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Ames Laboratory
Site Environmental Report
Calendar Year 1995

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Ames Laboratory
Iowa State University
Ames, Iowa 50011-3400

MASTER

Prepared for the
U. S. Department of Energy
Under Contract No. W-7405-Eng-82

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1.0 EXECUTIVE SUMMARY

This report summarizes the environmental status of Ames Laboratory for calendar year 1995. It includes descriptions of the Laboratory site, its mission, the status of its compliance with applicable environmental regulations, its planning and activities to maintain compliance, and a comprehensive review of its environmental protection, surveillance and monitoring programs.

Ames Laboratory is located on the campus of Iowa State University (ISU) and occupies twelve buildings owned by the Department of Energy (DOE). The Laboratory also leases space in ISU owned buildings. Laboratory activities involve less than ten percent of the total chemical use and approximately one percent of the radioisotope use on the ISU campus. In 1995, the Office of Assurance and Assessment merged with the Environment, Safety and Health Group to form Ames Laboratory Environment, Safety, Health and Assurance (ESH&A).

The Laboratory accumulates and disposes of wastes under U.S. Environmental Protection Agency (EPA) issued generator numbers. Ames Laboratory submitted a Proposed Site Treatment Plan to EPA on schedule in March 1995. This plan complies with the Federal Facilities Compliance Act (FFCA). It was approved by EPA in January 1996.

Pollution awareness, waste minimization and recycling programs, implemented in 1990 and updated in 1994, continued in 1995. Included in these efforts are a waste white paper and green computer paper recycling program. Ames Laboratory also continues to recycle salvageable metal and used oil, and recovers freon. All of the chemical and nearly all of the radiological "legacy" wastes have been properly disposed of. Laundry machine wastewater accumulated in holding tanks is analyzed before release to the sanitary sewer system.

Ames is responsible for a small former chemical disposal site (CDS), located on ISU property near the Applied Sciences Complex. The site was used from 1957 through 1966 for burying waste chemicals and metal slags. The materials were buried according to standard practice at the time. In 1993-94, the first phase of the site remedial investigation (RI) was completed. The Phase I RI included evaluation of surface soil samples, deep soil sample corings near the burial pits, shallow soil sample corings at various other points within the site area, groundwater samples from monitoring wells and surface water samples from adjacent ravines and Squaw Creek. The buried materials were removed and shipped to the Envirocare disposal facility in Utah in the fall and winter of 1994-95. A Phase II RI is in progress at the site. Fifteen groundwater monitoring wells are in place. An ecological survey was completed in August 1995. Groundwater samples were collected and analyzed in July and October of 1995, and in January and April of 1996. Uranium and volatiles contamination has been detected in the wells closest to the excavated area, within the security fence. A Phase II RI report will be written in 1996.

The former Ames Water Pollution Control Plant (sewage plant) was approved for unrestricted use by the Iowa Department of Public Health on February 17, 1995. The site was one of nine areas of concern that Ames Laboratory investigated in 1993 and 1994. Some of these areas were locations of research or waste storage during the 1940's and 1950's. The others were

areas where municipal sewage sludge from the old sewage plant containing small amounts of thorium progeny (radium, actinium, etc.) may have been used as fertilizer. After regulatory review of the original investigative report in 1994, the Iowa Department of Public Health decided the old Ames Water Pollution Control Plant required further sampling. This decision was influenced by the site's intended future use as a youth sports complex. The Oak Ridge Institute for Science and Education (ORISE), under direction of the Iowa Department of Public Health (IDPH), performed the investigation in April 1994. Thirteen samples were slightly elevated over background. Soil was removed from the thirteen sampled areas with the highest radioactivity, above or near the action level of 5pCi/g. Confirmatory samples were analyzed by EPA and the state's University Hygienic Laboratory (UHL). The site was approved by IDPH for unrestricted use February 17, 1995 based on the good confirmatory sample results and the well documented site history. In a letter dated January 11, 1996, IDPH approved five of the other eight areas for unrestricted use and approved the remaining three for their current uses.

The Laboratory removed its last underground storage tank (UST) in August 1995. Soil borings and groundwater samples collected between November 1993 and May 1994 indicated there is minor soil contamination confined to a small plume in a layer 7-15 feet below the surface. No volatiles were detected in the groundwater samples. The Iowa Department of Natural Resources is not requiring a site cleanup nor a standard monitoring program at this site because groundwater is not contaminated and the limited soil contamination is naturally attenuating. The tank was replaced by a double walled above ground tank with leak detection.

In calendar year 1995, Ames Laboratory was not required to report to DOE through the Performance Indicator Database System (PIDS) on any environmental performance indicators or measures. Plans were written for routine air and groundwater monitoring of Ames Laboratory facilities and areas to comply with existing DOE Orders and the pending 10 CFR 834. Implementation of these plans is resource limited. It is anticipated that funding to comply with 10 CFR 834 will be available when needed.

The following page contains the 1995 Ames Laboratory Site Environmental Report Feedback Form. The comment form is provided to solicit public input on the development and improvement of future SER's. Public input is encouraged.

1995 Ames Laboratory Site Environmental Report Feedback Form

(remove and copy as needed; attach additional pages as needed)

Return to: Ames Laboratory
Environment, Safety, Health and Assurance
G40 TASF, Iowa State University
Ames, IA 50011-3400

1. What prompted your interest in environmental activities at Ames Laboratory?

2. In what ways can this report document and/or format be improved?

3. Do you have any questions on specific items or issues in this report?

4. Do you have any other comments?

Ames Laboratory, June 1996

2.0 INTRODUCTION

2.1 Site Description

Ames Laboratory is a U. S. DOE facility located on the campus of Iowa State University (ISU) at Ames, Iowa (Figures 2-1 through 2-5). Ames is a government owned, contractor operated (GOCO) facility. ISU is the contractor. The Technical and Administrative Support Facility (TASF) houses most of the Laboratory management offices. The TASF is located at latitude 42° 01' 30" north by longitude 93° 39' 00" west. The buildings owned by the DOE are:

<u>Building</u>	<u>Gross Square Feet</u>
Spedding Hall	106,885
Metals Development Building	97,594
Wilhelm Hall	61,929
TASF	44,020
Campus Warehouse Building	16,594
Mechanical Maintenance Building	8,540
Maintenance Shops Building	7,503
Paint and Air Conditioning Shops Building	4,998
Construction Storage Shed	4,320
Storage Shed	2,100
Records Storage Building (formerly the Computer Services Building)	1,672
Storage Shed	500
-----	-----
Total DOE Owned	356,655

In addition to the buildings owned by the DOE, Ames Laboratory rented a net total of 37,006 square feet of space from ISU in 1995. In 1987 the DOE transferred ownership of the buildings it owned at the Applied Sciences Complex (ASC) site to ISU. The ASC is located one mile northwest of the ISU campus (Figure 2-6). The buildings included are the Applied Sciences Complex buildings, ASC I, II and III, the Radioactive Waste Handling Facility, and the Test Cell. Ames Laboratory retains beneficial use of the Radioactive Waste Handling Facility through the year 2060. This building also houses the Alpha Facility, a Laboratory facility which may use small amounts of radionuclides in the future.

The ISU main campus is surrounded by the City of Ames, Iowa (Figures 2-2 and 2-3), population 48,650. An estimated 55,000 people live within an eight kilometer (five mile) radius of the campus. The student population of ISU is about 24,350.

The climate is temperate, continental, and subject to wide temperature and precipitation ranges throughout the year. Mean monthly temperatures vary from a low of negative 7.5 degrees Celsius (18.5° F) in January to a high of 23.8 degrees Celsius (74.8° F) in July. Average

Ames Laboratory

Figure 2-1, Location of Ames Laboratory in the State of Iowa

Figure 2-2, City of Ames, Iowa

Figure 2-3, ISU Campus in Ames

Figure 2-5, Technical and Administrative Support Facility

Figure 2-6, ISU Applied Science Complex Buildings

rainfall equivalent precipitation varies from 1.8 centimeters (0.7 inches) in January to 13.7 centimeters (5.4 inches) in June.

The region is gently rolling with a slight pitch to the southeast. The shallow soils are glacial drift with a depth of approximately 19.8 meters (65 feet). This material is underlaid by predominantly limestone bedrock. In the central campus area, depth to ground water is approximately 3.0 meters (10 feet). At the ASC site depth to groundwater averages approximately 5.5 meters (18 feet). Surface run-off from both areas goes to Squaw Creek, a tributary of the South Skunk River. The streams have a combined average daily flow of approximately 644 million liters (170 million gallons).

2.2 Organization and Administration

Ames Laboratory is operated by Iowa State University under Contract No. W-7405-Eng-82 with the U. S. DOE. The DOE's Chicago Operations Office oversees operation of the Laboratory. Ames is a member of the Institute for Physical Research and Technology (IPRT), an ISU association of research laboratories. In 1995, the Laboratory employed 650 persons totaling 525 full time equivalents. See the organizational chart for the end of 1995, Figure 2-7.

2.3 Mission

The Ames Laboratory conducts fundamental research which underlies energy generating, conversion, transmission and storage technologies, environmental improvement, and other technical areas essential to national needs. These efforts are maintained to contribute to the achievement of the vision of DOE, and to increase the general levels of knowledge and technical capabilities, to prepare engineering and physical sciences students for the future and to develop new technologies and practical applications from our basic scientific programs that will contribute to strengthening the economy of the United States. In 1995, the Laboratory's research projects fell within the following 13 program areas.

