

Environmental Audit Manual Volume III



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SECTION 9

SAFE DRINKING WATER ACT

This protocol applies to the Department of Energy facilities that operate public water systems (community, non-community, non-community transient, and non-community non-transient). It includes a discussion of the relevant statutes (Introduction), regulations, and procedures for evaluating the facility's performance in meeting the applicable requirements (audit checklist). The protocol also includes the regulations for Underground Injection Control pertinent to groundwater protection and the audit checklist for evaluating the facility's performance in meeting the applicable requirements.

1.0 INTRODUCTION

The Safe Drinking Water Act (SDWA), passed in 1974, greatly expanded the scope of Federal responsibility for the safety of drinking water. The Federal Water Pollution Control Act of 1948 and the Clean Water Act of 1972 confined Federal authority to water supplies serving inter-state carriers. The SDWA extended U.S. standards to all public water systems with certain exceptions.

The purpose of the SDWA is to protect drinking water supplies through the establishment of contaminant limitations and enforcement procedures. By enactment, the Congress directed the U.S. Environmental Protection Agency issue the necessary regulations and enforcement procedures which include:

- o Interim standards of water quality and maximum contaminant levels (MCL) for bacteria, turbidity, inorganic and organic chemicals, pesticides, chlorinated organics and radionuclides;
- o Recommended maximum contaminant levels;
- o Secondary water standards to protect public welfare which are intended as guidelines (non-enforceable) to control contaminants that primarily affect aesthetic qualities and influence public acceptance of drinking water;
- o Monitoring for and analyzing of contaminants;
- o Recordkeeping and reporting;
- o Variances and exemptions; and,
- o Public notification of non-compliances.

The primary responsibility for enforcement of the laws and regulations is given to the States provided: they have adopted regulations which are no less stringent than the national primary drinking water regulations; they are implementing procedures for the enforcement of the regulations; and, they are complying with certain other recordkeeping and reporting requirements. The EPA retains enforcement authority in those States which do not have their own EPA-approved programs or which have not been granted the authority.

The SDWA was amended to extend authorization for technical assistance, information, training, and grants to the States.

1.1 KEY DEFINITIONS

Aquifer means a geological formation, group of formation of yielding a significant amount of water to a well or spring.

Community Water Systems means a public water system connections used by year-round residents or regularly served. **Disinfectant** means any oxidant, including but not limited to chloramines, and ozone added to water in any part of the system is intended to kill or inactivate pathogenic microorganisms.

Disposal Well means a well used for the disposal of waste.

Groundwater means water below the land surface is a zone.

Injection well means a "well" into which fluids are being injected.

Injection zone means a geological formation, group of formations through which fluids flow through a well.

Maximum Contaminant Level (MCL) means the maximum contaminant level in water which is delivered to the free flowing outlet of the distribution system except in the case of turbidity where the maximum permitted entry to the distribution resulting from corrosion of piping are excluded from this definition.

Maximum Contaminant Level Goal (MCLG) means the maximum level of drinking water at which no known or anticipated adverse health effects occur, and which allows an adequate margin of safety. Maximum enforceable health goals.

Maximum Total Trihalomethane Potential (MTP) means the maximum trihalomethanes produced in a given water containing a temperature of 25 C or above.

Non-community Water System means a public water system that is not a community water system.

Non-community non-transient water system or "NTNCWS" means a public water system that is not a community water system and that regularly serves at least 15 connections or 15 service connections per year.

Non-community transient-water systems are ones which serve facilities such as campgrounds, gas stations, etc.

Permit means an authorization, license, or equivalent approval from the approved state to implement requirements of specific regulations.

Public Water System means a system for the provision of water for human consumption, if such system has at least fifteen service connections or at least twenty-five individuals daily at least 60 days out of the year either a community water system or a noncommunity water system.

POTW means publicly owned treatment works.

Schedule of compliance means a schedule of remedial measures included in a permit including an enforceable sequence of interim requirements (for example, actions, operations, or milestone events) leading to compliance with the appropriate Acts and regulations.

SDWA means the Safe Drinking Water Act.

Secondary maximum contaminant level means SMCLs which apply to public water systems and which, in the judgement of the Administrator, are requisite to protect the public welfare. The SMCL means the maximum permissible level of a contaminant in water which is delivered to the free flowing outlet of the ultimate user of public water system. Contaminants added to the water under circumstances controlled by the user, except those resulting from corrosion of piping and plumbing caused by water quality are excluded from this definition.

Site means the land or water area where any facility or activity is physically located or conducted, including adjacent land used in connection with the facility or activity.

Trihalomethane (THM) means one of the family of organic compounds, named as derivatives of methane, wherein three of the four hydrogen atoms in methane are each substituted by a halogen atom in the molecular structure.

UIC means the Underground Injection Control program under Part C of the Safe Drinking Water Act, including an approved program.

USDW mean underground source of drinking water an aquifer or its portion.

Well Monitoring means the measurement, by on-site instruments or laboratory methods, of the quality or water in a well.

1.2 PUBLIC WATER SYSTEMS

Public water systems are defined in 40 CFR 141.2 as systems which provides piped water for human consumption and have at least 15 service connections or regularly serve at least 25 individuals daily for a total of at least 60 days per year.

EPA regulates three different types of public water systems: (1) community water system which serves year-round residents (eg., populations that generally live in cities and towns); (2) non-transient systems with their own separate water supply which serves the same population over six months of any year. These include schools, workplaces, and hospitals; and (3) transient systems with their own separate water to serve campgrounds, parks, gas stations, and highway rest stops.

1.2.1 State Primary Enforcement Responsibility

The SDWA provides the States (including Territories and Indian Tribes) with primary enforcement responsibility for public water systems. States that have adopted drinking water regulations at least as stringent as those set by EPA are given responsibility for enforcing the regulations. This delegation of enforcement authority is referred to as primacy. Fifty-four jurisdictions have received primary enforcement responsibility under the Act.

In areas that have not assumed primacy (as the District of Columbia and the States of Indiana and Wyoming and on Indian reservations), EPA has responsibility for enforcing the regulations. States may set more stringent regulations or establish standards for contaminants not regulated by EPA. In most cases, State drinking water regulations closely reflect the Federal requirements. Almost all States have received authorization from EPA to administer drinking water compliance programs. EPA executes the enforcement responsibilities until individual State programs are approved. The proposal describes the regulations and other procedures/policies the States must adopt to implement the rule. These include:

- o Adopting drinking water regulations which are no less stringent than the national primary drinking water regulations
- o Adopting and implementing adequate procedures for the enforcement of State regulations, including conducting, monitoring, and inspections as determined by the EPA
- o Recordkeeping of monitoring and inspections of public water systems
- o Adopting and implementing an adequate plan for the provisions of safe drinking water under emergency circumstances

1.2.2 Enforcement of Drinking Water Regulations

Whenever the EPA Administrator finds that any public water system is not in compliance with any national primary drinking water regulations in effect or do not comply with schedule or other requirements will notify the State that has a primary enforcement responsibility and provide advice and technical assistance to bring the public water system in compliance with such regulation or requirements by the earliest feasible time.

In such cases where the State does not have primary enforcement responsibility, the EPA Administrator will issue an order requiring the public water system to comply with such regulations or requirements.

1.2.3 Variances

- o A State which has a primary enforcement responsibility for public water systems may be granted variances from national primary drinking water regulations if it determines that a system cannot comply with MCL despite application of Best Available Technology (BAT).
- o EPA or a State may not issue a variance if an unreasonable risk to health exists. If a State grants a variance, it will prescribe at the time the variance is granted a schedule for compliance and implementation with each contaminant level requirements.

1.2.4 Exemptions

- o A State which has primary enforcement responsibility may exempt any public water system within the States jurisdiction from any requirements respecting a maximum contaminant level or any treatment technique requirement. State may not issue such an exemption if an unreasonable risk to health exists.
- o If the State grants an exemption, it will prescribe at the time of the exemption is granted a schedule for compliance and implementation with each contaminant level requirements.

1.3 PROTECTION OF UNDERGROUND SOURCES OF DRINKING WATER

In 1980, the groundwater protection program was added to control underground injection and recharge of wastes and treated effluents. The EPA was directed to publish proposed regulations for State underground injection control programs. States were given the authority for enforcement. Since this program can involve hazardous waste, treated wastewater or toxic substances, it overlooks and is coordinated with the provisions of other environmental laws, for example, RCRA and the CWA. Specific requirements include:

- o Regulations for State Program
- o State Primary Enforcement Responsibility
- o Enforcement of Program
- o Interim Regulation of Underground Injections
- o Optional Demonstration by States Relating to Oil or Natural Gas
- o Sole Source Aquifer Demonstration Program
- o State Programs To Establish Wellhead Protection Areas

1.3.1 Regulations for State Programs

- o State underground injection program shall contain minimum requirements to prevent underground injection which endangers drinking water sources
- o State shall prohibit any underground injection not authorized by a permit issued by the State. A permit will only be issued if the underground injection does not endanger drinking water
- o State underground injection program will include inspection, monitoring, recordkeeping, and reporting requirements
- o State may issue temporary injection permits if it finds that (a) the technology to permit safe injection of fluid in accordance with applicable underground injection program is not available, (b) that injection of the fluid would be less harmful to health than the use of other available means of disposing of waste, (c) that available technology or other means have been employed to reduce the volume and toxicity of the fluid and to minimize the potential adverse effect of the injection on the public health.

1.3.2 State Primary Enforcement Responsibility

- o State must adopt and implement an underground injection program which meets the requirements and regulations in effect
- o State will keep records and make reports with respect to its activities under its underground injection control program as required by EPA Administrator

1.3.3 Enforcement of Program

EPA Administrator will notify the State and the facility, whenever he finds during a period in which a State has primary enforcement responsibility for underground water source is not in compliance with the requirements of an applicable underground injection control program. If beyond the thirtieth day after

the Administrator's notification the State has not commenced appropriate enforcement action, the Administrator shall issue an order requiring the facility to comply with such requirements or commence a civil action. In such cases where the State does not have the primary enforcement responsibility, the Administrator shall issue an order requiring the facility to comply with such requirements or commence a civil action.

1.3.4 Interim Regulations of Underground Injections

The EPA Administrator may designate an area in the State in which no new underground injection well may be operated if he finds that the area has one aquifer which is the sole or principal drinking water source for the area and which, if contaminated, would create a significant hazard to public health.

1.3.5 Optional Demonstration by States Relating to Oil or Natural Gas

Any state underground injection control program which relates to the underground injection of brine or other fluids brought to the surface in connection with oil or natural gas production, storage or recovery operations may be disapproved by the EPA Administrator if such underground injection endangers drinking water sources.

1.3.6 Sole Source Aquifer Demonstration Program

The purpose of this program is to establish procedures for development, implementation, and assessment of demonstration programs designed to protect critical aquifer protection areas located within areas designated as sole or principal source of aquifer under section 1424(e) of the SDWA.

1.3.7 State Programs to Establish Wellhead Protection Areas

Under this program, the Governor or Governor's designee of each State shall within 3 years of the draft of enactment of the SDWA Amendment of 1986, adopt and submit to the EPA Administrator a State program to protect wellhead areas within their jurisdiction from contaminants which may have any adverse effect on the health of persons.

1.4 EMERGENCY POWERS

The Administrator of EPA is given the authority to exercise emergency powers to protect human health in situations in which a public water system or an underground source of drinking water may present an imminent and substantial endangerment to the health of persons and that appropriate State and local authorities have not acted.

1.4.1 Tampering With Public Water Systems

Penalties and punishments are mandated to be meted out to those who tamper with a public water system, as specified below:

- o \$50,000 for tampering
- o \$20,000 for attempted tampering or an intent to do so

- o Imprisonment for up to 5 years

1.5 GENERAL PROVISIONS

1.5.1 Treatment Chemicals

The EPA is instructed to make available adequate supplies of water treatment chemicals to those who need them, but are unable to procure.

1.5.2 Research, Technical Assistance, Information, and Training Personnel

This clause authorizes the EPA to conduct research studies and demonstrations relating to the causes, diagnosis, treatment, control, and prevention of physical and mental diseases and other impairments of man resulting directly or indirectly from contaminants in water or to the provisions of a dependable safe supply of drinking water.

1.6 1986 AMENDMENTS TO THE SDWA

The amendments to the SDWA passed in 1986 gave significant directives to EPA's standard-setting program. They are:

- o EPA must set MCLGs and National Primary Drinking Water Regulations for 83 specific contaminants and for any other contaminant in drinking water which may have any adverse effect upon the health of persons and which is known or anticipate to occur in public water systems
- o Recommended Maximum Contaminant Levels (RMCLs) are now termed Maximum Contaminant Level Goals (MCLGs). No changes were made in the basis of a MCLG
- o MCLGs are non-enforceable health goals which are to be set at the level at which no known or anticipated adverse effects on the health of persons occur and which allows an adequate margin of safety
- o Maximum Contaminant Levels (MCLs) must be set as close to MCLGs as is feasible. The definition of "feasible" was changed to the following:
 - **Feasible** means with the use of the best technology, treatment techniques and other means, which the administrator finds, after examination for efficacy under filed conditions and not solely under laboratory conditions, are available (taking costs into consideration).
- o The SDWA states the Granular Activated Carbon (GAC) is feasible for the control of synthetic organic chemicals (SOCs) and any technology or other means found to be best available for control of SOCs must be at least as effective in controlling SOCs as GAC
- o MCLGs and MCLs must be proposed at the same time and also promulgated simultaneously

- o MCLGs and MCLs/Monitoring requirements are to be set for 83 contaminants listed in the SDWA. The best available technology (BAT) is also to be specified for each
- o Of the 83 contaminants listed, seven substitutes are allowed if regulation of any seven other contaminants would be more protective of public health. The list of substitutes was to be proposed by June 19, 1987
- o The timetable to produce MCLGs and MCLs/Monitoring is as follows:
 - 9 by June 19, 1987
 - 40 by June 18, 1988
 - 34 by June 19, 1989
- o MCLGs and MCLs/Monitoring must be set for other contaminants in drinking water that may pose a health risk
 - The 1986 Amendments require that EPA publish a Drinking Water Priority List (DWPL) of drinking water contaminants that may require regulation under the SDWA
 - The seven substituted contaminants must be included on the drinking water priority list
 - MCLGs and MCLs/Monitoring are to be set for at least 25 contaminants on the list by January 1, 1991
 - MCLGs and MCLs/Monitoring are to be set for at least 25 contaminants every 3 years following January 1, 1991, from subsequent triennial lists.
- o Criteria must be established by which States must determine which surface water systems must install filtration. The SDWA deadline for promulgating this criteria was December 19, 1987. States with primary enforcement responsibility must make determinations regarding filtration within 12 months of promulgation of these criteria and must adopt regulations to implement the filtration requirements within 18 months of promulgation.
- o A treatment technique regulation must be promulgated which will require all public water systems to use disinfection.
 - Variances will be available. EPA will specify variance criteria (i.e., quality of source water, protection afforded by watershed management, etc.)
 - The disinfection treatment rule must be promulgated by June 19, 1989.

- o Requirements must be set for water systems to monitor for unregulated contaminants.
 - Minimum monitoring frequency is five years.
 - State may add/delete contaminants from list
 - Requirements to monitor for unregulated contaminants monitoring must be promulgated by December 19, 1987
- o MCLGs, MCLs and monitoring requirements must be reviewed by EPA every three years.
- o Other requirements/provisions of the 1986 Amendments:
 - Public notification regulations may be changed to provide for different types and frequencies of notice depending upon the potential health risk
 - Best Available Technology (BAT) for issuance of variances must be set when MCLs are set. BAT may vary depending upon the site of systems and other factors, including costs
 - Exemptions can be extended for systems with 500 connections or less. No limit is placed on the number of extensions but certain criteria must be met
- o A summary of deadlines pertinent to standard-setting is give below:

<u>Activity</u>	<u>Date</u>
9 MCLGs and MCLs/Monitoring	June 19, 1987
Propose Seven Substitutes	June 19, 1987
Public Notice Revisions	Sept. 19, 1987
Filtration Criteria	Dec. 19, 1987
Monitoring for Unregulated Contaminants	Dec. 19, 1987
First List of Contaminants (DWPL)	Jan. 01, 1988
40 MCLGs and MCLs/Monitoring	June 19, 1988
34 MCLGs and MCLs/Monitoring	June 19, 1989
Disinfection Treatment	June 19, 1989
25 MCLGs and MCLs/Monitoring	Jan. 01, 1991

1.7 SDWA REFERENCES TO OTHER ACTS

- o Public Health Service Act
- o Federal Water Pollution Control Act
- o Water Resources Planning Act

2.0 APPLICABLE REGULATIONS

The EPA regulations implementing the SDWA are presented in 40 CRF 141, 142, 143, 144, 146, 147, 148, and 149.

2.1 NATIONAL PRIMARY DRINKING WATER REGULATIONS

They are set forth in 40 CFR 141.

2.1.1 Subpart A: General

This section describes general requirements including:

- o **Applicability** - Any facility that has jurisdiction over a public water system is subject to regulation. A public water system is defined as:

"Any collection, treatment, storage or distribution facility for the provision of piped water for human consumption, provided that the system for which it exists has at least 15 service connections or regularly serves at least 25 individuals daily for a total of a least 60 days per year. "Exempt from complying with requirements of the SDWA are facilities that meet the criteria listed below. By definition, they are not public water systems.

- System consist only of distribution and storage facilities and do not have any collection and treatment facilities
 - Installation gets all of its water from a public water system that is owned or operated by another party
 - Installation does not sell water to any party.
- o **Definitions** (see Section 1.1)
 - o **Coverages**

EPA regulates three different types of public water systems: (1) community water system which serves year-round residents (eg., populations that generally live in cities and towns); (2) non-transient systems with their own separate water supply which serves the same population over six months of any year. These include schools, workplaces, and hospitals; and (3) transient systems with their own separate water to serve campgrounds, parks, gas stations, and highway rest stops. In addition, any on-site well used for the purpose of emplacement of fluids is subject to the underground injection control (UIC) regulations in 40 CRF 144. This includes any septic tank or cesspool used to dispose of fluids containing hazardous waste.
 - o **Variances and exemptions.**
 - o **Siting requirements.**
 - o **Effective dates regulations take effect.**

2.1.2 Subpart B: Maximum Contaminant Levels (MCLS)

Setting Drinking Water Standards

2.1.2.1 Primary and Secondary Standards

As required by the Safe Drinking Water Act (SDWA), EPA has established national drinking water standards. These standards apply to any water system which serves more than 25 people. A standard is the maximum level of a substance that EPA has deemed acceptable in drinking water. In setting a primary standard for a drinking water contaminant, EPA, in consultation with the National Academy of Sciences, first reviews the human and animal health effects data for the particular substance in question. EPA next proposes a non-mandatory maximum contaminant level goal (MCLG). By policy, EPA sets MCLGs at zero for all known or probable carcinogens. MCLGs for non-carcinogens are set at a level where no adverse health effects are detected or, if that level cannot be determined, at the lowest level where health effects were observed during laboratory tests. In order to take into account any uncertainty in the health effects data and to ensure that the MCLGs provide an adequate margin of safety safety factors, generally of 10, 100, or 1,000 are applied which result in lower MCLG values.

At the same time, EPA proposes an enforceable primary drinking water standard, a maximum contaminant level (MCL) which is set as close to the MCLG as is feasible based on technological and economic considerations. The important difference between the two is the MCLG is a non-enforceable health-based goal and the MCL is an enforceable standard that public water systems must meet. Following a period for public comment and review of the proposed MCL and MCLG, the Agency enacts a final regulation. States are expected to adopt the standard within 18 months of enactment. There are two types of drinking water standards:

2.1.2.2 Primary MCLs

Primary MCLs are set for substances that can pose a threat to health when present in drinking water at certain levels. Because these substances are of concern for health (not just aesthetic) reasons, primary MCLs are enforceable. In July 1987, EPA finalized MCLs for 8 volatile organic chemicals bringing the number of regulated contaminants to 33.

2.1.2.3 Secondary MCLs

Secondary MCLs serve as guidelines in setting levels based on aesthetic considerations such as taste or odor. Unlike primary MCLs, secondary MCLs are recommended levels only and are not federally enforceable.

Different drinking water standards apply to community, non-transient, and transient water systems. In transient systems, where water is consumed occasionally or over short periods of time, the focus of regulation is solely on short-term exposure to contaminants such as bacteria and nitrite/nitrate that can cause health problems even from occasional exposure. Since water from community and non-transient systems is consumed daily and over a long period of time, the health effects of both short-and long-term exposure to contaminants such as EDB and PCBs are taken into account in these systems.

2.1.2.4 Enforceable Standards

These are applicable to systems described below:

- o MCLs for all chemicals except nitrates, apply to community water systems. State requirement may include nitrate
- o MCLs for turbidity apply to all systems drawing on surface sources
- o MCLs for relevant radioactive particles apply to all systems

- o MCLs for coliform bacteria apply to all systems and they differ for each type of technique used
- o MCLs for inorganic and organic chemicals of concern, trihalomethanes, coliform bacteria and turbidity are specified.

2.13 Subpart C: Monitoring and Analysis Requirements

2.13.1 Monitoring Drinking Water Quality

To ensure the consistency and safety of drinking water, the SDWA requires utilities to conduct routine monitoring and testing of public water supplies. The monitoring requirements are very specific. All water systems are required to sample on a prescribed schedule for contaminants for which standards have been set. Monitoring requirements for community, non-transient and transient systems vary depending upon the contaminant. Monitoring and testing must be conducted in accordance with standard analytical testing procedures.

Two types of sampling are required. Routine sampling takes place on a regular basis and ensures that a treatment plant is running properly and delivering a consistent quality of drinking water and determines whether water quality meets MCLs. When a routine sample analysis indicates elevated levels of a particular contaminant that exceed the EPA or State standard, States may require systems to take a sampling.

2.13.2 Monitoring and Analytical Requirements

Inorganics: Barium, Cadmium, Chromium, Mercury, Selenium.

Currently, all community groundwater systems must monitor for inorganic contaminants every three years. Surface water systems must monitor annually. EPA proposes to retain these basic requirements. The major changes EPA proposes to the current requirements are to expand the requirements to non-transient systems and to allow monitoring at up to ten-year intervals after the system completes three rounds of sampling which show that the water consistently meets the MCLs.

2.13.3 Nitrate/Nitrite

Under present EPA regulations, all community ground-water systems must monitor every three years; community surface water systems must monitor annually. Non-transient and transient systems must monitor at the discretion of the State.

Because nitrate/nitrite contamination is associated with an acute health effect (methemoglobinemia), EPA proposes to increase the monitoring frequency for community and non-transient systems to annually for ground-water systems and quarterly for surface water systems. Community and non-transient groundwater systems must monitor quarterly if four consecutive samples are greater than 50% of the MCL (5 mg/L or 0.5 mg/L); a community or non-transient surface water system may decrease its monitoring frequency to annually if four consecutive samples are less than 50% of the MCL. Transient water systems served by ground water must monitor every three years; those served by surface water must monitor once every year. All water systems must monitor at the time of highest vulnerability, which is generally after rainfall and applications of fertilizers.

2.1.3.4 Asbestos

Monitoring for asbestos is not currently required. EPA proposes to require community and non-transient systems to monitor for asbestos, if a State vulnerability assessment determines that the system is vulnerable to contamination from the water source or corrosion of asbestos cement pipe. The vulnerability assessment determines where systems must sample. Vulnerable systems have five years after the rules are promulgated to complete the initial monitoring. Vulnerable surface water systems must take repeat samples annually; ground-water systems must take repeat samples every three years. Non-vulnerable systems are not required to monitor.

2.1.3.5 Organic Chemicals Other Than Total Trihalomethanes

EPA established monitoring requirements for eight solvents in 1987. According to these, community and non-transient systems must monitor quarterly for one year. Repeat sampling requirements depend on detection of contaminants and the results of a vulnerability assessment. The May 1989 proposal would add 12 additional contaminants to the list of 8 solvents previously regulated by EPA in 1987.

2.1.3.6 Pesticides/Herbicides/PCBs

Currently, community surface water systems must monitor every three years for six pesticides; pesticide monitoring for groundwater systems is at State discretion. EPA proposes new monitoring requirements for 5 currently regulated and 13 additional pesticides/herbicides/PCBs (endrin is not included in the May proposal). Community and non-transient water systems must monitor if the State determines they are vulnerable to contamination based upon an assessment. Systems found not vulnerable are not required to monitor. The assessment considers factors such as previous analytical results, proximity of the system to sources of contamination, and hydrogeological conditions. Systems determined as vulnerable must monitor quarterly for one year. Each sample must be taken at a time in the quarter when the system is most vulnerable. Repeat sampling frequencies vary based on system size and whether pesticides/herbicides/PCBs are detected.

2.1.3.7 Water Treatment Chemicals

Acrylamide and epichlorohydrin are primarily used as flocculants during water treatments to decrease turbidity. EPA proposes treatment technique requirements which limit the concentration of acrylamide and epichlorohydrin in polymers and the dose. Systems must annually certify to the State that the required levels are met.

2.1.3.8 Monitoring For Other Parameters

These include:

- o Turbidity sampling and analytical requirements
- o Microbiological sampling and analytical requirements
- o Analytical methods for radioactivity
- o Monitoring frequency for radioactivity in community water systems
- o Total trihalomethanes sampling, analytical and other requirements
- o Unregulated contaminants. Monitoring for contaminants other than those for which EPA has set MCLs is required by the SDWA Amendments of 1986. EPA proposes to establish

two priority lists of contaminants. Monitoring for the 29 priority #1 contaminants is dependent upon a State vulnerability assessment. Monitoring for the 84 priority #2 contaminants is at State discretion

- o Alternative analytical requirements
- o Approved laboratories
- o Monitoring of consecutive public water systems

2.2 SUBPART D: REPORTING, PUBLIC NOTIFICATION AND RECORDKEEPING

This section addresses reporting requirements, results of costs, analysis, and measurements required for compliance must be forwarded within prescribed times to appropriate EPA regional offices or cognizant State agencies, as applicable.

Records of bacteriological analysis are required to be retained for five years; chemical/physical analyses, ten years. Any instances of noncompliance with primary national standards, variances or exceptions, including failure to comply with sampling/monitoring requirements must also be reported within specific time frames. Non-compliance conditions should also be reported to all persons served by the public water system. The timing and means for all notifications are prescribed in 40 CFR 141 or cognizant State/local regulations as follows:

- o Public notification
- o Record maintenance
- o Public notice requirement pertaining to lead
- o Reporting and public notification for certain unregulated contaminants
- o Special monitoring for corrosivity characteristics
- o Prohibition on use of lead pipe, solder and flux

2.2.1 Subpart F: Recommended Maximum Contaminant Levels

Recommended maximum contaminant levels for listed organic and organic chemicals are indicated.

2.2.2 Subpart G: National Revised Primary Drinking Water Regulations

Revised MCLs for inorganic and organic contaminants and effective dates of enforcement are described.

2.3 EPA NATIONAL PRIMARY DRINKING WATER IMPLEMENTATION REGULATIONS

These are found in 40 CFR 142. Topics include:

- o Delegation of authority to states
- o Public hearings, recordkeeping and reporting by States
- o Alternate Federal enforcement

Provisions of this section are not of concern to the DOE.

2.3.1 National Secondary Drinking Water Regulations

These are found in 40 CFR 143. This part establishes National Secondary Drinking Water Standards which are meant to control contaminants in drinking water that primarily affect the aesthetic qualities relating to the public acceptance of drinking water. They are intended to serve as guidelines for States to control contaminants in drinking water. At considerably higher concentrations of these contaminants, health implications may also exist as well as aesthetic degradation. EPA has established 13 secondary MCLs. With a proposal published in the May 1989 Federal Register, EPA is establishing nine new Secondary MCLs bringing to 22 the number of secondary MCLs. Monitoring compliance with the standard and public notification for fluoride are also described.

2.4 EPA PERMIT REGULATIONS FOR THE UNDERGROUND INJECTION CONTROL PROGRAM

EPA regulations under this title are contained in 40 CFR 144. They establish minimum requirements for the UIC program which regulates underground injections by five classes of wells which are described below:

2.4.1 Classification of Wells

- o Class I wells are used to inject fluids beneath the lowermost formation containing an underground source of drinking water
- o Class II wells inject fluids for enhanced recovery of oil or natural gas and for storage of hydrocarbons
- o Class III wells inject for extraction of minerals
- o Class IV wells are used for disposal of hazardous waste or radioactive waste
- o Class V wells are wells not included in classes I, II, III and IV.

2.4.2 Other Requirements Include

- o Identification of underground sources of drinking water and exempted aquifers
- o Non-compliance and program reporting by the Director of EPA

2.5 SUBPART B: GENERAL PROGRAM REQUIREMENTS

These include:

- o Prohibition of unauthorized injection
- o Prohibition of movement of fluid into underground sources of drinking water
- o Prohibition of Class IV wells
- o Waiver of requirements by Director, i.e., authorization of a well project with less stringent requirements under certain conditions

2.6 SUBPART C: AUTHORIZATION OF UNDERGROUND INJECTION BY RULE

The following are included:

- o Classes I, II and III wells, operations permitted until permit expires or denied.
- o Existing Class II enhanced recovery and hydrocarbon storage wells. These are authorized for life of the well or project
- o Class IV wells. Authorized up to six months after approval or promulgation of UIC program
- o Requirements for Class I, II and III wells authorized by Rule.

2.7 SUBPART D: AUTHORIZATION BY PERMIT

This section describes types of permits such as area or emergency permits together with other characteristics of a permit.

2.8 SUBPART E: PERMIT CONDITIONS

These are established by the Director as required on a case-by-case basis. Schedule A Compliances, requirements for recording and reporting of monitoring results and corrective action are also included.

2.9 SUBPART F: FINANCIAL RESPONSIBILITY: CLASS I HAZARDOUS WASTE INJECTION WELLS

This section addresses the financial responsibility of the owner for plugging and abandonment, use of State required mechanisms, State assumption of responsibility, etc.

2.10 OTHER RELATED REGULATIONS

EPA regulations on State UIC program requirements, criteria and standards for the UIC programs and EPA regulations in State UIC programs are contained in 40 CFR Part 145, Part 146 and Part 147, respectively. Contents of those regulations are summarized below.

2.11 EPA REGULATIONS ON STATE UNDERGROUND INJECTION CONTROL PROGRAM REQUIREMENTS 40 CFR 145

- o Specifies the procedure EPA will follow in approving, revising and withdrawing State programs
- o State UIC program requirements
- o State program submissions
- o Program approval process, revision and withdrawal procedures.

2.12 EPA CRITERIA AND STANDARDS FOR THE UIC PROGRAM 40 CFR 146

- o Technical criteria and standards set forth for the UIC program applicable to all types of wells.

2.13 EPA REGULATIONS ON STATE UNDERGROUND IC PROGRAMS 40 CFR 147

Sets forth the applicable UIC programs for each of the States, territories and possessions identified pursuant to the SDWA as needing a UIC program. See Table 1 for State UIC program.

2.14 EPA REGULATIONS ON HAZARDOUS WASTE DISPOSAL RESTRICTION FOR CLASS I WELLS (40 CFR 148)

This part identifies hazardous wastes that are restricted from disposal into Class I hazardous waste injection wells and defines those circumstances under which a waste otherwise prohibited from injection, may be injected. This requirement applies to owners or operators of Class I hazardous waste injection wells.

3.0 APPLICABILITY TO DOE FACILITIES

DOE Orders 5400.1 and 5484.1 require all DOE facilities to comply with monitoring, recordkeeping and reporting requirements and promulgated by the EPA, State and local Agencies for public wastes systems pursuant to the Safe Drinking Water Act. It is expected that the majority of DOE public water systems will fall into the non-community, non-transient category.

4.0 NEW PROPOSED REQUIREMENTS

In May 1989, EPA proposed in the Federal Register national primary drinking water regulations for 30 synthetic organic chemicals (SOCs) and eight inorganic chemicals (IOCs). This proposal when it becomes final will establish primary MCLs for an additional 27 contaminants and delete the primary MCL for silver.

The May proposal consists of maximum contaminant level goals (MCLGs), maximum contaminant levels (MCLs), monitoring, reporting, and public notification requirements for the SOCs and IOCs. For two contaminants, epichlorohydrin and acrylamide, EPA proposes a treatment technique requirement in lieu of a MCL and monitoring requirements. The Notice also proposes the Best Available Technology (BAT) upon which the MCLs are based and BAT for the purpose of issuing variances. In addition, the proposal contains secondary maximum contaminant levels (SMLCs) for nine contaminants. Monitoring requirements for approximately 110 additional "unregulated" contaminants are also proposed. The public has 90 days to comment on the proposal. In December 1990, EPA intends to publish final regulations. Upon publication of final regulations in the Federal Register, the new monitoring requirements are effective within 30 days; the MCLs and MCLGs are effective 18 months after final Federal Register publication.

4.1 BEST AVAILABLE TECHNOLOGY (BAT)

EPA has identified the best available technologies (BAT) to remove each contaminant listed. BAT is determined by identifying available technologies which have high removal efficiencies, are available in most geographic regions of the country, are compatible with other water treatment processes, and have the ability to achieve compliance at a reasonable cost. The proposed BAT for each contaminant is identified. Systems can use BAT to comply with MCLs and/or qualify for a variance. DOE policy to conduct and monitor environmental surveillance programs to protect the public and the environment and to comply with applicable regulations is reiterated in DOE order 5400.1.

