RECID	**	CASNO	Material Name	MMES C A	MMES R T	Total LBS	Total KILOGRAMS	No of Items
04624		007727-37-9	NITROGEN	N	N	74.3244	33.7132	4
89735		NISS	P-10 NUCLEAR COUNTER MIXTURE	N	N	64.4252	29.2228	4
			Building 3026D Totals:			138.7496	62.9360	8

* indicates MSDS is not available
** indicates MSDS updated within last three months

5. BUILDING 3028—ALPHA POWDER FACILITY

ORNL FACILITY RmSE INFORMATION FORM

General Information	
Area/Facility Name (and aliases):	Building 3028 Radioisotope Laboratory A (Alpha Powder Facility)
Organization responsible for area/facility (include specific person and phone number if possible):	R.E. Eversole (576-7483), IFDP Project Manager, ER Program, LMES
Status (active/inactive): Inactive, Standby Mode	*Years of Operation:* ≈ 38

Description of Operation:

There are no current operations, other than surveillance, maintenance, and deactivation activities, on-going in this building. Building 3028 was originally constructed to separate ^{131}I, ^{133}Xe, and other short-lived fission products from uranium-aluminum targets. The building was later expanded to include curium processing cells. It has been used for storage, processing, conversion, and dispensing of radioactive isotopes. Building 3028 originally housed the ^{131}I processing facility (now the Short-Live Fission Product Operating Area) and the separation facility (a four-story ion-exchange column) for ^{147}Pm. The ^{131}I facility was converted to manipulator cells in the early 1960s and expanded to the Short-Lived Fission Product Facility. The ^{133}Xe facility was added at about the same time. Products and processes developed for sale included ^{133}Xe, ^{131}I, and ^{99}Mo. ^{133}Xe operations continued through 1980, and the Short-Lived Fission Product Program was discontinued in 1985. Radioisotope processing and handling was performed primarily in contained hot cells and lob hoods. Resulting primary waste streams for these processes included exhausted air and liquid process waste.

Physical description of area/facility:

- Building 3028 was originally constructed in 1950.
- The facility is a steel frame structure with metal siding, consisting of a four-story central section with single-story operating areas on east and west end of building.
- Exterior surfaces of building have been covered with polyurethane foam sealant for containment purposes.
- During operations, the building was kept under negative pressure. Currently, building is inactive and only contaminated hot cells remain under negative pressure relative to the building interior.
- Exterior of building is generally clean and in good condition with no visible areas of significant damage or determination.
- Equipment has been removed from story 2, 3, and 4 and these areas are currently empty.
- The interior portions of the first three stories are in fair to good condition. The fourth story is in poor condition. Painted surfaces throughout the facility are cracking, flaking, and chipping in some locations (particularly the 4th floor). Asbestos Containing Material (ACM), and radiation (RAD) hazard areas are posted and/or labeled as appropriate.
- Access to the Alpha Powder Cell on the 1st floor is restricted due to contamination.
- Building 3028 is located in Isotopes Circle, an industrial area of ORNL. The immediate area surrounding the facility is paved. Building utilities include steam, plant air and electrical service.

Physical description of area/facility: (Continued)

- The building contains primarily laboratories, hot cells, and process areas. There are seven hot cells located on the first floor of the building. The viewing windows of the hot cells are filled with water or mineral oil. Floor drains in Cells 1-4 discharge to an intermediate holding tank (W11) before discharging to the low-level liquid waste (LLLW) system (Tank WC-10). Cells 5-6 drain directly to the LLLW system (Tank WC-10). Cell 7 contains one drain which discharges to Tank WC-2 and two drains which discharge to Tank WC-10 of the LLLW system.
- Cell 7 has been decontaminated and cleaned.
- Work with radioactive material was performed primarily in the hot cells, hoods, and laboratory areas within this facility.
- A building space diagram is attached to this form showing the locations of the various process areas and equipment.

Release Information

Description of release, or threatened release, and source:

Low levels of residual fixed radiologic surface contamination exists in areas of the facility as a result of historical operations. The contamination exists primarily in the hot cells and process equipment (vessels, hoods, piping, ventilation ducts, etc.). This contamination has accumulated from activities involving a variety of materials throughout the operating history of the facility and, therefore, cannot be attributed to a single release episode. The existing levels of RAD contamination in the facility are low and the presence of this contamination is not considered a significant hazard in its current state.

Hazardous materials (HAZMATs) (e.g., acids, hydraulic fluids, and other chemicals) were reportedly used in small quantities (i.e., less than 5 gallons or 100 pounds) during facility operations and currently for surveillance and maintenance (S&M) activities. According to available spill/release records and facility personnel interviews, no significant HAZMAT spills (i.e., spills having the potential to adversely affect human health and/or the environment) have been reported for this building. No current conditions were identified which present a potential for a significant HAZMAT release.

Hazardous substances present:

Bulk HAZMATs have been removed from Building 3028. Hazardous substances remaining consist mainly of residual radiologic surface contaminants (α, β, γ). Fixed radiologic contamination exists in localized areas throughout the facility. Some of these areas have been painted over to contain α contamination. Highest levels of radiologic contamination exist in hot cells 1-6 which are isolated and kept under negative pressure. Hot cell 7 has been decontaminated to allow personnel access.

No items containing PCBs were identified to present within this building.

Estimate (if possible) of quantities of hazardous substances that have been released and that could be released:

The following represents the known quantities of substances currently existing in the facility. Radiologic surface contamination has accumulated from a legacy of many different programs and processes and cannot be attributed to a single release episode. It is only possible to quantify release amounts from contamination which currently exists in the facility and/or has been historically documented from past activities.

$\approx$ 10 μCi α contamination in facility, $\approx$ 150 mCi α in hot cells
$\approx$ 25 μCi β/γ contamination in facility, $\approx$ .45 Ci β/γ in hot cells

(Quantity estimates obtained from Building 3028 Hazard Screening Report)

Other pollutants or contaminants:

Asbestos containing material, primarily in the form of thermal system insulation, has been confirmed present in this building. ACM observed is in fair to good condition and poses no immediate health threat. Based on the age of the facility, interior and exterior painted surfaces are assumed to be lead-containing. Verification samples are taken by ORNL Lead Management Program personnel on an "as-needed" basis to confirm the presence of lead in the paint (i.e., when work activities will disturb the paint, or paint is found to be deteriorating and poses a health or environmental threat). Interior painted surfaces observed are in fair to good condition on the first three floors and poor condition on the fourth floor. These areas pose no immediate health threat given the status of this facility.

Groundwater

Are there any suspected impacts to groundwater? If yes, please describe. Include any impacts to drinking water sources.

Building 3028 is located in Waste Area Grouping 1 at ORNL. Although no specific adverse spills or releases of hazardous substances threatening the groundwater were identified during this RmSE, it is suspected, based on available environmental studies conducted in WAG 1, that process and LLLW drains and associated piping may have leaked over the life of the facility. Buried process and LLLW piping and some drains have been found to be deteriorated and leaking in other facilities and areas of WAG 1. Studies have determined that groundwater in WAG 1 has been both radiologically and chemically contaminated. Numerous man-made radionuclides have been detected in WAG 1 groundwater samples including many of those processed in Building 3028. It is likely that liquid waste from activities involving radioisotopes in Building 3028 have historically contributed to WAG 1 groundwater contamination. However, the radionuclides detected in the groundwater were common to the processes and activities in many other buildings in the area which makes it difficult to determine exactly which building is, or was, the source of contamination.

Because of the reported small quantities of chemicals historically used in this facility, it is unlikely that such usage has significantly contributed to WAG 1 groundwater contamination. As part of the facility shutdown process, inactive process and LLLW drains within the building have reportedly been plugged to prevent further release. However, no documentation was available at the time of this report to verify which drains have actually been plugged and which have not. Information on drain locations and discharge points is available from the ORNL Engineering Support Office.

Other than the potential for historical impact to groundwater in WAG 1 via leaking process and LLLW lines external to the building, no existing immediate threat to groundwater was identified given the current status of the facility.

Surface Water

Are there any suspected impacts to surface water? If yes, please describe. Also describe the most likely surface water migration route(s), if applicable. Include any impacts to drinking water sources.

WAG 1 is essentially bound by Fifth Creek to the east, White Oak Creek (WOC) to the south, and First Creek to the west. First and Fifth creeks flow south into (WOC) which flows to the west and exits WAG 1 at the southwest corner. Storm water (from surface runoff and storm water drainage system) and treated water from the process waste system discharges into WOC. The only potential for direct impact to surface water from Building 3028 in its current state would be from lead-containing paint chips which fall off the exterior painted surfaces and find their way into the storm water drainage system and eventually to WOC.

Based on the age of this facility, it is assumed that painted surfaces contain lead. The exterior paint of Building 3028 is in good condition and there was no visible evidence of significant deterioration observed during the site inspection. Therefore, the potential for impact to surface water due to assumed exterior lead-based paint is considered slight.

Surface water may have also been indirectly impacted by leaking process and LLLW lines external to the building. Some of these lines are known to have shared a common trench with storm water drainage piping. Contamination from leaking waste lines could potentially enter deteriorated storm water piping and migrate to WOC. The three creeks bordering WAG 1 are groundwater discharge points. Therefore, groundwater contaminated by leaking waste lines could also potentially impact surface water in the area.

Air

Are there any suspected impacts due to air emissions? If yes, please describe.

The Hazard Screening Report prepared for Building 3028 indicates a slight potential for radiation exposure to personnel working inside and within the immediate vicinity of the facility exists due to potential airborne migration of radioactive particulates and physical contact with contaminated surfaces. Areas of RAD contamination are identified, marked, and controlled as appropriate throughout the facility to protect against inadvertent exposure to personnel. Hot cells in the building are kept under negative pressure; however, the building is no longer operated under negative pressure. The Alpha Cells (Cell 1-4) exhaust through high efficiency particulate air (HEPA) filters to the process off-gas system and stack 3039. Cells 5-7 exhaust through HEPA filters to the cell ventilation system and stack 3039. Apart from catastrophic failure of the hot cells or cell ventilation system, it is unlikely that radioactive air emissions from Building 3028 would impact personnel or the environment in its current state.

There is also a potential for impact to indoor air quality due to the presence of ACM and assumed lead-based paint (LBP) should these materials be disturbed. The ACM and assumed LBP remaining in the building are not considered to be immediate threats to indoor quality in their current state.

Soil

Are there any suspected impacts to soil? If yes, please describe.

As stated for groundwater, there is also a potential for historical impact to soils in the area of Building 3028 due to leaking process and LLLW drain piping. Previous environmental studies have identified a soil contamination plume in the Isotopes Circle area and soil samples collected from the plume have detected radioisotopes common to the processes performed in Building 3028.

The WAG 1 Site Characterization Report and interviews with facility personnel indicated that a LLLW drain line was found to be leaking adjacent to Building 3028 in the early 1980's. The leak contaminated the soil in the immediate area. The soil was reportedly remediated and the leak was repaired. As a result of this spill, it is likely that past activities in Building 3028 have contributed to the isotopes area soil contamination plume.

It is unlikely, however, that the small quantities of chemicals used in Building 3028 have significantly impacted soil in the surrounding area.

Release Beyond Facility or Reservation Boundaries

Has or will the release migrate beyond the boundaries of the facility or reservation? If yes, please describe (including possible human or environmental receptors).

The following are considered potential scenarios where radiologic contamination could migrate beyond the facility or reservation boundaries:

- A person becomes inadvertently contaminated and leaves the facility/reservation undetected.
- Catastrophic failure of hot cells and/or contaminated equipment.

There is also a potential for assumed lead-containing paint which peels off of the building to be carried away with surface runoff during a rain event. Though these potentials exist, they are considered slight and unlikely due to the current status of the facility and the engineering/administrative controls that are in place to protect again such an event.

Worker Safety

Could the release pose a threat to workers? If yes, please describe.

Radiologically contaminated areas are isolated and well marked. Good radiation practices and standard operating procedures are enforced for worker safety. Personnel exiting the facility are required to "frisk" themselves to detect the presence of RAD contamination. Monitors and alarms are in place to detect any radioactive release within the building. Asbestos containing material is appropriately labeled. However, even with these safeguards in place, a potential threat to workers exists if safety measures are overlooked. This potential is not considered significant given the current status and level of activity of the building.

Environmental Receptors

Does the release pose a potential threat to environmental receptors? If yes, please describe. Include natural resources impacts.

No significant immediate threat to environmental receptors within the area surrounding Building 3028, including natural resources, was identified to exist as a result of contamination and conditions currently present in the facility.

Mitigation

What action(s) might be taken to abate/prevent release or impacts from release?

- Continued utilization and enforcement of engineering and administrative controls that are currently in place to protect workers and monitor conditions and activities in the building.
- Continue S&M activities per Procedure IP-900.

What actions are currently being taken to abate/prevent release or impacts from release?

Engineering and administrative controls are in place to control access to contaminated areas and to monitor conditions and activities within the facility for worker and environmental protection. Warning signs and labels are posted throughout the facility indicating RAD, and ACM hazard areas. Standard operating procedures are in place for building access and surveillance and maintenance activities to protect against inadvertent contact and disturbance of contaminated areas and materials. Radiologically contaminated areas are monitored periodically by ORNL health physics personnel. Personnel are "frisked" upon exit of the facility to detect the presence of radiologic contamination. The building is currently in surveillance and maintenance status awaiting entry into the Decontamination and Decommissioning (D&D) Program. Inactive waste drains are reportedly plugged in contaminated areas to prevent inadvertent discharge of contamination beyond the facility. A groundwater monitoring program is in place to monitor contamination levels and migration in groundwater underlying WAG 1. The building is inspected for structural changes after each natural incident (earthquake, tornado, or other severe storm), fire and/or man induced activity which could cause cracking, failure, or deterioration of the facility and/or equipment that may allow contamination to be released. No such conditions have been reported for Building 3028.

Current actions being taken to prevent further release and ensure worker safety in Building 3028 are considered adequate until D&D activities begin.

Other Environmental Authorities

Is the release or threatened release potentially subject to other environmental statutory actions? If yes, please explain.

If paint is found to be lead-containing and samples fail the Toxicity Characteristic Leaching Procedure (TCLP) analysis, the building could qualify as a hazardous waste generator point under the Resource Conservation and Recovery Act (RCRA).

Maintenance Actions

Are maintenance actions necessary to eliminate potential threats to human health and the environment? If so, explain.

No potential hazards requiring maintenance actions were identified to be associated with Building 3028.

Removal Actions

Are Removal Actions necessary to eliminate immediate threats to human health and the environment? If so, explain.

No imminent hazards requiring removal actions per 40 *CFR* 300.415 were identified to be currently associated with Building 3028.

Remedial Site Evaluation

Is a Remedial Site Evaluation needed?

Areas of radiologic contamination associated with Building 3028 have been identified and marked as appropriate. However, it is suspected that process and LLLW drains and associated piping may have leaked beneath the slab of the building as a result of past practices. As a result, it is recommended that some type of remedial investigation be performed to assess the condition of the soil in this area before conducting any S&M or D&D activities which involve disturbing the slab.

Asbestos containing material has also been identified, marked and documented. No further remedial investigation involving this hazard is considered necessary given the current status and future plans of this facility.

Based on the age of the facility, painted surfaces are assumed to contain lead. Samples of the paint should be taken and analyzed to verify the presence of lead prior to conducting any S&M or D&D activities which may disturb these assumed areas.

No Further Investigation

Is a finding of No Further Investigation appropriate? Please explain.

A finding of No Further Investigation implies that a facility or area is free from hazardous substances or contaminants that may threaten human health and the environment. Since Building 3028 contains substances and materials which may become threatening if not properly controlled, handled and managed during the S&M cycle, a finding of No Further Investigation is inappropriate in this case.

Additional Comments

The following documents and databases were referenced for historical and hazard information related to Building 3028:

- Phase 1 Safety Documentation, Radioisotope Laboratory A, Building 3028 - Hazard Screening, Document No. HS/3028/F/RI-5 (Rev. 1)
- Work Plan for the Isotopes Facilities Deactivation Project at Oak Ridge National Laboratory, Document No. ORNL/ER-249/R2.
- Building 3028 Occurrence Reports, 1989 to present.
- Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory, Oak Ridge, Tennessee, Volumes 1 and 2, Document Nos. DOE/OR-1043/V1&D1 and DOE/OR-1043/V2&D1.
- ORNL Hazardous Material Information System Database.
- ORNL Drain System Survey Report for Building 3028.

The following personnel and offices were contacted and provided historical and current use/condition information for Building 3028:

- Mr. Karl Haff, Radiochemical Processing Department Head, ORNL Radiochemical Technology Section.
- Mr. R.E. Eversole, Project Manager, Isotopes Facilities Deactivation Project, LMES.
- Ms. Swati Wilson, Manager, ORNL Lead Management Program.
- Mr. Nathan Dunn, Hazardous Material Information System Office.
- Mr. Jade Thomas, ORNL Environmental Compliance Office.
- Mr. Joe Armento, ORNL Chemical Technology Division, Isotopes Facilities Shutdown Program.

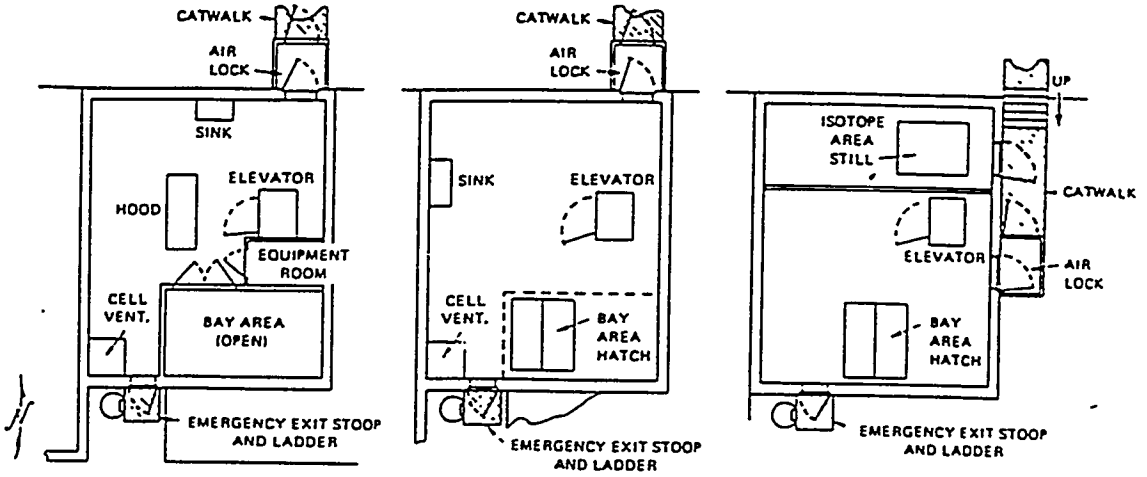
The RmSE of this facility was conducted for LMES under contract by:

Advanced Sciences, Inc.
800 Oak Ridge Turnpike, Suite C-102
Oak Ridge, TN

Todd R. Grant — Evaluator's Signature

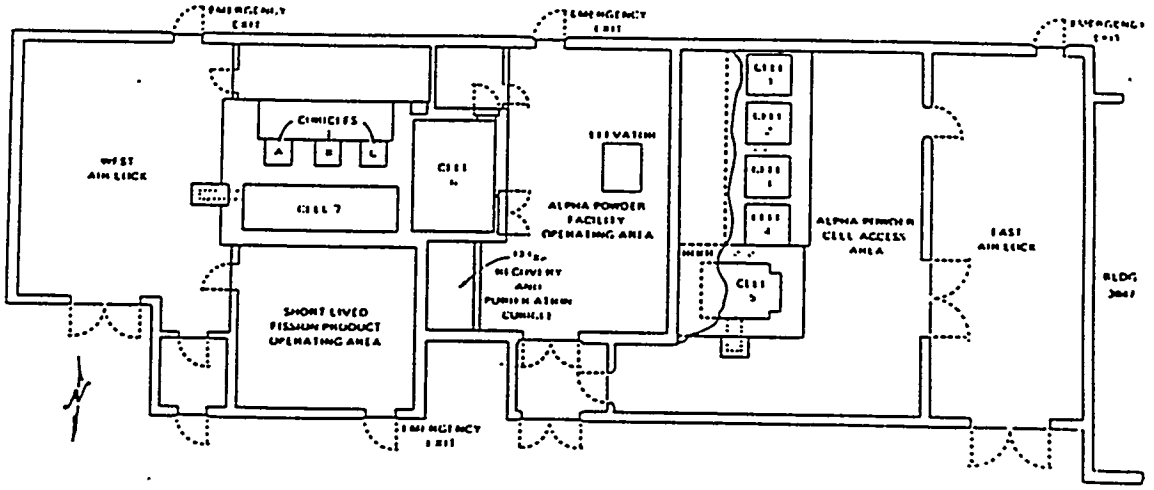
6/18/96 — Date

ORNL DWG 90-599



Second Floor Third Floor Fourth Floor

Upper Floors Building 3028



First Floor Building 3028

Fig. 5. Diagrams of Building 3028.

6. BUILDING 3029— SOURCE DEVELOPMENT LABORATORY

ORNL FACILITY RmSE INFORMATION FORM

General Information	
Area/Facility Name (and aliases):	Building 3029 The Source Development Laboratory
Organization responsible for area/facility (include specific person and phone number if possible):	R.E. Eversole (576-7483), IFDP Project Manager, ER Program, LMES
Status (active/inactive): Inactive, Standby Mode	*Years of Operation:* ≈ 40

Description of Operation:

There are no current operations on-going in this building, other than surveillance, maintenance, and decontamination activities required for facility stabilization. The Source Development Laboratory originally contained a system of remotely operated barricades and a small manipulator cell. Isotopes originally handled and processed in the facility were ^{192}Ir (source fabrication) and small ^{60}Co sources. Cell 1 was built to handle large quantities of ^{60}Co during the mid-1950s. Very little ^{60}Co source fabrication has been done since the late-1950s. Cell 3 was built and used for ^{137}Cs source fabrication in the early-1960s. Cell 2 was built and used for waste handling and pass-through between Cells 1 and 3. The main operations performed in this facility involved ^{60}Co, ^{137}Cs, ^{90}Sr, and ^{192}Ir source fabrication and ^{131}I processing. A ^{60}Co storage and irradiation facility, known as the ^{60}Co Garden, is located below the floor of the east wing. All inventory in the ^{60}Co Garden has reportedly been removed. Radioactive material was processed and handled primarily in the hot cells and glove boxes. Resulting primary waste streams included exhausted air and liquid process waste.

Physical description of area/facility:

- Building 3029 was originally constructed in 1952.
- The facility is a single-story, metal frame building with metal siding consisting of approximately 3,000 sq. ft. of floor space.
- The exterior of the building is cocooned with polyurethane foam for containment.
- Building 3029 is located in an industrial area of ORNL (Isotopes Circle). The immediate area surrounding the facility is paved.
- Building utilities include electric, steam, and plant air.
- The building currently consists primarily of four hot cells and associated operating areas and process equipment. Work involving radioactive materials was performed primarily in the hot cells and glove boxes.
- The building and hot cells are kept under negative pressure for containment purposes. Building ventilation is local and exhausts through high efficiency particulate air (HEPA) filters on the roof. Cell ventilation exhausts through HEPA filters to the cell ventilation system and stack 3039.
- Building sinks and floor drains discharge to process waste system. Cell drains discharge to the low-level liquid waste (LLLW) system (Tank WC-10).
- Exterior of the building is in good condition with no visual evidence of significant damage or deterioration.
- Access to some of the interior portions (i.e., the East Wing) of the building was restricted during the facility inspection. The interior areas of the building that were accessible were observed to be in fair to good condition without any significant areas of damage or deterioration.
- A building space diagram is attached to this form showing the location of the various process areas and equipment.

Release Information

Description of release, or threatened release, and source:

Low levels of residual fixed and transferable radiologic surface contamination exist in areas of the facility as a result of historical operations. The contamination exists primarily in the hot cells, ^{60}Co Garden, and related process equipment (vessels, hoods, piping, ventilation ducts, etc.). This contamination has accumulated from activities involving a variety of materials throughout the operating history of the facility and, therefore, cannot be attributed to a single release episode. Specific areas of contamination include the drain to Glove Box B which has leaked and contaminated the area beneath the box with α contamination. Attempts have been made to clean this area to acceptable levels without success. The area currently is sealed and isolated. Also, the access area behind Cells 2 and 3 in the East Wing of the building has been zoned as a radiation contamination area as the result of ^{137}Cs contamination which leaked from Cell 3. Clean up efforts to decontaminate this area were on-going at the time of this writing. The existing levels of RAD contamination in the facility are low and the presence of this contamination is not considered a significant hazard in its current state according to the Building 3029 Hazard Screening Report.

Hazardous materials (HAZMATs) (e.g., acids, hydraulic fluids, and other chemicals) were reportedly used in small quantities (i.e., less than 5 gallons or 100 pounds) during facility operations and currently for surveillance and maintenance (S&M) activities. According to available spill/release records and facility personnel interviews, no significant HAZMAT spills (i.e., spills having the potential to adversely affect human health and/or the environment) have been reported for this building. No current conditions were identified which present a potential for a significant HAZMAT release.

Hazardous substances present:

Hazardous substances remaining in Building 3029 consist mainly of residual RAD surface contamination (α, β, γ), PCBs, and a small quantity of miscellaneous HAZMATs. Areas of fixed and transferable RAD contamination are associated primarily with the hot cells, ^{60}Co Garden, and process equipment. PCBs are reportedly present in the form of fork lift hydraulic fluid within the building. The Hazard Screening Report for this facility indicates that small quantities of HAZMATs are currently used for S&M activities; however, an inventory list was not identified during this RmSE.

Estimate (if possible) of quantities of hazardous substances that have been released and that could be released:

The following represents the known quantities of substances currently existing in the facility. Radiologic surface contamination has accumulated from a legacy of many different programs and processes and cannot be attributed to a single release episode. It is only possible to quantify release amounts from contamination which currently exists in the facility and/or has been historically documented from past activities.

0 μCi α contamination in facility (Hazard Screening Report indicates "no alpha contamination present"; however, IFDP Work Plan and facility personnel interviews indicate that the area under Glove Box B is alpha contaminated and sealed.)

$<$ 700 μCi β/γ as ^{90}Sr.
$\approx$ 2 Ci β/γ as ^{60}Co.
PCB quantity not known (assumed to be less than 1 gallon).
Quantity of miscellaneous HAZMATs unknown (assumed to be less than 5 gallons or 100 pounds).

(Radioactive material quantity estimates obtained from Building 3026-C Hazard Screening Report, PCB and HAZMAT quantities assumed based on visual inspection and available information.)

Other pollutants or contaminants:

Asbestos containing material (ACM), primarily in the form of thermal system insulation, has been confirmed present in this building. ACM observed is in fair to good condition and poses no immediate health threat. Based on the age of the facility, interior and exterior painted surfaces are assumed to be lead-containing. Verification samples are taken by ORNL Lead Management Program personnel on an "as-needed" basis to confirm the presence of lead in the paint (i.e., when work activities will disturb the paint, or paint is found to be deteriorating and poses a health or environmental threat). Interior painted surfaces observed are in fair to good condition and pose no immediate health threat. Exterior paint is also in good condition with no visible evidence of significant damage or deterioration.

Groundwater

Are there any suspected impacts to groundwater? If yes, please describe. Include any impacts to drinking water sources.

Building 3029 is located in Waste Area Grouping (WAG) 1 at ORNL. Although no specific adverse spills or releases of hazardous substances threatening to groundwater were identified during this RmSE, it is suspected, based on available environmental studies conducted in WAG 1, that process and LLLW drains and associated piping may have leaked over the life of the facility, as evidenced by Glove Box B. Buried process and LLLW piping and some drains have been found to be deteriorated and leaking in other facilities and areas of WAG 1. Studies have determined that groundwater in WAG 1 has been both radiologically and chemically contaminated. Numerous man-made radionuclides have been detected in WAG 1 groundwater samples including many of those processed in Building 3029. It is likely that liquid waste from activities involving radioisotopes in Building 3029 have historically contributed to WAG 1 groundwater contamination. However, the radionuclides detected in the groundwater were common to the processes and activities in many other buildings in the area which makes it difficult to determine exactly which building is, or was, the source of contamination.

Because of the reported small quantities of chemicals historically and currently used in this facility, it is unlikely that such usage has significantly contributed to WAG 1 groundwater contamination. As part of the facility shutdown process, inactive process and LLLW drains within the building have reportedly been plugged to prevent further release. However, no documentation was available at the time of this report to verify which drains have actually been plugged and which have not. Information on drain locations and discharge points is available from the ORNL Engineering Support Office.

Other than the potential for historical impact to groundwater in WAG 1 via leaking process and LLLW lines external to the building, no existing immediate threat to groundwater was identified given the current status of the facility.

Surface Water

Are there any suspected impacts to surface water? If yes, please describe. Also describe the most likely surface water migration route(s), if applicable. Include any impacts to drinking water sources.

WAG 1 is essentially bound by Fifth Creek to the east, White Oak Creek (WOC) to the south, and First Creek to the west. First and Fifth creeks flow south into (WOC) which flows to the west and exits WAG 1 at the southwest corner. Storm water (from surface runoff and storm water drainage system) and treated water from the process waste system discharges into WOC. The only potential for direct impact to surface water from Building 3029 in its current state would be from lead-containing paint chips which fall off the exterior painted surfaces and find their way into the storm water drainage system and eventually to WOC.

Are there any suspected impacts to surface water? If yes, please describe. Also describe the most likely surface water migration route(s), if applicable. Include any impacts to drinking water sources. (Continued)

Based on the age of this facility, it is assumed that painted surfaces contain lead. The exterior paint of Building 3029 is in good condition and there was no visible evidence of deterioration observed during the site inspection. Therefore, the potential for impact to surface water due to assumed exterior lead-based paint is considered slight.

Surface water may have also been indirectly impacted by leaking process and LLLW lines external to the building. Some of these lines are known to have shared a common trench with storm water drainage piping. Contamination from leaking waste lines could potentially enter deteriorated storm water piping and migrate to WOC. The three creeks bordering WAG 1 are groundwater discharge points. Therefore, groundwater contaminated by leaking waste lines could also potentially impact surface water in the area.

No existing immediate threats to surface water were identified to be associated with Building 3029 during this RmSE.

Air

Are there any suspected impacts due to air emissions? If yes, please describe.

The Hazard Screening Report prepared for Building 3029 indicates a slight potential for radiation exposure to personnel working inside and within the immediate vicinity of the facility exists due to potential airborne migration of radioactive particulates and physical contact with contaminated surfaces. Areas of RAD contamination are identified, marked, and controlled as appropriate throughout the facility to protect against inadvertent exposure to personnel. Air in the building is controlled by a local ventilation system which exhausts building air through high efficiency particulate air (HEPA) filters, keeping the building under slight negative pressure relative to atmosphere. Air in the hot cells is exhausted through the cell ventilation system to stack 3039, keeping the cells at a slight negative pressure relative to the interior of the building. Apart from catastrophic failure of the hot cells or ventilation systems, it is unlikely that radioactive air emissions from Building 3029 would impact personnel or the environment in its current state.

There is also a potential for impact to indoor air quality due to the presence of ACM and assumed lead-based paint (LBP) should these materials be disturbed. The ACM and assumed LBP remaining in the building are not considered to be immediate threats to indoor quality in their current state.

Soil

Are there any suspected impacts to soil? If yes, please describe.

As stated for groundwater, there is also a potential for historical impact to soils in the area of Building 3029 due to leaking process and LLLW drain piping. Previous environmental studies have identified a soil contamination plume in the Isotopes Circle area and soil samples collected from the plume have detected radioisotopes common to the processes performed in Building 3029. Whether waste from Building 3029 has actually contributed to this contamination is unknown, given the information reviewed during this RmSE.

Since the area surrounding Building 3029 is paved, there is no potential for areas of soil adjacent to the facility to be impacted from lead if, in fact, exterior paint is found to be lead-containing. The exterior paint was observed to be good condition and does not pose an immediate threat in its current state.

It is unlikely that the small quantities of chemicals reportedly used in Building 3029 have significantly impacted soil in the surrounding area.

Release Beyond Facility or Reservation Boundaries

Has or will the release migrate beyond the boundaries of the facility or reservation? If yes, please describe (including possible human or environmental receptors).

The following are considered potential scenarios where radiologic contamination could migrate beyond the facility or reservation boundaries:

- A person becomes inadvertently contaminated and leaves the facility/reservation undetected.
- Catastrophic failure of hot cells and/or contaminated equipment.

There is also a potential for assumed lead-containing paint which peels off of the building to be carried away with surface runoff during a rain event. Though these potentials exist, they are considered slight and unlikely due to the current status of the facility and the engineering/administrative controls that are in place to protect again such an event.

Worker Safety

Could the release pose a threat to workers? If yes, please describe.

Radiologically contaminated areas are isolated and well marked. Good radiation practices and standard operating procedures are enforced for worker safety. Personnel exiting the facility are required to "frisk" themselves to detect the presence of RAD contamination. Monitors and alarms are in place to detect any radioactive release within the building. PCB containing equipment and ACM are appropriately labeled. However, even with these safeguards in place, a potential threat to workers exists if safety measures are overlooked. This potential is not considered significant given the current status and level of activity of the building.

Environmental Receptors

Does the release pose a potential threat to environmental receptors? If yes, please describe. Include natural resources impacts.

No existing conditions posing an immediate significant threat to environmental receptors, including natural resources, were identified to be currently existing or associated with Building 3029.

Mitigation

What action(s) might be taken to abate/prevent release or impacts from release?

- Continued utilization and enforcement of engineering and administrative controls that are currently in place to protect workers and monitor conditions and activities in the building.
- Continue S&M activities per Procedure IP-900.

What actions are currently being taken to abate/prevent release or impacts from release?

Engineering and administrative controls are in place to control access to contaminated areas and to monitor conditions and activities within the facility for worker and environmental protection. Warning signs and labels are posted throughout the facility indicating RAD, ACM, and PCB hazard areas. Standard operating procedures are in place for building access and surveillance and maintenance activities to protect against inadvertent contact and disturbance of contaminated areas and materials. Radiologically contaminated areas are monitored periodically by ORNL health physics personnel. Personnel are "frisked" upon exit of the facility to detect the presence of radiologic contamination.

What actions are currently being taken to abate/prevent release or impacts from release? (Continued)

The building is currently in surveillance and maintenance status awaiting entry into the Decontamination and Decommissioning (D&D) Program. Inactive waste drains are reportedly plugged in contaminated areas to prevent inadvertent discharge of contamination beyond the facility. A groundwater monitoring program is in place to monitor contamination levels and migration in groundwater underlying WAG 1. The building is inspected for structural changes after each natural incident (earthquake, tornado, or other severe storm), fire and/or man induced activity which could cause cracking, failure, or deterioration of the facility and/or equipment that may allow contamination to be released. No such conditions have been reported for Building 3029.

Current actions being taken to prevent further release and ensure worker safety in Building 3029 are considered adequate until D&D activities begin.

Other Environmental Authorities

Is the release or threatened release potentially subject to other environmental statutory actions? If yes, please explain.

If paint is found to be lead-containing and samples fail the Toxicity Characteristic Leaching Procedure (TCLP) analysis, the building could qualify as a hazardous waste generator point under the Resource Conservation and Recovery Act (RCRA).

Maintenance Actions

Are maintenance actions necessary to eliminate potential threats to human health and the environment? If so, explain.

No existing potential hazards requiring maintenance actions were identified to be associated with Building 3029.

Removal Actions

Are Removal Actions necessary to eliminate immediate threats to human health and the environment? If so, explain.

No imminent hazards requiring removal actions per 40 *CFR* 300.415 were identified to be currently associated with Building 3029.

Remedial Site Evaluation

Is a Remedial Site Evaluation needed?

Areas of radiologic contamination associated with Building 3029 have been identified and marked as appropriate. However, it is suspected that process and LLLW drains and associated piping may have leaked beneath the slab of the building as a result of past practices. As a result, it is recommended that some type of remedial investigation be performed to assess the condition of the soil in this area before conducting any S&M or D&D activities which involve disturbing the slab.

ACM and PCB-containing equipment have also been identified, marked and documented. No further remedial investigation involving these hazards is considered necessary given the current status and future plans of this facility.

Based on the age of the facility, painted surfaces are assumed to contain lead. Samples of the paint should be taken and analyzed to verify the presence of lead prior to conducting any S&M or D&D activities which may disturb these assumed areas.

No Further Investigation

Is a finding of No Further Investigation appropriate? Please explain.

A finding of No Further Investigation implies that a facility or area is free from hazardous substances or contaminants that may threaten human health and the environment. Since Building 3029 contains substances and materials which may become threatening if not properly controlled, handled and managed during the S&M cycle, a finding of No Further Investigation is inappropriate in this case.

Additional Comments

The following documents and databases were referenced for historical and hazard information related to Building 3029:

- Phase I Safety Documentation, The Source Development Laboratory, Building 3029, Hazard Screening, Document No. HS/3029/F/RT-6 (Rev. 1).
- Work Plan for the Isotopes Facilities Deactivation Project at Oak Ridge National Laboratory, Document No. ORNL/ER-249/R2.
- Building 3029 Occurrence Reports, 1989 to present.
- Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory, Oak Ridge, Tennessee, Volumes 1 and 2, Document Nos. DOE/OR-1043/V1&D1 and DOE/OR-1043/V2&D1.
- ORNL Hazardous Material Information System Database.
- ORNL Drain System Survey Report for Building 3029.

The following personnel and offices were contacted and provided historical and current use/condition information for Building 3026-C:

- Mr. Karl Haff, Radiochemical Processing Department Head, ORNL Radiochemical Technology Section.
- Ms. Swati Wilson, Manager, ORNL Lead Management Program.
- Mr. Nathan Dunn, Hazardous Material Information System Office.
- Mr. Jade Thomas, ORNL Environmental Compliance Office.
- Mr. Joe Armento, ORNL Chemical Technology Division, Isotopes Facilities Shutdown Program.

The RmSE of this facility was conducted for LMES under contract by:

Advanced Sciences, Inc.
800 Oak Ridge Turnpike, Suite C-102
Oak Ridge, TN

Todd R. Grant 6/18/96

Evaluator's Signature Date

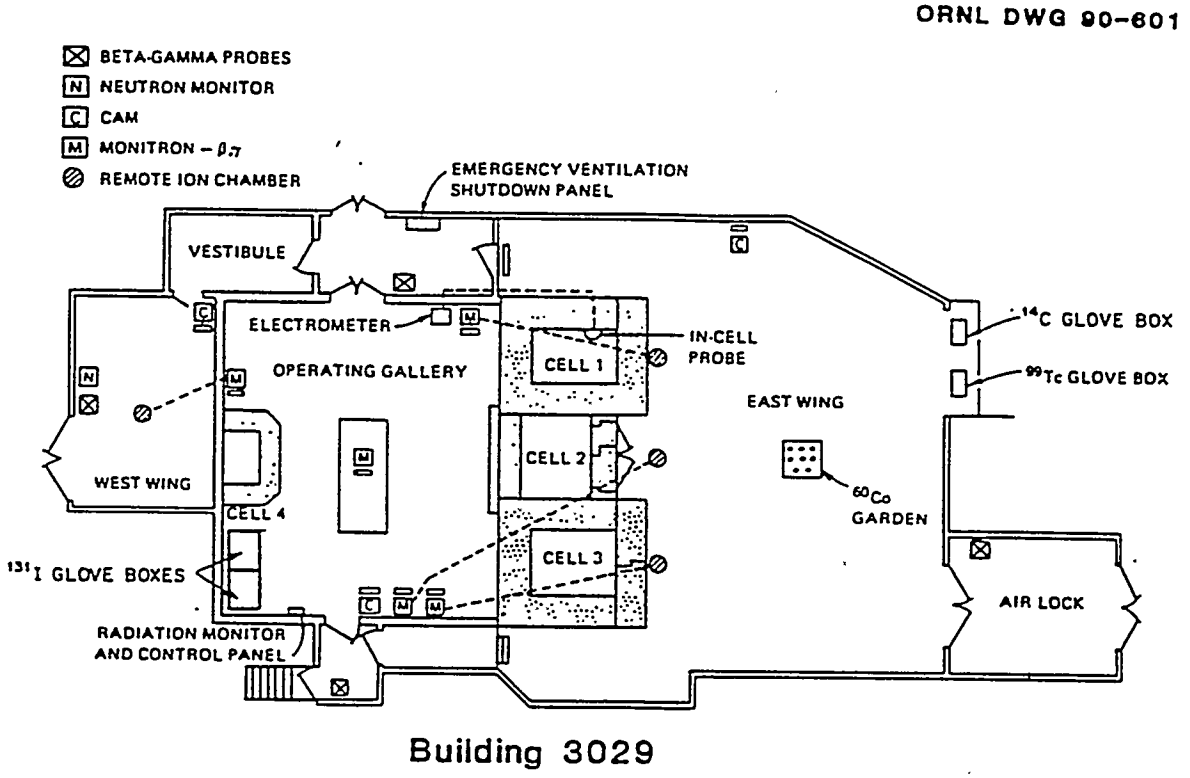


Fig. 6. Diagram of Building 3029.

7. BUILDINGS 3030, 3031, AND 3118—ISOTOPES PRODUCTION LABS C, D, AND H

ORNL FACILITY RmSE INFORMATION FORM

General Information	
Area/Facility Name (and aliases):	Building 3030/3031/3118 Radioisotopes Production Laboratories C, D, and H
Organization responsible for area/facility (include specific person and phone number if possible):	R.E. Eversole (576-7483), IFDP Project Manager, ER Program, LMES
Status (active/inactive): Inactive, Standby Mode	*Years of Operation:* ≈ 40

Description of Operation:

There are no current operations, other than surveillance, maintenance, and deactivation activities, on-going in these buildings. Historical operations involving radioisotopes were performed in Buildings 3030 and 3031. Building 3118 was built in the early 1960s by enclosing the area between Buildings 3030 and 3031. Building 3118 was used primarily for temporary storage of radioactive sources and contaminated wastes and rear access to the hot cells in Building 3030 and 3031. Operations in Buildings 3030 and 3031 consisted of limited production and development work with radioisotopes used for industrial, medical, and research applications. Operations have included purifying, processing, dispensing, and storage of radioactive isotopes. The hot cell in Building 3030 has been used for processing isotopes such as ^{56}Co, ^{57}Co, ^{198}Au, ^{55}Fe, ^{234}Np, ^{75}Se, ^{90}Sr, ^{119m}Sn, ^{237}U, ^{33}P, and ^{192}Ir. The hot cell in Building 3031 was utilized for the final separation of ^{153}Gd from europium targets. Radioisotope processing and handling was performed in contained hot cells, lab hoods, and glove boxes. Resulting primary waste streams included exhausted air and liquid process waste.

Physical description of area/facility:

- Buildings 3030 and 3031 were assumed to be constructed in the late 1940s, based on the documented construction date of surrounding buildings. Building 3118 was constructed in the early 1960s.
- The buildings are single-story, metal framed structures with metal siding. The exterior polyurethane cocooning process has only been partially completed on Building 3031; therefore, the buildings are not sealed.
- Buildings 3030, 3031, and 3118 are physically connected and share utilities (steam, electric, plant air).
- These buildings are located in an industrial area of ORNL (Isotopes Circle). The immediate area surrounding the facilities is paved for the most part with some grassy areas.
- Buildings 3030 and 3031 are single-room laboratories each consisting of a hot cell, a monitor, process hoods, and other laboratory equipment. Building 3118 is a single-room storage area consisting of rear access doors to each hot cell in Buildings 3030 and 3031. Floor drains in each building discharge to the process and low-level liquid waste (LLLW) (Tank WC10) systems. Cell, hood, and glove box hot drains discharge to the LLLW system (Tank WC10). The cells are currently shutdown. Work with radioactive materials was performed in the hot cells, hoods, and glove boxes.
- Generally, the interior of each building is in fair to good condition. Asbestos Containing Material (ACM), radiation (RAD) hazard areas, and polychlorinated bi-phenol (PCB) containing equipment are posted and/or labeled as appropriate.
- Buildings 3030 and 3031 are kept under slight negative pressure relative to atmosphere.
- Building space diagrams are attached to this form showing the locations of the various process areas and equipment.

Release Information

Description of release, or threatened release, and source:

Very low levels of residual fixed radiologic surface contamination exist in areas of these facilities as a result of historical operations. The contamination exists primarily in the hot cells and process equipment (vessels, hoods, piping, ventilation ducts, etc.). This contamination has accumulated from activities involving a variety of materials throughout the operating history of the facilities and, therefore, cannot be attributed to a single release episode. The existing levels of RAD contamination in the facilities are very low and well isolated. The presence of this contamination is not considered a significant hazard in its current state.

Hazardous materials (HAZMATs) (e.g., acids, hydraulic fluids, and other chemicals) were reportedly used in small quantities (i.e., less than 5 gallons or 100 pounds) during facility operations and currently for surveillance and maintenance (S&M) activities. According to available spill/release records and facility personnel interviews, no significant HAZMAT spills (i.e., spills having the potential to adversely affect human health and/or the environment) have been reported for these buildings. No current conditions were identified which present a potential for a significant HAZMAT release.

Hazardous substances present:

Hazardous substances remaining in Buildings 3030, 3031 and 3118 consist mainly of small amounts of residual fixed RAD surface contamination (α, β, γ), PCBs, and a small quantity of miscellaneous HAZMATs. Areas of fixed RAD contamination are associated primarily with the hot cells and process equipment. PCBs are present in electrical capacitors within the buildings. The Hazard Screening Report for these facilities indicates that small quantities of HAZMATs are currently used for S&M activities; however, an inventory list was not identified during this RmSE.