Applied Mathematical Sciences	Fossil Energy
Environmental Technology Development	Environmental Sciences
Fundamental Interactions	Advanced Industrial Concepts
Materials Chemistry	Metallurgy and Ceramics
Nondestructive Evaluation	Processes and Techniques
Advanced Nuclear Systems	Condensed Matter Physics
Safeguards and Securities	

The Laboratory approaches all its operations with the safety and health of all workers as a constant objective and with genuine concern for the environment. The Laboratory relies upon its strengths in materials synthesis and processing, materials reliability, chemical analysis, chemical sciences, photosynthesis, materials sciences, metallurgy, high-temperature superconductivity, and applied mathematical sciences to conduct the long term basic and intermediate range applied

Figure 2-7, Ames Laboratory 1995 Organizational Chart

* Member of Executive Council

** Partnership for a New Generation of Vehicles

research needed to solve the complex problems encountered in energy production and utilization as well as environmental restoration and waste management. Ames Laboratory will continue to maintain a very significant and highly beneficial pre-college math and science education program which currently serves both teachers and students at the middle school and high school levels. Our technology transfer and industrial outreach program is aided by joint efforts with ISU's technology development and commercialization enterprise and will sustain concerted efforts to implement "Cooperative Research and Development Agreements", industrially sponsored "Work for Others" projects, and scientific collaborations with industrial partners from both large and small businesses.

2.4 Purpose of Site Environmental Report

The primary purpose of this report is to summarize the performance of Ames Laboratory's environmental programs, present highlights of significant environmental activities, and confirm compliance with environmental regulations and requirements. The summarized data and conclusions from Ames Laboratory environmental monitoring during calendar year 1995 are presented in this annual Site Environmental Report. This report is a working requirement of Department of Energy Order 231.1, "Environment Safety, and Health Reporting".

3.0 COMPLIANCE SUMMARY

3.1 CALENDAR YEAR 1995 COMPLIANCE STATUS

Ames Laboratory was in compliance with all applicable environmental regulations that were in force during 1995. In 1995, the Laboratory addressed non-compliances with DOE orders which were identified by a DOE-HQ Environmental Audit in September 1994. The 1994 DOE related non-compliances were in the areas of air and groundwater monitoring, environmental training, and self-assessment and oversight. See Section 3.16.

3.2 Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)

At the closed chemical disposal site (CDS), a source removal (interim remedial action) was performed from September 1994 through March 1995. DOE entered into an interagency agreement with the U.S. Army Corps of Engineers (COE) to oversee the source removal. DOE entered into a license agreement with ISU allowing DOE and its contractors to perform the source removal on ISU property. Shipment of wastes from the CDS source removal was completed in March 1995.

Phase II Remedial Investigation work plans were approved in March 1995, and the Phase II RI is in progress. A Phase II RI ecology study was conducted in August 1995, and the preliminary ecology report was issued in October 1995. Groundwater samples were collected for the Phase II RI in July and October 1995, and in January and April 1996. Uranium and volatiles

contamination has been detected in the wells closest to the excavated area. See section 5.4.1. A Phase II RI report will be written in 1996.

An Investigative Summary Report of nine areas of concern was produced in December 1994. After reviews and revisions, the final report was released in February 1995. IDPH reviewed the Investigative Summary Report for the nine small areas of concern during 1995.

One of the nine sites was the former Ames Water Pollution Control Plant. Samples were collected from this site by Oak Ridge Institute for Science and Education (ORISE) under direction of the Iowa Department of Public Health (IDPH). Thirteen samples were slightly elevated over background. Soil was removed in October 1994 by the subcontractor doing the CDS source removal. The follow-up samples were within background level activity. IDPH released the site for unrestricted use February 17, 1995. See section 5.4.2.

A small area located at 13th Street and Stange Road in Ames was sampled under IDPH supervision. This area is known as the old Iowa State College dump. Uranium and thorium activities were background. See section 5.4.3.

The proper public comment periods have been observed for specified documents associated with the CDS site restoration. The community advisory group (CAG), formed in May 1994, is the primary vehicle for public input to Ames site restoration activities. The CAG meets with the Ames Laboratory Director and other interested parties on an as needed basis. DOE conducted a public meeting in the Ames City Council chambers on March 25, 1995. The primary topic was the Phase II Remedial Investigation at the CDS. No further meetings are anticipated until September 1996. At that meeting, the CDS proposed plan will be discussed.

3.3 Resource Conservation and Recovery Act (RCRA)

Ames Laboratory is a GOCO facility. Therefore, all wastes generated are DOE wastes. In 1995, DOE had four RCRA waste generator identification numbers from the Environmental Protection Agency (EPA) Region VII. See the summary table in section 3.17. Activities associated with the campus facility number were those of a large quantity generator. In calendar year 1995, 4687 kg of hazardous waste were properly disposed. All reporting requirements were met. The second EPA number was for a conditionally exempt small quantity generator for the radiological waste handling facility at the ASC. This waste disposal building stages radiological, hazardous and mixed wastes. The third generator number was for CDS source removal wastes only, a conditionally exempt small quantity generator. This activity was completed in 1995, but the site has not been released by the regulators. The fourth number was a conditionally exempt small quantity generator for the Technology Integration Program (TIP). This program became inactive after 1995, and the generator number expired in early 1996. See section 3.17.

The Laboratory was in compliance with all applicable requirements of 40 CFR 262 for all of 1995. A surprise inspection from EPA Region VII on April 12-14, 1994, resulted in findings

concerning waste storage. The local EPA inspector forwarded the findings to EPA Region VII. Through all of 1995, EPA did not decide if a formal notice of violation (NOV) will be issued. An initial response to the inspection findings was made April 22, 1994. The response consisted of corrective actions taken and a brief plan for preventing future non-compliances. Additional information was sent to EPA in October. EPA indicated verbally in 1995 that a response would be sent to the Laboratory after completion of activities associated with the Federal Facilities Compliance Act (FFCA). No further actions were taken on the findings through 1995.

The Laboratory uses the Idaho National Engineering Lab (INEL) Waste Tracking System. The EPA Biennial Report for calendar year 1995 was completed and submitted on time in January 1996. The report is required of all large quantity generators, and is a record of wastes removed from the facility.

Ames Laboratory has maintained a conservative waste disposal policy in which materials that are not regulated by RCRA, yet which might pose or be perceived to pose any kind of a potential hazard, are handled and sent for disposal as though they are RCRA regulated wastes. See section 3.4. The Laboratory disposes wastes at an out of state EPA permitted facility under three generator numbers. It remains the Laboratory's practice to have these RCRA regulated wastes incinerated rather than put into a permitted landfill. Incineration ensures the complete destruction of the hazardous constituents and eliminates any potential for members of the public being exposed in the future. Hazardous wastes are shipped out quarterly and radioactive wastes are shipped out yearly, except contaminated lead. It is shipped biennially.

The Laboratory removed its last underground storage tank (UST) in 1995. Soil borings and groundwater samples collected during site investigations indicated there is minor soil contamination confined to a small plume in a layer 7-15 feet below the surface. No volatiles were detected in the groundwater samples. The investigation results were submitted to Iowa DNR which issued an official ruling on December 2, 1994. DNR is not requiring a site cleanup nor a standard monitoring program at this site due to the limited, naturally attenuating soil contamination. In August 1995, the tank was removed. The excavation was filled with clean sand, and the area was repaved. An above-ground diesel tank is now on the site. See section 7.0.

3.4 Federal Facilities Compliance Act (FFCA)

The FFCA amends a part of RCRA, and requires the preparation of site treatment plans for the handling of mixed wastes. The Conceptual Site Treatment Plan (STP) was written in 1994 as a first step in compliance with the Federal Facilities Compliance Act (FFCA). It was expanded into a Draft Site Treatment Plan which received regulatory and public comments. In 1995, the draft plan was revised into a proposed plan and submitted to EPA December 20, 1995. The STP was approved by EPA in January 1996. DOE-CH received the complaint, compliance order and notice of opportunity for hearing from EPA on March 4, 1996, and the consent agreement and consent order on March 13, 1996.

The FFCA prescribes that EPA issue an order requiring compliance with the approved Site Treatment Plan. Within one year, Ames Laboratory must provide EPA a report on the completed treatability study. Once the treatability study report is approved, EPA is to provide Ames Laboratory with a notice of termination, indicating all actions have been fully performed in accordance with the consent agreement.

All mixed wastes not in compliance with land disposal restriction (LDR) requirements were removed from the facility by September 1995. The transuranic (TRU) waste stream was eliminated from the STP because it has not been generated yet. Contaminated lead was eliminated as a mixed waste stream because it does not meet the criteria. All mixed waste streams currently being generated at the Laboratory have been included in the Mixed Waste Inventory Report and are managed in accordance with the Site Treatment Plan. Ames properly disposed of 13 kg of mixed waste in 1995 to Diversified Scientific Services, Inc. (DSSI) and Scientific Ecology Group (SEG). DSSI incinerated 9.3 kg of the waste and SEG treated 3.7 kg to comply with LDR requirements.

3.5 National Environmental Policy Act (NEPA)

NEPA requires actions proposed by federal agencies to be evaluated for their potential environmental impacts, and for alternatives to the proposed actions. These evaluations are documented in either Environmental Assessments (EA's) or Environmental Impact Statements (EIS's). Categorical Exclusions (CX's) are classes of actions that the evaluating federal agency has determined do (will) not individually or cumulatively have a significant impact on the environment. CX's require less extensive documentation than EA's or EIS's. On February 13 and April 25, 1995, the Laboratory received categorical exclusion (CX) determinations. Both were for facilities repairs and room renovations and modifications having no significant environmental impact. The second project was an expansion of and cost increase to the first.

3.6 Clean Air Act (CAA) and National Emissions Standards for Hazardous Air Pollutants (NESHAP)

U.S. EPA Region VII delegated CAA authority to the State of Iowa Department of Natural Resources. Iowa DNR does not require either air construction permits or Title V permitting for laboratory fume hoods. DNR issued an official ruling for Ames Laboratory on July 18, 1994 stating that no permitting and no monitoring are required for the 144 fume hoods and 34 associated exhausts. There are no federal or local permits or compliance agreements in force for air emissions, nor are any anticipated.