5.0 MCL and MCLG

5.1 MAXIMUM CONTAMINANT LEVEL (MCL)

Maximum contaminant level (MCL) is the maximum permissible level of a contaminant in water which is delivered to the free flowing outlet of the ultimate user of a public water system, except in case of turbidity where the maximum permissible level is measured at the point of entry to the distribution system. The MCLs for public water systems are presented in Tables 2, 3, and 4.

TABLE - 1
State Administered Programs on Underground Injection Wells

State	State UIC Program (Class of Wells)
Alabama	I - V
Alaska	II
Arizona	-
Arkansas	I, III, IV and V
California	II
Colorado	-
Delaware	-
District of Columbia	-
Florida	I, III, IV and V
Georgia	-
Hawaii	-
Idaho	I - V
Illinois	I, III, IV and V
Indiana	-
Iowa	-
Kansas	I, III, IV and V
Kentucky	-
Louisiana	I - V
Maine	I - V
Maryland	-
Massachusetts	I - V
Michigan	-
Minnesota	-
Mississippi	I, III, IV and V
Missouri	I - IV
Montana	-
Nebraska	I - V
Nevada	I - V

TABLE - 1 (cont'd)
State Administered Programs on Underground Injection Wells

State	State UIC Program (Class of Wells)
New Hampshire	I - V
New Jersey	I - V
New Mexico	I - V
New York	-
North Carolina	-
North Dakota	I - V
Ohio	I - V
Oklahoma	I - V
Oregon	I - V
Pennsylvania	-
Rhode Island	-
South Carolina	I - V
South Dakota	II
Tennessee	-
Texas	I - V
Utah	I - V
Vermont	I - V
Virginia	-
Washington	I - V
West Virginia	-
Wisconsin	I - V
Wyoming	I - V

Blank space in Table indicates that the regulations are yet to be established by the State.

TABLE 2
SAMPLING AND ANALYTICAL REQUIREMENTS
FOR COMMUNITY PUBLIC WATER SYSTEMS
MAXIMUM CONTAMINANT LEVELS

<u>Class of Contaminant</u>	<u>Levels (mg/l)</u>
INORGANIC CHEMICALS	
40 CFR 141.11-(b):	
Nitrate	10*
Arsenic	0.05
Barium	1.0
Cadmium	0.01
Chromium	0.05
Lead	0.05
Mercury	0.002
Selenium	0.01
Silver	0.05
40 CFR 141.11(c)	
Fluoride	4.0
Chlorophenoxys	0.1
2,4,5-TP Silvex	0.01
Total trihalomethanes	0.01
40 CFR 141.13:	
Turbidity	1.0 TU
Surface water only	
40 CFR 141.14:	
Coliform bacteria	1/100 ml
40 CFR 141.15:	
Combined Radium - 226/Radium - 228	5 pCi/l
Gross alpha particle activity	15 pCi/l

* State may relax requirement for Nitrate up to 20 mg/l if condition stated in 40 CFR 141.11(b) (1) to (4) are met.

TABLE 2 (cont'd)
SAMPLING AND ANALYTICAL REQUIREMENTS
FOR COMMUNITY PUBLIC WATER SYSTEMS
MAXIMUM CONTAMINANT LEVELS

<u>Class of Contaminant</u>	<u>Levels (mg/l)</u>
ORGANIC CHEMICALS	
40 CFR 141.12:	
Endrin	0.0002
Lindane	0.0004
Methoxychlor	0.1
Toxaphene	0.005
ORGANIC CHEMICALS	
(Revised Primary Regulations	
Effective 01/09/89)	
40 CFR 141.61:	
Benzene	0.005
Vinyl Chloride	0.002
Carbon Tetrachloride	0.005
1,2 Dichloroethane	0.005
Trichloroethylene	0.005
1,1-Dichloroethylene	0.007
1,1,1-Trichloroethane	0.20
para-Dichlorobenzene	0.075

TABLE 2 (cont'd)
SAMPLING AND ANALYTICAL REQUIREMENTS
FOR COMMUNITY PUBLIC WATER SYSTEMS
MAXIMUM CONTAMINANT LEVELS

<u>Class of Contaminant</u>	<u>Levels (mg/l)</u>
40 CFR 143.3 Secondary Drinking Water Regulations	
Chloride	250
Color	15 color units
Copper	1.0
Corrosivity	non-corrosive
Fluoride	2.0
Foaming agents	0.05
Iron	0.3
Manganese	0.05
Odor	3 threshold odor units
pH	6.5 - 8.5
Sulfate	250
Total dissolved solids (TDS)	500
Zinc	5

TABLE 3
SAMPLING AND ANALYTICAL REQUIREMENTS
FOR NON-COMMUNITY, NON-TRANSIENT PUBLIC WATER SYSTEMS
MAXIMUM CONTAMINANT LEVELS

<u>Contaminant</u>	<u>Levels (mg/l)</u>
Inorganic Chemicals 40 CFR 141.11(b):	
Nitrate	10*
Arsenic	0.05
Barium	1.0
Cadmium	0.01
Chromium	0.05
Lead	0.05
Mercury	0.002
Selenium	0.01
Silver	0.05

* (State may relax requirement for Nitrate up to 20 mg/l if condition stated in 40 CFR 141.11(b) (1) to (4) are met).

TABLE 3 (cont'd)
SAMPLING AND ANALYTICAL REQUIREMENTS
FOR NON-COMMUNITY, NON-TRANSIENT PUBLIC WATER SYSTEMS
MAXIMUM CONTAMINANT LEVELS

<u>Contaminant</u>	<u>Levels (mg/l)</u>
40CFR 141.13 Turbidity For Surface Water Only	1.0 TU
40 CFR 141.14 Coliform Bacteria	1/100 ml
40 CFR 141.15 Combined Radium - 226 And Radium - 228	5 pCi/l
Gross alpha particle activity	15 pCi/l
40 CFR 141.61 Organic Chemicals Revised Primary Regulations Effective 01/09/89	
Benzene	0.005
Vinylchloride	0.002
Carbon tetrachloride	0.005
1,2 Dichloroethane	0.005
Trichloroethylene	0.005
1,1-Dichloroethylene	0.007
1,1,1-Trichloroethane	0.20
para-Dichloroebenzene	0.075

TABLE 3 (cont'd)

**SAMPLING AND ANALYTICAL REQUIREMENTS
FOR NON-COMMUNITY, NON-TRANSIENT PUBLIC WATER SYSTEMS
MAXIMUM CONTAMINANT LEVELS IN PARENTHESIS**

<u>Contaminant</u>	<u>Levels (mg/l)</u>
40 CFR 143.3 Secondary Drinking Water Regulations	
Chloride	250
Color	15 color units
Copper	1.0
Corrosivity	non-corrosive
Fluoride	2.0
Foaming agents	0.5
Iron	0.3
Manganese	0.05
Odor	3 threshold odor units
pH	6.5 - 8.5
Sulfate	250
Total dissolved solids (TDS)	500
Zinc	5

TABLE 4
SAMPLING AND ANALYTICAL REQUIREMENTS
FOR NON-COMMUNITY, NON-TRANSIENT PUBLIC WATER SYSTEMS
MAXIMUM CONTAMINANT LEVELS

<u>Contaminant</u>	<u>Levels (mg/l)</u>
Inorganic Chemicals 40 CFR 141.11(b):	
Nitrate	10*
	*State may relax requirement for Nitrate up to 20 mg/l if condition stated in 40 CFR 141.11(b) (1) to (4) are met.

5.2 MAXIMUM CONTAMINANT LEVEL GOAL (MCLG)

Maximum contaminant level goal (MCLG) means the maximum level of a contaminant in drinking water at which no known or anticipated adverse effect on the health of persons would occur, and which allows an adequate margin of safety. MCLGs are nonenforceable health goals and are presented in Table 5.

6.0 CONTAMINANTS FOR WHICH MONITORING IS REQUIRED UNDER THE SPECIAL REGULATION

6.1 ORGANICS

All community and non-transient, non-community water systems shall monitor for 34 organic chemicals listed under 40 CFR 141.40(e). State may monitor for Ethylene dibromide (EDB) and 1,2-Dibromo-3-chloropropane (DBCP) only if they determine that the water system is vulnerable to contamination by either or both of the substances.

6.2 SODIUM

Suppliers of water for community public water systems shall collect and analyze one sample per plant at the entry point of the distribution system for determination of sodium concentration levels. Samples must be collected and analyzed annually for systems utilizing surface water sources in whole or in part, and at least every three years for systems utilizing solely groundwater sources (40 CFR 141.41).

6.3 CORROSIVITY CHARACTERISTICS

Special monitoring for corrosivity characteristics is required for community public water systems (40 CFR 141.42). The suppliers of water for community public water systems shall collect samples from a representative entry point to the water distribution system. The determination of corrosivity characteristics of the water shall include measurement of pH, calcium hardness, alkalinity, temperature, total dissolved solids, and calculation of the Langelier Index. The number of samples to be collected will be determined by the State.

TABLE 5
MAXIMUM CONTAMINANT LEVEL GOALS

<u>Contaminants</u>	<u>Level (mg/l)</u>
40 CFR 141.50(b)	
1,1 - Dichloroethylene	0.007
1,1,1 - Trichloroethane	0.20
para - Dichlorobenzene	0.075

EXECUTIVE ORDER 12088, FEDERAL COMPLIANCE AND POLLUTION CONTROL STANDARDS

Executive Order 12088 states that the head of each executive agency is responsible for ensuring that the agency takes all necessary actions for the prevention, control, and abatement of environmental pollution with respect to Federal facilities and activities under its control. All Federal agencies must comply with applicable administrative and procedural pollution control standards established by, but not limited to, the following Federal laws:

- o Toxic Substances Control Act (15 USC 2601 et seq.)
- o Federal Water Pollution Control Act (33 USC 1251 et seq.)
- o Public Health Service Act, as amended by the Safe Drinking Water Act (42 USC 300 (f) et seq.)
- o Clean Air Act (42 USC 7401 et seq.)
- o Noise Control Act (42 USC 4901 et seq.)
- o Resource Conservation and Recovery Act (42 USC §6901 et seq.)

LIST OF SAFE DRINKING WATER ACT (SDWA) CHECKLISTS

Performance Checklist	Revision No.	Date	Checklist Title
SD - C	0	12/29/89	Suppliers of Drinking Water
SD - M	0	12/29/89	Monitoring and Analytical Requirements
SD - R	0	12/29/89	Reporting Requirements, Public Notification, Record Maintenance
SD - O	0	12/29/89	Special Monitoring for Organic Chemicals
SD - S	0	12/29/89	Special Monitoring for Sodium and Corrosivity
SD - P	0	12/29/89	Prohibition on Use of Lead Pipe, Solder, Flux
SD - NP	0	12/29/89	National Primary Drinking Water Standards
SD - N	0	12/29/89	National Secondary Drinking Water Regulations
SD - I	0	12/29/89	Injection Wells
SD - J	0	12/29/89	Injection Wells Permit Conditions
SD - B	0	12/29/89	Best Management Practices

AUDITOR(S): _____

BLDG/AREA/UNIT(S): _____

DATE: ____ / ____ / ____

ESO NO.: _____

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
CFR 141.3: Coverage			
1. Does the facility own or operate a public water system as defined in 40 CFR 141.2?	Y N		
- If YES, proceed with checklist.			
- If NO, proceed to SD-B checklist and checklist is complete.			
2. Does the public water system:			
a. Consist only of distribution and storage facilities (and does not have any collection and treatment facilities)?	Y N		
b. Obtains all of its water from, but is not owned or operated by, a public water system to which such regulations apply?	Y N		
c. Not sell water to any person?	Y N		
d. Is not a carrier which conveys passengers in interstate commerce?	Y N		
3. Check status of the public water system to determine which of the following categories it can be classified into:			
a. Community water system, which serves at least 15 service connections used by year-round residents or regularly serves at least 25 year-round residents (40 CFR 141.2(i))?	Y N		
b. Non-community water system which is a public water system that is not a community water system (40 CFR 141.2(ii))? (It primarily serves non-resident area customers.)	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
1) Transient systems such as campgrounds, gas stations or rest areas?	Y N		
2) Non-transient systems such as schools, workplaces, and hospitals which have their own water supply to serve the same 25 or more persons for at least six months per year (Federal Register Vol 52, No. 130, 5)?d	Y N		
Note: Most DOE public water probably comes under the category of non-transient supply systems, non-community systems. They must comply with all the Federal, State, and local regulations and applicable DOE orders. Community and non-community, non-transient systems differ in regard to their sampling, analysis, and reporting requirements. After applicability is determined, proceed to the appropriate SDWA checklist. This checklist is complete.			

AUDITOR(S): _____

BLDG/AREA/UNIT(S): _____

DATE: ____/____/____

ESO NO.: _____

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
<u>40 CFR 141.21: Microbiological Contaminant Sampling and Analytical Requirements</u> 1. a. Does the facility analyze water samples for coliform bacteria or use the services of an approved laboratory to determine compliance with 40 CFR 141.14? (If so, list the laboratory.) b. Are analyses conducted in accordance with methods and procedures specified by the EPA? - If YES, list the method. c. Does the sample correspond with the standard sample size specified for the procedure employed? d. Are samples taken at points which are representative of the conditions within the distribution system? e. Does the number of samples analyzed per month agree with the minimum specified for the population served by the facility? - If NO, check whether the State has permitted reduced sampling frequency. i. If the facility is a non-community water system, does it sample each calendar quarter that the system provides water to the public? g. When coliform bacteria in test samples exceed the specified levels, is sampling and analysis repeated as required until at least two consecutive check samples indicate acceptable values?	Y N Y N Y N Y N Y N Y N Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
h. Is the State notified within 48 hours when the presence of coliform bacteria in water is confirmed by check samples?	Y N		
i. Is a report filed with the State and the public notified when a maximum contaminant level specified in 40 CFR 141.14 is exceeded?	Y N		
j. Special purpose samples are not used to determine compliance with 40 CFR 141.14 or 141.21(b) or (c).	Y N		
k. Is substitution of chlorine residual monitoring, if any, done in accordance with the approval of the State and based upon a sanitary survey and in accordance with the procedures specified in 40 CFR 141.21(h)?	Y N		
l. Are sampling results indicating a free chlorine residual less than 0.2 mg/l, when confirmed, reported to the State within 48 hours?	Y N		
m. Are analyses for residual chlorine made in accordance with the EPA-recommended method?	Y N		
n. Is compliance with the maximum contaminant levels for coliform bacteria determined as specified in 40 CFR 141.14?			
- If YES to Questions 1a - n, ENTER STATUS "S".			
- If NO to any of Questions 1a - n, ENTER STATUS "U".			
40 CFR 141.22: Turbidity Sampling and Analytical Requirements			
2. Does the facility use water obtained in whole or in part from surface sources?	Y N		
- If YES, proceed with checklist.			
- If NO, proceed to Question 12.			

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
3. a. Are samples taken at representative entry points at least once per day, for the purpose of making turbidity measurements to determine compliance with 40 CFR 141.13?	Y N		
Note: Reduced frequency, if any, should be approved or permitted by the State based on a determination that such reduction will not pose a risk to public health.			
b. Are turbidity measurements made by the Nephelometric Method in accordance with EPA approved methods including calibration of the turbidity meter?	Y N		
c. When turbidity readings exceed maximum allowable limits, does the facility confirm the measurement by resampling within the recommended interval?	Y N		
d. Are exceedance of maximum allowable limits when confirmed by repeat sampling reported to the State within 48 hours?	Y N		
e. Is a report made to the State and the public notified when the monthly average of the daily samples exceeds the maximum allowable limit, or when the average of two samples taken on consecutive days exceeds 5 turbidity units?	Y N		
- If YES to Questions 3 a - e, ENTER STATUS "S".	☐		
- If NO to any of Questions 3 a - e, ENTER STATUS "U".			
<u>40 CFR 141.23: Inorganic Chemical Sampling and Analytical Requirements</u>			
4. If the facility uses surface water, is sampling and analysis conducted on an annual basis?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
5. If the facility uses groundwater, is sampling and analysis conducted at least once in 3 years?	Y N		
- If YES or NOT APPLICABLE to Questions 4 and 5, ENTER STATUS "S".			
- If NO to Question 4 or 5, ENTER STATUS "U".			
6. Is sampling and analysis for inorganic chemicals conducted in accordance with and at the frequency specified by State regulations?	Y N		
7. Does analytical data indicate that nitrate, fluoride, and other listed inorganic chemicals in the water samples are below the maximum contaminant levels noted in 40 CFR 141.11 and 141.62?	Y N		
8. Is compliance with MCLs for nitrate determined in accordance with the procedure described in 40 CFR 141.23(d)?	Y N		
9. When the result of an analysis indicates that the level of any contaminant listed in 40 CFR 141.11 or 141.62 exceeds the maximum contaminant level, are the State and the public notified?	Y N		
10. Is monitoring after public notification conducted at a frequency designated by the State until the contaminant drops to below the MCL?	Y N		
11. Are analyses conducted by methods specified by the EPA or their equivalents as determined by the Administrator?	Y N		
- If YES to Questions 6 - 11, ENTER STATUS "S".			
- If NO to any of Questions 6 - 11, ENTER STATUS "U".			
<u>40 CFR 141.24: Organic Chemicals Other than Total Trihalomethane Sampling and Analytical Requirements</u>			
12. Are analyses completed during the period of the year designated by the State for community water systems utilizing surface water sources?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
13. Are analysis repeated at intervals specified by the State or at least once in 3 years?	Y N		
14. If the system uses only ground water, does the State require analyses to be performed?	Y N NA		
15. Do analytical results indicate contaminant levels of chemicals listed under 40 CFR 141.12(a), 141.12(b) and 141.61 are within the maximum contaminant levels?	Y N		
16. When any listed chemical exceeds the maximum contaminant level, is notification given to the State and the public, as required?	Y N		
17. After public notification, is monitoring done at a frequency designated by the State or until the maximum contaminant level has not been exceeded in two successive samples, or until a monitoring schedule as a condition to a variance, exemption, or enforcement action becomes effective?	Y N		
18. Are analyses conducted by methods specified by the EPA or their equivalents as determined by the Administrator?	Y N		
19. Are sampling and analysis of the contaminants listed in 40 CFR 141.12(a) and 141.12(b) conducted in accordance with procedures and methods described by the EPA?	Y N		
20. Is compliance with 40 CFR 141.61(a) determined on the results of running annual average quarterly sampling for each sampling location? The system is deemed to be out of compliance if one location's average exceeds the MCL.	Y N		
- If YES or NOT APPLICABLE to Questions 12 - 20, ENTER STATUS "S".			
- If NO to any of Questions 12 - 20, ENTER STATUS "U".			

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
40 CFR 141.25: Analytical Methods for Radioactivity			
21. Is Compliance with the MCLs for radium-226, radium-228, and gross alpha particle radioactivity, and beta particle and photon radioactivity from man-made radionuclides in community water systems determined by using methods specified by the EPA or alternative methods approved in accordance with CFR 141.27?	Y N		
22. Are averages of data used to judge compliance with the MCL listed in Parts 141.15 and 141.16? (40 CFR 141.25(d))?	Y N		
- If YES to Questions 21 <u>and</u> 22, ENTER STATUS "S".	☐		
- If NO to Question 21 <u>or</u> 22, ENTER STATUS "U".			
23. Do analysis reports show that the radioactivity in community water systems has not exceeded the specified MCLS as follows:			
a. Combined radium-226 and radium-228 - 5pCi/l?	Y N		
b. Gross alpha particle activity including radium-226 but excluding radon and uranium-15pCi/l?	Y N		
24. 40 CFR 141.16 MCLs for beta particle and photon radioactivity from man-made radionuclides in community water systems are as follows:			
a. Do facility monitoring records show that the average annual concentration of beta particles and photon radioactivity from man-made radionuclides in drinking water is not such as to produce an annual dose equivalent to the body or any internal organ greater than 4 millirem/year?	Y N		
b. Except for Tritium and Strontium 90, is the concentration of man-made radionuclides causing 4 mrem total body or organ dose equivalent calculated on the basis of a 2liter per day drinking water intake?	Y N		
c. For Tritium and Strontium 90, does the average annual concentration not exceed 20,000 and 8 pCi per liter, respectively?	Y N		

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AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
31. Is any additional or more frequent monitoring ordered by the State for specific situations such as in the vicinity of mining or other operations conducted? (40 CFR 141.26(a)(3)(I) to (v)(4)(b)(II)(III)) - If YES to Questions 25 - 31, ENTER STATUS "S". - If NO to any of Questions 25 - 31, ENTER STATUS "U".	Y N ☐		
<u>40 CFR 141.28: Approved Laboratories</u>			
32. Are analyses of samples for contaminant measurements conducted by a laboratory approved by the State? - If YES, ENTER STATUS "S". - If NO, ENTER STATUS "U".	Y N		
<u>40 CFR 141.29: Monitoring of Consecutive Public Water System</u>			
33. Does the system supply water to one or more other public water systems? - If YES, proceed with checklist. - If NO, proceed to Question 36.	Y N		
34. Has the State modified the monitoring requirements? - If YES, proceed with checklist. - If NO, proceed to Question 36.	Y N		
35. Is the modified monitoring conducted pursuant to a schedule specified by the State? - If YES, ENTER STATUS "S". - If NO, ENTER STATUS "U".	Y N ☐		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
40 CFR 141.30: Total Trihalomethane Sampling, Analytical and Other Requirements			
36. Does the system serve a population of 10,000 or more individuals and add a disinfectant to the water? - If YES, proceed with checklist. - If NO, checklist is complete.	Y N		
37. Is monitoring for degradation products performed by the facility? - If YES, ENTER STATUS "S". - If NO, ENTER STATUS "U".	Y N 		
Note: DOE is not likely to have this type of facility. This checklist is complete.			

AUDITOR(S): _____
_____BLDG/AREA/UNIT(S): _____

DATE: ____/____/____

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AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
40 CFR 141.31: Reporting Requirements			
1. Are test measurement or analysis reports filed with the State within the specified time period?	Y N		
2. Are non-compliances with primary drinking water regulations reported to the State within 48 hrs?	Y N		
3. Are copies of public notification submitted to the State within 10 days?	Y N		
- If YES to Questions 1 - 3, ENTER STATUS "S".	☐		
- If NO to any of Questions 1 - 3, ENTER STATUS "U".			
40 CFR 141.32: Public Notification			
4. Has the facility complied with MCL, treatment technique, and variance and exemption schedule?	Y N		
5. Are violations and failures to comply with State requirements notified to persons served by the system through newspapers, radio, letter, or other appropriate communication media according to specified schedules?	Y N		
- If YES to Questions 4 <u>and</u> 5, ENTER STATUS "S".	☐		
- If NO to Question 4 <u>or</u> 5, ENTER STATUS "U".			

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
<u>40 CFR 141.34: Public Notice Requirements Pertaining to Lead</u>			
6. Has the facility notified water users of possible lead contamination of the water in the prescribed manner?	Y N		
- If YES, ENTER STATUS "S".			
- If NO, ENTER STATUS "U".			
<u>40 CFR 141.33: Record Maintenance</u>			
7. Are bacteriological analytical records kept for at least 5 years?	Y N		
Note: States may have a 1 year requirement.			
8. Are chemical analysis records kept for at least 10 years?	Y N		
9. Are reports on sanitary survey kept for a period of not less than 10 years?	Y N		
10. Are records of action taken to correct violation of primary drinking water regulations kept for at least 3 years?	Y N		
11. Are records of a variance or exemption granted kept for a period not less than 5 years following the expiration of such variance or exemption?	Y N		
- If YES to Questions 7 - 11, ENTER STATUS "S".			
- If NO to any of Questions 7 - 11, ENTER STATUS "U".			
<u>40 CFR 141.35: Reporting and Public Notification for Certain Unregulated Contaminants</u>			
12. Does the facility operate a non-transient, non-community water system?	Y N		
- If YES, proceed with checklist.			
- If NO, checklist is complete.			

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
13. Does the facility send a copy of the monitoring results required under 40 CFR 141.40 to the State within 30 days of receipt? - If YES, ENTER STATUS, "S". - If NO, ENTER STATUS "U". This checklist is complete.	Y N ☐		

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AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
40 CFR 141.40: Special Monitoring for Organic Chemicals			
1. Is monitoring for the listed contaminants except ethylene dibromide (EDB) and 1,2 - dibromo - 3 - chloropropane (DBCP) done on:			
a. Minimum 1 year of quarterly samples for surface water sources?	Y N		
b. Minimum of one sample per entry point to the distribution system for groundwater systems?	Y N		
2. Is analysis conducted by methods specified by the EPA or their equivalents approved by the Administrator?	Y N		
3. Is special monitoring for organic chemicals done at frequency of not less than once in 5 years?	Y N		
- If YES to Questions 1, 2, <u>and</u> 3, ENTER STATUS "S".	☐		
- If NO to Question 1, 2, <u>or</u> 3, ENTER STATUS "U".			
4. Is EDB and DBCP monitoring required by the State?	Y N		
- If YES, proceed with checklist.			
- If NO, checklist is complete.			
5. Does facility monitor for these contaminants?	Y N		
- If YES, ENTER STATUS "S".	☐		
- If NO, ENTER STATUS "U".			

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
6. Is special monitoring for EDB and DBCP done at frequency of not less than once in 5 years? - If YES, ENTER STATUS "S". - If NO, ENTER STATUS "U". Note: Check permit for State-imposed monitoring of other specified chemicals. In lieu of monitoring, the facility may send a letter to the State before January 1, 1991 stating that the system is available for sampling. This checklist is complete.	Y N ☐		

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AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
CFR 141.41: Special Monitoring for Sodium			
1. a. Are surface water systems sampled and analyzed annually for sodium and groundwater systems sampled at least once in 3 years?	Y N		
b. Are results reported to EPA and/or the State within specified time limits ?	Y N		
c. Are local and State Public Health officials notified within three months and a copy sent to EPA and/or the State within 10 days?	Y N		
- If YES to Questions 1a - c, ENTER STATUS "S".			
- If NO to any of Questions 1a - c, ENTER STATUS "U".			
CFR 141.42: Special Monitoring for Corrosivity Characteristics			
2. a. Are samples collected, as required, for the purpose of analysis to determine the corrosivity characteristics of the water?	Y N		
b. Does the analysis include measurement of pH, calcium, hardness, alkalinity, temperature, total dissolved solids, and calculation of the Langelier Index?	Y N		
Note: Check if any additional monitoring is required by the State, such as for sulfates and chlorides.			
c. Are results of the analyses reported to EPA and/or the State within the specified time limits?	Y N		
d. Are analysis conducted according to methods specified?	Y N		
e. Has the facility determined whether lead, copper, galvanized piping, ferrous piping, and asbestos cement pipe are present in distribution systems?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
f. Are positive results reported to the State? Note: Check facility permit for any additional State-required identification and reporting of contaminants like vinyl lined asbestos cement pipe and coal tar lined pipes and tanks. - If YES to Questions 2a - f, ENTER STATUS "S". - If NO to any of Questions 2a - f, ENTER STATUS "U". This checklist is complete	Y N ☐		

AUDITOR(S): _____

BLDG/AREA/UNIT(S): _____

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AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
40 CFR 141.43: Prohibition on use of Lead Pipes, Solder, and Flux			
1. a. Do solders and flux used at the facility contain less than 0.2 percent lead for use at the facility?	Y N		
b. Do any pipes and/or fittings used at the facility contain less than 8.0 percent lead?	Y N		
c. Is notice provided to water users when lead contamination occurs from (i) lead content in the construction materials of the public water distribution system and/or (ii) corrosivity of the water supply sufficient to cause leaching of lead?	Y N		
Note: Notice is provided notwithstanding the absence of a violation of any drinking water standard:			
- If YES to Questions 1a - c, ENTER STATUS "S".	☐		
- If NO to any of Questions 1a - c, ENTER STATUS "U".			
This checklist is complete.			

AUDITOR(S): _____

BLDG/AREA/UNIT(S): _____

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AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
40 CFR 142.40: Requirements for a Variance			
1. Has the facility been granted any variance for its public water system from the EPA for any requirements respecting MCLs of applicable national primary drinking water regulations? - If YES, proceed with checklist. - If NO, checklist is complete.	Y N		
2. Is the variance granted upon: a. The characteristic of the main sources available to the system? b. Determination of the system not being able to meet the requirements respecting MCL despite application of best treatment techniques?	Y N Y N		
3. Does the granting of variance result in an unreasonable risk to the health of persons using the system? - If YES, ENTER STATUS "U". - If NO, ENTER STATUS "S".	Y N ☐		
40 CFR 142.50: Exemptions issued by the Administrator			
4. Has the facility been granted an exemption for its public water system from EPA for any requirements respecting MCL or any treatment technique requirements? - If YES, proceed with checklist. - If NO, checklist is complete.	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
5. Is the exemption granted upon finding that:			
a. Due to the compelling factors (eg. economic factors), the public water system is unable to comply with MCLs or treatment technique requirements?	Y N		
b. The granting of exemption will not result in an unreasonable risk to health?	Y N		
- If YES to Questions 5a <u>and</u> b, ENTER STATUS "S".	☐		
- If NO to Question 5a <u>or</u> b, ENTER STATUS "U".			
This checklist is complete.			

AUDITOR(S): _____

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AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
40 CFR 143.4: Monitoring for Secondary Maximum Contaminant Levels			
1. Is monitoring conducted for chemicals and parameters such as odor, pH, etc., as listed in 40 CFR 143.3? - If YES, inspect copy of most recent analysis report on file and compare the values with the Secondary Maximum Contaminant Levels shown in 40 CFR 143.3.	Y N		
2. Are contaminants within the recommended levels? (40 CFR 143.3) - If YES to Questions 1 and 2, ENTER STATUS "S". - If NO to Question 1 or 2, ENTER STATUS "U".	Y N ☐		
3. Is analysis of surface water conducted annually? (40 CFR 143.4)	Y N		
4. Is analysis of groundwater sources conducted at least once in 3 years? (40 CFR 143.4)	Y N		
5. Is analysis conducted to determine compliance with SMCLs made in accordance with the specified method for each of the chemicals and parameters? (40 CFR 143.4(b)(1) to (11)) - If YES to Questions 3 - 5, ENTER STATUS "S". - If NO to any of Questions 3 - 5, ENTER STATUS "U".	Y N ☐		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
40 CFR 143.5: Compliance with Secondary Maximum Contaminant Level and Public Notification of Fluoride			
6. Have fluoride levels exceeded 2.0 mg/liter?	Y N		
- If YES, proceed with checklist.			
- If NO, proceed to checklist SDW-I.			
7. Did the facility provide notice in the prescribed form to:			
a. All billing units annually?	Y N		
b. All new billing units at the time service began?	Y N		
c. State public health officer?	Y N		
- If YES to Questions 7a, b, <u>and</u> c, ENTER STATUS "S".			
- If NO to Question 7a, b <u>or</u> c, ENTER STATUS "U".			
This checklist is complete.			

AUDITOR(S): _____

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DATE: ____/____/____

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AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
40 CFR 144.6: Class I Wells - Industrial or Municipal Disposal			
1. Does the facility own or operate Class I industrial or municipal type wells into which non-hazardous fluids are injected as defined in 40 CFR 144.6(2)? - If NO, proceed to Question 5. - If YES, proceed with checklist.	Y N		
2. Has the facility: a. Applied for a permit to operate the well as required in 40 CFR 144.31? b. Been issued a permit? c. Is the permit, if issued, current on the audit date?	Y N Y N Y N		
3. Are criteria and standards for the well described in 40 CFR 146 Subpart B regarding construction, operating, monitoring, and reporting requirements complied with in addition to those specified in the permit?	Y N		
4. Check whether facility is operating under Authorization by Rule and is within the 5-year period after promulgation of the program? (40 CFR 144.21 (3)(i)(A)) - If YES to Questions 2-4, ENTER STATUS "S". - If NO to any of Questions 2-4, ENTER STATUS "U".	Y N ☐		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
40 CFR 144.6(a)(1): Class I Wells - Injection of Hazardous Waste			
5. Does the facility own or operate Class I wells for injection of hazardous waste as defined in 40 CFR 144.6(a)(1)? - If NO, proceed to Question 9. - If YES, proceed with checklist.	Y N		
6. Has the facility: a. Applied for authorization as required in 40 CFR 144.31? b. Been issued a permit? c. The permit is current on the date of the audit?	Y N Y N Y N		
7. Check permit requirements. Is the facility complying with criteria and standards described in 40 CFR 146 Subpart B regarding construction, operating, monitoring, and reporting requirements in addition to those specified in the permit?	Y N		
8. In addition, does facility comply with hazardous waste management requirements applicable to generators and TSD operations, (for example, identification number, manifest system, operating records etc., listed in 40 CFR 144.14 (c)(1) to (9))? - If YES to Questions 6 - 8, ENTER STATUS "S". - If NO to any of Questions 6 - 8, ENTER STATUS "U". Note: See RCRA checklist for details.	Y N 		
40 CFR 144.6(b): Class II Wells - Injection for Production or Storage of Oil or Gas			
9. Does facility own or operate Class II Wells which inject fluids (1) in connection with natural gas storage operations, or (2) conventional oil or natural gas production?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
- If NO, proceed to Question 13. - If YES, proceed with checklist.			
10. Has facility:			
a. Applied for authorization to operate as required in 40 CFR 144.31?	Y N		
b. Been issued a permit?	Y N		
c. A current permit on the date of audit?	Y N		
11. Are criteria and standards described in 40 CFR 146 Subpart C regarding construction, operating, monitoring, and reporting requirements complied with in addition to those specified in the permit?	Y N		
12. Does facility comply with the applicable requirements of 40 CFR 144.28 (Authorization by Rule) and 40 CFR 147 (State program)?	Y N		
- If YES to Questions 10a - 12, ENTER STATUS "S". - If NO to any of Questions 10a - 12, ENTER STATUS "U".	☐		
40 CFR 144.6(c): Class III Wells - Injection for Extraction of Minerals			
13. Does facility own or operate Class III wells which inject for extraction of minerals including:			
a. Mining of sulfur?	Y N		
b. In situ production of uranium or other metals?	Y N		
c. Solution mining of salts and potash?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
- If NO to Questions 13a-c, proceed to Question 17. - If YES to any of Questions 13a-c, proceed with checklist.	Y N		
14. Has facility applied for authorization to operate the wells as required in 40 CFR 144.31 and been issued a permit that is valid on the date of audit?	Y N		
15. Are criteria and standards applicable to this class of wells described in 40 CFR 146 Subpart D regarding construction, operating, monitoring, and reporting requirements complied with in addition to those specified in the permit?	Y N		
16. Is facility operating under Authorization by Rule and is it complying with requirements described in 40 CFR 144.28 regarding 24-hour reporting, plugging and abandonment plan, casing and cementing, operating, monitoring, reporting, and record retention?	Y N		
- If YES to Questions 14 - 16, ENTER STATUS "S". - If NO to any of Questions 14 - 16, ENTER STATUS "U".			
<u>40 CFR 144.6(d): Class IV Wells - Injection of Hazardous or Radioactive Waste</u>			
Note: These are wells used by generators of hazardous waste or of radioactive waste, by owners or operators of hazardous waste management facilities, or by owners or operators of radioactive waste disposal sites to dispose of hazardous waste or radioactive waste into or above formation which within one quarter mile of the well contains an underground source of drinking water. This type of well has been prohibited. Therefore, no permits will be issued. Criteria and standards for Class IV wells have not been developed.			
Note: Refer to RCRA and RAD checklist.			