Estimate (if possible) of quantities of hazardous substances that have been released and that could be released:

The following represents the known quantities of substances currently existing in the facility. Radiologic surface contamination has accumulated from a legacy of many different programs and processes and cannot be attributed to a single release episode. It is only possible to quantify release amounts from contamination which currently exists in the facility and/or has been historically documented from past activities.

- Quantities of β/γ and α contamination were reported as "residual contamination" and "traces (very low)", respectively, in the Hazard Screening Report for these facilities.

≈ .5 gallons PCBs.

(Quantity estimates obtained from Building 3030, 3031, and 3118 Hazard Screening Report, and ORNL PCB Large High- and Low-Voltage and Small Capacitor Inventory database)

Other pollutants or contaminants:

Asbestos containing material, primarily in the form of thermal system insulation, has been confirmed present in this building. ACM observed is in fair-to-good condition and poses no immediate health threat. Based on the age of the facility, interior and exterior painted surfaces are assumed to be lead-containing.

Verification samples are taken by ORNL Lead Management Program personnel on an "as-needed" basis to confirm the presence of lead in the paint (i.e., when work activities will disturb the paint, or paint is found to be deteriorating and poses a health or environmental threat). Interior painted surfaces observed are in fair to good condition and pose no immediate health threat. Paint on exterior surfaces was also found to be in good condition, posing no immediate hazard to the surrounding area due to deterioration.

Groundwater

Are there any suspected impacts to groundwater? If yes, please describe. Include any impacts to drinking water sources.

Buildings 3030, 3031, and 3118 are located in Waste Area Grouping 1 at ORNL. Although no specific adverse spills or releases of hazardous substances threatening to groundwater were identified during this RmSE, it is suspected, based on available environmental studies conducted in WAG 1, that process and LLLW drains and associated piping may have leaked over the life of the facilities. Buried process and LLLW piping and some drains have been found to be deteriorated and leaking in other facilities and areas of WAG 1. Studies have determined that groundwater in WAG 1 has been both radiologically and chemically contaminated. Numerous man-made radionuclides have been detected in WAG 1 groundwater samples including those common to the processes in Buildings 3030 and 3031. It is likely that liquid waste from activities involving radioisotopes in these buildings have historically contributed to WAG 1 groundwater contamination. However, the radionuclides detected in the groundwater were common to the processes and activities in many other buildings in the area which makes it difficult to determine exactly which building is, or was, the source of contamination.

Because of the reported small quantities of chemicals historically used in this facility, it is unlikely that such usage has significantly contributed to WAG 1 groundwater contamination. As part of the facility shutdown process, inactive process and LLLW drains within the building have reportedly been plugged to prevent further release. However, no documentation was available at the time of this report to verify which drains have actually been plugged and which have not. Information on drain locations and discharge points is available from the ORNL Engineering Support Office.

Other than the potential for historical impact to groundwater in WAG 1 via leaking process and LLLW lines external to the building, no existing immediate threat to groundwater was identified given the current status of these facilities.

Surface Water

Are there any suspected impacts to surface water? If yes, please describe. Also describe the most likely surface water migration route(s), if applicable. Include any impacts to drinking water sources.

WAG 1 is essentially bound by Fifth Creek to the east, White Oak Creek (WOC) to the south, and First Creek to the west. First and Fifth creeks flow south into (WOC) which flows to the west and exits WAG 1 at the southwest corner. Storm water (from surface runoff and storm water drainage system) and treated water from the process waste system discharges into WOC. Surface water may have been indirectly impacted by leaking process and LLLW lines external to the building. Some of these lines are known to have shared a common trench with storm water drainage piping. Contamination from leaking waste lines could potentially enter deteriorated storm water piping and migrate to WOC. The three creeks bordering WAG 1 are groundwater discharge points. Therefore, groundwater contaminated by leaking waste lines could also potentially impact surface water in the area.

Are there any suspected impacts to surface water? If yes, please describe. Also describe the most likely surface water migration route(s), if applicable. Include any impacts to drinking water sources. (Continued)

Additionally, if exterior painted surfaces do, in fact, contain lead, the potential exits for surface water to be impacted from deteriorated paint which washes of the buildings and finds its way to surface water with the storm water runoff.

Other than the potential for historical impact, no existing immediate threat to surface water was identified given the current status of these facilities.

Air

Are there any suspected impacts due to air emissions? If yes, please describe.

The Hazard Screening Report prepared for Buildings 3030, 3031, and 3118 indicates a slight potential for radiation exposure to personnel working inside the facilities exists due to potential airborne migration of radioactive particulates and physical contact with contaminated surfaces. Because of the low levels and nature of RAD contamination within the facilities, impacts to persons or the environment surrounding the facilities are considered negligible. Areas of RAD contamination are identified, marked, and controlled as appropriate throughout the facilities to protect against inadvertent exposure to personnel. Air in the buildings is controlled by a local exhaust system which exhausts laboratory hood air through high efficiency particulate air (HEPA) filters. Hot cells are exhausted through HEPA filters to the 3039 stack. Apart from catastrophic failure of the hot cells or ventilation system, it is unlikely that radioactive air emissions from these buildings would impact personnel or the environment.

There is also a potential for impact to indoor air quality due to the presence of ACM and assumed lead-based paint (LBP) should these materials be disturbed. The ACM and assumed LBP remaining in the building are not considered to be immediate threats to indoor quality in their current state.

Soil

Are there any suspected impacts to soil? If yes, please describe.

As stated for groundwater, there is a potential for historical impact to soils in the area of Buildings 3030, 3031, and 3118 due to leaking process and LLLW drain piping. Previous environmental studies have identified a soil contamination plume in the Isotopes Circle area and soil samples collected from the plume have detected radioisotopes common to the processes performed in these building. An area of contaminated soil exists around the southwest corner of Building 3030. The area is well marked and covered with a protective barrier and river rock. Below-ground LLLW drains have been identified in this area. Information specific to this area was not identified during this RmSE; however, it is likely that this area of contamination is a result of leaks in the LLLW drain lines. As a result, it is also likely that operations in these facilities (at least Building 3030) have historically contributed to the Isotopes Circle soil contamination plume. This area of contamination is not considered an imminent hazard given the current status of the adjacent facility and the protective measures being taken to prevent contamination migration and personnel exposure.

It is unlikely that the small quantities of chemicals used in these facilities have significantly impacted soil in the surrounding area.

Release Beyond Facility or Reservation Boundaries

Has or will the release migrate beyond the boundaries of the facility or reservation? If yes, please describe (including possible human or environmental receptors).

The following are considered potential scenarios where radiologic contamination could migrate beyond the facility or reservation boundaries:

- A person becomes inadvertently contaminated and leaves the facility/reservation undetected.
- Catastrophic failure of hot cells and/or contaminated equipment.

There is also a potential for assumed lead-containing paint which peels off exterior surfaces of the buildings to be carried away with surface runoff during a rain event. Though these potentials exist, they are considered slight and unlikely due to the current status of the facility and the engineering/administrative controls that are in place to protect again such an event.

Worker Safety

Could the release pose a threat to workers? If yes, please describe.

Radiologically contaminated areas are isolated and well marked. Good radiation practices and standard operating procedures are enforced for worker safety. Personnel exiting the facilities are required to "frisk" themselves to detect the presence of RAD contamination. Monitors and alarms are in place in Buildings 3030 and 3031 to detect any radioactive release within the buildings. PCB containing equipment and ACM are appropriately labeled. However, even with these safeguards in place, a potential threat to workers exists if safety measures are overlooked. This potential is not considered significant given the current status and level of activity of buildings.

Environmental Receptors

Does the release pose a potential threat to environmental receptors? If yes, please describe. Include natural resources impacts.

No existing conditions posing an immediate significant threat to environmental receptors, including natural resources, were identified to be currently existing or associated with Building 3030, 3031 or 3118.

Mitigation

What action(s) might be taken to abate/prevent release or impacts from release?

- Continued utilization and enforcement of engineering and administrative controls that are currently in place to protect workers and monitor conditions and activities in these buildings.
- Continue S&M activities per Procedure IP-900.

What actions are currently being taken to abate/prevent release or impacts from release?

Engineering and administrative controls are in place to control access to contaminated areas and to monitor conditions and activities within the facilities for worker and environmental protection. Warning signs and labels are posted throughout the facilities indicating RAD, ACM, and PCB hazard areas. Standard operating procedures are in place for building access and surveillance and maintenance activities to protect against inadvertent contact and disturbance of contaminated areas and materials. Radiologically contaminated areas are monitored periodically by ORNL health physics personnel. Personnel are "frisked" upon exit of each facility to detect the presence of radiologic contamination. The buildings are currently in surveillance and maintenance status awaiting entry into the Decontamination and Decommissioning (D&D) Program. Inactive waste drains are reportedly plugged in contaminated areas to prevent inadvertent discharge of contamination beyond the facility. A groundwater monitoring program is in place to monitor contamination levels and migration in groundwater underlying WAG 1. The building is inspected for structural changes after each natural incident (earthquake, tornado, or other severe storm), fire and/or man induced activity which could cause cracking, failure, or deterioration of the facility and/or equipment that may allow contamination to be released. No such conditions have been reported for Buildings 3030, 3031, and 3118.

Current actions being taken to prevent further release and ensure worker safety in Buildings 3030, 3031, and 3118 are considered adequate until D&D activities begin.

Other Environmental Authorities

Is the release or threatened release potentially subject to other environmental statutory actions? If yes, please explain.

If paint is found to be lead-containing and samples fail the Toxicity Characteristic Leaching Procedure (TCLP) analysis, the building could qualify as a hazardous waste generator point under the Resource Conservation and Recovery Act (RCRA).

Maintenance Actions

Are maintenance actions necessary to eliminate potential threats to human health and the environment? If so, explain.

No existing potential hazards requiring maintenance actions were identified to be associated with Buildings 3030, 3031, or 3118.

Removal Actions

Are Removal Actions necessary to eliminate immediate threats to human health and the environment? If so, explain.

No imminent hazards requiring removal actions per 40 *CFR* 300.415 were identified to be currently associated with Buildings 3030, 3031, or 3118.

Remedial Site Evaluation

Is a Remedial Site Evaluation needed?

Areas of radiologic contamination associated with Buildings 3030, 3031, and 3118 have been identified and marked as appropriate. However, it is suspected that process and LLLW drains and associated piping may have leaked beneath the slab of the building as a result of past practices. As a result, it is recommended that some type of remedial investigation be performed to assess the condition of the soil in this area before conducting any S&M or D&D activities which involve disturbing the slab.

ACM and PCB-containing equipment have also been identified, marked and documented. No further remedial investigation involving these hazards is considered necessary given the current status and future plans of this facility.

Based on the age of the facility, painted surfaces are assumed to contain lead. Samples of the paint should be taken and analyzed to verify the presence of lead prior to conducting any S&M or D&D activities which may disturb these assumed areas.

No Further Investigation

Is a finding of No Further Investigation appropriate? Please explain.

A finding of No Further Investigation implies that a facility or area is free from hazardous substances or contaminants that may threaten human health and the environment. Since Buildings 3030, 3031, and 3118 contain substances and materials which may become threatening if not properly controlled, handled and managed during the S&M cycle, a finding of No Further Investigation is inappropriate in this case.

Additional Comments

The following documents and databases were referenced for historical and hazard information related to Buildings 3030, 3031, and 3118:

- Phase I Safety Documentation, Radioisotope Production Laboratories C, D, and H, Buildings 3030, 3031, and 3118, Hazard Screening, Document No. Draft.
- Work Plan for the Isotopes Facilities Deactivation Project at Oak Ridge National Laboratory, Document No. ORNL/ER-249/R2.
- Building 3030, 3031, and 3118 Occurrence Reports, 1989 to present.
- Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory, Oak Ridge, Tennessee, Volumes 1 and 2, Document Nos. DOE/OR-1043/V1&D1 and DOE/OR-1043/V2&D1.
- ORNL Hazardous Material Information System Database.
- ORNL Drain System Survey Report for Buildings 3030, 3031, and 3118.

The following personnel and offices were contacted and provided historical and current use/condition information for Building 3030, 3031, and 3118:

- Mr. Karl Haff, Radiochemical Processing Department Head, ORNL Radiochemical Technology Section.
- Mr. Herman Phillips, Assistant Facilities Manager, ORNL Special Projects.
- Ms. Swati Wilson, Manager, ORNL Lead Management Program.
- Mr. Nathan Dunn, Hazardous Material Information System Office.
- Mr. Jade Thomas, ORNL Environmental Compliance Office.
- Mr. Joe Armento, ORNL Chemical Technology Division, Isotopes Facilities Shutdown Program.

The RmSE of this facility was conducted for LMES under contract by:

Advanced Sciences, Inc.
800 Oak Ridge Turnpike, Suite C-102
Oak Ridge, TN

Todd R. Grant — Evaluator's Signature

6/18/96 — Date

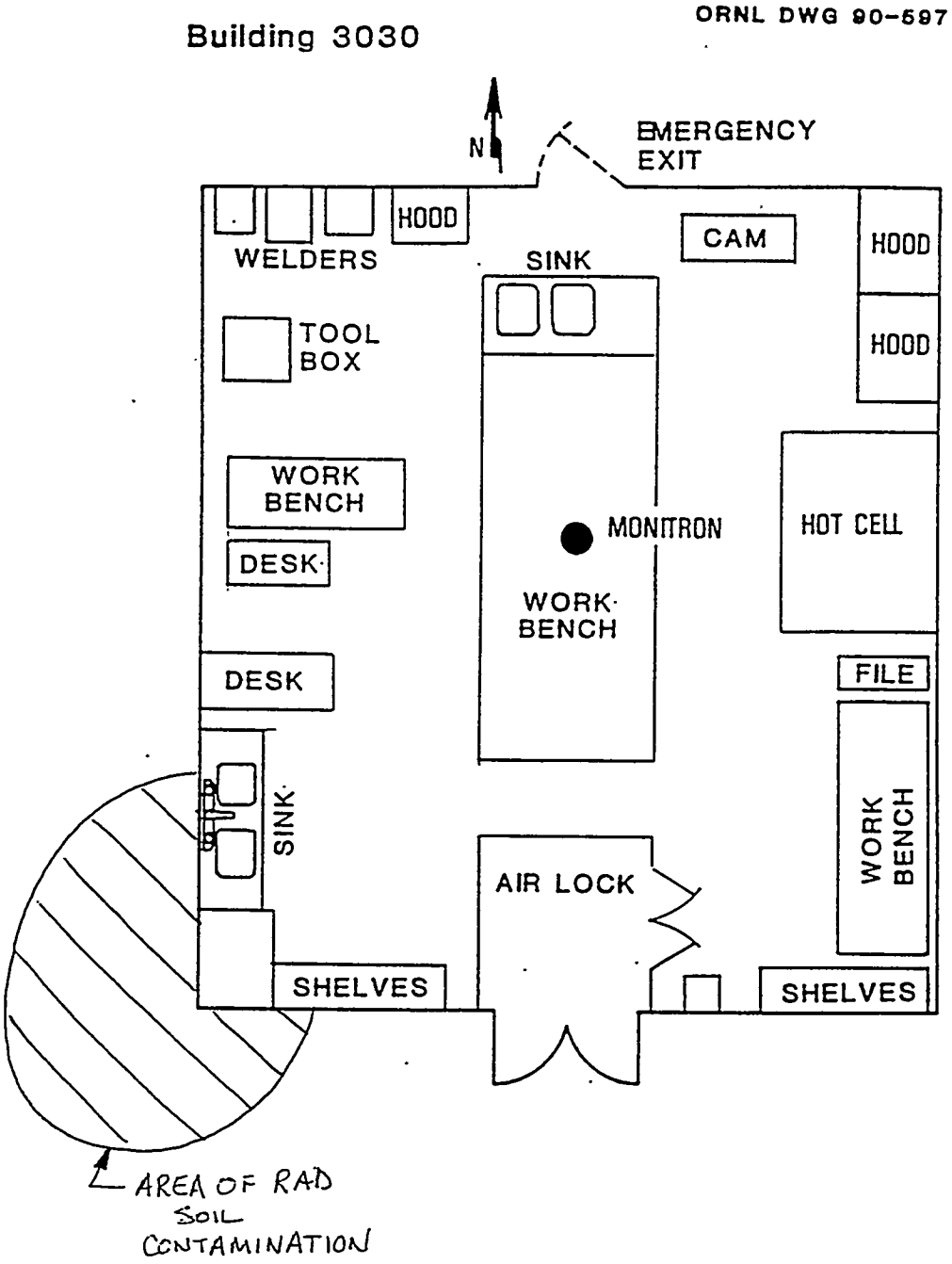


Fig. 7. Diagram of Building 3030.

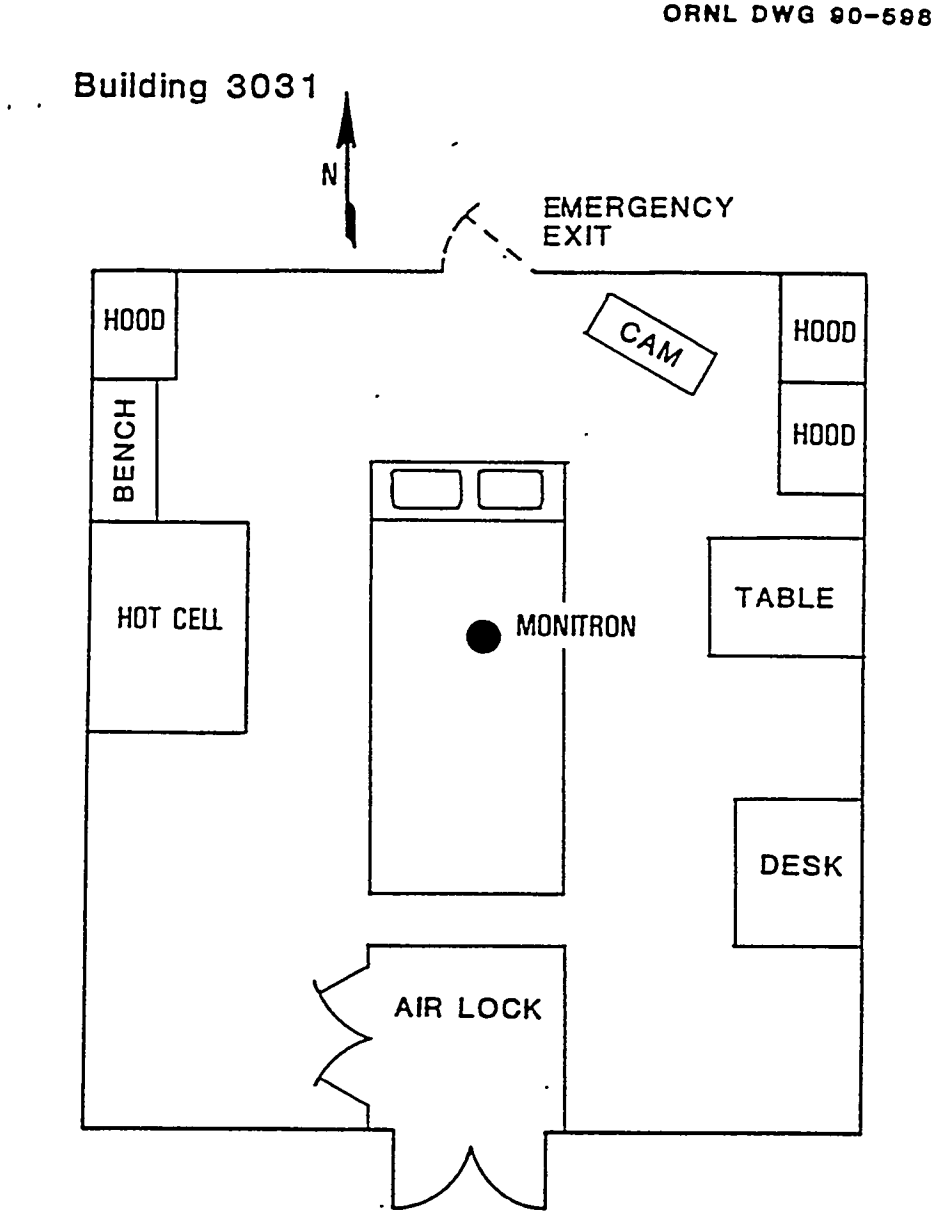


Fig. 8. Diagram of Building 3031.

8. BUILDING 3032/(3099)—RADIOISOTOPES PRODUCTION LABORATORY E

ORNL FACILITY RmSE INFORMATION FORM

General Information	
Area/Facility Name (and aliases):	Building 3032 (including Building 3099) Radioisotope Production Laboratory E
Organization responsible for area/facility (include specific person and phone number if possible):	R.E. Eversole (576-7483), IFDP Project Manager, ER Program, LMES
Status (active/inactive): Inactive, Standby Mode	*Years of Operation:* ≈ 40

Description of Operation:

There are no current operations, other than surveillance, maintenance, and deactivation activities, on-going in this building. Information on historical operations identified for Building 3032 during this RmSE was not detailed. The building was originally built as part of the Isotopes Program, and it housed an analytical facility for radiochemical support of the isotopes production activities. Currently, all discrete items of radioactive material inventory have been removed. Radioisotope processing and handling was performed in lab hoods. Resulting primary waste streams included exhausted air and liquid process waste. Building 3099 is actually a concrete storage pad adjacent to the west side of Building 3032. This pad has been used for temporary storage of many different items including containerized radioactive materials and wastes.

Physical description of area/facility:

- Building 3032 was originally constructed in the 1950s.
- The building is a single-story, metal framed structure with metal siding consisting of 1,200 sq. ft. of floor space. The building is not sealed by polyurethane cocooning. Paint observed on exterior surfaces is in good condition.
- Building 3032 is located in an industrial area of ORNL (Isotopes Circle). The immediate area surrounding the facilities is paved for the most part with some grassy areas.
- The building is basically a single-room laboratory consisting of a five process hoods and other laboratory equipment. Floor drains in the building reportedly discharge to the process waste system. Hood drains discharged to the low-level liquid waste (LLLW) system (Tank WC10). The Hazard Screening report for this building indicates that LLLW service is no longer available. Work with radioactive materials was performed in the process hoods.
- Generally, the interior of the building is in fair to good condition. Asbestos Containing Material (ACM) and radiation (RAD) hazard areas are posted and/or labeled as appropriate. No polychlorinated biphenols (PCBs) were identified to be associated with this building.
- Building 3032 is operated under normal atmospheric pressure.
- A building space diagram is attached to this form showing the locations of the various process areas and equipment.

Release Information

Description of release, or threatened release, and source:

Small amounts of residual fixed radiologic surface contamination and a few isolated areas of transferable RAD contamination exist in areas of the facility as a result of historical operations. Accessible areas of RAD contamination have been decontaminated and are considered "clean", according to the Hazard Screening Report. Some small fixed and transferable hot spots remain in inaccessible areas, primarily in the process hoods and related equipment. This contamination has accumulated from activities involving a variety of materials throughout the operating history of the facility and, therefore, cannot be attributed to a single release episode. The existing levels of RAD contamination in the facility are very low and well isolated. The presence of this contamination is not considered a significant hazard in its current state.

It is assumed, based on the historical laboratory function of this building and operations in similar facilities, that hazardous materials (HAZMATs) (e.g., acids, hydraulic fluids, and other chemicals) were used in small quantities (i.e., less than 5 gallons or 100 pounds) during facility operations. Reportedly, no HAZMATs are currently used or stored in this facility. According to available spill/release records and facility personnel interviews, no significant HAZMAT spills (i.e., spills having the potential to adversely affect human health and/or the environment) have been reported for this building. No current conditions were identified which present a potential for a HAZMAT release.

Hazardous substances present:

Hazardous substances remaining in Building 3032 consist main of small amounts of residual fixed and transferable RAD surface contamination (α, β, γ). Areas of fixed RAD contamination are associated primarily with the process hoods and associated equipment. No PCBs were identified to be present in within the building.

Estimate (if possible) of quantities of hazardous substances that have been released and that could be released:

The following represents the known quantities of substances currently existing in the facility. Radiologic surface contamination has accumulated from a legacy of many different programs and processes and cannot be attributed to a single release episode. It is only possible to quantify release amounts from contamination which currently exists in the facility and/or has been historically documented from past activities.

< 400 µCi α
$< 1{,}100$ µCi β/γ

(Quantity estimates obtained from Building 3032 Hazard Screening Report)

Other pollutants or contaminants:

Asbestos containing material, primarily in the form of thermal system insulation, has been confirmed present in this building. ACM observed is in fair to good condition and poses no immediate health threat. Based on the age of the facility, interior and exterior painted surfaces are assumed to be lead-containing. Verification samples are taken by ORNL Lead Management Program personnel on an "as-needed" basis to confirm the presence of lead in the paint (i.e., when work activities will disturb the paint, or paint is found to be deteriorating and poses a health or environmental threat). Interior painted surfaces observed are in fair to good condition and pose no immediate health threat. Paint on exterior surfaces was also found to be in good condition, posing no immediate hazard to the surrounding area due to deterioration.

Groundwater

Are there any suspected impacts to groundwater? If yes, please describe. Include any impacts to drinking water sources.

Building 3032 is located in Waste Area Grouping 1 at ORNL. Although no specific adverse spills or releases of hazardous substances threatening to groundwater were identified during this RmSE, it is suspected, based on available environmental studies conducted in WAG 1, that process and LLLW drains and associated piping may have leaked over the life of the facility. Buried process and LLLW piping and some drains have been found to be deteriorated and leaking in other facilities and areas of WAG 1. Studies have determined that groundwater in WAG 1 has been both radiologically and chemically contaminated. Numerous man-made radionuclides have been detected in WAG 1 groundwater samples; however, because of the lack of specific information concerning radioisotope processes in Building 3032, it is not known whether any of these radionuclides were common to the processes in this building. It is likely, however, that liquid waste from activities involving radioisotopes in this building has historically contributed to WAG 1 groundwater contamination to some extent. However, the radionuclides detected in the groundwater were common to the processes and activities in many buildings in the area which makes it difficult to determine exactly which building is, or was, the source of contamination.

Because of the assumed small quantities of chemicals historically used in this facility, it is unlikely that such usage has significantly contributed to WAG 1 groundwater contamination. As part of the facility shutdown process, inactive process and LLLW drains within the building have reportedly been plugged to prevent further release. However, no documentation was available at the time of this report to verify which drains have actually been plugged and which have not. Information on drain locations and discharge points is available from the ORNL Engineering Support Office.

Other than the potential for historical impact to groundwater in WAG 1 via leaking process and LLLW lines external to the building, no existing immediate threat to groundwater was identified given the current status of the facility.

Surface Water

Are there any suspected impacts to surface water? If yes, please describe. Also describe the most likely surface water migration route(s), if applicable. Include any impacts to drinking water sources.

WAG 1 is essentially bound by Fifth Creek to the east, White Oak Creek (WOC) to the south, and First Creek to the west. First and Fifth creeks flow south into (WOC) which flows to the west and exits WAG 1 at the southwest corner. Storm water (from surface runoff and storm water drainage system) and treated water from the process waste system discharges into WOC. Surface water may have been indirectly impacted by leaking process and LLLW lines external to the building. Some of these lines are known to have shared a common trench with storm water drainage piping. Contamination from leaking waste lines could potentially enter deteriorated storm water piping and migrate to WOC. The three creeks bordering WAG 1 are also groundwater discharge points; therefore, groundwater contaminated by leaking waste lines could also potentially impact surface water in the area.

Additionally, if exterior painted surfaces do, in fact, contain lead, the potential exits for surface water to be impacted from deteriorated paint which washes off the building and finds its way to surface water with the storm water runoff.

Other than the potential for historical impact, no existing immediate threat to surface water was identified given the current status of this facility.

Air

Are there any suspected impacts due to air emissions? If yes, please describe.

The Hazard Screening Report prepared for Building 3032 indicates that there is no potential for significant radiation exposure to personnel working in or around this facility as a result of airborne migration of radioactive particulates and physical contact with contaminated surfaces. Areas of RAD contamination are identified, marked, and controlled as appropriate throughout the facility to protect against inadvertent exposure to personnel. Radiologic contamination in the building is controlled by a local exhaust system which exhausts building and hood air through high efficiency particulate air (HEPA) filters. Because of the small amounts of RAD contamination present, it is highly unlikely that radioactive air emissions from this building would impact personnel or the environment.

There is, however, a potential for impact to indoor air quality due to the presence of ACM and assumed lead-based paint (LBP) should these materials be disturbed. The ACM and assumed LBP remaining in the building are not considered to be immediate threats to indoor quality in their current state.

Soil

Are there any suspected impacts to soil? If yes, please describe.

As stated for groundwater, there is a potential for historical impact to soils in the area of Building 3032 due to leaking process and LLLW drain piping. Previous environmental studies have identified a soil contamination plume in the Isotopes Circle area and soil samples collected from the plume have detected radioisotopes common to many of the processes performed in the Isotopes Facilities. Even though specific radioisotopes processed in Building 3032 were not identified during this RmSE, it is likely that liquid waste from activities involving radioisotopes in this building has historically contributed to the Isotopes Circle contamination plume to some extent. However, the radionuclides detected in the soil were common to the processes and activities in many buildings in the area which makes it difficult to determine exactly which building is, or was, the source of contamination.

It is unlikely that the assumed small quantities of chemicals used in Building 3032 have impacted soil in the surrounding area.

Release Beyond Facility or Reservation Boundaries

Has or will the release migrate beyond the boundaries of the facility or reservation? If yes, please describe (including possible human or environmental receptors).

Because of the small amount and inaccessibility of existing radiologic contamination in Building 3032, there is considered to be no potential for significant radiologic release beyond the facility or reservation boundaries.

There is, however, a potential for assumed lead-containing paint which peels off exterior surfaces of the building to be carried away with surface runoff during a rain event. Though this potential exists, it is considered slight and unlikely due to the current status and condition of the facility.

Worker Safety

Could the release pose a threat to workers? If yes, please describe.

Radiologically contaminated areas are isolated and well marked. Good radiation practices and standard operating procedures are enforced for worker safety. Personnel exiting the facilities are required to "frisk" themselves to detect the presence of RAD contamination. ACM is appropriately labeled. However, even with these safeguards in place, a potential threat to workers exists if safety measures are overlooked and workers are careless. This potential is not considered significant given the current status and level of activity of this building.

Environmental Receptors

Does the release pose a potential threat to environmental receptors? If yes, please describe. Include natural resources impacts.

No existing conditions posing an immediate significant threat to environmental receptors, including natural resources, were identified to be currently existing or associated with Building 3032.

Mitigation

What action(s) might be taken to abate/prevent release or impacts from release?

- Continued utilization and enforcement of engineering and administrative controls that are currently in place to protect workers and monitor conditions and activities in these buildings.
- Continue S&M activities per Procedure IP-900.

What actions are currently being taken to abate/prevent release or impacts from release?

Engineering and administrative controls are in place to control access to contaminated areas and to monitor conditions and activities within the facility for worker and environmental protection. Warning signs and labels are posted as necessary indicating RAD and ACM hazard areas. Standard operating procedures are in place for building access and surveillance and maintenance activities to protect against inadvertent contact and disturbance of contaminated areas and materials. Radiologically contaminated areas are monitored periodically by ORNL health physics personnel. Personnel are "frisked" upon exit of the facility to detect the presence of radiologic contamination. The building is currently in surveillance and maintenance status awaiting entry into the Decontamination and Decommissioning (D&D) Program. Inactive waste drains are reportedly plugged in contaminated areas to prevent inadvertent discharge of contamination beyond the facility. A groundwater monitoring program is in place to monitor contamination levels and migration in groundwater underlying WAG 1. The building is inspected for structural changes after each natural incident (earthquake, tornado, or other severe storm), fire and/or man induced activity which could cause cracking, failure, or deterioration of the facility and/or equipment that may allow contamination to be released. No such conditions have been reported for Building 3032.

Current actions being taken to prevent further release and ensure worker safety in Buildings 3032 are considered adequate until D&D activities begin.

Other Environmental Authorities

Is the release or threatened release potentially subject to other environmental statutory actions? If yes, please explain.

If paint is found to be lead-containing and samples fail the Toxicity Characteristic Leaching Procedure (TCLP) analysis, the building could qualify as a hazardous waste generator point under the Resource Conservation and Recovery Act (RCRA).

Maintenance Actions

Are maintenance actions necessary to eliminate potential threats to human health and the environment? If so, explain.

No existing potential hazards requiring maintenance actions were identified to be associated with Building 3032.

Removal Actions

Are Remedial Actions necessary to eliminate immediate threats to human health and the environment? If so, explain.

No imminent hazards requiring removal actions per 40 *CFR* 300.415 were identified to be currently associated with Building 3032.

Remedial Site Evaluation

Is a Remedial Site Evaluation needed?

Areas of radiologic contamination associated with Buildings 3032 are marked as appropriate. However, it is suspected that process and LLLW drains and associated piping may have leaked beneath the slab of the building as a result of past practices. As a result, it is recommended that some type of remedial investigation be performed to assess the condition of the soil in this area before conducting any S&M or D&D activities which involve disturbing the slab.

ACM has also been identified, marked and documented. No further remedial investigation involving this hazards is considered necessary given the current status and future plans of this facility.

Based on the age of the facility, painted surfaces are assumed to contain lead. Samples of the paint should be taken and analyzed to verify the presence of lead prior to conducting any S&M or D&D activities which may disturb these assumed areas.

No Further Investigation

Is a finding of No Further Investigation appropriate? Please explain.

A finding of No Further Investigation implies that a facility or area is free from hazardous substances or contaminants that may threaten human health and the environment. Since Building 3032 contains substances and materials which may become threatening if not properly controlled, handled and managed during the S&M cycle, a finding of No Further Investigation is inappropriate in this case.

Additional Comments

The following documents and databases were referenced for historical and hazard information related to Building 3032:

- Phase I Safety Documentation, Radioisotope Production Laboratory E, Building 3032 Hazard Screening, Document No. HS/3032/F/RT-9 (Rev.0).
- Work Plan for the Isotopes Facilities Deactivation Project at Oak Ridge National Laboratory, Document No. ORNL/ER-249/R2.
- Building 3032 Occurrence Reports, 1989 to present.
- Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory, Oak Ridge, Tennessee, Volumes 1 and 2, Document Nos. DOE/OR-1043/V1&D1 and DOE/OR-1043/V2&D1.
- ORNL Hazardous Material Information System Database.
- ORNL Drain System Survey Report for Building 3032.

The following personnel and offices were contacted and provided historical and current use/condition information for Building 3032:

- Mr. Karl Haff, Radiochemical Processing Department Head, ORNL Radiochemical Technology Section.
- Ms. Swati Wilson, Manager, ORNL Lead Management Program.
- Mr. Nathan Dunn, Hazardous Material Information System Office.
- Mr. Jade Thomas, ORNL Environmental Compliance Office.
- Mr. Joe Armento, ORNL Chemical Technology Division, Isotopes Facilities Shutdown Program.

The RmSE of this facility was conducted for LMES under contract by:

Advanced Sciences, Inc.
800 Oak Ridge Turnpike, Suite C-102
Oak Ridge, TN

Todd R. Conant 6/18/96

Evaluator's Signature Date

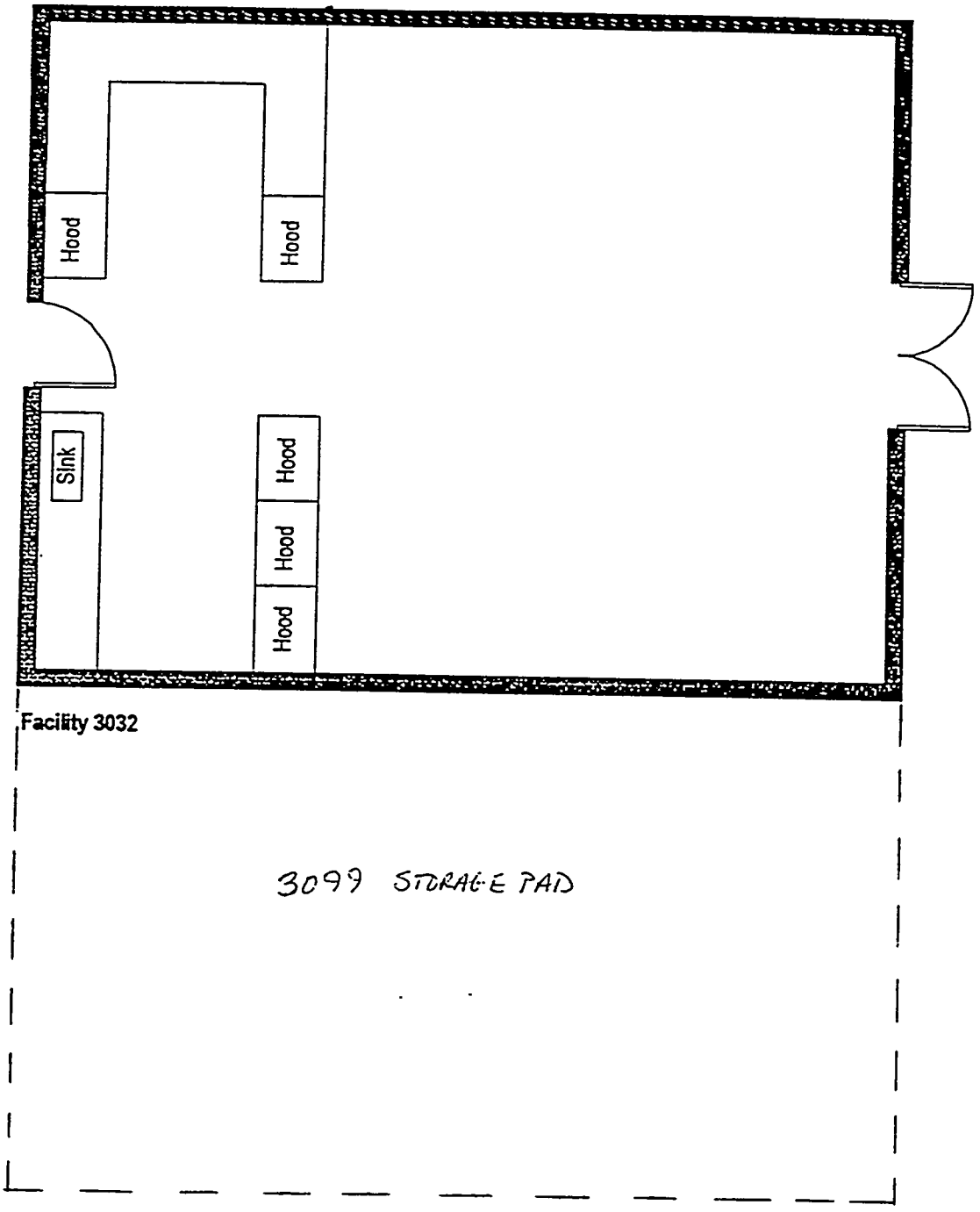


Fig. 9. Diagram of Building 3032/(3099).

9. BUILDING 3033/(3093)— KRYPTON AND TRITIUM FACILITY

ORNL FACILITY RmSE INFORMATION FORM

General Information	
Area/Facility Name (and aliases):	Building 3033 (Including 3093) The Krypton and Tritium Facility
Organization responsible for area/facility (include specific person and phone number if possible):	R.E. Eversole (576-7483), IFDP Project Manager, ER Program, LMES
Status (active/inactive): Inactive, Standby Mode	*Years of Operation:* ≈ 40

Description of Operation:

There are no current operations, other than surveillance, maintenance, and deactivation activities, on-going in this building. Building 3033 was originally constructed to process ^{14}C, ^{85}Kr, and ^{3}H. It contains facilities that were historically utilized for storage, purification, processing, and dispensing of tritium (^{3}H) and krypton isotopes (mainly ^{85}Kr). Tritium operations involved the receipt of bulk tritium shipments followed by purification, loading of shipping containers, and shipment to numerous customers worldwide. Krypton operations included the purification of krypton in preparation for direct sale or as feed to the thermal diffusion columns in Building 3026-C. Radioisotope processing and handling was performed in contained enclosures and process hoods. Resulting primary waste streams included exhausted air. Reportedly, the processes in this building did not produce liquid process waste.

Building 3093 is a permanent krypton storage enclosure located adjacent to Building 3033 to the northwest. For purposes of this report, reference to "the facility" or "the building" includes both Building 3033 and 3093, unless otherwise stated.

Physical description of area/facility:

- Building 3033 and 3093 are assumed to have been constructed in the late 1940s, based on the documented construction date of surrounding buildings.
- Building 3033 is a single-story, metal framed structure with metal siding. The exterior of the building has been sealed by a polyurethane cocooning process, and it is operated under negative pressure. Building 3093 is a roofless, reinforced-concrete enclosure containing four charcoal-filled storage tanks which are currently empty.
- Building 3033 consists of approximately 1,200 sq ft and shares a common wall with Building 3033-A to the east.
- This facility is located in an industrial area of ORNL (Isotopes Circle). The immediate area surrounding the facility is paved for the most part with some grassy areas.
- Building 3033 is basically a single-room laboratory consisting of a krypton processing enclosure, a carbon reactor enclosure, a tritium process room consisting of a number of process hoods, and a utility area. Floor drains in the building discharge to the process system, and the cells drain to the low-level liquid waste (LLLW) system (WC-10). Reportedly, the processes in this building did not generate liquid waste. Work with radioactive materials was performed in the cells and hoods.
- The exterior of the building was observed to be in good condition.
- Generally, the interior of the building is in fair to good condition. Asbestos Containing Material (ACM) and radiation (RAD) hazard areas are posted and/or labeled as appropriate.
- A building space diagram is attached to this form showing the locations of the various process areas and equipment.

Release Information

Description of release, or threatened release, and source:

The only significant area of radioactive contamination in this facility reportedly exists in the form of tritium in three traps and associated equipment (vessels, piping, vent ducts, etc.) in the Tritium Process Room. There are also a few small areas of fixed and transferable radiologic surface contamination located in other areas of the facility. Irretrievable amounts of krypton remain absorbed in the charcoal linings of the krypton storage tanks (Building 3093). Radiologic contamination in this facility has accumulated from activities involving a variety of materials throughout the operating history of the facility and, therefore, cannot be attributed to a single release episode. The existing levels of RAD contamination in the facility are very low and well isolated. The presence of this contamination is not considered a significant hazard in its current state.

It is assumed, based on the historical laboratory function of this building and operations in similar facilities, that hazardous materials (HAZMATs) (e.g., acids, hydraulic fluids, and other chemicals) were used in small quantities (i.e., less than 5 gallons or 100 pounds) during facility operations. Reportedly, no HAZMATs are currently used or stored in this facility. According to available spill/release records and facility personnel interviews, no significant HAZMAT spills (i.e., spills having the potential to adversely affect human health and/or the environment) have been reported for this building. No current conditions were identified which present a potential for a HAZMAT release.

Hazardous substances present:

Hazardous substances remaining in Building 3033 consist mainly of small amounts of residual fixed and transferable RAD surface contamination (β, γ). Areas of RAD contamination are associated primarily with the hot cells and tritium process equipment. Reportedly, no HAZMATs are stored or used within this facility.

Estimate (if possible) of quantities of hazardous substances that have been released and that could be released:

The following represents the known quantities of substances currently existing in the facility. Radiologic surface contamination has accumulated from a legacy of many different programs and processes and cannot be attributed to a single release episode. It is only possible to quantify release amounts from contamination which currently exists in the facility and/or has been historically documented from past activities.

< 500 Ci of ^{3}H

(Quantity estimate obtained from Building 3033 Hazard Screening Report)

Other pollutants or contaminants:

Asbestos containing material, primarily in the form of thermal system insulation, has been confirmed present in this building. ACM observed is in fair to good condition and poses no immediate health threat. Based on the age of the facility, interior and exterior painted surfaces are assumed to be lead-containing. Verification samples are taken by ORNL Lead Management Program personnel on an "as-needed" basis to confirm the presence of lead in the paint (i.e., when work activities will disturb the paint, or paint is found to be deteriorating and poses a health or environmental threat). Interior painted surfaces observed are in fair to good condition and pose no immediate health threat given the status of this facility. Paint on exterior surfaces was also found to be in good condition, posing no immediate hazard to the surrounding area due to deterioration.

Groundwater

Are there any suspected impacts to groundwater? If yes, please describe. Include any impacts to drinking water sources.

Building 3033 is located in Waste Area Grouping 1 at ORNL. Although no specific adverse spills or releases of hazardous substances threatening to groundwater were identified during this RmSE, it is suspected, based on available environmental studies conducted in WAG 1, that process and LLLW drains and associated piping may have leaked over the life of the facilities. Reportedly, processes in Building 3033 did not generate liquid waste; however, since the building is serviced by the LLLW system there is a potential that historically radiologic waste of some sort may have been introduced into the system. Buried process and LLLW piping and some drains have been found to be deteriorated and leaking in other facilities and areas of WAG 1. Studies have determined that groundwater in WAG 1 has been both radiologically and chemically contaminated. Numerous man-made radionuclides have been detected in WAG 1 groundwater samples. The WAG 1 Site Characterization Report indicates that high levels of tritium have been detected in a monitoring well just south of Building 3033. As a result, it is likely that liquid waste from activities involving radioisotopes in this building have historically contributed to WAG 1 groundwater contamination. However, the radionuclides detected in the groundwater were common to the processes and activities in many other buildings in the area which makes it difficult to determine exactly which building is, or was, the source of contamination.

Because of the small quantities of chemicals assumed to have been used historically used in this facility, it is unlikely that such usage has significantly contributed to WAG 1 groundwater contamination. As part of the facility shutdown process, inactive process and LLLW drains within the building have reportedly been plugged to prevent further release. However, no documentation was available at the time of this report to verify which drains have actually been plugged and which have not. Information on drain locations and discharge points is available from the ORNL Engineering Support Office.