The Laboratory uses only small quantities of chemicals and radionuclides, lab bench quantities, for its research and development activities. Any air emissions generated by Ames Laboratory activities are sporadic and in very small quantities. Ames Laboratory does not have a power plant, but obtains its utilities from ISU. The Laboratory is in compliance with all CAA requirements including the National Emission Standards for Hazardous Air Pollutants (NESHAP)

regulations for radionuclide emissions from DOE facilities. In 1995, the work involving radionuclides did not produce small enough particles in sufficient quantities to become airborne contaminants or radioactive emissions to the environment. See Table 5-1. Historically any use of radionuclides is inside glove boxes and/or fume hoods. These hoods and boxes are high efficiency particulate air (HEPA) filtered. Using the CAP88 model, calculated emissions have always been a minute fraction of the 10 mrem (0.1 mSv) per year limit, typically 10^{-8} to 10^{-11} mrem (10^{-10} to 10^{-13} mSv) per year.

There are currently eight potential sources of radionuclide emissions to the environment at Ames Laboratory. However, these sources are small scale activities and the radionuclide use in these sources is conducted so that no environmental hazard will be introduced. The hoods and glove boxes used for these activities are HEPA filtered. The CAP88 air model is used to produce the annual NESHAP report for these potential sources.

3.7 Clean Water Act (CWA)

The Ames Laboratory does not have any regulated point source effluents. Neither Ames Laboratory nor ISU need any National Pollutant Discharge Elimination System (NPDES) permits. The Laboratory discharged approximately 52,840,000 liters (13,950,000 gallons) of wastewater to the ISU sanitary sewer system in 1995. This was 5.5% of the total discharged from ISU's central campus. The University central campus discharged 963,500,000 liters (254,368,000 gallons) of wastewater to the City of Ames sewer system. Central campus does not include the dormitory complex or the ASC. Ames Laboratory discharges were less than one percent of the total wastewater processed by the City of Ames wastewater treatment facility. The City of Ames has an NPDES permit. The City of Ames has an agreement for wastewater pre-treatment with ISU, which includes Ames Laboratory wastewater. Both the City of Ames and the University sampled ISU wastewater effluent in 1995 as part of this agreement. No stormwater permits are necessary for current Laboratory operations. DOE construction on ISU land is covered by a stormwater permit held by ISU.

3.8 Safe Drinking Water Act (SDWA)

Drinking water for the Laboratory is supplied by the City of Ames public water system through the University's water mains. The Ames public water system is tested by the city to meet the standards of the SDWA. The Laboratory used 55,530,500 liters (14,667,309 gallons) of potable water in 1995, or 4.6% of the $1.20\text{E}+9$ liters ($3.22\text{E}+8$ gallons) used by the ISU central campus.

Selected Ames Laboratory drinking fountains were monitored for lead and copper in 1995. In 1992 and 1993, the drinking fountain on the first floor of Spedding Hall was tested for lead and copper by ISU, both the sample collection and analysis. A confirmatory sample was collected by ISU in 1993 and analyzed by Minnesota Valley Testing Lab. A one time sampling of fountains in five Laboratory buildings was conducted by Ames ESH&A in July 1994. Beginning

in September 1994, Ames Laboratory Facilities Services has monitored fountains in Wilhelm Hall, Metals Development and Spedding Hall in accordance with the Laboratory's Policy for Monitoring Lead in Potable Water. Samples are drawn and tested annually, but the frequency may be adjusted based on a history of the results. Analyses are done at an independent laboratory. Results which exceed action levels, will initiate corrective action and re-testing until lead content is below the action level. The results are summarized in Table 3-1. All samples have been within regulatory limits for lead and copper.

3.9 Superfund Amendments and Reauthorization Act (SARA) Title III and Iowa Administrative Code, Section 567, Chapter 131, Spill Reporting

The Laboratory is subject to the emergency reporting requirements of the Superfund Amendments and Reauthorization Act (SARA) in Title III the Emergency Planning and Community Right to Know Act (EPCRA), Sections 302-304, 311 and 312. Data reported to EPA are available to the public through the National Library of Medicine's "TOXNET" database and under the DOE Office of Environmental Compliance, EH-41, Internet home page. The Laboratory was in compliance with Executive Order 12856, Federal Compliance with Right to Know Laws and Pollution Prevention Requirements, during 1995. The name of a facility representative and a listing of all hazardous chemicals on site have been reported to the State Emergency Response Commission, the Story County Emergency Planning Committee and the City of Ames Fire Department. The Laboratory did not store any chemicals in excess of threshold planning quantities (TPQ) in 1995. If a chemical is found to exceed the TPQ, the Laboratory will submit a Tier II report to the agencies named above.

Spills to the environment are reported to the Iowa Department of Natural Resources in accordance with the Iowa Administrative Code, Rule 567, Chapter 131. There is no minimum reportable quantity under Chapter 131. There were no environmental spills in 1995. See section 6.5.

3.10 Toxic Substances Control Act (TSCA)

Approximately 4712 kg of asbestos and asbestos containing material were properly removed and disposed in 1995. Ames Laboratory asbestos is disposed in the Ames-Story Environmental Landfill, DNR permit number 85-SDP-13-91P. The Laboratory complies with the State of Iowa Solid Waste Disposal Rule #102.14 and 40 CFR 61, Subpart M (asbestos NESHAP).

All Ames equipment has been declassified for polychlorinated biphenols (PCB's). A piece of equipment that contained oil with <50 ppm PCB was declassified in late 1994, and removed in 1995. All Laboratory PCB's are incinerated at the Aptus facilities near Coffeyville, KS and Aragonite, UT.

Table 3-1, Ames Laboratory Drinking Fountain Analyses

Results in mg/l

BUILDING, LOCATION	1992 LEAD / COPPER	1993 LEAD / COPPER	1994 LEAD / COPPER	1995 LEAD / COPPER
Warehouse, main area			<0.002 / 0.03	
Shop, main area			<0.002 / 0.03	
Metals Development, 2nd floor			<0.002 / 0.13	
Computer Building, main hall			<0.002 / 0.01	
Wilhelm Hall, 3rd floor west			<0.002 / 0.02	
Spedding Hall, 1st floor west	<0.005 / <0.005 <0.005 / <0.005	0.001 / <0.1 <0.002 / 0.01	<0.002 / <0.01	<0.002 / 0.03
Wilhelm Hall, 3rd floor east			<0.002 / <0.01	0.003 / 0.02
Metals Development, room 158			<0.002 / 0.03 <0.002 / 0.03	<0.002 / 0.06

The regulatory limits are 0.015 mg/l lead and 1.3 mg/l copper.

3.11 Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)

Not Applicable. Ames Laboratory does not purchase or use pesticides regulated by FIFRA.

3.12 Endangered Species Act (ESA)

Not Applicable. No endangered species have been identified on or near Ames Laboratory facilities or Laboratory controlled areas.

3.13 National Historic Preservation Act (NHPA)

Not Applicable. No historic resources have been identified on or near any of the Ames Laboratory facilities or Laboratory controlled areas. No archeological resources have been identified on or near the facilities or controlled areas.

3.14 Executive Order 11988, "Floodplain Management"

Not Applicable. All Laboratory facilities are well outside the 100 year flood line as mapped by the U.S. Geological Survey (USGS) and the Iowa Geological Survey Bureau (GSB). Ames Laboratory facilities and Laboratory controlled areas were not affected by the 500 year flood during the summer of 1993.

3.15 Executive Order 11990, "Protection of Wetlands"

Not Applicable. No wetlands are affected by any Ames Laboratory activities.

3.16 Other Major Environmental Issues and Actions

Low level radioactive wastes were properly disposed in calendar year 1995. During maintenance activities, very small quantities of low level wastes may be generated. This is Class A material under 10 CFR 61.55 and 61.56. The total annual accumulation is less than 0.010 Curies per cubic meter. Ames Laboratory shipped 15.3 cubic meters (540 cubic feet) of low level waste to the Hanford Facility in Washington. A total of 1602 cubic meters (56,574 cubic feet) of contaminated soils, debris and packing material from the CDS source removal were shipped to Envirocare in Utah, and properly disposed.

The Laboratory's Tiger Team Corrective Action Plan required an air emissions monitoring program to be developed and implemented, in accordance with DOE Orders 5400.1, 5400.4 and 5400.5. The final plan was issued in February 1995. See section 3.6. The Tiger Team Corrective Action Plan also required a Groundwater Protection Management Plan to be

developed and implemented by the Laboratory, in accordance with DOE Order 5400.1. The final plan was issued in May 1995. Seven environmental action plans associated with Tiger Team findings were closed in 1995.

One action plan, resulting from a DOE Chicago appraisal, pertaining to UST records keeping was also closed in 1995. In September 1994, the DOE Office of Environmental Audit conducted a routine environmental audit of the Laboratory. The team from DOE-HQ and Arthur D. Little Company cited minor deficiencies in routine environmental monitoring, hazardous waste storage and identification, environmental training, and self-assessment and oversight. The audit team's report was never officially approved or officially released. The deficiencies noted were corrected through planning and implementation of specific actions addressing each deficiency. A general environmental monitoring plan and an environmental monitoring quality assurance plan were approved in final form in June 1995, closing two action plans associated with the audit findings.

The Laboratory's walk-through topical appraisals and self assessments begun in 1993 and 1994 continued in 1995. The ES&H work area was one of those inspected in 1995. Also in 1995, the former Office of Assurance and Assessment, now part of ESH&A, initiated an independent walk-through that included a member of the Ames Laboratory Executive Council. The walk-throughs noted a few minor workplace discrepancies such as use of extension cords and partial obstructions to corridors. All discrepancies were corrected within a month of notification.

3.17 Summary of Permits

Ames Laboratory currently needs no environmental discharge, storage, treatment or disposal permits for gaseous, liquid or solid effluents. See Sections 3.3, 3.6, 3.7, 3.8, 3.10, and 3.16. DOE held four waste generator identification numbers associated with Ames Laboratory in 1995. One was a conditionally exempt small quantity generator for the Technology Integration Program. This program became inactive after 1995, and the generator number expired in early 1996. Though the buried waste has been removed from the CDS, the generator number cannot be closed until the regulatory agencies are satisfied with the entire site cleanup. DOE can request that the generator status be changed from a small quantity to a conditionally exempt small quantity generator. This change would remove the 180 day time requirement.