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
40 CFR 144.6(e): Class V Wells			
17. Does the facility own or operate Class V injection wells?	Y N		
Note: These are the wells not considered applicable to Class I, II, III or IV wells.			
- If NO, proceed to checklist of permit conditions (SD-J). - If YES, proceed with checklist.			
18. Has the facility applied for and secured a permit?	Y N		
19. Are permit conditions complied with?	Y N		
- If YES to Questions 17-19, ENTER STATUS "S". - If NO to any of Questions 17 - 19, ENTER STATUS "U".			
This checklist is complete.			

AUDITOR(S): _____

BLDG/AREA/UNIT(S): _____

DATE: ____/____/____

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AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
<u>40 CFR 144(i): Subpart E - Permit Conditions</u>			
Note: All conditions applicable to all permits are incorporated into the permits either expressly or by reference. If incorporated by reference, a specific citation to these regulations will be given in the permits.			
Note: Any permit noncompliance constitutes a violation of the SDWA and is grounds for enforcement action. (40 CFR 144.51)			
1. Review permit conditions and verify if the facility is in compliance with all the requirements.	Y N		
- If YES, ENTER STATUS "S".			
- If NO, ENTER STATUS "U" and explain extent and severity of noncompliance.			
<u>40 CFR 144.51(d): Duty to Mitigate</u>			
2. In the event of noncompliance, has facility taken all reasonable steps to minimize or correct any adverse impact on the environment resulting from noncompliance?	Y N		
<u>40 CFR 144.51(e): Proper Operation and Maintenance</u>			
3. Does the facility have procedures in place to ensure that systems are properly operated and maintained?	Y N		
4. Are there systems (treatment and control) installed or used by the facility to achieve compliance with the permit?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
Note: Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls including appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities or similar systems only when necessary to achieve compliance with the conditions of the permit. <u>40 CFR 144.51(h): Duty to Provide Information</u> 5. Has facility furnished to the Director upon request copies of records required to be kept by the permit? <u>40 CFR 144.51(i): Monitoring and Records</u> 6. Does the facility collect and analyze samples in accordance with monitoring requirements? 7. Are records kept of all monitoring information including: a. Calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all records required by the permit, for a period of at least 3 years from the date of the sample, measurement, report, or application? b. The nature and composition of all injected fluids until 3 years after the completion of any plugging and abandonment procedures specified under 40 CFR 144.52(a)(6), or under Part 146 Subpart G, as appropriate? (40 CFR 144.51(i)(2)(i)(ii)) <u>40 CFR 144.51(3): Monitoring Information Records</u> 8. Do records of monitoring information include the following: a. The date, exact place, and time of sampling or measurements?	Y N Y N Y N Y N Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
b. The individuals who performed the sampling or measurements?	Y N		
c. The dates analyses were performed?	Y N		
d. The individuals who performed the analyses?	Y N		
e. The analytical techniques or methods used?	Y N		
f. The results of such analyses?	Y N		
9. Are all applications, reports, or information submitted to the Administrator signed and certified? (40 CFR 144.32)	Y N		
10. Is notice given to the Director as soon as possible of any planned physical alterations or additions to the permitted facility? (40 CFR 144.51 (k)(1))	Y N		
11. Is advance notice given to the Director of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements? (40 CFR 144.51 (k)(2))	Y N		
12. Are monitoring reports filed at intervals specified in the permit? (40 CFR 144.51(k)(4))	Y N		
13. Are reports of compliance or noncompliance with, or any progress reports, or interim and final requirements contained in any compliance schedule of the permit, submitted no later than 30 days following each schedule date? (40 CFR 144.51(k)(5))	Y N		
14. Is noncompliance reported within 24 hours?	Y N		
15. Is a written submission made within 5 days of occurrence?	Y N		
16. Does the written submission contain a description of the compliance including exact dates and times and, if the noncompliance has not been corrected, the anticipated time it is expected to continue, and steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance? (40 CFR 144.51(k)(6))	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
17. Are reporting requirements relating to noncompliance, requirements prior to commencing injection and plugging and abandonment, and mechanical integrity demonstration requirements, if any, complied with? (40 CFR 144.51(k)(7)(8)(m)(o)(p))	Y N		
- If YES to Questions 2 - 17, ENTER STATUS "S".	☐		
- If NO to any of Questions 2 - 17, ENTER STATUS "U".			
This checklist is complete.			

SDWA - BEST MANAGEMENT PRACTICES

(SD-B, 1/2)

SITE ID: _____

AUDITOR(S): _____

BLDG/AREA/UNIT(S): _____

DATE: ____/____/____

ESO NO.: _____

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
<u>General</u>			
1. Does the facility have a master plan for water collection, treatment, storage, and distribution? (BMP)	Y N		
a. Is it updated every 5 years? (BMP)	Y N		
b. Are records maintained in files reflecting operational changes to the water system since the last update of the master plan? (BMP)	Y N		
2. Is an up-to-date map of the facility's potable water system available at the site? (BMP)	Y N		
a. Are potential cross-connections with sewage, storm water, fuel lines, etc. clearly identified? (BMP)	Y N		
b. Have proper control devices been installed to prevent contamination of cross-connection points? (BMP)	Y N		
c. Is the facility periodically checked for cross-connections or other possible sources of back contamination? (BMP)	Y N		
3. Do construction specifications used for storage or transportation of water indicate that they do not contain more than 80 percent lead? (BMP)	Y N		
4. Does the facility have a permit on file from the State to withdraw and distribute water from existing water supply sources (State regulation)?	Y N		
- If YES, review the permit.			
a. Are records maintained of the facility's rate of water usage?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
b. Are reports submitted periodically to the State concerning quantities of water consumed?	Y N		
c. Are reports up-to-date, accurate, and complete?	Y N		
d. Has the amount withdrawn not exceeded the maximum daily withdrawal limits and are average withdrawals per day, week, month, or year within specified permit limits?	Y N		
- If YES to Questions 4a - d, ENTER STATUS "S".	☐		
- If NO to any of Questions 4a - d, ENTER STATUS "U".			
- If NOT APPLICABLE, ENTER STATUS "NA".			
This checklist is complete.			

SECTION 10

TOXIC SUBSTANCES CONTROL ACT

This protocol applies to Department of Energy facilities that are involved in the manufacture, distribution, use, or disposal of polychlorinated biphenyls (PCBs). It includes a discussion of the relevant statutes and regulations, and of procedures for determining applicability of the regulations and for evaluating the facilities, performance in meeting the applicable requirements.

1.0 INTRODUCTION

The Toxic Substances Control Act (TSCA), enacted in 1976, provides the Environmental Protection Agency (EPA) with the authority and responsibility to protect human health and the environment from unreasonable risks arising from excessive exposure to, manufacture, distribution, use, or disposal of substances containing toxic chemicals such as polychlorinated biphenyls (PCBs). Substances that are regulated by this rule include, but are not limited to, dielectric fluids, contaminated solvents, oils, waste oils, heat transfer fluids, hydraulic fluids, paints, sludges, slurries, dredge spoils, soils, materials contaminated as a result of spills, and other chemical substances or combinations of substances.

2.0 TSCA PROVISIONS

The principal sections of TSCA authorize testing of chemicals, premanufacture notification for new substances or significant new uses of existing substances, regulation of chemicals which pose unreasonable risk, and requirements for recordkeeping and reporting. The act also defines TSCA's relationship with other Federal laws; authorizes research and development; and provides specific authority for inspection and subpoenas, for regulation of export and imports, and for imposition of prohibition, penalties, and injunctive relief. It also provides for protection of confidential business information.

The EPA may require submission of records and maintenance of records and reports necessary for the effective implementation of TSCA. Applicable Parts of Title 40 implementing TSCA are discussed below.

Part 704 of Title 40 CFR regulations, Reporting and Recordkeeping Requirements, require manufacturers and importers of certain chemicals (listed in Subpart B of this Part) to keep records and provide reports to the EPA regarding these specific chemicals when requested. According to Part 704.5, Exemptions, DOE operations would be exempt from these requirements because the manufacture is for research and development and/or as a "small manufacturer" (see definition in Part 704.3).

Part 717, Records and Reports of Allegations that Chemical Substances Cause Significant Adverse Reactions to Health or the Environment, implements Section 8(c) of TSCA and requires manufacturers, processors, and distributors of chemical substances and mixtures to keep records of significant adverse reactions to health or the environment. Also, these groups are to permit inspection and submit copies of records upon the request of the EPA Administrator.

Section 5 of TSCA requires that manufacturers must submit premanufacture notices to EPA 90 days before manufacturing any new chemical substance or beginning a significant new use of any chemical substance that is not exempt.

Part 723, Premanufacture Notification Exemptions, allows for the exemption of an organization from the premanufacture notification (PMN) requirements of Section 5(a)(1)(A) of TSCA if the chemical substances manufactured annually are equal to or less than 1000 kilograms, or if instant photographic film or polymers are manufactured.

PMN requirements do not apply to the following among others:

- o Chemicals used in small quantities for research and development
- o Chemicals used only in pesticides, tobacco products, nuclear materials, guns and ammunition, foods, food additives, and drugs or cosmetics
- o Chemical mixtures, etc.

Eight product categories are exempt from TSCA's regulatory authorities. They are pesticides, tobacco, nuclear materials, firearms and ammunition, food, food additives, drugs, and cosmetics.

Part 762, Fully Halogenated Chlorofluoroalkanes, prohibits the manufacture, processing, or distribution in commerce of fully halogenated chlorofluoroalkanes for aerosol propellant use. Other requirement requires the submission of annual reports.

Part 763, Asbestos, states several requirements and prohibitions regarding asbestos applies to its manufactures import and processing and the presence and condition of asbestos in schools. Primary subparts of this part include:

- o Subpart D - Reporting Commercial and Industrial Uses of Asbestos
- o Subpart E - Asbestos - Containing Materials in Schools
- o Subpart F - Friable Asbestos - Containing Materials in Schools
- o Subpart G - Asbestos Abatement Projects [in schools]

DOE facilities typically do not manufacture or process asbestos materials nor do they operate elementary and secondary schools as defined by section 198 of the Elementary and Secondary Education Act of 1965. Therefore, this Part of Title 40 is not applicable.

Part 792, Good Laboratory Practice Standards, prescribes certain laboratory practices to implement in the conduct of studies of chemicals as related to their potential health effects, environmental effects, and chemical fate testing. The requirements of this part are intended to ensure the quality and integrity of data submitted pursuant to Section 4(a) of TSCA.

3.0 POLYCHLORINATED BIPHENYLS

EPA has promulgated regulations in 40 CFR Part 761 establishing prohibitions and requirements for the manufacture, processing, distribution in commerce, use, disposal, storage, and marking of PCBs and PCB items. Following are the aspects covered by the regulations:

- o Prohibited PCB activities
- o Authorized PCB activities

- o Marking requirements for PCB containers, transformers, capacitors, equipment, electrical motors, and hydraulic and heat transfer systems
- o Storage and disposal methods and requirements for PCBs, PCB articles, PCB containers, and PCB spills
- o PCB cleanup requirements
- o Recordkeeping and monitoring requirements for PCBs, PCB items, and PCB storage and disposal facilities

Exemptions for a period of 1 year are granted to petitioners as specified in Subpart E to manufacture small quantities of PCBs for research and development.

The EPA has also established disposal procedures and requirements for:

- o Facilities used to incinerate liquid and non-liquid PCBs
- o Chemical waste landfills used for disposal of PCBs and PCB items
- o Decontamination of PCB containers

The Director, Exposure Evaluation Division, and Regional Administrators of EPA, are the primary approval authorities for disposal methods.

The PCB Spill Cleanup Policy establishes criteria the EPA will use to determine the adequacy of the cleanup of spills resulting from the release of materials containing PCBs. It also establishes the reporting, disposal, and pre-cleaning/post-cleaning sampling requirements for:

- o Low concentration spills
- o High concentration spills
- o Spills in restricted and non-restricted access areas
- o Spills in outdoor electrical substations

Section 15 of TSCA states that failure to comply with these regulations is unlawful. Section 16 of TSCA imposes liability for civil penalties upon any person who violates these regulations and the administrator can establish appropriate remedies for any violations subject to any limitation included in section 16 of TSCA. In addition, section 17 authorizes Federal district courts to enjoin activities prohibited by these regulations, to compel the taking of actions required by these regulations, and to issue orders to seize PCBs and PCB items in violation of these regulations. These regulations (40 CFR Part 761) do not pre-empt other more stringent Federal statutes and regulations.

4.0 KEY DEFINITIONS

Following are some important key definitions to aid in understanding the regulatory programs under 40 CFR Parts 700-799 of TSCA.

Administrator means the Administrator of the Environmental Protection Agency, or any employee of the Agency to whom the Administrator delegates his authority to carry out his functions, or any person who shall by operation of law be authorized to carry out such functions.

Capacitor means a device for accumulating and holding a charge of electricity and consisting of conducting surfaces separated by a dielectric. Types of capacitors are as follows:

- o "Small capacitor" means a capacitor which contains less than 1.36 kg (3 lbs.) of dielectric fluid. The following assumptions may be used if the actual weight of the dielectric fluid is unknown. A capacitor whose total volume is less than 1,639 cubic centimeters (100 cubic inches) may be considered to contain less than 1.36 kg (3 lbs.) of dielectric fluid and a capacitor whose total volume is more than 3,278 cubic centimeters (200 cubic inches) must be considered to contain more than 1.36 kg (3 lbs.) of dielectric fluid. A capacitor whose volume is between 1,639 and 3,278 cubic centimeters may be considered to contain less than 1.36 kg (3 lbs.) of dielectric fluid if the total weight of the capacitor is less than 4.08 kg (9 lbs.).
- o "Large high voltage capacitor" means a capacitor which contains 1.36 kg (3 lbs.) or more of dielectric fluid and which operates at 2,000 volts (a.c. or d.c.) or above.
- o "Large low voltage capacitor" means a capacitor which contains 1.36 kg (3 lbs.) or more of dielectric fluid and which operates below 2,000 volts (a.c. or d.c.).

Chemical Substance means:

- o Any organic or inorganic substance of a particular molecular identity, including: Any combination of such substances occurring in whole or part as a result of a chemical reaction or occurring in nature, and any element or uncombined radical.
- o Such term does not include: Any mixture; any pesticide when manufactured, processed, or distributed in commerce for use as a pesticide; tobacco or any tobacco product; any source material, special nuclear material, or byproduct material; any article, the sale of which is subject to the tax imposed by section 4181 of the Internal Revenue Code of 1954; and any food, food additive, drug, cosmetic, or device when manufactured, processed or distributed in commerce for use as a food, food additive, drug, cosmetic, or device.

Chemical Waste Landfill means a landfill at which protection against risk of injury to health or the environment from migration of PCBs to land, water, or the atmosphere is provided from PCBs and PCB items deposited therein by locating, engineering, and operating the landfill as specified in 40 CFR 761.75.

Disposal means intentionally or accidentally to discard, throw away, or otherwise complete or terminate the useful life of PCBs and PCB items. Disposal includes spills, leaks, and other uncontrolled discharges of PCBs as well as actions related to containing, transporting, destroying, degrading, decontaminating, or confining PCBs and PCB items.

Distribute in Commerce means an action taken with respect to a chemical substance or mixture or an article containing a chemical substance or mixture, with intent to sell, or the sale of, the substance, mixture, or article in commerce; to introduce or deliver for introduction into commerce, or the introduction or delivery for introduction into commerce of the substance, mixture, or article; or to hold or the holding of the substance, mixture, or article after its introduction into commerce.

Incinerator means an engineered device using controlled flame combustion to thermally degrade PCBs and PCB items. Examples of devices used for incineration include rotary kilns, liquid injection incinerators, cement kilns, and high temperature boilers.

Leak or Leaking means any instance in which a PCB article, PCB container, or PCB equipment has any PCBs on any portion of its external surface.

Manufacture means to produce, manufacture, or import into the customs territory of the United States for commercial purposes.

Manufacture for commercial purposes means (1) to import, produce, or manufacture with the purpose of obtaining an immediate or eventual commercial advantage for the manufacturer, and includes among other things, such "manufacture" of any amount of a chemical substance or mixture:

- (i) For commercial distribution, including for test marketing, and
- (ii) For use by the manufacturer, including use for product research and development, or as an intermediate; and

(2) Manufacture for commercial purposes also applies to substances that are produced coincidentally during the manufacture, processing, use, or disposal of another substance or mixture, including both byproducts that are separated from that other substance or mixture and impurities that remain in that substance or mixture. Such byproducts and impurities may or may not in themselves have commercial value. They are nonetheless produced for the purpose of obtaining a commercial advantage because they are part of the manufacture of a chemical product for a commercial purpose.

Mark means the descriptive name, instructions, cautions, or other information applied to PCBs and PCB items or other objects subject to these regulations.

PCB and PCBs means any chemical substance that is limited to the biphenyl molecule that has been chlorinated to varying degrees or any combination of substances which contains such substance. Refer to 40 CFR 761.1(b) for applicable concentrations of PCBs. PCB and PCBs as contained in PCB items are defined in 40 CFR 761.3. For any purposes under this part, inadvertently generated non-Aroclor PCBs are defined as the total PCBs calculated following division of the quantity of monochlorinated biphenyls by 50 and dichlorinated biphenyls by 5.

PCB Article means any manufactured article, other than a PCB Container, that contains PCBs and whose surface(s) has been in direct contact with PCBs. "PCB Article" includes capacitors, transformers, electric motors, pumps, pipes, and any other manufactured item: (1) which is formed to a specific shape or design during manufacture, (2) which has end use function(s) dependent in whole or in part upon its shape or design during end use, and (3) which has either no change of chemical composition during its end use or only those changes of composition which have no commercial purpose separate from that of the PCB Article.

PCB Article Container means any package, can, bottle, bag, barrel, drum, tank, or other device used to contain PCB Articles or PCB Equipment, and whose surface(s) has not been in direct contact with PCBs.

PCB Container means any package, can, bottle, bag, barrel, drum, tank, or other device that contains PCBs or PCB Articles and whose surface(s) has been in direct contact with PCBs.

PCB Equipment means any manufactured item, other than PCB Container or a PCB Article Container, which contains a PCB Article or other PCB Equipment, and includes microwave ovens, electronic equipment, and fluorescent light ballasts and fixtures.

PCB Item is defined as any PCB Article, PCB Article Container, PCB Container, or PCB Equipment, that deliberately or unintentionally contains or has as a part of it any PCB or PCBs.

PCB Transformer means any transformer with dielectric fluid that contains 500 ppm PCB or greater concentration.

PCB-Contaminated Electrical Equipment means any electrical equipment, including but not limited to transformers (including those used in railway locomotives and self-propelled cars), capacitors, circuit breakers, reclosers, voltage regulators, switches (including sectionalizers and motor starters), electromagnets, and cable, that contain 50 ppm or greater PCB, but less than 500 ppm PCB. Oil-filled electrical equipment other than circuit breakers, reclosers, and cable whose PCB concentration is unknown must be assumed to be PCB-Contaminated Electrical Equipment. (See 40 CFR 761.30 (a) and (h) for provisions permitting reclassification of electrical equipment containing 500 ppm or greater PCBs to PCB-Contaminated Electrical Equipment).

Process for commercial purposes means the preparation of a chemical substance or mixture containing the chemical substance, after manufacture of the substance, for distribution in commerce with the purpose of obtaining an immediate or eventual commercial advantage for the processor. Processing of any amount of a chemical substance or mixture is included in this definition. If a chemical substance or mixture containing impurities is processed for commercial purpose, then the impurities also are processed for commercial purpose (Part 704).

School means any elementary or secondary school as defined in section 198 of the Elementary and Secondary Education Act of 1965 (20 U.S.C. 2854). "School building" means:

- (1) Any structure suitable for use as a classroom, including a school facility such as a laboratory, library, school eating facility, or facility used for the preparation of food.
- (2) Any gymnasium or other facility which is specially designed for athletic or recreational activities for an academic course in physical education.
- (3) Any other facility used for the instruction or housing of students or for the administration of educational or research programs.
- (4) Any maintenance, storage, or utility facility, including any hallway, essential to the operation of any facility described in this definition of "school building" under paragraphs (1), (2), or (3).
- (5) Any portico or covered exterior hallway or walkway.
- (6) Any exterior portion of a mechanical system used to condition interior space (Part 763).

Small manufacturer means a manufacturer (or importer) that meets either of the standards set forth below. Small manufacturers should read the introductory paragraph of section 704.5 and paragraph (d) of section 704.5 to obtain complete information on the TSCA section 8(a) small manufacturer exemption.

- (1) First standard. A manufacturer of a chemical substance is small if its total annual sales, when combined with those of its parent company (if any), are less than \$40 million. However, if the annual production volume of a particular chemical substance at any individual site owned or controlled by the manufacturer is greater than 45,400 kilograms (100,000 pounds), the manufacturer shall not qualify as small for purposes of reporting on the production of that chemical substance at that site, unless the manufacturer qualifies as small under "small manufacturer" paragraph (2) of this definition.
- (2) Second standard. A manufacturer of a chemical substance is small if its total annual sales, when combined with those of its parent company (if any), are less than \$4 million, regardless of the quantity of chemicals produced by that manufacturer (Part 704).

Storage for disposal means temporary storage of PCBs that have been designated for disposal.

Transport vehicle means a motor vehicle or rail car used for the transportation of cargo by any mode. Each cargo-carrying body (e.g., trailer, railroad freight car) is a separate transport vehicle.

Totally enclosed manner means any manner that will ensure no exposure of human beings or the environment to any concentration of PCBs.

Waste Oil means used products primarily derived from petroleum, which include, but are not limited to, fuel oils, motor oils, gear oils, cutting oils transmission fluids, hydraulic fluids, and dielectric fluids.

Additional relevant definitions can be found in 40 CFR 700 Sections.

5.0 PROPOSED AMENDMENTS

The July 1985 and July 1988 amendments to 40 CFR 761 PCB regulations placed even greater requirements and restrictions on owners of PCB-containing equipment. Prompted by several highly publicized incident of transformer fires, the EPA presented evidence of PCB equipment creating far more dangerous substances due to incomplete combustion of PCBs in fire situations. Concern that these substances (dioxin, furan) are carried through smoke and soot, causing unreasonable risk to human health and environment, resulted in a series of additions to the PCB regulations. They are as follows:

- o As of October 1, 1990, the use of network PCB Transformers with higher secondary voltages (secondary voltages equal to or greater than 480 volts, including 480/277 volt systems) in or near commercial buildings is prohibited. Network PCB Transformers with higher secondary voltages which are removed from service in accordance with this requirement must either be reclassified to PCB Contaminated or non-PCB status, placed into storage for disposal, or disposed.
- o As of October 1, 1990, all radial PCB Transformers and lower secondary voltage network PCB Transformers (network transformer with secondary voltages below 480 volts) in use in or near commercial buildings must be equipped with electrical protection to avoid transformer failures caused by high current faults. Current-limiting fuses or other equivalent technology must be used to detect sustained high current faults and provide for complete deenergization of the transformer within several tenths of a second of detection, before transformer failure occurs. The installation, setting, and maintenance of current-limiting fuses or other equivalent technology to avoid PCB Transformer failures from sustained high current faults must be completed in accordance with good engineering practices.
- o As of October 1, 1990, all radial PCB Transformers with higher secondary voltages (480 volts and above, including 480/277 volt systems) in use in or near commercial buildings must be equipped with protection to avoid transformer failures caused by sustained low current faults.

6.0 WORKING PAPERS

This discussion refers to Section 1 instructions of the manual which includes a series of checklists and forms to assist the auditor in preparing for and performing an audit of a facility's control of PCB. By completing the provided checklists and forms the auditor will establish a comprehensive record of:

- o Applicability
- o Contacts and References
- o Observations (visual observance)
- o Performance

The auditor will start gathering information and documenting applicability determinations, contacts and references prior to the on-site audit. As the audit progresses on-site, the performance checklists will guide the auditor and provide a mechanism for documenting observations or findings.

The performance checklist provided is a guide to the auditor in determining if regulatory requirements under 40 CFR Part 761 are being satisfied. It is not a standalone document. Consequently, completing the checklists does not replace the obligations of the auditor to seek out any information which may be necessary to identify environmental problems. Determining which checklists to complete should be done prior to the facility visit, although the need for other checklists may be identified during the on-site audit.

In instances where a detailed review of these regulatory requirements and amendments is necessary the checklists have to be modified or supplemented to reflect the additional requirements.

**APPENDIX
DEPARTMENT OF ENERGY
ENVIRONMENTAL AUDIT
TOXIC SUBSTANCE CONTROL ACT (TSCA)
WORKING PAPERS**

Site Name: _____

Site ID: _____

Date(s): _____

Auditor(s): _____

Instructions: The auditor should check off each of the items on the following list as the items are completed or as a determination is made that the item is not required. The list should be completed by the end of the audit.

<u>Completed ()</u>	<u>Not Required ()</u>	<u>Item</u>	<u>Page</u>
_____	_____	List of TSCA Perform Checklists	
_____	_____	List of Audit Units (AUs)	
_____	_____	List of Applicable State and Local Regulations	
_____	_____	List of Off-Site Waste Management Vendors	
_____	_____	List of Contacts	
_____	_____	List of Site Documents	
_____	_____	Summary of Findings	
_____	_____	Summary of Noteworthy Practices	
_____	_____	Performance Checklists	

LIST OF TOXIC SUBSTANCES CONTROL ACT (TSCA) CHECKLISTS

<u>Performance Checklist</u>	<u>Revision No.</u>	<u>Date</u>	<u>Checklist Title</u>
T-GA	0	12/29/89	General Applicability
T-P-P	0	12/29/89	Prohibitions
T-P-T	0	12/29/89	Use In and Servicing of PCB Transformers other than Railroad Transformers
T-P-RT	0	12/29/89	Servicing Conditions for PCB Railroad Transformers
T-P-HT	0	12/29/89	Use In Heat Transfer Systems
T-P-HS	0	12/29/89	Use In Hydraulic Systems
T-P-CB	0	12/29/89	Use In and Servicing Circuit Breakers, Reclosers and Cables
T-P-EM	0	12/29/89	Use In and Servicing Electromagnets, Switches and Voltage Regulators
T-P-C	0	12/29/89	Use In and Servicing of Capacitors
T-P-MR	0	12/29/89	Marking Requirements
T-P-DR	0	12/29/89	Disposal Requirements
T-P-S	0	12/29/89	Storage for Disposal
T-P-DA	0	12/29/89	Disposal of PCB Articles
T-P-I	0	12/29/89	Incinerators
T-P-CL	0	12/29/89	Chemical Waste Landfills
T-P-B	0	12/29/89	High Efficiency Boilers
T-P-D	0	12/29/89	Decontamination
T-P-SC	0	12/29/89	PCB Spill Report/Cleanup
T-P-SR	0	12/29/89	Sampling Requirements
T-P-RR	0	12/29/89	Records and Reports for PCB and PCB Items In Service or Projected for Disposal

LIST OF TOXIC SUBSTANCES CONTROL ACT (TSCA) CHECKLISTS (continued)

Performance Checklist	Revision No.	Date	Checklist Title
T-R	0	12/29/89	Reporting and Recordkeeping Requirements
T-RAR	0	12/29/89	Records and Reports...Significant Adverse Reactions
T-FHC	0	12/29/89	Fully Halogenated Chlorofluoroalkanes
T-PNE	0	12/29/89	Premanufacture Notification Exemptions
T-AS	0	12/29/89	Asbestos

AUDITOR(S): _____

BLDG/AREA/UNIT(S): _____

DATE: ____/____/____

ESO NO.: _____

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
1. Does the facility manufacture or import chemicals listed in Subpart B of 40 CFR 704? - If YES, proceed with checklist and complete T-R checklist. - If NO, proceed with checklist.	Y N		
2. Does the facility manufacture chemical substances commercially for the purpose of obtaining an immediate or eventual commercial advantage? - If YES, proceed with checklist and complete T-RAR checklist. - If NO, proceed with checklist.	Y N		
3. Does the facility handle PCB or PCB items regardless of concentrations? - If YES, proceed with checklist and complete T-P-P through T-P-RR checklists. - If NO, proceed with checklist.	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
4. Does the facility manufacture, process, and/or distribute in commerce, any fully halogenated chlorofluoroalkane chemical (CFC) products? - If YES, proceed with checklist and complete T-FHC checklist. - If NO, proceed with checklist. 5. Does the facility manufacture, process for commercial purposes, or use asbestos materials and/or products in schools? - If YES, complete T-AS checklist. - If NO, checklist is complete. This checklist is complete.	Y N Y N		

AUDITOR(S): _____

BLDG/AREA/UNIT(S): _____

DATE: ____/____/____

ESO NO.: _____

AUDIT QUESTIONS AND PROCEDURES

RESPONSE

REFERENCE

COMMENTS

40 CFR 761.20: Prohibitions

1. Does the facility use PCBs or PCB items, regardless of concentration, in a totally enclosed manner?
- If YES, ENTER STATUS "S".
- If NO, ENTER STATUS "U" and list noncompliance items.
2. Does the facility use waste oil that contains any detectable concentration of PCB as a sealant, coating, dust control agent, road oiling agent, pesticide or herbicide carrier, or pipe rust preventive?
3. Has the facility purchased or installed new PCB transformers or brought PCB transformers out of storage for reuse?
- If YES, ENTER STATUS "U".
- If NO, ENTER STATUS "S".

Y N

☐

Y N

Y N

☐

This checklist is complete.

AUDITOR(S): _____

BLDG/AREA/UNIT(S): _____

DATE: ____/____/____

ESO NO.: _____

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
40 CFR 761.30 (a): Use in and Servicing of PCB Transformers Other than Railroad Transformers			
Note: - o PCB transformer - greater than 500 ppm concentration - o PCB - contaminated transformer 50 - 500 ppm concentration - o Non - PCB transformer - less than 50 ppm concentration			
1. Does the facility maintain PCB transformers (other than railroad transformers)?	Y N		
- If YES, proceed with checklist.			
- If NO, checklist is complete.			
2. Does the facility have an inventory of PCB transformers?	Y N		
- If YES, ENTER STATUS "S".			
- If NO, ENTER STATUS "U".			
Note: List PCB transformers inspected during the walkthrough and verify that inventory listings are correct for these units. This inventory can be used for the annual PCB articles summary as required by EPA regulations (40 CFR 761).			
3. Is visual inspection of each PCB transformer performed at least once every 3 months (not closer than 30 days apart) or if in a diked area at least once annually (long as there is a minimum of 180 days between inspections)?	Y N		
- If YES, ENTER STATUS "S".			
- If NO, ENTER STATUS "U".			