Other than the potential for historical impact to groundwater in WAG 1 via leaking process and LLLW lines external to the building, no existing immediate threat to groundwater was identified given the current status of the facility.

Surface Water

Are there any suspected impacts to surface water? If yes, please describe. Also describe the most likely surface water migration route(s), if applicable. Include any impacts to drinking water sources.

WAG 1 is essentially bound by Fifth Creek to the east, White Oak Creek (WOC) to the south, and First Creek to the west. First and Fifth creeks flow south into (WOC) which flows to the west and exits WAG 1 at the southwest corner. Storm water (from surface runoff and storm water drainage system) and treated water from the process waste system discharges into WOC. Surface water may have been indirectly impacted by leaking process and LLLW lines external to the building. Some of these lines are known to have shared a common trench with storm water drainage piping. Contamination from leaking waste lines could potentially enter deteriorated storm water piping and migrate to WOC. The three creeks bordering WAG 1 are groundwater discharge points. Therefore, groundwater contaminated by leaking waste lines could also potentially impact surface water in the area.

Additionally, if exterior painted surfaces do, in fact, contain lead, the potential exists for surface water to be impacted from deteriorated paint which washes of the building and finds its way to surface water with the storm water runoff.

Other than the potential for historical impact, no existing immediate threat to surface water was identified given the current status of this facility.

Air

Are there any suspected impacts due to air emissions? If yes, please describe.

The Hazard Screening Report prepared for Building 3033 indicates that there is no potential for significant radiation exposure to personnel working in or around the facility due to potential airborne migration of radioactive particulates and physical contact with contaminated surfaces. Because of the low levels and nature of RAD contamination within the facilities, potential impacts to persons or the environment surrounding the facilities are considered negligible. Areas of RAD contamination are identified, marked, and controlled as appropriate throughout the facilities to protect against inadvertent exposure to personnel. Air in the building is controlled by the isotopes area cell ventilation system which exhausts building and cell air to stack 3039. This also keeps Building 3033 under slight negative pressure relative to atmosphere. Apart from catastrophic failure of the hot cells, process areas, or ventilation system, it is unlikely that radioactive air emissions from this building would impact personnel or the environment.

There is also a potential for impact to indoor air quality due to the presence of ACM and assumed lead-based paint (LBP) should these materials be disturbed. The ACM and assumed LBP remaining in the building are not considered to be immediate threats to indoor quality in their current state.

Soil

Are there any suspected impacts to soil? If yes, please describe.

As stated for groundwater, there is a potential for historical impact to soils in the area of Buildings 3033 due to leaking process and LLLW drain piping. Previous environmental studies have identified a soil contamination plume in the Isotopes Circle area and soil samples collected from the plume have detected radioisotopes common to the processes performed in this building (tritium). As a result, it is likely that operations in this facility have historically contributed to the Isotopes Circle soil contamination plume.

There is also a potential for areas of soil adjacent to the facility to be impacted from lead if, in fact, exterior paint is found to be lead-containing. Deteriorating paint could dislodge from the surface and fall to the soil below. The exterior paint was observed to be good condition and does not pose an immediate threat in its current state.

It is unlikely that the small quantities of chemicals assumed to have been used in Building 3033 have significantly impacted soil in the surrounding area.

Release Beyond Facility or Reservation Boundaries

Has or will the release migrate beyond the boundaries of the facility or reservation? If yes, please describe (including possible human or environmental receptors).

The following are considered potential scenarios where radiologic contamination could migrate beyond the facility or reservation boundaries:

- A person becomes inadvertently contaminated and leaves the facility/reservation undetected.
- Catastrophic failure of hot cells and/or contaminated equipment.

There is also a potential for assumed lead-containing paint which peels off exterior surfaces of the buildings to be carried away with surface runoff during a rain event. Though these potentials exist, they are considered slight and unlikely due to the current status of the facility and the engineering/administrative controls that are in place to protect again such an event.

Worker Safety

Could the release pose a threat to workers? If yes, please describe.

Radiologically contaminated areas are isolated and well marked. Good radiation practices and standard operating procedures are enforced for worker safety. Personnel exiting the facility are required to "frisk" themselves to detect the presence of RAD contamination. Monitors and alarms are in place to detect any radioactive release within the building. ACM is appropriately labeled. However, even with these safeguards in place, a potential threat to workers exists if safety measures are overlooked. This potential is not considered significant given the current status and level of activity of building.

Environmental Receptors

Does the release pose a potential threat to environmental receptors? If yes, please describe. Include natural resources impacts.

No existing conditions posing an immediate significant threat to environmental receptors, including natural resources, were identified to be currently existing or associated with Building 3033.

Mitigation

What action(s) might be taken to abate/prevent release or impacts from release?

- Continued utilization and enforcement of engineering and administrative controls that are currently in place to protect workers and monitor conditions and activities in this building.
- Continue S&M activities per Procedure IP-900.

What actions are currently being taken to abate/prevent release or impacts from release?

Engineering and administrative controls are in place to control access to contaminated areas and to monitor conditions and activities within the facilities for worker and environmental protection. Warning signs and labels are posted throughout the facilities indicating RAD and ACM hazard areas. Standard operating procedures are in place for building access and surveillance and maintenance activities to protect against inadvertent contact and disturbance of contaminated areas and materials. Radiologically contaminated areas are monitored periodically by ORNL health physics personnel. Personnel are "frisked" upon exit of the facility to detect the presence of radiologic contamination. The building is currently in surveillance and maintenance status awaiting entry into the Decontamination and Decommissioning (D&D) Program. Inactive waste drains are reportedly plugged in contaminated areas to prevent inadvertent discharge of contamination beyond the facility. A groundwater monitoring program is in place to monitor contamination levels and migration in groundwater underlying WAG 1. The building is inspected for structural changes after each natural incident (earthquake, tornado, or other severe storm), fire and/or man induced activity which could cause cracking, failure, or deterioration of the facility and/or equipment that may allow contamination to be released. No such conditions have been reported for Building 3033.

Current actions being taken to prevent further release and ensure worker safety in Building 3033 are considered adequate until D&D activities begin.

Other Environmental Authorities

Is the release or threatened release potentially subject to other environmental statutory actions? If yes, please explain.

If paint is found to be lead-containing and samples fail the Toxicity Characteristic Leaching Procedure (TCLP) analysis, the building could qualify as a hazardous waste generator point under the Resource Conservation and Recovery Act (RCRA).

Maintenance Actions

Are maintenance actions necessary to eliminate potential threats to human health and the environment? If so, explain.

No existing potential hazards requiring maintenance actions per 40 *CFR* 300.415 were identified to be currently associated with Building 3033.

Removal Actions

Are Removal Actions necessary to eliminate immediate threats to human health and the environment? If so, explain.

No imminent hazards requiring removal actions per 40 *CFR* 300.415 were identified to be currently associated with Building 3033.

Remedial Site Evaluation

Is a Remedial Site Evaluation needed?

Areas of radiologic contamination associated with Building 3033 have been identified and marked as appropriate. However, it is suspected that process and LLLW drains and associated piping may have leaked beneath the slab of the building as a result of past practices. As a result, it is recommended that some type of remedial investigation be performed to assess the condition of the soil in this area before conducting any S&M or D&D activities which involve disturbing the slab.

ACM has also been identified, marked and documented. No further remedial investigation involving this hazard is considered necessary given the current status and future plans of this facility.

Based on the age of the facility, painted surfaces are assumed to contain lead. Samples of the paint should be taken and analyzed to verify the presence of lead prior to conducting any S&M or D&D activities which may disturb these assumed areas.

No Further Investigation

Is a finding of No Further Investigation appropriate? Please explain.

A finding of No Further Investigation implies that a facility or area is free from hazardous substances or contaminants that may threaten human health and the environment. Since Building 3033 contains substances and materials which may become threatening if not properly controlled, handled and managed during the S&M cycle, a finding of No Further Investigation is inappropriate in this case.

Additional Comments

The following documents and databases were referenced for historical and hazard information related to Buildings 3033:

- Phase I Safety Documentation, The Krypton and Tritium Facility, Building 3033/3093, Hazard Screening, Document No. HS/3033/3093/F/RT-10/R-1.
- Work Plan for the Isotopes Facilities Deactivation Project at Oak Ridge National Laboratory, Document No. ORNL/ER-249/R2.
- Building 3033 Occurrence Reports, 1989 to present.
- Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory, Oak Ridge, Tennessee, Volumes 1 and 2, Document Nos. DOE/OR-1043/V1&D1 and DOE/OR-1043/V2&D1.
- ORNL Hazardous Material Information System Database.
- ORNL Drain System Survey Report for Building 3033.

The following personnel and offices were contacted and provided historical and current use/condition information for Building 3033:

- Mr. Karl Haff, Radiochemical Processing Department Head, ORNL Radiochemical Technology Section.
- Mr. Herman Phillips, Assistant Facilities Manager, ORNL Special Projects.
- Ms. Swati Wilson, Manager, ORNL Lead Management Program.
- Mr. Nathan Dunn, Hazardous Material Information System Office.
- Mr. Jade Thomas, ORNL Environmental Compliance Office.
- Mr. Joe Armento, ORNL Chemical Technology Division, Isotopes Facilities Shutdown Program.

The RmSE of this facility was conducted for LMES under contract by:

Advanced Sciences, Inc.
800 Oak Ridge Turnpike, Suite C-102
Oak Ridge, TN

Todd R. Grant 6/18/96

Evaluator's Signature Date

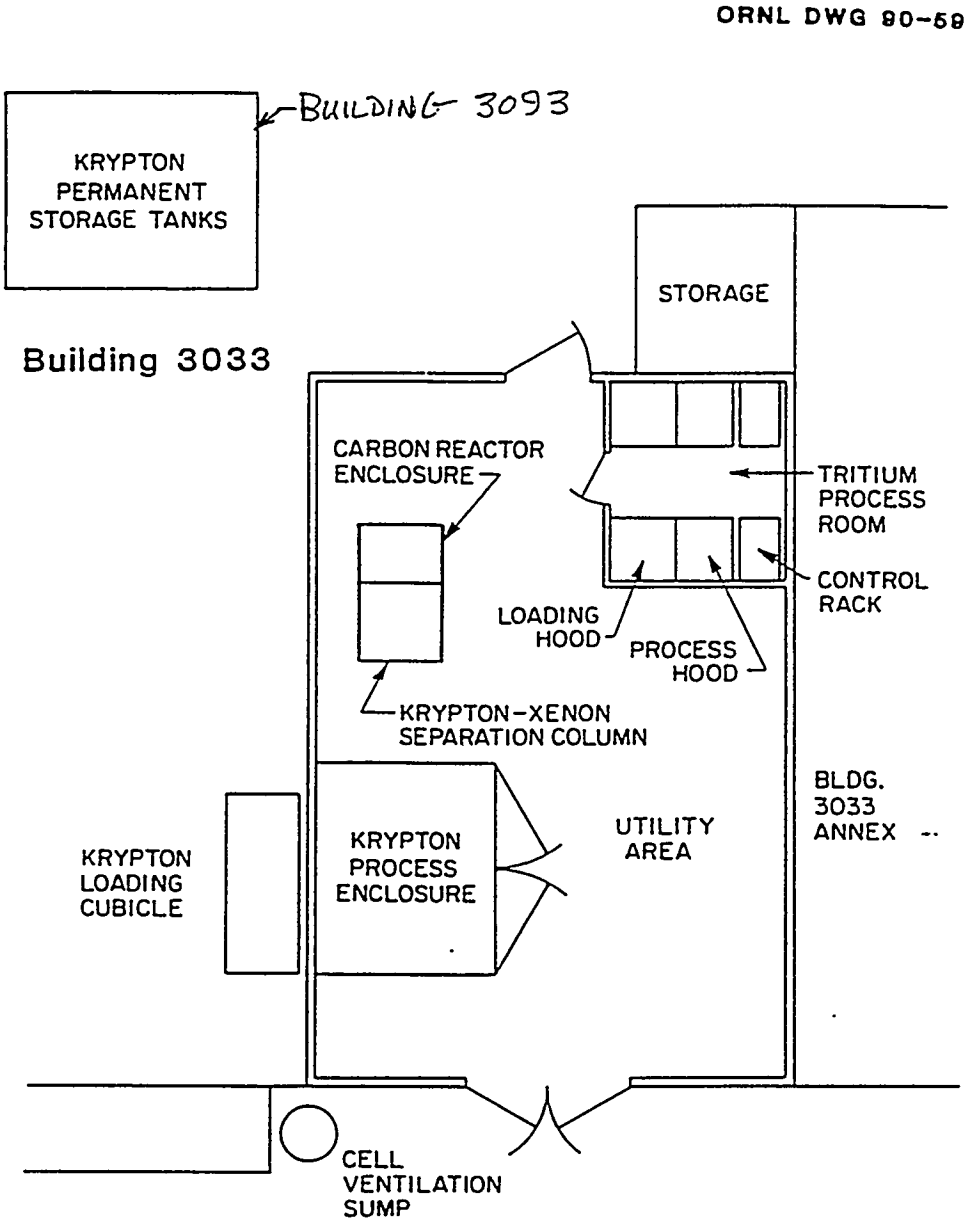


Fig. 10. Diagram of Building 3033/3093.

10. BUILDING 3033-A—ACTINIDE FABRICATION FACILITY

ORNL FACILITY RmSE INFORMATION FORM

General Information	
Area/Facility Name (and aliases):	Building 3033-A The Actinide Fabrication Facility
Organization responsible for area/facility (include specific person and phone number if possible):	R.E. Eversole (576-7483), IFDP Project Manager, 0ER Program, LMES
Status (active/inactive): Inactive, Standby Mode	*Years of Operation:* ≈ 30

Description of Operation:

There are no current operations, other than surveillance, maintenance, and deactivation activities, on-going in this building. Building 3033-A was used to house and contain the facilities for the production, loading, welding, and decontamination of neutron dosimeter materials as well as the weighing and packaging of milligram to gram quantities of actinide materials for research applications. The building included two operating areas; a small area for ^{14}C production at the south end of the building, and a larger main operating area for preparation of research materials. This building has been used almost exclusively for the preparation and distribution of highly enriched actinide isotopes, and for a period ^{14}C for the Isotopes Program. The following are some of the historical operations performed in this building: fabrication of ceramic oxide wires; loading of ceramic oxide wires, oxide powder, or metal into small metal capsules for use as in-core reactor neutron dosimeters; fabrication of monoenergetic gamma sources; weighing and packaging of milligram to gram quantities of actinide materials; preparation of nanogram to milligram actinide samples for alpha counting; decontamination of nuclear material shipping containers; and storage of radioactive materials. Additionally, many other small projects have been performed in this facility throughout the years.

Physical description of area/facility:

- Building 3033-A was constructed in approximately 1960.
- The facility is a single-story, metal framed structure with metal siding. The exterior of the building has been sealed by a polyurethane cocooning process, and the building is operated under negative pressure.
- Building 3033-A consists of approximately 760 sq ft and shares common walls with Building 3033 to the west and Building 3034 to the east.
- This facility is located in an industrial area of ORNL (Isotopes Circle). The immediate area surrounding the facility is paved for the most part with some grassy areas.
- Building 3033-A is basically a single-room laboratory which consisted of a process hood, glove boxes, and various laboratory equipment. Floor, one hood, and sink drains discharge to the process waste system, and the drain in the hood which was located adjacent to the west wall discharged to the low-level liquid waste (LLLW) system (Tank WC-10). Work with radioactive materials was performed primarily in the hoods and glove boxes. Primary waste streams included exhausted air and liquid process waste.
- The exterior of the building was observed to be in good condition.
- Generally, the interior of the building is in fair to good condition. Asbestos Containing Material (ACM) and radiation (RAD) hazard areas are posted and/or labeled as appropriate. All equipment and hoods have been removed and the building has undergone general decontamination.
- A building space diagram is attached to this form showing the locations of the various process areas and equipment.

Release Information

Description of release, or threatened release, and source:

No significant areas of radioactive contamination were identified in this facility. Small localized areas of residual fixed and transferable RAD contamination exist in isolated areas throughout the facility; however, this contamination is not considered to represent a significant hazard due to the small amount of material involved. This contamination has accumulated from activities involving a variety of materials throughout the operating history of the facility and, therefore, cannot be attributed to a single release episode. The existing levels of RAD contamination in the facility are very low and well isolated. The presence of this contamination is not considered a significant hazard in its current state.

It is assumed, based on the historical laboratory function of this building and operations in similar facilities, that hazardous materials (HAZMATs) (e.g., acids, hydraulic fluids, and other chemicals) were used in small quantities (i.e., less than 5 gallons or 100 pounds) during facility operations. Reportedly, no HAZMATs are currently used or stored in this facility. According to available spill/release records and facility personnel interviews, no significant HAZMAT spills (i.e., spills having the potential to adversely affect human health and/or the environment) have been reported for this building. No current conditions were identified which present a potential for a HAZMAT release.

Hazardous substances present:

Hazardous substances remaining in Building 3033-A consist mainly of small amounts of residual fixed and transferable RAD surface contamination (α, β/γ). No significant β/γ material has been found other than the limited remains of ^{14}C contamination. Areas of RAD contamination are associated primarily with isolated surfaces throughout the facility. Reportedly, no HAZMATs are stored or used within this facility.

Estimate (if possible) of quantities of hazardous substances that have been released and that could be released:

The following represents the known quantities of substances currently existing in the facility. Radiologic surface contamination has accumulated from a legacy of many different programs and processes and cannot be attributed to a single release episode. It is only possible to quantify release amounts from contamination which currently exists in the facility and/or has been historically documented from past activities.

$\approx$ 1,100 μCi α
$\approx$ 2,160 μCi β/γ
$\approx$ 72 μCi ^{14}C (located in the ^{14}C storage room)

(Quantity estimates obtained from Building 3033-A Hazard Screening Report)

Other pollutants or contaminants:

Asbestos containing material, primarily in the form of thermal system insulation, has been confirmed present in this building. ACM observed is in fair to good condition and poses no immediate health threat. Based on the age of the facility, interior and exterior painted surfaces are assumed to be lead containing. Verification samples are taken by ORNL Lead Management Program personnel on an "as-needed" basis to confirm the presence of lead in the paint (i.e., when work activities will disturb the paint, or paint is found to be deteriorating and poses a health or environmental threat). Interior painted surfaces observed are in fair to good condition and pose no immediate health threat. Paint on exterior surfaces was also found to be in good condition, posing no immediate hazard to the surrounding area due to deterioration.

Groundwater

Are there any suspected impacts to groundwater? If yes, please describe. Include any impacts to drinking water sources.

Building 3033-A is located in Waste Area Grouping 1 at ORNL. Although no specific adverse spills or releases of hazardous substances threatening to groundwater were identified during this RmSE, it is suspected, based on available environmental studies conducted in WAG 1, that process and LLLW drains and associated piping may have leaked over the life of the facilities. Buried process and LLLW piping and some drains have been found to be deteriorated and leaking in other facilities and areas of WAG 1. Studies have determined that groundwater in WAG 1 has been both radiologically and chemically contaminated. Numerous man-made radionuclides common to many of the processes in the Isotopes Facilities have been detected in WAG 1 groundwater samples. As a result, it is possible that liquid waste from activities involving radioisotopes in this building have historically contributed to WAG 1 groundwater contamination. However, the radionuclides detected in the groundwater were common to the processes and activities in many other buildings in the area which makes it difficult to determine exactly which building is, or was, the source of contamination.

Because of the small quantities of chemicals assumed to have been used historically used in this facility, it is unlikely that such usage has significantly contributed to WAG 1 groundwater contamination. As part of the facility shutdown process, inactive process and LLLW drains within the building have reportedly been plugged to prevent further release. However, no documentation was available at the time of this report to verify which drains have actually been plugged and which have not. No Drain Survey Report was available for Building 3033-A.

Other than the potential for historical impact to groundwater in WAG 1 via leaking process and LLLW lines external to the building, no existing immediate threat to groundwater was identified given the current status of the facility.

Surface Water

Are there any suspected impacts to surface water? If yes, please describe. Also describe the most likely surface water migration route(s), if applicable. Include any impacts to drinking water sources.

WAG 1 is essentially bound by Fifth Creek to the east, White Oak Creek (WOC) to the south, and First Creek to the west. First and Fifth creeks flow south into (WOC) which flows to the west and exits WAG 1 at the southwest corner. Storm water (from surface runoff and storm water drainage system) and treated water from the process waste system discharges into WOC. Surface water may have been indirectly impacted by leaking process and LLLW lines external to the building. Some of these lines are known to have shared a common trench with storm water drainage piping. Contamination from leaking waste lines could potentially enter deteriorated storm water piping and migrate to WOC. The three creeks bordering WAG 1 are groundwater discharge points. Therefore, groundwater contaminated by leaking waste lines could also potentially impact surface water in the area.

Additionally, if exterior painted surfaces do, in fact, contain lead, the potential exists for surface water to be impacted from deteriorated paint which washes of the building and finds its way to surface water with the storm water runoff.

Other than the potential for historical impact, no existing immediate threat to surface water was identified given the current status of this facility.

Air

Are there any suspected impacts due to air emissions? If yes, please describe.

The Hazard Screening Report prepared for Building 3033-A indicates that there is no potential for significant radiation exposure to personnel working in or around the facility due to potential airborne migration of radioactive particulates and physical contact with contaminated surfaces. Because of the low levels and nature of RAD contamination within the facilities, potential impacts to persons or the environment surrounding the facilities are considered negligible. Areas of RAD contamination are identified, marked, and controlled as appropriate throughout the facilities to protect against inadvertent exposure to personnel. Air within the building is controlled by the isotopes area cell ventilation system which exhausts building air to stack 3039 after passing through local roughing and high efficiency particulate air (HEPA) filters inside the building. This also keeps Building 3033-A under slight negative pressure relative to atmosphere. Apart from catastrophic failure of the structure or ventilation system, it is unlikely that radioactive air emissions from this building would impact personnel or the environment.

There is also a potential for impact to indoor air quality due to the presence of ACM and assumed lead-based paint (LBP) should these materials be disturbed. The ACM and assumed LBP remaining in the building are not considered to be immediate threats to indoor quality in their current state.

Soil

Are there any suspected impacts to soil? If yes, please describe.

As stated for groundwater, there is a potential for historical impact to soils in the area of Building 3033-A due to leaking process and LLLW drain piping. Previous environmental studies have identified a soil contamination plume in the Isotopes Circle area and soil samples collected from the plume have detected radioisotopes common to many of the processes performed in the Isotopes Facilities. As a result, it is possible that operations in this facility have historically contributed to the Isotopes Circle soil contamination plume.

There is also a potential for areas of soil adjacent to the facility to be impacted from lead if, in fact, exterior paint is found to be lead-containing. Deteriorating paint could dislodge from the surface and fall to the soil below. The exterior paint was observed to be good condition and does not pose an immediate threat in its current state.

It is unlikely that the small quantities of chemicals assumed to have been used in Building 3033-A have significantly impacted soil in the surrounding area.

Release Beyond Facility or Reservation Boundaries

Has or will the release migrate beyond the boundaries of the facility or reservation? If yes, please describe (including possible human or environmental receptors).

The following are considered potential scenarios where radiologic contamination could migrate beyond the facility or reservation boundaries:

- A person becomes inadvertently contaminated and leaves the facility/reservation undetected.
- Catastrophic failure of the structure and/or contaminated equipment.

Has or will the release migrate beyond the boundaries of the facility or reservation? If yes, please describe (including possible human or environmental receptors). (Continued)

There is also a potential for assumed lead-containing paint which peels off exterior surfaces of the buildings to be carried away with surface runoff during a rain event. Though these potentials exist, they are considered slight and unlikely due to the current status of the facility and the engineering/administrative controls that are in place to protect again such an event.

Worker Safety

Could the release pose a threat to workers? If yes, please describe.

Radiologically contaminated areas are isolated and well marked. Good radiation practices and standard operating procedures are enforced for worker safety. Personnel exiting the facility are required to "frisk" themselves to detect the presence of RAD contamination. ACM is appropriately labeled. However, even with these safeguards in place, a potential threat to workers exists if safety measures are overlooked. This potential is not considered significant given the current status and level of activity of this building.

Environmental Receptors

Does the release pose a potential threat to environmental receptors? If yes, please describe. Include natural resources impacts.

No existing conditions posing an immediate significant threat to environmental receptors, including natural resources, were identified to be currently existing or associated with Building 3033-A.

Mitigation

What action(s) might be taken to abate/prevent release or impacts from release?

- Continued utilization and enforcement of engineering and administrative controls that are currently in place to protect workers and monitor conditions and activities in these buildings.
- Continue S&M activities per Procedure IP-900.

What actions are currently being taken to abate/prevent release or impacts from release?

Engineering and administrative controls are in place to control access to contaminated areas and to monitor conditions and activities within the facilities for worker and environmental protection. Warning signs and labels are posted throughout the facilities indicating RAD and ACM hazard areas. Standard operating procedures are in place for building access and surveillance and maintenance activities to protect against inadvertent contact and disturbance of contaminated areas and materials. Radiologically contaminated areas are monitored periodically by ORNL health physics personnel. Personnel are "frisked" upon exit of the facility to detect the presence of radiologic contamination. The building is currently in surveillance and maintenance status awaiting entry into the Decontamination and Decommissioning (D&D) Program. Inactive waste drains are reportedly plugged in contaminated areas to prevent inadvertent discharge of contamination beyond the facility. A groundwater monitoring program is in place to monitor contamination levels and migration in groundwater underlying WAG 1. The building is inspected for structural changes after each natural incident (earthquake, tornado, or other severe storm), fire and/or man induced activity which could cause cracking, failure, or deterioration of the facility and/or equipment that may allow contamination to be released. No such conditions have been reported for Building 3033-A.

Current actions being taken to prevent further release and ensure worker safety in Building 3033-A are considered adequate until D&D activities begin.

Other Environmental Authorities

Is the release or threatened release potentially subject to other environmental statutory actions? If yes, please explain.

If paint is found to be lead-containing and samples fail the Toxicity Characteristic Leaching Procedure (TCLP) analysis, the building could qualify as a hazardous waste generator point under the Resource Conservation and Recovery Act (RCRA).

Maintenance Actions

Are maintenance actions necessary to eliminate potential threats to human health and the environment? If so, explain.

No existing potential hazards requiring maintenance actions were identified to be associated with Building 3033-A.

Removal Actions

Are Removal Actions necessary to eliminate immediate threats to human health and the environment? If so, explain.

No imminent hazards requiring removal actions per 40 *CFR* 300.415 were identified to be currently associated with Building 3033-A.

Remedial Site Evaluation

Is a Remedial Site Evaluation needed?

Areas of radiologic contamination associated with Building 3033-A have been identified and marked as appropriate. However, it is suspected that process and LLLW drains and associated piping may have leaked beneath the slab of the building as a result of past practices. As a result, it is recommended that some type of remedial investigation be performed to assess the condition of the soil in this area before conducting any S&M or D&D activities which involve disturbing the slab.

ACM has also been identified, marked and documented. No further remedial investigation involving this hazard is considered necessary given the current status and future plans of this facility.

Based on the age of the facility, painted surfaces are assumed to contain lead. Samples of the paint should be taken and analyzed to verify the presence of lead prior to conducting any S&M or D&D activities which may disturb these assumed areas.

No Further Investigation

Is a finding of No Further Investigation appropriate? Please explain.

A finding of No Further Investigation implies that a facility or area is free from hazardous substances or contaminants that may threaten human health and the environment. Since Building 3033-A contains substances and materials which may become threatening if not properly controlled, handled and managed during the S&M cycle, a finding of No Further Investigation is inappropriate in this case.

Additional Comments

The following documents and databases were referenced for historical and hazard information related to Building 3033-A:

- Phase I Safety Documentation, The Actinide Fabrication Facility, Building 3033-A, Hazard Screening, Document No. HS/3033-A/3093/F/RT-11(Rev.1).
- Work Plan for the Isotopes Facilities Deactivation Project at Oak Ridge National Laboratory, Document No. ORNL/ER-249/R2.
- Building 3033-A Occurrence Reports, 1989 to present.
- Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory, Oak Ridge, Tennessee, Volumes 1 and 2, Document Nos. DOE/OR-1043/V1&D1 and DOE/OR-1043/V2&D1.
- ORNL Hazardous Material Information System Database.
- ORNL Drain System Survey Report for Buildings 3030, 3031, and 3118.

The following personnel and offices were contacted and provided historical and current use/condition information for Building 3033-A:

- Mr. Karl Haff, Radiochemical Processing Department Head, ORNL Radiochemical Technology Section.
- Mr. Herman Phillips, Assistant Facilities Manager, ORNL Special Projects.
- Ms. Swati Wilson, Manager, ORNL Lead Management Program.
- Mr. Nathan Dunn, Hazardous Material Information System Office.
- Mr. Jade Thomas, ORNL Environmental Compliance Office.
- Mr. Joe Armento, ORNL Chemical Technology Division, Isotopes Facilities Shutdown Program.

The RmSE of this facility was conducted for LMES under contract by:

Advanced Sciences, Inc.
800 Oak Ridge Turnpike, Suite C-102
Oak Ridge, TN

Todd R. Grant 6/18/96

Evaluator's Signature Date

ORNL DWG 90-595

Building 3033-A

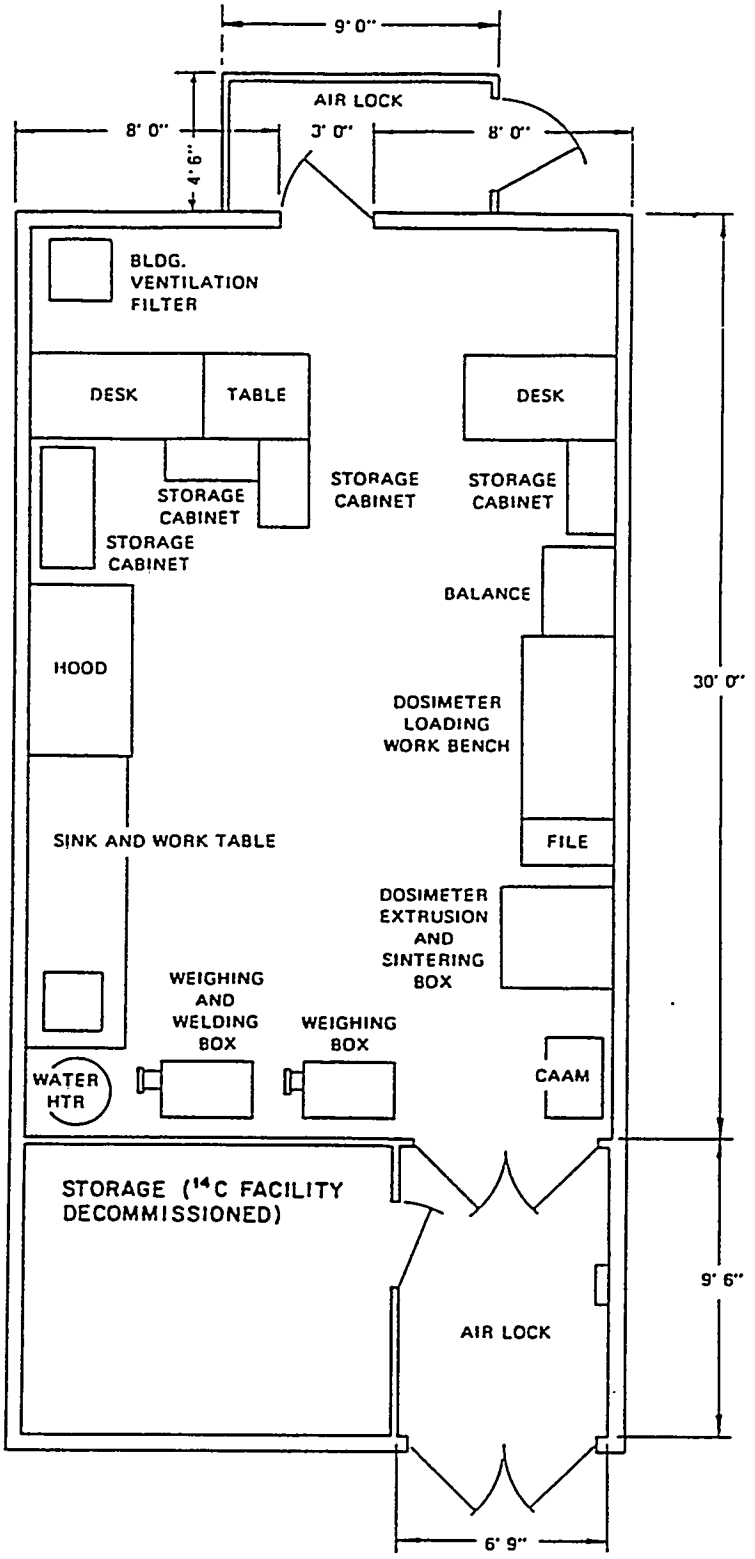


Fig. 11. Diagram of Building 3033-A.

11. BUILDING 3034—RADIOISOTOPE AREA SERVICES BUILDING

ORNL FACILITY RmSE INFORMATION FORM

General Information		
Area/Facility Name (and aliases):	Building 3034 Radioisotope Area Services Building	
Organization responsible for area/facility (include specific person and phone number if possible):	R.E. Eversole (576-7483), IFDP Project Manager, ER Program, LMES	
Status (active/inactive): Inactive, Standby Mode		*Years of Operation:* ≈ 40

Description of Operation:

There are no current operations, other than surveillance and maintenance activities, on-going in this building. Information on historical operations identified for Building 3034 during this RmSE was not detailed. The building was originally built as part of the Isotopes Program. The facility was used as a field shop for the Plant and Equipment Division in supporting past isotope production operations in other facilities and it houses the central electrical distribution station for the Isotopes Circle area. Reportedly, no radioactive materials have been handled in this building. Currently, the building is being prepared to be used as office space in addition to continuing to house the electrical distribution station.

Physical description of area/facility:

- Building 3034 was originally constructed in the 1950s.
- The building is a single-story, metal framed structure with metal siding consisting of approximately 1,400 sq. ft. of floor space. The building is not sealed by polyurethane cocooning. Paint observed on exterior surfaces is in good condition.
- Building 3034 is located in an industrial area of ORNL (Isotopes Circle). The immediate area surrounding the facilities is paved for the most part with some grassy areas. The building shares a common wall with Building 3033-A to the west.
- The building consists of offices and a small warehouse area containing the electrical distribution station. Floor drains in the building reportedly discharge to the process waste system. Low-level liquid waste (LLLW) service has never been available in this building. Reportedly, no work associated with radioactive materials has been performed in this building. Information on drain locations and discharge points is available from the ORNL Engineering Support Office.
- Generally, the interior of the building is in good condition. Asbestos Containing Material (ACM) is labeled as appropriate. No polychlorinated bi-phenols (PCBs) were identified to be associated with this building.
- Building 3034 is operated under normal atmospheric pressure.
- A building space diagram is attached to this form showing the layout of the facility.

Release Information

Description of release, or threatened release, and source:

Despite the fact that no radioactive materials were reportedly handled in this facility (according to the IFDP Work Plan and facility personnel), the Hazard Screening report for the facility indicates that some small, fixed hot spots of residual radioactive surface contamination remain in inaccessible areas.

Description of release, or threatened release, and source: (Continued)

Perimeter walls within the facility have been decontaminated to a level of ten feet above the floor. The wall area above this point is presently identified as a fixed radiologic contamination area by postings. Since there is no record of radioactive material handling in this facility, the origin of this release and remaining contamination is uncertain. The remaining contamination is in small enough quantity to be considered insignificant.

It is assumed, based on the historical shop function of this building, that hazardous materials (HAZMATs) (e.g., acids, hydraulic fluids, and other chemicals) were used in small quantities (i.e., less than 5 gallons or 100 pounds) during facility operations. According to available spill/release records and facility personnel interviews, no significant HAZMAT spills (i.e., spills having the potential to adversely affect human health and/or the environment) have been reported for this building. No current conditions were identified which present a potential for a HAZMAT release.

Hazardous substances present:

Hazardous substances remaining in Building 3034 consist mainly of small amounts of residual fixed RAD surface contamination (β/γ) and larger quantities of HAZMATs. Areas of fixed RAD contamination are associated with the interior perimeter wall surfaces above the ten-foot level. Because of the renovation work on-going in this building, a number of HAZMATs exist in this facility in various quantities. These materials are listed on the attached HAZMAT inventory sheets. No PCBs were identified to be present in within the building.

Estimate (if possible) of quantities of hazardous substances that have been released and that could be released:

The following represents the known quantities of substances currently existing in the facility. Since there has been no documented historical use of radioactive materials in this facility, it is uncertain where this contamination originated from. It is only possible to quantify release amounts from contamination which currently exists in the facility and/or has been historically documented from past activities.

$< 1{,}700$ μCi β/γ
4,875 lbs HAZMATs (see attached HAZMAT sheet for detailed quantity breakdown).

(Quantity estimates obtained from Building 3034 Hazard Screening Report and ORNL Hazardous Material Information System database)

Other pollutants or contaminants:

Asbestos containing material, primarily in the form of thermal system insulation, has been confirmed present in this building. ACM observed is in fair to good condition and poses no immediate health threat. Based on the age of the facility, interior and exterior painted surfaces are assumed to be lead-containing. Verification samples are taken by ORNL Lead Management Program personnel on an "as-needed" basis to confirm the presence of lead in the paint (i.e., when work activities will disturb the paint, or paint is found to be deteriorating and poses a health or environmental threat). Interior painted surfaces observed are in good condition and pose no immediate health threat. Paint on exterior surfaces was also found to be in good condition, posing no immediate hazard to the surrounding area due to deterioration. There is, however, an area of deteriorating exterior paint on exposed piping adjacent to the east wall of the building which should be noted. Though this piping is not specific to Building 3034, it is peeling off and paint chips can be seen laying in the grassy area adjacent to the east side of the building.

Groundwater

Are there any suspected impacts to groundwater? If yes, please describe. Include any impacts to drinking water sources.

Building 3034 is located in Waste Area Grouping 1 at ORNL. Based on the information available regarding current and historical usage and operation of this facility, there is no reasonable evidence to suggest Building 3034 has significantly impacted groundwater in the area in any way.

Because of the depth to groundwater in the area of building 3034, soil characteristics, and nature and extent of potential lead-based paint (LBP) contamination, it is unlikely that lead from the paint chipping off of the exterior piping adjacent to the east side of the building has impacted groundwater through vertical migration if, in fact, the paint actually contains lead.

Surface Water

Are there any suspected impacts to surface water? If yes, please describe. Also describe the most likely surface water migration route(s), if applicable. Include any impacts to drinking water sources.

The only identified potential for impact to surface water from Building 3034 was the exterior painted surfaces and piping adjacent to the building if, in fact, the paint does contain lead. The potential exits for paint which has chipped off the building or piping to finds its way to surface water with the storm water runoff during a rain event. Numerous paint chips were observed in the grassy area adjacent to the east side of the building. This area runs alone the side of the building, is approximately three feet wide, and slopes toward the pavement between Buildings 3034 and 3036. As a result, it is highly likely that a hard downpour could float the chips and carry them to the nearest storm drain.

Other than the potential for assumed lead paint impact, no existing immediate threat to surface water was identified given the current status of this facility.

Air

Are there any suspected impacts due to air emissions? If yes, please describe.

The Hazard Screening Report prepared for Building 3034 indicates that there is no potential for significant radiation exposure to personnel working in or around this facility as a result of airborne migration of radioactive particulates and physical contact with contaminated surfaces. Areas of RAD contamination are identified and marked within the facility to protect against inadvertent exposure to personnel. Air within the building is controlled by a local ventilation system. Because of the small amounts of RAD contamination present, it is highly unlikely that radioactive air emissions from this building would impact personnel or the environment.

There is, however, a potential for impact to indoor air quality due to the presence of ACM, assumed LBP, and usage of HAZMATs. ACM and lead-based paint pose a potential threat should these materials be disturbed and become airborne. Certain HAZMATs can pose a potential threat to indoor air quality if the area they are used in is not adequately ventilated. The ACM, assumed LBP, and HAZMATs remaining in the building are not considered to be immediate threats to indoor quality in their current state.

Soil

Are there any suspected impacts to soil? If yes, please describe.

Based on the information available regarding historical usage and operation of this facility, there is no reasonable evidence to suggest Building 3034 has significantly impacted the soil below the building or in the immediate area in any way. Therefore, it is unlikely that activities in this building have contributed to the Isotopes Circle soil contamination plume identified in the Site Characterization Report for WAG 1.

Paint chips from the exterior piping adjacent to the east side of the building were observed in the grassy area below the piping. If the paint contains lead, there is a potential for lead impact to the soil in this area.

Release Beyond Facility or Reservation Boundaries

Has or will the release migrate beyond the boundaries of the facility or reservation? If yes, please describe (including possible human or environmental receptors).

Because of the small amount and inaccessibility of existing radiologic contamination in Building 3034, there is considered to be no potential for significant radiologic release beyond the facility or reservation boundaries.

There is, however, a potential for assumed lead-containing paint which peels off exterior surfaces of the building to be carried away with surface runoff during a rain event. This potential is considered slight for the exterior surfaces of the building current condition of the facility. However, this potential is greater for the piping exterior to the east side of the facility since paint chips have already fallen to the ground.

Worker Safety

Could the release pose a threat to workers? If yes, please describe.

The low levels of radiologic surface contamination existing in Building 3034 are inaccessible and well marked. Good radiation practices and standard operating procedures are enforced for worker safety. ACM is appropriately labeled. However, even with these safeguards in place, a potential threat to workers exists if safety measures are overlooked and workers are careless. This potential is not considered significant given the current status and level of activity of building.

Environmental Receptors

Does the release pose a potential threat to environmental receptors? If yes, please describe. Include natural resources impacts.

No existing conditions posing an immediate significant threat to environmental receptors, including natural resources, were identified to be currently existing or associated with Building 3034.

Mitigation

What action(s) might be taken to abate/prevent release or impacts from release?

- Continued utilization and enforcement of administrative controls that are currently in place to protect workers and monitor conditions and activities in this building.
- Exterior paint on piping adjacent to the east wall of the building should be tested for lead content. If the paint is found to be lead-containing, a maintenance action will be required to eliminate areas of deteriorating paint. In addition, a remedial site evaluation will be necessary to determine whether the soil in this area has been impacted by lead from the peeling paint.
- Continue S&M activities per Procedure IP-900.

What actions are currently being taken to abate/prevent release or impacts from release?

Administrative controls are in place to control access to contaminated areas and to monitor conditions and activities within the facility for worker and environmental protection. Warning tape and labels are used to identify RAD and ACM hazard areas. Standard operating procedures are in place for building access and surveillance and maintenance activities to protect against inadvertent contact and disturbance of contaminated areas. Radiologically contaminated areas are monitored periodically by ORNL health physics personnel. The building is currently in surveillance and maintenance status awaiting usage as storage and office space and subsequent entry into the Decontamination and Decommissioning (D&D) Program. A groundwater monitoring program is in place to monitor contamination levels and migration in groundwater underlying WAG 1. The building is inspected for structural changes after each natural incident (earthquake, tornado, or other severe storm), fire and/or man induced activity which could cause cracking, failure, or deterioration of the facility and/or equipment that may allow contamination to be released. No such conditions have been reported for Building 3034.

Current actions being taken to prevent further release and ensure worker safety in Building 3034 are considered adequate until D&D activities begin.

Other Environmental Authorities

Is the release or threatened release potentially subject to other environmental statutory actions? If yes, please explain.

If paint is found to be lead-containing and samples fail the Toxicity Characteristic Leaching Procedure (TCLP) analysis, the building could qualify as a hazardous waste generator point under the Resource Conservation and Recovery Act (RCRA).

Maintenance Actions

Are maintenance actions necessary to eliminate potential threats to human health and the environment? If so, explain.

Samples should be taken of the exterior paint located on the piping adjacent to the east wall of the facility. The samples should then be analyzed to determine whether the paint does, in fact, contain lead. Such analysis should include TCLP (40 *CFR* 261, Appendix II) to determine whether the area qualifies as a RCRA generator point. If the paint is found to contain lead, abatement actions will be required to prevent deteriorated areas of paint from dislodging and falling to the ground below, potentially having a direct impact on soil in this area, and an indirect impact to surface water.

No further potential hazards requiring maintenance actions were identified to be associated with Building 3034.

Removal Actions

Are Removal Actions necessary to eliminate immediate threats to human health and the environment? If so, explain.

No imminent hazards requiring removal actions per 40 *CFR* 300.415 were identified to be currently associated with Building 3034.

Remedial Site Evaluation

Is a Remedial Site Evaluation needed?

Pending confirmatory sampling and analysis results of the paint on exterior piping adjacent to the east wall of the facility, a remedial site evaluation (RSE) should be conducted to determine whether the soil in this area has been impacted by lead from chipping paint and whether remediation of the soil is necessary.

Although no reasonable evidence was identified during this RmSE to suggest that Building 3034 has contributed to soil contamination in the area, it is possible that soil beneath the slab of this building may have been impacted from migration of contamination originating from leaking process and/or LLLW piping in the area. As a result, it is recommended that some type of remedial investigation be performed to assess the condition of the soil in this area before conducting any S&M or D&D activities which involve disturbing the slab.

ACM has also been identified, marked and documented. No further remedial investigation involving this hazards is considered necessary given the current status and future plans of this facility.

Based on the age of the facility, painted surfaces are assumed to contain lead. Samples of the paint should be taken and analyzed to verify the presence of lead prior to conducting any S&M or D&D activities which may disturb these assumed areas.

No Further Investigation

Is a finding of No Further Investigation appropriate? Please explain.