DOE RCRA Generator Identification Numbers

RCRA Generator ID#	Type	Ames Laboratory Facility/Area	Expiration
IA6890008950	LQG	Ames Laboratory Main Campus	None
IAD984617605	CESQG	ASC #1 Waste Handling Facility	None
IAD000365973	SQG	ASC #2 CDS Source Removal Wastes	None
IAD098715881	CESQG	Technology Integration Program	02/15/96

4.0 ENVIRONMENTAL PROGRAM

4.1 Monitoring and Surveillance

Ames Laboratory obtains meteorological data from the National Weather Service in Des Moines and the ISU Geological and Atmospheric Sciences Department. The Laboratory's main uses of weather data are related to spills and accidental releases, and to site restoration work. The average and 1995 Ames Climatic data are in Table 4-1.

In accordance with 10 CFR 835 and the Ames Laboratory Radiological Protection Plan (RPP), airborne releases from the Laboratory are always minimized. During 1995, the work with uranium, and thorium isotopes did not produce any particles sufficiently small to become airborne. The potential dose equivalent to the public due to estimated radionuclide emissions are calculated annually for the NESHAP report. See section 5.1.

4.2 Pollution Awareness, Waste Minimization and Recycling Programs

A waste minimization plan and program, was originally implemented in 1990, updated in 1994, and continued in 1995. As required by DOE Order 5400.1, elements of the plan include:

- A statement of management support and commitment.
- A waste minimization policy for the Laboratory.
- Objectives and numerical goals.
- Methods of tracking waste production.
- Employee awareness, training and incentive programs.
- Program performance, evaluation and quality assurance.

The Laboratory has been engaged in many waste minimization activities and procedures. The procedures have reduced the quantities of non-hazardous and hazardous wastes generated by the Laboratory's research efforts. Examples include:

- Work Authorization System (WAS) reviews.
- The project Readiness Review Procedure.
- Review of Purchase Orders to prevent duplication or over-supply.
- Collection of surplus mercury for resale.

	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
1961-1990 Average "Normal"	27.7	33.2	46.0	62.0	73.6	82.1	85.3	82.9	75.8	64.4	46.9	31.6
Max Temp												
Min Temp	8.8	14.0	26.2	38.2	49.5	58.7	63.1	60.0	51.9	40.6	28.0	14.3
Precip (Inches)	.69	.84	2.09	3.38	4.27	5.24	3.73	3.93	3.48	2.63	1.59	1.07
Wind Sp	11.5	11.4	12.7	12.7	11.1	10.2	8.9	8.6	9.4	10.3	11.3	11.2
Wind Direct	NW	NW	NW	NW	SE	S	S	S	S	S	NW	NW
Max Temp	24.3	34.8	45.9	57.3	67.9	80.2	84.0	85.7	74.0	62.9	40.7	31.5
Mean Temp	17.7	26.1	37.5	46.2	58.0	70.4	73.5	76.1	61.5	52.1	30.9	24.7
Min Temp	11.1	17.3	29.0	35.0	48.1	60.5	63.0	66.4	48.9	41.2	21.1	17.8
Precip (Inches)	0.39	0.30	2.37	5.27	4.34	3.47	3.99	3.07	2.66	1.02	1.61	0.59
Calendar Year 1995												

NOTE: Wind data are from Des Moines Airport.

Table 4-1, Ames Climatic Data

- White paper and computer paper are separated and recycled.

All other non-hazardous waste generated by the Laboratory, e.g., paper, garbage, trash et cetera, is collected and transported to the City of Ames' Waste Recycling Plant where it is processed. Combustible waste is used as fuel in the city's electrical utility power plant. Scrap metal is sold for re-use. Used oil is recycled for re-use. Ames recovers R-12 refrigerants, except from vehicles, and R-22 refrigerants with one recovery unit, but cannot recycle them. The Laboratory recovers blended refrigerants with a second unit, but cannot recycle them. Onsite contractual recovery and recycling with Iowa State University (ISU) is used as needed for all listed ozone depleting substances (ODS's). ISU and Ames Laboratory have separate Facilities Services and ES&H units, but ISU is the management and operating contractor with DOE. Therefore, the ODS's do not change owners.

4.3 Performance Measures

In calendar year 1995, Ames Laboratory was not required to report to DOE through the Performance Indicator Database System (PIDS) on any environmental performance indicators or measures. There are no specific environmental performance measures written into the current Ames Laboratory contract, which expires December 31, 1996. Contract negotiations are ongoing. The new contract will include PIDS reporting. The Laboratory currently complies with applicable federal, state and local rules and regulations and DOE orders. See section 3.0 and section 8.0.

5.0 ENVIRONMENTAL RADIOLOGICAL PROGRAM

5.1 Radiation Emissions and Doses

By policy, airborne releases from the Ames Laboratory complex are minimized or eliminated by experiment design or source limitation. Historically, radioactive materials handled at Ames Laboratory have included radiation instrument calibration sealed sources and standards, lab bench experiment quantities of normal and depleted uranium, uranium-235, thorium and plutonium. There was very little use of other than sealed sources in 1995. Work activities involving radioisotopes did not generate airborne contaminants. All the work consisted of cutting uranium or thorium in a dedicated fume hood. No venting of the process was necessary.

Research activities using less than 0.5 g quantities of several isotopes of plutonium and gram quantities of uranium-235, may be conducted in the future in a single glovebox facility designed for inductive coupled plasma (ICP) spectroscopy research. This glove box is located at the Alpha Facility at the Applied Sciences Complex. The Alpha Facility was not operational in 1995.

The National Emission Standards for Hazardous Air Pollutants; Radionuclides, under Subpart H of 40 CFR Part 61 (8), requires that an Air Emission Annual Report be submitted by each DOE

facility emitting any radionuclides (other than radon) into the air. Using the guidance found in 40 CFR 61.94, an annual report was prepared in June 1995 as required. According to the guidance, and based on the isotope inventory in Curies per year used at the Laboratory, air emissions are not required to be monitored at the Laboratory. Iowa DNR and IDPH do not require permits for Laboratory fume hoods. However, Appendix D to 40 CFR Part 61 does provide a method for estimating the radionuclide emissions for a year for reporting purposes, based on the amount of radionuclides in Curies used at the facility. This information and other required parameters are used to calculate potential dose equivalent to the public due to estimated radionuclide emissions from the Laboratory. The effective dose equivalent values are calculated using the EPA-approved computer model CAP88-PC v. 1.0. The dose estimates are reported in Table 5-1.

No liquid effluent releases are made directly to the environment. Ames Laboratory routinely analyzes laundry machine wastewater from the Radioactive Waste Handling Facility before it is released to the sanitary sewer. ISU and the City of Ames are notified directly of the sample results before any discharge. There were no such discharges in 1995. Liquid wastes discharged to the ISU sanitary sewer system, which discharges into the City of Ames sewer system, are periodically analyzed by the University in accordance with ISU's pretreatment agreement with the City of Ames. See sections 6.1 and 7.0.

5.2 Unplanned Releases

There were no unplanned or accidental radiological releases from Ames Laboratory during 1995.

5.3 Environmental Monitoring

Liquid aqueous wastes (laundry machine water), when generated at the Laboratory's Radioactive Waste Handling Facility (Figure 2-6), are analyzed for radioactivity as required by DOE Order 5480.1 (1) before release to the sanitary sewer. They are analyzed for radioactive content using gamma ray spectroscopy, gas proportional counting for gross beta and gross alpha activity, and liquid scintillation for tritium. No releases of liquid aqueous wastes were made during 1995. The level of radioactivity released in the past has always been below 10 CFR 20.2003 and DOE Order 5400.5 (Chapters II and III) limits. When wastewater is generated, results of the sample analyses and water quantities released are reported to the City of Ames, ISU, the DOE Chicago Operations Office and the DOE Idaho Operations Office. No sampling of storm and sanitary sewer water was accomplished in 1995. CDS groundwater was sampled, and a sump in Wilhelm Hall was sampled. The water in the sump was well below the Part 20 action level. See section 7.0 for the groundwater results.

Table 5-1
Ames Laboratory Air Dose Compliance
Calendar Year 1995

Summary of Input Parameters

<u>Isotope</u>	<u>Ci(Bq)/yr</u>	<u>Adjustment Factors</u> (Appendix D to Part 61)	<u>Adjusted Source</u> <u>Term, Ci(Bq)/yr</u>
Iowa State University Campus Site			
Uranium (depleted)	0.0E0 (0)	1.0E-6 (solid)	0.0E0 (0)
Thorium-232	0.0E0 (0)	1.0E-6 (solid)	0.0E0 (0)

Sources were not used or opened in 1995.

Alpha Facility Site

No radionuclides used
at this site during
calendar year 1995.

Compliance Assessment

Ames Laboratory-Iowa State University Site.

Effective Dose Equivalent:

For dep. Uranium, 0.00

For U-234, 0.00

Doses are calculated in accordance with DOE 5400.5 and 5400.1. The standard for air emissions found in 40 CFR 61.92 states that emissions of radionuclides to ambient air from a DOE facility "shall not exceed those amounts that would cause any member of the public to receive in any year an effective dose equivalent of 10 mrem/yr" (0.1 mSv/yr). The Laboratory is in compliance with the stated standard.

5.4 Areas of Concern

The areas of concern are small local areas in or near the City of Ames that were, or could have been, contaminated by Ames Laboratory or ISU Manhattan Project activities. Areas of concern include inactive waste sites, spill sites and other areas that had a potential to be contaminated, but not any UST sites. UST's are a RCRA matter. The numerous tables and figures for this section are at the end of the section to minimize text fragmentation.