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
Note: A reduced visual inspection frequency of at least once every 12 months is permitted for PCB transformers which have impervious, undrained secondary containment capacity of 100 percent of the dielectric fluid and/or PCB transformers which have been tested and found to contain less than 60,000 ppm PCBs after 3 months in service if the transformer has been serviced for purposes of reducing PCB contamination.			
4. Did visual inspection include investigation for any leak of dielectric fluid on or around the PCB transformer?	Y N		
- If YES, ENTER STATUS "S".			
- If NO, ENTER STATUS "U".			
a. If transformer is leaking, are daily inspections implemented until cleanup and repair actions are completed?	Y N		
- If YES, ENTER STATUS "S".			
- If NO, ENTER STATUS "U".			
5. Do any PCB transformers pose an exposure risk to feed or food? (These are prohibited after 1985).	Y N		
- If YES, ENTER STATUS "U".			
- If NO, ENTER STATUS "S".			
6. Are PCB transformer records of inspection and maintenance histories maintained for the 3 years after disposal or after being placed out-of-service?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
7. Do such records contain the following information for each PCB transformer: a. Its location? b. The date of each visual inspection and the date that any leak was discovered, if different from the inspection date? c. The person performing the inspection? d. The location of any leaks? e. An estimate of the amount of dielectric fluid released from any leak? f. The date of any cleanup, containment, repair, or replacement? g. A description of any cleanup, containment, or repair performed? h. The results of any containment and daily inspection required for uncorrected active leaks? - If YES to Questions 6 <u>and</u> 7, ENTER STATUS "S". - If NO to Question 6 <u>or</u> 7, ENTER STATUS "U".	Y N Y N Y N Y N Y N Y N Y N Y N ☐		
8. Is there the same documentation stated in Question 7a - h for the facility's PCB - contaminated (less than 500 ppm concentration) transformers? (BMP) a. Are these units part of the annual inventory and status report referred to in Question 2? (BMP) b. Are liquid non-PCB transformers (less than 50 ppm concentration) included in this inventory (in case of leaks)? (BMP)	Y N Y N Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
9. Are PCB transformers in use or in storage in or near a commercial building? - If YES, proceed with checklist. - If NO, ENTER STATUS "S" for Question 10 and proceed to Question 12.	Y N ☐		
10. Are PCB transformers located near commercial buildings registered with owners of all buildings located within 30 meters of the PCB transformers? - If YES, ENTER STATUS "S". - If NO to Question 9 or 10, ENTER STATUS "U" and proceed to Question 12.	Y N ☐		
11. Does this information, referred to in Question 10, include: a. The specific location of each PCB transformer? b. The principal constituent of the dielectric fluid in the PCB transformers (e.g., PCBs, mineral oil, or silicone oil) and its concentration? c. The type of transformer installed (e.g., 208/120 volt network, 280/120 volt radial, 280 volt radial, 480 volt network, 480/277 volt network, 480 volt radial, 480/277 volt radial)? - If YES to Questions 11a - c, ENTER STATUS "S". - If NO to any of Questions 11a - c, ENTER STATUS "U".	Y N Y N Y N ☐		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
12. Are all PCB transformers the facility registered with fire response personnel with primary jurisdiction? - If YES, proceed with checklist. - If NO, ENTER STATUS "U" for Questions 13 and proceed to Question 14.	Y N		
13. Does the information include: a. The location of the PCB transformers (the addresses of the buildings and the physical location of PCB transformers on the building sites and for outdoor PCB transformers, the location of the outdoor station)? b. The principal constituent of the dielectric fluid in the transformers (e.g. PCBs, mineral oil, or silicone oil)? c. The name and telephone number of the person to contact in the event of a fire involving the equipment? - If YES to Questions 13a - c, ENTER STATUS "S". - If NO to any of Questions 13a - c, ENTER STATUS "U".	Y N Y N Y N ☐ ☐		
14. Were there any PCB transformers involved in a fire-related incident? - If NO, ENTER STATUS "NA" for Question 15. - If YES, proceed with checklist.	Y N ☐ ☐		
15. Were the following procedures accomplished: a. Was the incident reported to the National Response Center (1-800-424-8802, in Washington, DC (202) 426-2675)?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
b. Was information provided on the type of PCB transformer involved in the fire accident (e.g., high or low secondary voltage network transformer, high or low secondary voltage simple radial system, etc.)?	Y N		
c. Were measures taken as soon as practically and safely possible to contain and control any potential releases of PCBs and incomplete combustion products into water?	Y N		
d. Did the measure include :			
1) Blocking all floor drains in the vicinity of the transformer?	Y N		
2) Containment of water runoff?	Y N		
3) Control and treatment of water used in subsequent cleanup operation?	Y N		
- If YES to Questions 15 a - d 3), ENTER STATUS "S".			
- If NO to any of Questions 15 a - d 3), ENTER STATUS "U".			
16. Is the facility performing servicing (including rebuilding) of PCB Transformers?	Y N		
- If YES, proceed with checklist.			
- If NO, checklist is complete.			
17. Does the facility use the following procedures:			
a. Service or rebuild transformers classified as PCB Contaminated Electrical Equipment with dielectric fluid containing less than 500 ppm PCB?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
b. Service or rebuild PCB transformers without removal of the transformer coil?	Y N		
c. Were PCBs removed during any servicing activity captured? If captured, make note in Comments whether it was reused, disposed, or stored.	Y N		
d. Was dielectric fluid containing PCBs dielectric fluid containing 500 ppm or greater PCB mixed with fluids used as dielectric fluid in electrical equipment and containing PCBs?	Y N		
e. Are any dielectric fluids containing 50 ppm or greater PCBs used for servicing transformers stored in accordance with the storage for disposal requirements of 40 CFR 761.65?	Y N		
- If YES to Questions 17 a - e, ENTER STATUS "S".	☐		
- If NO to any of Questions 17 a - e, ENTER STATUS "U".			
This checklist is complete.			

AUDITOR(S): _____

BLDG/AREA/UNIT(S): _____

DATE: ____/____/____

ESO NO.: _____

AUDIT QUESTIONS AND PROCEDURES

RESPONSE

REFERENCE

COMMENTS

40 CFR 761.30(b): Servicing Conditions for PCB Railroad Transformers

1. Is the facility operating any railroad locomotive?

Y N

- If YES, proceed with checklist.

- If NO, checklist is complete.

2. Is the concentration of PCBs in the dielectric fluid of the railroad transformer less than 1,000 ppm? (761.30(b)(1)(vi))

Y N
NA

Note: Check records.

- If YES or NOT APPLICABLE, ENTER STATUS "S".

- If NO, ENTER STATUS "U".

3. Are any dielectric fluids that are used to service PCB railroads transformers stored in accordance with the storage for disposal requirements of 40 CFR 761.65?

Y N

- If YES, ENTER STATUS "S".

- If NO, ENTER STATUS "U".

This checklist is complete.

AUDITOR(S): _____

BLDG/AREA/UNIT(S): _____

DATE: ____/____/____

ESO NO.: _____

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
40 CFR 761.30(d): Use in Heat Transfer Systems			
1. Does the facility use heat transfer fluid containing PCBs in heat a transfer system? - If YES, proceed with checklist. - If NO, this checklist is complete.	Y N		
2. Is all fluid containing PCBs used in a totally enclosed manner?	Y N		
3. Is the concentration of PCBs in the heat transfer fluid less than 50 ppm? - If YES to Questions 2 <u>and</u> 3, ENTER STATUS "S". - If NO to Question 2 <u>or</u> 3, ENTER STATUS "U". This checklist is complete.	Y N ☐		

AUDITOR(S): _____

BLDG/AREA/UNIT(S): _____

DATE: ____ / ____ / ____

ESO NO.: _____

AUDIT QUESTIONS AND PROCEDURES

RESPONSE

REFERENCE

COMMENTS

40 CFR 761.30(e): Use in Hydraulic Systems

1. Does the facility use fluid containing PCBs in hydraulic systems?

Y N

- If YES, proceed with checklist.

- If NO, checklist is complete.

2. Is the concentration of PCBs in all systems less than 50 ppm as confirmed by annual testing?

Y N

Note: Check analysis records.

- If YES, ENTER STATUS "S".

- If NO, ENTER STATUS "U".

This checklist is complete.

☐

AUDITOR(S): _____

BLDG/AREA/UNIT(S): _____

DATE: ____/____/____

ESO NO.: _____

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
40 CFR 761.30(m): Use In and Servicing of Circuit Breakers, Reclosers and Cables			
1. Does the facility maintain circuit breakers, reclosers, or cable containing PCBs at any concentration? - If YES, proceed with checklist. - If NO, this checklist is complete.	Y N		
2. Are circuit breakers, reclosers, and cables serviced (including rebuilding) with dielectric fluid containing less than 50 ppm PCBs? - If YES, ENTER STATUS "S". - If NO, ENTER STATUS "U". This checklist is complete.	Y N ☐		

AUDITOR(S): _____

BLDG/AREA/UNIT(S): _____

DATE: ____/____/____

ESO NO.: _____

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
<u>40 CFR 761.30(h): Use In and Servicing of Electromagnets, Switches and Voltage Regulators</u>			
1. Are PCBs at any concentration used by the facility in electromagnets, switches, and voltage regulators? - If YES, proceed with checklist. - If NO, checklist is complete.	Y N		
2. Is a visual inspection of each electromagnet performed at least once every week in accordance with 40 CFR 761.30(a)(1)? - If YES, ENTER STATUS "S". - If NO, ENTER STATUS "U".	☐		
3. Does servicing (including rebuilding) of any electromagnets, switches, or voltage regulators with a PCB concentration of 500 pp, or greater require the removal and rework of any internal component?	Y N		
4. Are dielectric fluids containing less than 500 ppm PCBs mixed with fluids containing 500 ppm or greater PCBs and used as dielectric fluids? - If YES, ENTER STATUS "U". - If NO, ENTER STATUS "S".	Y N ☐		
5. Are electromagnets, switches, and voltage regulators classified as PCB-contaminated electrical equipment serviced (including rebuilding) with dielectric fluid containing less than 500 ppm PCBs?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
6. Are PCBs removed during any servicing activity captured? - If YES, check for compliance with 40 CFR 761.60 and 761.65.	Y N		
7. Are PCBs from electromagnets, switches, and voltage regulators with concentrations of 500 ppm or greater not mixed with or added to dielectric fluid from PCB-contaminated electrical equipment? - If YES to Questions 5 - 7, ENTER STATUS "S". - If NO to any of Questions 5 - 7, ENTER STATUS "U".	Y N ☐		
This checklist is complete.			

AUDITOR(S): _____

BLDG/AREA/UNIT(S): _____

DATE: ____/____/____

ESO NO.: _____

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
40 CFR 761.30(k)(1): Use in and Servicing of Capacitors			
1. Does the facility maintain capacitors containing PCBs at any concentration? - If YES, proceed with checklist. - If NO, checklist is complete.	Y N		
2. Does the use and storage for reuse of PCB capacitors (PCB Large High Voltage and PCB Large Low Voltage) pose an exposure risk to food or feed? - If YES, ENTER STATUS "U". - If NO, ENTER STATUS "S".	Y N ☐		
3. Are all PCB capacitors used within a restricted-access electrical substation or in a contained and restricted-access indoor installation? - If YES, ENTER STATUS "S". - If NO, ENTER STATUS "U". This checklist is complete.	Y N ☐		

AUDITOR(S): _____

BLDG/AREA/UNIT(S): _____

DATE: ____/____/____

ESO NO.: _____

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
40 CFR 761.40: Marking Requirements			
1. Does the facility use or store any of following items:			
a. PCB containers?	Y N		
b. PCB transformers?	Y N		
c. PCB large high voltage capacitors?	Y N		
d. Equipment containing a PCB transformer or a PCB high voltage capacitor?	Y N		
e. PCB large low voltage capacitors?	Y N		
f. Electrical motors using PCB coolants?	Y N		
g. Hydraulic systems using PCB hydraulic fluids?	Y N		
h. Heat transfer system using PCBs?	Y N		
i. PCB containers containing the articles or equipment listed above?	Y N		
j. Transport vehicle loaded with PCB containers that contain 45 Kgs (99.4 lbs) of PCB in the liquid phase or one or more PCB transformers?	Y N		
k. Have means of access other than grates and manhole covers (e.g., vault door, machinery room door, fence, or hallway) through which personnel must travel to reach the PCB transformers?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
- If YES to any of Questions 1 a - k, proceed with checklist. - If NO to Questions 1 a - k, checklist is complete.			
2. Are all PCB articles or PCB equipment marked as illustrated in Figure 1 or Figure 2? (If PCB article or PCB equipment is too small to accommodate the smallest permissible size of mark in Figure 1 (See TSCA Introduction) mark illustrated in Figure 2 may be used instead.)	Y N		
- If YES, ENTER STATUS "S". - If NO, ENTER STATUS "U".			
Note: All marks must be placed on the exterior of the PCB item or transport vehicles so that marks can be easily read by persons inspecting or servicing the PCB items or transport vehicles.			
3. Are the entrances to the PCB transformers or storage areas properly marked with the labels described in Question 2? (40 CFR 761.40(j))	Y N		
- If YES, ENTER STATUS "S". - If NO, ENTER STATUS "U".			
This checklist is complete.			

AUDITOR(S): _____

BLDG/AREA/UNIT(S): _____

DATE: ____/____/____

ESO NO.: _____

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
40 CFR 761.60(a): Disposal Requirements			
1. Does facility dispose of PCBs at concentrations of 500 ppm or greater? - If YES, proceed with checklist. - If NO, proceed to Question 3.	Y N		
2. Does facility dispose of PCBs in an incinerator which complies with 40 CFR 761.60? (Check records for compliance.) - If YES, ENTER STATUS "S". - If NO, ENTER STATUS "U".	Y N ☐		
3. Does facility dispose of mineral oil dielectric fluid from PCB-contaminated electrical equipment containing a PCB concentration of 50 ppm or greater but less than 500 ppm? - If YES, proceed with checklist. - If NO, proceed to Question 7.	Y N		
4. Is the mineral oil dielectric fluid containing PCB an ignitable waste (flash point less than 60°C or 140°F)? - If YES, proceed with checklist and refer to RCRA checklist. - If NO, proceed to Question 6.	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
5. Is the mineral oil dielectric fluid disposed of in a chemical waste landfill? (40 CFR 761.60 (a)(2)(ii)) - If YES, ENTER STATUS "U". - If NO, ENTER STATUS "S".	Y N ☐ Y N		
6. Is mineral oil dielectric fluid with PCB concentrations of 500 ppm or greater disposed of in an incinerator? - If YES, ENTER STATUS "S". - If NO, ENTER STATUS "U". - If NOT APPLICABLE, ENTER STATUS "NA".	 ☐ Y N		
7. Is the mineral oil dielectric fluid with PCB concentrations of 50 - 500 ppm disposed of in a chemical waste landfill or incinerator or high efficiency boiler? - If YES, ENTER STATUS "S". - If NO, ENTER STATUS "U". Note: Check manifest records to see how mineral oil dielectric fluid is disposed.	 ☐ Y N		
8. Are liquids other than mineral oil dielectric fluids containing a PCB concentration of 50 ppm or greater but less than 500 ppm, disposed of by the facility? - If YES, proceed with checklist. - If NO, proceed to Question 10.	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
9. Are liquids, other than mineral oil dielectric fluid, an ignitable waste (flash point less than 60°C or 140°F)? - If YES, proceed with checklist and refer to RCRA checklist. - If NO, proceed to Question 11.	Y N Y N		
10. Are liquids disposed of in an incinerator or high efficiency boiler? - If YES, ENTER STATUS "S". - If NO, ENTER STATUS "U".	 		
11. Does facility dispose of non-liquid PCB in the form of contaminated soil, rags, or debris at concentrations of 50 ppm or greater? - If YES, proceed with checklist. - If NO, proceed to Question 13.	Y N Y N		
12. Is the waste as defined in Question 11 disposed of in an incinerator or a chemical waste landfill? - If YES, ENTER STATUS "S". - If NO, ENTER STATUS "U".	 		
13. Does the facility dispose of any dredged materials and municipal sewage treatment sludges that contain PCBs at concentrations of 50 ppm or greater? - If YES, proceed with checklist. - If NO, checklist is complete.	Y N Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
14. Is the waste discussed in Question 13 disposed of in:			
a. An incinerator that complies with 40 CFR 761.70?	Y N		
b. Chemical waste landfill that complies with 40 CFR 761.65?	Y N		
c. Disposed of using a method approved by the EPA Regional Administrator?	Y N		
- If YES to Questions 14 a - c, ENTER STATUS "S".	☐		
- If NO to any of Questions 14 a - c, ENTER STATUS "U".			
This checklist is complete.			

AUDITOR(S): _____

BLDG/AREA/UNIT(S): _____

DATE: ____/____/____

ESO NO.: _____

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
40 CFR 761.65(b): Storage for Disposal			
Note: This part of the checklist applies to the storage for disposal of PCBs at concentrations of 50 ppm or greater and PCB items with PCB concentrations of 50 ppm or greater.			
1. Does the facility store any PCB article or PCB container for disposal for more than 1 year from the date it was first placed into storage?	Y N		
- If YES, ENTER STATUS "U".			
- If NO, ENTER STATUS "S".			
2. Does the facility store any PCB articles or PCB containers for disposal for more than 30 days but less than 1 year?	Y N		
- If YES, proceed with checklist.			
- If NO, proceed to Question 4.			
3. Does the storage facility meet the following criteria:			
a. Have an adequate roof and walls to prevent rain water from reaching the stored PCBs and PCB items?	Y N		
b. Have an adequate floor which has continuous curbing with a minimum six-inch high curb?	Y N		
c. Does the floor and curbing provide a contaminant volume equal to at least two times the internal volume of the largest PCB article or PCB container stored therein or 25 percent of total internal volume of all PCB articles or PCB containers stored therein, whichever is greater?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
d. Is the storage area void of drain valves, floor drains, expansion joints, sewer lines, or other openings that would permit liquids to flow from the curbed area?	Y N		
e. Are floors and curbing constructed of continuous smooth and impervious materials (e.g., Portland cement, concrete or steel) to prevent or minimize penetration of PCBs?	Y N		
f. Is the storage facility located at a site that is above the 100-year flood water elevation?	Y N		
- If YES to Questions 3 a - f, ENTER STATUS "S".			
- If NO to any of Questions 3 a - f, ENTER STATUS "U".			
g. Are all PCB articles and PCB containers in storage checked for leaks at least once every 30 days?	Y N		
h. Are any leaking PCB articles and PCB containers and their contents transferred immediately to properly marked non-leaking containers?	Y N		
i. Are all spills immediately cleaned up, using sorbents or other adequate means and disposed of in accordance with 40 CFR 761.60(a)(4)?	Y N		
- If YES or NOT APPLICABLE to Questions 3 g - i, ENTER STATUS "S".			
- If NO to any of Questions 3 g - i, ENTER STATUS "U".			
4. Do all containers used for storage of liquid PCBs comply with the Shipping Containers Specification of the DOT (e.g., 49 CFR 178.80, 178.82, 178.102, 178.35, 178.35a, or 178.116)?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
5. Do all containers used for storage of non-liquid PCBs comply with the specifications of 49 CFR 178.82 or 178.115? - If YES or NOT APPLICABLE to Questions 4 and 5, ENTER STATUS "S". - If NO to Question 4 or 5, ENTER STATUS "U".	Y N ☐ 		
6. Are all containers used for storage of liquid PCBs (other than those mentioned in Question 4) designed and operated in compliance with OSHA and 29 CFR 1910.106 regulations?	Y N		
7. Are all containers used for storage of non-liquid PCBs (other than those mentioned in Question 5) designed and constructed in a manner that meets the specification of DOT containers (e.g., protection against leaks, exposure to environment, same relative strength and durability)?	Y N		
8. Are all PCB articles and PCB containers dated when placed in the storage?	Y N		
9. Does the facility maintain a record that is in accordance with 40 CFR 761.180? - If YES or NOT APPLICABLE to Questions 6 - 9, ENTER STATUS "S". - If NO to any of Questions 6 - 9, ENTER STATUS "U".	Y N ☐ 		
10. Does the facility maintain a temporary storage facility (up to 30 days from the date of removal from services) for PCB articles or PCB container? - If YES, proceed with checklist. - If NO, checklist is complete.	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
11. Are PCB articles and PCB equipment non-leaking?	Y N		
- If YES, proceed to Question 13.			
- If NO, proceed with checklist.			
12. Are leaking PCB articles and PCB equipment placed in non-leaking PCB containers that contain sufficient sorbent material to absorb any liquid PCBs remaining in the PCB items?	Y N		
13. Has there been a Spill Prevention, Control, and Countermeasure (SPCC) Plan prepared for the temporary storage area in accordance with 40 CFR Part 112? (BMP)	Y N		
- If YES to Questions 12 <u>and</u> 13, ENTER STATUS "S".			
- If NO to Question 12 <u>or</u> 13, ENTER STATUS "U".			
Note: Check CWA checklist for SPCC protocol.			
14. Are any non-leaking and structurally undamaged PCB large high voltage capacitors and PCB-contaminated electrical equipment that have not been drained of free flowing dielectric fluid stored next to a storage facility that meets the requirements of 40 CFR 761.65(b)?	Y N		
- If YES, proceed with checklist.			
- If NO, checklist is complete.			
15. Are the capacitors and electrical equipment stored on pallets?	Y N		
16. Are the capacitors and electrical equipment temporarily stored outside the storage facility checked for leaks every week?	Y N		
- If YES to Questions 15 <u>and</u> 16, ENTER STATUS "S".			
- If NO to Question 15 <u>or</u> 16, ENTER STATUS "U".			
This checklist is complete.			

TSCA - PCB 40 CFR 761 SUBPART D - DISPOSAL OF PCB ARTICLES

(T-P-DA, 1/5)

SITE ID: _____

AUDITOR(S): _____

BLDG/AREA/UNIT(S): _____

DATE: ____/____/____

ESO NO.: _____

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
40 CFR 761.60(b)(1): Disposal of PCB Articles (Transformers)			
1. Does the facility dispose of any PCB transformers? - If YES, proceed with checklist. - If NO, proceed to Question 6.	Y N		
2. Is the PCB transformer drained of all free-flowing liquid, filled with solvent, allowed to stand for at least 18 hours, and then drained thoroughly?	Y N		
3. Is the PCB transformer carcass disposed of in a chemical waste landfill? - If YES, proceed with checklist. - If NO, proceed to Question 5.	Y N		
4. Is the solvent (kerosene, xylene, toluene, etc.) flushing procedure in accordance with the existing State and Federal health and safety regulations? - If YES to Questions 2, 3 and 4, ENTER STATUS "S". - If NO to Question 2, 3 or 4, ENTER STATUS "U". Note: Check State guidelines, if applicable.			
40 CFR 761.60(b)(2): Disposal of Capacitors			
5. Does the facility dispose of any PCB Capacitors (e.g., small, large high, or low voltage capacitors)? - If YES, proceed with checklist. - If NO, proceed to Question 12.			

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
6. Does the facility dispose of any PCB small capacitors? - If YES, proceed with checklist. - If NO, proceed to Question 8.	Y N		
7. Are the following procedures used in disposing the PCB small capacitors? a. Are they disposed of as a municipal solid waste? b. Prior to disposal, are all small PCB capacitors placed in one of the DOT specification containers identified in 40 CFR 761.65(c)(6) or in containers that comply with 49 CFR 178.118 (Specification 17H Containers)? - If YES to Questions 8 a <u>and</u> b, ENTER STATUS "S". - If NO to Question 8 a <u>or</u> b, ENTER STATUS "U". c. If 25 or more small PCB capacitors are disposed of at one time, is the disposal method incineration or chemical landfill placement? (BMP)	Y N Y N ☐ Y N		
8. Does the facility dispose of any PCB large high or low voltage capacitors which contain 500 ppm or greater PCB concentration? - If YES, proceed with checklist. - If NO, proceed to Question 10.	Y N		
9. Are they disposed of in an incinerator that complies with 40 CFR 761.70? - If YES, ENTER STATUS "S". - If NO, ENTER STATUS "U".	Y N ☐		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
10. Does the facility dispose of capacitors that contain between 50 and 500 ppm PCBs? - If YES, proceed with checklist. - If NO, proceed to Question 12.	Y N ☐		
11. Are the capacitors disposed of in an incinerator that complies with 40 CFR 761.70 or in a chemical waste landfill that complies with 761.75? - If YES, ENTER STATUS "S". - If NO, ENTER STATUS "U".	Y N ☐		
Note: Check records for compliance.			
<u>40 CFR 761.60(b)(3): Disposal of PCB Hydraulic Machines</u>			
12. Does the facility dispose of any PCB hydraulic machines containing 50 ppm or greater concentration of PCBs? - If YES, proceed with checklist - If NO, proceed to Question 17.	Y N ☐		
13. Is the PCB hydraulic machine disposed of as a municipal solid waste or salvage? - If YES, proceed with checklist. - If NO, check records for disposal method.	Y N		
14. Is the machine drained of all free-flowing liquid and the liquid disposed of in accordance with CFR 761.60 (a)? - If YES, proceed with checklist. - If NO, ENTER STATUS "U" in Question 16 and proceed to Question 17.	Y N		

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AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
20. Does the facility dispose of any PCB containers that are used to contain PCBs? - If YES, proceed with checklist. - If NO, ENTER STATUS "S" in Question 22 and proceed to Question 23.	Y N		
21. Were the containers disposed of in a chemical waste landfill that complied with 40 CFR 761.75?	Y N		
22. Were the containers drained and the PCB liquid disposed of in accordance with 40 CFR 761.60 (a)? - If YES, ENTER STATUS "S". - If NO, ENTER STATUS "U".	Y N ☐		
<u>40 CFR 761.60 (d): Spills</u>			
23. Does the facility generate PCB at concentrations of 50 ppm or greater resulting from cleanup and removal of spills, leaks, or other uncontrolled discharges? - If YES, proceed with checklist. - If NO, checklist is complete.	Y N		
24. Are the PCBs stored and disposed of in accordance with 40 CFR 761.60 (a)? - If YES, ENTER STATUS "S". - If NO, ENTER STATUS "U". This checklist is complete.	Y N ☐		

AUDITOR(S): _____

BLDG/AREA/UNIT(S): _____

DATE: ____ / ____ / ____

ESO NO.: _____

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
40 CFR 761.70: Incinerators			
1. Does the facility maintain an incinerator to dispose of PCBs? - If YES, proceed with checklist. - If NO, checklist is complete.	Y N		
2. Does the facility use the incinerator to burn liquid PCBs? - If YES, proceed with checklist. - If NO, proceed to Question 15.	Y N ☐		
3. Has the facility an approval from the EPA Regional Administrator or the Director, Exposure Evaluation Division? - If YES, ENTER STATUS "S". - If NO, ENTER STATUS "U".	Y N ☐		
4. Does the incinerator meet the following combustion criteria: a. Maintenance of the introduced liquids for a 2-second dwell time at 1200°C (+/-100°C) and 3 percent excess oxygen in the stack gas? b. Maintenance of the introduced liquids for a 1-1/2 second dwell time at 1600°C (+/-100°C) and 2 percent excess oxygen in the stack gas?	Y N Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
c. Combustion efficiency of 99.9 percent computed as: Combustion Efficiency = $(\text{CCO}_2 / \text{CCO}_2 + \text{CCO}) 100$ Where: CCO_2 = Concentration of carbon dioxide CCO = Concentration of carbon monoxide?	Y N		
5. Is the rate and quantity of PCBs fed to the combustion system measured and recorded at regular intervals of no longer than 15 minutes?	Y N		
6. Is the temperature of the incineration process continuously measured and recorded?	Y N		
7. Does the flow of PCBs stop automatically whenever the combustion criteria in Question 4 are not met?	Y N		
8. Was the monitoring of stack emission product conducted when: a. The incinerator was first used for the disposal of PCBs? b. The incinerator was first used for the disposal of PCBs after the incinerator was modified in a manner which may affect the characteristics of the stack emission products? Note: Check CAA checklists.	Y N Y N		
9. Was the monitoring in Question 8 conducted for the following parameters: a. Oxygen? b. Carbon dioxide? c. Carbon monoxide?	Y N Y N Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
d. Oxides of nitrogen?	Y N		
e. Hydrochloric Acid?	Y N		
f. Total Chlorinated Organic Content?	Y N		
g. PCBs?	Y N		
h. Total Particulate Matter?	Y N		
10. Was the monitoring and recording for combustion products from incineration operations conducted for the following parameters:			
a. Oxygen?	Y N		
b. Carbon monoxide?	Y N		
c. Carbon dioxide?	Y N		
Note: The monitoring for oxygen and carbon monoxide shall be continuous. The monitoring for carbon dioxide shall be periodic as specified by Regional Administrator or Director, Exposure Evaluation Division.			
11. Was the flow of PCB to the incinerator stopped when any of the following conditions occurred:			
a. Failure of monitoring and recording operations specified in Questions 5 and 10.	Y N		
b. Excess oxygen falls below 3 percent?	Y N		
12. Are water scrubbers used for HCl control during PCB incineration?	Y N		
13. Have the water scrubbers used in Question 12 been approved by the EPA Regional Administrator or the Director, Exposure Evaluation Division?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
14. Does the facility use an alternate method for HCl control that has been approved by the EPA Regional Administrator or the Director, Exposure Evaluation Division? - If YES to Questions 3 - 14, ENTER STATUS "S". - If NO to any of Questions 3 - 14, ENTER STATUS "U".	Y N ☐		
15. Does the facility use an incinerator to burn nonliquid PCBs? - If YES, proceed with checklist. - If NO, checklist is complete.	Y N		
16. Is the incinerator used to burn the following:	Y N		
a. Nonliquid PCBs?	Y N		
b. PCB articles?	Y N		
c. PCB equipment?	Y N		
d. PCB containers?	Y N		
17. Has the facility obtained an approval from the EPA Regional Administrator or the Director, Exposure Evaluation Division? - If YES, ENTER STATUS "S". - If NO, ENTER STATUS "U".	Y N ☐		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
18. Does the incinerator meet the following combustion criteria:			
a. The mass of air emissions from the incinerator is no greater than 0.001g PCB/kg of the PCB introduced into the incinerator?	Y N		
b. Comply with the combustion criteria of Question 4?	Y N		
19. Does the facility comply with the provisions of Question 5 - 14?	Y N		
- If YES to Questions 18 <u>and</u> 19, ENTER STATUS "S".	☐		
- If NO to Question 18 <u>or</u> 19, ENTER STATUS "U".			
This checklist is complete.			

AUDITOR(S): _____

BLDG/AREA/UNIT(S): _____

DATE: ____/____/____

ESO NO.: _____

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
40 CFR 761.75: Chemical Waste Landfills			
1. Does the facility maintain any chemical waste landfills to dispose of PCBs? - If YES, proceed with checklist. - If NO, checklist is complete.	Y N		
2. Has the facility obtained an approval from the EPA Regional Administrator? - If YES, ENTER STATUS "S". - If NO, ENTER STATUS "U".	Y N 		
3. Is the landfill located in thick, relative impermeable formation such as a large clay pan? - If YES, ENTER STATUS "S" in Question 4 and proceed to Question 5. - If NO, proceed with checklist.	Y N		
4. Does the soil have a high clay and silt content with the following parameters: a. In-place soil thickness of four feet or compacted soil liner thickness of three feet? b. Permeability (cm/sec), equal to or less than $1/10^7$? c. Percent soil passing No. 200 Sieve > 30? d. Liquid limit > 30?	Y N Y N Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
e. Plasticity Index > 15?	Y N		
- If YES to Questions 3 - 4 e, ENTER STATUS "S".			
- If NO to any of Questions 4 a - e, ENTER STATUS "U".	Y N		
5. Is the facility using synthetic membrane liners?			
- If YES, proceed with checklist.			
- If NO, proceed to Question 7.			
6. Does the liner meet the following technical criteria:			
a. Is it chemically compatible with PCBs?	Y N		
b. Have a minimum thickness of 30 mils?	Y N		
c. Has adequate soil underlining and soil cover to prevent excessive stress and rupture of the liner?	Y N		
- If YES to Questions 6 a - c, ENTER STATUS "S".			
- If NO to any of Questions 6 a - c, ENTER STATUS "U".			
7. Does the facility meet the following technical criteria for hydrologic conditions:			
a. Is the bottom of the landfill 50 feet above the historical high groundwater table?	Y N		
b. There is no hydraulic connection between the site and standing or flowing water?	Y N		
c. Does the landfill site have monitoring wells and leachate collection system?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
- If YES to Questions 7a - c, ENTER STATUS "S". - If NO to any of Questions 7a - c, ENTER STATUS "U".	☐		
8. Is the landfill above the 100-year floodwater elevation?	Y N		
- If YES, proceed to Question 10. - If NO, proceed with checklist.			
9. Does the facility have surface water diversion dikes around the perimeter of the landfill site with a minimum height equal to two feet above the 100-year floodwater elevation?	Y N		
- If YES, ENTER STATUS "S". - If NO, ENTER STATUS "U".	☐		
10. If the landfill is above the 100-year floodwater elevation, does the facility have diversion structures capable of diverting all the surface water runoff from a 24-hours, 25-year storm?	Y N		
- If YES, ENTER STATUS "S". - If NO, ENTER STATUS "U".	☐		
11. Is the landfill site located in an area of low to moderate relief to minimize erosion and help prevent landslides or slumping?	Y N		
- If YES, ENTER STATUS "S". - If NO, ENTER STATUS "U".	☐		
12. Did the facility collect surface water and groundwater samples prior to commencing operations?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
13. Did the facility collect surface water samples from areas designated by the Regional Administrator at a frequency of at least once every month when the landfill is being used for disposal operations?	Y N NA		
14. Did the facility collect surface water samples from areas designated by the Regional Administrator at a frequency of at least once every six months after the final closure of the disposal area?	Y N NA		
- If YES to Questions 12 - 14, ENTER STATUS "S".			
- If NO to any of Questions 12 - 14, ENTER STATUS "U".			
15. Does the facility install a groundwater monitoring well in accordance with State regulations?	Y N		
16. Are the number and location of monitoring well in accordance with State regulations?	Y N		
17. Is the purged water from the wells treated before discharge to applicable State or Federal discharge standards or recycled back to the landfill?	Y N		
18. Are all the water samples analyzed for the following parameters:			
a. PCBs?	Y N		
b. pH?	Y N		
c. Specific conductance?	Y N		
d. Chlorinated organics?	Y N		
- If YES to Questions 15 - 18, ENTER STATUS "S".			
- If NO to any of Questions 15 - 18, ENTER STATUS "U".			