A finding of No Further Investigation implies that a facility or area is free from hazardous substances or contaminants that may threaten human health and the environment. Since Building 3034 contains substances and materials which may become threatening if not properly controlled, handled and managed during the S&M cycle, a finding of No Further Investigation is inappropriate in this case.

Additional Comments

The following documents and databases were referenced for historical and hazard information related to Building 3034:

- Phase I Safety Documentation, Radioisotopes Area Services Building, Building 3034 Hazard Screening, Document No. HS/3034/F/RT-12 (Rev.0).
- Work Plan for the Isotopes Facilities Deactivation Project at Oak Ridge National Laboratory, Document No. ORNL/ER-249/R2.
- Available Building 3034 Occurrence Reports, 1989 to present.
- Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory, Oak Ridge, Tennessee, Volumes 1 and 2, Document Nos. DOE/OR-1043/V1&D1 and DOE/OR-1043/V2&D1.
- ORNL Hazardous Material Information System Database.
- ORNL Drain System Survey Report for Building 3034.

The following personnel and offices were contacted and provided historical and current use/condition information for Building 3034:

- Mr. Karl Haff, Radiochemical Processing Department Head, ORNL Radiochemical Technology Section.
- Ms. Swati Wilson, Manager, ORNL Lead Management Program.
- Mr. Nathan Dunn, Hazardous Material Information System Office.
- Mr. Jade Thomas, ORNL Environmental Compliance Office.
- Mr. Joe Armento, ORNL Chemical Technology Division, Isotopes Facilities Shutdown Program.

The RmSE of this facility was conducted for LMES under contract by:

Advanced Sciences, Inc.
800 Oak Ridge Turnpike, Suite C-102
Oak Ridge, TN

Todd R. Grant 6/18/96

Evaluator's Signature Date

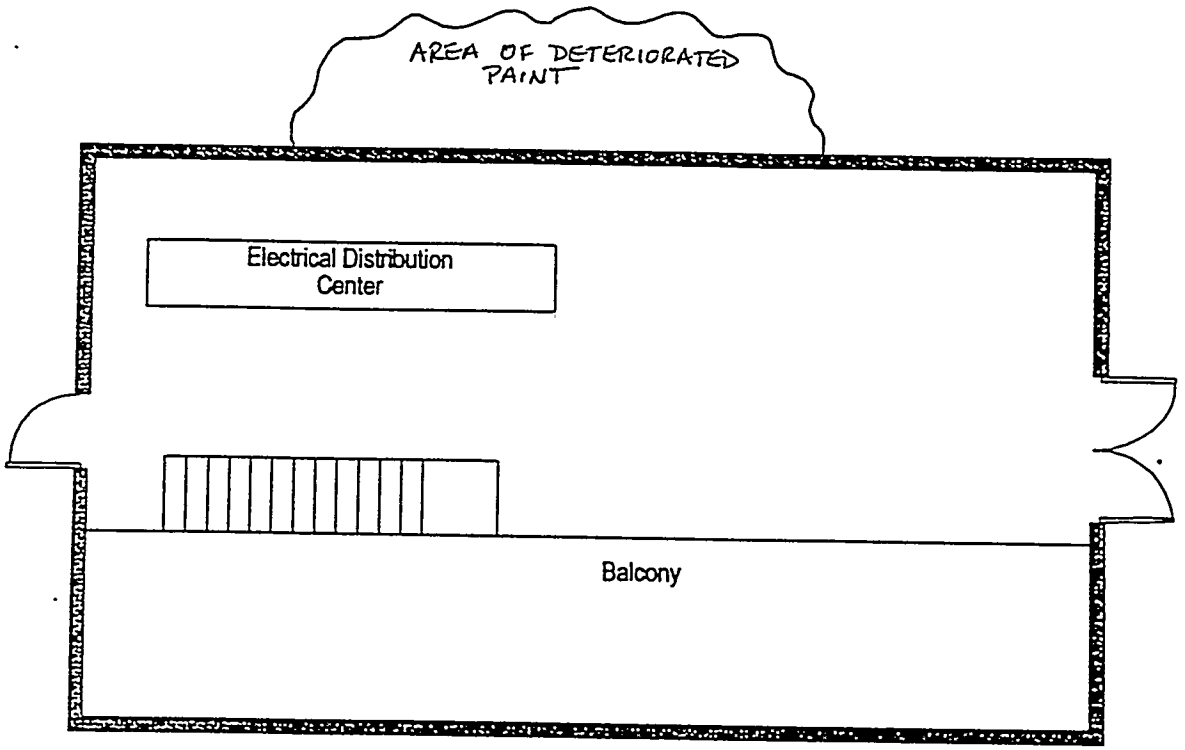


Fig. 12. Diagram of Building 3034.

Plant: 3 Division: Department: Control Area: Building: 3034 Room: Area: WA Code:
Item ID: LIST: Ingredient: Mix Comp: to HAZ Class: HAZ Rating:
Date Expiration: Inv Status: MSDS Avail: Haz Mat Grp Cd: Phy State: Pressure Cd: Temp Cd: Cont Type Cd:

Building: 3034

RECID	**	CASNO	Material Name	MMES C	MMES R	Total LBS	Total KILOGRAMS	No of Items
00677		000067-64-1	ACETONE	N	N	0.8686	0.3940	1
00882		000074-86-2	ACETYLENE	N	N	36.8118	16.6976	7
81179		NISS	AJAX INSTITUTIONAL CLEANSER WITH OXYGEN BLEACH	N	N	0.2508	0.1136	4
01730		007440-37-1	ARGON	N	N	192.7890	87.4482	12
82571		NISS	ASHLAND PLIOBOND 20	Y	Y	1.6970	0.7700	10
89601		NISS	BELT DRESSING #439-3490	N	N	0.7500	0.3401	1
B1340		NISS	BOSTON INDUSTRIAL PRODUCTS STYLE 264 MOR SHEET	Y	N	29.4298	13.3491	2
B1343		NISS	BOSTON INDUSTRIAL PRODUCTS STYLE 50 PACKING	N	N	32.0005	14.5153	1
A7206		NISS	CARBOLINE ALARA 1146 CAVITY DECON	N	N	89.2946	40.5037	1
A7327		NISS	CARBOLINE ALARA 1146 STRIPPABLE COATING	N	N	446.4730	202.5180	10
A6677		NISS	CHEMREX SONNEBORN SONOLASTIC NP-1 (ALL COLORS EXCE	N	N	85.2014	38.6444	62
86406		NISS	CIMCOOL FIVE STAR 30	Y	N	1.0431	0.4731	1
86418		NISS	CINCINNATI MILICRON CIMTAP(R)	N	N	1.0434	0.4733	1
92404		NISS	COPPERMATE PASTE SOLDERING FLUX	N	N	0.6250	0.2840	10
A0222			DEVCON 5-MINUTE EPOXY HARDENER(91081) AND RESIN(90	N	N	0.1953	0.0885	3
87236		NISS	DEVCON PLASTIC STEEL PUTTY (A) RESIN	N	N	6.0000	2.7210	6
96137		NISS	DEVOE WONDER SHIELD EXTERIOR ACRYLIC LATEX SATIN P	Y	Y	16.6904	7.5706	2
A0795			DEXTER EPOXI-PATCH KIT 615, PART A (88069) AND PAR	Y	N	0.2500	0.1136	4
91304		NISS	DOW CORNING SILICONE PLUS(TM) PREM 100% SIL SLNT,	N	N	0.6364	0.2888	8
87241		NISS	DOW CORNING(R) HIGH VACUUM GREASE	N	N	1.3820	0.6268	4
92595		NISS	EXXON KUTWELL 40	N	N	33.3812	15.1416	1
90652		NISS	EXXON TERESSTIC 33	N	N	399.3222	181.1313	1
82988		NISS	EXXON UNIREX N 2	N	N	9.4530	4.2880	10
90530		NISS	FEL-PRO C5-A HIGH TEMPERATURE ANTISEIZE COMPOUND	N	N	0.6572	0.2980	2
92228		NISS	FEL-PRO CLOVER SILICON CARBIDE GREASE MIX	N	N	1.0000	0.4535	1
91239		NISS	GARLOCK LUBALL WITH MOLY S-2	N	N	0.9375	0.4252	1
A7274		NISS	GARLOCK STYLE HTC-9800 COMPRESSED CARBON FIBER SHE	Y	N	20.0025	9.0731	1
85527		NISS	GAVLON 510 ENAMEL, ANY COLOR	N	Y	8.3452	3.7853	1
86113		NISS	GE SILICONE RUBBER SEALANT SCS2004	N	N	0.5224	0.2368	8
90866		NISS	GE SILICONE SEALANT GE5090	N	N	26.8619	12.1844	1
89236		NISS	GLYPTAL 1202	N	Y	4.1726	1.8926	2
91430		NISS	HANDY & HARMAN WHITE FLUX, SILVER BRAZING FLUX - L	N	N	0.5001	0.2268	1
01861		007440-59-7	HELIUM	N	N	4.0116	1.8196	2
B0509		NISS	HERCULES PVC CEMENT CLEAR MEDIUM	N	Y	0.9492	0.4305	1
90215		NISS	HERCULES STA-PUT(R)	N	N	8.2148	3.7260	4
91493	**	NISS	INSTA-FOAM OZONE FRIENDLY GREAT STUFF	N	N	11.7355	5.3230	4
B2783		NISS	ITW FLUID PRODUCTS GROUP TOLE STEEL BLUE DX-100	N	Y	0.1956	0.0888	3
95267		NISS	J.W. HARRIS STAY-SILV 15	N	N	0.5215	0.2365	1
82454		NISS	JOHNSON COMPLETE FOR FLOORS	N	N	127.6827	57.9165	3
92010		NISS	JOHNSON FORTIFY	N	N	85.1218	38.6110	2
97209		NISS	JOHNSON GO-GETTER READY-TO-USE	N	N	15.2299	6.9079	7
87805		NISS	JOHNSON WAX FINISH JX-4000/CONCRETE SEALER	N	Y	407.9177	185.0296	11
90647		NISS	K&W KNOCKER LOOSE	N	N	0.5867	0.2661	1
89862		NISS	KEL-SAN SUPER DRAIN OPENER	Y	N	91.6312	41.5636	2
B3049		NISS	KULITE TUNGSTEN HEAVY METAL ALLOY (POWDER/METAL)	Y	Y	18.0000	8.1646	2

* indicates MSDS is not available
** indicates MSDS updated within last three months

Plant: 3 Division: Department: Control Area: Building: 3034 Room: Area:
Item ID: LIST: Ingredient: Mix Comp: to HAZ Class: HAZ Rating: WA Code:
Date Expiration: Inv Status: MSDS Avail: Haz Mat Grp Cd: Phy State: Pressure Cd: Temp Cd: Cont Type Cd:

86128	**	NISS	LOCTITE REMOVABLE THREADLOCKER 242	Y	Y	0.0651	0.0295	1
B2687		NISS	MASTER BUILDERS CONCRESIVE 1420 PARTS A & B (REFER	N	N	1.1718	0.5310	18
92594		NISS	MOBIL DTE OIL EXTRA HEAVY	N	N	33.3812	15.1416	1
82754		NISS	MOBIL DTE OIL HEAVY	N	N	8.3452	3.7853	1
82732		NISS	MOBIL DTE OIL LIGHT	N	N	25.0376	11.3569	1
90716		NISS	NORTON RESINOID BONDED GRINDING WHEELS	Y	N	6.7500	3.0617	1
94789		NISS	OATEY ALL PURPOSE CEMENT	N	Y	6.6759	3.0279	7
82539		NISS	OATEY CLEANER	N	Y	4.9632	2.2512	6
91411		NISS	OATEY HEAVY DUTY CLEAR PVC SOLVENT CEMENT	N	Y	2.0862	0.9462	2
91282		NISS	OATEY PURPLE PRIMER/CLEANER	N	Y	0.7500	0.3401	1
01133		007782-44-7	OXYGEN	N	Y	100.2707	45.4823	9
89735		NISS	P-10 NUCLEAR COUNTER MIXTURE	N	N	5.6590	2.5669	1
A6607		NISS	PPG INDUSTRIES QUICK DRY ENAMEL - REGAL BLUE	N	Y	26.0373	11.8104	3
A5769		NISS	PPG PITT-TECH HIGH GLOSS	N	Y	60.5868	27.4818	6
A9857		NISS	PPG PITT-TECH SATIN 90-474	N	Y	1539.7050	698.4030	30
94841		NISS	PPG QUICK DRY ENAMEL SAFETY YELLOW, 6-330	N	N	80.3646	36.4527	9
A0744		NISS	PPG SPEEDHIDE 6-306	N	N	16.6904	7.5706	2
89201		NISS	PPG SPEEDHIDE ALKYD GLOSS ENAMELS, 6-F	N	Y	28.7910	13.0593	3
89353		NISS	PPG SPEEDHIDE LATEX FLAT PAINTS, 6-B	N	N	41.7264	18.9268	4
88524		NISS	PPG SPEEDHIDE LO-SHEEN ENAMELS, 6-C	N	N	73.0212	33.1221	3
A2302		NISS	PREMIER ALL PURPOSE ETP	N	N	4.5633	2.0699	7
B1963		NISS	PREMIER ETP GOLD	N	N	6.2568	2.8368	24
A4587		NISS	PREMIER INDUSTRIAL CITRUS DEGREASER	N	N	4.1727	1.8927	1
A7641		NISS	PREMIER INDUSTRIAL CONTAX	N	Y	2.0862	0.9462	2
A7342		NISS	PREMIER INDUSTRIAL PATCH AND BOND II	N	N	0.1304	0.0592	2
B1863		NISS	PREMIER INDUSTRIAL PATCH'N BOND FOR CONCRETE	N	N	0.1956	0.0888	3
88744		NISS	RECTORSEAL(R) NO. 5(R)	N	N	12.8619	5.8338	9
92397		NISS	RIDGID DARK THREAD CUTTING OIL	N	N	7.2604	3.2932	1
91410		NISS	RUBY'S STAINLESS STEEL SOLDERING FLUX	N	Y	0.3911	0.1774	1
85567		NISS	RUST VETO SPRAY	N	Y	1.0001	0.4536	1
A2940		NISS	SIKAGARD 62 HI BILD PART B ALL COLORS	N	N	52.7422	23.9236	2
91048	*	NISS	SIKAGARD 62, YELLOW, GREEN, GRAY, RED, TAN (A2939,	N	N	233.6677	105.9905	7
90980		NISS	SILVER GOOP	N	N	0.1954	0.0886	2
B2875		NISS	SIRCHIE 719UV FLUORESCENT INVISIBLE DETECTION POWD	N	N	0.2500	0.1132	2
A5857		NISS	SIRCHIE FINGERPRINT LABORATORIES CLUE SPRAY - 730U	N	N	0.7500	0.3400	2
06410		007681-52-9	SODIUM HYPOCHLORITE SOLUTION	N	N	50.0717	22.7123	1
A9818		NISS	STAINLESS STEEL ALLOYS (REFER TO RECIDS A9465, A94	Y	N	55.3148	25.0906	1
95324		NISS	STEEL WOOL PADS	N	N	15.0000	6.8040	1
89521		NISS	SYNKO INTERIOR AND EXTERIOR SPACKLING PASTE	N	Y	33.3808	15.1412	4
85489		NISS	THORO WATERPLUG(R)	Y	N	33.3808	15.1412	4
89871		NISS	USG JOINT TREATMENT PRODUCTS - READY MIXED COMPOUN	N	Y	41.7264	18.9269	1
94192	**	NISS	WATERBURY TIME MIST AEROGEL DEODORANT 4 OZ. - ALL	N	N	0.5001	0.2269	1
82913		NISS	WD-40 AEROSOL	N	N	3.5202	1.5966	6
82672		NISS	WD-40 BULK LIQUID	N	N	4.1726	1.8927	1
89356		NISS	WHITE LIGHTNING, 3006	N	N	27.5387	12.4907	13
89768		NISS	WINFIELD BROOKS ALUMTAP	Y	Y	1.3039	0.5914	1
			Building 3034 Totals:			4874.8985	2211.2233	432

* indicates MSDS is not available
** indicates MSDS updated within last three months

12. BUILDING 3038 (AHF, E, M)—ISOTOPE DEVELOPMENT LABORATORY

ORNL FACILITY RmSE INFORMATION FORM

General Information	
Area/Facility Name (and aliases):	Building 3038 (AHF, E, M) Isotope Development Laboratory
Organization responsible for area/facility (include specific person and phone number if possible):	R.E. Eversole (576-7483), IFDP Project Manager, ER Program, LMES
Status (active/inactive): Inactive, Standby Mode	*Years of Operation:* ≈ 40

Description of Operation:

There are no current operations on-going in this building, other than surveillance, maintenance, and deactivation activities required for facility stabilization. Building 3038 was constructed to house all the radioisotope shipping activities for ORNL. Originally, the entire facility was dedicated to radioisotope shipping as follows: the east portion (3038-E) contained the analytical chemistry laboratory to perform analyses of short-lived radioisotopes prior to shipment; the middle section (3038-M) housed the radioisotope handling and transfer barricade; and the west section (3038-AHF) housed the packaging, inspection, and shipping activities. During the 1960s, the volume of radioisotopes being shipped decreased and the shipping area was reduced. In the late 1960s, the west portion of the building was converted into the Alpha Handling Facility (AHF) by addition of water-shielded hot cells and glove boxes for target fabrication. The middle portion of the building (3038-M) has always been the center of radioactive isotope shipping operations for ORNL. The analytical chemistry laboratories supporting the isotopes shipping activities were located in the east end of the facility until 1976 when the analytical function was transferred to other ORNL facilities. That portion of the building (3038-E) was subsequently converted into an isotope production and development facility. During the late 1970s and early 1980s, research program activities involving plutonium alloys and compounds were conducted in this area of the building. The same glove boxes were used in the mid 1980s to perform research on ^{147}Pm-doped crystals and glasses for laser development studies. With these two exceptions, all work in the east end of the facility has been dedicated to isotopes efforts.

Physical description of area/facility:

- Building 3038 was originally constructed in the late 1940s.
- The facility is a single-story, metal frame building with brick siding consisting of approximately 7,250 sq. ft. of floor space.
- Building 3038 is located in an industrial area of ORNL (Isotopes Circle).
- Building utilities include electric, steam, and plant air.
- The immediate area surrounding consists of a grassy area to the south and combination of pavement and grass skirting to the north, east, and west.
- Building 3038 consists of a number of hot cells, glove boxes, process hoods, and related equipment and process areas for handling and packaging radioactive materials. Work involving radioactive materials was conducted primarily in the hot cells, glove boxes, process hoods, and Radioactive Materials Shipping and Packaging area located in 3038-M.
- The building and hot cells are kept under negative pressure for containment purposes. Building ventilation is local and exhausts through high efficiency particulate air (HEPA) filters on the roof. Cell ventilation exhausts through HEPA filters to the cell ventilation system and stack 3039. The manipulator cells and the glove boxes in the AHF and AHF Annex exhaust through HEPA filters to the isotopes area process off-gas system.

Physical description of area/facility: (Continued)

- Building sinks and floor drains discharge to process waste system. Hot cell drains discharged to the low-level liquid waste (LLLW) system (Tank WC-10). In addition, hood and sink operations in 3038-E also discharged to the LLLW system.
- Exterior of the building appears to be sound with no visual evidence of significant damage or deterioration.
- Access to some of the interior portions of the building was restricted during the facility inspection. The interior areas of the building that were accessible were observed to be in fair to good condition without any significant areas of damage or deterioration. Asbestos containing material (ACM) and items containing poly chlorinated bi-phenols are labeled as appropriate.
- A building space diagram is attached to this form showing the location of the various process areas and equipment.

Release Information

Description of release, or threatened release, and source:

Low levels of residual fixed and transferable radiologic surface contamination exist in areas of the facility as a result of historical operations. The contamination exists primarily in the hot cells, barricade area, a glove boxes, hoods and related process equipment (vessels, piping, ventilation ducts, etc.). This contamination has accumulated from activities involving a variety of materials throughout the operating history of the facility and, therefore, cannot be attributed to a single release episode. The existing levels of RAD surface contamination in the facility are low and the presence of this contamination is not considered a significant hazard in its current state according to the Building 3038 Hazard Screening Report.

The Hazard Screening Report does, however, indicate that a major potential hazard exists in the form of radiologic source material inventory remaining in the facility. This presents a potential for release of radiologic material from storage containers that might rupture during a natural phenomenon of other facility upset.

Hazardous materials (HAZMATs) (e.g., acids, hydraulic fluids, and other chemicals) were reportedly used in small quantities (i.e., less than 5 gallons or 100 pounds) during facility operations and currently for surveillance and maintenance (S&M) activities. According to available spill/release records and facility personnel interviews, no significant HAZMAT spills (i.e., spills having the potential to adversely affect human health and/or the environment) have been reported for this building. No current conditions were identified which present a potential for a significant HAZMAT release.

Hazardous substances present:

Hazardous substances remaining in Building 3038 consist mainly of residual RAD surface contamination (α, β, γ), radioactive source materials, PCBs, and a small quantity of miscellaneous HAZMATs. Areas of fixed and transferable RAD contamination are associated primarily with the hot cells, barricade areas, glove boxes, hoods and related process equipment. Radioactive source materials are containerized in Department of Transportation (DOT) approved shipping containers and stored in the east and west ends of the facility. PCBs are reportedly present in the form fork lift hydraulic fluid within the building. Hazardous materials present in the building are listed on the attached HAZMAT inventory sheet.

Estimate (if possible) of quantities of hazardous substances that have been released and that could be released:

The following represents the known quantities of substances currently existing in the facility. Radiologic surface contamination has accumulated from a legacy of many different programs and processes and cannot be attributed to a single release episode. It is only possible to quantify release amounts from contamination which currently exists in the facility and/or has been historically documented from past activities.

Residual Surface Contamination:

≈ 10 mCi β/γ as ^{90}Sr
<75 μCi α as ^{238}Pu
<2 μCi α as ^{239}Pu

Radiologic Material Inventory:

≈ 3,800 Ci α (the bulk as ^{238}Pu)
≈ 10 Ci β/γ (as ^{90}Sr equivalent)

Other Hazardous Substances:
PCB quantity not known (assumed to be less than 1 gallon).
≈ 11 pounds total miscellaneous HAZMATs (see attached HAZMAT inventory sheet).

(Radioactive material quantity estimates obtained from Building 3038 Hazard Screening Report; PCB quantity was not available in ORNL PCB Containing Equipment Inventory Database; HAZMAT quantity obtained from ORNL Hazardous Material Information System Database.)

Other pollutants or contaminants:

Asbestos containing material, primarily in the form of thermal system insulation, has been confirmed present in this building. ACM observed is in fair to good condition and poses no immediate health threat. Based on the age of the facility, interior and exterior painted surfaces are assumed to be lead-containing. Verification samples are taken by ORNL Lead Management Program personnel on an "as-needed" basis to confirm the presence of lead in the paint (i.e., when work activities will disturb the paint, or paint is found to be deteriorating and poses a health or environmental threat). Interior painted surfaces observed are in fair to good condition and pose no immediate health threat. The exterior of this building is brick and is not painted; therefore, no suspect areas of exterior lead-containing paint are associated with this building.

Groundwater

Are there any suspected impacts to groundwater? If yes, please describe. Include any impacts to drinking water sources.

Building 3038 is located in Waste Area Grouping (WAG) 1 at ORNL. Although no specific adverse spills or releases of hazardous substances threatening to groundwater were identified during this RmSE, it is suspected, based on available environmental studies conducted in WAG 1, that process and LLLW drains and associated piping may have leaked over the life of the facility.

Are there any suspected impacts to groundwater? If yes, please describe. Include any impacts to drinking water sources. (Continued)

Buried process and LLLW piping and some drains have been found to be deteriorated and leaking in other facilities and areas of WAG 1. Studies have determined that groundwater in WAG 1 has been both radiologically and chemically contaminated. Numerous man-made radionuclides have been detected in WAG 1 groundwater samples including many of those processed in Building 3038. It is likely that liquid waste from activities involving radioisotopes in Building 3038 have historically contributed to WAG 1 groundwater contamination. However, the radionuclides detected in the groundwater were common to the processes and activities in many other buildings in the area which makes it difficult to determine exactly which building is, or was, the source of contamination.

Because of the reported small quantities of chemicals historically and currently used in this facility, it is unlikely that such usage has significantly contributed to WAG 1 groundwater contamination. As part of the facility shutdown process, inactive process and LLLW drains within the building have reportedly been plugged to prevent further release. However, no documentation was available at the time of this report to verify which drains have actually been plugged and which have not. Information on drain locations and discharge points is available from the ORNL Engineering Support Office.

Other than the potential for historical impact to groundwater in WAG 1 via leaking process and LLLW lines external to the building, no existing immediate threat to groundwater was identified given the current status of the facility.

Surface Water

Are there any suspected impacts to surface water? If yes, please describe. Also describe the most likely surface water migration route(s), if applicable. Include any impacts to drinking water sources.

WAG 1 is essentially bound by Fifth Creek to the east, White Oak Creek (WOC) to the south, and First Creek to the west. First and Fifth creeks flow south into (WOC) which flows to the west and exits WAG 1 at the southwest corner. Storm water (from surface runoff and storm water drainage system) and treated water from the process waste system discharges into WOC. Since the exterior surfaces of this building are not painted, no potential for direct impact to surface water from Building 3038 was identified in its current state.

Surface water may, however, have historically been indirectly impacted by leaking process and LLLW lines external to the building. Some of these lines are known to have shared a common trench with storm water drainage piping. Contamination from leaking waste lines could potentially enter deteriorated storm water piping and migrate to WOC. The three creeks bordering WAG 1 are groundwater discharge points. Therefore, groundwater contaminated by leaking waste lines could also potentially impact surface water in the area.

No existing immediate threats to surface water were identified to be associated with Building 3038 during this RmSE.

Air

Are there any suspected impacts due to air emissions? If yes, please describe.

The Hazard Screening Report prepared for Building 3038 indicates a slight potential for radiation exposure to personnel working inside and within the immediate vicinity of the facility exists due to potential airborne migration of radioactive particulates and physical contact with contaminated surfaces.

Are there any suspected impacts due to air emissions? If yes, please describe. (Continued)

Also indicated is the greater potential of exposure due to catastrophic failure of containers of radioactive source material. Release of this material could pose a major airborne threat to personnel within and in the immediate vicinity of Building 3038. Areas of RAD contamination are identified, marked, and controlled as appropriate throughout the facility to protect against inadvertent exposure to personnel. Air in the building is controlled by a combination of a local ventilation system which controls building air, the cell ventilation system which controls hot cell exhaust, and the process off-gas system which controls exhaust from manipulator cells and glove boxes in the AHF and AHF Annex. Apart from catastrophic failure of the hot cells, glove boxes, structure, ventilation systems, or other contaminated equipment, it is unlikely that radioactive air emissions from Building 3038 would impact personnel or the environment in its current state.

There is also a potential for impact to indoor air quality due to the presence of ACM and assumed lead-based paint (LBP) should these materials be disturbed. The ACM and assumed LBP remaining in the building are not considered to be immediate threats to indoor quality in their current state.

Soil

Are there any suspected impacts to soil? If yes, please describe.

As stated for groundwater, there is a potential for historical impact to soils in the area of Building 3038 due to leaking process and LLLW drain piping. Previous environmental studies have identified a soil contamination plume in the Isotopes Circle area and soil samples collected from the plume have detected radioisotopes common to the processes performed in this building. An area of contaminated soil exists around the southeast corner of Building 3038. Reportedly this area is suspected to be the result of an abandoned waste tank and piping in the area that has leaked in the past. The area is well marked and covered with a protective barrier and river rock. Information specific to this area of contamination was not identified during this RmSE. As a result, it is likely that operations in this facility have historically contributed to the Isotopes Circle soil contamination plume. This area of contamination is not considered an imminent hazard given the current status of the adjacent facility (Building 3038) and the protective measures being taken to prevent contamination migration and personnel exposure.

It is unlikely that the small quantities of chemicals used in Building 3038 will, or have, significantly impact(ed) soil in the surrounding area.

Release Beyond Facility or Reservation Boundaries

Has or will the release migrate beyond the boundaries of the facility or reservation? If yes, please describe (including possible human or environmental receptors).

The following are considered potential scenarios where radiologic contamination could migrate beyond the facility or reservation boundaries:

- A person becomes inadvertently contaminated and leaves the facility/reservation undetected.
- Catastrophic failure of hot cells and/or contaminated equipment.

Though these potentials exist, they are considered slight and unlikely due to the current status of the facility and the engineering/administrative controls that are in place to protect again such an event.

Worker Safety

Could the release pose a threat to workers? If yes, please describe.

Radiologically contaminated areas are isolated and well marked. Good radiation practices and standard operating procedures are enforced for worker safety. Personnel exiting the facility are required to "frisk" themselves to detect the presence of RAD contamination. Monitors and alarms are in place to detect any radioactive release within the building. PCB containing equipment and ACM are appropriately labeled. However, even with these safeguards in place, a potential threat to workers exists if safety measures are overlooked. This potential is not considered significant given the current status and level of activity of the building.

Environmental Receptors

Does the release pose a potential threat to environmental receptors? If yes, please describe. Include natural resources impacts.

No existing conditions posing an immediate significant threat to environmental receptors, including natural resources, were identified to be currently existing or associated with Building 3038.

Mitigation

What action(s) might be taken to abate/prevent release or impacts from release?

- Continued utilization and enforcement of engineering and administrative controls that are currently in place to protect workers and monitor conditions and activities in the building.
- Continue S&M activities per Procedure IP-900.

What actions are currently being taken to abate/prevent release or impacts from release?

Engineering and administrative controls are in place to control access to contaminated areas and to monitor conditions and activities within the facility for worker and environmental protection. Warning signs and labels are posted throughout the facility indicating RAD, ACM, and PCB hazard areas. Standard operating procedures are in place for building access and surveillance and maintenance activities to protect against inadvertent contact and disturbance of contaminated areas and materials. Radiologically contaminated areas are monitored periodically by ORNL health physics personnel. Personnel are "frisked" upon exit of the facility to detect the presence of radiologic contamination. The building is currently in surveillance and maintenance status awaiting entry into the Decontamination and Decommissioning (D&D) Program. Inactive waste drains are reportedly plugged in contaminated areas to prevent inadvertent discharge of contamination beyond the facility. A groundwater monitoring program is in place to monitor contamination levels and migration in groundwater underlying WAG 1. The building is inspected for structural changes after each natural incident (earthquake, tornado, or other severe storm), fire and/or man induced activity which could cause cracking, failure, or deterioration of the facility and/or equipment that may allow contamination to be released. No such conditions have been reported for Building 3038.

Current actions being taken to prevent further release and ensure worker safety in Building 3038 are considered adequate until D&D activities begin.

Other Environmental Authorities

Is the release or threatened release potentially subject to other environmental statutory actions? If yes, please explain.

If paint is found to be lead-containing and samples fail the Toxicity Characteristic Leaching Procedure (TCLP) analysis, the building could qualify as a hazardous waste generator point under the Resource Conservation and Recovery Act (RCRA).

Maintenance Actions

Are maintenance actions necessary to eliminate potential threats to human health and the environment? If so, explain.

No existing potential hazards requiring maintenance actions were identified to be associated with Building 3038.

Removal Actions

Are Removal Actions necessary to eliminate immediate threats to human health and the environment? If so, explain.

No imminent hazards requiring removal actions per 40 *CFR* 300.415 were identified to be currently associated with Building 3038.

Remedial Site Evaluation

Is a Remedial Site Evaluation needed?

Areas of radiologic contamination associated with Building 3038 have been identified and marked as appropriate. However, it is suspected that process and LLLW drains and associated piping may have leaked beneath the slab of the building as a result of past practices. As a result, it is recommended that some type of remedial investigation be performed to assess the condition of the soil in this area before conducting any S&M or D&D activities which involve disturbing the slab.

ACM and PCB-containing equipment have also been identified, marked and documented. No further remedial investigation involving these hazards is considered necessary given the current status and future plans of this facility.

Based on the age of the facility, painted surfaces are assumed to contain lead. Samples of the paint should be taken and analyzed to verify the presence of lead prior to conducting any S&M or D&D activities which may disturb these assumed areas.

No Further Investigation

Is a finding of No Further Investigation appropriate? Please explain.

A finding of No Further Investigation implies that a facility or area is free from hazardous substances or contaminants that may threaten human health and the environment. Since Building 3038 contains substances and materials which may become threatening if not properly controlled, handled and managed during the S&M cycle, a finding of No Further Investigation is inappropriate in this case.

Additional Comments

The following documents and databases were referenced for historical and hazard information related to Building 3038:

- Phase I Safety Documentation, The Isotope Development Laboratory, Building 3038, Hazard Screening, Document No. HS/3038/F/RT-15 (Rev. 1).
- Work Plan for the Isotopes Facilities Deactivation Project at Oak Ridge National Laboratory, Document No. ORNL/ER-249/R2.
- Building 3038 Occurrence Reports, 1989 to present.
- Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory, Oak Ridge, Tennessee, Volumes 1 and 2, Document Nos. DOE/OR-1043/V1&D1 and DOE/OR-1043/V2&D1.
- ORNL Hazardous Material Information System Database.
- ORNL Drain System Survey Report for Building 3038.

The following personnel and offices were contacted and provided historical and current use/condition information for Building 3038:

- Mr. Karl Haff, Radiochemical Processing Department Head, ORNL Radiochemical Technology Section.
- Ms. Swati Wilson, Manager, ORNL Lead Management Program.
- Mr. Nathan Dunn, Hazardous Material Information System Office.
- Mr. Jade Thomas, ORNL Environmental Compliance Office.
- Mr. Joe Armento, ORNL Chemical Technology Division, Isotopes Facilities Shutdown Program.

The RmSE of this facility was conducted for LMES under contract by:

Advanced Sciences, Inc.
800 Oak Ridge Turnpike, Suite C-102
Oak Ridge, TN

Todd R. Grant — Evaluator's Signature

6/18/96 — Date

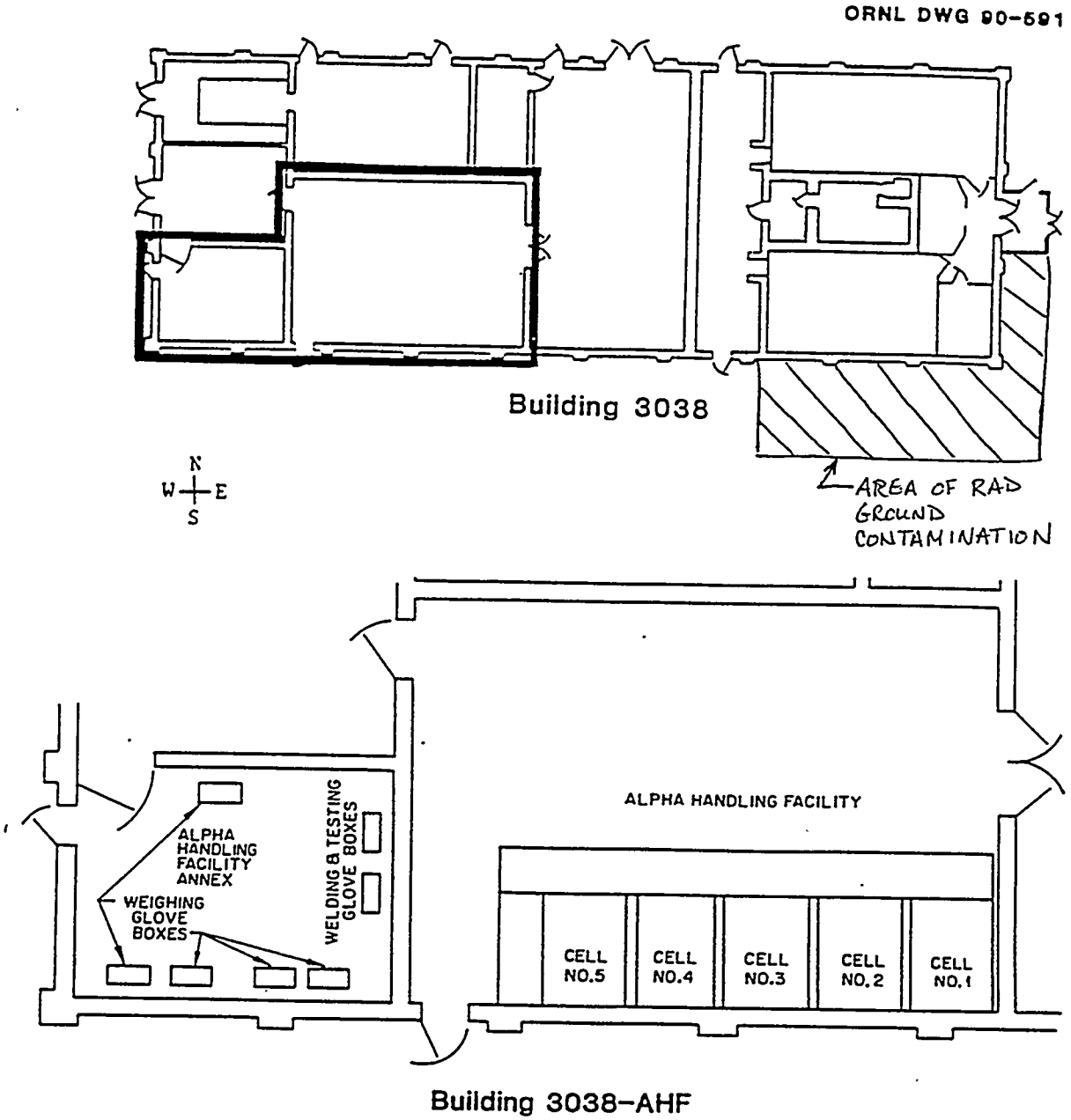


Fig. 13. Diagram of Building 3038-AHF.

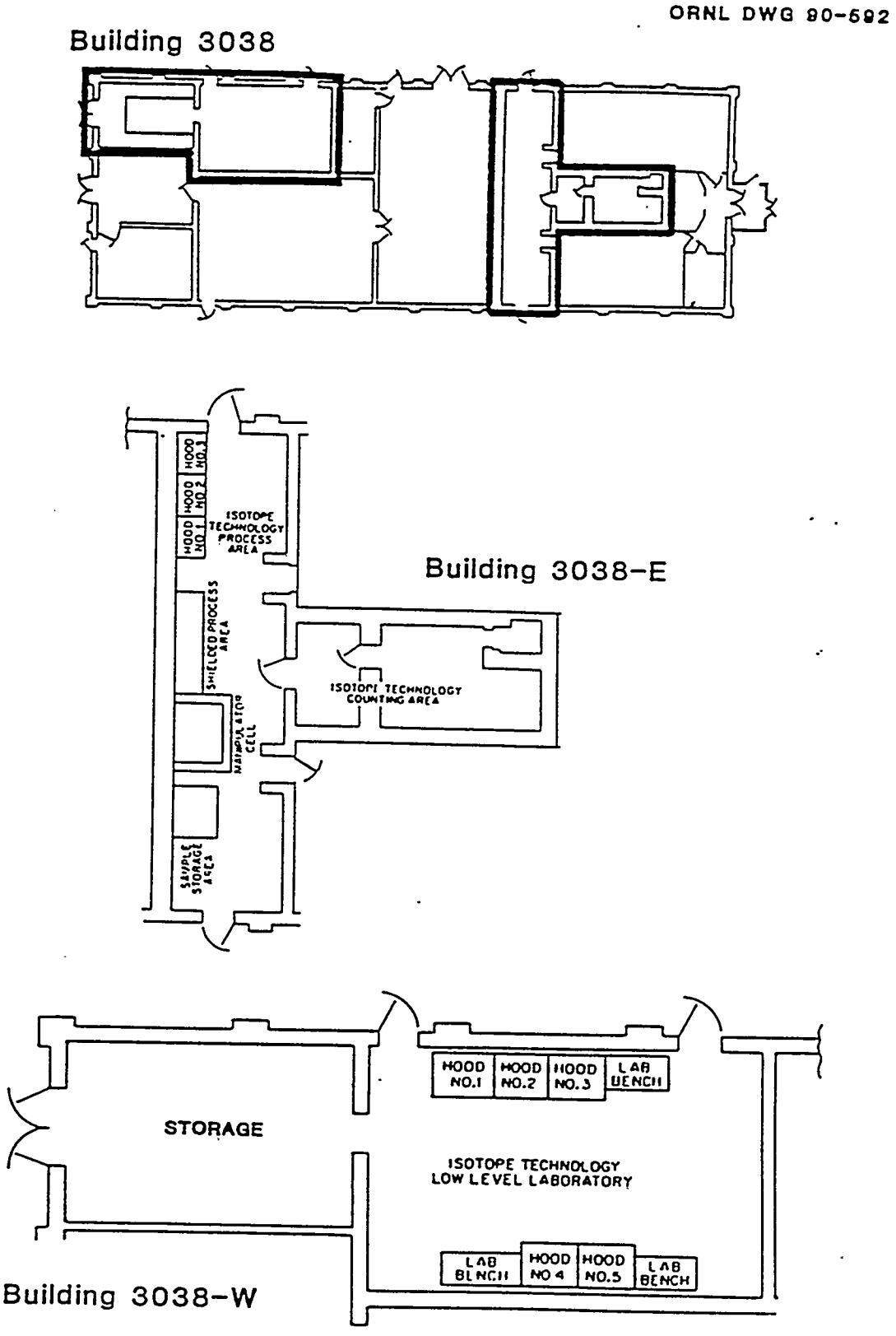


Fig. 14. Diagram of Building 3038-W.

ORNL DWG 90-593

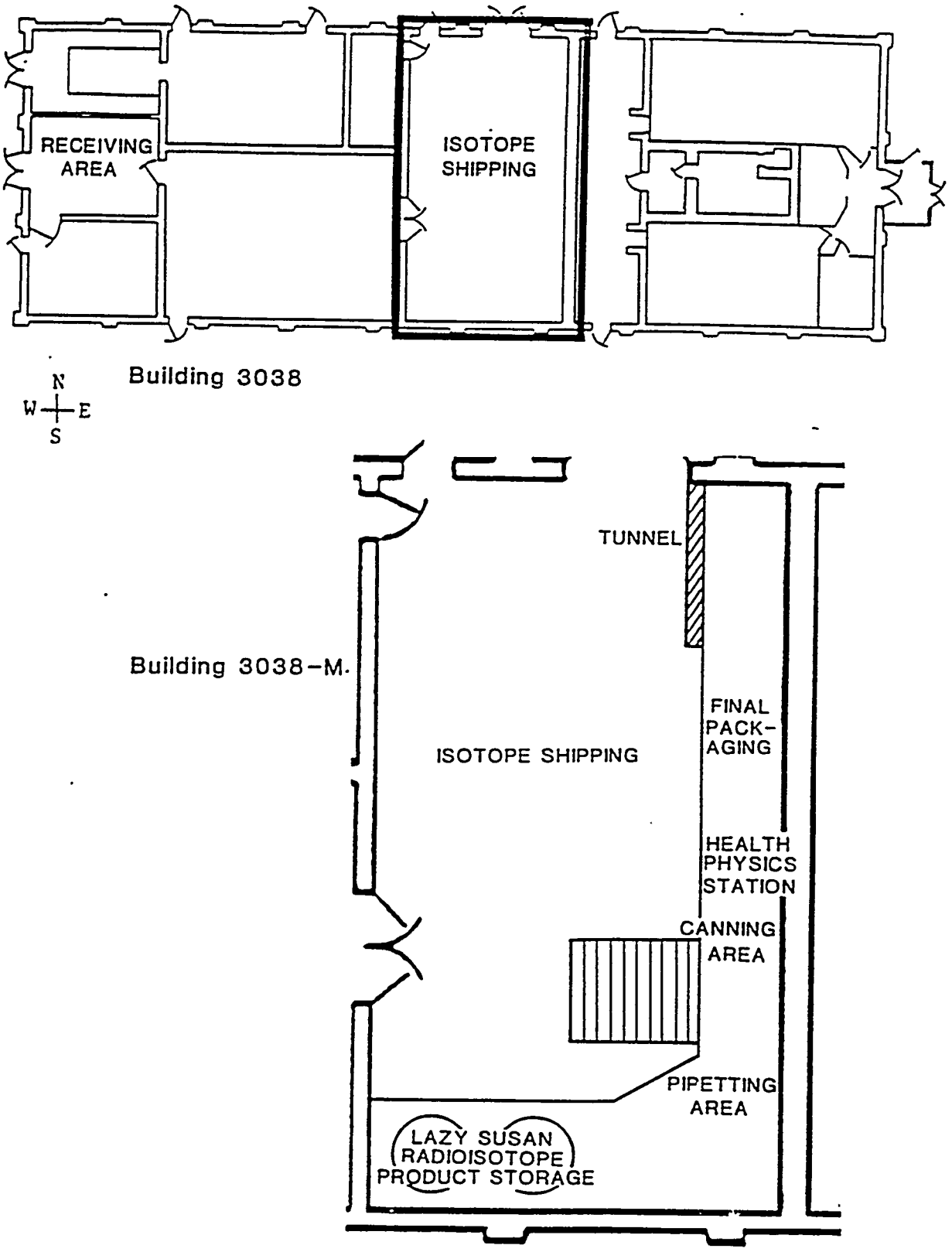
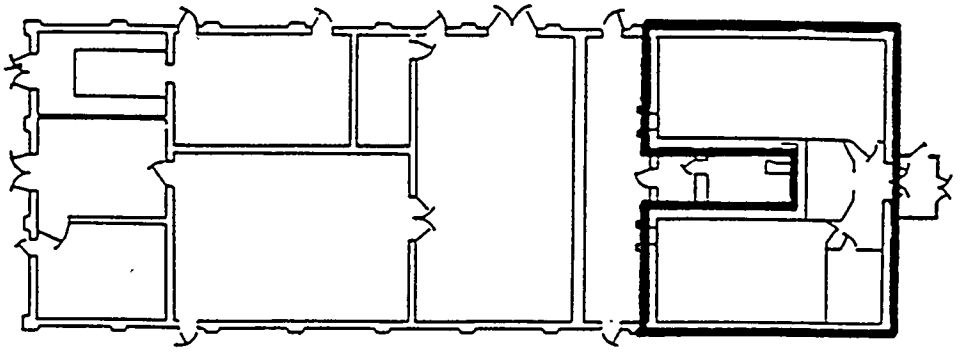


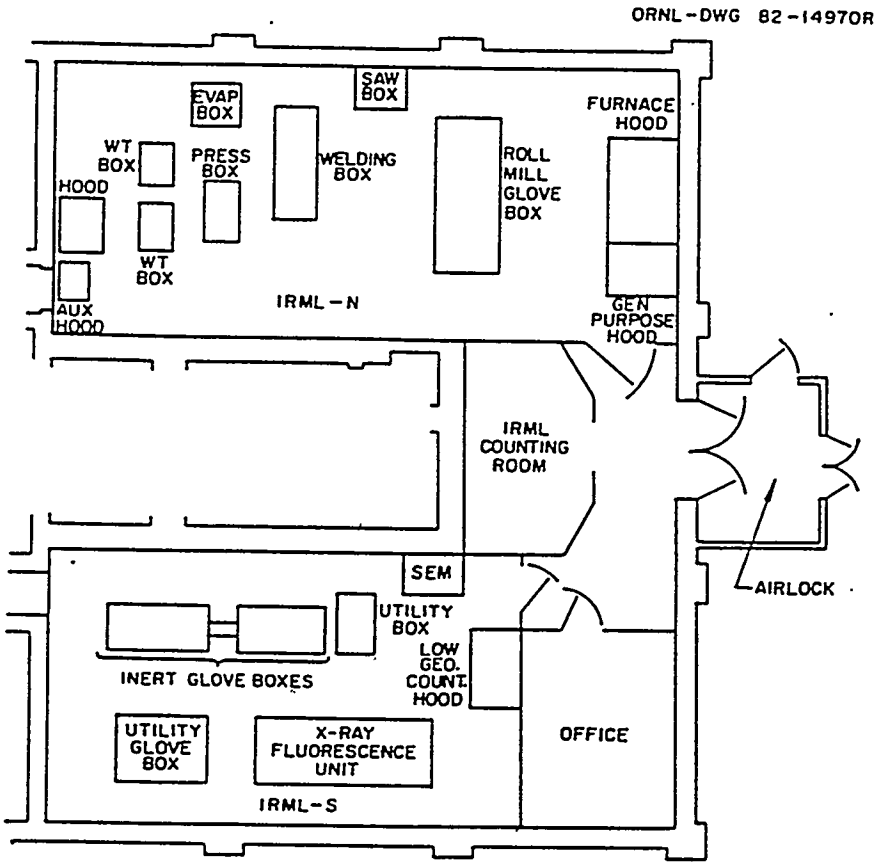
Fig. 15. Diagram of Building 3038-M.