5.4.1 Chemical Disposal Site (CDS)

Much progress was made at the CDS in 1995. The CDS is a small former chemical burial site, located on ISU property, which was used from 1957-1966 for disposal of hazardous wastes and wastes from yttrium, thorium and uranium production. A Phase I RI was conducted at the CDS in 1992-1993. The Phase I RI report was issued as final in August 1994. DOE signed an interagency agreement with the Army Corps of Engineers to implement a source removal. DOE entered into a license agreement with ISU to perform the source removal on ISU property. The source removal was done during the fall of 1994, with final waste shipments completed in March 1995. The nine Phase I RI wells were abandoned during the source removal. See Figure 5-2 and Figure 5-3.

Phase II Remedial Investigation work plans were approved in March 1995, and the RI is in progress. The current network of 15 monitoring wells was installed in April 1995. See Figure 5-4. A Phase II RI ecology study was conducted in August 1995, and the preliminary ecology report was issued in October 1995. Groundwater samples were collected for the Phase II RI in July and October 1995, and in January and April 1996. The samples were analyzed for twenty three different parameters. The results for the five parameters detected at concentrations greater than their drinking water MCL's in any well are in Table 5-5. Uranium and volatiles contamination has been detected in the well closest to the excavated area. No final groundwater cleanup concentrations have been established for the site yet. Refer to the site work plans and investigation reports for detailed information concerning the CDS. Documents produced through 1995 are:

- A Phase I Remedial Investigation (RI) site work plan, a Phase I RI health and safety plan (HASP), a field sampling plan (FSP), a sampling and analysis quality assurance plan (QA), a risk assessment plan
- A Phase I RI report
- A Phase I RI groundwater resampling report
- A source removal engineering evaluation and cost analysis (EE/CA)
- A preliminary feasibility study (FS) draft
- A source removal action plan
- The OHM Corporation/Corps of Engineers Source Removal Report
- A Phase II RI work plan, including HASP, QA and FSP, monitoring well network and ecological sampling components
- An ecological study preliminary report

- Two Phase II RI groundwater sampling event reports

A third Phase II RI groundwater report was produced in March 1996, based on January samples. A fourth round of samples was collected in April 1996. A Phase II RI report will be written in 1996. Copies of all final reports are placed in the Ames Laboratory Public Repository at the Ames Public Library.

5.4.2 Inactive Waste Sites (IWS)

Several regulatory decisions were made in 1995 concerning IWS's. Nine areas of concern were investigated for potential radiological contamination in 1993-1994. Soil and/or groundwater sampling was done at these nine areas by Rust E&I. The "Investigative Report, Ames Laboratory Inactive Waste Sites, Ames Iowa" was finished by Rust in October 1993. It concluded that eight areas were suitable for unrestricted use without further investigative activities. The report recommended resampling of the drain field monitoring well at the Applied Sciences Complex due to gross alpha and gross beta activity above background. Resampling in December 1993 and in February 1994 showed gross alpha and gross beta activity levels at background. Based on the reports to that date, DOE concluded that none of the sites posed any threat to human health or the environment. In accordance with DOE public involvement policy, the report was submitted for comment to the IDPH, IDNR and USEPA. Only USEPA commented formally. Rust E&I produced an Investigative Summary Report draft in December 1994, and a final in February 1995.

After regulatory review of the original investigative report in 1994, the Iowa Department of Public Health decided one site, the old Ames Water Pollution Control (sewage treatment) Plant, required further sampling. This decision was influenced by the site's intended future use as a youth sports complex. The Oak Ridge Institute for Science and Education (ORISE), under direction of the Iowa Department of Public Health (IDPH), performed the investigation in April 1994. A thorough exposure rate survey was done using hand held instruments, over a wider area than the original survey. Surface and subsurface soil, surface water, groundwater, sludge, and sediment samples were collected. Thirteen samples were slightly elevated over background. Those thirteen areas producing the highest radioactivity samples, above or near the action level of 5pCi/g, were selected for soil removal. OHM Corporation removed the soil in October 1994 during the CDS source removal. Soil was removed within a one meter radius of each selected point. Individual excavation depths were determined by hand held survey instruments. Clean fill was brought in and the area was graded. IDPH conducted follow-up sampling, and found the site to be well below the action level. The site was approved by IDPH for unrestricted use February 17, 1995. See Figure 5-1. The confirmatory samples results are in Tables 5-2 through 5-4.

IDPH modeled the old plant site in November 1995, using the Residual Radiation (RESRAD) model approved by the U.S. Nuclear Regulatory Commission (NRC). The modeled risk of excess cancer was one in 10^{-8} to 10^{-9} (one in one hundred million to one in a billion). The USEPA acceptable risk rate is one in 10^{-6} (one in a million).

5.4.3 Old Iowa State College Dump

Another area of concern was identified at 13th Street and Stange Road in Ames, a five acre tract known as the old Iowa State College dump. Some Manhattan Project and Ames Laboratory wastes were disposed there in the late 1940's. In 1946, 250 tons of uranium extraction wastes were removed from the site for reprocessing.

In response to a public meeting comment, it was determined the radiological waste portion of the site would be sampled to determine if it posed a threat to human health or the environment. Sampling was conducted in August 1995 by Fox Engineering, ISU and Ames Laboratory, under IDPH direct onsite supervision. The samples were below action levels for thorium, uranium and their decay products, indicating no threat to human health or the environment. DOE sent the results to IDPH in September 1995, indicating that DOE considers the radiological investigation closed. IDPH did not formally respond to the sampling report, but forwarded it to ISU. The cover letter stated that IDPH is waiting for ISU as the "licensee" to review the data and issue to IDPH a written synopsis of ISU's conclusion. IDPH will then issue a written determination of the status of the site.

5.4.4 Fire Service Institute Training Area

ISU was investigating its Fire Service Institute training area on campus in 1995. The site is under ISU control and responsibility. ISU made a radiological survey of the site in April 1995 and found seven small areas of activity above background. The University fenced these areas to minimize the threat to human health. Soil samples collected in July and October 1995 detected some thorium contamination. The samples ranged from 14.9 to 662.9 pCi/g Th-232. There were also some non-radiological sample analyses done by ISU, but those results have not been made available to DOE. Due to the possibility of some of the thorium contamination being linked to former Atomic Energy Commission activities at Ames Laboratory, DOE is implicated as one of the potentially responsible parties.

The University formerly had underground storage tanks in this area, and it stores coal at the east end. A 33 well monitoring network is in place. As site owner, ISU has lead responsibility in any further site investigation.

Figure 5-1, Former Ames Water Pollution Control Plant

- - - - - SURVEY
 BOUNDARY
 == ROADWAY
 * - * - * FENCE

NOT TO SCALE

Table 5-2, UHL Sewage Plant Confirmatory Summary

Activity = pCi/gm

Sample ID	UHL Lab #	Ac-228 ^a	Tl-208 ^b	U-238	Ra-226
1A	9410330	1.2 ± 0.2 ^c	0.4 ± 0.3	0.6 ± 0.3	0.4 ± 0.3
2A	9410331	2.1 ± 0.2	0.8 ± 0.4	0.7 ± 0.4	0.4 ± 0.2
3A	9410332	2.5 ± 0.3	0.9 ± 0.4	0.9 ± 0.5	0.5 ± 0.3
4A	9410333	5.1 ± 0.4	1.9 ± 0.5	1.0 ± 0.4	0.4 ± 0.3
5A	9410334	3.9 ± 0.3	1.5 ± 0.3	< 0.8	0.4 ± 0.3
6A	9410335	0.7 ± 0.2	0.3 ± 0.3	0.5 ± 0.3	0.2 ± 0.2
7A	9410336	3.2 ± 0.3	1.0 ± 0.4	1.1 ± 0.5	0.4 ± 0.3
8A	9410337	5.8 ± 0.4	2.1 ± 0.6	0.8 ± 0.5	0.4 ± 0.3
9A	9410338	1.2 ± 0.2	0.4 ± 0.3	0.9 ± 0.4	0.3 ± 0.3
10A	9410339	2.4 ± 0.3	0.8 ± 0.4	0.6 ± 0.5	0.3 ± 0.3
11A	9410340	1.6 ± 0.3	0.6 ± 0.3	1.1 ± 0.5	0.5 ± 0.3
12A	9410341	2.0 ± 0.2	0.8 ± 0.3	0.8 ± 0.4	0.3 ± 0.3
13A	9410342	1.8 ± 0.3	0.7 ± 0.3	0.6 ± 0.5	0.2 ± 0.3
14A	9410343	0.8 ± 0.2	0.2 ± 0.3	< 0.6	0.3 ± 0.3
15A	9410344	4.5 ± 0.4	1.5 ± 0.4	1.0 ± 0.3	0.4 ± 0.3
16A	9410345	0.7 ± 0.2	0.2 ± 0.3	0.3 ± 0.4	0.2 ± 0.3
17A	9410346	1.0 ± 0.2	0.3 ± 0.3	0.7 ± 0.5	0.3 ± 0.3
18A	9410347	3.3 ± 0.4	1.3 ± 0.5	< 0.7	0.4 ± 0.3
19A	9410348	0.9 ± 0.2	0.3 ± 0.2	0.8 ± 0.4	0.3 ± 0.3
20A	9410349	2.1 ± 0.3	0.7 ± 0.3	0.6 ± 0.5	0.5 ± 0.3
21A	9410350	1.6 ± 0.2	0.6 ± 0.3	1.0 ± 0.3	< 0.1
22A	9410351	1.1 ± 0.2	0.4 ± 0.2	0.8 ± 0.3	0.1 ± 0.2

Table 5-2, UHL Sewage Plant Confirmatory Summary, continued

Activity = pCi/gm

Sample ID	UHL Lab #	Ac-228 ^a	Tl-208 ^b	U-238	Ra-226
23A	9410352	1.1 ± 0.2	0.4 ± 0.3	0.8 ± 0.4	0.4 ± 0.3
24A	9410353	0.9 ± 0.2	0.3 ± 0.3	0.4 ± 0.2	0.2 ± 0.3
25A	9410354	0.9 ± 0.2	0.3 ± 0.3	0.5 ± 0.4	0.3 ± 0.3
26A	9410355	0.7 ± 0.2	0.3 ± 0.3	< 0.5	0.3 ± 0.3
UHL soil bkgd		0.7 ± 0.2	0.2 ± 0.2	0.5 ± 0.3	0.4 ± 0.2

^a Values in this column represent the concentrations of Ra-228 (mesothorium).