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
19. Does the facility collect leachate samples on a monthly basis and analyzed for parameters in Question 18?	Y N		
20. Is the leachate treated before discharge to applicable State or Federal discharge standards?	Y N		
- If YES to Questions 19 <u>and</u> 20, ENTER STATUS "S".			
- If NO to Question 19 <u>or</u> 20, ENTER STATUS "U".			
<u>40 CFR 761.75(b)(8): Chemical Waste Landfill Operations</u>			
21. Does the facility have an operational plan approved by the Regional Administrator?	Y N		
22. Does the facility comply with the operational plan?	Y N		
Note: Check the operational plan.	Y N		
23. Are PCBs and PCB items placed in the landfill in a manner that will prevent damage to containers or articles?	Y N		
24. Are other waste placed in the landfill that are not chemically compatible with PCBs and PCB items segregated from the PCBs throughout the waste handling and disposal process?	Y N		
- If YES, ENTER STATUS "S".			
- If NO, ENTER STATUS "U".			
<u>40 CFR 761.75(b)(9): Supporting Facilities</u>			
25. Does the chemical waste landfill maintain the following supporting facilities:			
a. A six-foot woven mesh fence, wall, or similar device around the site to prevent unauthorized persons and animals from entering?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
b. Maintain roads to and within the site which are adequate to support the operation and maintenance of the site without causing safety or nuisance problems or hazardous conditions? - If YES to Questions 25a <u>and</u> b, ENTER STATUS "S". - If NO to Question 25a <u>or</u> b, ENTER STATUS "U". This checklist is complete.	Y N		

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AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
40 CFR 761.60(a)(2)(iii) and 40 CFR 761.60(a)(3)(iii): High Efficiency Boilers			
1. Does the facility maintain a high efficiency boiler? - If YES, proceed with checklist. - If NO, checklist is complete.	Y N		
2. Is the boiler rated at a minimum of 50 million BTU/hour?	Y N		
3. If the boiler uses natural gas or oil as primary fuel, is the carbon monoxide concentration in stack gas 50 ppm or less and the excess oxygen at least 3 percent when PCBs are burned?	Y N		
4. If the boiler uses coal as primary fuel, is the carbon monoxide concentration in the stack gas 100 ppm or less and the excess oxygen at least 3 percent when PCBs are burned?	Y N		
5. The mineral oil dielectric fluid or waste does not compose more than 10 percent of the total fuel feed rate?	Y N		
6. The mineral oil dielectric fluid or waste is not fed into the boiler unless the boiler is operating at its normal operating temperature?	Y N		
7. The facility continuously monitors (at least once every hour) and record carbon monoxide concentration and excess oxygen percentage in stack gas while burning mineral oil, dielectric fluid, or waste?	Y N		
8. If the boiler burns less than 30,000 gallons of mineral oil dielectric fluid or waste, does the facility measure the parameters in Question 7 at intervals no longer than 60 minutes?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
9. Does the facility measure and record the primary fuel feed water, mineral oil dielectric fluid or waste and total quantities of both at regular intervals of no longer than 15 minutes while burning mineral oil, dielectric fluid, or waste?	Y N		
10. Provide written notification to the Regional Administrator 30 days prior to burning mineral oil dielectric fluid or waste in the boiler?	Y N		
11. Does the facility maintain records of Questions 7 - 10 and the quantity of mineral oil dielectric fluid or waste burned in the boiler each month?	Y N		
- If YES to Questions 2 - 11, ENTER STATUS "S".			
- If NO to any of Questions 2 - 11, ENTER STATUS "U".			
This checklist is complete.			

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AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
40 CFR 761.79: Decontamination			
1. Does the facility use the following decontamination procedures:			
a. Decontaminate PCB containers by flushing internal surfaces of the container three times with a solvent containing less than 50 ppm PCB?	Y N		
b. Is the solubility of PCBs in the solvent 5 percent or more by weight?	Y N		
c. Is the used solvent disposed of in accordance with 40 CFR 761.60(a)?	Y N		
d. Are any non-liquid PCBs resulting from the decontamination procedure disposed of in accordance with 40 CFR 761.60(a)(4)?	Y N		
e. Is any movable equipment used in storage areas decontaminated by swabbing surfaces that have contacted PCBs with a solvent containing less than 50 ppm PCB?	Y N		
- If YES to Questions 1a - e, ENTER STATUS "S".	☐		
- If NO to any of Questions 1a - e, ENTER STATUS "U".			
This checklist is complete.			

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AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
40 CFR 761.125: PCB Spill Reporting Requirements			
This checklist applies to all spills of PCBs at concentrations of 50 ppm or greater which are subject to decontamination requirement under TSCA.			
1. Has the facility ever spilled PCBs:			
a. In vaults?	Y N		
b. On soil?	Y N		
c. Down drains?	Y N		
d. In waterways?	Y N		
e. In occupied areas?			
2. Did the PCB spill directly contaminate surface water, sewers, or drinking water, sewers, or drinking water supplies?	Y N		
- If YES, proceed with checklist.	☐		
- If NO, proceed to Question 3.			
3. Did the facility notify the appropriate EPA Regional Office (the Office of Pesticides and Toxic Substance Branch) and obtain guidance for appropriate cleanup measures with 24 hours?	Y N		
- If YES, ENTER STATUS "S".	☐		
- If NO, ENTER STATUS "U".			

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
4. Did the spill directly contaminate grazing lands or vegetable gardens? - If YES, proceed with checklist. - If NO, proceed to Question 6.	Y N		
5. Did the facility notify the appropriate EPA Regional Office (the Office of Pesticides and Toxic Substance Branch) within 24 hours? - If YES, ENTER STATUS "S". - If NO, ENTER STATUS "U".	Y N 		
6. Did the spill exceed 10 pounds of PCB material (measured by the weight of PCB-containing material)? - If YES, proceed with checklist and record quantity, date, and time of each occurrence. - If NO, proceed to Question 8.	Y N		
7. Did the facility notify the appropriate EPA Regional Office and proceed to decontaminate the spill area within 24 hours? - If YES, ENTER STATUS "S". - If NO, ENTER STATUS "U".	Y N 		
8. Was the spill of 10 pounds or less of PCB material? - If YES, proceed with checklist and denote amount and time period of occurrence(s). - If NO, proceed to Question 10.	Y N		
9. Was the cleanup initiated within 24 hours (notification to EPA is not required)?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
- IF YES, ENTER STATUS "S".	☐		
- IF NO, ENTER STATUS "U".			
10. Was any cleanup debris (e.g., contaminated soils, solvents, rags, and other materials resulting from the cleanup) properly stored, labeled, and disposed of in accordance with 40 CFR 761.60?	Y N		
- IF YES, ENTER STATUS "S".	☐		
- IF NO, ENTER STATUS "U".			
11. Was a determination of spill boundaries made by the facility using a statistically based sampling scheme as recommended by EPA guidance documents:			
a. Verification of PCB Spill Cleanup By Sampling and Analysis, No. 560/5-85-025, May 1985?	Y N		
b. Field Manual for Grid Sampling of PCB Spill Sites to Verify Cleanup, No. 560/5-86-017, August 1985?	Y N		
- IF YES to Questions 11a and b, ENTER STATUS "S".	☐		
- IF NO to Question 11a or b, ENTER STATUS "U".			
<u>40 CFR 761.125(b): Requirements for Cleanup of Low Concentration Spills which involve Less Than One Pound of PCB by Weight (Less Than 270 Gallons of Untested Mineral Oil Containing Less Than 500 ppm PCBs)</u>			
12. Were any solid surfaces contaminated with PCBs?	Y N		
- IF YES, proceed with checklist.			
- IF NO, proceed to Question 16.			
13. Were all solid surfaces double mixed and washed with an appropriate solvent in which PCB are at least 5 percent soluble?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
14. Were all indoor residential surfaces other than vault areas cleaned to 10 micrograms per 100 square centimeters by standard commercial wipe test?	Y N N A		
15. Was this decontamination completed within 48 hours after the facility became aware of the spill?	Y N		
- If YES to Questions 13, 14 <u>and</u> 15, ENTER STATUS "S".			
- If NO to Question 13, 14 <u>or</u> 15, ENTER STATUS "U".			
16. Was any soil contaminated due to the spill?	Y N		
- If YES, proceed with checklist.			
- If NO, proceed to Question 18.			
17. Was all soil within the spill area (i.e., visible traces of soil and a buffer of 1 lateral foot around visible traces) excavated, and the ground restored to its original configuration by backfilling with clean soil containing less than 1 ppm PCB?	Y N		
- If YES, ENTER STATUS "S".			
- If NO, ENTER STATUS "U".			
18. Does the facility maintain records and certification of cleanup?	Y N		
- If YES, proceed with checklist.			
- If NO, ENTER STATUS "U" in Question 20.			
19. Are the records and certification of cleanup maintained for a period of 5 years?	Y N		
20. Do the records and certification consist of the following information:			
a. Identification of the source of the spill (e.g., type of equipment)?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
b. Estimated or actual date and time of the spill?	Y N		
c. The date and time cleanup was completed or terminated (if cleanup was delayed by emergency or adverse weather: the nature and duration of delay)?	Y N		
d. A brief description of spill location?	Y N		
e. Pre-cleanup sampling data used to determine the spill boundaries and a brief description of the sampling methodology used to establish the spill boundaries?	Y N		
f. A brief description of the solid surface cleaned and of the double wash/rinse method used?	Y N		
g. Approximate depth of soil excavation and the amount of soil removed?	Y N NA		
h. A certification statement signed by the facility stating that the cleanup requirements were met and the information contained in the record is true?	Y N		
- If YES to Questions 19 - 20 h, ENTER STATUS "S".	☐		
- If NO to any of Questions 19 - 20 h, ENTER STATUS "U".			
<u>40 CFR 761.125(c): Requirements for Cleanup of High Concentration Spills and Low-concentration Spills Involving One Pound or More PCBs by Weight (270 Gallons or More of Untested Mineral Oil)</u>			
21. Did the facility notify the EPA Regional Office and NRC as required by 40 CFR 761.125(a)(1)?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
22. Did the facility cordon off or otherwise delineate and restrict an area encompassing any visible traces plus a 3-foot buffer?	Y N		
23. Did the facility place clearly visible signs advising persons to avoid the area to minimize the spread of contamination as well as potential for human exposure?	Y N		
24. Did the facility record and document the area of visible contamination, noting the extent of the visible trace areas and the center of the visible trace area?	Y N NA		
25. If there were no visible traces, did the facility note this fact and contact the regional office of the EPA for guidance in completing statistical sampling of the spill area to establish spill boundaries?	Y N NA		
26. Did the facility initiate cleanup of visible traces of the fluid on hard surface?	Y N		
27. Did the facility initiate removal of all visible traces of the spill on soil and other media (e.g., gravel, sand, etc.)?	Y N		
28. Were all the cleanup measures in Question 21 to Question 27 started within 24 hours (or within 48 hours for PCB transformers) after the facility was made aware of the spill, except in adverse conditions (e.g., civil emergency, hurricane, tornado, etc.)?	Y N		
- If YES to Questions 21 - 28, ENTER STATUS "S".	☐		
- If NO to any of Questions 21 - 28, ENTER STATUS "U".			
<u>40 CFR 761.125 (c) (2): Requirements for Decontaminating Spills in Outdoor Electric Substations</u>			
29. Did the spill occur in an outdoor electrical substation?	Y N		
- If YES, proceed with checklist.			
- If NO, proceed to Question 32.			

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
30. Was the soil contaminated by the spill cleaned either to 25 ppm PCB or 50 ppm PCB by weight and a notice visibly placed in the area? - If YES or NOT APPLICABLE to Questions 29 - 31, ENTER STATUS "S". - If No to any of Questions 29 - 31 ENTER STATUS "U".	Y N ☐		
<u>40 CFR 761.125 (c)(3): Requirements for Decontaminating Spills in Other Restricted Access Areas</u>			
Note: This checklist applies to spills which occurred in restricted access locations other than outdoor electrical substations.			
32. Did the spill contaminate any high-contact solid surfaces? - If YES, proceed with checklist. - If NO, proceed to Question 34.	Y N ☐		
33. Was the high contact solid surface decontaminated to 10 micrograms per 100 cm ² as measured by standard wipe test? - If YES, ENTER STATUS "S". - If NO, ENTER STATUS "U".	Y N ☐		
34. Did the spill contaminate any low-contact, indoor, impervious surface? - If YES, proceed with checklist. - If NO, proceed to Questions 36.	Y N		
35. Was the low-contact surface decontaminated to 10 micrograms per 100 cm ² as measured by standard wipe test? - If YES, ENTER STATUS "S". - If NO, ENTER STATUS "U".	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
36. Did the spill contaminate any low-contact, indoor, nonimpervious surfaces? - If YES, proceed with checklist. - If NO, proceed to Question 40.	Y N		
37. Was the nonimpervious surface cleaned to 10 micrograms per 100 cm ² , or 100 micrograms per 100 cm ² and encapsulated? - If YES, ENTER STATUS "S". - If NO, ENTER STATUS "U".	Y N 		
38. For upcoming or completed PCB-related abatement and construction projects have the following been conducted: (BMP)			
a. Surface areas analyzed for PCB residue concentration levels?	Y N		
b. Specific contractor cleanup criteria stated in construction specifications?	Y N		
c. Are independent wipe tests conducted after the abatement work to ensure proper final cleanup levels have been achieved or exceed?	Y N		
Note: This acceptable post-abatement and construction residual PCB concentration levels on surfaces are the same as for a current spill.			
d. Do the post-construction project files contain wipe sample analysis results showing acceptable residual PCB levels EPA regulations?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
39. Was any soil contaminated by the PCB spill? - If YES, proceed with checklist. - If NO, proceed to Question 41.	Y N Y N		
40. Was the soil cleaned to 25 ppm PCBs by weight? - If YES, ENTER STATUS "S". - If NO, ENTER STATUS "U".			
<u>40 CFR 761.125 (c)(4): Requirements for Decontaminating Spills in Nonrestricted Access Areas:</u>			
41. Did the spill occur in a nonrestricted area? - If YES, proceed with checklist. - If NO, checklist is complete.	Y N Y N		
42. Did the decontamination procedure include the following: a. Were the indoor solid surface and high contact outdoor solid surfaces cleaned to 10 micrograms per 100 cm ² ? b. Were indoor vault areas and low contact, outdoor, impervious solid surfaces decontaminated to 10 micrograms per 100 cm ² ? c. Were any low-contact, outdoor, nonimpervious solid surface cleaned to 10 micrograms per 100 cm ² or 100 micrograms per 100 cm ² and encapsulated?	Y N NA Y N NA Y N NA		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
d. Was any soil contaminated by the spill decontaminated to 10 ppm PCB by weight and the soil excavated to a minimum depth of 10 inches and replaced with clean soil?	Y N NA		
- If YES to Question 42 a - d, ENTER STATUS "S".			
- If No to any of Questions 42 a - d, ENTER STATUS "U".			
43. Does the facility maintain records and certification of cleanup for a period of 5 years?	Y N		
- If YES, proceed with checklist.			
- If No, ENTER STATUS "U" in Question 44.			
44. Does the facility maintain records and certification of cleanup as stated in Questions 20 a - g, and post cleanup verification sampling data and, if not otherwise apparent from the documentation, a brief description of the sampling methodology and analytical techniques used?	Y N		
- If YES, ENTER STATUS "S".			
- If NO, ENTER STATUS "U".			
This checklist is complete.			

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AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
40 CFR 761.130: Sampling Requirements			
Note: Post cleanup is required to verify the levels of cleanup under 40 CFR 761.125(C)2 through (4).			
1. Did the post cleanup meet the following criteria:			
a. Was the sampling area greater than or equal to the area cleaned plus an additional 1-foot boundary or an area 20 percent larger than the original area of contamination?	Y N		
b. Did the sampling scheme ensure 95 percent confidence against false positive?	Y N		
c. Were the number of samples sufficient to detect contamination within the sampling area of radius 2 feet or more?	Y N		
d. Did the sampling scheme include calculation for expected variability due to analytical error?	Y N		
- If YES to Questions 1a - e, ENTER STATUS "S".			
- If NO to any of Questions 1a - e, ENTER STATUS "U".			
Note: EPA recommends the use of a sampling scheme found in documents: EPA publication No. 560/5-85-025 - Verification of PCB Spill Cleanup By Sampling and Analysis and EPA publication No. 560/5-86-017 - Field Manual For Grid sampling of PCB Spill Sites To Verify Cleanup.			
This checklist is complete.			

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AUDIT QUESTIONS AND PROCEDURES

RESPONSE

REFERENCE

COMMENTS

Note: This section of the checklist contains recordkeeping and reporting requirements that apply to PCBs, PCB items, and PCB storage and disposal facility.

40 CFR 761.180(a): PCB and PCB Items in Service or Projected for Disposal

1. Does the facility use or store:

a. 45 kgs (99.4 lbs) of PCBs contained in PCB containers? Y N

b. One or more PCB transformers? Y N

c. 50 or more PCB large high-or low-voltage capacitors? Y N

- If YES to any of Questions 1 a - c, proceed with checklist.

- If NO to Questions 1 a - c, checklist is complete.

2. Does the facility develop and maintain records on the disposition of PCBs and PCB items annually? Y N

- If YES, proceed with checklist.

- If NO, ENTER STATUS "U" in Question 3.

3. Is the following information included in the EPA-required PCB status annual report:

a. The dates when PCBs and PCB items were removed from service, placed into storage for disposal, or placed into transport for disposal? Y N

b. The quantities of PCBs and PCB items remaining in service at the end of the subject calendar year? Y N

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
c. Total weight of any PCBs and PCB items in PCB containers including identification of container contents (e.g., liquids, capacitors)?	Y N		
d. Total number of PCB transformers and total weight in kilograms of any PCBs contained in the transformers?	Y N		
e. Total number of PCB large high-or low-voltage capacitors?	Y N		
- If YES to all Questions 3 a - e, ENTER STATUS "S".			
- If NO to any of Questions 3 a - e, ENTER STATUS "U".			
40 CFR 761.180(c): Incineration Facilities			
4. Does the facility maintain an incinerator to dispose of any PCBs or PCB items?	Y N		
- If YES, proceed with checklist.			
- If NO, proceed to Question 10.			
5. Does the facility maintain the records for at least 5 years?	Y N		
6. Is the following information included in the records:			
a. Rate and quantity of PCBs fed to the combustion system?	Y N		
b. Temperature of the combustion process?	Y N		
c. Stack emission products (including O ₂ , CO, and CO ₂)?	Y N		
d. Total weight in kilograms of any solid residues generated by the incinerator during the calendar year?	Y N		
e. Total weight in kilograms of any solid residues disposed by the incinerator facility in chemical waste landfills?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
1. Total weight in kilograms of any solid residues remaining on the site?	Y N		
g. Any other data required by the Regional Administrator?	Y N		
- If YES to Questions 5 a - g, ENTER STATUS "S".			
- If NO to any of Questions 5 a - g, ENTER STATUS "U".			
7. Did the facility suspend the operation of the incinerator? (Pursuant to Section 761.70(a)(8))	Y N		
8. Did the facility prepare a document including, at a minimum, date and time of suspension, and an explanation of the circumstances causing the suspension of operations?	Y N		
9. Was the document sent to the Regional Administrator within 30 days of any such suspension?	Y N		
- If YES to Questions 8 <u>and</u> 9, ENTER STATUS "S".			
- If NO to Question 8 <u>or</u> 9, ENTER STATUS "U".			
<u>40 CFR 761.180(d): Chemical Waste Landfill Facilities</u>			
10. Does the facility operate any chemical waste landfill facility for the purpose of PCBs or PCB item disposal?	Y N		
- If YES, proceed with checklist.			
- If NO, proceed to Question 12.			
11. Does the facility maintain records containing the following information:			
a. Any water analysis obtained in compliance with 761.75(b)(6)(iii)?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
b. Any operations records including burial coordinates of wastes obtained in compliance with 761.75(b)(8)(ii)?	Y N		
c. Is there a policy to retain burial records for at least 20 years at the facility?	Y N		
- If YES to Questions 11 a, b and c, ENTER STATUS "S".			
- If NO to Question 11 a, b or c, ENTER STATUS "U".			
40 CFR 761.180(e): High Efficiency Boiler Facilities			
12. Does the facility maintain a high efficiency boiler or boilers to dispose of any PCBs or PCB items?	Y N		
- If YES, proceed with checklist.			
- If NO, checklist is complete.			
13. Do the PCB liquids disposed of in the boiler contain 500 ppm or less concentration PCBs?	Y N		
- If YES, ENTER STATUS "S".			
- If NO, ENTER STATUS "U".			
14. Are records developed and retained for at least 5 years containing the following:			
a. Monthly CO and excess O ₂ monitoring data?	Y N		
b. Monthly summary of the quantities of PCBs burned?	Y N		
c. Chemical analysis data of waste as required by 761.60(a)(3)(iii)(B)(6)?	Y N		
- If YES to Questions 14 a - c, ENTER STATUS "S".			
- If NO to any of Questions 14 a - c, ENTER STATUS "U".			
This checklist is complete.			

AUDITOR(S): _____

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AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
Part 704: Subparts A and B			
1. Does the facility manufacture or import (or propose to conduct these actions) chemicals listed in Subpart B of this Part? - If YES, proceed with checklist. - If NO, checklist is complete.	Y N		
2. Does the facility, which manufactures or imports these chemicals: a. Use them for research and development purposes? b. Develop them as byproducts or impurities? c. Import them as part of an article? (See Part 704.3 for definition) d. Is the facility considered a small manufacturer as defined in introduction to checklist or Part 704.3? Note: In some subparts different annual quantities produced define "small manufacturer." - If YES to any of Questions 2 a - d, proceed with checklist. - If NO to all Questions 2 a - d, checklist is complete.	Y N Y N Y N Y N		
3. Has the facility submitted to required reports for each chemical listed in Subparts A and B in the format stated in: a. 704.25(d)? b. 704.30(d)? c. 704.33(d)?	Y N Y N Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
d. 704.83(e)?	Y N		
e. 704.85(c)?	Y N		
f. 704.104(d)?	Y N		
g. 704.142(d)?	Y N		
h. 704.175(d)?	Y N		
i. 704.205(d)?	Y N		
- If YES or NOT APPLICABLE to Questions 3 a - i, ENTER STATUS "S".			
- If NO to any of Questions 3 a - i, ENTER STATUS "U".			
4. Has the facility submitted the required reports according to the time periods stated in the following subparts, as applicable:			
a. 704.25(e)?	Y N		
b. 704.30(c)?	Y N		
c. 704.33(e)?	Y N		
d. 704.83(f)?	Y N		
e. 704.85(d)?	Y N		
f. 704.104(e)?	Y N		
g. 704.142(e)?	Y N		
h. 704.175(e)?	Y N		
i. 704.205(e)?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
- If YES or NOT APPLICABLE to Questions 4 a - i, ENTER STATUS "S". - If NO to any of Questions 4 a - i, ENTER STATUS "U". This checklist is complete.			

AUDITOR(S): _____

BLDG/AREA/UNIT(S): _____

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AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
Part 717 - Records And Reports Of Allegations That Cause Significant Adverse Reactions To Health Or The Environment			
40 CFR 717.1: Scope and Compliance			
1. Does the facility manufacture chemical substances for commercial purposes for the purpose of obtaining an immediate or eventual commercial advantage (i.e., business development and profit)? - If YES, proceed with checklist. - If NO, checklist is complete.	Y N		
2. Has the facility identified and kept records of significant adverse effects (as defined in Part 717.12) to health or the environment alleged to have been caused by the subject chemical substance? - If YES, ENTER STATUS "S". - If NO, ENTER STATUS "U" and proceed to Question 4. - If NOT APPLICABLE, ENTER STATUS "NA" and proceed to Question 4.	Y N 		
3. Have the records kept been prepared in accordance with the format stated in Part 717.15?	Y N		
4. Has the EPA requested copies of any of these adverse reaction reports as allowed by Part 717.17? - If YES, list reports requested and review contents for appropriateness. This checklist is complete.	Y N		

AUDITOR(S): _____

BLDG/AREA/UNIT(S): _____

DATE: ____/____/____

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AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
Subpart A: General Provisions			
1. Does the facility manufacture, process and/or distribute in commerce, any fully halogenated chlorofluoroalkane (CFC) chemical products? - If YES, proceed with checklist. - If NO, checklist is complete.	Y N		
Subpart C: Prohibitions, Exemptions, and Certification Requirements			
2. Does the facility manufacture CFCs after 1978, for purposes other than those conditions stated in Part 762.45(a) or (b)? - If YES, ENTER STATUS "U". - If NO or NA, ENTER STATUS "S".	Y N 		
3. Does the facility process CFCs after 1978, for purposes other than those conditions stated in Part 762.50 (a) or (b)? - If YES, ENTER STATUS "U". - If NO or NA, ENTER STATUS "S".	Y N 		
4. Does the facility produce CFCs after 1978 that are exempt from the requirements of this Part, pursuant to conditions of Part 762.59?	Y N		
Subpart D: Records and Reports			
5. As applicable to Parts 762.60, 762.65 and 762.70, are reports submitted to the EPA Office of Toxic Substances, in accordance with these requirements?	Y N		
This checklist is complete.			

TSCA - 40 CFR 723 - PREMANUFACTURE NOTIFICATION EXEMPTIONS

(T-PNE, 1/2)

SITE ID: _____

AUDITOR(S): _____

BLDG/AREA/UNIT(S): _____

DATE: ____/____/____

ESO NO.: _____

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
Note: Subpart B of Part 723 allows exemptions from premanufacture notice requirements of Section 5(a)(1)(A) of TSCA, if certain conditions are applicable.			
1. Does the facility manufacture quantities of 1,000 kilograms or less a year of chemicals pursuant to Section 5(a)(1)(A) of TSCA?	Y N		
- If YES, proceed with checklist.			
- If NO, review Part 720 notification requirement and proceed to audit facility pursuant to that subpart's requirements.			
2. Does the manufacture product conform to any of conditions stated in Part 723.50(d):			
a. Chronic effects?	Y N		
b. Acute effects?	Y N		
c. Environmental effects?	Y N		
d. Impurities?	Y N		
e. Byproducts?	Y N		
- If YES to any of Questions 2 a - e, then an exemption under this Part is prohibited and checklist is complete. Refer to Part 720 requirements.			
- If NO to Questions 2 a - e, proceed with checklist.			
3. Was the exemption notice submitted to the EPA Document Control Office at least 21 days before manufacturing began?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
4. Has the facility kept the following records pursuant to this Part's requirements (40 CFR 723.50(o)):			
a. For each chemical under exemption, annual production volumes?	Y N		
b. Documentation of information in the exemption notice and compliance with this section?	Y N		
c. Records kept for at least 5 years?	Y N		
5. Does the facility manufacture chemical substances for use in the manufacture or processing of instant photographic and peel-apart film articles? - If YES, refer to Part 723.175 requirements and audit facility based on these criteria.	Y N		
6. Does the facility manufacture polymers (in accordance with Part 723.250(b)(12) guidelines)? - If YES, audit facility based on Part 723.250 requirements. This checklist is complete.	Y N		

AUDITOR(S): _____

BLDG/AREA/UNIT(S): _____

DATE: / /

ESO NO.: _____

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
Subpart D: Reporting Commercial and Industrial Uses of Asbestos			
1. Does the facility mine asbestos or import asbestos for commercial or industrial use?	Y N		
2. Does the facility manufacture or process for commercial purposes, asbestos materials/products?	Y N		
Note: See definitions in Part 763.63 on the use of asbestos to repair or construct buildings or other construction activities as these do not constitute manufacturing or processing activities.			
- If YES, check reports to be submitted to EPA in accordance with 763.65 and .71 requirements.			
Subpart E: Asbestos - Containing Materials in Schools			
Note: It is unlikely that DOE facilities have schools open over six months a year and defined as such pursuant to Section 196 of the Elementary and Secondary Education Act of 1965 (20 USC 2854).			
3. Does the facility own and operate elementary or secondary schools (K - 12 grades)?	Y N		
- If YES, must comply with all provisions of this Subpart pursuant only to the school and its facilities (see definition in introduction or Part 763.63) and proceed with checklist.			
- If NO, checklist is complete.			

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
4. Has an asbestos inspection been conducted for the school by an AHERA - Certified Asbestos Inspector to identify friable asbestos by July 1989 and submitted a management plan to the State's Governor's Office? - # YES, ENTER STATUS "S". - # NO, ENTER STATUS "U".	Y N 		
<u>Subpart F: Friable Asbestos - Containing Materials in Schools</u>			
5. Did this inspection report identify friable asbestos conditions pursuant to the requirements of this subpart? - # YES, ENTER STATUS "S". - # NO, ENTER STATUS "U".	Y N 		
<u>Subpart G: Asbestos Abatement Projects</u>			
6. Was the friable asbestos identified in the report corrected or abated as per the requirements of this subpart?	Y N		
7. Was the proper sampling conducted and post-abatement clearance airborne concentration levels of work areas approved before reoccupancy pursuant to Appendix A criteria? - # YES, ENTER STATUS "S". - # NO, ENTER STATUS "U". - # NOT APPLICABLE, ENTER STATUS "NA".	Y N 		
This checklist is complete.			

Figure - 1

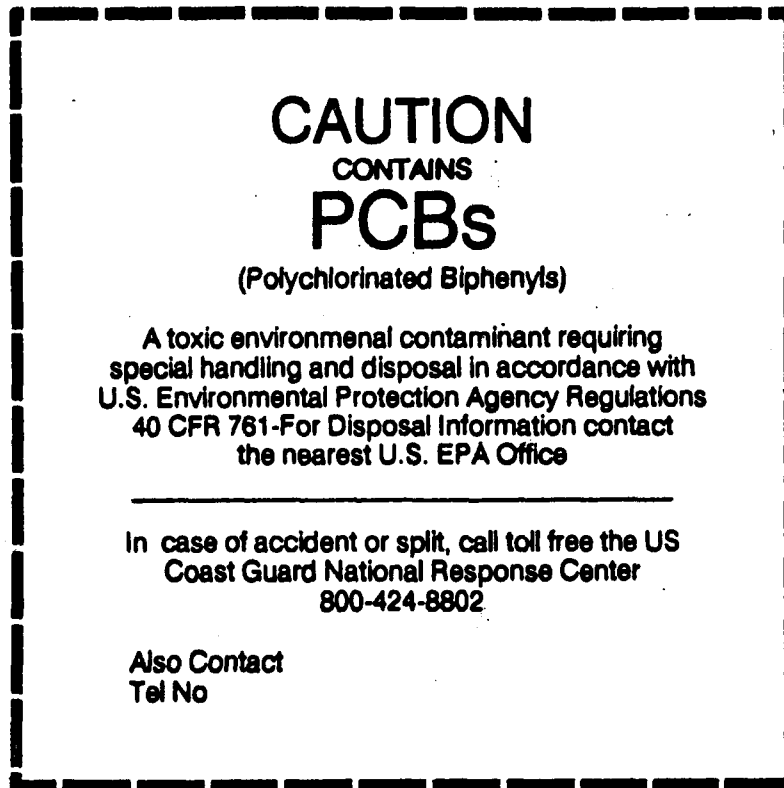
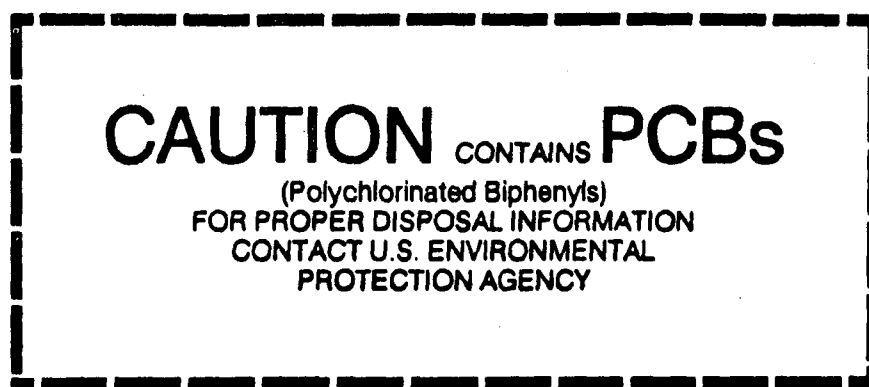


Figure - 2



SECTION 11

GROUNDWATER

This protocol applies to Department of Energy (DOE) facilities and elements that could impact groundwater through past or current operations. The scope of this protocol includes the groundwater related portions DOE Order 5400.1 that provides direction on the establishment of environmental protection requirements, authorities and responsibilities for assuring compliance with applicable environmental laws and regulations. It also includes specific topics dealt with in regulatory guidance documents that provide industry and government sponsored actions with technical and procedural state-of-the-practice requirements relative to groundwater. Where specific regulatory protocol applies, such as the Resource Conservation and Recovery Act or Safe Drinking Water Act, those protocols should be utilized.

It is the intent of this checklist to provide the auditor with only basic line of inquiry for audit purposes. It is anticipated that the auditor is technically capable of evaluating the site conditions, is thoroughly knowledgeable in the details of the current state-of-practice of groundwater investigations, principles and regulatory requirements and guidance, and has a familiarity and access to the current guidance documents and applicable regulations.

1.0 INTRODUCTION

The Department of Energy Organization Act of 1977 provided for Assistant Secretaries to centralize and improve coordination of a national energy policy. The Assistant Secretary for Environment was charged with advising the Secretary with respect to conformance of the Department's activities to environmental laws and principles. Through the Office of Environmental Safety and Health, a series of orders have been issued dealing with environmental protection. The policy expressed in DOE Order 5400.1 is that the DOE and its contractors will:

- o Conduct its operations in an environmentally safe and sound manner,
- o Conduct the Department's operations in compliance with the letter and spirit of applicable environmental statutes, regulations and standards,
- o Correct existing environmental problems,
- o Minimize risks to the environment or public health, and
- o Anticipate and address potential environmental problems before they pose a threat to the quality of the environment or public welfare.