ORNL DWG 80-594



Building 3038

ORNL-DWG 82-14970R



Building 3038-E

Fig. 16. Diagram of Building 3038-E.

Plant: 3 Division: Department: Control Area: Building: 3038 Room: Area: WA Code:
Item ID: LIST: Ingredient: Mix Comp: to HAZ Class: HAZ Rating:
Date Expiration: Inv Status: MSDS Avail: Haz Mat Grp Cd: Phy State: Pressure Cd: Temp Cd: Cont Type Cd:

Building: 3038

RECID	**	CASNO	Material Name	MMES C A	MMES R T	Total LBS	Total KILOGRAMS	No of Items
87241		NISS	DOW CORNING(R) HIGH VACUUM GREASE	N	N	0.4563	0.2070	1
81193		NISS	FORMULA 409 ALL PURPOSE CLEANER	N	Y	0.7174	0.3255	1
89515		NISS	HOUSEHOLD (HANDY) OIL	N	N	0.1955	0.0887	1
94226		NISS	INSTA-GEL XF	N	N	8.3453	3.7854	1
97063	**	NISS	J. PENNER CRT CLEAN SOLUTION	N	N	0.1858	0.0842	1
00318		000067-56-1	METHANOL	N	Y	0.0652	0.0296	1
89448		NISS	PPG QUICK DRY SPRAY ENAMELS, 55-B	N	Y	0.7500	0.3401	1
92251		NISS	SANFORD ROLL-ON STAMP PAD INKER	N	Y	0.1955	0.0887	2
94032		NISS	SELIG MASTER MECHANIC LIQUID	N	Y	0.3913	0.1775	1
			Building 3038 Totals:			11.3023	5.1267	10

* indicates MSDS is not available
** indicates MSDS updated within last three months

13. BUILDING 3047— RADIOISOTOPE DEVELOPMENT LABORATORY

ORNL FACILITY RmSE INFORMATION FORM

General Information	
Area/Facility Name (and aliases):	Building 3047 The Radioisotope Development Laboratory (RDL)
Organization responsible for area/facility (include specific person and phone number if possible):	R.E. Eversole (576-7483), IFDP Project Manager, ER Program, LMES
Status (active/inactive): Inactive, Standby Mode	*Years of Operation:* ≈ 30

Description of Operation:

All isotopes activities within Building 3047 are shutdown with the exception of waste removal and transloading of radioactive material in the beta/gamma hot cells. There are currently a large number of different work items performed within this facility. Actual operations can involve temporary storage and movement of discrete items of inventory; trans-loading/shipment of items (transfer of items from on carrier or cask to another); receipt, packaging, repackaging, transfer, and shipment of radioactive material; and the unloading, opening, handling, repackaging, and shipment of liquid and solid radioactive materials including waste. The Health Sciences Research Division (HSRD) utilizes parts of this facility for processing medical radioisotopes and radiopharmaceutical research. The hot cells are used for opening High-Flux Isotopes Reactor target capsules and transloading highly radioactive materials. Laboratories 209 and 210 are currently not in use but are expected to be used by theIsotope Production and Distribution Program. Laboratory 208 is used by HSRD staff as an analytical and research facility. Laboratory 207 may also be used by the Isotope Production and Distribution Program.

Historically, this facility has been used for research, development, and production of radioisotopes. The Medical Isotopes Section (now the Nuclear Medicine Group) of the HSRD has utilized several laboratories for nuclear medicine research. No specific descriptions can be given for past processing performed in RDL because of frequent changes not only in the processes themselves but also in the materials, operating procedures and parameters, and program requirements. Special safety summaries and approved procedures were required for each new experiment and operation. Before an operation could begin, all pertinent paperwork had to be reviewed and approved. If any potential hazard were identified, additional reviews and approvals were needed. Reviews identified and analyzed potential hazards that might be different in degree or type from those previously approved.

Physical description of area/facility:

- Building 3047 was originally constructed in the early 1960s.
- The building is a three-story, steel frame structure with concrete block interior and exterior walls.
- Building 3047 shares a common wall with the Isotopes Technology Building (Building 3047-A) to the east. Because they have individual ventilation systems and are separated by heavy walls and at least two sets of double doors, they are considered separate buildings. Building 3047-A, which contains administrative offices, is not considered a part of the RDL; nor is it included in the RDL programmatic missions and Isotopes Facilities Deactivation Project (IFDP). As of this writing, there remains speculation as to whether Building 3047 will itself remain in the IFDP. The building also shares a common wall with Building 3028 to the west.

Physical description of area/facility: (Continued)

- Building ventilation is divided into three zones; west, middle, and east. The west and middle zones operate under slight negative pressure, and the east zone is not contained. Exhaust ventilation of Hot Cells A, B, C, and D is provided by the cell ventilation system, exhaust ventilation of the Alpha Hot Cell is provided by the process off-gas system.
- The exterior of building is generally clean and in good condition with no visible areas of significant deterioration or damage.
- The interior portions of the building fair to good condition with no visible areas of significant deterioration or damage.
- Building 3047 is located in Isotopes Circle, an industrial area of ORNL. The immediate area surrounding the facility is paved.
- RDL houses four high-level beta/gamma hot cells (A-D), one alpha hot cell, seven laboratories for handling low-level materials, a decontamination room, a Health Physics (HP) area, offices, and service areas. Utilities include electrical power, steam, and plant air.
- Cell floor drains, some hood drains, and drains in the decontamination facility discharge to the LLLW system (Tank WC-10). The remaining floor, sink, and hood drains discharge to the process waste system.
- Work with radioactive materials was/is conducted primarily in the hot cells and laboratories within the building. Resulting primary waste streams included exhaust air and liquid process waste.
- A building space diagram is attached to this form showing the location of the various process areas and equipment.

Release Information

Description of release, or threatened release, and source:

Low levels of residual fixed and transferable radiologic surface contamination exist in areas of the facility as a result of historical operations. The contamination exists primarily in the hot cells and process equipment (vessels, hoods, piping, ventilation ducts, etc.). This contamination has accumulated from activities involving a variety of materials throughout the operating history of the facility and, therefore, cannot be attributed to a single release episode. The existing levels of RAD contamination in the facility are low and the presence of this contamination is not considered a significant hazard in its current state. The potential for release of additional radiologic contamination exists due to inventory of radioactive materials currently stored in the facility in limited quantities. The existing levels of residual RAD surface contamination in the facility are low, especially in comparison with the remaining radiologic material inventory, and the presence of this contamination is not considered a significant hazard in its current state.

Hazardous materials (HAZMATs) (e.g., acids, hydraulic fluids, and other chemicals) were reportedly used in small quantities (i.e., less than 5 gallons or 100 pounds) historically during facility operations and currently for surveillance and maintenance (S&M) activities. A large number of HAZMATs are currently used and stored within Building 3047, the majority of the individual items consist of less than one pound of material. Two of these materials were identified in the Hazard Screening Report to be potential significant hazard sources. These chemicals are chloroform and benzene, which are listed as human carcinogens by the Occupational Safety and Health Administration and the American Conference of Government Industrial Hygienists. These chemicals are used only in laboratory hoods while the containers are open and no more than 20 kg of each chemical is present in the facility at one time. A release of these chemicals within the building would result in minor effects on any personnel in the immediate vicinity of the accident. According to available spill/release records and facility personnel interviews, no significant HAZMAT spills (i.e., spills having the potential to adversely affect human health and/or the environment) have been reported for this building. No current conditions were identified which present a potential for a significant HAZMAT release within the building.

There was a small diesel fuel spill identified around the pad of the emergency generator located adjacent to the northwest wall of the facility. This leak poses an immediate threat to surface water and is discussed in more detail in the Surface Water section of this report.

Hazardous substances present:

Hazardous substances remaining in Building 3047 consist mainly of residual RAD surface contamination (α, β, γ), radioactive materials in storage, PCBs, and a number of small quantities of miscellaneous HAZMATs including chloroform and benzene. Areas of fixed and transferable RAD contamination are associated primarily with the hot cells and process equipment. PCBs are reportedly present in small electrical capacitors. Hazardous materials present in the building are listed on the attached HAZMAT inventory sheets.

Estimate (if possible) of quantities of hazardous substances that have been released and that could be released:

The following represents the known quantities of substances currently existing in the facility. Radiologic surface contamination has accumulated from a legacy of many different programs and processes and cannot be attributed to a single release episode. It is only possible to quantify release amounts from contamination which currently exists in the facility and/or has been historically documented from past activities.

Residual Radiologic Surface Contamination:

< 1 mCi β/γ as ^{90}Sr
< 5 mCi α as ^{239}Pu

Radiologic Material Inventory:

$\approx$ 3,000 Ci α (the bulk as ^{238}Pu)
$\approx$ 500,000 Ci β/γ (as ^{90}Sr equivalent)

Other Hazardous Substances:

$\approx$ 1 gallon PCBs
$\approx$ 4,923 pounds total miscellaneous HAZMATs (see attached HAZMAT inventory sheet).

(Quantity estimates obtained from Building 3047 Hazard Screening Report, ORNL PCB Large High- and Low-Voltage and Small Capacitors Inventory database, ORNL Hazardous Material Information System database.)

Other pollutants or contaminants:

Asbestos containing material (ACM), primarily in the form of thermal system insulation, has been confirmed present in this building. ACM observed is in good condition and poses no immediate health threat. Based on the age of the facility, interior and exterior painted surfaces are assumed to be lead-containing. Verification samples are taken by ORNL Lead Management Program personnel on an "as-needed" basis to confirm the presence of lead in the paint (i.e., when work activities will disturb the paint, or paint is found to be deteriorating and poses a health or environmental threat). Interior painted surfaces observed are in good condition and pose no immediate health threat. Paint on exterior surfaces was observed to be in good condition with no visible evidence of significant damage or deterioration.

Groundwater

Are there any suspected impacts to groundwater? If yes, please describe. Include any impacts to drinking water sources.

Building 3047 is located in Waste Area Grouping 1 at ORNL. Although no specific adverse spills or releases of hazardous substances threatening the groundwater were identified during this RmSE, it is suspected, based on available environmental studies conducted in WAG 1, that process and LLLW drains and associated piping may have leaked over the life of the facility. Buried process and LLLW piping and some drains have been found to be deteriorated and leaking in other facilities and areas of WAG 1. Studies have determined that groundwater in WAG 1 has been both radiologically and chemically contaminated. Numerous man-made radionuclides have been detected in WAG 1 groundwater samples including many of those processed in Building 3047. It is likely that liquid waste from activities involving radioisotopes in Building 3047 have historically contributed to WAG 1 groundwater contamination. However, the radionuclides detected in the groundwater were common to the processes and activities in many other buildings in the area which makes it difficult to determine exactly which building is, or was, the source of contamination.

Because of the reported small quantities of chemicals historically and currently used in this facility, it is unlikely that such usage has, or will, significantly contribute(d) to WAG 1 groundwater contamination. As part of the facility shutdown process, inactive process and LLLW drains within the building have reportedly been plugged to prevent further release. However, no documentation was available at the time of this report to verify which drains have actually been plugged and which have not. Information on drain locations and discharge points is available from the ORNL Engineering Support Office.

Other than the potential for historical impact to groundwater in WAG 1 via leaking process and LLLW lines external to the building, no existing immediate threat to groundwater was identified given the current status of the facility.

Surface Water

Are there any suspected impacts to surface water? If yes, please describe. Also describe the most likely surface water migration route(s), if applicable. Include any impacts to drinking water sources.

WAG 1 is essentially bound by Fifth Creek to the east, White Oak Creek (WOC) to the south, and First Creek to the west. First and Fifth creeks flow south into (WOC) which flows to the west and exits WAG 1 at the southwest corner. Storm water (from surface runoff and storm water drainage system) and treated water from the process waste system discharges into WOC. An immediate, direct threat to surface water is associated with the emergency diesel generator located adjacent to the northwest wall of the building on the concrete apron. A portion of the concrete pad supporting the generator was found to be soaked with diesel fuel (an area of approximately four square feet). This area is susceptible to rainwater which can wash the fuel off the pad and channel it along the concrete apron into Fifth Creek to the east of the building. Though the area of fuel is small, continued leakage and subsequent rain events can compound the impact to Fifth Creek.

The only other potential for direct impact to surface water from Building 3047 in its current state would be from lead-containing paint chips which fall off the exterior painted surfaces and find their way into the storm water drainage system and eventually to WOC. Based on the age of this facility, it is assumed that painted surfaces contain lead. The exterior paint of Building 3047 is in good condition and there was no visible evidence of deterioration observed during the site inspection. Therefore, the potential for impact to surface water due to assumed exterior lead-based paint is considered slight.

Surface water may have also been indirectly impacted by leaking process and LLLW lines external to the building. Some of these lines are known to have shared a common trench with storm water drainage piping. Contamination from leaking waste lines could potentially enter deteriorated storm water piping and migrate to WOC. The three creeks bordering WAG 1 are groundwater discharge points. Therefore, groundwater contaminated by leaking waste lines could also potentially impact surface water in the area.

Air

Are there any suspected impacts due to air emissions? If yes, please describe.

The Hazard Screening Report prepared for Building 3047 indicates that the potential for radiation exposure to personnel working inside and within the immediate vicinity of the facility as a result of potential airborne migration of radioactive particulates and physical contact with contaminated surfaces is considered insignificant. There is, however, a potential for significant radiation exposure to personnel as a result airborne migration of particulates from the remaining inventory of radioactive material should containment of this material be compromised. Areas of RAD contamination are identified, marked, and controlled as appropriate throughout the facility to protect against inadvertent exposure to personnel. Air in the building is controlled by the cell ventilation system (hot cells A-D), process off-gas system (alpha hot cell), and local ventilation systems (west, middle, and east building zones). Exhaust air from hot cells A-D, the alpha hot cell, the west building zone, and the middle building zone is filtered through high efficiency particulate air (HEPA) filtration units before discharge to local exhaust stacks or stack 3039. Apart from catastrophic failure of the hot cells, storage equipment, or ventilation systems, it is unlikely that radioactive air emissions from Building 3047 would impact personnel or the environment in its current state.

There is also a potential for impact to indoor air quality due to the presence of ACM, assumed lead-based paint (LBP), chloroform, and benzene should these materials be disturbed or release within the facility. The ACM and assumed LBP remaining in the building are not considered to be immediate threats to indoor quality in their current state. Special handling procedures are implemented for usage of chloroform and benzene within the building to prevent release and personnel exposure.

Soil

Are there any suspected impacts to soil? If yes, please describe.

As stated for groundwater, there is also a potential for historical impact to soils in the area of Building 3047 due to leaking process and LLLW drain piping. Previous environmental studies have identified a soil contamination plume in the Isotopes Circle area and soil samples collected from the plume have detected radioisotopes common to the processes performed in Building 3047. Since, these radioisotopes were common to the processes in many of the other buildings in the area, it is difficult to determine whether waste from Building 3047 has actually contributed to the Isotopes area soil contamination plume based on the information reviewed during this RmSE.

It is unlikely, however, that the small quantities of chemicals used in Building 3047 have, or will, significantly impact(ed) soil in the surrounding area.

Release Beyond Facility or Reservation Boundaries

Has or will the release migrate beyond the boundaries of the facility or reservation? If yes, please describe (including possible human or environmental receptors).

The following are considered potential scenarios where radiologic contamination could migrate beyond the facility or reservation boundaries:

- Leaking diesel fuel around the base of the emergency generator is washed away with storm water and is carried away from the facility and potentially the reservation via Fifth and White Oak Creeks.
- A person becomes inadvertently contaminated and leaves the facility/reservation undetected.
- Catastrophic failure of hot cells and/or contaminated equipment.

There is also a potential for assumed lead-containing paint which peels off of the building to be carried away with surface runoff during a rain event. With the exception of the diesel fuel leak, these potential scenarios are considered slight and unlikely due to the current status of the facility and the engineering/administrative controls that are in place to protect again such an event.

Worker Safety

Could the release pose a threat to workers? If yes, please describe.

Radiologically contaminated areas are isolated and well marked. Good radiation practices and standard operating procedures are enforced for worker safety. Personnel exiting the facility are required to "frisk" themselves to detect the presence of RAD contamination. Monitors and alarms are in place to detect any radioactive release within the building. Asbestos containing material and PCB items are appropriately labeled. However, even with these safeguards in place, a potential threat to workers exists if safety measures are overlooked. This potential is not considered significant given the current status and level of activity of the building.

Environmental Receptors

Does the release pose a potential threat to environmental receptors? If yes, please describe. Include natural resources impacts.

No significant immediate threat to environmental receptors within the area surrounding Building 3047 was found to exist as a result of contamination and conditions currently present in the facility.

Mitigation

What action(s) might be taken to abate/prevent release or impacts from release?

- Clean up area of diesel fuel on concrete pad around emergency generator. Identify and repair source of leak.
- Continued utilization and enforcement of engineering and administrative controls that are currently in place to protect workers and monitor conditions and activities in the building.
- Continue S&M activities per Procedure IP-900.

What actions are currently being taken to abate/prevent release or impacts from release?

Engineering and administrative controls are in place to control access to contaminated areas and to monitor conditions and activities within the facility for worker and environmental protection. Warning signs and labels are posted throughout the facility indicating RAD, ACM, and PCB hazard areas. Standard operating procedures are in place for building access and surveillance and maintenance activities to protect against inadvertent contact and disturbance of contaminated areas and materials. Radiologically contaminated areas are monitored periodically by ORNL health physics personnel. Personnel are "frisked" upon exit of the facility to detect the presence of radiologic contamination. The building is currently in surveillance and maintenance status. The future long-term use of this facility was uncertain at the time of the writing and the building has currently been removed from the IFDP. Inactive waste drains are reportedly plugged in contaminated areas to prevent inadvertent discharge of contamination beyond the facility. A groundwater monitoring program is in place to monitor contamination levels and migration in groundwater underlying WAG 1. The building is inspected for structural changes after each natural incident (earthquake, tornado, or other severe storm), fire and/or man induced activity which could cause cracking, failure, or deterioration of the facility and/or equipment that may allow contamination to be released. No such conditions have been reported for Building 3047.

Current actions being taken to prevent further release and ensure worker safety in Building 3047 are considered adequate given the current status and level of activity of the facility.

Other Environmental Authorities

Is the release or threatened release potentially subject to other environmental statutory actions? If yes, please explain.

If paint is found to be lead-containing and samples fail the Toxicity Characteristic Leaching Procedure (TCLP) analysis, the building could qualify as a hazardous waste generator point under the Resource Conservation and Recovery Act (RCRA).

Maintenance Actions

Are maintenance actions necessary to eliminate potential threats to human health and the environment? If so, explain.

One potential hazard requiring a maintenance action was identified to be associated with Building 3047. That is, the diesel fuel leak associated with the emergency generator located adjacent to the northwest wall of the building. The area of fuel around the generator should be cleaned up and the source of the leak should be identified and repaired to prevent further release.

Removal Actions

Are Removal Actions necessary to eliminate immediate threats to human health and the environment? If so, explain.

No imminent hazards requiring removal actions per 40 *CFR* 300.415 were identified to be currently associated with Building 3047.

Remedial Site Evaluation

Is a Remedial Site Evaluation needed?

Areas of radiologic contamination associated with Building 3047 have been identified and marked as appropriate. However, it is suspected that process and LLLW drains and associated piping may have leaked beneath the slab of the building as a result of past practices. As a result, it is recommended that some type of remedial investigation be performed to assess the condition of the soil in this area before conducting any S&M or D&D activities which involve disturbing the slab.

Asbestos containing material and PCB items have also been identified, marked and documented. No further remedial investigation involving these hazards is considered necessary given the current status and future plans of this facility.

Based on the age of the facility, painted surfaces are assumed to contain lead. Samples of the paint should be taken and analyzed to verify the presence of lead prior to conducting any S&M or D&D activities which may disturb these assumed areas.

No Further Investigation

Is a finding of No Further Investigation appropriate? Please explain.

A finding of No Further Investigation implies that a facility or area is free from hazardous substances or contaminants that may threaten human health and the environment. Since Building 3047 contains substances and materials which may become threatening if not properly controlled, handled and managed during the S&M cycle, a finding of No Further Investigation is inappropriate in this case.

Additional Comments

The following documents and databases were referenced for historical and hazard information related to Building 3047:

- Phase 1 Safety Documentation, Radioisotope Development Laboratory, Building 3047 - Hazard Screening, Document No. HS/3047/F/RI-16 (Rev. 1)
- Work Plan for the Isotopes Facilities Deactivation Project at Oak Ridge National Laboratory, Document No. ORNL/ER-249/R2.
- Building 3047 Occurrence Reports, 1989 to present.
- Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory, Oak Ridge, Tennessee, Volumes 1 and 2, Document Nos. DOE/OR-1043/V1&D1 and DOE/OR-1043/V2&D1.
- ORNL Hazardous Material Information System Database.
- ORNL Drain System Survey Report for Building 3047.

The following personnel and offices were contacted and provided historical and current use/condition information for Building 3047:

- Mr. Karl Haff, Radiochemical Processing Department Head, ORNL Radiochemical Technology Section.
- Mr. Herman Phillips, Assistant Facilities Manager, ORNL Special Projects.
- Ms. Swati Wilson, Manager, ORNL Lead Management Program.
- Mr. Nathan Dunn, Hazardous Material Information System Office.
- Mr. Jade Thomas, ORNL Environmental Compliance Office.
- Mr. Joe Armento, ORNL Chemical Technology Division, Isotopes Facilities Shutdown Program.

The RmSE of this facility was conducted for LMES under contract by:

Advanced Sciences, Inc.
800 Oak Ridge Turnpike, Suite C-102
Oak Ridge, TN

Todd R. Grant 6/18/96

Evaluator's Signature Date

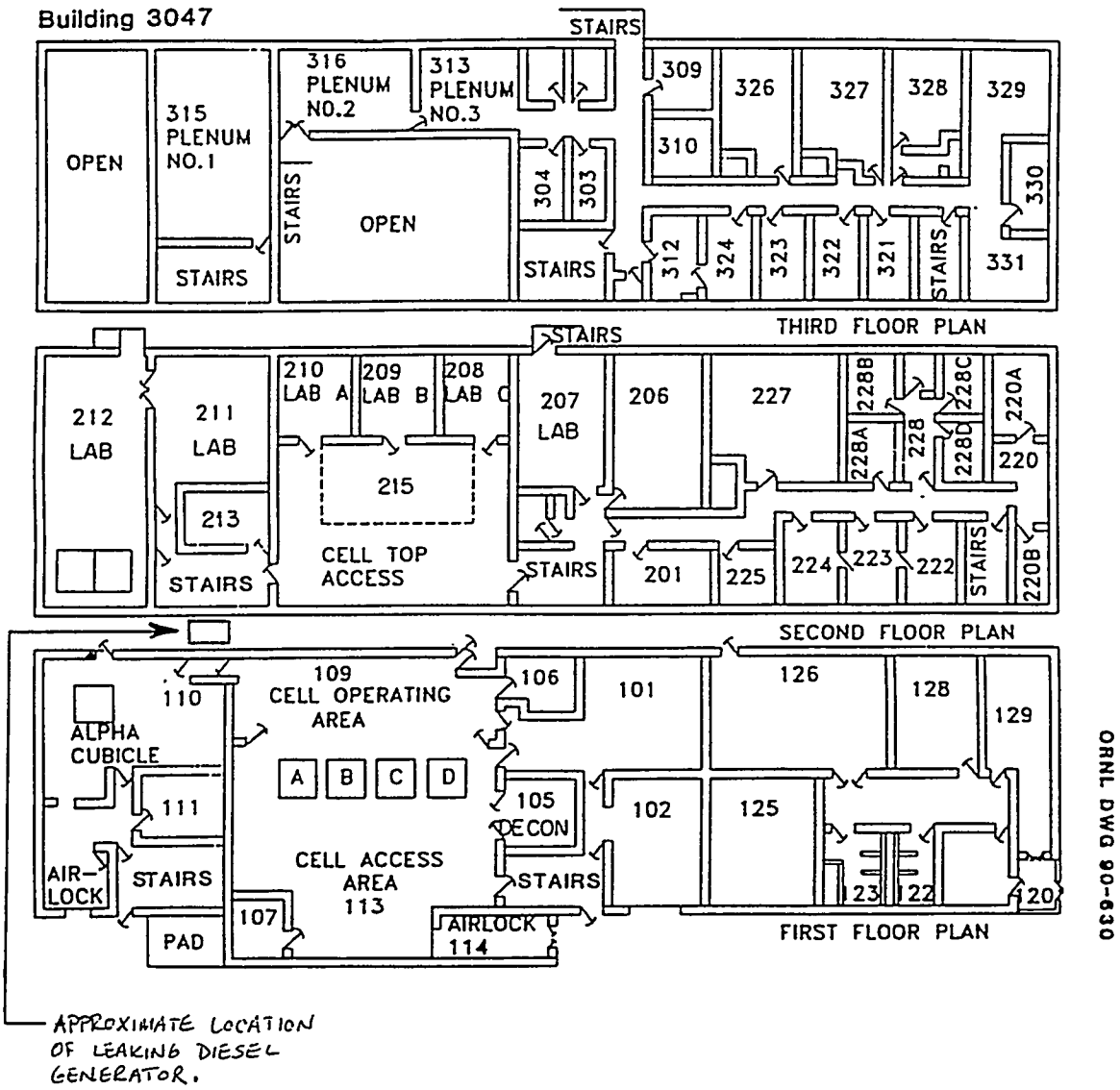


Fig. 17. Diagram of Building 3047.

03-28-1996
HAZARDOUS MATERIALS INFORMATION SYSTEM
Management Inventory Summary Report (by Building)

Plant: 3 Division: Department: Control Area: Building: 3047 Room: Area:
Item ID: LIST: Ingredient: Mix Comp: to HAZ Class: HAZ Rating: WA Code:
Date Expiration: Inv Status: MSDS Avail: Haz Mat Grp Cd: Phy State: Pressure Cd: Temp Cd: Cont Type Cd:

Building: 3047

RECID	**	CASNO	Material Name	MMES CAT	MMES RT	Total LBS	Total KILOGRAMS	No of Items
96439		112246-73-8	(+)-DIP-CHLORIDE	N	N	0.0551	0.0250	1
96448		020439-47-8	(1R,2R)-(-)-1,2-DIAMINOCYCLOHEXANE	N	N	0.0044	0.0019	1
07699		028143-91-1	(1S,2S)-(+)-2-AMINO-1-PHENY-1,3-PROPANEDIOL	N	N	0.2204	0.1000	1
07702		052075-14-6	(4S,5S)-(-)-4-METHOXYMETHYL-2-METHYL-5-PHENYL-2-OX	N	N	0.0110	0.0050	1
A2689		001099-45-2	(ETHOXYCARBONYLMETHYLENE)TRIPHENYLPHOSPHORANE	N	N	0.0110	0.0050	1
96507		000623-82-5	(R)-(+)-3-METHYLADIPIC ACID	N	N	0.0440	0.0199	2
00038		000079-00-5	1,1,2-TRICHLOROETHANE	N	N	1.0431	0.4731	1
08064		004637-24-5	1,1-DIMETHOXY-N,N-DIMETHYLMETHANAMINE	N	N	0.2204	0.0999	1
96469		016355-92-3	1,10-DIIODODECANE	N	N	0.0551	0.0250	1
07781		003344-70-5	1,12-DIBROMODODECANE	N	N	0.0551	0.0249	1
06499		001663-45-2	1,2-BIS(DIPHENYLPHOSPHINO)ETHANE, 97%	N	N	0.0220	0.0100	1
00098	**	000107-06-2	1,2-DICHLOROETHANE	Y	N	0.0055	0.0024	1
A7097		030334-71-5	1,2-DIPALMITOYL-SN-GLYCEROL	N	N	0.0005	0.0002	1
A7543		001188-58-5	1,2-DISTEAROYL-RAC-GLYCEROL	N	N	0.0002	0.0000	1
96455		000582-52-5	1,2:5,6-DI-O-ISOPROPYLIDENE-A-D-GLUCOFURANOSE	N	N	0.4408	0.1999	2
96498		051592-06-4	1,3,4,6-TETRACHLORO-3A,6A-DIPHENYLGLYCOLURIL	N	N	0.0022	0.0009	1
A9590		NISS	1,3,5(10),16-ESTRATETRAEN-3,17-DIOL 17-ACETATE, 3-	N	N	0.0004	0.0001	1
05751		000142-28-9	1,3-DICHLOROPROPANE	N	N	0.1653	0.0749	1
06199		000096-26-4	1,3-DIHYDROXY-2-PROPANONE	N	N	2.2046	1.0000	2
08511		000627-31-6	1,3-DIIODOPROPANE	N	N	0.1102	0.0499	1
A3049		000502-52-3	1,3-DIPALMITIN	N	N	0.0033	0.0015	2
07432		000628-21-7	1,4-DIIODOBUTANE	N	N	0.1102	0.0499	1
00137		000123-91-1	1,4-DIOXANE	Y	N	9.9207	4.5000	2
07754		000886-66-8	1,4-DIPHENYLBUTADIYNE	N	N	0.0110	0.0049	1
96472		000628-77-3	1,5-DIIODOPENTANE	N	N	0.1102	0.0499	2
07663		000629-03-8	1,6-DIBROMOHEXANE	N	N	0.0551	0.0250	1
96470		000629-09-4	1,6-DIIODOHEXANE	N	N	0.0551	0.0249	1
96461		004549-31-9	1,7-DIBROMOHEPTANE	N	N	0.1102	0.0499	1
07783		004549-32-0	1,8-DIBROMOOCTANE	N	N	0.1102	0.0499	2
96471		024772-63-2	1,8-DIIODOOCTANE	N	U	0.0551	0.0249	1
07597		004549-33-1	1,9-DIBROMONONANE	N	N	0.0440	0.0199	2
07675		002008-75-5	1-(2-CHLOROETHYL)PIPERIDINE MONOHYDROCHLORIDE	N	N	0.2204	0.0999	1
96484		002252-63-3	1-(4-FLUOROPHENYL)PIPERAZINE	N	N	0.0440	0.0199	2
03071		000078-77-3	1-BROMO-2-METHYLPROPANE	N	N	0.2204	0.0999	1
96421		000637-59-2	1-BROMO-3-PHENYLPROPANE	N	N	0.4408	0.1999	2
07691		006940-78-9	1-BROMO-4-CHLOROBUTANE	N	N	0.2204	0.1000	1
07664		000693-58-3	1-BROMONONANE	N	N	0.2204	0.0999	1
07170		000112-89-0	1-BROMOOCTADECANE	N	N	0.2204	0.0999	1
07723		000111-83-1	1-BROMOOCTANE	N	N	0.2204	0.0999	1
03069		000106-94-5	1-BROMOPROPANE	N	N	0.2204	0.0999	1
01002		000112-71-0	1-BROMOTETRADECANE	N	N	0.2204	0.0999	1
96431		000765-09-3	1-BROMOTRIDECANE	N	N	0.1102	0.0499	1
96433		000693-67-4	1-BROMOUNDECANE	N	N	0.2204	0.0999	1
07594		006940-76-7	1-CHLORO-3-IODOPROPANE	N	N	0.2204	0.0999	1
A4063		000107-84-6	1-CHLORO-3-METHYLBUTANE	N	N	0.2204	0.0999	1

* indicates MSDS is not available
** indicates MSDS updated within last three months

Plant: 3 Division: Department: Control Area: Building: 3047 Room: Area: WA Code:
Item ID: LIST: Ingredient: Mix Comp: to HAZ Class: HAZ Rating:
Date Expiration: Inv Status: MSDS Avail: Haz Mat Grp Cd: Phy State: Pressure Cd: Temp Cd: Cont Type Cd:

B3404		015733-63-8	1-CHLORO-5-PHENYLPENTANE	N	N	0.0220	0.0100	1
B3405		071434-68-9	1-CHLORO-6-PHENYLHEXANE	N	N	0.0110	0.0050	1
B3403		071434-47-4	1-CHLORO-7-PHENYLHEPTANE	N	N	0.0110	0.0050	1
B3402		061440-32-2	1-CHLORO-8-PHENYLOCTANE	N	N	0.0110	0.0050	1
B3401		027175-81-1	1-CHLORO-9-PHENYLNONANE	N	N	0.0440	0.0200	2
B4101	*	NISS	1-DIETHYLPHOSPHINO-2-DIPHENYLPHOSPHINOETHANE	U	N	0.0022	0.0010	1
05851		025952-53-8	1-ETHYL-3-(3-DIMETHYLAMINOPROPYL)-CARBO DIIMIDE HY	N	N	0.0110	0.0049	1
08007		002050-77-3	1-IODODECANE	N	N	0.2204	0.0999	1
05769		000051-31-0	1-ISOPRENALINE	N	N	0.0002	0.0000	1
06206	**	000070-25-7	1-METHYL-3-NITRO-1-NITROSOGUANIDINE	Y	N	0.0551	0.0249	1
A2629		019670-51-0	1-MONOPALMITOYL-RAC-GLYCEROL (C16:0)	N	N	0.0046	0.0021	2
01021		000131-91-9	1-NITROSO-2-NAPHTHOL	N	N	0.4408	0.1998	2
96525		000104-72-3	1-PHENYLDECANE	N	N	0.0551	0.0249	1
96527		000092-54-6	1-PHENYLPIPERAZINE	N	N	0.2204	0.1000	1
A2665		002777-65-3	10-UNDECYNOIC ACID	N	N	0.0220	0.0100	1
07672		001611-56-9	11-BROMO-1-UNDECANOL	N	N	0.1322	0.0599	2
96432		002834-05-1	11-BROMOUNDECANOIC ACID	N	N	0.4408	0.1998	2
07805		073367-80-3	12-BROMODODECANOIC ACID	N	N	0.0330	0.0149	2
96512		004669-02-7	14-METHYLPENTADECANOIC ACID	N	N	0.0000	0.0000	2
B3358		004617-33-8	15-HYDROXYPENTADECANOIC ACID	N	N	0.0551	0.0250	1
B3444		NISS	16-BROMO-9-HEXADECANOIC ACID	N	N	0.0044	0.0020	2
96531		000979-02-2	16-DEHYDROPREGNENOLONE ACETATE	N	N	0.0551	0.0249	1
A2675		000506-13-8	16-HYDROXYHEXADECANOIC ACID	N	N	0.0551	0.0250	1
06124		017455-13-9	18-CROWN-6	N	N	0.0551	0.0250	1
A2684		000434-22-0	19-NORTESTOSTERONE	Y	N	0.0220	0.0100	1
08375		016373-93-6	2'-DEOXYADENOSINE MONOHYDRATE	N	N	0.0005	0.0002	1
07888		000951-77-9	2'-DEOXYCYTIDINE	N	N	0.0002	0.0000	1
07499		000961-07-9	2'-DEOXYGUANOSINE	N	N	0.0000	0.0000	1
96558		003709-18-0	2,2,5-TRIMETHYL-1,3-DIOXANE-4,6-DIONE	N	N	0.0551	0.0249	1
03117		000077-76-9	2,2-DIMETHOXYPROPANE	N	N	1.1023	0.5000	1
96473		002033-24-1	2,2-DIMETHYL-1,3-DIOXANE-4,6-DIONE	N	N	0.0551	0.0249	1
07799		017587-22-3	2,2-DIMETHYL-6,6,7,7,8,8,8-HEPTAFLUORO 3,5-OCTANED	N	N	0.1102	0.0500	1
07750		000769-39-1	2,3,5,6-TETRAFLUOROPHENOL	N	N	0.0551	0.0250	1
06177		054897-59-5	2,3-DIAMINOPROPIONIC ACID MONOHYDROCHLORIDE	N	N	0.0110	0.0050	1
03128		000108-75-8	2,4,6-TRIMETHYLPYRIDINE	N	N	0.2204	0.1000	1
01123		000092-71-7	2,5-DIPHENYL OXAZOLE	N	N	0.4408	0.1998	2
07786		005452-83-5	2-(2-PIPERIDINOETHYL)PYRIDINE	N	N	0.0220	0.0099	1
07696		013472-00-9	2-(4-AMINOPHENYL)ETHYLAMINE	N	N	0.0660	0.0299	3
03154		000124-68-5	2-AMINO-2-METHYL-1-PROPANOL	N	N	1.1023	0.5000	1
06941		007154-66-7	2-BROMOBENZOYL CHLORIDE	N	N	0.0220	0.0099	1
07855		002576-47-8	2-BROMOETHYLAMINE HYDROBROMIDE	N	N	0.2204	0.1000	1
A6762		004781-83-3	2-IMINOTHIOLANE HYDROCHLORIDE	N	N	0.0002	0.0000	1
96497		000088-67-5	2-IODOBENZOIC ACID	N	N	0.2204	0.0999	1
A4683		NISS	2-IODOPHENYLACETIC ACID	N	N	0.0022	0.0010	1
03214	**	000594-61-6	2-METHYLLACTIC ACID	N	N	0.4408	0.1998	3
A2680		003433-37-2	2-PIPERIDINEMETHANOL	N	N	0.0551	0.0250	1
06086	**	000098-03-3	2-THIOPHENECARBOXALDEHYDE	N	N	0.2204	0.1000	1
06087		000527-72-0	2-THIOPHENECARBOXYLIC ACID	N	N	0.2204	0.1000	1
96550		004075-59-6	2-THIOPHENEGLYOXYLIC ACID	N	N	0.0440	0.0199	2
B4034	**	NISS	22,23-BISNOR-5ALPHA-CHOLANIC ACID-3BETA-OL ACETATE	N	N	0.0066	0.0030	1

* indicates MSDS is not available
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Plant: 3 Division: Department: Control Area: Building: 3047 Room: Area:
Item ID: LIST: Ingredient: Mix Comp: to HAZ Class: HAZ Rating: WA Code:
Date Expiration: Inv Status: MSDS Avail: Haz Mat Grp Cd: Phy State: Pressure Cd: Temp Cd: Cont Type Cd:

A9585		NISS	23-24-BISNOR-5-CHOLENIC ACID-3B-OL ACETATE	N	N	0.0551	0.0250	1
A9586		NISS	23-24-BISNOR-5-CHOLENIC ACID-3B-OL METHYL ESTER	N	N	0.0588	0.0268	8
07700		034841-35-5	3'-CHLOROPROPIOPHENONE	N	N	0.0220	0.0100	1
07683		004160-82-1	3,3-DIMETHYLGLUTARIC ANHYDRIDE	N	N	0.4408	0.1998	2
A4021	**	000156-87-6	3-AMINO-1-PROPANOL	N	N	0.5511	0.2499	1
07442		000814-75-5	3-BROMO-2-BUTANONE	N	N	0.1102	0.0499	1
06938		001711-09-7	3-BROMOBENZOYL CHLORIDE	N	N	0.0551	0.0249	1
06537		000590-92-1	3-BROMOPROPIONIC ACID	N	N	0.0551	0.0249	1
03253		000107-94-8	3-CHLOROPROPIONIC ACID	N	N	0.0551	0.0250	1
07782		004166-53-4	3-METHYLGLUTARIC ANHYDRIDE	N	N	0.2204	0.0996	4
07124		000641-70-3	3-NITROPHTHALIC ANHYDRIDE	N	N	0.1102	0.0498	2
A2685		020231-57-6	3B-HYDROXYCHOL-5-EN-24-OIC ACID METHYL ESTER	N	N	0.0507	0.0230	4
A9066		000070-69-9	4'-AMINOPROPIOPHENONE	N	N	0.1102	0.0500	2
07681		003647-69-6	4-(2-CHLOROETHYL)MORPHOLINE HYDROCHLORIDE	N	N	0.2204	0.0999	1
08808		001083-48-3	4-(P-NITROBENZYL)PYRIDINE	N	N	0.2204	0.0999	2
96517		000140-66-9	4-(TERT-OCTYL)PHENOL	N	N	1.1023	0.5000	1
08820		000103-90-2	4-ACETAMIDOPHENOL	N	N	0.1102	0.0498	2
A2690		000063-05-8	4-ANDROSTENE-3,17-DIONE	Y	N	0.0551	0.0250	1
08818		005728-52-9	4-BIPHENYLACETIC ACID	N	N	0.0220	0.0100	2
96419		005162-44-7	4-BROMO-1-BUTENE	N	N	0.0220	0.0099	1
96425		001122-91-4	4-BROMOBENZALDEHYDE	N	N	0.0551	0.0249	1
06940		000586-75-4	4-BROMOBENZOYL CHLORIDE	N	N	0.0220	0.0099	1
96426		000589-15-1	4-BROMOBENZYL BROMIDE	N	N	0.2204	0.0999	1
96438		000627-00-9	4-CHLOROBUTYRIC ACID	N	N	0.0660	0.0299	3
A7100		000352-32-9	4-FLUOROTOLUENE	N	N	0.0551	0.0250	1
08572		000626-64-2	4-HYDROXYPYRIDINE	N	N	0.0551	0.0249	1
07646		000100-11-8	4-NITROBENZYL BROMIDE	N	N	0.2204	0.0999	1
96522		000591-80-0	4-PENTENOIC ACID	N	N	0.0551	0.0250	1
96523		001200-03-9	4-PHENOXYBUTYL BROMIDE	N	N	0.0551	0.0249	1
00261		005351-69-9	4-PHENYLTHIOSEMICARBAZIDE	N	N	0.1102	0.0500	1
00207		000104-15-4	4-TOLUENESULFONIC ACID	N	N	0.2204	0.1000	1
06944		000917-23-7	5,10,15,20-TETRAPHENYL-21H,23H-PORPHINE	N	N	0.0220	0.0099	1
A2651		010325-79-8	5-ANDROSTEN-3B-OL-17B-CARBOXYLIC ACID	Y	N	0.0220	0.0100	1
A9583		NISS	5-ANDROSTEN-3B-OL; 17B-CARBOXYLIC ACID METHYL ESTE	N	N	0.0110	0.0050	1
A2662		001119-51-3	5-BROMO-1-PENTENE	N	N	0.1101	0.0500	2
06205		000059-14-3	5-BROMO-2'-DEOXYURIDINE	N	N	0.0022	0.0010	1
A2688		014267-92-6	5-CHLORO-1-PENTYNE	N	N	0.2134	0.0967	1
A9580		019462-13-6	5-CHOLENIC ACID-3B-OL ACETATE	N	N	0.0072	0.0033	1
A9380		NISS	5-METHYLHYDANTOIN	N	N	0.0220	0.0100	1
96532		001778-02-5	5-PREGNEN-3-B-OL-20-ONE ACETATE	N	N	0.0551	0.0249	1
96533		000901-57-5	5-PREGNENE-3-B-20-B-DIOL	N	N	0.0002	0.0000	1
A9578		002276-93-9	5A-CHOLANIC ACID-3B-OL	N	N	0.0260	0.0115	8
96442		000566-88-1	5A-CHOLESTAN-3-ONE	N	N	0.0110	0.0049	1
A9577		003110-99-4	5B-CHOLAN-24-OL	N	N	0.0004	0.0001	1
96441		000546-18-9	5B-CHOLANIC ACID	N	N	0.0308	0.0138	3
A9579		NISS	5B-CHOLANIC ACID-3A,12A-DIOL DIACETATE	N	N	0.0110	0.0050	1
A9581		NISS	5B-CHOLANIC ACID-3A,12A-DIOL DIACETATE METHYL ESTE	N	N	0.0066	0.0030	1
A9582		NISS	5B-CHOLANIC ACID-3A,12A-DIOL N-(CARBOXYMETHYL)-AMI	N	N	0.0066	0.0030	1
B4032	**	NISS	5BETA-CHOLAN-24-IODO	N	N	0.0002	0.0000	1
B4033	**	NISS	5BETA-CHOLANIC ACID-3ALPHA,7ALPHA,12ALPHA-TRIOL	N	N	0.0551	0.0250	1