^b Values in this column represent 36% of Th-228 concentrations.

^c Uncertainties represent the 95% confidence level based only on counting statistics.

Table 5-3, EPA Sewage Plant Confirmatory Summary

Activity=pCi/g

SAMPLE ID	GAMMA	GROSS ALPHA	GROSS BETA
E-651	214Pb 0.61 ± 0.04 226Ra 1.95 ± 0.36 212Pb 2.89 ± 0.05 214Bi 0.50 ± 0.04 228Ra 2.68 ± 0.08 234Th 1.13 ± 0.35 208Tl 0.92 ± 0.03 137Cs 0.37 ± 0.03 212Bi 1.66 ± 0.17	30.2 ± 10.9 MDC 10.9	21.1 ± 4.0 MDC 4.4
E-759	214Pb 0.64 ± 0.03 226Ra 1.70 ± 0.29 212Pb 2.95 ± 0.04 214Bi 0.53 ± 0.03 228Ra 2.77 ± 0.06 234Th 0.66 ± 0.26 208Tl 0.95 ± 0.02 137Cs 0.49 ± 0.02 212Bi 1.67 ± 0.10	28.2 ± 9.9 MDC 9.6	24.3 ± 4.1 MDC 4.3
E-766	214Pb 0.50 ± 0.02 226Ra 1.43 ± 0.24 212Pb 1.00 ± 0.03 214Bi 0.42 ± 0.03 228Ra 0.90 ± 0.04 234Th 0.90 ± 0.26 208Tl 0.31 ± 0.02 137Cs 0.14 ± 0.01 212Bi 0.57 ± 0.09	19.4 ± 8.7 MDC 9.5	13.6 ± 3.5 MDC 4.2
E-775	214Pb 0.42 ± 0.02 226Ra 1.10 ± 0.23 212Pb 0.67 ± 0.03 214Bi 0.35 ± 0.03 235U 0.07 ± 0.01 228Ra 0.61 ± 0.03 234Th 0.69 ± 0.21 208Tl 0.21 ± 0.01 137Cs 0.45 ± 0.02 212Bi 0.41 ± 0.07	11.5 ± 7.3 MDC 9.7	14.0 ± 3.3 MDC 3.9

MDC = Minimum Detectable Concentration

Table 5-3, EPA Sewage Plant Confirmatory Summary, continued

Activity = pCi/g

SAMPLE ID	GAMMA	GROSS ALPHA	GROSS BETA
E-805	214Pb 0.64 ± 0.03 226Ra 1.76 ± 0.37 212Pb 3.70 ± 0.05 214Bi 0.51 ± 0.03 235U 0.11 ± 0.02 228Ra 3.44 ± 0.06 234Th 1.43 ± 0.35 208Tl 1.22 ± 0.03 137Cs 0.39 ± 0.02 212Bi 2.18 ± 0.12	44.9 ± 12.1 MDC 9.8	26.7 ± 4.3 MDC 4.3
E-807	214Pb 0.58 ± 0.03 226Ra 1.68 ± 0.29 212Pb 1.05 ± 0.03 214Bi 0.51 ± 0.03 228Ra 1.08 ± 0.05 234Th 0.73 ± 0.25 208Tl 0.35 ± 0.02 137Cs 0.29 ± 0.02 212Bi 0.57 ± 0.11	13.0 ± 7.4 MDC 9.1	14.8 ± 3.4 MDC 3.9
E-812	214Pb 0.80 ± 0.06 226Ra 3.10 ± 0.69 212Pb 1.57 ± 0.07 214Bi 0.62 ± 0.06 228Ra 1.35 ± 0.10 234Th 0.64 ± 0.43 208Tl 0.50 ± 0.03 137Cs 0.29 ± 0.03 212Bi 0.96 ± 0.19	13.2 ± 7.4 MDC 9.1	14.3 ± 3.4 MDC 4.0
E-813	214Pb 0.69 ± 0.03 226Ra 1.86 ± 0.33 212Pb 1.43 ± 0.04 214Bi 0.57 ± 0.03 228Ra 1.37 ± 0.06 208Tl 0.45 ± 0.02 137Cs 0.31 ± 0.02 212Bi 0.73 ± 0.10	21.8 ± 9.7 MDC 10.9	21.0 ± 4.0 MDC 4.3

MDC = Minimum Detectable Concentration

Table 5-3, EPA Sewage Plant Confirmatory Summary, continued

Activity=pCi/g

SAMPLE ID	GAMMA	GROSS ALPHA	GROSS BETA
E-825	214Pb 0.51 ± 0.03 226Ra 1.20 ± 0.30 212Pb 1.36 ± 0.03 214Bi 0.44 ± 0.03 235U 0.07 ± 0.02 228Ra 1.29 ± 0.05 234Th 0.90 ± 0.37 208Tl 0.44 ± 0.02 137Cs 0.19 ± 0.01 212Bi 0.82 ± 0.09	6.3 ± 5.9 MDC 8.9	11.3 ± 3.2 MDC 4.1
E-826	214Pb 0.58 ± 0.03 226Ra 1.50 ± 0.28 212Pb 3.38 ± 0.04 214Bi 0.48 ± 0.02 235U 0.09 ± 0.02 228Ra 3.08 ± 0.06 234Th 0.53 ± 0.25 208Tl 1.08 ± 0.02 137Cs 0.25 ± 0.01 212Bi 1.98 ± 0.10	30.9 ± 10.6 MDC 10.0	20.4 ± 4.0 MDC 4.3
E-766 QA	214Pb 0.51 ± 0.02 226Ra 1.31 ± 0.21 212Pb 0.99 ± 0.02 214Bi 0.43 ± 0.02 228Ra 0.92 ± 0.03 234Th 0.53 ± 0.18 208Tl 0.31 ± 0.01 137Cs 0.16 ± 0.01 212Bi 0.58 ± 0.06	15.6 ± 7.7 MDC 8.9	16.9 ± 3.6 MDC 4.1

MDC = Minimum Detectable Concentration

Table 5-4, Ames Laboratory Sewage Plant Confirmatory Summary
Results in uCi/g

Sample ID#	Dry Weight (g)	Ac-228	% CG	Tl-208	% CG	Ra-226	% CG	Bi-214	% CG	Cs-137	% CG
#E747, 22C	503.7	7.61E-07	15.23	2.69E-07	5.38	1.52E-06	30.51	3.22E-07	6.44	1.89E-07	6.31
#E785, 19C	713.6	9.04E-07	18.09	3.15E-07	6.31	9.46E-07	18.93	3.39E-07	6.79	1.38E-07	4.60
#E796, 16C	675.6	4.83E-07	9.66	1.53E-07	3.06	9.80E-07	19.61	2.71E-07	5.43	3.44E-07	11.48
#E800, 1C	590.2	8.38E-07	16.77	2.98E-07	5.97	1.23E-06	24.69	4.33E-07	8.66	2.19E-07	7.31
#E802, 7C	516.4	2.15E-06	43.04	7.85E-07	15.70	1.33E-06	26.68	4.20E-07	8.40	3.48E-07	11.60
#E808, 5C	590.2	2.62E-06	52.52	1.00E-06	20.04	1.50E-06	30.07	3.92E-07	7.84	2.94E-07	9.82
#E818, 15C	606.8	2.51E-06	50.23	9.71E-07	19.42	1.24E-06	24.89	4.18E-07	8.37	3.26E-07	10.88
#E819, 9C	535.6	8.03E-07	16.06	2.93E-07	5.87	1.60E-06	32.15	4.30E-07	8.61	2.13E-07	7.11
#E821, 17C	666.8	6.33E-07	12.67	2.10E-07	4.21	1.17E-06	23.44	3.25E-07	6.51	9.82E-08	3.27
#E823, 18C	726.2	2.01E-06	40.25	7.59E-07	15.19	1.25E-06	25.17	3.88E-07	7.77	1.70E-07	5.67

Figure 5-2, Closed Chemical Disposal Site Vicinity

Figure 5-3, Phase I CDS Soil Borings and Monitoring Wells

LEGEND:

- 990 --- CONTOUR LINE
- x 987.85 SPOT ELEVATION
- (B-4A/4B) MONITORING WELL (BORING NUMBERS)
- POWER POLE
- INLET
- △ BENCH MARK
- ⊗ BORING LOCATION
- ▨ SOURCE REMOVAL AREA
- |—|— WATERMAIN
- |—|— GAS LINE
- |—|— UNDERGROUND ELECTRIC
- |—|— UNDERGROUND TELEPHONE
- CHAINLINK FENCE
- ==== STORM CULVERTS

Groundwater flow is generally eastward toward Squaw Creek

Figure 5-4, CDS Soil Borings and Monitoring Wells, Phase II

Table 5-5, CDS Phase II RI Groundwater Samples Summary
(first quarter, collected July 1995)

Well number	Uranium ug/l	Trichloro- ethene ug/l	Gross alpha pCi/l	Gross beta pCi/l	Uranium- 238 pCi/l
4A	2.2				1.0
4B	3.6				1.7
5A					
5B	1.7				
6A	-----	-----	DRY WELL	-----	-----
7A	46		25		21.9
7B					
8A	4.9				1.6
8B	4.5				2.0
9A	4.6				1.8
9B					
10A	5600	34	2000	1600	3140
10B	2900	14	1300	900	1500
11A	1500		500	320	568
11B	4.4				2.3

Note: No groundwater cleanup concentrations had been established for this site through 1995.