The Order further defines the responsibilities and authorities within the Department at all levels and for contractors that operate DOE facilities.

1.1 GENERAL ENVIRONMENTAL GROUNDWATER MONITORING

The scope of DOE Order 5400.1 includes requirements for programs and plans for environmental monitoring. Chapter III, Subparagraph 4.a, defines requirements that each Head of Field Organization must prepare a Groundwater Protection Management Program. Chapter IV, Subparagraph 9, defines the general requirements of a Groundwater Monitoring Program. It is the purpose of these programs and plans to measure and monitor effluent and provide surveillance to:

- o Demonstrate compliance with legal and regulatory requirements imposed by applicable Federal, State and local agencies,
- o Confirm adherence to DOE environmental protection policies, and to
- o Support environmental management decisions.

To this effort it is recognized that each facility is unique and that each must be evaluated and planned for on an individual basis relative to regulatory requirements, DOE directives and activities at that particular site.

1.2 HAZARDOUS WASTE SITE GROUNDWATER MONITORING

Recognition of hazardous wastes sites and actual or suspected releases to groundwater are regulated through several mechanisms. The facilities may be assessing and restoring groundwater environmental quality through regulated programs operated under the Resource Conservation and Recovery Act (RCRA), the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) or other programs that regulate groundwater quality. Where such regulatory programs take precedence, those protocols should be addressed. Where there is no clear application, general guidance and industry practice applies. In these cases the following guidance documents have been used in this protocol as a basis for evaluation of site and facility coverage and adherence to technical levels of practice used elsewhere in the industry:

- o RCRA Technical Enforcement Guidance Document (TEGD), OSWER Directive 9950.1,
- o RCRA Comprehensive Ground-Water Monitoring Evaluation Document, OWSE Directive 9950.2,
- o Compendium of Field Operations Methods, OSWER Directive 9355.0-14,
- o Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA, OWSE Directive 9355.3-01,
- o Guidance on Remedial Actions for Contaminated Ground Water at Superfund Sites, OWSE Directive 9283.1-2, and
- o RCRA Facility Investigation (RFI) Guidance, OWSE Directive 9502.00-6D.

It should be recognized by the auditor that the relative detail of investigations performed by the site will vary depending on the nature of the subsurface physical conditions and the site operational history dealing with potential discharges of hazardous constituents to the environment. Thus it will be necessary to apply professional judgement in evaluating the items in the Groundwater checklist and the level of detail needed to adequately audit the site efforts. Although the source documents are directly related to regulatory requirements under RCRA or included in CERCLA guidance (basically for Superfund projects), industry application of this guidance is being applied to other types of projects outside of the regulatory scope of those laws. This application to professional practice implicitly defines what the standards of the industry are at the current time. Since practices change and evolve, as have the environmental regulations, guidance will also change for the auditor to use in evaluating the efforts of the site or facility to adequately investigate and report on their environment.

LIST OF GROUNDWATER (GW) CHECKLISTS

Performance <u>Checklist</u>	Revision <u>No.</u>	<u>Date</u>	Checklist <u>Title</u>
GW-GMP	0	12/29/89	Environmental Groundwater Monitoring Program

GW - ENVIRONMENTAL GROUNDWATER MONITORING PROGRAM

(GW-GMP, 1/8)

SITE ID: _____

AUDITOR(S): _____

BLDG/AREA/UNIT(S): _____

DATE: ____/____/____

ESO NO.: _____

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
General Environmental Groundwater Monitoring Program			
Note: Checklist R-H-F or R-HP-F should be used for auditing units regulated under RCRA, 40 CFR Part 264 or 265 Subpart F. Other areas not covered as a RCRA regulated unit with known or suspected groundwater contamination should be audited also using the Hazardous Waste Site Groundwater Program sections of this checklist.			
1. Does the site have an environmental groundwater monitoring plan developed as a specific element of the environmental monitoring plan and Groundwater Protection Management Program as per DOE Order 5400.1(III)(4)(a).	Y N		
- If YES, ENTER STATUS "S".			
- If NO, ENTER STATUS "U" and proceed to Question 6.			
2. Does the environmental groundwater monitoring plan as required by DOE Order 5400.1(IV)(9)(a) include the following items:			
a. DOE requirements, Federal and State regulations applicable to groundwater protection identified?	Y N		
b. Monitoring strategy?	Y N		
c. Sampling plan?	Y N		
d. Analytical requirements?	Y N		
e. Data management plan?	Y N		
f. Quality assurance requirements?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
4. Has the site completely implemented all facets of the plan? - If YES, ENTER STATUS "S". - If NO, ENTER STATUS "U". <u>Hazardous Waste Site Groundwater Program</u> Note: Regulatory guidance for the following sections can be found in: 1) RCRA Ground-Water Monitoring Technical Enforcement Guidance Document (TEGD), OSWER Directive 9950.1; 2) RCRA Comprehensive Ground-Water Monitoring Evaluation Document, OSWER Directive 9950.2; 3) Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA, OWAER Directive 9353.3-01; 4) Compendium of Field Operations Methods, OSWER Directive 9355.0-14; 5) Guidance on Remedial Actions for Contaminated Groundwater at Superfund Sites, OSWER Directive 9283.1-2; and 6) RCRA Facility Investigation (RFI) Guidance, OSWER Directive 9502.00-6D.	Y N ☐		
5. Are there areas of known or suspected groundwater contamination at the site that are regulated under RCRA Parts 264 or 265? - If YES, proceed to checklist R-H-F and/or R-HP-F. - If NO, proceed with checklist. Note: If groundwater has been contaminated, also refer to the Safe Drinking Water Act Checklist, and DOE Order 5400.XX checklist.	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
<u>Hydrogeologic Characterization</u>			
6. Has the partially saturated zone geology been characterized for physical and hydrogeologic parameters of: a. Composition or lithology? b. Infiltration rate or vertical permeability? c. Geologic structure and thickness of strata? d. Areal continuity of strata? - If YES or NOT APPLICABLE to Questions 6 a - d, ENTER STATUS "S". - If NO to any of Questions 6 a - d, ENTER STATUS "U".	Y N Y N Y N Y N 		
7. Has the saturated zone geology been characterized for physical and hydrogeologic parameters of : a. Composition or lithology? b. Geologic structure and thickness of saturated zone unit(s)? c. Horizontal and vertical permeabilities? d. Horizontal and vertical pore water velocities? e. Pore water flow gradients and directions? f. Background water quality or aquifer? g. Relationship of site aquifer(s) to area drinking water aquifer(s)? - If YES or NOT APPLICABLE to Questions 7 a - g, ENTER STATUS "S". - If NO to any of Questions 7 a - g, ENTER STATUS "U".	Y N Y N Y N Y N Y N Y N Y N 		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
<u>Groundwater Monitoring System</u>			
Note: If monitoring wells are not installed for the site, facility or unit because of exemptions under regulation ENTER STATUS "NA" for the balance of the questions and the checklist is complete.			
8. Do the groundwater monitoring well locations meet the following attributes:			
a. Is adequate areal and vertical coverage provided through the use of strategically placed monitoring wells to ensure that potential contamination of the aquifer would be detected at the earliest practical time?	Y N		
b. Is adequate vertical coverage within the aquifer provided through the use of monitoring wells constructed with well screens capable of detecting immiscible liquids either floating or sinking in the aquifer in areas where these types of contaminants are known or potentially present?	Y N		
c. In areas of known contamination, are the wells located adequately to completely define and quantify the horizontal and vertical extent of contamination?	Y N		
- If YES or NOT APPLICABLE to Questions 8 a - c, ENTER STATUS "S".			
- If NO to any of Questions 8 a - c, ENTER STATUS "U".			
9. Are the monitoring wells constructed according to the following:			
a. Are well filters, screen slot sizes, screened intervals, casing materials, annular seals and backfill grout constructed based on known geologic formation conditions and anticipated contaminant chemical properties?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
b. Are wells constructed with adequate surface protection from vehicles and vandalism, identified with a permanent visible marking on the casing, concrete surface pad or sign post and secured (locked) to prevent unauthorized intrusion?	Y N		
c. Are reference elevations and coordinates surveyed for each well to within 0.01 ft. and 0.5 ft. respectively, and is the reference point plainly marked on the top of the casing?	Y N		
d. Have unused wells been properly abandoned by over-drilling and tremie grouting the borehole?	Y N		
Note: Enter "NA" if there are no unused or improperly constructed wells that should be abandoned.			
- If YES or NOT APPLICABLE to Questions 9 a - d, ENTER STATUS "S".			
- If NO to any of Questions 9 a - d, ENTER STATUS "U".			
10. Are records of well construction available for the following:			
a. Are well construction as-built records available and complete for all monitoring wells being used at the site?	Y N		
b. Are records on the development methods and procedures, and field record of development available for all of the monitoring wells?	Y N		
- If YES to Questions 10 a and b, ENTER STATUS "S".			
- If NO to Question 10 a or b, ENTER STATUS "U".			

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
<u>Groundwater Sampling and Analysis</u>			
11. Is there a written groundwater sampling and analysis plan that contains:			
Note: If there are no written sampling and analysis procedures for the facility, site or unit, unless exempted by regulation, ENTER STATUS "U", and proceed to the Groundwater Analytical Data Evaluation section.			
a. Well purging procedures requiring monitoring of purge effectiveness?	Y N		
b. Sample collection procedures including decontamination requirements?	Y N		
c. Sample preservation requirements, shipping and handling procedures?	Y N		
d. Chain of custody requirements and procedures for field and laboratory?	Y N		
e. Laboratory analytical requirements and a listing of specific procedures?	Y N		
f. Map showing identification and location of all monitoring wells?	Y N		
g. Frequency or schedule for each monitoring well to be sampled in accordance with the appropriate regulation under RCRA, approved remedial investigation sampling plan, or DOE Order?	Y N		

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SECTION 12

HAZARDOUS MATERIALS STORAGE

Portions of the hazardous materials storage checklist will apply to DOE facilities which store, dispense and use hazardous materials. Checklist procedures and questions which pertain to hazardous materials storage have been developed from relevant sections of regulations which have been promulgated by the Department of Labor (DOL), Department of Transportation (DOT) and the Environmental Protection Agency (EPA). The Occupational Safety and Health Administration's (OSHA) regulations combine many standards and specifications which have been incorporated by reference. Auditors should have access to technical data and specifications which have been established by:

- o American National Standards Institute (ANSI)
- o American Society for Testing and Materials (ASTM)
- o Compressed Gas Association (CGA)^R
- o National Fire Protection Association (NFPA)
- o American Petroleum Institute (API)

Auditors should review in detail the regulations published by OSHA which outline safe storage, dispensing and handling of hazardous materials in the workplace. The majority of storage procedures and use requirements are set forth in Title 29 of the Code of Federal Regulations by the Department of Labor. However, the Department of Transportation has also published regulations specifying container design, construction, manufacturing and testing requirements. Key sections of the OSHA and DOT regulations should be reviewed by auditors along with relevant Title 40 EPA response regulations. Auditors should have copies of or access to selected Federal regulations prior to conducting field activities. Recent copies of the following titles should be available as well as related changes for the regulations which are published in the Federal Register:

- o 49 CFR - DOT - Container Specifications - Part 178
- o 49 CFR - DOT - Tank Car Specifications - Part 179
- o 29 CFR - OSHA - Occupational Safety and Health Standards - Part 1910
- o 40 CFR - EPA - National Oil and Hazardous Substances Pollution Contingency Plan - Part 300

LIST OF HAZARDOUS MATERIALS STORAGE (HMS) CHECKLISTS

Performance <u>Checklist</u>	Revision <u>No.</u>	<u>Date</u>	Checklist <u>Title</u>
HMS	0	12/29/89	Hazardous Materials Storage

AUDITOR(S): _____
_____BLDG/AREA/UNIT(S): _____

DATE: ____/____/____

ESO NO.: _____

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
<u>Flammable and Combustible Liquids</u>			
<u>29 CFR 1910.106(e)(2): Incidental Storage of Small Quantities</u>			
1. When small quantities of flammable or combustible liquids are used within work areas, are they stored in approved metal cabinets which meet the design, construction, and fire resistance requirements set forth in this section (i.e., NFPA 10-minute fire test specs., etc)?	Y N		
2. Are metal cabinets which contain flammable or combustible liquids labeled in conspicuous lettering "Flammable-Keep Fire Away"?	Y N		
3. Is it facility practice to only store a few days worth of flammable liquids, not to exceed storage quantities in this section, in approved metal cabinets?	Y N		
4. Are plant personnel and the local firefighters kept informed as to the locations of work area cabinets containing flammable or combustible liquids?	Y N		
5. Are containers used at the facility for storing small quantities of flammable or combustible liquids manufactured to DOT specifications?	Y N		
<u>29 CFR 1910.144: Container Safety Color Code</u>			
6. Are safety cans and other containers of flammable liquids with flash points at or below 80° F painted red with some additional clearly visible identification in the form of a yellow band or the name of the contents of the can conspicuously stenciled or painted on the can in yellow?	Y N		
- If YES to Questions 1 - 6, ENTER STATUS "S".	☐		
- If NO to any of Questions 1 - 6, ENTER STATUS "U".			

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
29 CFR 1910.106(4)(i): Inside Storage of Flammable and Combustible Liquids			
7. Are rooms in which flammable and combustible liquids are stored constructed of materials and in such a way to meet or exceed National Fire Prevention Association (NFPA) specifications?	Y N		
8. Are automatic sprinkling systems constructed in an acceptable manner and are they fully functional at the time of inspection?	Y N		
9. Is the storage room constructed such that openings to other rooms are separated by liquid-tight sills or ramps (four inch minimum) or the floor of the room constructed four inch lower than the surrounding floor with liquid-tight construction where the room walls meet the floor?	Y N		
10. If not lowered, silled, or ramped, is the storage room constructed with an open-grate trench inside of the room which drains to a safe location?	Y N		
11. Where other portions of the building or properties are exposed, is the room constructed with protected windows and self-closing fire doors in accordance with NFPA?	Y N		
- If YES to Questions 7 - 11 ENTER STATUS "S".	☐		
- If NO to any of Questions 7 - 11, ENTER STATUS "U" and note deficiencies.			

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS																				
<u>29 CFR 1910.106(4)(ii): Inside Storage Room Rating and Capacity</u>																							
12. Are the flammable and combustible materials which are stored in inside rooms, within the allowable quantities in gallons per square foot of storage area as prescribed below?	Y	N																					
<table border="1"> <thead> <tr> <th>Fire Protection Provided</th> <th>Fire Resistance</th> <th>Maximum Size</th> <th>Total Allowable Quantities (gals/eq.ft./floor area)</th> </tr> </thead> <tbody> <tr> <td>Yes</td> <td>2 hours</td> <td>500 sq/ft</td> <td>10</td> </tr> <tr> <td>No</td> <td>2 hours</td> <td>500 "</td> <td>5</td> </tr> <tr> <td>Yes</td> <td>1 hour</td> <td>150 "</td> <td>4</td> </tr> <tr> <td>No</td> <td>1 hour</td> <td>150 "</td> <td>2</td> </tr> </tbody> </table> Note: Table H-13 above from Storage in Inside Rooms - 29 CFR 1910.106(4)(ii).	Fire Protection Provided	Fire Resistance	Maximum Size	Total Allowable Quantities (gals/eq.ft./floor area)	Yes	2 hours	500 sq/ft	10	No	2 hours	500 "	5	Yes	1 hour	150 "	4	No	1 hour	150 "	2			
Fire Protection Provided	Fire Resistance	Maximum Size	Total Allowable Quantities (gals/eq.ft./floor area)																				
Yes	2 hours	500 sq/ft	10																				
No	2 hours	500 "	5																				
Yes	1 hour	150 "	4																				
No	1 hour	150 "	2																				
<u>29 CFR 1910.106(4)(iii): Wiring</u>																							
13. Is the room wired and supplied with electrical equipment pursuant to NFPA specifications for classes of stored liquids?	Y	N																					
<u>29 CFR 1910.106(4)(iv): Ventilation</u>																							
14. Is the room equipped with a mechanical or gravity exhaust system which provides a complete change of air within the room at least six times per hour?	Y	N																					
15. If a mechanical system is used, is the lighting and ventilation equipment operated by the same switch which is located outside of the door to the room?	Y	N																					
16. When the room is ventilated via a gravity system, are both the fresh air intake and exhaust outlets located outside of the building?	Y	N																					
<u>29 CFR 1910.106(4)(v): Room Configuration and Use</u>																							
17. Does the storage room have at least one totally clear aisle at least three feet wide?	Y	N																					

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
18. Are containers of 30-gallon capacity or larger stored such that they are not stacked upon each other?	Y N		
19. Is all dispensing of flammable or combustible liquids by means of an approved pump or by self-closing faucet?	Y N		
<u>29 CFR 1910.106(5)(i): Egress</u>			
20. Are containers stored so as not to limit the use of exits, stairways, or areas normally used for the safe egress of personnel?	Y N		
21. If flammable or combustible liquids are stored in indoor tanks, is the tank constructed, located, vented, and operated in accordance with provisions of this section?	Y N		
- If YES to Questions 12 - 21, ENTER STATUS "S".			
- If NO to any of Questions 12 - 21, ENTER STATUS "U" and note problems.			
<u>29 CFR 1910.106(e)(9): General Housekeeping and Best Management Practices</u>			
22. Are maintenance and operating procedures established at the facility to control leakage and to prevent the accidental escape of flammable or combustible liquids?	Y N		
23. Are all spills cleaned up immediately?	Y N		
24. Is the proper absorbent material and other spill-handling equipment easily accessible and known to personnel?	Y N		
25. Are all containers neatly stored, regularly inspected for condition, and clearly labeled with the names of the liquid contents?	Y N		
26. Is aisle access maintained in work and process areas to allow for the unobstructed movement of personnel and fire protection equipment?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
27. Are wastes and residues kept to a minimum volume, stored in closed metal containers, and removed daily from work and process areas?	Y N		
28. Are the facility ground areas around buildings, tank storage, and outdoor container storage locations kept clear of tall weeds, dry grasses, trash, and combustible materials?	Y N		
29. Are facility water supply systems checked regularly to ensure enough pressure is supplied to utilize fire hoses, foam producing equipment, water spray systems, eye washes, safety showers, spray systems, etc.?	Y N		
- If YES to Questions 22 - 29, ENTER STATUS "S".			
- If NO to any of Questions 22 - 29, ENTER STATUS "U" and note the area of and the personnel responsible for deficiencies.			
<u>29 CFR 1910.106(5)(ii): Containers</u>			
30. Are leaking containers removed from the room or work area and taken to a safe location outside the building where the contents can be transferred to an undamaged container?	Y N		
31. Are flammable or combustible liquids transferred and stored only into DOT-approved metal containers?	Y N		
<u>29 CFR 1910.106(5)(vi): Indoor Container Storage in Piles</u>			
32. Are flammable and combustible liquids stored in piles inside building area in accordance with volume restrictions presented in Tables H-14 and H-15 of this section?	Y N		
- If YES to Questions 30 - 32, ENTER STATUS "S".			
- If NO to any of Questions 30 - 32, ENTER STATUS "U" and note problems.			

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
<u>29 CFR 1910.106(5)(vi): Flammable/Combustible Liquid Storage in Warehouses or Storage Buildings</u>			
33. If within 50 feet of a property which may be built upon, is the exposing wall blank and does it have a fire-resistance rating of at least 2 hours?	Y N		
34. Are containers which are in piles separated where necessary to provide stability and prevent excess strain on containers?	Y N		
35. Are container piles arranged such that containers are at least three feet away from the nearest beam, girder, or sprinkler system deflector?	Y N		
36. Are aisles at least three feet wide in warehouses and in storage buildings where flammable or combustible liquids are stored?	Y N		
- If YES to Questions 33 - 36, ENTER STATUS "S".			
- If NO to any of Questions 33 - 36, ENTER STATUS "U" and note nature and location of deficiency.			
<u>29 CFR 1910.106(d)(6)(i): Outside Building Storage</u>			
37. When flammable or combustible containers and portable storage tanks are in outside buildings, are they stored in accordance with the distance-to-property-line and maximum gallonage requirements set forth in Tables H-16 and H-17 of this section?	Y N		
<u>29 CFR 1910.106(d)(6)(iii): Spill Containment and Security</u>			
38. Is the storage area graded in a manner to divert spills away from buildings or other structures?	Y N		
39. Is the storage area surrounded by curbs at least six inches high?	Y N		
40. Is the curb system designed such that areas may be drained of ground or rain water or in the event of a spill?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
41. Do drains terminate in safe areas which are easily accessible under fire conditions?	Y N		
42. Is the storage area protected against tampering or trespassers and is the area kept free of weeds, debris, and other unnecessary material?	Y N		
- If YES to Questions 37 - 42, ENTER STATUS "S".			
- If NO to any of Questions 37 - 42, ENTER STATUS "U" and note deficiencies.			
<u>29 CFR 1910.106(7)(i)(a & b): Fire Control</u>			
43. Is there at least one portable fire extinguisher of not less than 12-B unit capacity located outside of but not more than 10 feet from the door opening for inside flammable/combustible liquid storage rooms?	Y N		
44. Is there at least one 12-B unit capacity extinguisher located not less than 10 feet away from but not more than 25 feet away from Class I or Class II liquid storage areas outside of a storage room but inside a building?	Y N		
<u>29 CFR 1910.106(7)(ii): Sprinklers</u>			
45. Are sprinklers within the facility constructed in accordance with requirements set forth in 29 CFR 1910.159?	Y N		
<u>29 CFR 1910.106(7)(iii): Open Flames</u>			
46. Does the facility strictly enforce no-smoking and no-use-of-open-flames rules near and in flammable/combustible liquid storage areas?	Y N		
- If YES to Questions 43 - 46, ENTER STATUS "S".			
- If NO to any of Questions 43 - 46, ENTER STATUS "U" and note exact location and nature of deficiency.			

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
<u>Compressed Gases</u>			
<u>29 CFR 1910.101, 1910.252: General Requirements for Compressed Gases, Use of Compressed Gases and Good Management Practices</u>			
47. When cylinders are stored outside in sheds, are the buildings built above grade and made of noncombustible materials?	Y	N	
48. Are the gas cylinder storage sheds located at least 50 feet from the nearest building and away from where personnel congregate?	Y	N	
49. Are cylinders always stored with valves closed and protective caps in place?	Y	N	
50. Are cylinders stored far away from ignition and heat sources, in a ventilated area which receives six volumes of air exchange per hour?	Y	N	
51. Are cylinders stored out of areas which receive ground or surface water accumulations?	Y	N	
52. Do all cylinders and other tanks used meet DOT specifications and are they inspected regularly for their condition?	Y	N	
53. When materials are stored inside, is the building constructed such that storage rooms are vented by gravity or mechanically to provide six volumes of air exchange per hour?	Y	N	
54. Is the storage room unheated with at least one wall being an outside wall?	Y	N	
55. Is the storage room area one story in height?	Y	N	
56. Are cylinders stored such that separate rooms are used to store flammable gases apart from gases which can support combustion?	Y	N	
57. Are general bulk storage of gases and piping system construction, design, and delivery specifications set forth in 29 CFR 1910 complied with?	Y	N	

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
<u>Water Reactive Materials</u>			
<u>29 CFR 1910.106(7)(iv): Water Reactive Materials</u>			
65. Do facility response personnel know where and what quantities of water-reactive chemicals are stored?	Y	N	
66. Do facility personnel inspect water-reactive chemical containers to guard against water or moisture contact?	Y	N	
67. Are water-reactive chemicals segregated, stored in a dry area, and kept elevated from floor level in the event of water accumulation?	Y	N	
68. Are emergency personnel trained on how to fight a fire in a situation where water-reactive chemicals may be involved?	Y	N	
<u>Contingency and Response Planning</u>			
<u>40 CFR 300.1 through 300.86: Superfund, Emergency Planning and Community Right-To-Know Program</u>			
69. When required, has the facility manager developed a written release contingency and emergency plan for the facility?	Y	N	
70. Are phone numbers for Federal, State, local and facility response personnel posted such that they may be viewed at a location near each hazardous materials storage areas?	Y	N	
71. Is there a phone, alarm, or radio-telephone system in the proximity of the facility to allow for quick incident reporting?	Y	N	
72. In the event of a major incident are facility personnel instructed as to how to handle the spill, release, fire, etc.?	Y	N	
73. At larger facilities, has a comprehensive response plan been developed which satisfies the requirements and needs for Federal, State, local and facility response personnel?	Y	N	

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
74. Is there available a facility map which can be supplied to emergency response personnel, and that shows the locations of hazardous materials storage areas, water supply lines, gas lines, access routes, electrical lines, etc.?	Y N		
75. Is a map available which indicates the route, distance, etc., to the nearest emergency medical facility?	Y N		
76. Has a plan been developed to activate a communications network with the government, the media, and the community during facility incidents?	Y N		
- If YES to Questions 69 - 76, ENTER STATUS "S".	☐		
- If NO to any of Questions 69 - 76, ENTER STATUS "U" and note deficiencies.			
This checklist is complete.			

SECTION 13

MANAGEMENT CONTROLS

1.0 INTRODUCTION

This protocol addresses management practices at Department of Energy facilities that aid in compliance with environmental laws and DOE Orders. Although no specific regulations are referenced throughout this protocol, compliance with the management practices identified provides the framework through which compliance with other specific regulations can be achieved. Many DOE Orders exist which fall under the category of management controls. These orders are referenced throughout the protocol. The identification of deficiencies in the area of management controls can be very useful when combined with other regulatory-specific checklists to identify management trends of a positive and negative nature which can assist in developing and implementing corrective actions.

1.1 IDENTIFYING ENVIRONMENTAL MANAGEMENT TRENDS

The intent of these Management Control (MC) checklists are for the audit team to ascertain the direction and implementation of the facility's environmental protection program. Aspects such as the qualifications of environmental and technical personnel; annual resources allocated to environmental programs; personnel knowledge of communication procedures and reporting requirements; and top and middle management interest in the program can be evaluated through discussions with specific discipline (media) audit specialists.

Each auditor evaluating his/her area of responsibility will be able to summarize the facility management's compliance with the various Federal, State, and DOE requirements pursuant to that particular area of interest. These should be reviewed in a general sense by the MC auditor to identify the overall trend of the top and middle-line management officials (whether DOE-in house or contractor firms) in their efforts to properly address operational/procedural problems which may impact the ambient environment.

After review of each summary from the specific environmental specialists, the MC auditor will be able to obtain overall findings from all the specific evaluations, which can lead to solutions to address these short-comings within the facility/operations office (OPS) management structure.

1.2 EVALUATION EXAMPLE

The goal is to identify the overall trend of management efforts across the disciplines in areas such as:

- o Management support to each specific environmental concern.
- o Proper staffing to conduct the specific oversight necessary for each concern.
- o Personnel knowledge of whom to report to with findings, problems and during incidents.
- o Other management concepts discussed in Section 3.0.

Examples of how the management controls checklists may be used are discussed below.

In the first situation, the MC auditor discusses the facility personnel's conduct in performing sample monitoring for each of their media disciplines under their purview. It is noted that the stack sampling program (for Clean Air Act compliance) is substandard due to a lack of operable state-of-the-art collection equipment and a lack of properly trained personnel with ambient air regulatory expertise. However, all other media-specific monitoring programs are conducted properly in accordance with EPA, NRC, State and DOE requirements.

The findings here would be an isolated case of a particular manager's office's possible poor judgment in the proper implementation of these procedures. A meeting with the responsible line-management official would probably be enough to remind him/her of that office's responsibility and the necessity in conducting a quality air surveillance program. In summary, this is an isolated problem and not an indication of the facility operations as a whole.

In the second situation, the MC auditor is told by most of the specific auditors that they have identified a lack of properly trained monitoring personnel and less than adequate equipment to conduct the periodic sampling required. This situation is much more grave than the first situation and shows a lack of interest or too low of a level of concern on the part of middle and probably top management at the facility or OPS. Discussions with these managers to correct this poor management trend will be much more comprehensive in scope.

In another example, the auditor inspects the facility's four buildings which contain PCB transformers. In each building one or more units are leaking with no spill control/cleanup efforts apparent. This is a general management trend substandard finding. If only one building contained leaking units, this could just be a temporary personnel communication problem. When leaks are found in several different buildings then a larger management problem is apparent and a higher level of effort is needed to rectify the site-wide non-compliant situations.

1.3 AUDITOR COMMUNICATION WITH TEAM MEMBERS

It is therefore important that each media-specific audit specialist be cognizant of these management trend concepts so during their inspection/audit duties, "recurring" substandard procedures or situations involving items such as management support or resource allocations can be "flagged" and discussed with the MC auditor. Then these various management-related findings can be summarized to get a better picture of management's interest and support of the Agency's Environmental Protection Program.

2.0 KEY DEFINITIONS

The following definitions are based on those found in DOE Orders:

Contractor includes any DOE prime contractor or subcontractor subject to the contractual provisions of DOE PR-50.704.2(a), 48 CFR 923.70, 48 CFR 970.23 or specific negotiated contract provisions indicating DOE's decision to enforce environmental protection, safety, and health protection requirements.

Coordination Process is the means by which significant environmental compliance issues will be resolved or disseminated to ensure timely development and consistent application of Departmental environmental policy and guidance.

Criteria are rules or tests against which the quality of performance can be measured. They are most effective when expressed quantitatively. Fundamental criteria are contained in policies and objectives, as well as codes, standards, regulations, and recognized professional practices that DOE and DOE contractors are required to observe.

DOE Operations are those DOE managed, directed, or funded activities for which the Department has responsibility for Environment, Safety and Health (ES&H).

DOE Representative is an employee approved by the DOE Designating Official: (1) to work on standards committee assignments by reason of individual professional or technical expertise to further technical programmatic objectives of the Department or (2) to serve as an official spokesperson for the Department on boards of directors governing as policy-developing bodies, including, for example, management boards of standards developing organizations.

Environment, Safety, and Health (ES&H) Program encompasses those DOE requirements, activities, and functions in the conduct of all DOE and DOE-controlled operations that are concerned with: controlling air, water, and soil pollution; limiting the risks to the well being of both operating personnel and the general public to acceptable low levels; and protecting property adequately against accidental loss and damage. Typical activities and functions related to this program include, but are not limited to, the following: environmental protection, occupational safety, fire protection, industrial hygiene, health physics, occupational medicine, process and facilities safety, nuclear safety, emergency preparedness, quality assurance, and radioactive and hazardous waste management.

Environmental Occurrence is any sudden or sustained deviation from a regulated or planned performance at a DOE operations that has environmental protection and compliance significance.

Environmental Survey is a documented, multidiscipline assessment (with sampling and analysis) of a facility to determine environmental conditions and to identify environmental problem areas of environmental risk requiring corrective action.

Environmental Audit is a documented assessment of a facility to monitor the progress of necessary corrective actions, to assure compliance with environmental laws and regulations, and to evaluate field organization practices and procedures.

Environmental Protection Standard is a specified set of rules or conditions concerned with: delineation of procedures; definition of terms; specification of performance, design, or operations; or measurements that define the quantity of emissions, discharges, or releases to the environment and the quality of the environment.

Exception is an interim release from a DOE-prescribed OSHA standard, granted after a request for a temporary or permanent variance. Exceptions shall not exceed 180 days and are not renewable.

Facility refers to equipment, systems, buildings, utilities, services, and related activities whose use is directed to a common purpose at a single location. Examples include accelerators, storage areas, test loops, nuclear reactors, coal conversion plants, magnetohydrodynamics (MHD) experiments, windmills, radioactive waste disposal systems and burial grounds, testing laboratories, research laboratories, and accommodations for analytical examinations of irradiated and unirradiated components.

Field Organization is a Departmental Element located outside the Washington, D.C. geographical area. It is the first line DOE field element that carries the organizational responsibility for (1) managing and executing assigned programs, (2) directing contractors who conduct the programs, and (3) assuring that environment, safety, and health are integral parts of each program.

Finding is a statement of fact concerning a condition in the ES&H program that was investigated during an appraisal. It may be a simple statement of proficiency, or a description of a deficiency (i.e., a variance from procedures or criteria). Both severity and potential consequences should be addressed in describing a deficient condition.

Finding of No Significant Impact refers to a document prepared to record a Departmental decision that the environmental impacts are not significant and that an environmental impact statement is not required for a proposed action.

Functional Appraisal is a documented review of an ES&H specialty discipline performed in accordance with written guidance and criteria to verify, by examination and evaluation of objective evidence at the facility and/or operation, that applicable elements of the program have been developed, documented, and effectively implemented in accordance with specific ES&H requirements and needs.

Generic Significance are those unusual occurrences which by their nature are capable of occurring at more than one specific DOE facility, location, or site.

Government Standards are Federal agency standards and specifications including proposed or recommended standards developed by Federal agency personnel, outside groups under agency regulations, or by organizations or committees made up solely of Government agency representatives.

Government-Owned Contractor-Operated Facility is a facility owned or leased by DOE or a contractor for the account of DOE in connection with which DOE prescribes and enforces through contractual provisions, occupational safety and health standards pursuant to the authority in the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974, and the Department of Energy Organization Act of 1977, for contractor employees working therein. A listing of these GOCO facilities is maintained by the Office of Operational Safety (EP-32).

Heads of Field Operations (HFO) are defined as the top management officials of the OPS offices and other applicable field organizations. They are the senior officials who manage the day-to-day operations of DOE's facilities under their jurisdiction.

Implementation Plan is a written plan that records the results of the scoping process and outlines the procedures by which an environmental impact statement is to be prepared. The implementation plan should be prepared in accordance with the Department's guidelines (45 FR 20694), paragraph A4(E).