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96420		002695-47-8	6-BROMO-1-HEXENE	N	N	0.1320	0.0599	6
05719		004224-70-8	6-BROMOHEXANOIC ACID	N	N	0.1102	0.0500	2
96444		001175-06-0	6-KETOCHOLESTANOL	N	N	0.0110	0.0049	1
07462		002430-16-2	6-PHENYL-N-HEXANOL	N	N	0.0220	0.0099	1
A9361		040228-90-8	7-PHENYLHEPTANOIC ACID	N	N	0.0330	0.0150	2
07677		002695-48-9	8-BROMO-1-OCTENE	N	N	0.0551	0.0249	1
07697		017696-11-6	8-BROMOOCTANOIC ACID	N	N	0.0440	0.0199	2
00145		000148-24-3	8-HYDROXYQUINOLINE	N	N	0.2204	0.1000	1
03321		000103-84-4	ACETANILIDE	N	N	0.0551	0.0249	1
00015		000064-19-7	ACETIC ACID	N	N	25.7847	11.6956	4
07679		003483-11-2	ACETOACETIC ACID LITHIUM SALT	N	N	0.0110	0.0049	1
96395		000572-09-8	ACETOBROMO-A-D-GLUCOSE	N	N	0.1102	0.0499	1
00677		000067-64-1	ACETONE	N	N	0.8686	0.3939	1
00024		000075-05-8	ACETONITRILE	N	Y	12.2906	5.5749	2
00683		000075-36-5	ACETYL CHLORIDE	N	N	0.5511	0.2499	1
01706		000107-02-8	ACROLEIN	N	Y	1.1023	0.5000	1
90710	**	NISS	ACTIVATED ALUMINA	N	N	3.3069	1.5000	2
05771		000073-24-5	ADENINE	N	N	0.0573	0.0259	2
A7728		020398-34-9	ADENOSINE 5'-DIPHOSPHATE SODIUM	N	N	0.0002	0.0000	1
07312	**	018422-05-4	ADENOSINE 5'-MONOPHOSPHATE MONOHYDRATE	N	N	0.0110	0.0050	5
06548		051963-61-2	ADENOSINE-5-TRIPHOSPHATE DISODIUM CRYST	N	N	0.0088	0.0039	2
B0031		000627-91-8	ADIPIC ACID MONOMETHYL ESTER	N	N	0.1102	0.0500	2
96397		000488-81-3	ADONITOL	N	N	0.0110	0.0049	1
94664		NISS	AIRCOSIL 12 WHITE	N	Y	0.0625	0.0283	1
89621		NISS	AJAX ALL PURPOSE CLEANER (NON-PHOSPHATE)	N	N	31.5000	14.2883	1
A4659		009006-59-1	ALBUMIN, EGG	N	N	0.0022	0.0009	1
08175		070024-90-7	ALBUMIN, HUMAN	N	N	0.0110	0.0049	1
A3183		009048-46-8	ALBUMINS, BLOOD SERUM	N	N	0.2446	0.1107	3
96399		001324-21-6	ALIZARIN BLUE BLACK B	N	N	0.0220	0.0099	1
03359		000072-48-0	ALIZARINE	N	N	0.0220	0.0099	1
96400		002244-11-3	ALLOXAN MONOHYDRATE	N	N	0.0220	0.0099	1
00743		000441-38-3	ALPHA-BENZOIN OXIME	N	N	0.2204	0.0999	1
96422		005061-21-2	ALPHA-BROMO-GAMMA-BUTYROLACTONE	N	N	0.2201	0.1000	10
07745		000617-04-9	ALPHA-METHYL-D-MANNOPYRANOSIDE	N	N	0.2204	0.0999	1
A4017		007784-26-1	ALUMINUM AMMONIUM SULFATE DODECAHYDRATE	N	N	5.2046	2.3605	4
00269		007446-70-0	ALUMINUM CHLORIDE, ANHYDROUS	N	Y	5.1750	2.3462	13
05796		021645-51-2	ALUMINUM HYDROXIDE	N	N	2.2046	1.0000	1
00355		007429-90-5	ALUMINUM METAL	N	N	10.3069	4.6745	10
00356	**	007784-27-2	ALUMINUM NITRATE NONAHYDRATE	N	N	26.5345	12.0358	5
06477		024304-00-5	ALUMINUM NITRIDE	N	N	2.2046	1.0000	1
00357		001344-28-1	ALUMINUM OXIDE	N	N	12.9718	5.8836	11
A4024		007784-30-7	ALUMINUM PHOSPHATE	N	N	1.1023	0.5000	1
87294		NISS	AMBERLITE ADSORBENT RESINS	N	N	3.4250	1.5534	3
A7664	**	NISS	AMERICAN CONTINENTAL MASTER MELT	N	N	50.0717	22.7124	1
00273		007664-41-7	AMMONIA	N	N	30.0084	13.6115	4
06390		005108-96-3	AMMONIUM 1-PYRROLIDINECARBODITHIOATE	N	N	0.1102	0.0499	2
00363		000631-61-8	AMMONIUM ACETATE	N	N	5.0705	2.2999	1
00364		001066-33-7	AMMONIUM BICARBONATE	N	N	1.1023	0.5000	1
00366		001341-49-7	AMMONIUM BIFLUORIDE	N	N	7.2046	3.2675	6
00367	**	012124-97-9	AMMONIUM BROMIDE	N	N	1.1023	0.5000	1

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Item ID: LIST: Ingredient: Mix Comp: to HAZ Class: HAZ Rating: WA Code:
Date Expiration: Inv Status: MSDS Avail: Haz Mat Grp Cd: Phy State: Pressure Cd: Temp Cd: Cont Type Cd:

00369		012125-02-9	AMMONIUM CHLORIDE	N	N	3.5511	1.6104	4
00370		003012-65-5	AMMONIUM CITRATE, DIBASIC	N	N	4.2046	1.9070	3
00287		007789-09-5	AMMONIUM DICHROMATE	Y	N	1.1023	0.5000	1
02221		013826-83-0	AMMONIUM FLUOBORATE	N	N	5.2046	2.3605	4
02220	**	012125-01-8	AMMONIUM FLUORIDE	N	N	3.2046	1.4535	2
A3269		016919-19-0	AMMONIUM HEXAFLUOROSILICATE	N	N	1.1023	0.5000	1
A7102		007803-63-6	AMMONIUM HYDROGEN SULFATE	N	N	1.0000	0.4535	1
00372	**	001336-21-6	AMMONIUM HYDROXIDE	N	N	10.5114	4.7674	6
00374		012027-06-4	AMMONIUM IODIDE	N	N	0.8002	0.3629	2
00375	**	012027-67-7	AMMONIUM MOLYBDATE	N	N	0.7186	0.3259	3
00262		001113-38-8	AMMONIUM OXALATE ANHYDROUS	N	N	7.2046	3.2675	6
00378		007727-54-0	AMMONIUM PERSULFATE	N	N	2.1023	0.9535	2
06098		007783-28-0	AMMONIUM PHOSPHATE, DIBASIC	N	N	1.1023	0.5000	1
07434		000528-94-9	AMMONIUM SALICYLATE	N	N	0.5511	0.2499	1
00380		007783-20-2	AMMONIUM SULFATE	N	N	2.2046	1.0000	2
00291		007803-55-6	AMMONIUM VANADATE	N	N	1.6014	0.7263	3
A5508		NISS	AMP-1	N	N	3.3069	1.5000	3
A2323		NISS	ANALTECH SILICA GEL GF UNIPLATES (00809, 92189, A2	N	N	1.0000	0.4535	1
00007		000062-53-3	ANILINE	N	N	3.1023	1.4071	2
00383	**	007440-36-0	ANTIMONY METAL	N	N	1.1023	0.5000	1
00384		010025-91-9	ANTIMONY TRICHLORIDE	N	N	0.8002	0.3629	2
01726		001309-64-4	ANTIMONY TRIOXIDE	Y	N	1.1023	0.5000	1
87736		NISS	APIEZON GREASE	N	N	0.0551	0.0250	1
94089		NISS	AREMCO CERAMA-BOND 569	N	N	0.0312	0.0141	1
01730		007440-37-1	ARGON	N	N	320.8636	145.5423	10
00311		001332-21-4	ASBESTOS	Y	N	0.8817	0.4000	4
92876		NISS	ASHLAND.BUFFER SOLUTION PH 4	N	N	2.2046	1.0000	2
07784		004648-54-8	AZIOTRIMETHYLSILANE	N	N	0.0551	0.0250	1
A3061		000492-61-5	B-D(+)GLUCOSE	N	N	0.0220	0.0100	1
00386		000513-77-9	BARIUM CARBONATE	N	N	2.0987	0.9520	5
00303		010326-27-9	BARIUM CHLORIDE, DIHYDRATE	N	N	4.2046	1.9070	3
00306		017194-00-2	BARIUM HYDROXIDE	N	N	6.3069	2.8605	5
00293	**	010022-31-8	BARIUM NITRATE	N	N	4.1023	1.8605	4
00454		008012-89-3	BEESWAX	N	N	1.0000	0.4535	1
B0565		000929-77-1	BEHENIC ACID METHYL ACID	N	N	0.0220	0.0099	1
07762		001125-88-8	BENZALDEHYDE DIMETHYL ACETAL	N	N	0.4408	0.1999	2
00001	**	000071-43-2	BENZENE	Y	Y	8.8294	4.0050	2
06348	**	001076-43-3	BENZENE-D6	Y	N	0.0110	0.0049	1
A7095		000531-85-1	BENZIDINE DIHYDROCHLORIDE	Y	N	0.2204	0.1000	1
00603		000065-85-0	BENZOIC ACID	N	N	0.2755	0.1249	1
00747		000098-88-4	BENZOYL CHLORIDE	N	N	0.5510	0.2498	3
00748		000094-36-0	BENZOYL PEROXIDE	N	N	0.3306	0.1499	2
00078	**	000100-39-0	BENZYL BROMIDE	N	N	0.2204	0.0999	1
00079		000100-44-7	BENZYL CHLORIDE	N	N	0.1102	0.0499	1
96416		000501-53-1	BENZYL CHLOROFORMATE	N	N	0.6613	0.2999	2
06037		000621-08-9	BENZYL SULFOXIDE	N	N	0.0551	0.0250	1
03544		000100-46-9	BENZYLAMINE	N	N	1.1023	0.5000	1
07748		000633-65-8	BERBERINE HYDROCHLORIDE	N	N	0.1100	0.0495	5
00391		007787-55-5	BERYLLIUM NITRATE TRIHYDRATE	Y	N	0.2204	0.0999	1
07744		000604-69-3	BETA-D-GLUCOSE PENTAACETATE	N	N	0.4408	0.1998	2

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00203		000103-63-9	BETA-PHENYLETHYL BROMIDE	N	N	0.4409	0.1999	1
82250		NISS	BIG "D" WATER SOLUBLE DEODORANT	N	N	41.3100	18.7381	2
95639		NISS	BIO RAD AG 50W-X2, -X4, -X8, -X12, AND -X16	N	N	22.4717	10.1920	23
93224		NISS	BIO-RAD AG 1-X2, -X4, -X8 RESIN AND MSZ-1	N	N	21.1570	9.5954	21
93223		NISS	BIO-RAD AG11A8	N	N	1.0000	0.4535	1
A4106		NISS	BIO-RAD ANION EXCHANGE RESIN (AG1 X10)	U	N	2.0000	0.9070	2
A4108		NISS	BIO-RAD BIO REX 9	U	N	1.0000	0.4535	1
A0833		NISS	BIO-RAD BIO-REX 70	N	N	2.0000	0.9070	2
A4107		NISS	BIO-RAD CATION EXCHANGE RESIN (AG50W X1)	U	N	1.0000	0.4535	1
A6571		NISS	BIO-RAD LABORATORIES AG 2-X8	N	N	1.0000	0.4535	1
93342		NISS	BIO-RAD LABORATORIES AG MP-1	N	N	3.2046	1.4535	3
93379		NISS	BIO-RAD LABORATORIES AG MP-50	N	N	2.1023	0.9535	2
93543	**	NISS	BIO-RAD LABORATORIES ALUMINA	N	N	5.4092	2.4535	3
92434		NISS	BIO-RAD LABORATORIES AMINEX	N	N	4.1876	1.8999	38
92390		NISS	BIO-RAD LABORATORIES CHELEX 100	N	N	5.0000	2.2675	5
A4394		NISS	BIO-RAD ZP1 CATION EXCHANGE CRYSTALS	U	N	1.3227	0.6000	2
96440		000821-48-7	BIS(2-CHLOROETHYL)AMINE HYDROCHLORIDE	N	N	0.0551	0.0249	1
06688		007787-60-2	BISMUTH CHLORIDE	N	N	0.2204	0.0999	1
00392		007440-69-9	BISMUTH METAL	N	N	0.2204	0.0999	1
06841		058632-95-4	BOC-ON	N	N	0.0551	0.0249	1
00332		010043-35-3	BORIC ACID	N	Y	3.3069	1.5000	3
06045		000109-63-7	BORON TRIFLUORIDE ETHERATE	N	N	1.1023	0.5000	1
00395		007726-95-6	BROMINE	N	N	0.2204	0.0999	1
96423		002032-35-1	BROMOACETALDEHYDE DIETHYL ACETAL	N	N	0.0551	0.0250	1
A8942		NISS	BROMOACETONE	N	N	0.3602	0.1633	1
96424		022118-09-8	BROMOACETYL CHLORIDE	N	N	0.4408	0.1999	2
00338		000076-59-5	BROMOTHYMOL BLUE	N	N	0.0022	0.0009	1
83616		NISS	BUFFER SOLUTION PH 10.00	N	Y	2.2046	1.0000	2
86344		NISS	BUFFER SOLUTION PH 7.00	N	N	2.2046	1.0000	2
89878		NISS	BULLEN HI-SEPT	N	N	10.4316	4.7317	1
00046		010108-64-2	CADMIUM CHLORIDE	Y	Y	0.8002	0.3629	2
00397		007440-43-9	CADMIUM METAL	Y	Y	1.6005	0.7260	3
A4027		010124-36-4	CADMIUM SULFATE ANHYDROUS	Y	N	0.2204	0.0999	1
00400		000471-34-1	CALCIUM CARBONATE	N	N	3.2046	1.4535	2
00401	**	010043-52-4	CALCIUM CHLORIDE	N	N	3.2046	1.4535	3
06406		010035-04-8	CALCIUM CHLORIDE, DIHYDRATE	N	N	1.1023	0.5000	1
A7113		012007-99-7	CALCIUM HEXABORIDE	N	N	0.3306	0.1500	6
00404		007778-54-3	CALCIUM HYPOCHLORITE	N	N	0.5511	0.2499	1
00406	**	007440-70-2	CALCIUM METAL	N	N	3.9483	1.7910	8
00407	**	010124-37-5	CALCIUM NITRATE	N	N	5.1023	2.3140	5
00409		001305-78-8	CALCIUM OXIDE	N	N	4.3148	1.9570	4
00410		007778-18-9	CALCIUM SULFATE, ANHYDROUS	N	N	5.2046	2.3605	4
00692	**	007440-44-0	CARBON (GRAPHITE, SYNTHETIC)	N	N	1.1023	0.5000	1
00786		000075-15-0	CARBON DISULFIDE	N	Y	1.1023	0.5000	1
00151		000558-13-4	CARBON TETRABROMIDE	N	N	0.2204	0.0999	1
07168		009000-11-7	CARBOXYMETHYL CELLULOSE ETHER	N	N	0.2204	0.1000	1
07931		009001-05-2	CATALASE	N	N	0.0044	0.0019	1
07658		000274-07-7	CATECHOLBORANE	N	N	0.4408	0.1998	8
07623		009004-34-6	CELLULOSE	N	N	1.1023	0.5000	1
00790		009004-35-7	CELLULOSE ACETATE	N	N	2.2046	1.0000	2

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00412		016775-21-3	CERIC AMMONIUM NITRATE	N	N	2.2046	1.0000		1
03689		001306-38-3	CERIUM OXIDE	N	N	1.0000	0.4535		1
00413		007790-86-5	CERIUM(III) CHLORIDE	N	N	1.1023	0.5000		1
06217		010294-41-4	CERIUM(III) NITRATE, HEXAHYDRATE	N	N	1.5621	0.7080		6
07049		013590-82-4	CERIUM(IV) SULFATE	N	N	1.1023	0.5000		1
00415		007647-17-8	CESIUM CHLORIDE	N	N	1.2125	0.5500		2
00416		007789-18-6	CESIUM NITRATE	N	N	0.0551	0.0250		1
06558		010294-54-9	CESIUM SULFATE	N	N	1.1023	0.5000		1
00792		000544-77-4	CETYL IODIDE	N	N	0.0551	0.0249		1
A0869			CETYLITE INDUSTRIES CETYLCIDE	N	Y	3.2859	1.4904		3
07139		064365-11-3	CHARCOAL, ACTIVATED	N	N	16.0000	7.2564		13
06392		068647-86-9	CHARCOAL, ACTIVATED, COCONUT	N	N	7.2046	3.2675		7
96436		006003-94-7	CHELIDONIC ACID MONOHYDRATE	N	N	0.0551	0.0249		1
00281		007782-50-5	CHLORINE	N	N	10.0000	4.5359		1
A4028		000078-95-5	CHLOROACETONE	N	N	0.2204	0.0999		1
00173		000079-04-9	CHLOROACETYL CHLORIDE	N	N	0.1102	0.0500		1
00016		000067-66-3	CHLOROFORM	Y	Y	10.4542	4.7419		2
05914		000865-49-6	CHLOROFORM-D	Y	N	0.2644	0.1199		2
07685		005293-84-5	CHLOROMETHYLTRIPHENYLPHOSPHONIUM CHLORIDE	N	N	0.1102	0.0500		2
00308		016941-12-1	CHLOROPLATINIC ACID	N	N	0.0081	0.0036		1
07670		001529-47-1	CHLOROTRIMETHYLGERMANE	N	N	0.0110	0.0050		1
05772	**	000075-77-4	CHLOROTRIMETHYLSILANE	N	N	1.1023	0.5000		1
03796		000057-88-5	CHOLESTEROL	N	N	1.1023	0.5000		1
A2649		000516-91-6	CHOLESTERYL BROMIDE	N	N	0.0110	0.0050		1
07151		000601-34-3	CHOLESTERYL PALMITATE	N	N	0.0110	0.0049		1
00340		001787-61-7	CHROME BLACK T	N	N	0.0220	0.0099		1
00319		007738-94-5	CHROMIC ACID	Y	N	5.5114	2.4999		1
00286		007789-02-8	CHROMIC NITRATE NONAHYDRATE	N	N	0.2204	0.0999		1
00417		007440-47-3	CHROMIUM METAL	Y	N	5.2046	2.3605		4
02295		001308-38-9	CHROMIUM(III) OXIDE	N	N	2.6454	1.2000		4
01813		015663-27-1	CIS-PLATIN	Y	N	0.0000	0.0000		1
03821		000077-92-9	CITRIC ACID	N	N	23.8184	10.8039		9
00421		007440-48-4	COBALT METAL	Y	N	0.8002	0.3629		2
00422		010026-22-9	COBALT NITRATE HEXAHYDRATE	N	N	0.2204	0.0999		1
00420		007791-13-1	COBALT(II) CHLORIDE, HEXAHYDRATE	N	N	1.1023	0.5000		1
95221		NISS	COLD KILL WASP/HORNET KILLER #297852	Y	Y	2.3470	1.0646		2
86089	**	NISS	COMPRESSED AIR	N	Y	27.1391	12.3102		1
02316		007758-89-6	COPPER CHLORIDE	N	N	1.1023	0.5000		1
00424		007440-50-8	COPPER METAL	N	N	2.2046	1.0000		2
00430		001317-38-0	COPPER(II) OXIDE	N	N	3.2046	1.4535		2
81444		NISS	CRC 2-26 (AEROSOL)	N	Y	0.0651	0.0295		1
02326		000548-62-9	CRYSTAL VIOLET	N	N	0.2204	0.0999		1
00257		007447-39-4	CUPRIC CHLORIDE	N	N	2.1023	0.9535		2
00277		007758-98-7	CUPRIC SULFATE	N	N	2.2046	1.0000		1
06450		007787-70-4	CUPROUS BROMIDE	N	N	0.2204	0.0999		1
A4026		000108-85-0	CYCLOHEXYL BROMIDE	N	N	0.1653	0.0749		1
05928		000065-46-3	CYTIDINE	N	N	0.0002	0.0000		1
A4661		081012-87-5	CYTIDINE 5'-TRIPHOSPHATE SODIUM TYPE I	N	N	0.0000	0.0000		1
A3048		034393-59-4	CYTIDINE-5-DIPHOSPHATE TYPE I SODIUM SALT	N	N	0.0000	0.0000		1
06693		000071-30-7	CYTOSINE	N	N	0.0022	0.0009		1

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A3050		005796-17-8	D-3,4-DIHYDROXYPHENYLALANINE	N	N		0.0002	0.0000	1
96398		000338-69-2	D-ALANINE	N	N		0.0002	0.0000	1
96404		009000-88-8	D-AMINO ACID OXIDASE	N	N		0.0022	0.0009	1
96410		000488-82-4	D-ARABINITOL	N	N		0.0022	0.0009	1
96412		002058-58-4	D-ASPARAGINE MONOHYDRATE	N	N		0.0002	0.0000	1
96413		001783-96-6	D-ASPARTIC ACID	N	N		0.0002	0.0000	1
96446		000349-46-2	D-CYSTINE	N	N		0.0002	0.0000	1
00825		000050-99-7	D-GLUCOSE	N	N		5.7540	2.6099	5
A2626		006893-26-1	D-GLUTAMIC ACID	N	N		0.0002	0.0000	1
96488		000351-50-8	D-HISTIDINE	N	N		0.0002	0.0000	1
08811		000319-78-8	D-ISOLEUCINE	N	N		0.0002	0.0000	1
96500		000328-38-1	D-LEUCINE	N	N		0.0002	0.0000	1
96505		000348-67-4	D-METHIONINE	N	N		0.0002	0.0000	1
96516		000327-56-0	D-NORLEUCINE	N	N		0.0002	0.0000	1
A2627		000673-06-3	D-PHENYLALANINE	N	N		0.0002	0.0000	1
96538		000312-84-5	D-SERINE	N	N		0.0002	0.0000	1
96551		000632-20-2	D-THREONINE	N	N		0.0002	0.0000	1
96564		000153-94-6	D-TRYPTOPHAN	N	N		0.0002	0.0000	1
96566		000640-68-6	D-VALINE	N	N		0.0002	0.0000	1
06794		000605-65-2	DANSYL CHLORIDE	N	N		0.0002	0.0000	1
89518		NISS	DAP 33 GLAZING	N	N		0.0044	0.0019	2
96450		012609-80-2	DEAE SEPHADEX	N	N		4.5899	2.0819	1
05884		009013-34-7	DEAE-CELLULOSE	N	N		0.2204	0.0999	1
A2647		000053-43-0	DEHYDROISOANDROSTERONE	N	N		1.6534	0.7500	1
96454		000058-28-6	DESIPRAMINE HYDROCHLORIDE	Y	N		0.0551	0.0250	1
88011		NISS	DETEK FLUORESCENT PIGMENT	N	N		0.0220	0.0099	1
A0222			DEVCON 5-MINUTE EPOXY HARDENER(91081) AND RESIN(90	N	N		0.2204	0.0999	1
90511		NISS	DEVCON 5-MINUTE EPOXY RESIN	N	N		0.7161	0.3245	11
03916		000142-84-7	DI-N-PROPYLAMINE	N	N		0.0651	0.0295	1
06153		000080-11-5	DIAZALD	N	N		0.2204	0.0999	2
80834		000103-49-1	DIBENZYLAMINE	N	N		0.2204	0.0999	1
96460		055671-55-1	DIBROMOBORANE-METHYL SULFIDE COMPLEX	N	N		0.2204	0.0999	1
00177		000079-36-7	DICHLOROACETYL CHLORIDE	N	N		0.2204	0.0999	1
01865		000075-43-4	DICHLOROFLUOROMETHANE	N	N		0.2204	0.0999	1
A4022		000101-83-7	DICYCLOHEXYLAMINE	N	N		2.5648	1.1634	2
01876		000111-42-2	DIETHANOLAMINE	N	N		0.5511	0.2499	1
96463		029263-94-3	DIETHYL 2-BROMO-2-METHYLMALONATE	N	N		0.2204	0.0999	1
06220		002049-80-1	DIETHYL ALLYLMALONATE	N	N		0.0220	0.0099	1
96464		000607-81-8	DIETHYL BENZYLMALONATE	N	N		0.1653	0.0749	3
A4018		000685-87-0	DIETHYL BROMOMALONATE	N	N		0.0551	0.0249	1
A9379		NISS	DIETHYL BROMOMETHYLMALONATE	N	N		0.0551	0.0249	1
96468		000133-08-4	DIETHYL BUTYLMALONATE	N	U		0.1210	0.0550	10
00883		000060-29-7	DIETHYL ETHER	N	N		0.4408	0.1999	2
96465		001462-12-0	DIETHYL ETHYLIDENEMALONATE	N	N		0.7863	0.3566	1
07725		000133-13-1	DIETHYL ETHYLMALONATE	N	N		0.0110	0.0049	1
96466		006326-44-9	DIETHYL FORMAMIDOMALONATE	N	N		0.2204	0.0999	1
96467		000609-08-5	DIETHYL METHYLMALONATE	N	N		0.0551	0.0249	1
B4113	**	NISS	DIETHYL-5-BROMOPENTYLMALONATE	N	N		0.4408	0.1999	2
00116		000109-89-7	DIETHYLAMINE	N	N		0.0440	0.0200	2
07372		038078-09-0	DIETHYLAMINOSULFUR TRIFLUORIDE	N	N		2.3658	1.0730	3
							0.1102	0.0499	2

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05922		020624-25-3	DIETHYLDITHIOCARBAMATE SODIUM TRIHYDRATE	N	N	0.2204	0.1000	1
06295	**	000111-46-6	DIETHYLENE GLYCOL	N	Y	8.8184	4.0000	1
03566		000111-96-6	DIETHYLENE GLYCOL DIMETHYL ETHER	N	Y	0.5511	0.2499	1
00888		000111-90-0	DIETHYLENE GLYCOL MONOETHYL ETHER	N	N	0.2204	0.0999	1
05923		000067-43-6	DIETHYLENETRIAMINEPENTAACETIC ACID	N	N	1.1023	0.5000	1
A2669		001605-53-4	DIETHYLPHENYLPHOSPHINE	N	N	0.0110	0.0050	1
89999		NISS	DIFCO AGAR NOBLE 0142	N	N	0.2500	0.1133	1
90685		NISS	DIFCO AGAR, BACTO 0140	N	N	0.2500	0.1133	1
92147		NISS	DIFCO MALTOSE 0168	N	N	0.2204	0.1000	1
96443		000080-97-7	DIHYDROCHOLESTEROL	N	N	0.0551	0.0249	1
96459		001191-15-7	DIISOBUTYLALUMINUM HYDRIDE	N	N	0.2204	0.0999	1
00875		000108-18-9	DIISOPROPYLAMINE	N	N	2.2046	1.0000	2
00034		000077-78-1	DIMETHYL SULFATE	Y	N	1.1023	0.5000	1
00017		000067-68-5	DIMETHYL SULFOXIDE	N	N	6.6448	3.0139	6
A7502		000128-04-1	DIMETHYLDITHIOCARBAMIC ACID, SODIUM SALT HYDRATE	N	N	0.4408	0.2000	2
00850		000068-12-2	DIMETHYLFORMAMIDE	Y	Y	7.4713	3.3888	7
00858		000095-45-4	DIMETHYLGLYOXIME	N	N	1.1030	0.5003	3
96475		000672-66-2	DIMETHYLPHENYLPHOSPHINE	N	N	0.0220	0.0099	1
06141		000577-11-7	DIOCTYL SODIUM SULFOSUCCINATE	N	N	1.0000	0.4535	1
96476		001666-13-3	DIPHENYL DISELENIDE	N	N	0.0660	0.0299	3
A7112		032294-60-3	DIPHENYL DITELLURIDE	N	N	0.0440	0.0200	4
02580		007789-00-6	DIPOTASSIUM CHROMATE	Y	N	2.1023	0.9535	2
00679		003483-12-3	DITHIOTHREITOL	N	N	0.0110	0.0050	1
00873	**	000060-10-6	DITHIZONE	N	N	0.0771	0.0348	2
00579		001314-36-9	DIYTTRIUM TRIOXIDE	N	N	0.1100	0.0499	4
A3058		016742-48-6	DL-A-HYDROXYARACHIDIC ACID	N	N	0.0001	0.0000	1
96494		002507-55-3	DL-A-HYDROXYMYRISTIC ACID	N	N	0.0001	0.0000	1
A3057		000764-67-0	DL-A-HYDROXYPALMITIC ACID	N	N	0.0001	0.0000	1
96493		000629-22-1	DL-A-HYDROXYSTEARIC ACID	N	N	0.0000	0.0000	1
B1380		073548-70-6	DL-A-PHOSPHATIDYL-DL-GLYCEROL-DIPALMITOYL AMMONIUM	N	N	0.0000	0.0000	1
96489		001927-25-9	DL-HOMOSERINE	N	N	0.6613	0.2999	2
96539		005619-04-5	DL-SERINE METHYL ESTER HCL	N	N	0.3744	0.1699	9
07668		001077-28-7	DL-THIOCTIC ACID	N	N	0.0011	0.0004	1
07656		000123-01-3	DODECYLBENZENE	N	N	0.0330	0.0149	1
07715	**	000062-31-7	DOPAMINE CHLORIDE	N	N	0.0220	0.0099	1
A5533		NISS	DOW CHEMICAL DOWEX(R) 2X8, 50-100 MESH, CL ANION E	N	N	3.0000	1.3605	3
85494		NISS	DOW CORNING SILICONE RUBBER PAINTABLE SEALANT 8644	N	N	0.1875	0.0850	1
A1304		NISS	DOW CORNING(R) 111 COMPOUND	N	N	0.3306	0.1500	1
81320	**	NISS	DOW CORNING(R) 3140 RTV COATING	N	N	0.1955	0.0887	1
88601		NISS	DOW CORNING(R) 321 DRY FILM LUBRICANT - AEROSOL	Y	N	1.4342	0.6506	2
82356		NISS	DOW CORNING(R) 705 DIFFUSION PUMP FLUID	N	N	1.1023	0.5000	1
87241		NISS	DOW CORNING(R) HIGH VACUUM GREASE	N	N	1.4132	0.6407	8
93211		NISS	DOW CORNING(R) X5-8022 LIQUID SIL. RUBBER, PART A	N	N	1.0000	0.4535	1
A3194		NISS	DOWEX 1 X 10	N	N	1.0000	0.4535	1
89343		NISS	DOWEX(R) 1-X8 20-50 MESH IONIC FORM CL	N	N	4.2046	1.9070	4
95243		NISS	DOWEX(R) 21K, 16-30 MESH, CL ANION EXCHANGE RESIN	N	N	1.1023	0.5000	1
82358		NISS	DOWEX(R) 50WX4, 50-100 MESH, H CATION EXCHANGE RES	N	N	1.0000	0.4535	1
82359		NISS	DOWEX(R) 50WX8, 100-200 MESH, H CATION EXCHANGE RE	N	N	2.1023	0.9535	2
89342		NISS	DRIERITE(R)	N	N	23.1023	10.4770	23
96477		000608-66-2	DULCITOL	N	N	0.0220	0.0099	1

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93998		NISS	DUPONT.OMNIFLUOR(R) PREMIXED LSC POWDER	N	N	0.1940	0.0880		1
88126		NISS	DUPONT PROTOSOL(R) TISSUE AND GEL SOLUBILIZER	N	Y	3.3069	1.5000		3
95390		NISS	EAGLE SILICA GEL	N	N	2.2046	1.0000		1
A8435		NISS	ENGINEERED LUBRICANTS ENLUBE 450 WHITE-1 GREASE	N	N	0.1234	0.0560		1
A3879		NISS	EPOXY EPO TEK 310, PART B	N	N	0.0551	0.0250		1
08724		000149-32-6	ERYTHRITOL	N	N	0.0110	0.0050		1
A7099		NISS	ESCHERICHICA COLI	N	N	0.0110	0.0050		1
A2683		001624-62-0	ESTRONE 3-METHYL ETHER	N	N	0.0550	0.0249		4
05984		001239-45-8	ETHIDIUM BROMIDE	N	N	0.0110	0.0049		1
00142	**	000141-78-6	ETHYL ACETATE	N	N	17.6368	8.0000		2
00022	**	000074-96-4	ETHYL BROMIDE	N	N	0.5511	0.2499		1
04082		000105-36-2	ETHYL BROMOACETATE	N	N	0.4408	0.2000		2
06724		000109-94-4	ETHYL FORMATE	N	N	1.1023	0.5000		1
00166		000075-03-6	ETHYL IODIDE	N	N	0.4408	0.1998		2
04075		000111-62-6	ETHYL OLEATE	N	N	0.0022	0.0009		1
96480		004755-77-5	ETHYL OXALYL CHLORIDE	N	N	0.0551	0.0249		1
00919		000107-21-1	ETHYLENE GLYCOL	N	Y	11.0230	5.0000		6
00917		000060-00-4	ETHYLENEDIAMINE TETRAACETIC ACID	N	N	1.1023	0.5000		1
05794	**	001308-96-9	EUROPIUM OXIDE	N	N	4.2988	1.9500		5
82765		NISS	EXXON TERESSTIC 150	N	N	0.1955	0.0887		1
A1250			FABER-CASTELL UHU STIC GLUE STICK U-26, U-75, U-12	N	N	0.0837	0.0380		1
90530		NISS	FEL-PRO C5-A HIGH TEMPERATURE ANTISEIZE COMPOUND	N	N	0.6572	0.2980		2
B3360		001944-12-3	FENOTEROL HYDROBROMIDE	Y	N	0.2314	0.1050		2
00432		007783-83-7	FERRIC AMMONIUM SULFATE DODECAHYDRATE	N	N	1.6005	0.7260		3
00295		007705-08-0	FERRIC CHLORIDE, ANHYDROUS	N	N	2.1023	0.9535		2
00434		007782-61-8	FERRIC NITRATE, NONAHYDRATE	N	N	1.2984	0.5889		4
00435		001309-37-1	FERRIC OXIDE	N	N	3.3069	1.5000		3
00436	**	010028-22-5	FERRIC SULFATE, ANHYDROUS	N	N	5.2046	2.3605		4
00439		013478-10-9	FERROUS CHLORIDE, TETRAHYDRATE	N	N	1.1023	0.5000		1
00441		007782-63-0	FERROUS SULFATE, HEPTAHYDRATE	N	N	1.1023	0.5000		1
96247			FISHER JET CLEAN GLASSWARE DETERGENT	N	N	83.4528	37.8536		4
96483		000067-73-2	FLUOCINOLONE ACETONIDE	N	N	0.0022	0.0009		1
00932		002321-07-5	FLUORESCEIN	N	N	0.1102	0.0500		1
96530		NISS	FOLIN & CIOCALTEU'S PHENOL REAGENT (04392,00548,06	N	N	3.1878	1.4459		2
00014		000064-18-6	FORMIC ACID	N	N	3.6088	1.6368		4
81193		NISS	FORMULA 409 ALL PURPOSE CLEANER	N	Y	0.9781	0.4437		1
04149		012064-62-9	GADOLINIUM OXIDE	N	N	5.6592	2.5668		3
89329		NISS	GASOLINE, PREMIUM UNLEADED	Y	Y	8.3452	3.7853		1
89856		NISS	GB DUCT SEAL	N	N	30.0000	13.6074		6
90311		NISS	GE RTV SILICONE RUBBER SEALANT, GE012	N	N	1.3402	0.6078		2
85495		NISS	GE RTV SILICONE SEALANT	N	N	2.6672	1.2096		4
90544		NISS	GE RTV102	N	N	0.1749	0.0793		1
04159		009000-70-8	GELATIN	N	N	1.1023	0.5000		1
93275		NISS	GENERAL SERVICE (AEROSOL) COATING, 8010-00-515-248	Y	Y	0.8475	0.3844		1
00442		001310-53-8	GERMANIUM DIOXIDE	N	N	0.0198	0.0089		5
05774		000108-55-4	GLUTARIC ANHYDRIDE	N	N	0.2204	0.1000		1
00936	**	000056-81-5	GLYCERINE	N	N	4.2908	1.9462		4
00938		000056-40-6	GLYCINE	N	N	0.0022	0.0010		1
96210		NISS	GRAPHIC CONTROLS HONEYWELL QUICK DRY INK & TYPE 13	Y	N	2.1833	0.9903		1
06667		000073-40-5	GUANINE	N	N	0.0022	0.0009		1

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96486		000118-00-3	GUANOSINE	N	N	0.0004	0.0000		2
A3060		043139-22-6	GUANOSINE 5'-DIPHOSPHATE SODIUM TYPE I	N	N	0.0000	0.0000		1
A4039		009000-65-1	GUM TRAGACANTH	N	N	0.2204	0.0999		1
A2549		NISS	HACH PHENOL RED INDICATOR SOLUTION	N	N	0.2204	0.0999		1
08581		002363-71-5	HENEICOSANOIC ACID	N	N	0.0022	0.0009		1
08580		000506-12-7	HEPTADECANOIC ACID	N	N	0.0022	0.0009		1
06213		000112-67-4	HEXADECANOYL CHLORIDE	N	N	0.0551	0.0250		1
05987		000661-69-8	HEXAMETHYLDITIN	N	N	0.0881	0.0399		4
06502		001608-26-0	HEXAMETHYLPHOSPHOROUS TRIAMIDE, TECH., 85%	N	N	0.0220	0.0099		1
00119		000110-54-3	HEXANE	N	Y	26.4552	12.0000		3
95206		NISS	HIGGINS WATERPROOF BLACK DRAWING INK 4415-4419	N	N	0.0652	0.0296		1
00623	**	000495-69-2	HIPPURIC ACID	N	N	0.2204	0.0999		1
96491		000461-72-3	HYDANTOIN	N	N	0.0440	0.0199		1
06575		010217-52-4	HYDRAZINE HYDRATE	Y	N	0.8818	0.3999		1
00951		010034-93-2	HYDRAZINE SULFATE	Y	N	0.2500	0.1133		1
01113	**	007647-01-0	HYDROCHLORIC ACID SOLUTIONS INCLUDING TECHNICAL GR	N	N	30.6024	13.8808		9
00624		000501-52-0	HYDROCINNAMIC ACID	N	N	0.4408	0.1999		2
00322		001333-74-0	HYDROGEN	N	N	14.7079	6.6713		2
06740	**	032001-55-1	HYDROGEN FLUORIDE-PYRIDINE	N	N	0.2204	0.1000		1
00956		005470-11-1	HYDROXYLAMINE HYDROCHLORIDE	N	N	3.3069	1.5000		3
07250		002950-43-8	HYDROXYLAMINE-O-SULFONIC ACID	N	N	0.0551	0.0249		1
06002		000127-07-1	HYDROXYUREA	N	N	0.0220	0.0100		2
00263		006303-21-5	HYPOPHOSPHOROUS ACID	N	N	5.4077	2.4528		3
06690		000068-94-0	HYPOXANTHINE	N	N	0.0022	0.0009		1
92296		NISS	HYVAC PUMP OIL	N	N	8.3452	3.7853		1
07727		000142-73-4	IMINODIACETIC ACID	N	N	9.9207	4.5000		2
82726		NISS	INLAND-19	N	N	12.7057	5.7631		7
04298		007782-68-5	IODIC ACID	N	N	1.1023	0.5000		1
00290		007553-56-2	IODINE	N	Y	2.2486	1.0199		3
A4046		007790-99-0	IODINE MONOCHLORIDE	N	N	0.2204	0.1000		1
01894		000075-47-8	IODOFORM	N	N	0.4408	0.1998		2
00447		007439-89-6	IRON METAL	N	N	7.5115	3.4070		6
07688		006047-25-2	IRON(II) OXALATE DIHYDRATE	N	N	2.1023	0.9535		2
A4035		000110-46-3	ISOAMYL NITRITE	N	N	0.6612	0.2999		3
06291		000079-30-1	ISOBUTYRYL CHLORIDE	N	N	0.2204	0.0999		1
00707		000067-63-0	ISOPROPYL ALCOHOL	N	N	7.3326	3.3259		3
00167		000075-30-9	ISOPROPYL IODIDE	N	N	1.1023	0.5000		1
01058		000075-31-0	ISOPROPYLAMINE	N	N	1.1023	0.5000		1
97063	**	NISS	J. PENNER CRT CLEAN SOLUTION	N	N	0.4955	0.2247		1
02549		NISS	J.T. BAKER OXALIC ACID, 0.1N VOLUMETRIC SOLUTION	N	N	42.0063	19.0538		6
93928		NISS	JOHNSON BRAVO EXTRA HEAVY DUTY STRIPPER 04587	N	N	41.7264	18.9269		1
82454		NISS	JOHNSON COMPLETE FOR FLOORS	N	N	85.1218	38.6110		2
87950		NISS	JOHNSON CREW SHOWER ROOM CLEANER	N	N	10.4316	4.7317		1
90355		NISS	JOHNSON LIQUID ENVY INSTANT CLEANER	N	N	10.4316	4.7318		1
A2237		NISS	JOHNSON MATTHEY TUNGSTEN AAS	N	N	0.2204	0.0999		1
89659		NISS	JOHNSON SNAPBACK LIQUID	N	N	41.7264	18.9269		1
82906		NISS	JOHNSON SOFT CARE LOTIONIZED SOAP	N	N	42.1437	19.1162		1
89636		NISS	JOHNSON ULD BP-300 INSECTICIDE	N	Y	1.0431	0.4731		1
93930		NISS	JOHNSON WAX VIEW QUICK CLEANER	N	N	42.1437	19.1162		1
90647		NISS	K&W KNOCKER LOOSE	N	N	0.5867	0.2661		1

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82459		NISS	KEL-SAN UTILITY CLEANER (AEROSOL)	N	Y	1.4669	0.6654	1
A8986		NISS	KEL-SAN UTILITY CLEANER (LIQUID)	N	Y	10.2229	4.6371	1
89624		NISS	KELSAN CONCENTRATED BOWL CLEANER	N	N	11.7877	5.3468	1
A2181		038346-83-7	KETANSERIN TARTRATE	N	N	0.0001	0.0000	1
94012		NISS	KOH-I-NOOR 3084 RAPIDRAW INK	N	Y	0.5856	0.2652	12
96499		000079-33-4	L(+)-LACTIC ACID	N	N	0.0110	0.0049	1
00733		001119-34-2	L-(+)-ARGININE MONOHYDROCHLORIDE	N	N	0.0022	0.0010	1
04345		000056-86-0	L-(+)-GLUTAMIC ACID	N	N	0.2226	0.1010	2
A3052		018194-24-6	L-A-PHOSPHATIDYLCHOLINE, DIMYRISTOYL	N	N	0.0002	0.0000	1
B3995	**	NISS	L-A-PHOSPHATIDYLETHANOLAMINE IN CHLOROFORM (REFER	Y	Y	0.0000	0.0000	1
94808		NISS	L-A-PHOSPHATIDYLETHANOLAMINE TYPE I FROM BOVINE BR	Y	Y	0.0000	0.0000	1
B3364		NISS	L-A-PHOSPHATIDYLINOSITOL AMMONIUM FROM BOVINE LIVE	Y	Y	0.0000	0.0000	1
08128		000056-41-7	L-ALANINE	N	N	0.0022	0.0010	1
05838		009000-89-9	L-AMINO ACID OXIDASE	N	N	0.0002	0.0000	1
96411		007643-75-6	L-ARABINITOL	N	N	0.0022	0.0009	1
06671		000070-47-3	L-ASPARAGINE	N	N	0.0022	0.0009	1
07652		000056-84-8	L-ASPARTIC ACID	N	N	0.0022	0.0009	1
06785		000052-90-4	L-CYSTEINE	N	N	0.0022	0.0010	1
04347		000056-89-3	L-CYSTINE	N	N	0.0022	0.0010	1
06393		000056-85-9	L-GLUTAMINE	N	N	0.0022	0.0009	1
08129		007048-02-4	L-HISTIDINE MONOHYDROCHLORIDE MONOHYDRATE	N	N	0.0022	0.0010	1
96490		000672-15-1	L-HOMOSERINE	N	N	0.0550	0.0249	3
08130		000073-32-5	L-ISOLEUCINE	N	N	0.0022	0.0010	1
07621		000061-90-5	L-LEUCINE	N	N	0.0022	0.0010	1
07358		000056-87-1	L-LYSINE	N	N	0.0022	0.0010	1
07716		000063-68-3	L-METHIONINE	N	N	0.0022	0.0010	1
07761		001113-41-3	L-PENICILLAMINE	N	N	0.0022	0.0009	1
07198		000063-91-2	L-PHENYLALANINE	N	N	0.0022	0.0010	1
07607		000147-85-3	L-PROLINE	N	N	0.0022	0.0010	1
07606		000056-45-1	L-SERINE	N	N	0.2204	0.0999	1
96540		005680-80-8	L-SERINE METHYL ESTER HCL	N	N	0.1101	0.0499	3
05880		000072-19-5	L-THREONINE	N	N	0.0022	0.0010	1
05883		000073-22-3	L-TRYPTOPHAN	N	N	0.0022	0.0010	1
04346		000060-18-4	L-TYROSINE	N	N	0.0022	0.0010	1
08132		000072-18-4	L-VALINE	N	N	0.0022	0.0010	1
00630		000050-21-5	LACTIC ACID	N	N	1.1023	0.5000	1
00448	**	010277-43-7	LANTHANUM NITRATE HEXAHYDRATE	N	N	1.0000	0.4535	1
04359		001312-81-8	LANTHANUM OXIDE	N	N	1.1023	0.5000	1
00964		000143-15-7	LAURYL BROMIDE	N	N	0.2204	0.0999	1
08224		015082-28-7	LC 3600	N	N	0.2204	0.0999	1
06322		000301-04-2	LEAD ACETATE	Y	Y	2.3523	1.0668	3
00265		007439-92-1	LEAD METAL	Y	Y	1.1023	0.5000	1
00302		010099-74-8	LEAD NITRATE	Y	N	1.0000	0.4535	1
06352		001335-25-7	LEAD OXIDE	Y	N	1.1023	0.5000	1
04379		008002-43-5	LECITHIN	N	N	0.0000	0.0000	1
07117		006867-30-7	LITHIUM ACETYLIDE, ETHYLENEDIAMINE COMPLEX	N	N	0.2204	0.0999	1
00250		016853-85-3	LITHIUM ALUMINUM HYDRIDE	N	N	0.0551	0.0249	1
08060		019597-69-4	LITHIUM AZIDE	N	N	0.0551	0.0249	1
00456	**	000554-13-2	LITHIUM CARBONATE	N	N	7.3602	3.3385	5
01115		007447-41-8	LITHIUM CHLORIDE	N	N	13.2046	5.9889	8