Table 5-5, CDS Phase II RI Groundwater Samples Summary, continued
(second quarter, collected October 1995)

Well number	Uranium ug/l	Trichloro- ethene ug/l	Gross alpha pCi/l	Gross beta pCi/l	Uranium- 238 pCi/l
4A	1.4				
4B	4.3				2.0
5A					
5B	2.2				
6A	-----	-----	DRY WELL	-----	-----
7A	41		32		18
7B	3.2				1.7
8A	8.2			4.5	2.9
8B	4.0		3.7		2.9
9A	3.8				1.9
9B	0.2			6.2	1.7
10A	7500	32	2400	1700	2490
10B	2600	13	1300	920	1080
11A					
11B	160				3.2

Note: No groundwater cleanup concentrations had been established for this site through 1995.

Table 5-5, CDS Phase II RI Groundwater Samples Summary, continued
(third quarter, collected January 1996)

Well number	Uranium ug/l	Trichloro- ethene ug/l	Gross alpha pCi/l	Gross beta pCi/l	Uranium pCi/l
4A	1.1				0.7
4B	2.8		7.9	23	1.4
5A					
5B	1.0			2.7	1.4
6A	-----	-----	DRY WELL	-----	-----
7A	26		22		16.5
7B	1.1				0.8
8A	4.0				2.1
8B	2.6			8.7	1.5
9A	2.9				1.6
9B					
10A	6900	29	4100	1600	2350
10B	1600	16	850	420	757
11A					
11B	2.7				1.6

Note: No groundwater cleanup concentrations had been established for this site through 1995.

6.0 ENVIRONMENTAL NON-RADIOLOGICAL PROGRAM

6.1 National Pollutant Discharge Elimination System (NPDES) Data

Ames Laboratory does not have or need any NPDES permits since there are no direct discharges or surface runoff to the environment. The Laboratory discharges all liquid wastes to the ISU sanitary sewer system, which discharges into the City of Ames sewer system. The Laboratory's wastewater is included in the University's pretreatment agreement with the City of Ames. The contract between ISU and the City of Ames for wastewater from the ASC was renewed on April 1, 1995 for five years. The contract requires the University to analyze its waste discharges periodically. This discharge includes the contribution by Ames Laboratory. The Laboratory contributes an estimated 5.5% of the ISU central campus sanitary waste. ISU central campus wastewater comprises 12-15% of the sanitary wastes received in the summer, and 15-20% of the wastewater received during the academic year, by the Ames Water Pollution Control Plant. Since the DOE buildings are on ISU land, ISU holds any necessary storm water permits.

6.2 Other Emissions Monitoring

Employee fire extinguisher training sessions involving open burning of flammable liquids and solids are permitted by State of Iowa open burning statutes. The local fire department is notified as required.

It is the policy of Iowa DNR to exempt laboratory fume hoods from permitting and monitoring. Ames Laboratory described its system to DNR. DNR issued an official ruling for the Laboratory on July 18, 1994 stating that no permitting and no monitoring are required for the 144 fume hoods and 34 associated exhausts. DNR requested permit applications for the Laboratory's paint booth and sand blaster. The applications were submitted in 1995. DNR requested supplemental information in January 1996. The permitting status of these two sources has not been determined by DNR yet. There are no federal or local permits or compliance agreements in force, nor are any anticipated.

6.3 Continuous Release Reporting

Ames Laboratory has no continuous release sources.

6.4 Environmental Occurrences

There were no reportable spills or releases at Ames Laboratory in 1995.

6.5 SARA Title III Reporting Requirements

There were no chemicals stocked at Ames Laboratory at or above the threshold planning quantity (TPQ) in 1995. There is one cylinder dedicated to hydrogen fluoride (HF) whose total capacity matches the TPQ of 100 pounds. It contained only 40 pounds in 1995. The research program using hydrofluoric acid (HF) has implemented administrative controls to limit the total quantity on site to a maximum of 80 lbs. The Laboratory was in compliance with Executive Order 12856 in 1995. Reporting requirements are summarized below. Ames reports under section 313 for DOE though EPA does not require it. The name of a facility representative and a listing of all hazardous chemicals on site have been reported to the State Emergency Response Commission, the Story County Emergency Planning Committee and the City of Ames Fire Department. There is no volumetric information in the report because the Laboratory does not meet the TPQ for any EPCRA chemicals. If a chemical is found to exceed the TPQ, the Laboratory will submit a Tier II report to the agencies named above.

EPCRA 302-303: Planning Notification	Yes (X) No () Not Required ()
EPCRA 304: EHS Release Notification	Yes () No () Not Required (X)
EPCRA 311-312: MSDS Chemical Inventory	Yes (X) No () Not Required ()
EPCRA 313: TRI Reporting	Yes (X) No () Not Required (X)

7.0 GROUNDWATER MONITORING AND PROTECTION PROGRAM

A revised combined Groundwater Protection Management Plan and Groundwater Monitoring Plan have been in place at the Laboratory since May 1995. The combined groundwater plan addresses sitewide groundwater protection. The plan is required by DOE Order 5400.1.

Ames Laboratory has a 20 well system for monitoring groundwater. The inactive chemical disposal site (CDS) is monitored by a system of 15 monitoring wells. Thirteen are downgradient of the remediated area and two are off site, upgradient wells. See Figure 5-4. On the main campus, the groundwater monitoring network consists of five wells. See Figure 7-1. Two of the wells belong to ISU and exceed 100 feet in depth. One well is upgradient, for background data. Four wells are downgradient (east-southeast) of the Laboratory's main campus facilities. The deeper ISU wells are screened into the Ames Aquifer. The combination of shallow and deep wells is to detect both floating and sinking contaminants. When resources allow, the system will be sampled semi-annually in the spring and fall, except for the CDS. The CDS area will be monitored as prescribed by the Iowa DNR, IDPH, and EPA until the regulatory agencies release the site. It will then be monitored on the same schedule in effect for the main campus, if required.

Only the CDS groundwater was monitored in 1995. Groundwater samples were collected for the Phase II RI in July and October 1995, and in January and April 1996. The samples were analyzed for twenty three different parameters. Uranium and volatiles contamination has been detected in the well closest to the excavated area. The results for the five parameters detected at concentrations greater than their drinking water MCL's in any well are in Table 5-5. No final groundwater

Figure 7-1, Main Campus Monitoring Well Network

cleanup concentrations have been established for the site yet. The 1994 baseline monitoring effort used all the monitoring wells, plus the storm and sanitary sewers adjacent to the Laboratory's main campus facilities. Results of the baseline monitoring indicated no areas of concern on the main campus. See Table 7-1.

The Laboratory removed its last underground storage tank (UST) in 1995. Soil borings and groundwater samples collected between November 1993 and May 1994 indicated there is minor soil contamination confined to a small plume in a layer 7-15 feet below the surface. No volatiles were detected in the groundwater samples. The investigation results were submitted to DNR in October 1994. Iowa DNR issued an official ruling on December 2, 1994. DNR is not requiring a site cleanup nor a standard monitoring program at this site. This is because the groundwater is not contaminated and the minor soil contamination is naturally attenuating. In August 1995, the tank was removed. The excavation was filled with clean sand, and the area was repaved. A doubled walled above-ground diesel tank with leak detection is now on the site.

8.0 QUALITY ASSURANCE PROGRAMS

The Ames Laboratory has an environmental monitoring quality assurance program. The Laboratory also participates in the DOE Environmental Measurements Laboratory's Quality Assessment Program (QAP). The programs include testing of water, pulverized soil, pulverized vegetation and air filter samples. Elements of the program which involve measurement of radioactivity are the responsibility of Environment, Safety, Health and Assurance. Radioactive sources and solutions that are used for calibration of radiation detection instrumentation are obtained with quantitative calibration that is directly traceable to the National Institute of Standards and Technology. Ames' Environmental Monitoring Quality Assurance Program Plan complies with DOE Orders 5400.1, CH5700.6B and 5700.6C.

Ames Laboratory quality assurance relies on established U.S. EPA, Iowa DNR, Iowa DPH, and DOE regulations, standards and methods. This applies to both radioactive and non-radioactive environmental sampling and analyses. See the Ames Environmental Monitoring Plan, the Groundwater Protection Management Plan, the Environmental Protection Implementation Plan, the Environmental Monitoring Quality Assurance Plan, and the previous Site Environmental Reports. Ames Laboratory already practices the QA measures described in this report and the referenced plans and reports.

The Ames Laboratory Air Emissions Program Plan (Policy and Procedure) ensures that Laboratory activities will not degrade local air quality in violation of the CAA. This is accomplished through control of emissions and rapid remediation of any air quality problems. All applicable DOE Orders, federal, state, and local regulations are complied with. The primary regulatory authority is the Iowa DNR. The IDPH and EPA Region VII also play significant roles. This plan relies on the use of standard EPA protocols and methods.