Interagency Committee on Standards Policy is a committee established under the auspices of the Department of Commerce to coordinate and provide policy guidance to the heads of Federal agencies on standards. It is comprised of representatives from the major Federal departments and agencies which have an interest in standards. The Committee is chaired by the Deputy Assistant Secretary for Product Standards, Office of the Assistant Secretary for Productivity, Technology and Innovation, U.S. Department of Commerce.

Internal Appraisal an examination and evaluation by the operating level (either Federal or contractor) of those portions of its internal ES&H program, program plan implementation, and operations retained under its direct control.

Line Organization is that unbroken chain of command which extends from the Secretary through the Under Secretary, to the Program Senior Officials (PSO) who set program policy and plans and develop assigned programs, to the field organization managers who are responsible to the PSO for execution of these programs, and to the contractors who conduct the programs. Environment, safety, and health are integral parts of each program. Accordingly, line management responsibility for ES&H functions flows from the secretary through the Under Secretary, to the PSO, to the field organization managers, to the contractors.

Line Organization includes the Program Secretarial Officer, the program office, and the field organization responsible for the management of a given DOE operation.

Management Appraisal is a documented determination of managerial effectiveness in establishing and implementing ES&H program plans which conform to DOE policy requirements. It is based on an analysis of functional appraisals, internal appraisals, and other information, and on the application of appropriate criteria. The appraisal is a review and evaluation of management responsibilities to assure proper program balance.

Mandatory Standards are those standards of this Order adopted by DOE that define the minimum requirements that DOE and its contractors must comply with to the extent they apply to the activities being conducted.

Operating Level is the organization performing the actual work or job related tasks. It may be a contractor performing work for DOE or it may be a particular DOE element, such as an energy technology center or a power administration.

Operations are those activities funded by DOE for which DOE has responsibility for environmental protection, safety, and health protection.

Operator is an individual designated by management to perform operations or conduct activities with radioactive materials at a nuclear facility.

Permanent Exemption is a release from a mandatory standard of a specific order. Such exemptions are not time-specified.

Program Office is a Headquarters organization which is responsible for assisting and supporting field organizations in safety and health, administrative, management, and technical areas, and reports to the cognizant Program Secretarial Officer.

Program Significant or Programmatic Significance refers to factors that relate to cost, delay, efficiency, maintainability, performance, reliability, and safety as developed by the Program Senior Officials.

Program Senior Officials include: the Assistant Secretaries for Conservation and Renewable Energy (CE-1), Fossil Energy (FE-1), Defense Programs (DP-1), Nuclear Energy (NE-1), the Director of Energy Research (ER-1), the Director of Civilian Radioactive Waste Management, (RW-1), the Administrator of Bonneville Power Administration ; and the Administrator of Western Area Power Administration.

Program Secretarial Officer (PSO). Outlay program managers which include: the Assistant Secretaries for Conservation and Renewable Energy; Fossil Energy; Nuclear Energy; Policy, Safety, and Environment; Defense Programs; and the Directors of Energy Research and Civilian Radioactive Waste Management. For purposes of this Environmental Audit Program, this definition also includes the Administrators of the Bonneville Power and Western Area Power Administrations.

Program or Regulatory Organization is an organization (Assistant Secretary, Administrator, or Director level) responsible for the decision making and implementation of the Department's programmatic or regulatory action requiring a National Environmental Policy Act review.

Record of Decision is a concise public record of the Department's decision on a proposed action for which an environmental impact statement was prepared which includes the alternatives considered, the environmentally preferable alternative, factors balanced in the decision, and mitigation measures and monitoring to minimize harm.

Reference Standards are those guides or standards of this Order adopted by DOE that DOE and its contractors should consider for guidance, as applicable, in addition to the mandatory standards.

Risk is a quantitative or qualitative expression of possible loss which considers both the probability that a hazard will cause harm and the consequences of that event.

Second Line Organization Level is the DOE element that is contractually or organizationally responsible for the work or job tasks being performed by an operating level. It may be an operations office, or an Assistant Secretary directly responsible for an energy technology center or a power administration.

Significant Environmental Compliance Issue is a significant environmental compliance issue is one which is or has the potential of being precedent setting or controversial, and/or involves Headquarters notification, concurrence, or approval.

Standard is defined as a prescribed set of rules, conditions, or requirements, concerned with classification of components; delineation of procedures; specifications of materials, performance, design, or operations; the definition of terms or measurements of quality and quantity in describing materials, products, systems, services or practices.

Standards-developing Groups may consist of Committees, subcommittees, boards or other principal subdivisions of voluntary standards bodies, established by such bodies for the purpose of developing, revising, or reviewing standards, and which are bound by the procedures of those bodies.

Supervisor is an individual officially designated by management to direct the activities of operators or fissionable materials handlers and to supervise the operation of equipment that handles, produces, processes, stores, packages, or uses radioactive material or significant quantities of fissionable materials.

Technical Expert is defined as a technically trained individual with professional experience in personnel radiation dosimetry (programmatic or research) for a minimum of 5 years who may serve as a site assessor or as a member of the Oversight or Appeals Boards. Technical experts are nominated by Managers of Operations Offices and selected by the DOE Laboratory Accreditation Program Administrator.

Temporary Exemption is a short-term release from a mandatory standard of specific orders. Such exemptions shall not exceed 1 year, except that in unusual cases a renewal may be granted, not to exceed an additional year.

Undue Risk is a level of identifiable risk which is unacceptable to DOE.

Unusual Occurrence is defined as any unusual or unplanned event having programmatic significance such that it adversely affects or potentially affects the performance, reliability, or safety of a facility.

Unusual Occurrence Report (UOR) provides a written evaluation of an unusual occurrence that is prepared in sufficient detail to enable the reviewer to assess its significance, consequences, or implications and to determine the means of avoiding a recurrence with minimal additional inquiry.

User Agency is any Government agency or contractor thereof other than DOE who utilize facilities and equipment at DOE Government-owned, contractor-operated sites.

Voluntary Standards Bodies are nongovernmental bodies which are broadly based, multimembered, domestic and multinational organizations, industry associations, and professional or technical societies which develop, establish, or coordinate voluntary standards activities.

Voluntary Standards (commercial standards) are those standards that are established generally by private sector bodies and are available for use by any person or organization, private or governmental. Voluntary standards are also referred to as "industry standards" as well as "consensus standards" (standards developed under due process procedures) but do not include professional standards of personal conduct, private standards of individual firms, standards mandated by law, or standards of individual organizations for their internal use.

3.0 CHECKLIST DESCRIPTIONS

The Management Controls Checklist is divided into the following sections:

- o Management Support (MC-MS)
- o Organizational Structure (MC-OS)
- o Staffing (MC-S)
- o Training (MC-T)
- o Information Flow and Communications (MC-IFC)
- o Reporting (MC-R)
- o Tracking and Recordkeeping (MC-TR)

3.1 MANAGEMENT SUPPORT

Completing the management support checklist determines top management's commitment for the DOE environmental audit, appraisal and compliance programs. Top management is considered to be the Heads of Field Operations (HFO) for purposes of this checklist. The checklist attempts to determine if

the commitment by the Heads of Field Operations exists in the area of policy implementation, staffing, contractor support, communications, training, etc. DOE's compliance with its Environmental Protection program cannot be successful without strong support from the heads of field operations, its middle and line management, and the various contractors who carry out many of the day-to-day operations which fulfill DOE's program mission as legislated by Congress.

3.2 ORGANIZATIONAL STRUCTURE

The protocol for the organizational structure is designed to determine if a program exists to monitor environmental regulatory compliance. The checklist also raises questions regarding the availability of internal auditors to monitor the facility's operations and their independence from the operations they audit. The main purpose of the checklist is to determine that a program is established with proper organizational reporting and that mechanisms for quality control of the audits are in place.

3.3 STAFFING

The protocol for this section is designed to determine the availability of an Environmental Planning and Compliance Director properly located in the organization structure. Additionally, the adequacy of the environmental support staff, auditors and legal counsel is discussed in the protocol.

3.4 INFORMATION FLOW AND COMMUNICATIONS

Communications is an integral part of any environmental compliance program. This protocol attempts to determine if a lack of communication exists and specifically where. Questions dealing with public release of information and general reporting requirements are also present in the protocol. The availability on-site of environmental regulations, guidance and policy is also addressed in this checklist.

3.5 TRAINING

The training protocol is designed to determine the resources that are invested in developing the staff. Questions regarding the initial qualifications and ongoing training of environmental staff are raised. Questions are also raised regarding the training opportunities afforded to program staff in the areas of environmental compliance. Regulations and guidance change on a regular basis. The ability to keep abreast of these changes requires a proactive position, not a passive approach.

3.6 REPORTING

Many of the DOE Orders require that management be notified of events that occur in the field. This protocol is a review of DOE Orders with a focus on those that require specific reports related to environmental issues. Since this protocol deals with DOE Orders, there are more situations in which a satisfactory or unsatisfactory status can be determined. Therefore, more status blocks exist in this protocol than in other management protocols since they are more conceptual and subjective in their evaluation of management success.

4.0 SUMMARY

An Environmental Compliance Audit program can only be successful if it is managed properly. A program without goals and strong leadership is destined for indifference. Regardless of the technical quality of specific checklists and the comprehensive nature of the overall effort, without proper management the program loses its effectiveness. DOE is faced with the difficult problem of managing an audit program which is to be applied to hundreds of facilities nationwide at a time when environmental regulations are plentiful and constantly evolving. The management of this program must also change to adapt to the current situation. This may mean that goals or policies change from time to time. Although the goals may change, establishing broad, affirmative goals while maintaining top management support for them is the only way to achieve desired results.

In addition to setting goals, DOE must have an organizational structure through which the program can operate. The structure will not be the same at every facility but must be adapted to fit specific requirements. Within an operating structure, qualified staff must be in place with specific assigned responsibilities. In addition to ensuring that the staff is technically qualified, training is an essential management technique to make the program successful. Introductory training to make new employees more productive in a short time is necessary along with periodic training to maintain skills and open communication in the ever changing environmental field.

One of the most common pitfalls in managing a program the size and complexity of that of the DOE is poor communications. Communications is necessary to disseminate the goals, policies, and methods for compliance with regulations. Problems with communications and information transfer can occur at any step along the chain-of-command. It is important to make all staff members aware of this potential problem in order to reduce the possibility that it will impact the success of their important national program.

Reporting to management on the audit results is necessary in order to identify problem areas and successes. If there is no way to record corrective actions and the reductions (over time) of the number of non-compliance situations, then there is no way to record or track the success of the program. DOE has an established reporting and tracking system that can be used for monitoring the results of the program. The system must be utilized for the purposes of tracking the environmental compliance program.

5.0 REFERENCES

- o EPA Procedures (Handbook of Procedures, Second Ed.), Construction Grants Program for Municipal Waste Water Treatment Works, 1986.
- o Urban Storm Water Management and Technology Update to Users Guide, Municipal Environmental Research Laboratory, Office of Research and Development, US EPA, Cincinnati, OH, 1982.
- o Guidelines for State and Area Wide Water Quality Management Program Development. US EPA, Washington, D.C., Nov. 1976.
- o Effectiveness of Soil and Water Conservation Practices for Pollution Control, US EPA, Environmental Research Lab, Oct., 1979.

- o **The Clean Water Act Showing Changes Made by the 1977 Amendments and the 1978 Amendments to Sections 104 and 311 Serial No. 96-1 US Govt. Printing Office, Washington, D.C. 1979 (Printed for the use of the Senate Committee in Environment and Public Works)**
- o **Guide to State Environmental Programs, Air and Water Pollution Control, Bureau of National Affairs, Washington, D.C., 1989.**

LIST OF MANAGEMENT CONTROLS CHECKLISTS

<u>Performance Checklist</u>	<u>Revision No.</u>	<u>Date</u>	<u>Checklist Title</u>
MC-MS	0	12/29/89	Management Support
MC-OS	0	12/29/89	Organizational Structure
MC-S	0	12/29/89	Staffing
MC-T	0	12/29/89	Training
MC-IFC	0	12/29/89	Information Flow and Communications
MC-R	0	12/29/89	Reporting
MC-TR	0	12/29/89	Tracking and Recordkeeping

MANAGEMENT CONTROLS - MANAGEMENT SUPPORT		(MC-MS, 1/2)	SITE ID: _____
AUDITOR(S): _____ _____	BLDG/AREA/UNIT(S): _____ _____	DATE: ____/____/____ ESO NO.: _____	
AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
1. Does evidence exist that management (i.e., Heads of Field Organizations) support the environmental audit appraisal and compliance programs?	Y N		
2. Are adequate resources available to conduct the program in areas of:			
a. Staffing?	Y N		
b. Contractor support?	Y N		
c. Training?	Y N		
Note: Refer to other Management Controls checklists for more detailed discussion about these functions.			
3. Do budget requests support the needs of the program?	Y N		
4. Have budget requests been consistently denied or substantially reduced in the past fiscal year?	Y N		
5. Does a policy statement developed and implemented by the facility exist defining explicit environmental appraisal program objectives and scope?	Y N		
6. Is the policy of the field organization consistent with the following DOE Policy (DOE 5482.1B):			
a. To assure the protection of the environment and the health and safety of the public?	Y N		
b. To provide safe and healthful workplaces and conditions of employment for all employees of DOE and DOE contractors?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
c. To protect Government property against accidental loss and damage?	Y N		
d. To assure compliance with applicable statutory requirements affecting Federal facilities and operations and where possible, consistent with the Department's mission and supported by an appropriate cost/benefit analysis, reduce identified environmental, safety and health risks, even though not mandated by specific requirements?	Y N		
e. To assure that quality assurance is pursued (i.e., that research, development, demonstration and production activities are performed in a controlled manner; that components, systems and processes are designed, developed, constructed, tested, operated and maintained according to industry accepted engineering standards, quality practices and Technical Specifications and Operational Safety Requirements; and that resulting technology data are valid and retrievable)?	Y N		
f. To require line management to be responsible for effective Environment, Safety and Health (ES&H) performance in their programs?	Y N		
- If YES to Questions 5 - 6 f, ENTER STATUS "S".	☐		
- If NO to any of Questions 5 - 6 f, ENTER STATUS "U".			
This checklist is complete.			

MANAGEMENT CONTROLS - ORGANIZATIONAL STRUCTURE

(MC-OS, 1/1)

SITE ID: _____

AUDITOR(S): _____

BLDG/AREA/UNIT(S): _____

DATE: ____/____/____

ESO NO.: _____

AUDIT QUESTIONS AND PROCEDURES		RESPONSE	REFERENCE	COMMENTS
1.	Does a program exist to ensure compliance with environmental regulations?	Y N		
2.	a. Are internal auditors available to monitor operations for environmental compliance?	Y N		
	b. Does a position description exist for the auditors?	Y N		
	c. Are these internal auditors independent of audited operations?	Y N		
	d. Do they have direct access through their supervisor to the heads of field organizations to resolve discrepancies regarding findings, corrective actions, and implementation schedules?	Y N		
3.	a. Does an organization chart exist?	Y N		
	b. Does the chart clearly depict individual responsibilities and chain of command?	Y N		
	c. Are all positions indicated on the organization chart filled?	Y N		
	d. Are position descriptions available for designated environmental positions?	Y N		
4.	Are internal mechanisms in place to ensure the quality control of the environmental auditing program? (See QA checklist.)	Y N		
This checklist is complete.				

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MANAGEMENT CONTROLS - STAFFING

(MC-S, 1/3)

SITE ID: _____

AUDITOR(S): _____
_____BLDG/AREA/UNIT(S): _____

DATE: ____/____/____

ESO NO.: _____

AUDIT QUESTIONS AND PROCEDURES		RESPONSE	REFERENCE	COMMENTS
1.	a. Does the overall organizational chart identify a Director who is responsible for environmental planning and compliance?	Y N		
	b. Does the Director report directly to the head of the field organization?	Y N		
	c. Does the Director have a working knowledge of facility operations?	Y N		
	d. Is the Director well-versed in environmental regulations related to the operations?	Y N		
	e. Does the Director devote most of his or her time to environmental affairs?	Y N		
2.	Are adequate environmental support staff available in the following areas:			
	a. Radiological?	Y N		
	b. Clean Air Act?	Y N		
	c. Clean Water Act?	Y N		
	d. RCRA?	Y N		
	e. CERCLA?	Y N		
	f. HMTA?	Y N		
	g. FIFRA?	Y N		
	h. TSCA?	Y N		

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AUDIT QUESTIONS AND PROCEDURES		RESPONSE	REFERENCE	COMMENTS
i.	SWDA?	Y N		
j.	Groundwater?	Y N		
k.	Cultural and Natural Resources?	Y N		
l.	Quality Assurance (QA)?	Y N		
Note: List supporting documentation under "Comments".				
3.	a. Are sufficient numbers of auditors available to conduct the environmental compliance program?	Y N		
	b. Do auditors have a working knowledge of site operations and environmental regulations?	Y N		
	c. Do the auditors know who to go to if they have questions?	Y N		
	d. Do auditors report to anyone other than the environmental staff (i.e., are they independent)?	Y N		
4.	a. Are all environmental staff fully aware of their specific roles and responsibilities?	Y N		
	b. Are staff positions described fully including minimum requirements?	Y N		
	c. Do staff qualifications meet minimum requirements?	Y N		
5.	Is legal counsel available for discussion of environmental regulations?	Y N		
6.	Do Staff know who to contact in case of an environmental release of pollutants?	Y N		

MANAGEMENT CONTROLS - STAFFING

(MC-S, 3/3)

SITE ID: _____

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
7. Are environmental staff familiar with the Unusual Occurrences Reporting System (DOE Order 5000.3)?	Y N		
8. Are environmental staff familiar with the requirements of DOE Order 5480.4 to notify DOE Officials about environmental incidents?	Y N		
This checklist is complete.			

MANAGEMENT CONTROLS - TRAINING

(MC-T, 1/2)

SITE ID: _____

AUDITOR(S): _____

BLDG/AREA/UNIT(S): _____

DATE: ____/____/____

ESO NO.: _____

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
1. Are minimum qualifications for environmental staff management and internal auditors established? List exceptions under "Comments". 2. Are new employees (auditors and other environmental staff) given initial training in their specific areas of responsibility? 3. Are environmental staff encouraged to attend seminars and instructional programs in their areas of expertise? 4. Are environmental staff encouraged to serve on committees that develop and evaluate Best Management Practices (DOE Order 1300.2)? 5. Are incentives provided for environmental staff qualifications to publish papers and give technical presentations? 6. Are records kept of environmental staff qualifications, training courses, seminars, publications, etc.? 7. Are operations staff provided training in the environmental aspects of their specific jobs? 8. a. Are operations staff aware of the resources available to them regarding environmental regulations compliance? b. Do operations staff know who to contact with questions about environmental compliance? c. Do they know who to contact in case of a contaminant release and appropriate reporting requirements (e.g., DOE Order 5000.3 guidelines)?	Y N Y N Y N Y N Y N Y N Y N Y N Y N Y N Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
d. Are they aware of the items that will be evaluated during an external audit?	Y N		
e. Are they aware of how to get corrective action recommendations into the DOE system (e.g., CATS and A-106 program) for budget requests and how to track the status of corrective actions?	Y N		
9. a. Are environmental staff members knowledgeable about the operations portion of the facility?	Y N		
b. Are they familiar with guidance documents, DOE orders, Federal and State regulations, and management controls?	Y N		
c. Are they knowledgeable of the mechanism to ensure that all guidance documents are updated as new orders and regulations are used?	Y N		
d. Are the environmental staff allowed time for periodic reviews of Standard Operation Procedures and Operations & Maintenance plans for the operations conducted as related to environmental protection against effluents, on-site discharges, or other similar concerns?	Y N		
This checklist is complete.			

MANAGEMENT CONTROLS - INFORMATION FLOW AND COMMUNICATIONS

(MC-IFC, 1/1)

SITE ID: _____

AUDITOR(S): _____

BLDG/AREA/UNIT(S): _____

DATE: ____/____/____

ESO NO.: _____

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
1. Does a good flow of communication exist among: a. Heads of Field Organizations and field environmental officials? b. Regulatory officials (EPA and State) and field environmental officials? c. Headquarters (EH-1) and field environmental staff? d. Other headquarters (EH-23, EH-24, EH-25, etc.) and field environmental officials? e. Field environmental staff and program staff? Note: In Comments, specify areas where an improvement in communications would result in a better operating program.	Y N Y N Y N Y N Y N		
2. Are copies of environmental regulations, guidance, and policies readily available for reference on-site?	Y N		
3. a. Does a Public Affairs Liaison exist?	Y N		
b. Does all information for release to the public go through this individual?	Y N		
c. Are facilities familiar with and in compliance with DOE Orders 5500.4 and 5500.5, "Public Affairs Policy" guidance?	Y N		
4. Are reports submitted in a timely and informative manner? (See MC-R checklist)	Y N		
5. Do operations and environmental officials know how to report environmental incidents and in what format? (See MC-OS and MC-R checklists)	Y N		
This checklist is complete.			

MANAGEMENT CONTROLS - REPORTING

(MC-R, 2/9)

SITE ID: _____

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
b. Is the biannual pollution abatement plans, per OMB Circular A-106, prepared and submitted to EH-1 by May 1 and December 15 of each year?	Y N		
c. Have budget requests been made for the five "out" years in the submission?	Y N		
- If YES to Question 6 a, b <u>and</u> c, ENTER STATUS "S".			
- If NO to Question 6 a, b <u>or</u> c, ENTER STATUS "U".			
7. Are there requests for exemptions to environmental regulations and DOE Orders and are these sent to EH-1 for concurrence?	Y N		
- If YES, proceed with checklist.			
- If NO, proceed to Question 8.			
a. Are they "temporary" exemptions?	Y N		
b. Are they "permanent" exemptions, which are requested per Chapter 1, No. 4 guidelines found 5400.1?	Y N		
- If YES, ENTER STATUS "S".			
- If NO, ENTER STATUS "U".			
- If there are no permanent requests, ENTER STATUS "NA".			
8. Does facility provide notifications and reports regarding environmental occurrences via the requirements of DOE Orders 5484.1, 5000.3, and 5500 Series (emergency management)?	Y N		
9. a. Has an "Annual Site Environmental Report" summarizing environmental occurrences been submitted to EH-1 by June 1 of each year (per Chapter II guidance)?	Y N		
b. Was this report developed to meet the following format requirements found in Attachment II-1 of this Order?	Y N		

MANAGEMENT CONTROLS - REPORTING

(MC-R, 3/9)

SITE ID: _____

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
- o Summary - o Compliance summary - o Environmental program information - o Environmental radiological program information - o Environmental non-rad program information - o Groundwater protection - o Quality assurance - o References			
- If YES to Questions 9 a <u>and</u> b, ENTER STATUS "S".	☐		
- If NO to Question 9 a <u>or</u> b, ENTER STATUS "U".			
10. Has the Radiological Effluent and On-site Discharge Data Report been submitted to EG&G Idaho, Inc., by April 1 for the previous calendar year?	Y	N	
a. Was the copy of the cover letter submitted to EH-1?	Y	N	
b. Did report include DOE for F 5821.1, Radioactive Effluent/On-site Discharge/Unplanned Releases?	Y	N	
- If YES to Questions 10, 10 a <u>and</u> b, ENTER STATUS "S".	☐		
- If NO to Question 10, 10 a <u>or</u> b, ENTER STATUS "U".			
11. Are data errors on F 5821.1 corrected using amended forms and submitted to the Information Systems Branch, EG&G Idaho, Inc.?	Y	N	

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MANAGEMENT CONTROLS - REPORTING

(MC-R, 4/9)

SITE ID: _____

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
12. Are Chapter III requirements, assignments, and responsibilities of managers known and implemented, regarding this Order?	Y N		
a. Has the environmental protection program implementation plan been sent to the PSO with the concurrence of EH-1, regarding its contents, by November 1989?	Y N		
b. Has the long-range environmental protection plan report been prepared and submitted to EH-1, PSO, and MA-1?	Y N		
- If YES to Questions 12, 12 a <u>and</u> b, ENTER STATUS "S".	☐		
- If NO to Question 12, 12 a <u>or</u> b, ENTER STATUS "U".			
13. Have the following special program planning requirements reports (submitted separately) been developed and updated every 3 years in accordance with Chapter III protocol and submitted to the PSO and EH-1 for:			
a. Ground water protection management?	Y N		
b. Waste minimization program?	Y N		
c. Pollution prevention awareness program?	Y N		
- If YES to Questions 13 a, b <u>and</u> c, ENTER STATUS "S".	☐		
- If NO to Question 13 a, b, <u>or</u> c, ENTER STATUS "U".			
<u>DOE Order 5480.4: Environmental Protection, Safety, and Health Protection Standards</u>			
14. Have requests for facility operation exemptions to applicable requirements been:			
a. Submitted to EH-1 and Program Secretarial Officers via this Order's Attachment 1 format for non-DOE Federal or State mandated statutes or implementing directives?	Y N		

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MANAGEMENT CONTROLS - REPORTING

(MC-R, 5/9)

SITE ID: _____

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
- If YES, ENTER STATUS "S". - If NO, ENTER STATUS "U". - If NOT APPLICABLE, ENTER STATUS "NA".			
b. Submitted to EH-1 and Program Secretarial Officers regarding mandatory standards as delineated in this Order's Attachment 2 procedures?	Y N		
- If YES, ENTER STATUS "S". - If NO, ENTER STATUS "U". - If NOT APPLICABLE, ENTER STATUS "NA".			
15. Has the field management exercised any field-level exemptions from mandatory standards as allowed by Attachment 2, No. 3c requirements?	Y N		
a. If YES to Question 15, was the field-level exemption rescinded with 180 days of the date EH-1 received request?	Y N		
- If YES, ENTER STATUS "S". - If NO, ENTER STATUS "U".			
16. Has field management submitted any requests for new standards or guidance regarding environmental issues? (State them in Comments.)	Y N		
<u>DOE Order 5482.1B: Environmental, Safety and Health Appraisal Program</u>			
17. Do heads of Field Organizations send management and functional appraisal reports to the appropriate PSO and to EH-1 for each facility at least once every 3 years as required by No. 8e(3) of the Order?	Y N		

MANAGEMENT CONTROLS - REPORTING

(MC-R, 6/9)

SITE ID: _____

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
- # YES, ENTER STATUS "S". - # NO, ENTER STATUS "U".			
18. Has an annual appraisal scheduled report denoting the management and functional appraisals planned for the following fiscal year been submitted to the cognizant PSO and EH-1 by August 1 of each year, as required by No. 8e(7) of the Order? - # YES, ENTER STATUS "S". - # NO, ENTER STATUS "U".	Y N 		
19. Has the field organization head submitted, in accordance with requirement No. 8e(8), a list of contractors (under their purview) and dates that they received management and functional appraisals, to the PSO and EH-1 by November 1 for the previous fiscal year? - # YES, ENTER STATUS "S". - # NO, ENTER STATUS "U".	Y N 		
20. Was the performed management appraisal submitted as a report with 45 days to the appraised organization?	Y N		
21. a. Did the appraised organization respond to this report within 30 days of receipt, stating corrective actions (if any) planned? b. Did the appraised organization provide quarterly updates on intended corrective actions until they are completed, to the appraising organization?	Y N Y N		
22. Was the performed technical function appraisal submitted as a report with 30 days to the appraised organization?	Y N		

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MANAGEMENT CONTROLS - REPORTING

(MC-R, 7/9)

SITE ID: _____

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
23. Did the appraised organization respond to this report within 30 days of receipt, stating corrective actions (if any) planned?	Y N		
a. Did the appraised organization provide quarterly updates on intended corrective actions until they are completed, to the appraising organization?	Y N		
24. Did the field organization respond within 30 days to the EH-24 environmental audit report, which must include a discussion of planned corrective actions with requisite scheduled dates?	Y N		
- If YES, ENTER STATUS "S".			
- If NO, ENTER STATUS "U".			
a. Are quarterly status reports discussing the implementation of corrective measures sent to EH-24 officials?	Y N		
<u>DOE Order 5484.1 Change 1.2, and 3: Environmental Protection, Safety, and Health Protection Information Reporting Requirements</u>			
25. Are the following effluent and environmental, monitoring reports as discussed in Change 2, No. 3c, submitted to appropriate offices (e.g., Information Systems Branch, EG&G Idaho, Inc.):			
a. Effluent monitoring data report per Chapter III guidelines?	Y N		
b. Radioactive Effluent and Onsite Discharge Data Reports, sent every April 1? (See Question 10 of this checklist.)	Y N		
c. Unplanned releases of radioactivity in effluent report form F 5821.1? (See Question 10 of this checklist.)	Y N		
- If YES to Questions 25 a, b <u>and</u> c, ENTER STATUS "S".			
- If NO to Question 25 a, b <u>or</u> c, ENTER STATUS "U".			

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MANAGEMENT CONTROLS - REPORTING

(MC-R, 8/9)

SITE ID: _____

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
26. Are environmental monitoring reports covering the previous year submitted annually, by May 1, to the Operational and Environmental Safety Division, program office and the DOE Technical Information Center in Attachment 5 format? Components include: - o Introduction - o Summary - o Monitoring data evaluations - o References - o Distribution	Y N		
27. Are environmental summaries reports covering the previous year submitted annually, by May 1, to the Operational and Environmental Safety Division in Attachment 6 format? Components include: - o Summary - o Body of text - o References - o Distribution - If YES or NOT APPLICABLE to Question 26 <u>or</u> 27, ENTER STATUS "S". - If NO to Questions 26 <u>and</u> 27, ENTER STATUS "U".	Y N 		
28. Have field investigation reports been submitted to the Office of Operational Safety (EH-34), the Inspector General (IG-1) and appropriate headquarters officials (in accordance with Change 3 of Order, No. 6e(4))?	Y N		

MANAGEMENT CONTROLS - REPORTING

(MC-R, 9/9)

SITE ID: _____

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
29. If facility has an exemption from environmental reporting requirements, did the facility field element lead or contact administrator submit an annual report, in accordance with page III-3, para. 4c of the Order, to the Director of Operational Safety? - If YES, ENTER STATUS "S". - If NO, ENTER STATUS "U". This checklist is complete.	Y N ☐		

MANAGEMENT CONTROLS - TRACKING AND RECORDKEEPING

(MC-TR, 1/7)

SITE ID: _____

AUDITOR(S): _____

BLDG/AREA/UNIT(S): _____

DATE: ____/____/____

ESO NO.: _____

AUDIT QUESTIONS AND PROCEDURES

RESPONSE

REFERENCE

COMMENTS

1. Does the facility enter into the following tracking systems information regarding identified environmental deficiencies requiring corrective measures:

a. DOE Computerized Automated Tracking System (CATS)?

Y N

b. Biannual submission pursuant to the Office of Management and Budget (OMB) Circular A-106 program? (Also see MC-R checklist for frequency of report submission.)

Y N

2. a. Is DOE's PC-based database, EH Corrective Action Project Plan, used to record information on nonroutine environmental corrective action projects?

Y N

b. Is this database updated semi-annually?

Y N

3. Are entries into the Environmental Corrective Action Project Plan (A-106 Program) properly coded and summarized with the following category information: (Check random entries for audited facility)

a. Project number?

Y N

b. Media designation and pollutant category?

Y N

c. Funding account?

Y N

d. Project contact?

Y N

e. Total cost estimate?

Y N

MANAGEMENT CONTROLS - TRACKING AND RECORDKEEPING

(MC-TR, 2/7)

SITE ID: _____

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
f. Progress code?	Y N		
g. Design plan completion date?	Y N		
h. Construction start date?	Y N		
i. Final compliance required (if applicable)?	Y N		
j. Year funding required?	Y N		
k. Dollars budgeted and dollars funded?	Y N		
4. Pursuant to the A-106 program, are entries placed in the right media designation for the concern addressed, per the following categories?	Y N		
o Air.			
o Water.			
o Noise.			
o Pesticides.			
o Radiation.			
o Drinking water.			
o Solid waste.			
o TSCA.			
o Ocean dumping.			
o CERCLA.			