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96501		004111-54-0	LITHIUM DIISOPROPYLAMIDE	N	N	0.2204	0.1000	1
00457	**	007789-24-4	LITHIUM FLUORIDE	N	N	1.1023	0.5000	1
05745		001310-66-3	LITHIUM HYDROXIDE	N	N	10.0705	4.5678	2
00461	**	007790-69-4	LITHIUM NITRATE	N	N	4.2046	1.9070	3
06833	**	012057-24-8	LITHIUM OXIDE	N	N	0.1102	0.0499	1
04392	**	010377-48-7	LITHIUM SULFATE	N	N	0.2204	0.0999	1
B3479		123334-21-4	LITHIUM TETRACHLOROPALLADATE (II) HYDRATE	N	N	0.0110	0.0050	1
A2682		017476-04-9	LITHIUM TRI-TERT-BUTOXYALUMINOHYDRIDE, 0.5M SOLUTI	N	Y	0.0551	0.0250	1
07800		022560-16-3	LITHIUM TRIETHYLBOROHYDRIDE	N	N	1.5429	0.6995	5
A2686		000434-13-9	LITHOCHOLIC ACID	N	N	0.0771	0.0350	2
92963		NISS	LPS(R) 1 GREASELESS LUBRICANT	N	Y	0.7171	0.3253	1
82376		NISS	LUBRI-BOND(R) A AEROSOL, 10-601	Y	Y	0.8475	0.3844	1
82986		NISS	LUBRIPLATE "130" SERIES	N	N	0.4560	0.2068	4
07316		058366-64-6	LUTEINIZING HORMONE RELEASING HORMONE ACETATE GAMM	N	N	0.0022	0.0009	1
00465		007439-95-4	MAGNESIUM METAL	N	N	5.3769	2.4389	6
00466	**	010377-60-3	MAGNESIUM NITRATE DODECAHYDRATE	N	N	2.1023	0.9535	2
00467		001309-48-4	MAGNESIUM OXIDE	N	N	2.2125	1.0035	3
00468		010034-81-8	MAGNESIUM PERCHLORATE ANHYDROUS	N	N	1.1023	0.5000	1
04133		001343-88-0	MAGNESIUM SILICATE (FLORISIL)	N	N	10.0705	4.5678	2
00469		007487-88-9	MAGNESIUM SULFATE ANHYDROUS	N	N	5.1887	2.3534	4
06579	**	010034-99-8	MAGNESIUM SULFATE HEPTAHYDRATE	N	N	1.0000	0.4535	1
00632		000110-16-7	MALEIC ACID	N	N	0.0551	0.0249	1
00633		000108-31-6	MALEIC ANHYDRIDE	N	N	0.1102	0.0500	1
07738		000541-59-3	MALEIMIDE	N	N	0.0044	0.0019	1
00227		000141-82-2	MALONIC ACID	N	N	0.4408	0.1999	2
00470		013446-34-9	MANGANESE CHLORIDE, TETRAHYDRATE	N	N	1.1023	0.5000	1
00471		001313-13-9	MANGANESE DIOXIDE	N	N	3.2046	1.4535	2
00473		010034-96-5	MANGANESE SULFATE, MONOHYDRATE	N	N	1.1023	0.5000	1
94734		NISS	MARSH T-GRADE DYE TYPE MARKING PEN INK, ALL COLORS	N	Y	0.2334	0.1058	1
82978		NISS	MARVEL MYSTERY OIL	N	N	0.2607	0.1182	1
00270		007487-94-7	MERCURIC CHLORIDE	N	Y	1.0493	0.4759	3
00300		010045-94-0	MERCURIC NITRATE	N	N	1.1023	0.5000	1
04446		010415-75-5	MERCUROUS NITRATE	N	N	1.1023	0.5000	1
08296		007783-34-8	MERCURY(II) NITRATE MONOHYDRATE	N	N	0.5511	0.2500	1
04443		021908-53-2	MERCURY(II) OXIDE	N	Y	0.2204	0.0999	1
08227		000304-55-2	MESO-2,3-DIMERCAPTOSUCCINIC ACID	N	N	0.0661	0.0299	2
01968		000072-33-3	MESTRANOL	Y	N	0.0044	0.0019	1
04464		000075-75-2	METHANESULFONIC ACID	N	N	0.2204	0.0999	1
96504		007143-01-3	METHANESULFONIC ANHYDRIDE	N	N	0.0551	0.0249	1
00318		008032-32-4	METHANOL	N	Y	16.6326	7.5444	3
04467		000625-45-6	METHOXYACETIC ACID	N	N	0.1102	0.0499	1
A7241		NISS	METHYL 3-HYDROXYTETRADECANOATE	N	N	0.0000	0.0000	1
07669		002905-65-9	METHYL 4-CHLOROBENZOATE	N	N	0.4408	0.1998	2
07787		005454-83-1	METHYL 5-BROMOVALERATE	N	N	0.0771	0.0349	2
00055		000096-33-3	METHYL ACRYLATE	N	N	1.1023	0.5000	1
00197		000096-32-2	METHYL BROMOACETATE	N	N	0.0551	0.0249	1
B3605		001120-28-1	METHYL EICOSANOATE	N	N	0.0220	0.0099	1
00037		000078-93-3	METHYL ETHYL KETONE	N	Y	34.4295	15.6171	2
96508	**	006064-90-0	METHYL HENEICOSANOATE	N	N	0.0022	0.0009	1
A2672		001731-92-6	METHYL HEPTADECANOATE	N	N	0.0330	0.0149	3

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04482		000106-70-7	METHYL HEXANOATE	N	N	0.0390	0.0176	2
00979		000108-10-1	METHYL ISOBUTYL KETONE	N	Y	17.5420	7.9567	4
B3361		000556-61-6	METHYL ISOTHIOCYANATE	N	N	0.0110	0.0050	1
04473		000111-82-0	METHYL LAURATE	N	N	0.0191	0.0087	1
B4112	**	000112-63-0	METHYL LINOLEATE	N	N	0.0195	0.0088	1
04483		000124-10-7	METHYL MYRISTATE	N	N	0.0220	0.0099	1
04485		001731-84-6	METHYL NONANOATE	N	N	0.0193	0.0087	1
04486		000111-11-5	METHYL OCTANOATE	N	N	0.0193	0.0087	1
01911		000112-62-9	METHYL OLEATE	N	N	0.0192	0.0087	1
00517	**	000547-58-0	METHYL ORANGE	N	N	0.0551	0.0249	1
04474		000553-90-2	METHYL OXALATE	N	N	0.4408	0.2000	2
04488		000112-39-0	METHYL PALMITATE	N	N	0.0220	0.0099	1
00544		000493-52-7	METHYL RED	N	N	0.1540	0.0698	6
04475	**	000112-61-8	METHYL STEARATE	N	N	0.0220	0.0099	1
A9198		001731-86-8	METHYL UNDECANOATE	N	N	0.0192	0.0087	1
B4110	**	000111-81-9	METHYL UNDECYLENATE	N	N	0.0196	0.0088	1
A9378		NISS	METHYL-11-BROMOUNDECYLATE	N	N	0.0220	0.0100	1
A7239		000141-23-1	METHYL-12-HYDROXYSTEARATE	N	N	0.0022	0.0010	1
07719		000097-30-3	METHYL-ALPHA-D-GLUCOPYRANOSIDE	N	N	0.2204	0.0999	1
00971		000109-87-5	METHYLAL	N	N	1.1023	0.5000	1
07065	**	000061-73-4	METHYLENE BLUE	N	N	0.0440	0.0198	2
00025		000075-09-2	METHYLENE CHLORIDE	Y	Y	20.5468	9.3199	2
05782		005137-55-3	METHYLTRIOCTYLAMMONIUM CHLORIDE	N	N	0.5511	0.2499	1
07769		001779-49-3	METHYLTRIPHENYLPHOSPHONIUM BROMIDE	N	N	0.1102	0.0498	2
A1291		NISS	MIDLAB DUST MOP & CLOTH TREATMENT	N	Y	10.7445	4.8735	5
06436	**	008042-47-5	MINERAL OIL, WHITE	N	N	1627.3317	738.1526	4
04399		008020-83-5	MINERAL OILS	N	N	9.4139	4.2700	3
91821		081133-20-2	MIXED BED RESIN M-614 16-50 MESH, IONIC FORM H/OH	N	N	2.1023	0.9535	2
00479		007439-98-7	MOLYBDENUM METAL	N	Y	1.4086	0.6389	4
04519		001313-27-5	MOLYBDENUM(VI) OXIDE	N	N	0.2500	0.1133	1
00342		007782-91-4	MOLYBDIC ACID (85%)	N	N	2.6023	1.1801	4
00122		000110-91-8	MORPHOLINE	N	N	1.1023	0.5000	1
06118		000051-80-9	N,N,N',N'-TETRAMETHYLDIAMINOMETHANE	N	N	0.0551	0.0249	1
A5010		000996-50-9	N,N-DIETHYLTRIMETHYLSILYLAMINE	N	N	0.0551	0.0250	1
00723		000110-53-2	N-AMYL BROMIDE	N	N	0.2204	0.0999	1
07655		000103-67-3	N-BENZYLMETHYLAMINE	N	N	0.2204	0.1000	1
04558		000128-08-5	N-BROMOSUCCINIMIDE	N	N	0.2204	0.1000	1
00208		000104-51-8	N-BUTYL BENZENE	N	N	0.0551	0.0249	1
00773		000109-65-9	N-BUTYL BROMIDE	N	N	0.0220	0.0099	1
00775		000109-69-3	N-BUTYL CHLORIDE	N	N	1.1023	0.5000	1
00229		000142-96-1	N-BUTYL ETHER	N	N	2.2046	1.0000	1
96435		001145-80-8	N-CBZ-L-SERINE	N	N	0.2755	0.1249	3
96487		003546-17-6	N-HEPTADECANOYL COENZYME A	N	N	0.0000	0.0000	1
00943		000142-82-5	N-HEPTANE	N	N	2.2046	1.0000	2
00944		000629-04-9	N-HEPTYL BROMIDE	N	N	0.4408	0.1999	2
00948		000111-25-1	N-HEXYL BROMIDE	N	N	0.1102	0.0499	1
00706	**	000111-87-5	N-OCTYL ALCOHOL	N	N	1.3227	0.5999	2
00099		000107-10-8	N-PROPYLAMINE	N	N	0.0551	0.0249	1
05717		066796-30-3	NAFION 117	N	N	0.0110	0.0050	1
00064		000091-20-3	NAPHTHALENE	N	N	0.5511	0.2499	1

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04605		012054-48-7	NICKEL-HYDROXIDE						
00321		007440-02-0	NICKEL METAL	Y	N	1.1023	0.5000		1
00485		013478-00-7	NICKELOUS NITRATE, HEXAHYDRATE	Y	Y	5.0987	2.3125		8
00641		000059-67-6	NICOTINIC ACID	Y	N	1.1023	0.5000		1
88279		000485-47-2	NINHYDRIN SPRAY REAGENT, 0.2% NINHYDRIN IN ETHANOL	N	N	0.2204	0.0999		1
04619		007440-03-1	NIOBIUM METAL	N	Y	0.0551	0.0249		1
00275		007697-37-2	NITRIC ACID	N	N	0.0022	0.0009		1
04624		007727-37-9	NITROGEN	N	N	128.9579	58.4940		17
00648		000088-99-3	O-PHTHALIC ACID	N	N	51.7651	23.4803		4
00054		000095-53-4	O-TOLUIDINE	N	N	1.1022	0.5000		2
00644	**	000112-80-1	OLEIC ACID	Y	N	0.2204	0.0999		1
06164		000370-81-0	OXALIC ACID, BIS(CYCLOHEXYLIDENEHYDRAZIDE)	N	N	0.2204	0.0999		1
00144		006153-56-6	OXALIC ACID, DIHYDRATE	N	N	0.1102	0.0498		2
01133		007782-44-7	OXYGEN	N	N	6.6138	2.9999		2
89735		NISS	P-10 NUCLEAR COUNTER MIXTURE	N	Y	30.2575	13.7246		2
00595		000150-13-0	P-AMINOBENZOIC ACID	N	N	34.2255	15.5245		5
00210		000106-38-7	P-BROMOTOLUENE	N	N	0.2314	0.1048		2
A4682		NISS	P-IODOPHENYLACETIC ACID	N	N	0.8816	0.3999		4
00705		000619-73-8	P-NITROBENZYL ALCOHOL	N	N	0.0022	0.0010		1
07682		004124-41-8	P-TOLUENESULFONIC ANHYDRIDE	N	N	0.1653	0.0749		2
01093		000098-59-9	P-TOLUENESULFONYL CHLORIDE	N	N	0.0220	0.0100		1
00669		000099-94-5	P-TOLUIC ACID	N	N	1.3226	0.5998		3
00093	**	000106-49-0	P-TOLUIDINE	N	N	1.1023	0.5000		1
A2631		006865-14-1	PALMITOYL-DL-CARNITINE CHLORIDE	N	N	0.4408	0.1998		2
06629		009001-73-4	PAPAIN, LYOPHILIZED	N	N	0.0022	0.0010		1
00795		008002-74-2	PARAFFIN	N	N	0.0088	0.0039		1
06233		001002-84-2	PENTADECANOIC ACID	N	N	1.0000	0.4535		1
06511		086508-42-1	PERFLUORO COMPOUNDS, C5-18	N	N	0.0551	0.0250		1
86793	**	NISS	PERMATEX(R) HYDRAULIC JACK OIL	N	N	140.0000	63.5034		2
00111		000108-95-2	PHENOL	N	N	2.0863	0.9463		1
00387		000143-74-8	PHENOL RED	N	Y	1.0000	0.4535		1
00388		000077-09-8	PHENOLPHTHALEIN	N	N	0.0044	0.0018		2
A2397		NISS	PHENOMENEX PHENOGEL LINEAR/MIXED BED	N	N	0.7473	0.3387		3
A3059		068332-77-4	PHENOXYACETYLCELLULOSE	N	N	0.2204	0.1000		1
07765		001464-44-4	PHENYL-BETA-D-GLUCOPYRANOSIDE	N	N	0.0551	0.0250		1
80206		000103-80-0	PHENYLACETYL CHLORIDE	N	N	0.2204	0.1000		1
06500		000536-74-3	PHENYLACETYLENE, 98%	N	N	0.2204	0.1000		1
06795		000064-04-0	PHENYLETHYLAMINE	N	N	0.1653	0.0750		3
B2593		001124-19-2	PHENYLTIN TRICHLORIDE	N	N	0.0551	0.0249		1
02081		007664-38-2	PHOSPHORIC ACID	N	N	0.2204	0.1000		1
05801		012067-99-1	PHOSPHOTUNGSTIC ACID	N	N	12.7544	5.7853		2
00649		000085-44-9	PHTHALIC ANHYDRIDE	N	N	0.2204	0.0999		1
91402	**	NISS	POLYMERIC SYSTEMS DSI-601 SILICONE SEALANT	N	N	0.2204	0.0999		1
05373	**	009005-64-5	POLYOXYETHYLENESORBITAN MONOLAURATE TWEEN 20	N	N	0.5247	0.2379		3
01046		001806-34-4	POPOP	N	N	0.0551	0.0249		1
04903	**	000298-14-6	POTASSIUM BICARBONATE	N	N	0.0220	0.0099		2
00288		007789-29-9	POTASSIUM BIFLUORIDE	N	N	2.0000	0.9070		2
00493		007758-01-2	POTASSIUM BROMATE	N	N	1.1023	0.5000		1
00494	**	007758-02-3	POTASSIUM BROMIDE	Y	N	1.1023	0.5000		1
00495		000584-08-7	POTASSIUM CARBONATE	N	N	0.1102	0.0500		2
				N	N	15.4207	6.9947		5

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00496		003811-04-9	POTASSIUM CHLORATE	N	N	2.1023	0.9535		2
00497		007447-40-7	POTASSIUM CHLORIDE	N	N	5.8499	2.6534		7
00499		000151-50-8	POTASSIUM CYANIDE	N	N	2.2046	1.0000		2
00755		014459-95-1	POTASSIUM FERROCYANIDE, TRIHYDRATE	N	N	1.1023	0.5000		1
00289		007789-23-3	POTASSIUM FLUORIDE	N	N	1.7085	0.7748		3
00048		001310-58-3	POTASSIUM HYDROXIDE	N	N	14.4092	6.5358		5
06541		001310-58-3	POTASSIUM HYDROXIDE SOLUTIONS	N	N	4.4092	2.0000		1
00504		007758-05-6	POTASSIUM IODATE	N	N	0.2204	0.0999		1
00505	**	007681-11-0	POTASSIUM IODIDE	N	Y	2.4250	1.0999		3
00508		007757-79-1	POTASSIUM NITRATE	N	N	3.3069	1.5000		2
00509	**	007758-09-0	POTASSIUM NITRITE	N	N	3.3069	1.5000		2
04900		007790-21-8	POTASSIUM PERIODATE	N	N	1.0493	0.4759		3
00512		007722-64-7	POTASSIUM PERMANGANATE	N	N	25.1801	11.4214		19
06532		010466-65-6	POTASSIUM PERRHENATE	N	N	0.0110	0.0050		1
00513		007727-21-1	POTASSIUM PERSULFATE	N	N	0.2204	0.0999		1
00515		007758-11-4	POTASSIUM PHOSPHATE, DIBASIC	N	N	0.2204	0.1000		1
00514		007778-77-0	POTASSIUM PHOSPHATE, MONOBASIC	N	N	4.2517	1.9283		4
00516		007790-62-7	POTASSIUM PYROSULFATE	N	N	1.1023	0.5000		1
04897	**	007778-80-5	POTASSIUM SULFATE	N	N	10.2046	4.6280		9
04922		000333-20-0	POTASSIUM THIOCYANATE	N	N	0.2500	0.1133		1
07393		010294-66-3	POTASSIUM THIOSULFATE	N	N	1.1023	0.5000		1
04925	**	012037-29-5	PRASEODYMIUM OXIDE	N	N	0.6613	0.3000		1
00323		000074-98-6	PROPANE	N	N	206.2508	93.5540		9
96430	**	NISS	PROPARGYL BROMIDE, 80 WT. % SOLUTION IN TOLUENE	N	Y	0.2204	0.0999		1
07746		000624-65-7	PROPARGYL CHLORIDE	N	N	0.2204	0.0999		1
00040		000079-09-4	PROPIONIC ACID	N	N	1.1023	0.5000		1
00654		000123-62-6	PROPIONIC ACID ANHYDRIDE	N	N	0.2204	0.1000		1
00010	**	000057-55-6	PROPYLENE GLYCOL	N	N	4.2909	1.9463		2
96528		004370-90-5	PTH-METHIONINE	N	N	0.0002	0.0000		2
A3054		068984-76-9	PTH-METHIONINE SULFONE	N	N	0.0001	0.0000		1
00121		000110-86-1	PYRIDINE	N	N	0.5511	0.2499		1
08706		000065-22-5	PYRIDOXAL, HYDROCHLORIDE	N	N	0.0011	0.0004		1
07611		000524-36-7	PYRIDOXAMINE DIHYDROCHLORIDE	N	N	0.0005	0.0002		1
96535		000065-23-6	PYRIDOXINE	N	N	0.0110	0.0049		1
00127		000120-80-9	PYROCATECHOL	N	N	0.2491	0.1129		1
00058		000087-66-1	PYROGALLIC ACID	N	N	1.0009	0.4540		1
00656		000127-17-3	PYRUVIC ACID	N	N	0.0551	0.0249		1
89240		NISS	QUIETROLE MARK II	N	Y	0.3911	0.1774		1
A2552		NISS	RAID FLYING INSECT KILLER FORMULA 12	N	Y	0.8449	0.3832		1
05663		000989-38-8	RHODAMINE 6G	N	N	1.1020	0.4995		5
04983		000081-88-9	RHODAMINE B	N	N	1.4879	0.6747		4
07382		010049-07-7	RHODIUM TRICHLORIDE	N	N	0.0154	0.0069		1
A4037	**	000523-21-7	RHODIZONIC ACID SODIUM SALT	N	N	0.0022	0.0009		1
00518		007791-11-9	RUBIDIUM CHLORIDE	N	N	0.0308	0.0139		3
04992		007488-54-2	RUBIDIUM SULFATE	N	N	0.2204	0.0999		1
04997		007440-18-8	RUTHENIUM METAL	N	N	0.0881	0.0399		1
A2241		010049-08-8	RUTHENIUM(III) CHLORIDE	N	N	0.0110	0.0049		4
A7107		032740-79-7	RUTHENIUM(IV) OXIDE HYDRATE	N	N	0.0110	0.0050		1
A4660		000979-92-0	S-ADENOSYL-L-HOMOCYSTEINE	N	N	0.0000	0.0000		1
B3363		NISS	S-ADENOSYL-L-HOMOCYSTEINE HYDROLASE FROM RABBIT ER	N	N	0.0220	0.0100		1

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92251		NISS	SANFORD ROLL-ON STAMP PAD INKER	N	Y	0.2607	0.1182	1
89646		NISS	SANI-FRESH 10-10	N	N	21.4816	9.7439	1
93167		NISS	SARGENT-WELCH DUO SEAL OIL	N	N	4.4092	2.0000	2
92144		NISS	SBS BAR SOAP	N	N	18.7500	8.5049	1
B4036	**	000057-63-6	SEE RECID 01917	Y	N	0.0022	0.0010	1
93539		NISS	SEE RECID 86878	N	N	1.1023	0.5000	1
05042		007446-08-4	SELENIUM DIOXIDE	N	N	0.3306	0.1498	2
00280		007782-49-2	SELENIUM METAL	N	N	1.2420	0.5632	3
96536		002897-21-4	SELENO-DL-CYSTINE	N	N	0.0006	0.0002	1
96537		002578-28-1	SELENO-DL-METHIONINE	N	N	0.0006	0.0000	3
06487		000630-10-4	SELENOUREA	N	N	0.0022	0.0009	1
88509		NISS	SEPHADEX	N	N	0.3857	0.1747	3
06924		009048-71-9	SEPHADEX G-50	N	N	0.2204	0.1000	1
A2547		NISS	SHERWIN-WILLIAMS KRYLON(R) COLORWORKS(R) LACQUER S	N	Y	0.8475	0.3844	1
A5390		NISS	SIGMA GUANOSINE 5'-TRIPHOSPHATE SODIUM TYPE III	N	Y	0.0000	0.0000	1
A0446		024346-00-7	SIGMA S-ADENOSYL-L-METHIONINE CHLORIDE	N	Y	0.0000	0.0000	1
08477		NISS	SIGMA URIDINE 5'-TRIPHOSPHATE SODIUM FROM YEAST TY	N	Y	0.0000	0.0000	1
96414		000280-64-8	SIGMA-ALDRICH 9-BBN, 0.5M SOLUTION IN HEXANES	N	N	0.4408	0.1998	2
96402		001730-25-2	SIGMA-ALDRICH ALLYLMAGNESIUM BROMIDE, 1.0M SOLUTIO	N	N	0.2204	0.0999	1
06044		014044-65-6	SIGMA-ALDRICH BORANE-TETRAHYDROFURAN COMPLEX, 1.0M	N	Y	3.5677	1.6182	3
06047		000109-72-8	SIGMA-ALDRICH BUTYLLITHIUM, 2.0M SOLUTION IN CYCLO	N	N	0.3968	0.1799	2
A5908		NISS	SIGMA-ALDRICH CARDIOLIPIN FROM BOVINE HEART SODIUM	N	Y	0.0000	0.0000	1
96511		000917-54-4	SIGMA-ALDRICH METHYLLITHIUM, 1.4M SOLUTION IN DIET	N	N	1.9840	0.8998	2
05276		000125-20-2	SIGMA-ALDRICH THYMOLPHTHALEIN 0.04% SOLUTION IN 50	N	Y	0.0551	0.0249	1
00809		063231-67-4	SILICA GEL	N	N	34.1712	15.4997	20
02117		007631-86-9	SILICA, AMORPHOUS - OTHER FORMS	N	N	1.0000	0.4535	1
05786		014808-60-7	SILICA, CRYSTALLINE - QUARTZ	Y	N	3.3069	1.5000	3
00348		007699-41-4	SILICIC ACID	N	N	4.4092	2.0000	4
80533		063148-58-3	SILICONE RUBBERS	N	N	0.3196	0.1449	1
05067		000563-63-3	SILVER ACETATE	N	N	0.0220	0.0100	1
00235		000534-16-7	SILVER CARBONATE	N	N	0.0220	0.0100	1
01399		000506-64-9	SILVER CYANIDE	N	N	0.0110	0.0049	1
01403		007440-22-4	SILVER METAL	N	N	0.0735	0.0332	2
05064		020667-12-3	SILVER OXIDE	N	N	0.2204	0.1000	1
00521		000127-09-3	SODIUM ACETATE	N	N	8.2672	3.7499	7
05706	**	001344-00-9	SODIUM ALUMINOSILICATE	N	N	1.1023	0.5000	1
00522		013011-54-6	SODIUM AMMONIUM PHOSPHATE, TETRAHYDRATE	N	N	1.1023	0.5000	1
00018		026628-22-8	SODIUM AZIDE	N	N	1.1023	0.5000	1
00525		000144-55-8	SODIUM BICARBONATE	N	N	2.2046	1.0000	2
05096		012232-99-4	SODIUM BISMUTHATE	N	N	0.5511	0.2499	1
00527		007631-90-5	SODIUM BISULFITE	N	N	5.5115	2.5000	4
06592		016940-66-2	SODIUM BOROHYDRIDE	N	N	0.2755	0.1249	2
00531		007789-38-0	SODIUM BROMATE	N	N	2.2046	1.0000	2
00532	**	007647-15-6	SODIUM BROMIDE	N	N	0.2204	0.0999	1
05760		000125-65-2	SODIUM CACODYLATE	N	N	0.5511	0.2499	1
00292		008006-28-8	SODIUM CALCIUM HYDRATE	N	N	2.2046	1.0000	1
00534		000497-19-8	SODIUM CARBONATE	N	N	5.2064	2.3615	4
00536	**	007647-14-5	SODIUM CHLORIDE	N	N	3.3069	1.5000	2
06385		007775-11-3	SODIUM CHROMATE	Y	N	2.0000	0.9070	2
00537		000068-04-2	SODIUM CITRATE	N	N	1.1023	0.5000	1

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05099		013600-98-1	SODIUM COBALTINITRITE	N	N	4.4092	2.0000	2
00538		000143-33-9	SODIUM CYANIDE	N	N	3.3069	1.5000	3
06258		025895-60-7	SODIUM CYANOBOROHYDRIDE	N	N	0.6612	0.2997	3
95149		NISS	SODIUM CYCLOPENTADIENIDE, 2-3 M IN TETRAHYDROFURAN	N	Y	0.0005	0.0002	1
00047		010588-01-9	SODIUM DICHROMATE	Y	N	1.1023	0.5000	1
07136	**	013601-19-9	SODIUM FERROCYANIDE	N	N	0.0220	0.0099	1
00540		007681-49-4	SODIUM FLUORIDE	N	Y	1.1023	0.5000	1
07378		000149-44-0	SODIUM FORMALDEHYDESULFOXYLATE	N	N	4.4092	2.0000	1
06489		016721-80-5	SODIUM HYDROSULFIDE HYDRATE	N	N	0.1102	0.0499	1
00543		001310-73-2	SODIUM HYDROXIDE	N	N	12.7161	5.7679	3
06411	**	001310-73-2	SODIUM HYDROXIDE SOLUTIONS (>10%)	N	N	8.5818	3.8926	4
06414		001310-73-2	SODIUM HYDROXIDE, <10%	N	N	2.2046	1.0000	1
06410		007681-52-9	SODIUM HYPOCHLORITE SOLUTION	N	N	46.0367	20.8820	4
00545		010039-56-2	SODIUM HYPOPHOSPHITE, MONOHYDRATE	N	N	1.1023	0.5000	1
00528		007681-57-4	SODIUM METABISULFITE, ANHYDROUS	N	N	0.5511	0.2499	1
00548		010102-40-6	SODIUM MOLYBDATE, DIHYDRATE	N	N	0.2204	0.0999	1
00549	**	007631-99-4	SODIUM NITRATE	N	N	0.1102	0.0500	1
00550	**	007632-00-0	SODIUM NITRITE	N	Y	0.8818	0.3999	1
05114	**	013755-38-9	SODIUM NITROPRUSSIDE DIHYDRATE	N	N	0.2500	0.1133	1
00155		000062-76-0	SODIUM OXALATE	N	N	0.2500	0.1133	1
07796		007790-28-5	SODIUM PERIODATE	N	N	0.2204	0.0999	1
05682		013472-33-8	SODIUM PERRHENATE	N	N	0.0022	0.0010	1
05115	**	007775-27-1	SODIUM PERSULFATE	N	N	1.1023	0.5000	1
02351		007558-79-4	SODIUM PHOSPHATE, DIBASIC	N	N	0.2491	0.1129	1
02612	**	013472-36-1	SODIUM PYROPHOSPHATE, DECAHYDRATE	N	N	1.1023	0.5000	1
06172		012209-98-2	SODIUM STANNATE TRIHYDRATE	N	N	3.3069	1.5000	3
00558		007757-82-6	SODIUM SULFATE	N	N	32.4076	14.6998	19
00560		001313-84-4	SODIUM SULFIDE, NONAHYDRATE	N	N	3.3069	1.5000	2
00559		007757-83-7	SODIUM SULFITE ANHYDROUS	N	N	3.2046	1.4535	3
00529	**	001330-43-4	SODIUM TETRABORATE	N	N	4.4092	2.0000	2
00562		000143-66-8	SODIUM TETRAPHENYLBORON	N	N	0.1102	0.0498	2
00555		007722-88-5	SODIUM TETRAPYROPHOSPHATE	N	N	1.0000	0.4535	1
02614		000540-72-7	SODIUM THIOCYANATE	N	N	1.0000	0.4535	1
00564		007772-98-7	SODIUM THIOSULFATE	N	N	1.5432	0.6999	2
06417	**	NISS	SODIUM THIOSULFATE, 0.01-1.0 N SOLUTION	N	N	3.6510	1.6561	1
94501		NISS	SODIUM TRIPHOSPHOPYRIDINE NUCLEOTIDE HYDRATE IN AC	N	N	0.0002	0.0000	1
00565		053125-86-3	SODIUM TUNGSTATE, DIHYDRATE	N	N	1.1023	0.5000	1
89036		NISS	SOLDER SEAL LIQUID WRENCH NO.1, POUR	N	N	0.0651	0.0295	1
B0466		NISS	SPHINGOSINE	N	N	0.0001	0.0000	1
96542		000749-02-0	SPIPERONE	N	N	0.0110	0.0050	5
A8223		NISS	SPRAYON LUBRICANTS, RUST PREVENTATIVES & MAINTENAN	N	N	0.7823	0.3548	1
00272		007646-78-8	STANNIC CHLORIDE	N	N	1.5511	0.7034	2
05155	**	018282-10-5	STANNIC OXIDE	N	N	1.0000	0.4535	1
07264		007772-99-8	STANNOUS CHLORIDE	N	N	0.0551	0.0250	1
00567		010025-69-1	STANNOUS CHLORIDE, DIHYDRATE	N	N	2.2046	1.0000	1
02124		009005-25-8	STARCH	N	N	1.1023	0.5000	1
05705		000506-24-1	STEAROLIC ACID	N	N	0.0551	0.0250	1
89876		NISS	STERAMINE TABLETS 1-G	N	N	3.0000	1.3608	1
00568	**	001633-05-2	STRONTIUM CARBONATE	N	N	3.2495	1.4740	3
05166		018480-07-4	STRONTIUM HYDROXIDE	N	N	7.2046	3.2679	2

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00570	**	010042-76-9	STRONTIUM NITRATE	N	N	3.0951	1.4040	9
01074		000057-50-1	SUCROSE	N	N	7.7161	3.5000	4
00349		005329-14-6	SULFAMIC ACID	N	N	2.2046	1.0000	2
A9043		034071-95-9	SULFOSUCCINIMIDYL-3-(4-HYDROXYPHENYL) PROPIONATE	N	N	0.0002	0.0000	1
00572		007704-34-9	SULFUR	N	N	2.2046	1.0000	2
02134		007783-60-0	SULFUR TETRAFLUORIDE	N	N	2.0000	0.9070	2
00351		007664-93-9	SULFURIC ACID, >40%	Y	N	11.0228	4.9998	2
94248		NISS	SYNTECH PRODUCTS TOUCH IT UP DE-CONTAMINANT	N	Y	0.1940	0.0879	1
00869		014807-96-6	TALC (POWDER), CONTAINING NO ASBESTOS FIBERS	N	N	6.6138	3.0000	3
96543		012033-62-4	TANTALUM NITRIDE	N	N	0.0110	0.0049	1
00573		001314-61-0	TANTALUM PENTOXIDE	N	N	0.8011	0.3632	2
06858		007721-01-9	TANTALUM(V) CHLORIDE	N	N	2.2046	1.0000	2
87084		NISS	TAP MAGIC CUTTING FLUID	N	Y	1.0431	0.4731	1
05214		000107-35-7	TAURINE	N	N	0.0551	0.0249	1
A3051		006009-98-9	TAUROCHENODEOXYCHOLIC ACID SODIUM	N	N	0.0002	0.0000	1
96544		000145-42-6	TAUROCHOLIC ACID SODIUM	N	N	0.0005	0.0002	1
96545		001180-95-6	TAURODEOXYCHOLIC ACID SODIUM	N	N	0.0022	0.0009	1
02140		013494-80-9	TELLURIUM	N	N	3.9196	1.7780	9
07440		010026-07-0	TELLURIUM CHLORIDE	N	N	0.3857	0.1749	4
A0048		NISS	TEMPILSTIK TEMPERATURE INDICATOR CRAYONS (300 DEG	N	N	1.2500	0.5669	1
00032		000075-65-0	TERT-BUTYL ALCOHOL	N	Y	2.7557	1.2499	2
B4108	**	001070-19-5	TERT-BUTYL AZIDOFORMATE	N	N	0.0660	0.0300	3
05710		000507-40-4	TERT-BUTYL HYPOCHLORITE	N	N	0.2204	0.0999	1
A0707		000058-22-0	TESTOSTERONE	Y	N	0.1102	0.0499	2
A7104		087749-50-6	TETRABUTYLAMMONIUM FLUORIDE TRIHYDRATE	N	N	0.0440	0.0200	2
A2863		032503-27-8	TETRABUTYLAMMONIUM HYDROGEN SULFATE	N	N	0.0551	0.0250	1
01077		002052-49-5	TETRABUTYLAMMONIUM HYDROXIDE	N	N	1.1023	0.5000	1
A4038		000311-28-4	TETRABUTYLAMMONIUM IODIDE	N	N	0.0551	0.0249	1
07705		098330-04-2	TETRAETHYLAMMONIUM FLUORIDE HYDRATE	N	N	0.0551	0.0250	1
08094		000077-98-5	TETRAETHYLAMMONIUM HYDROXIDE	N	N	1.1023	0.5000	1
A2667		002138-24-1	TETRAHEXYLAMMONIUM IODIDE	N	N	0.1102	0.0500	1
00117		000109-99-9	TETRAHYDROFURAN	N	Y	2.1562	0.9779	3
07196		000075-76-3	TETRAMETHYLSILANE	N	N	0.2204	0.0999	1
05252		000507-28-8	TETRAPHENYLARSONIUM CHLORIDE	N	N	1.1023	0.5000	1
96548		002001-45-8	TETRAPHENYLPHOSPHONIUM CHLORIDE	N	N	0.3086	0.1400	1
82704		NISS	TEXACO 01562 CAPELLA OIL WF 68	N	N	8.3452	3.7853	1
07450		023586-53-0	THALLIC TRIFLUOROACETATE	N	N	0.2204	0.0998	2
B3643		034822-90-7	THALLIUM CYCLOPENTADIENIDE	N	N	0.0551	0.0250	1
01700		001314-32-5	THALLIUM SESQUIOXIDE	N	N	0.1102	0.0500	1
01085		000326-91-0	THENOYLTRIFLUOROACETONE	N	N	1.6612	0.7534	7
A4495		000123-93-3	THIODIGLYCOLIC ACID	N	N	0.2204	0.0999	1
06123		000110-02-1	THIOPHENE	N	N	1.1023	0.5000	1
00112		000108-98-5	THIOPHENOL	N	N	1.1023	0.5000	1
00012		000062-56-6	THIOUREA	Y	Y	2.2046	1.0000	2
05273	**	012036-44-1	THULIUM OXIDE	N	N	1.1023	0.5000	1
06782		000050-89-5	THYMIDINE	N	N	0.0022	0.0010	1
06692		000065-71-4	THYMINE	N	N	0.0220	0.0099	1
00389		000076-61-9	THYMOL BLUE	N	N	0.0022	0.0009	1
00574	**	007440-31-5	TIN METAL	N	N	4.2046	1.9070	3
02158		013463-67-7	TITANIUM DIOXIDE	N	N	7.2046	3.2675	6

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05288		013860-02-1	TITANIUM NITRATE	N	N	1.1023	0.5000	1
05289		007705-07-9	TITANIUM TRICHLORIDE	N	N	2.1454	0.9731	2
A1154		NISS	TODAY & BEYOND BEYOND - 2001(TM)	N	Y	53.5764	24.3018	6
00107		000108-88-3	TOLUENE	N	Y	24.8004	11.2493	3
07127		001576-35-8	TOLUENE-4-SULFONOHYDRAZIDE	N	N	0.2204	0.0999	1
A1025			TORRSEAL PART A (82645) AND PART B (89492)	Y	N	0.3911	0.1774	1
07557		000538-81-8	TRANS,TRANS-1,4-DIPHENYL-1,3-BUTADIENE	N	N	0.0551	0.0250	1
05752		000110-57-6	TRANS-1,4-DICHLORO-2-BUTENE	N	N	0.0551	0.0249	1
07649		000051-35-4	TRANS-4-HYDROXY-L-PROLINE	N	N	0.0022	0.0010	1
00909		000078-50-2	TRI-N-OCTYLPHOSPHINE OXIDE	N	N	0.0551	0.0249	1
96553		000998-40-3	TRIBUTYLPHOSPHINE	N	N	0.2204	0.0999	1
05777		000688-73-3	TRIBUTYLTIN HYDRIDE	N	N	0.0660	0.0298	2
00033		000076-03-9	TRICHLOROACETIC ACID	N	N	1.1023	0.5000	1
00039	**	000079-01-6	TRICHLOROETHYLENE	Y	Y	12.2251	5.5452	1
07657		000123-02-4	TRIDECYLBENZENE	N	N	0.0551	0.0249	1
07724		000115-80-0	TRIETHYL ORTHOPROPIONATE	N	N	0.4408	0.1998	2
00131		000121-44-8	TRIETHYLAMINE	N	N	0.5511	0.2499	1
05330		000078-39-7	TRIETHYLORTHOACETATE	N	N	0.4408	0.1999	2
05335		000076-05-1	TRIFLUOROACETIC ACID	N	N	0.6612	0.2997	3
07448		000358-23-6	TRIFLUOROMETHANESULFONIC ANHYDRIDE	N	N	0.0770	0.0346	4
96557		000149-73-5	TRIMETHYL ORTHOFORMATE, ANHYDROUS	N	N	1.1023	0.5000	1
00028		000075-50-3	TRIMETHYLAMINE	N	N	0.2204	0.0999	1
96559		000503-30-0	TRIMETHYLENE OXIDE	N	N	1.1574	0.5249	2
96562		000555-44-2	TRIPALMITIN	N	N	0.0110	0.0049	1
02172		000603-34-9	TRIPHENYLAMINE	N	N	0.0551	0.0249	1
07430		000603-36-1	TRIPHENYLANTIMONY	N	N	0.0551	0.0249	1
06339		000603-35-0	TRIPHENYLPHOSPHINE	N	N	0.6612	0.2998	3
A0606		000892-20-6	TRIPHENYLTIN HYDRIDE	N	N	0.0220	0.0100	1
00680		000077-86-1	TRIS(HYDROXYMETHYL)AMINOMETHANE	N	N	1.1023	0.5000	1
06128		000072-57-1	TRYPAN BLUE	Y	N	0.2204	0.0999	1
00861		009002-07-7	TRYPSIN	N	N	0.2204	0.0999	1
A2583		NISS	TURTLE WAX MINUTE DE-ICER, T-297	N	N	10.3672	4.7017	11
A2621		000051-67-2	TYRAMINE	N	N	0.0551	0.0250	1
00672		000112-38-9	UNDECYLENIC ACID	N	N	0.2204	0.0999	1
05770	**	000066-22-8	URACIL	N	N	0.0110	0.0050	1
00908		000057-13-6	UREA	N	N	14.9207	6.7675	10
07714		000058-96-8	URIDINE	N	N	0.0002	0.0000	1
A2632		000058-97-9	URIDINE 5-MONOPHOSPHATE	N	N	0.0000	0.0000	1
00577		007440-62-2	VANADIUM METAL	N	N	0.4408	0.1999	2
00578		001314-62-1	VANADIUM PENTOXIDE	N	N	1.1647	0.5282	3
05410	**	027774-13-6	VANADYL SULFATE	N	N	1.1022	0.4999	2
00866		000121-33-5	VANILLIN	N	N	0.2204	0.0999	1
B4098	*	003536-96-7	VINYLMAGNESIUM CHLORIDE	U	N	0.1984	0.0900	1
05264		000067-03-8	VITAMIN B1	N	N	0.0110	0.0049	1
07539	**	000083-88-5	VITAMIN B2	N	N	0.0110	0.0049	1
06175	**	008032-32-4	VM & P NAPHTHA	N	N	8.8184	4.0000	1
89881		NISS	WESTLAND STIHL TWO-CYCLE ENGINE OIL	N	N	0.8345	0.3785	1
82916		NISS	WINDSHIELD DE-ICER	N	Y	1.4994	0.6802	2
06689		000069-89-6	XANTHINE	N	N	0.0022	0.0009	1
00049		001330-20-7	XYLENE	N	Y	1.1023	0.5000	1

* indicates MSDS is not available
** indicates MSDS updated within last three months

Plant: 3 Division: Department: Control Area: Building: 3047 Room: Area: WA Code:
Item ID: LIST: Ingredient: Mix Comp: to HAZ Class: HAZ Rating:
Date Expiration: Inv Status: MSDS Avail: Haz Mat Grp Cd: Phy State: Pressure Cd: Temp Cd: Cont Type Cd:

96568	000087-99-0	XYLITOL						
02188	007440-65-5	YTTRIUM METAL	N	N	0.0022	0.0009		1
00581	007646-85-7	ZINC CHLORIDE	N	N	0.0660	0.0300		3
00582	007440-66-6	ZINC METAL	N	N	6.3069	2.8605		5
00585	001314-13-2	ZINC OXIDE	N	N	3.4801	1.5783		4
A2484	001315-09-0	ZINC SELENIDE	N	N	2.2125	1.0035		3
00586	007733-02-0	ZINC SULFATE	N	N	0.1102	0.0500		1
00587	014475-63-9	ZIRCONIUM HYDROXIDE	N	Y	1.3227	0.5999		2
02679	010026-11-6	ZIRCONIUM TETRACHLORIDE	N	N	4.2046	1.9070		3
			N	N	0.2352	0.1065		3
	Building 3047	Totals:			4923.1656	2233.0585		2033

* indicates MSDS is not available
** indicates MSDS updated within last three months

14. BUILDING 3517—FISSION PRODUCTS DEVELOPMENT LABORATORY

ORNL FACILITY RmSE INFORMATION FORM

General Information	
Area/Facility Name (and aliases):	Building 3517 Fission Products Development Laboratory (FPDL)
Organization responsible for area/facility (include specific person and phone number if possible):	R.E. Eversole (576-7483), IFDP Project Manager, ER Program, LMES
Status (active/inactive): Inactive, Standby Mode	*Years of Operation:* ≈ 30

Description of Operation:

Activities involving the processing of radioactive source material have ceased in Building 3517. Current operations are limited to surveillance, maintenance, and deactivation activities and storage of most of ORNL's inventory of ^{90}Sr and ^{137}Cs. Some over packing, packaging, and transfer/transport activities are also planned for the facility for removal of remaining inventory and subsequent facility stabilization. Historical operations included recovery of long-lived fission products from aqueous waste, purification and pelletization of radiation source materials, and testing of new procedures for source fabrication. Large quantities of ^{137}Cs, ^{90}Sr, ^{144}Ce, and ^{147}Pm have been processed from liquid, high-level waste streams each year. Many Curies (Ci) of fission product materials have also been processed through the FPDL over the years. Until 1989, the FPDL processed ^{90}Sr and ^{137}Cs from Hanford, Washington for production of sources for distribution through the Isotope Distribution Program. Radioisotope processing continued in the manipulator cells between 1975 and 1989 at reduced levels of operation. This process equipment has been placed in standby for possible utilization in the future.