Ames Laboratory's air quality assurance procedure consists of maintaining an exhaust hood inventory, radiological material balance, and chemicals tracking waste management. These

Table 7-1, 1994 Baseline Samples Summary

(14 total samples analyzed with 2 QA blanks)

ANALYTE	UNITS	ANALYSIS RESULT
Vinyl Chloride	ug/l	Not Detected (ND)
1,1-Dichloroethylene	ug/l	Not Detected
2-Butanone (MEK)	ug/l	ND to 8.9
Chloroform	ug/l	ND to 5.5
Carbon Tetrachloride	ug/l	ND to 1.4
Benzene	ug/l	ND to 49.2
1,2-Dichloroethane	ug/l	Not Detected
Trichloroethylene	ug/l	ND to 1.5
Tetracholoroethylene	ug/l	ND to 123.0
Chlorobenzene	ug/l	Not Detected
Arsenic, dissolved	mg/l	ND to 0.234
Barium, dissolved	mg/l	ND to 0.546
Cadmium, dissolved	mg/l	Not Detected
Chromium, dissolved	mg/l	Not Detected
Lead, dissolved	mg/l	ND to 0.009
Mercury, dissolved	mg/l	ND to 0.005
Selenium, dissolved	mg/l	Not Detected
Silver, dissolved	mg/l	Not Detected

measures will determine if we have a source that needs monitoring or permitting, in accordance with Iowa DNR guidance. The Laboratory uses the CAP88 modeling program to produce an annual NESHAP report. Air sampling is performed in specific cases to meet specific needs. There are no federal or local permits or compliance agreements in force, nor are any anticipated. The Safe Drinking Water Act establishes drinking water quality standards, well head protection requirements, monitoring requirements, treatment standards, and the regulation of underground injection activities. Drinking water for Ames Laboratory is supplied by ISU which obtains its water from the city of Ames public water system. The Laboratory has a Policy for Monitoring Lead in Potable Water. Potable water at Ames facilities is monitored in accordance with the SDWA to ensure that the lead concentration in drinking water does not exceed the action level. Samples are drawn and tested on a periodic basis. The frequency of the testing is annually, but may be adjusted based on a history of the results. Analyses are done at an independent contracted laboratory. EPA protocols and methodologies are used in samples collection and analyses.

The Procedure for Monitoring Lead in Potable Water consists of sampling and analysis of drinking water in accordance with SDWA. Corrective measures are taken as necessary. Water samples are collected in Metals Development Building, Wilhelm Hall, and Spedding Hall. Samples are collected from a drinking fountain in each building. The same drinking fountain is used each time. If the test site is removed or unavailable, another drinking fountain is selected as the test site. Samples are collected on an annual basis. If the action levels have not been exceeded for three consecutive years (3 sample periods), the sample frequency may be reduced to every three years. Analyses are done by an independent testing laboratory. Ames currently uses Minnesota Valley Testing Labs in Nevada, IA. The contracted laboratory analyzes every sample using test procedures approved by the regulatory agencies. The latest sample results are in Table 3-1.

Ames Laboratory does not have any regulated point source discharges. Neither the Laboratory nor ISU have any NPDES permits. The City of Ames has an NPDES permit. The City of Ames has an agreement for wastewater pre-treatment with ISU, which includes Ames Laboratory wastewater. Both the City of Ames and the University sample ISU wastewater effluent using EPA protocols and methods. The sampling schedule and permit for ASC wastewater was renewed April 1, 1995, for five years. The Laboratory notifies the City of Ames and ISU directly of all discharges of analyzed wash water from the storage tanks at the Radioactive Waste Handling Facility. ISU has a storm water permit for construction activities. Since the existing DOE buildings are on land leased from ISU, Ames Laboratory activities are covered by the ISU storm water permit.

The Ames Laboratory Combined Groundwater Protection Management Plan and Groundwater Monitoring Plan ensures groundwater quality through pollution prevention and rapid remediation. All applicable DOE Orders, federal, state, and local regulations are complied with. This policy depends on the use of standard EPA protocols and methods that are analyte specific. Sampling methodologies, containerization, and analyses will comply with EPA standards. Sample shipments and handling will comply with U.S. Department of Transportation standards. The strategy for groundwater protection is to actively clean up and/or monitor all contaminated sites, and to perform routine monitoring of wells at the main campus and ASC locations. On the main campus, a combination of shallow and deep wells between the Laboratory and Squaw Creek will be

sampled as resources permit. The CDS is monitored as prescribed by the regulators. Inactive waste sites will be sampled as necessary.

Ames Laboratory ESH&A developed an Ames Laboratory Calibration Policy. The instrument calibration policy is to ensure the accuracy of measurements made at the Laboratory. Equipment enrolled in the calibration program is marked by stickers. Some equipment is calibrated by the manufacturers, and some is calibrated in-house. ESH&A oversees the calibration program.

The Laboratory has a Readiness Review Procedure for new or significantly modified research activities. This procedure is for risk identification, categorization, and ESH&A readiness review of activities. It has been developed to ensure that an appropriate level of rigor, commensurate to the risk associated with an activity's hazards, is applied to the activity's ES&H review. Another purpose of the Readiness Review Procedure is to prevent and/or control releases of hazardous materials to the environment.

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3. DOE Order #231.1, "
4. DOE Order #5400.1, "General Environmental Protection Program."
5. DOE Order #5400.5, "Radiation Protection of the Public and the Environment."
6. DOE Order #5480.14, "Comprehensive Environmental Response, Compensation, and Liability Act Program."
7. DOE Order #5484.1, "Environmental Protection, Safety, and Health Protection Information Reporting Requirements."
8. DOE Order #5900.2A, "Use of the Metric System of Measurement."
9. Executive Order 11988, "Floodplain Management."
10. Executive Order 11990, "Protection of Wetlands."
11. Executive Order 12856, "Federal Compliance with Right to Know Laws and Pollution Prevention Requirements."
12. Investigative Summary Report, Ames Laboratory Inactive Waste Sites, Rust Environment and Infrastructure, February 1995.
13. Iowa Administrative Code, Rule 567, Chapter 22, "Controlling Pollution."
14. Iowa Administrative Code, Rule 567, Chapter 23, "Emission Standards for Contaminants."
15. Iowa Administrative Code, Rule 567, Chapter 41, "Water Supplies."
16. Iowa Administrative Code, Rule 567, Chapter 61, "Water Quality Standards."
17. Iowa Administrative Code, Rule 567, Chapter 62, "Effluent Standards."
18. Iowa Administrative Code, Rule 567, Chapter 131, "Notification of Hazardous Conditions."
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21. Iowa Department of Natural Resources (DNR) letter dated February 17, 1995, concerning the old Ames Water Pollution Control Plant.
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29. 10 CFR 61, "Licensing Requirements for Land Disposal of Radioactive Wastes."
30. 10 CFR 834 (draft), "Radiation Protection of the Public and the Environment."
31. 40 CFR, "Clean Air Act and Amendments."
32. 40 CFR, "Clean Water Act."
33. 40 CFR, "Comprehensive Environmental Response, Compensation and Liability Act."
34. 40 CFR, "Resource Conservation and Recovery Act."
35. 40 CFR, "Toxic Substances Control Act."

10.0 LIST OF ACRONYMS

ASC: Applied Sciences Complex of Iowa State University

Bq: Becquerel, one disintegration per second

CAA: Clean Air Act and Amendments

CAG: Community Advisor Group for Ames Laboratory environmental activities

CDS: closed chemical disposal site at the ASC

CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act

CESQG: conditionally exempt small quantity generator

CFR: Code of Federal Regulations

CG: concentration guide, DOE derived

CH: Chicago Operations Office of the U.S. Department of Energy

Ci: Curie, $3.7E10$ disintegrations per second

COE: U.S. Army Corps of Engineers

CWA: Clean Water Act

CX: categorical exclusion, a class of activities determined to have no environmental impact

DNR: Iowa Department of Natural Resources

DOE: U.S. Department of Energy

DSSI: Diversified Scientific Services, Incorporated

EA: environmental assessment

EE/CA: engineering evaluation/cost analysis

EIS: environmental impact statement

EPA: U.S. Environmental Protection Agency

EPCRA: Emergency Planning and Community Right to Know Act

ESA: Endangered Species Act

ESH&A: Environment, Safety, Health and Assurance Group of Ames Laboratory

FFCA: Federal Facilities Compliance Act

FIFRA: Federal Insecticide, Fungicide and Rodenticide Act

FS: feasibility study

FSP: field sampling plan

g: gram, of mass

GOCO: a government (DOE) owned, contractor operated facility

GSB: Geological Survey Bureau of the Iowa DNR

HASP: health and safety plan

HEPA: high efficiency particulate air, a filter element or filtration system.

HQ: Headquarters of U.S. Department of Energy

IAC: Iowa Administrative Code

ICP: inductively coupled plasma

IDPH: Iowa Department of Public Health

INEL: Idaho National Engineering Laboratory, U.S. DOE

IPRT: Institute for Physical Research and Technology, ISU

ISU: Iowa State University

IWS: inactive waste site

LDR: land disposal restriction

LQG: large quantity generator

MCL: maximum contaminant level

mg/L: milligrams per liter; equivalent to ppm or PPM

mrem: millirem

mSv: millisievert, 10^{-3} Sieverts

NEPA: National Environmental Policy Act

NESHAP: National Emission Standards for Hazardous Air Pollutants

NHPA: National Historic Preservation Act

NOV: notice of violation

NPDES: National Pollutant Discharge Elimination System

NRC: Nuclear Regulatory Commission

ODS: ozone depleting substance

ORISE: Oak Ridge Institute for Science and Education

PCB: polychlorinated biphenols

pCi: picocurie, 10^{-12} Curies

PIDS: performance indicator database system

QA: quality assurance

QAP: Quality Assessment Program, DOE

RCRA: Resource Conservation and Recovery Act

rem: Roentgen equivalent man, radiation dose

RESRAD: residual radiation model for sites

RI: remedial investigation

RPP: Radiological Protection Plan, for Ames Laboratory

SARA: Superfund Amendments and Reauthorization Act

SDWA: Safe Drinking Water Act

SEG: Scientific Ecology Group

SER: annual Site Environmental Report, for Ames Laboratory

SQG: small quantity generator

STP: Site Treatment Plan, for Ames Laboratory

Sv: Sievert, 100 rem

TASF: Technical and Administrative Support Facility, the Ames Laboratory office building

TIP: Technology Integration Program of Ames Laboratory

TPQ: threshold planning quantity

TRU: transuranic waste

TSCA: Toxic Substances Control Act

uCi: microcurie, 10^{-6} Curies

ug/L: micrograms per liter

UHL: University (of Iowa) Hygienic Laboratory, provides analytical services for DNR

USGS: United States Geological Survey

UST: underground storage tank

WAS: work authorization system of Ames Laboratory

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