Physical description of area/facility:

- Building 3517 was originally constructed in the late 1950s.
- The building is a two-story, concrete block structure containing operating areas, service areas, offices, and personnel access areas. There is also an aluminum sided superstructure designated as the third story which houses a 20-ton crane, which services the operating cells. The building consists of approximately 14,400 sq. ft. of floor space.
- Building utilities include electric power, steam, and plant air.
- The building is maintained as an active storage area for radioisotopes, although the processing hot cells are in standby mode.
- Building 3517 is located in an industrial area of ORNL to the southwest of Isotopes circle. The immediate area surrounding the facility is paved for the most part with some grassy areas.
- The operating area consists of nine process cells (cell 1 through 9), ten manipulator and service cells (cell 10 through 20 - there is no longer a cell numbered 19), four tank farm cells (cell 21 through 24), a ventilation filter pit, an old and a newly installed filtration housing, and several service/pipe tunnels. (Some of the cells and one of the tunnels are presently inactive.) The four tank farm cells (listed as numbered cells) and the two pipe tunnels are located underground adjacent to the northwest corner of the building.
- The FPDL includes two cell ventilation buildings, a new filter housing (no building number), and a storage building. Building 3547 and 3548 are filtration facilities for the FPDL. Building 3542 is a storage building for the facility, containing no radioactive materials.

Physical description of area/facility: (Continued)

- An concrete pad exposed to the weather is located at the northeast corner of the facility and used for storage of casks containing radiologically contaminated material (^{90}Sr).
- Cell floor drains and the electropolisher glove box drain discharge to stainless steel collection tanks (S-223, S-324, and S-523) located in shielded underground cells adjacent to the northwest corner of the facility. Liquid waste is discharged from these tanks to the low-level, liquid waste (LLLW) system as necessary. Building floor and sink drains, steam condensate, and emergency cooling water for the storage well is monitored at Manhole 209 before discharge to the process waste system.
- Work with radioactive materials was performed primarily in the hot cells and electropolisher.
- Some interior portions of the building are restricted access areas due to radiologic contamination. Interior portions of the building observed were found to be in good condition. Many surfaces have been recently painted. Asbestos Containing Material (ACM), radiation (RAD) hazard areas, and polychlorinated bi-phenol (PCB) containing equipment are posted and/or labeled as appropriate.
- The building is operated in a "contained" state and kept under negative pressure relative to atmosphere.
- A building space diagram is attached to this form showing the locations of the various process areas and equipment.

Release Information

Description of release, or threatened release, and source:

Low levels of residual fixed and transferable radiologic surface contamination exist in areas of the facility as a result of historical operations. The contamination exists primarily in the hot cells and process equipment (vessels, hoods, piping, ventilation ducts, etc.). This contamination has accumulated from activities involving a variety of materials throughout the operating history of the facility and, therefore, cannot be attributed to a single release episode. The existing levels of RAD contamination in the facility are low and the presence of this contamination is not considered a significant hazard in its current state. The potential for release of additional radiologic contamination exists due to the large quantities of radioactive materials (primarily ^{244}Cm, ^{90}Sr, and ^{137}Cs) currently stored in the facility.

Hazardous materials (HAZMATs) (e.g., acids, hydraulic fluids, and other chemicals) were reportedly used, for the most part, in small quantities (i.e., less than 5 gallons or 100 pounds) during facility operations and currently for surveillance and maintenance (S&M) activities. A few materials are currently used in quantities that exceed 100 pounds. According to available spill/release records and facility personnel interviews, no significant HAZMAT spills (i.e., spills having the potential to adversely affect human health and/or the environment) have been reported for this building. No current conditions were identified which present a potential for a significant HAZMAT release.

Hazardous substances present:

Hazardous substances remaining in Building 3517 consist mainly of residual RAD surface contamination (α, β, γ), radioactive materials in storage, PCBs, and quantities of miscellaneous HAZMATs. Areas of fixed and transferable RAD contamination are associated primarily with the hot cells and process equipment. PCBs are reportedly present in the form of forklift hydraulic fluid. Hazardous materials present in the building are listed on the attached HAZMAT inventory sheets.

Estimate (if possible) of quantities of hazardous substances that have been released and that could be released:

The following represents the known quantities of substances currently existing in the facility. Radiologic surface contamination has accumulated from a legacy of many different programs and processes and cannot be attributed to a single release episode. It is only possible to quantify release amounts from contamination which currently exists in the facility and/or has been historically documented from past activities.

90,000 Ci ^{90}Sr.
350,000 Ci ^{137}Cs.
≈ 3,500 Ci ^{154}Eu.
≈ 2,500 Ci ^{152}Eu.
≈ 16,000 Ci ^{60}uCo.
≈ 36,000 Ci ^{244}Cm.
Quantity of PCBs unknown (assumed to be less than 1 gallon).
≈ 1,686 pounds total miscellaneous HAZMATs (see attached HAZMAT inventory sheet).

(Quantity estimates obtained from Building 3517 Hazard Screening Report, ORNL PCB Hydraulic Equipment Inventory database, ORNL Hazardous Material Information System database.)

Other pollutants or contaminants:

Asbestos containing material, primarily in the form of thermal system insulation, has been confirmed present in this building. ACM observed is in fair to good condition and poses no immediate health threat. Based on the age of the facility, interior and exterior painted surfaces are assumed to be lead-containing. Verification samples are taken by ORNL Lead Management Program personnel on an "as-needed" basis to confirm the presence of lead in the paint (i.e., when work activities will disturb the paint, or paint is found to be deteriorating and poses a health or environmental threat). Interior painted surfaces observed are in good condition and pose no immediate health threat. Many of the interior surfaces have been recently painted which leaves the potential for lead-containing underlayers of paint. Paint on exterior surfaces was observed to be in good condition with no visible evidence of significant damage or deterioration.

Groundwater

Are there any suspected impacts to groundwater? If yes, please describe. Include any impacts to drinking water sources.

Building 3517 is located in Waste Area Grouping 1 at ORNL. Although no specific adverse spills or releases of hazardous substances threatening to groundwater were identified during this RmSE, it is suspected, based on available environmental studies conducted in WAG 1, that process and LLLW drains and associated piping may have leaked over the life of the facility. Buried process and LLLW piping and some drains have been found to be deteriorated and leaking in other facilities and areas of WAG 1. Studies have determined that groundwater in WAG 1 has been both radiologically and chemically contaminated. Numerous man-made radionuclides have been detected in WAG 1 groundwater samples including many of those processed in Building 3517. It is likely that liquid waste from activities involving radioisotopes in Building 3517 have historically contributed to WAG 1 groundwater contamination. However, the radionuclides detected in the groundwater were common to the processes and activities in many other buildings in the area which makes it difficult to determine exactly which building is, or was, the source of contamination.

Because of the reported small quantities of chemicals historically used in this facility, it is unlikely that such usage has significantly contributed to WAG 1 groundwater contamination. As part of the facility shutdown process, inactive process and LLLW drains within the building have reportedly been plugged to prevent further release. However, no documentation was available at the time of this report to verify which drains have actually been plugged and which have not. Information on drain locations and discharge points is available from the ORNL Engineering Support Office.

Other than the potential for historical impact to groundwater in WAG 1 via leaking process and LLLW lines external to the building, no existing immediate threat to groundwater was identified to be associated with this facility given its current status.

Surface Water

Are there any suspected impacts to surface water? If yes, please describe. Also describe the most likely surface water migration route(s), if applicable. Include any impacts to drinking water sources.

WAG 1 is essentially bound by Fifth Creek to the east, White Oak Creek (WOC) to the south, and First Creek to the west. First and Fifth creeks flow south into (WOC) which flows to the west and exits WAG 1 at the southwest corner. Storm water (from surface runoff and storm water drainage system) and treated water from the process waste system discharges into WOC. The only potential for direct impact to surface water from Building 3517 in its current state would be from lead-containing paint chips which fall off the exterior painted surfaces and find their way into the storm water drainage system and eventually to WOC.

Surface water may have also been indirectly impacted by leaking process and LLLW lines external to the building. Some of these lines are known to have shared a common trench with storm water drainage piping. Contamination from leaking waste lines could potentially enter deteriorated storm water piping and migrate to WOC. The three creeks bordering WAG 1 are groundwater discharge points. Therefore, groundwater contaminated by leaking waste lines could also potentially impact surface water in the area.

Other than the potential for historical impact, no existing immediate threats to surface water were identified to be associated with facility.

Air

Are there any suspected impacts due to air emissions? If yes, please describe.

The Hazard Screening Report prepared for Building 3517 indicates that the potential for radiation exposure to personnel working inside and within the immediate vicinity of the facility as a result of potential airborne migration of radioactive particulates and physical contact with contaminated surfaces is considered insignificant. There is, however, a potential for significant radiation exposure as a result airborne migration of particulates from the remaining inventory of radioactive material should containment of this material be compromised. Areas of RAD contamination are identified, marked, and controlled as appropriate throughout the facility to protect against inadvertent exposure to personnel. Air flows from the interior of the building into the cells which exhaust through underground ducts to three stages of high efficiency particulate air (HEPA) filtration units and eventually to the stack 3039. Apart from catastrophic failure of the hot cells, storage equipment, or cell ventilation system, it is unlikely that radioactive air emissions from Building 3517 would impact personnel or the environment in its current state.

There is also a potential for impact to indoor air quality due to the presence of ACM and assumed lead-based paint (LBP) should these materials be disturbed. The ACM and assumed LBP remaining in the building are not considered to be immediate threats to indoor quality in their current state.

Soil

Are there any suspected impacts to soil? If yes, please describe.

As stated for groundwater, there is a potential for historical impact to soils in the area of Building 3517 due to leaking process and LLLW drain piping. Previous environmental studies have identified areas of soil contamination throughout WAG 1 and soil samples collected have detected radioisotopes common to the processes performed in this building. Since, these radioisotopes were common to the processes in many of the other buildings in the area, it is difficult to determine whether waste from Building 3517 has actually contributed to WAG 1 soil contamination based on the information reviewed during this RmSE.

There is also a potential for areas of soil adjacent to the facility to be impacted from lead if, in fact, exterior paint is found to be lead-containing. Deteriorating paint could dislodge from the surface and fall to the soil below. The exterior paint was observed to be good condition and does not pose an immediate threat in its current state.

It is unlikely that the quantities of chemicals that have been, and are being, used in Building 3517 have, or will, significantly impact(ed) soil in the surrounding area.

Release Beyond Facility or Reservation Boundaries

Has or will the release migrate beyond the boundaries of the facility or reservation? If yes, please describe (including possible human or environmental receptors).

The following are considered potential scenarios where radiologic contamination could migrate beyond the facility or reservation boundaries:

- A person becomes inadvertently contaminated and leaves the facility/reservation undetected.
- Catastrophic failure of hot cells and/or contaminated equipment.

There is also a potential for assumed lead-containing paint which peels off of the building to be carried away with surface runoff during a rain event. Though these potentials exist, they are considered slight and unlikely due to the current status of the facility and the engineering/administrative controls that are in place to protect again such an event.

Worker Safety

Could the release pose a threat to workers? If yes, please describe.

Radiologically contaminated areas are isolated and well marked. Good radiation practices and standard operating procedures are enforced for worker safety. Personnel exiting the facility are required to "frisk" themselves to detect the presence of RAD contamination. Monitors and alarms are in place to detect any radioactive release within the building. PCB containing equipment and ACM are appropriately labeled. However, even with these safeguards in place, a potential threat to workers exists if safety measures are overlooked. This potential is not considered significant given the current status and level of activity of the building.

Environmental Receptors

Does the release pose a potential threat to environmental receptors? If yes, please describe. Include natural resources impacts.

No existing conditions posing an immediate significant threat to environmental receptors, including natural resources, were identified to be currently existing or associated with Building 3517.

Mitigation

What action(s) might be taken to abate/prevent release or impacts from release?

- Continued utilization and enforcement of engineering and administrative controls that are currently in place to protect workers and monitor conditions and activities in the building.
- Continue S&M activities per Procedure IP-900.

What actions are currently being taken to abate/prevent release or impacts from release?

Engineering and administrative controls are in place to control access to contaminated areas and to monitor conditions and activities within the facility for worker and environmental protection. Warning signs and labels are posted throughout the facility indicating RAD, ACM, and PCB hazard areas. Standard operating procedures are in place for building access and surveillance and maintenance activities to protect against inadvertent contact and disturbance of contaminated areas and materials. Radiologically contaminated areas are monitored periodically by ORNL health physics personnel. Personnel are "frisked" upon exit of the facility to detect the presence of radiologic contamination. The building is currently in surveillance and maintenance status undergoing facility stabilization activities pursuant to acceptance into the Decontamination and Decommissioning (D&D) Program. Inactive waste drains are reportedly plugged in contaminated areas to prevent inadvertent discharge of contamination beyond the facility. A groundwater monitoring program is in place to monitor contamination levels and migration in groundwater underlying WAG 1. The building is inspected for structural changes after each natural incident (earthquake, tornado, or other severe storm), fire and/or man induced activity which could cause cracking, failure, or deterioration of the facility and/or equipment that may allow contamination to be released. No such conditions have been reported for Building 3517.

Current actions being taken to prevent further release and ensure worker safety in Building 3517 are considered adequate until D&D activities begin.

Other Environmental Authorities

Is the release or threatened release potentially subject to other environmental statutory actions? If yes, please explain.

If paint is found to be lead-containing and samples fail the Toxicity Characteristic Leaching Procedure (TCLP) analysis, the building could qualify as a hazardous waste generator point under the Resource Conservation and Recovery Act (RCRA).

Maintenance Actions

Are maintenance actions necessary to eliminate potential threats to human health and the environment? If so, explain.

No potential hazards requiring maintenance actions were identified to be associated with Building 3517.

Removal Actions

Are Removal Actions necessary to eliminate immediate threats to human health and the environment? If so, explain.

No imminent hazards requiring removal actions per 40 *CFR* 300.415 were identified to be currently associated with Building 3517.

Remedial Site Evaluation

Is a Remedial Site Evaluation needed?

Areas of radiologic contamination associated with Building 3517 have been identified and marked as appropriate. However, it is suspected that process and LLLW drains and associated piping may have leaked beneath the slab of the building as a result of past practices. As a result, it is recommended that some type of remedial investigation be performed to assess the condition of the soil in this area before conducting any S&M or D&D activities which involve disturbing the slab.

ACM and PCB-containing equipment have also been identified, marked and documented. No further remedial investigation involving these hazards is considered necessary given the current status and future plans of this facility.

Based on the age of the facility, painted surfaces are assumed to contain lead. Samples of the paint should be taken and analyzed to verify the presence of lead prior to conducting any S&M or D&D activities which may disturb these assumed areas.

No Further Investigation

Is a finding of No Further Investigation appropriate? Please explain.

A finding of No Further Investigation implies that a facility or area is free from hazardous substances or contaminants that may threaten human health and the environment. Since Building 3517 contains substances and materials which may become threatening if not properly controlled, handled and managed during the S&M cycle, a finding of No Further Investigation is inappropriate in this case.

Additional Comments

The following documents and databases were referenced for historical and hazard information related to Building 3517:

- Phase I Safety Documentation, The Fission Product Development Laboratory, Building 3517, Hazard Screening, Document No. HS/3517/F/RT-29 (Rev. 0).
- Work Plan for the Isotopes Facilities Deactivation Project at Oak Ridge National Laboratory, Document No. ORNL/ER-249/R2.
- Building 3517 Occurrence Reports, 1989 to present.
- Site Characterization Summary Report for Waste Area Grouping 1 at Oak Ridge National Laboratory, Oak Ridge, Tennessee, Volumes 1 and 2, Document Nos. DOE/OR-1043/V1&D1 and DOE/OR-1043/V2&D1.
- ORNL Hazardous Material Information System Database.
- ORNL Drain System Survey Report for Building 3517.

The following personnel and offices were contacted and provided historical and current use/condition information for Building 3517:

- Mr. Karl Haff, Radiochemical Processing Department Head, ORNL Radiochemical Technology Section.
- Ms. Swati Wilson, Manager, ORNL Lead Management Program.
- Mr. Nathan Dunn, Hazardous Material Information System Office.
- Mr. Jade Thomas, ORNL Environmental Compliance Office.
- Mr. Joe Armento, ORNL Chemical Technology Division, Isotopes Facilities Shutdown Program.

The RmSE of this facility was conducted for LMES under contract by:

Advanced Sciences, Inc.
800 Oak Ridge Turnpike, Suite C-102
Oak Ridge, TN

Todd R. Grant 6/18/96

Evaluator's Signature Date

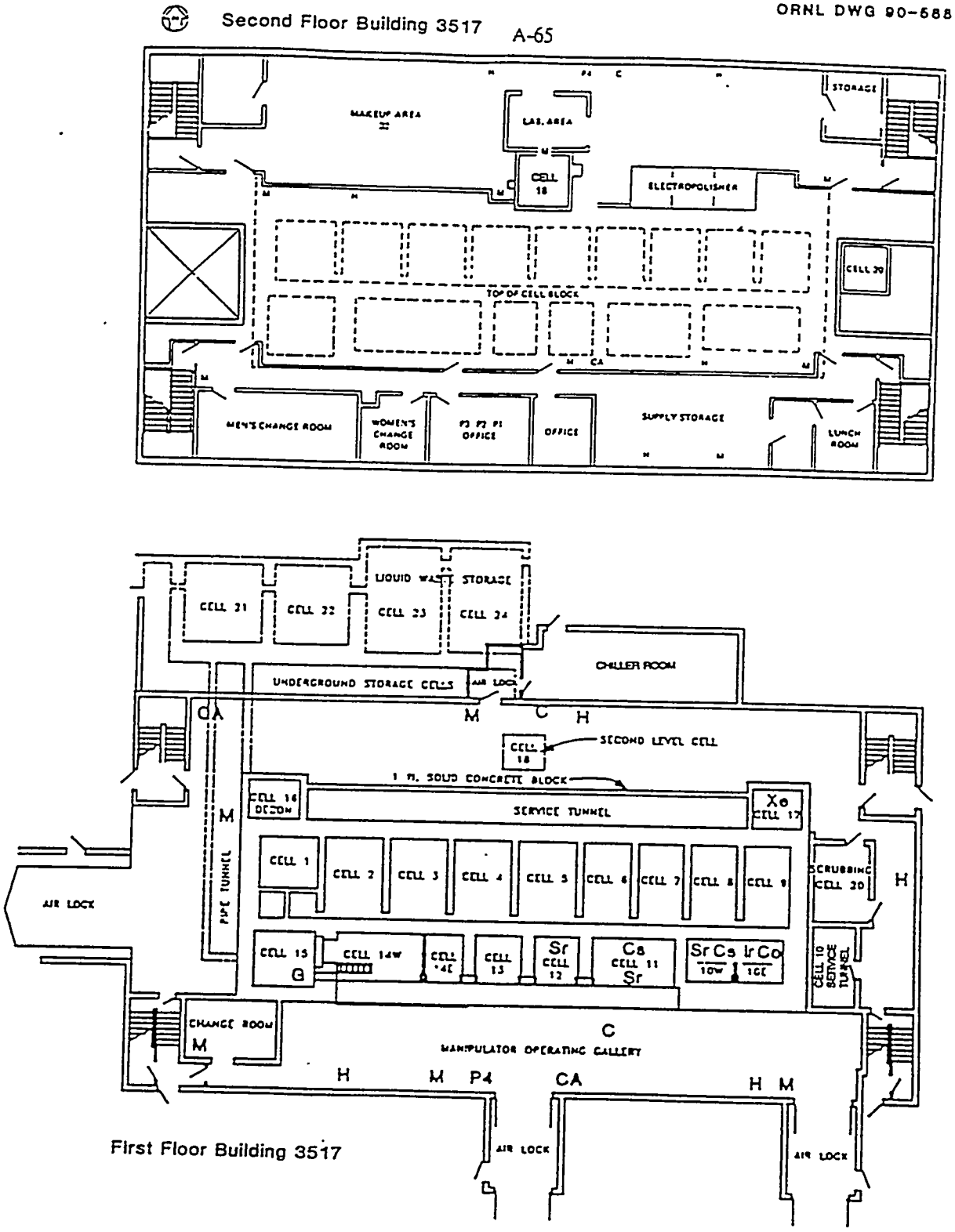

Fig. 18. Diagram of Building 3517.

Plant: 3 Division: Department: Control Area: Building: 3517 Room: Area: WA Code:
Item ID: LIST: Ingredient: Mix Comp: to HAZ Class: HAZ Rating:
Date Expiration: Inv Status: MSDS Avail: Haz Mat Grp Cd: Phy State: Pressure Cd: Temp Cd: Cont Type Cd:

Building: 3517

RECID	**	CASNO	Material Name	MMES C A	R T	Total LBS	Total KILOGRAMS	No of Items
87321		NISS	AEROSOL LACQUER	N	Y	2.5425	1.1532	3
89621		NISS	AJAX ALL PURPOSE CLEANER (NON-PHOSPHATE)	N	N	31.5000	14.2883	1
01730		007440-37-1	ARGON	N	N	277.9816	126.0909	13
91793		NISS	ARGON (95%)/METHANE (5%)	N	N	46.3860	21.0405	3
96317	**		ASHLAND PLIOBOND 8003	N	Y	2.2818	1.0350	2
00303		010326-27-9	BARIUM CHLORIDE, DIHYDRATE	N	N	0.4188	0.1900	1
82250		NISS	BIG "D" WATER SOLUBLE DEODORANT	N	N	41.3092	18.7377	1
89878		NISS	BULLEN HI-SEPT	N	N	10.4316	4.7317	1
00415		007647-17-8	CESIUM CHLORIDE	N	N	1.1023	0.5000	1
95221		NISS	COLD KILL WASP/HORNET KILLER #297852	Y	Y	8.2145	3.7261	7
86440		NISS	DURABOND D-500 CLEAR THIN SPREAD ADHESIVE	N	Y	8.3452	3.7853	1
00436	**	010028-22-5	FERRIC SULFATE, ANHYDROUS	N	N	0.8818	0.4000	1
85495		NISS	GE RTV SILICONE SEALANT	N	N	0.6715	0.3046	1
A5396		NISS	HIGH-PURITY NITROGEN AS NANO3	N	N	61.8480	28.0540	4
00870	**	007647-01-0	HYDROCHLORIC ACID	N	N	1.9626	0.8902	1
00956		005470-11-1	HYDROXYLAMINE HYDROCHLORIDE	N	N	0.8818	0.4000	1
02549		000144-62-7	J.T. BAKER OXALIC ACID, 0.1N VOLUMETRIC SOLUTION	N	N	50.0000	22.6798	1
93928		NISS	JOHNSON BRAVO EXTRA HEAVY DUTY STRIPPER 04587	N	N	41.7264	18.9269	1
82454		NISS	JOHNSON COMPLETE FOR FLOORS	N	N	42.5609	19.3055	1
87950		NISS	JOHNSON CREW SHOWER ROOM CLEANER	N	N	10.4316	4.7317	1
90355		NISS	JOHNSON LIQUID ENVY INSTANT CLEANER	N	N	10.4316	4.7317	1
89659		NISS	JOHNSON SNAPBACK LIQUID	N	N	41.7264	18.9269	1
82906		NISS	JOHNSON SOFT CARE LOTIONIZED SOAP	N	N	42.1437	19.1162	1
93930		NISS	JOHNSON WAX VIEW QUICK CLEANER	N	N	41.8930	19.0024	4
90647		NISS	K&W KNOCKER LOOSE	N	N	7.1709	3.2527	11
A8986		NISS	KEL-SAN UTILITY CLEANER (LIQUID)	N	Y	10.2229	4.6371	1
89624		NISS	KELSAN CONCENTRATED BOWL CLEANER	N	N	11.7877	5.3468	1
90007		NISS	LUBRI-BOND A (10-600)	N	Y	1.5646	0.7096	2
82502		NISS	MASTER MECHANIC AEROSOL	N	Y	9.1273	4.1398	7
A1291		NISS	MIDLAB DUST MOP & CLOTH TREATMENT	N	Y	10.7445	4.8737	1
00275		007697-37-2	NITRIC ACID	N	N	3.3069	1.5000	1
04624		007727-37-9	NITROGEN	N	N	140.2170	63.6020	8
89735		NISS	P-10 NUCLEAR COUNTER MIXTURE	N	N	161.3126	73.1702	10
95731		NISS	PLANISOL M	N	N	33.3811	15.1415	1
00512		007722-64-7	POTASSIUM PERMANGANATE	N	N	0.8818	0.4000	1
85508		NISS	PPG CUSTOM BULK COLORANTS, 96 LINE	N	Y	2.0863	0.9463	1
A5892		NISS	PREMIER CLEAN LUBE II	N	N	0.5652	0.2564	1
00323		000074-98-6	PROPANE	N	N	134.0000	60.7816	4
89646		NISS	SANI-FRESH 10-10	N	N	21.4816	9.7439	1
92144		NISS	SBS BAR SOAP	N	N	18.7500	8.5049	1
91432		NISS	SILICONE SPRAY LUBRICANT (AEROSOL) M9-14	N	Y	0.8750	0.3968	1
00543		001310-73-2	SODIUM HYDROXIDE	N	N	229.7621	104.2193	7
06410		007681-52-9	SODIUM HYPOCHLORITE SOLUTION	N	N	41.7264	18.9269	1
00658	**	000057-11-4	STEARIC ACID	N	N	1.1023	0.5000	1
89876		NISS	STERAMINE TABLETS 1-G	N	N	3.0000	1.3607	1

* indicates MSDS is not available
** indicates MSDS updated within last three months

Plant: 3 Division: Department: Control Area: Building: 3517 Room: Area: WA Code:
Item ID: LIST: Ingredient: Mix Comp: to HAZ Class: HAZ Rating:
Date Expiration: Inv Status: MSDS Avail: Haz Mat Grp Cd: Phy State: Pressure Cd: Temp Cd: Cont Type Cd:

05685	007783-48-4	STRONTIUM FLUORIDE						
80848	NISS	TURCO DECON 4502			N N	0.4409	0.2000	1
					Y N	65.0000	29.4838	1
		Building 3517 Totals:				1686.1799	764.8426	118

* indicates MSDS is not available
** indicates MSDS updated within last three months

15. BUILDING 7025—TRITIUM TARGET FACILITY

ORNL FACILITY RmSE INFORMATION FORM

General Information	
Area/Facility Name (and aliases):	Building 7025 Tritium Target Facility
Organization responsible for area/facility (include specific person and phone number if possible):	R.E. Eversole (576-7483), IFDP Project Manager, ER Program, LMES
Status (active/inactive): Inactive, Standby Mode	*Years of Operation:* ≈ 20

Description of Operation:

There are no current operations, other than surveillance, maintenance, and deactivation activities, on-going in this building. Building 7025 was originally installed in support of tritium target needs for neutron generation and special metallurgical studies. The building housed equipment for preparing tritium targets made of titanium and diffusing of tritium into metallurgical samples. The metallurgical samples were utilized for helium embrittlement studies. Other equipment, since removed, was necessary for preparation of thin films of thorium oxide and/or uranium oxide. All tritium process activities within the Tritium Target Facility were halted in October 1989. All natural-thorium/natural-uranium operations ended in late 1992.

Physical description of area/facility:

- Building 7025 is a TVA surplus building which was installed at ORNL during the late 1960s.
- The facility is a single-story, prefabricated metal structure consisting of approximately 590 sq. ft. of floor space.
- This facility is remotely located in the East Support Area of ORNL and is basically isolated from other buildings in this area. The immediate area surrounding the facility is gravel and dirt with some grassy areas.
- Building 7025 is a small single-room laboratory which consisted of a tritium process hood and various related process equipment. The hot sink located at the east end of the tritium hood drained to a small underground collection tank adjacent to the east side of the facility. Wastewater from the lavatory sink was reportedly bottled for disposal away from the facility. There is no other drainage service available for this building.
- Building utilities include plant air and electrical service.
- Work with radioactive materials was performed primarily in the tritium hood and uranium evaporator.
- The exterior of the building was observed to be in fair to good condition with no visible areas of significant deterioration or damage.
- All tritium traps, cylinders, and sources of bulk material have been removed from the facility, as well as all thorium/uranium equipment. Basically, all equipment except for the tritium hood and ventilation equipment has been removed and the facility is being cleaned. The tritium hood is in the process of being decontaminated and dismantled.
- Generally, the interior of the building is in fair condition. Wall surfaces are deteriorating in areas as a result of the on-going removal work. Asbestos Containing Material (ACM) and radiation (RAD) hazard areas are posted and/or labeled as appropriate.
- A building space diagram is attached to this form showing the locations of the various process areas and equipment.

Release Information

Description of release, or threatened release, and source:

Low levels of residual fixed and transferable radiologic surface contamination exist in areas of this facility as a result of historical operations. The contamination exists primarily in the tritium hood and associated process equipment. This contamination has accumulated from various activities throughout the operating history of the facility and, therefore, cannot be attributed to a single release episode. The existing levels of RAD contamination in the facility are low and well isolated or controlled. The presence of this contamination is not considered a significant hazard in its current state.

Hazardous materials (HAZMATs) (e.g., acids, hydraulic fluids, and other chemicals) were reportedly used in small quantities (i.e., less than 5 gallons or 100 pounds) during facility operations and currently for surveillance and maintenance (S&M) activities. According to available spill/release records and facility personnel interviews, no significant HAZMAT spills (i.e., spills having the potential to adversely affect human health and/or the environment) have been reported for this building. No current conditions were identified which present a potential for a significant HAZMAT release.

Hazardous substances present:

Hazardous substances remaining in Building 7025 consist mainly of small amounts of residual fixed and transferable RAD surface contamination (α, β/γ). Areas of RAD contamination are associated primarily with the tritium hood and process equipment remaining in the building. These areas are marked and isolated and building access is restricted.

No polychlorinated bi-phenol (PCB) items were identified to be associated with this building.

Estimate (if possible) of quantities of hazardous substances that have been released and that could be released:

The following represents the known quantities of substances currently existing in the facility. Radiologic surface contamination has accumulated from a legacy of many different programs and processes and cannot be attributed to a single release episode. It is only possible to quantify release amounts from contamination which currently exists in the facility and/or has been historically documented from past activities.

<2 μCi α
<20 μCi β/γ as ^{3}H

(Quantity estimates obtained from Building 7025 Hazard Screening Report)

Other pollutants or contaminants:

Asbestos containing material in the building has been identified, documented, and marked as appropriate. There is no immediate threat from the presence of ACM in this building. Based on the age of the facility, interior and exterior painted surfaces are assumed to be lead-containing. Verification samples are taken by ORNL Lead Management Program personnel on an "as-needed" basis to confirm the presence of lead in the paint (i.e., when work activities will disturb the paint, or paint is found to be deteriorating and poses a health or environmental threat). Interior painted surfaces observed are in fair condition with some localized areas of deterioration and pose no immediate health threat given the status of this facility. Paint on exterior surfaces was found to be in good condition, posing no immediate hazard to the surrounding area due to deterioration.

Groundwater

Are there any suspected impacts to groundwater? If yes, please describe. Include any impacts to drinking water sources.

Building 7025 is located in a fairly remote area of ORNL, approximately 1.5 miles east of Isotopes Circle. The building is not serviced by a common drainage system. A small local underground collection tank adjacent to the east side of the building was used to collect liquid waste from the hot sink in the tritium hood. Reportedly, no liquid waste streams were generated by the processes in this building, and this sink was only used by personnel for washing and decontamination. Although it was not confirmed, it is assumed that wastewater from the water fountain in the building also drained to this tank. Wastewater from the lavatory sink was reportedly bottled and disposed of away from the facility. The integrity of the existing collection tank is unknown. Reportedly, the contents have been pumped out and it currently sits empty. However, no information was identified during this RmSE to indicate the size of this tank, its historical content, or to confirm or deny whether the tank may have leaked. Due to the lack of information concerning this tank, there is a potential, which is common to all tanks of this age, that they may have leaked in the past. If the tank has leaked and did contain hazardous substances there is a high potential that groundwater in the immediate area may have been impacted. However, this potential could not be substantiated based on information identified during this RmSE.

Aside from the historical potential for groundwater impact, no existing immediate threat to groundwater was identified to be associated with this building.

Surface Water

Are there any suspected impacts to surface water? If yes, please describe. Also describe the most likely surface water migration route(s), if applicable. Include any impacts to drinking water sources.

The only potential threat to surface water identified during this RmSE is related to exterior painted surfaces if, in fact, the paint does contain lead. The potential exists for surface water to be impacted from deteriorated paint which washes of the building and finds its way to surface water with the storm water runoff.

Other than the potential for lead-based paint (LBP) impact, no existing immediate threat to surface water was identified to be associated with this building.

Air

Are there any suspected impacts due to air emissions? If yes, please describe.

The Hazard Screening Report prepared for Building 7025 indicates that there is a slight potential for radiation exposure to personnel working in or around the facility due to potential airborne migration of radioactive particulates and physical contact with contaminated surfaces. Because of the low levels and nature of RAD contamination within this facility, potential impacts to persons or the environment surrounding the facility are considered insignificant. Areas of RAD contamination are identified, marked, and controlled as appropriate throughout the facility to protect against inadvertent exposure to personnel. Air within the building is controlled by a local exhaust system. Exhaust air from the now-removed uranium evaporator was filtered through a high efficiency particulate air (HEPA) filter inside the building before being discharged to atmosphere. No HEPA filtration was used in the tritium hood exhaust since the processes in the hood involved only radioactive gases.

Are there any suspected impacts due to air emissions? If yes, please describe. (Continued)

Apart from catastrophic failure of the structure which could disturb existing contaminated surfaces, it is unlikely that radioactive air emissions from this building would impact personnel or the environment.

There is also a potential for impact to indoor air quality due to the presence of ACM and assumed LBP should these materials be disturbed. These hazards are not considered to be an immediate threat to indoor air quality given the current status of this facility.

Soil

Are there any suspected impacts to soil? If yes, please describe.

As stated for groundwater, there is a potential for historical impact to soils in the area of Buildings 7025 if, in fact, the collection tank adjacent to the building has leaked. No evidence of soil contamination such as staining, stressed vegetation, odor, etc. were observed in the area of the UST. This potential for soil contamination could not be substantiated based on information identified during this RmSE.

There is also a potential for areas of soil adjacent to the facility to be impacted from lead if, in fact, exterior paint is found to be lead-containing. Deteriorating paint could dislodge from the surface and fall to the soil below. The exterior paint was observed to be good condition and does not pose an immediate threat in its current state.

Release Beyond Facility or Reservation Boundaries

Has or will the release migrate beyond the boundaries of the facility or reservation? If yes, please describe (including possible human or environmental receptors).

The following are considered potential scenarios where radiologic contamination could migrate beyond the facility or reservation boundaries:

- A person becomes inadvertently contaminated and leaves the facility/reservation undetected.
- Catastrophic failure of the structure and/or contaminated equipment.

There is also a potential for assumed lead-containing paint which peels off exterior surfaces of the buildings to be carried away with surface runoff during a rain event. Though these potentials exist, they are considered slight and unlikely due to the current status of the facility and the engineering/administrative controls that are in place to protect again such an event.

Worker Safety

Could the release pose a threat to workers? If yes, please describe.

Radiologically contaminated areas are isolated and well marked. Good radiation practices and standard operating procedures are enforced for worker safety. Personnel exiting the facility are required to "frisk" themselves to detect the presence of RAD contamination. However, even with these safeguards in place, a potential threat to workers exists if safety measures are overlooked. This potential is not considered significant given the current status and level of activity of building.

Environmental Receptors

Does the release pose a potential threat to environmental receptors? If yes, please describe. Include natural resources impacts.

No existing conditions posing an immediate significant threat to environmental receptors, including natural resources, were identified to be currently existing or associated with Building 7025.

Mitigation

What action(s) might be taken to abate/prevent release or impacts from release?

- Continued utilization and enforcement of engineering and administrative controls that are currently in place to protect workers and monitor conditions and activities in these buildings.
- Continue S&M activities per Procedure IP-900.

What actions are currently being taken to abate/prevent release or impacts from release?

Engineering and administrative controls are in place to control access to contaminated areas and to monitor conditions and activities within the facilities for worker and environmental protection. Warning signs and labels are posted throughout the facilities indicating RAD hazard areas. Standard operating procedures are in place for building access and surveillance and maintenance activities to protect against inadvertent contact and disturbance of contaminated areas and materials. Radiologically contaminated areas are monitored periodically by ORNL health physics personnel. Personnel are "frisked" upon exit of the facility to detect the presence of radiologic contamination. The building is currently in surveillance and maintenance status awaiting entry into the Decontamination and Decommissioning (D&D) Program. The building is inspected for structural changes after each natural incident (earthquake, tornado, or other severe storm), fire and/or man induced activity which could cause cracking, failure, or deterioration of the facility and/or equipment that may allow contamination to be released. No such conditions have been reported for Building 7025. The building remains locked and secured to limit access.

Current actions being taken to prevent further release and ensure worker safety in Building 7025 are considered adequate until D&D activities begin.

Other Environmental Authorities

Is the release or threatened release potentially subject to other environmental statutory actions? If yes, please explain.

If paint is found to be lead-containing and samples fail the Toxicity Characteristic Leaching Procedure (TCLP) analysis, the building could qualify as a hazardous waste generator point under the Resource Conservation and Recovery Act (RCRA).

Maintenance Actions

Are maintenance actions necessary to eliminate potential threats to human health and the environment? If so, explain.

No existing potential hazards requiring maintenance actions were identified to be associated with Building 7025.

Removal Actions

Are Removal Actions necessary to eliminate immediate threats to human health and the environment? If so, explain.

No imminent hazards requiring removal actions per 40 *CFR* 300.415 were identified to be currently associated with Building 7025.

Remedial Site Evaluation

Is a Remedial Site Evaluation needed?

It is recommended that a Remedial Site Evaluation (RSE) be conducted at Building 7025 to determine whether the collection tank located adjacent to the building has leaked and whether a remedial investigation is necessary.

Building 7025 has reportedly been surveyed for asbestos containing material (ACM); therefore, no further remedial investigation involving this hazard is considered necessary given the current status and future plans of this facility.

Based on the age of the facility, painted surfaces are assumed to contain lead. Samples of the paint should be taken and analyzed to verify the presence of lead prior to conducting any S&M or D&D activities which may disturb these assumed areas.

No Further Investigation

Is a finding of No Further Investigation appropriate? Please explain.

A finding of No Further Investigation implies that a facility or area is free from hazardous substances or contaminants that may threaten human health and the environment. Since Building 7025 contains substances and materials which may become threatening if not properly controlled, handled and managed during the S&M cycle, a finding of No Further Investigation is inappropriate in this case.

Additional Comments

The following documents and databases were referenced for historical and hazard information related to Building 7025:

- Phase I Safety Documentation, Tritium Target Facility, Building 7025, Hazard Screening, Document No. HS/7025/3093/F/RT-33 (Rev. 0).
- Work Plan for the Isotopes Facilities Deactivation Project at Oak Ridge National Laboratory, Document No. ORNL/ER-249/R2.
- Building 7025 Occurrence Reports, 1989 to present.
- ORNL Hazardous Material Information System Database.

The following personnel and offices were contacted and provided historical and current use/condition information for Building 7025:

- Mr. Karl Haff, Radiochemical Processing Department Head, ORNL Radiochemical Technology Section.
- Mr. Herman Phillips, Assistant Facilities Manager, ORNL Special Projects.
- Ms. Swati Wilson, Manager, ORNL Lead Management Program.
- Mr. Nathan Dunn, Hazardous Material Information System Office.
- Mr. Jade Thomas, ORNL Environmental Compliance Office.
- Mr. Joe Armento, ORNL Chemical Technology Division, Isotopes Facilities Shutdown Program.

The RmSE of this facility was conducted for LMES under contract by:

Advanced Sciences, Inc.
800 Oak Ridge Turnpike, Suite C-102
Oak Ridge, TN

Todd R. Grant — Evaluator's Signature

6/18/96 — Date

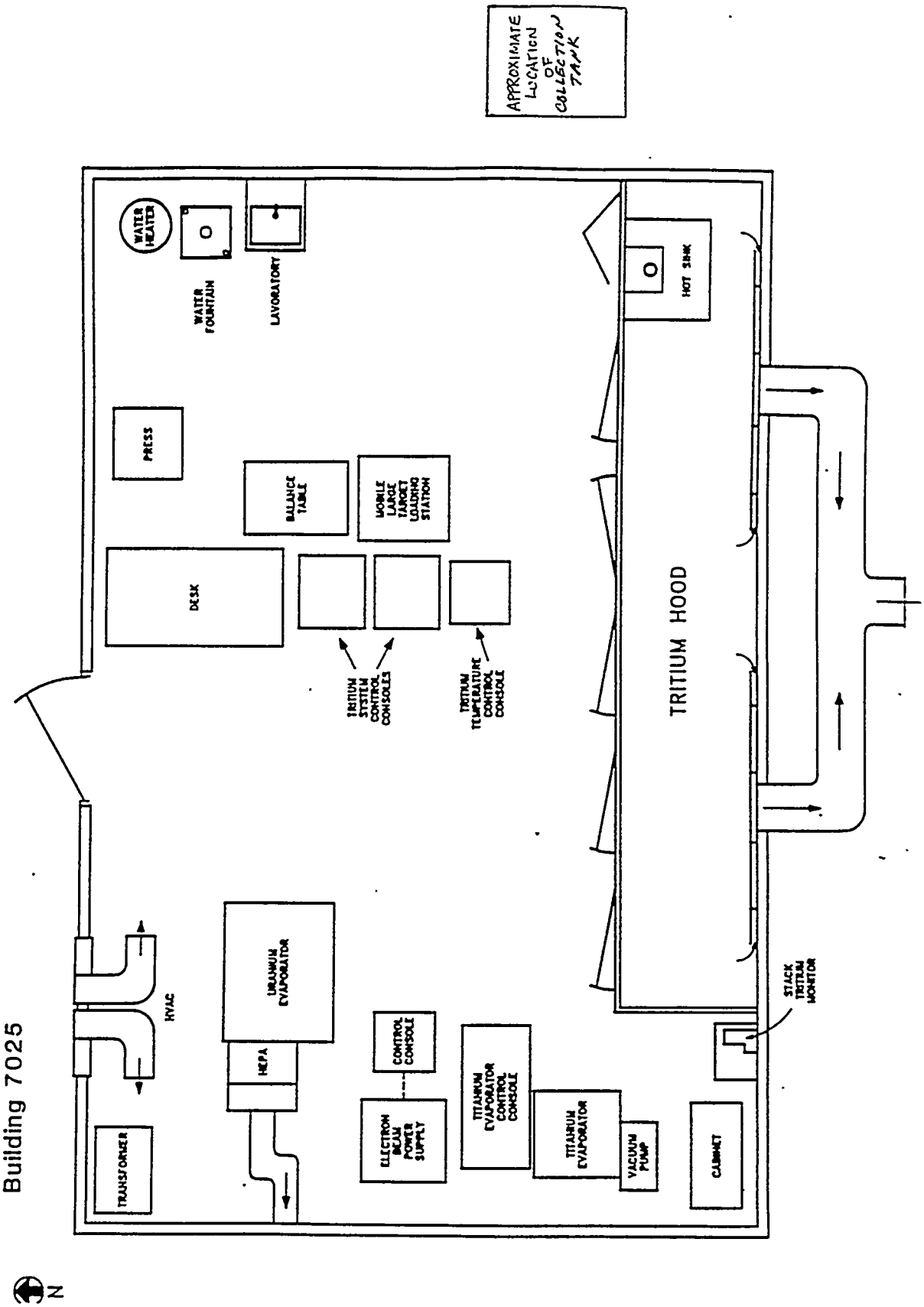

Fig. 19. Diagram of Building 7025.

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15. J. W. Wagoner II, Team Leader, Portsmouth/Paducah/Weldon Spring Team, Office of Environmental Restoration, U.S. Department of Energy, Cloverleaf Building, EM-424, 19901 Germantown Road, Germantown, MD 20874
16. V. F. Boston, DOE Oak Ridge Operations Office, P.O. Box 2001, Oak Ridge, TN 37831-8541
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19-20. Office of Scientific and Technical Information, P.O. Box 62, Oak Ridge, TN 37831 (2)
21. T. R. Conant, Advanced Sciences, Inc., 800 Oak Ridge Turnpike, Suite C-102, Oak Ridge, TN 37830-6927