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AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
o Mixed waste. - If YES overall, ENTER STATUS "S". - If NO overall, ENTER STATUS "U". 5. Pursuant to the A-106 program, are the three classes of compliance status used properly as designated for the degree of concern: (See Office of Management and Budget (OMB) A-106 Program guidebook for definitions of the following codes.) a. Class I (highest priority)? o CMPA o INOV o ESDP b. Class II (next priority)? o ESDF o PSDF c. Class III (miscellaneous)? o ESRO o ESRE o ESDL o OTHR - If YES overall, ENTER STATUS "S". - If NO overall, ENTER STATUS "U".	YN YN YN		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
6. Pursuant to the A-106 program submissions, are the three types of "Project Assessment Determination" properly used as designated for the degree of concern:			
a. High (a critical project with few if any alternatives to implement)?	Y N		
b. Medium (important project but not critical)?	Y N		
c. Low (a desirable project)?	Y N		
- If YES overall to 6 a, b <u>and</u> c, ENTER STATUS "S".			
- If NO overall to 6 a, b <u>or</u> c, ENTER STATUS "U".			
7. Pursuant to the A-106 program, are DOE and General Services Administration (GSA) facility designation codes properly entered into system?	Y N		
8. Do facilities have a DOE official designated as the point of contact for the A-106 Program?	Y N		
- If YES, ENTER STATUS "S".			
- If NO, ENTER STATUS "U".			
9. a. Does the facility A-106 Program contact person have available the latest submission of the biannual report?	Y N		
b. Has it been updated since the last submission? (Review previous submission)	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
10. Are past Environmental Surveys, Compliance and/or Audit Reports from the following sources available and referred to by facility environmental staff:			
a. Office of Environmental Audit (EH-24)?	Y N		
b. Office of Guidance and Compliance (EH-25)?	Y N		
c. NEPA Office?	Y N		
d. Operations Office?	Y N		
e. Facility/site level?	Y N		
11. Pursuant to Question 9, does a review of a cross-section of those reports indicate a trend by the facility that environmental noncompliance items are being reduced in quantity and severity?	Y N		
- If YES, ENTER STATUS "S".			
- If NO, ENTER STATUS "U".			
12. Is there one location for all environmental records, reports, permits, correspondence, consent agreements, NOVs, etc., so quick and/or comprehensive reviews and evaluations can be conducted as required? (BMP)	Y N		
13. Are these records accessible to an auditor and kept in an organized fashion for timely retrieval? (DOE Order 5400.3 and BMP)	Y N		
14. Are these records, reports, and correspondence kept up-to-date? (DOE Order 5400.3 and BMP)	Y N		
15. Is one individual, with an alternate, responsible for the proper maintenance of these records?	Y N		

MANAGEMENT CONTROLS - TRACKING AND RECORDKEEPING

(MC-TR, 6/7)

SITE ID: _____

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
16. Are policies and procedures in place for all DOE operations and its contractors to provide copies to this records maintenance official, as required by DOE Orders (including 5400.3)? - IF YES, ENTER STATUS "S". - IF NO, ENTER STATUS "U".	Y N ☐		
17. Are copies of these existing, in force, environmentally-related DOE Orders/Notices and published draft Orders, as listed, available for facility officials (in-house and contractors)? Note exceptions under Comments. a. 1300.2 b. 1540.2 c. 5000.3 d. 5400.1 e. 5400.2A f. 5400.3 g. 5400.4 h. 5400.1C i. 5400.1 - Chg. 1, 2 and 6 j. 5400.1B - Chg. 1 and 2 k. 5400.3 l. 5400.4 m. 5400.14	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
n. 5482.1B			
o. 5484.1 - Chg. 1, 2 and 3			
p. 5500.2A			
q. 5500.3			
r. 5500.4			
s. 5700.6B			
t. 5820.2A			
u. N 5480.xx			
v. 5400.xx			
w. 5400.xy			
18. Pursuant to DOE Order 5400.1, in addition to final reports and records, are the backup data such as calculations, computer programs and printouts, and other information (e.g., procedures) kept in records file?	Y N		
- If YES, ENTER STATUS "S".	☐		
- If NO, ENTER STATUS "U".			
This checklist is complete.			

SECTION 14

QUALITY ASSURANCE

1.0 OVERVIEW OF ENVIRONMENTAL PROGRAM REQUIREMENTS

In accordance with the Department of Energy Organization Act of 1977 and the Atomic Energy Act of 1954, as amended, which provide for the protection of the health and safety of the public and the environment in the conduct of the Department's programs, DOE Order 5400.1 establishes the general environmental protection program requirements, authorities, and responsibilities for Department of Energy (DOE) operations for assuring compliance with applicable Federal, State, and local environmental protection laws and regulations, executive orders, and internal department policies.

In accordance with DOE Order 5400.1, it is DOE policy to conduct its operations in an environmentally safe and sound manner. Protection of the environment and the public are responsibilities of paramount importance and concern to DOE. All DOE activities should recognize and reflect this concern and public trust. To that end, DOE is firmly committed to ensuring incorporation of national environmental protection goals in the formulation and implementation of DOE programs. It has an equal commitment to advance the goals of restoring and enhancing environmental quality, and ensuring public health. Accordingly, it is DOE policy to conduct the Department's operations in compliance with the letter and spirit of applicable environmental statutes, regulations, and standards. In addition, DOE is committed to good environmental management of all its programs and at all its facilities to correct existing environmental problems, to minimize risks to the environment or public health, and to anticipate and address potential environmental problems before they pose a threat to the quality of the environment or the public health and welfare. Finally, it is DOE's policy that efforts to meet environmental obligations be carried out consistently across all operations and among all field organizations and programs.

While responsibility for good environmental management is a Departmental one, environmental protection practices will, of necessity, be carried out at the levels and locations where many DOE activities are performed by its management and operating contractors. Thus, while the Department will continue to indemnify its management and operating contractors for fines, penalties, and other liabilities that are incurred pursuant to their contracts which are not the result of willful misconduct or lack of good faith, it is DOE policy that contractors share the Department's commitment to good environmental management. DOE expects its management and operating contractors to conduct their operations in an environmentally sound manner that limits the risks to the environment and protects the public health. DOE will actively oversee contractors' activities to assure compliance with this policy.

Environmental management activities of DOE are extensively, but not entirely, regulated by EPA, State, and local environmental agencies. Where these agencies clearly exercise environmental protection authority through permitting and compliance administrative procedures applicable to DOE, they establish and regulate required performance for environmental protection. DOE Order 5400.1 and other DOE environmental protection directives provide requirements for satisfying these externally imposed regulations. Additionally, these directives establish requirements for those environmental protection programs that are not externally regulated, but require internal management consistent with DOE Orders that provide specific, detailed requirements in selected areas of environmental protection.

In as much as this directive for the most part serves to implement legislatively mandated requirements, it is expected that activities, documentation, and special planning conducted to meet these legal requirements will be used to the maximum extent to satisfy requirements of this Order.

In recognition of the environmental significance of Departmental activities authorized by the Atomic Energy Act (AEA), DOE Order 5400.1 addresses and emphasizes requirements for radiation protection. It also is written to reflect the DOE organizational structure for operations that implement AEA activities. It is understood and expected that other DOE elements, e.g., power marketing administrations, will design and manage their environmental protection programs in such a manner so as to be equivalent to requirements contained in this Order and in compliance with applicable statutes and regulations.

In accordance with DOE 5400.1, each field organization should prepare a plan for implementing the requirements of the Order. An Implementation Plan should be prepared for each facility or group of facilities, the purpose of which is to provide management direction, including assignment of responsibilities and authorities, to ensure that all DOE facilities are operated and managed in a manner that will protect, maintain, and where necessary, restore environmental quality, minimize potential threats to the environment and the public health, and comply with environmental regulations and DOE policies. Specifically, the implementation plan should:

- o Provide environmental protection goals and objectives for the organization, and identify strategies and timetables for attaining them. Organization and staffing, including the assignment of responsibilities for environmental activities, policies, facility operating procedures, and budgeting, will be described.
- o Provide an overall framework for the design and implementation of an environmental protection program for each DOE facility.
- o Assign responsibilities for complying with requirements under all Federal, state, and local environmental laws and/or regulations for all DOE facilities.
- o The implementation plan should be updated annually.

DOE Order 5400.1 contains requirements and guidance for environmental monitoring programs concerned with: (1) measuring and monitoring effluents from DOE operations; and (2) surveillance through measurement monitoring, and calculation of the effects of those operations on the environment and public health. The objectives of the monitoring programs are to; demonstrate compliance with legal and regulatory requirements imposed by the applicable Federal, State and local agencies, confirm adherence to DOE environmental protection policies, and support environmental management decisions. A critical element of monitoring is quality assurance and verification. Each DOE facility is unique; therefore, the need and levels of effort for monitoring programs should be determined by the appropriate field organization on a case-by-case basis, consistent with regulatory requirements, DOE directives and the degree of environmental assurance that activities at the particular site require.

In accordance with DOE 5400.1, a written environmental monitoring plan should be prepared for each site, facility, or process that uses, generates, releases, or manages significant pollutants or hazardous materials. The plan should contain the rationale and design criteria for the monitoring program, extent and frequency of monitoring and measurements, procedures for laboratory analyses, quality assurance requirements, program implementation procedures, and direction for the preparation and disposition of reports. The plan should be approved by the appropriate Head of Field Organization, or his or her designee. The plan should be reviewed annually and updated as needed and the plan should identify and discuss two major activities: (a) effluent monitoring, and (b) environmental surveillance. It

should reflect the importance of monitoring as a critical element of an effective environmental protection program and should be reviewed annually and updated every 3 years.

Environmental monitoring should consist of two major activities: effluent monitoring and environmental surveillance. Selected references for environmental monitoring are listed in Attachment IV-1 of DOE Order 5400.1.

1.1 EFFLUENT MONITORING

The following activities and procedures are required to be implemented, as appropriate to each facility, by DOE Order 5400.1.

Effluent monitoring shall be conducted at all DOE sites to satisfy the following program objectives:

- o Verify compliance with applicable Federal, State, and local effluent regulations and DOE Orders.
- o Determine compliance with commitments made in Environmental Impact Statements, Environmental Assessments, or other official documents.
- o Evaluate the effectiveness of effluent treatment and control.
- o Identify potential environmental problems and evaluate the need for remedial actions or mitigation measures.
- o Support permit revision and/or reissuance.
- o Detect, characterize, and report unplanned releases.

Effluent monitoring shall comply with applicable regulations and should be conducted to provide representative measurements of the quantities and concentrations of pollutants in liquid and airborne discharges, and solid wastes.

- o **Monitoring Stations.** Effluents from on-site waste treatment or disposal systems shall be monitored in accordance with applicable regulations. Effluents to on-site waste treatment or disposal systems shall be monitored as needed.
- o **Sampling.** Sample collection programs shall reflect specific facility needs. Type and frequency of sampling shall be adequate to characterize effluent streams.
- o **Sample Analysis.** Standard analyses shall be used to analyze samples whenever such methods are required by regulatory programs. Exemptions due to analytical problems or for non-routine analyses may be employed after receiving approval from the appropriate regulatory agency. Analyses not required by regulations may be conducted as determined by site-specific conditions.
- o **Monitoring Data Recordkeeping.** Auditable records shall be established in accordance with the requirements of DOE 5700.6B.

1.2 ENVIRONMENTAL SURVEILLANCE

The following activities and procedures are required to be implemented, as appropriate to each facility, by DOE Order 5400.1.

Environmental surveillance shall be conducted to monitor the effects, if any, of DOE activities on on-site and offsite environmental and natural resources. An environmental surveillance screening program shall be undertaken at DOE sites to determine the need for a permanent surveillance program. Environmental surveillance shall be designed to satisfy one or more of the following program objectives:

- o Verify compliance with applicable environmental laws and regulations;
- o Verify compliance with environmental commitments made in Environmental Impact Statements, Environmental Assessments, Safety Analysis Reports, or other official DOE documents.
- o Characterize and define trends in the physical, chemical and biological condition of environmental media.
- o Establish baselines of environmental quality.
- o Provide a continuing assessment of pollution abatement programs.
- o Identify and quantify new or existing environmental quality problems.

Environmental surveillance programs and components shall be determined on a site-specific basis by the field organization. Programs should reflect facility characteristics, applicable regulations, hazard potential, quantities and concentrations of materials released, the extent and use of affected air, land, and water, and specific local public interest or concern.

Surveillance programs are likely to include one or more of the following:

- o Monitoring stations.
- o Sampling and analysis.
- o Monitoring data recordkeeping.

In addition to DOE 5700.6B, these procedures and requirements come from DOE field organization orders, contractor corporate QA programs and environmental legislation QA requirements.

DOE Field Organization Orders. The DOE field organizations (Operations Offices) have issued orders that establish QA policy and responsibility within the field organizations and establish requirements for QA programs for contractors. These requirements specify that QA Implementation Plans (as defined by DOE 5700.6B) be established and implemented for each project and program. These plans are specified as a document identifying the requirements which are selected from the overall QA program, and are also applicable to a particular program or project.

Contractor Corporate QA Programs. The system of DOE Orders (Headquarters and field organizations), as described above, specifies that contractors implement QA programs. DOE 5700.6B requires the preparation of QA implementation plans for assigned projects. Facility managers are to verify implementation of the QA program and plans through audits and appraisals. They are also to provide that QA requirements are incorporated into contracts, work orders, and purchase orders issued under their authority as DOE contractors. All contractors performing environmental and effluent monitoring are required to have QA programs in place that meet the general DOE QA requirements.

Environmental Legislation QA Requirements. Environmental legislation, such as the Safe Drinking Water Act, the Clean Air Act, the Federal Water Pollution Control Act (i.e., Clean Water Act), the Toxic Substances Control Act, the Federal Insecticide, Fungicide and Rodenticide Act, the Resource Conservation and Recovery Act, and the Comprehensive Environmental Response, Compensation, and Liability Act, (as amended by Superfund Amendments and Reauthorization Act), includes requirements for using EPA-approved procedures for monitoring. These monitoring procedures include sample-collection methods, sampling frequency, sample analysis, and data reporting. Monitoring to demonstrate compliance with these environmental laws incorporates the QA/QC requirements that are specified by the EPA.

2.0 ENVIRONMENTAL MONITORING STATUTORY REQUIREMENTS

As a group, these statutes require the Agency to prevent damage to human health and the environment caused by pollution. Some of these statutes, such as the Clean Water Act, the Clean Air Act and the Safe Drinking Water Act, focus on a particular aspect of the environment. Others, such as the Toxic Substances Control Act and the Federal Insecticide, Fungicide, and Rodenticide Act, are aimed at controlling particular types and classes of chemical pollutants. Still others, such as the Resource Conservation and Recovery Act, and the Comprehensive Environmental Response, Compensation, and Liability Act (Superfund), are concerned with ways to dispose of solid waste, and with uncontrolled hazardous waste sites. Each Public Law has distinctive requirements and strategies for protecting and improving environmental quality.

Like the Congressional mandates they implement, the EPA regulations and standards deal with a great variety of pollutants, activities, and regulated parties. But at the center of this diversity, there is a crucial element common to all regulatory data. The Agency must collect or have access to information and data in order to establish standards and regulations, to monitor compliance with standards and regulations, and to determine and report if the Congressional mandates are being achieved. Realizing the importance of information and data to major environmental decisions, EPA has established a policy that all data collection operations required or supported by the Agency must participate in a quality assurance (QA) program to ensure that the data collected are of documented and sufficient quality to satisfy the purpose(s) for which they were collected.

The regulatory requirements for the statutes listed above are specified in the document: Title 40, Code of Federal Regulations.

The following sections present a summary of the listed statutes.

2.1 CLEAN AIR ACT

The Clean Air Act provides a major role for EPA in the protection of air quality. QA procedures and requirements for air programs are defined in applicable regulations. Data quality and collection requirements are divided into ambient air quality, stationary sources, and mobile sources.

The ambient air quality program, defined in 40 CFR Part 51, contains the most specific and comprehensive QA requirements pursuant to the Clean Air Act. EPA sets National Ambient Air Quality Standards for pollutants that could adversely affect public health or welfare. Maintaining these standards is the role of the states, who must address QA requirements for sample collection and analysis in their State Implementation Plans (SIPs). Each SIP mandates that QA criteria be in place to govern the operation and monitoring of stationary sources of air pollution. Sample locations must be in accordance with siting guidelines, approved monitoring methods and reports to EPA on precision and accuracy.

QA procedures for stationary sources, covered in 40 CFR Part 61, are similar to ambient air quality requirements. EPA establishes National Emission Standards for Hazardous Air Pollutants and requires states to submit plans with descriptions of emission-reduction systems that can achieve the Agency's standards. The regulations include QA guidelines for the preparation of these plans.

2.1.1 40 CFR 50: National Ambient Air Quality Standards

Pursuant to Section 109 of the CAA, EPA promulgated National Ambient Air Quality Standards (NAAQS) for certain gaseous and solid pollutants that could adversely affect public health or welfare. The regulation set both primary and secondary air quality standards. Primary standards are those concentration levels of pollutants which the Administrator judges necessary, with an adequate margin of safety, to protect public health. Secondary standards are those levels of pollutants which the Administrator judges to have an adverse effect on the public welfare.

The NAAQS set primary and secondary standards for the following:

- PM - total suspended particulate matter
- PM₁₀ - suspended particulate matter with an effective aerodynamic diameter, 10µm
- CO - carbon monoxide
- O₃ - ozone
- SO_x - sulfur oxides as nitrogen dioxide
- HCs - hydrocarbons corrected for methane
- Pb - lead associated with suspended airborne particulate matter

Title 40 of the Code of Federal Regulations, Part 50, also has appended reference methods for monitoring these pollutants, along with guidance for the uniform interpretation of the NAAQS for ozone and airborne particulate matter (PM₁₀). The states may set air quality standards which are more stringent, but not less than, the NAAQS. Other methods demonstrated to be equivalent to the reference methods may be used to determine compliance with the ambient air quality standards.

2.1.2 40 CFR 53: Reference/Equivalent Methods

The NAAQS regulation stipulates the reference methods that are to be used to monitor compliance, or attainment of the standards. Methods that are demonstrated to be equivalent to the reference methods may also be used to monitor compliance. Part 53 describes procedures for testing performance of automated measurement methods; conducting comparability tests of candidate methods versus the reference method; and testing the performance of methods for measuring airborne particles with diameters of 10 micrometers or less (PM₁₀). The regulation also establishes format and procedures for data submittal, approval, and promulgation of the results.

2.1.3 40 CFR 61: National Emission Standards for Hazardous Air Pollutants (NESHAP)

Pursuant to Section 112 of the Clean Air Act, EPA, from time to time since 1975, has designated some chemicals as hazardous air pollutants and cited them in the Federal Register along with a notice that serious health effects, including cancer, could result from ambient air exposure to such substances. Part 61 establishes "National Emission Standards for Hazardous Air Pollutants (NESHAPs)" that include emission standards for radionuclides from designated facilities. This Part is applicable to existing as well as new construction or modification of any designated source. Section 112 directs the Administrator to delegate to each state, when appropriate, the authority to implement and enforce NESHAPs for stationary sources located in each state. The regulation specifies the monitoring requirements and data reporting/retention, along with information on the compliance status of the NESHAPs; test procedures for sampling; and analysis (some procedures are indicated by reference); and QA procedures for gas chromatographic analysis (some of the procedures have QA/QC protocols included).

2.2 WATER PROGRAMS

The Clean Water Act is intended to protect all navigable waters from discharges of pollution that make the waters unsuitable for fish and wildlife and for recreational purposes. The Safe Drinking Water Act directs the establishment of primary and secondary water quality standards for public drinking water systems to protect human health and welfare. As with air quality standards, primary water quality standards are to protect public health, and secondary standards are to protect human welfare or the economy.

2.2.1 40 CFR 122: National Pollutant Discharge Elimination System

Pursuant to the more obtainable objectives of the CWA, the National Pollutant Discharge Elimination System (NPDES) requires a legal permit for any private, public, or industrial discharge of pollution into navigable waters. The regulated requirements for the administration and operation of the system are contained in 40 CFR Part 122, which sets forth the administrative and operative requirements for the NPDES if it is operated by EPA. Those areas of Part 122 most important to understanding water quality data operations and QA include the following:

- o Permit conditions - standards and other conditions
- o Requirements for recording and reporting of monitoring results (DMR's)
- o Industrial categories - permit requirements
- o Storm sewers - special conditions
- o Permit application testing requirements by industrial category

Although the approved methods for monitoring compliance with NPDES permits are not found in 40 CFR Part 122, permit application testing requirements establish the basis for QA for reviewing data collection operations, measurement methods, and the QC employed. Part 122

prescribes testing by specific category, including GC/MS analysis of samples for volatiles, cyanides; and non-conventional pollutants (if suspected as present) such as asbestos, toxics, and hazardous substances. In addition, Part 122 covers special NPDES program requirements for control of pollution from activities such as aquaculture and silviculture, along with criteria for determining concentrated animal and aquatic feeding areas.

Although this information is helpful in understanding the many facets of the NPDES program, several requirements of 40 CFR Part 125 of more importance to QA appear in Subpart G, and Appendix A and B. Subpart G establishes criteria for modifying secondary treatment requirements under Section 301 (h) of the CWA. Among other requirements to protect the quality of receiving waters, Subpart G requires the establishment of a monitoring program to collect data sufficient to demonstrate attainment or maintenance of water quality that assures the protection of public water supplies; the protection and propagation of a balanced, indigenous population of fish, shellfish, and wildlife; and allowance of recreational activities. Applications for permits for any modified POTW's must include the questionnaire in Appendix A or B, which requires measurement data for physical, chemical, and biological parameters relevant to an appropriate water quality standard.

2.2.2 40 CFR 129: Standards for Extremely Toxic Pollutants

For certain extremely toxic pollutants, 40 CFR Part 129 establishes effluent standards and prohibitions that must be contained in any NPDES permit for specific or potential discharges of any of these designated toxic substances. Currently, these regulated toxic substances include: polychlorinated biphenyls (PCB's), toxaphene, endrin, aldrin/dieldrin, and other similar compounds and precursors. The QA significance of this Part is that it sets an environmental standard based on a measurable quantity, and designates an acceptable analytical method for demonstrating compliance.

2.2.3 40 CFR 130: Water Quality Management

Most of the environmental data operations associated with the CWA evolve from 40 CFR Part 130, which establishes policies and program requirements for the Water Quality Management (WQM) process described in the Act. This regulation "provides the authority for a consistent national approach for maintaining, improving, and protecting water quality, while allowing states to implement the most effective individual programs." The WQM process, implemented jointly by EPA and the states, has the following major components:

- o Water Quality Standards
- o Water Quality Monitoring
- o Water Quality Management Plans
- o Water Quality Reports

2.2.4 40 CFR 136: Test Procedures for the Analysis of Pollutants

At the center of all water surveillance and protection programs is 40 CFR Part 136, which lists those parameters and pollutants of concern in water quality for which measurement methods have been approved by EPA. The parameter, units of measurements, and method description are listed along with a citation for the source of the approved method(s). Test procedures and sample-handling techniques are approved by reference for the following:

- o Biologicals (bacteria)
- o Inorganics (and acidity, alkalinity, etc.)
- o Non-pesticide Organics
- o Pesticides
- o Radiologicals
- o Sample containers
- o Sample preservation
- o Sample holding times

Approved methods, as cited in 40 CFR Part 136, have been developed and standardized by EPA, the American Public Health Association, the American Society for Testing and Materials (ASTM), the U.S. Geological Survey (USGS), and several private organizations. The methods vary widely with respect to the level of QC incorporated in each method or procedure. In addition to the methods approved by reference, 40 CFR Part 136 contains the following detailed write-up of methods and procedures:

- o Methods for Organic Chemical Analysis of Municipal and Industrial Waste Water - 17 methods
- o Definition and Procedures for the Determination of the Method Detection Limit (MDL)
- o Inductively Coupled Plasma - Atomic Emission Spectrometric Method for Trace Analysis of Water and Waste Water

Only the methods approved by reference, or presented in writing, can be used for compliance monitoring. Applications for use of an alternate test procedure may be submitted to the appropriate EPA Regional Administrator for approval.

The written methods in 40 CFR Part 136 incorporate a minimum level of QC to document the precision and bias of any results. For example, each written method stipulates that "each laboratory that uses this method is required to operate a formal quality control program. The minimum requirement of this program consists of an initial demonstration of laboratory capability, and an ongoing analysis of spiked samples to evaluate and document data quality. The laboratory must maintain records to document the quality of the data that is generated." There are no specific QA guidelines or procedures in Part 136, but an important part of "good" QA is knowing what level of QC is needed to produce data of the desired or required quality.

2.2.5 40 CFR 402: Implementing Effluent Limitations

Part 402 sets forth the legal authorities for implementing effluent limitations, and stipulates that test procedures prescribed at Part 136 "should apply to effluent guidelines and standards of performance, and pretreatment standards as set forth in Parts 402 through 699." 40 CFR Part 403, "General Pretreatment Regulations for New and Existing Sources," covers some sampling methods and data reporting requirements of QA interest.

Although all testing is done in accordance with test procedures in 40 CFR Part 136, Part 403 describes sample collection procedures for a composite method of sampling and a grab method.

2.2.6 40 CFR 141: National Primary Drinking Water Regulations

Pursuant to Section 1412 of the Public Health Services Act, as amended by the SDWA, 40 CFR Part 141 - "National Primary Drinking Water Regulations" establishes a national program for the protection of public drink water that includes:

- o Maximum contaminant levels (MCL's) for pollutants
- o Monitoring and analytical requirements
- o Reporting, public notification, and recordkeeping
- o Special regulations including monitoring for organic chemicals, sodium, corrosivity and lead
- o MCL's for certain organic and inorganic chemicals
- o Revised drinking water regulations to include MCL's for fluoride

Of major interest to QA are the monitoring and analytical requirements promulgated at 40 CFR Part 141 to assure compliance with the MCL's.

2.2.7 40 CFR 143: National Secondary Drinking Water Regulations

Pursuant to Section 1412 of the SWDA, as amended, 40 CFR Part 143 - "National Secondary Drinking Water Regulations" controls contaminants in drinking water that primarily affect the aesthetic qualities of water related to public acceptance of drinking water, and have economic implications. The regulations are not Federally enforceable, but are intended to provide guidelines to the states.

The monitoring for these contaminants or parameters should be at about the same frequency and conditions as for the inorganic contaminants in the National Primary Drinking Water Regulations. Measurement methods are by reference to EPA methods and to Standard Methods for the analysis of waters and wastewaters, 14th edition. Some of the methods have QC incorporated, particularly the EPA methods.

2.3 FEDERAL INSECTICIDE, FUNGICIDE AND RODENTICIDE ACT

Chemical substances manufactured and marketed for use as insecticides, fungicides, or rodenticides are classified as pesticides. The FIFRA mandates the prevention of pollution and the protection of public health and the environment by establishing a product registration, labeling, and review process for all pesticides and pesticide devices produced and distributed for use in the United States. Pursuant to the Act, EPA developed and promulgated regulations under Title 40 of the Code of Federal Regulations for the prevention and control of pollution resulting from the production, distribution, and use of all chemicals and substances categorized as pesticides under the Act.

2.3.1 40 CFR 152-157: Pesticide Registration

The pesticide registration process, as mandated by the FIFRA, is implemented in 40 CFR Parts 152-157. The regulations set forth policies, procedures for the registration of pesticides/products, and data collection and reporting requirements. The regulations pursuant to the Act that have the greatest interest for QA are 40 CFR Parts 158-160.

2.3.2 40 CFR 158: Data Requirements

The data requirements for the registration of pesticides are at 40 CFR Part 158, including data acceptability and the availability of standardized technical guidelines to assist applicants. The primary purpose of Part 158 is to prescribe the minimum data and information required by the Agency to make regulatory judgments concerning the risks and benefits of chemicals, substances, and devices intended for use as pesticides.

2.3.3 40 CFR 160: Good Laboratory Practice Standards

To assure the quality and integrity of data generated and submitted pursuant to the FIFRA, 40 CFR Part 160 establishes Good Laboratory Practice Standards (GLPS) that must be followed in meeting the data requirements that were prescribed in Part 158. A key element of the GLPS is the establishment of an independent QA unit.

2.4 TOXIC SUBSTANCES CONTROL ACT

The Toxic Substances Control Act (TSCA) authorizes EPA to take action when chemicals pose an "unreasonable risk" to public health.

2.4.1 40 CFR 710: General Reporting Requirements

The TSCA regulations have extensive data collection and reporting requirements. Part 710 contains general reporting requirements for all chemical substances that are manufactured, imported, or processed for commercial purposes.

2.4.2 40 CFR 717: Records

Part 717 requires the manufacturer or processor to collect and maintain specific records on any alleged or determined adverse health or environmental effect. These records are used by EPA to determine if suggested restrictions or protective actions are plausible.

2.4.3 40 CFR 720: Premanufacture/Import Notice

Part 720 requires premanufacture/import notice for all new chemicals intended for use in commerce. Test and other data that document the health and environmental effects of a proposed chemical substance or mixture must be submitted to EPA.

2.4.4 40 CFR 792: Good Laboratory Practice Standards (GLPS)

Laboratories conducting tests under the TSCA must follow the Good Laboratory Practice Standards (GLPS) contained in Part 792. The GLPS include the establishment of a QA unit that oversees and evaluates each study to ensure the quality and integrity of data generated.

Uniform guidelines for testing requirements are contained in the regulations that cover chemical fate testing, health effects testing, environmental effects testing, and the identification of testing requirements for specific chemical substances and mixtures.

The TSCA regulations also contain requirements to control and restrict specific chemicals (such as asbestos) that have known adverse effects on human health and the environment.

2.5 RESOURCE CONSERVATION AND RECOVERY ACT OF 1976

The Resource Conservation and Recovery Act of 1976, which amended the Solid Waste Disposal Act (SWDA), established a framework for the regulation of all waste disposal activities. The Act mandates the environmentally sound management of the disposal of solid and hazardous waste, as well as the conservation and maximum use of valuable resources.

The Resource Conservation and Recovery Act (RCRA), as amended, is primarily concerned with protecting human health and the environment from damage resulting from the disposal of solid and hazardous wastes. The Act places special emphasis on the recycling/reuse of valuable resources.

2.5.1 40 CFR 240 and 241: Waste Disposal Methods

There are four principle ways of disposing of man-made solid waste: land disposal, thermal processing/incineration, ocean dumping, and recycling/reuse. The two primary waste disposal methods used in the United States are land fill and incineration. Title 40 of the Code of Federal Regulations, Parts 240 and 241, promulgates guidelines for thermal processing and land disposal of solid waste, respectively. Both of these regulations have the following common elements or provisions:

- o Site selection criteria
- o Waste acceptance requirements
- o Air and water quality protection
- o Safety and vector (carriers of disease) control

2.5.2 40 CFR 240: Thermal Processing

Of primary concern to QA managers are the requirements for surveillance to assure the protection of air and water quality, including ground water. For air quality, the emissions must not exceed existing EPA air quality standards, or the state air quality standards, if more stringent than EPA. All emissions, including fugitive dust, must be controlled. Although no specific air monitoring methodology or QA are cited, the guidelines do include, by reference, parts of Title 40 that require specific monitoring methodology, QC and QA.

For water quality protection in the thermal processing of solid wastes, Part 240 requires that "all water discharged from the facility should be sufficiently treated to meet the most stringent of water quality standards established in accordance with, or effective under, the provisions of the Federal Water Pollution Control Act, as amended..." When monitoring instrumentation indicates excessive discharge contamination, appropriated adjustments should be made to lower the concentrations to acceptable levels."

2.5.3 40 CFR 260: Hazardous Waste Management

For all solid waste classified as hazardous and subject to the requirements of the RCRA, Part 260 - "Hazardous Waste Management System" gives general guidance, standards, and test procedures applicable to Parts 260-265 and 268. Any data submitted under these Parts must use test methods cited in the American Society for Testing and Materials Standard Methods, and EPA Publication SW846, as updated. Part 260 gives a definition and a schematic diagram for distinguishing between solid waste and hazardous waste for the purposes of the RCRA.

2.5.4 40 CFR 261: HAZARDOUS WASTE IDENTIFICATION

Those wastes that are subject to regulation as hazardous waste are addressed in 40 CFR Part 261 - "Identification and Listing of Hazardous Waste." This Part further defines hazardous waste, along with general administrative and management procedures; criteria for identifying the characteristics of hazardous waste and for listing them; general and specific measurable characteristics or solid wastes; and lists of hazardous wastes by source and hazardous waste code number, along with references to test methods where appropriate.

Appendices I-X to Part 261, except where reserved, contain the following guidelines and test methods:

- o Representative Sampling Methods
- o EP Toxicity Test Procedures
- o Chemical Analysis Test Methods
- o Basis for Listing Hazardous Waste
- o Hazardous Constituents
- o Waste Excluded in Sections 260.20 and 260.22
- o Methods of Analysis for Chlorinated-p-dioxins and for chlorinated - dibenzofurans

The methods used to identify and characterize hazardous waste are prescribed by reference, or are available. Although some of the methods contain QC and sampling procedures, there are no specific QA requirements in Part 261.

2.5.5 40 CFR 262 AND 263: Generators/Transporters

The generators and transporters of hazardous wastes must comply with regulations promulgated at 40 CFR Parts 262 and 263. They must follow procedures prescribed for identification and classification of hazardous waste; obtain an EPA identification code number; and meet minimum prescribed guidelines,

reporting, and record-keeping requirements. While Parts 262/263 are in the "for your information" category, the records required by these regulations, particularly copies of the manifest, could be of value in an emergency episode where monitoring is required.

2.5.6 40 CFR 264 and 265: Owners/Operators

Of QA interest and concern are Parts 264 and 265, which establish standards/interim status standards, respectively, for owners and operators of hazardous waste treatment, storage, and disposal facilities. The purpose of these two regulations is to establish minimum national standards that define the acceptable management of hazardous waste.

2.5.6.1 40 CFR 264: Standards for Hazardous Waste Management

The standards established by 40 CFR Part 264 apply to all owners and operators of facilities that treat, store, or dispose of hazardous waste.

Most of these standards include some environmentally related monitoring and test method requirements to ensure compliance with these standards. There are two standards which best demonstrate the monitoring and data collection of most concern to QA managers: 1) general facilities standards; and 2) releases from solid waste management units.

The general facilities standard, under general waste analysis, contains two important features:

- o Before an owner or operator treats, stores or disposes of any hazardous waste, he or she must obtain a detailed chemical and physical analysis of a representative sample of the waste, and analysis must be repeated as necessary to ensure that it is accurate and up to date
- o The owner/operator must develop and follow a written waste analysis plan that describes the procedures used to comply with (1) above. The plan must be kept at the facility and, at a minimum, include parameters measured, sampling and test methods used, and the frequency of initial/repeat analysis.

The testing and sampling must be done with methods cited in the appropriate Parts of this Subchapter, except that an approved equivalent sampling method may be used.

The standard for releases from solid waste management units includes the following requirements:

- o Required programs
- o Groundwater protection standards
- o Hazardous constituents
- o Concentration limits
- o General ground-water monitoring
- o Detection monitoring program

- o Compliance monitoring
- o Corrective action

The elements of the monitoring and response program are described in other sections of Part 264, and should be consulted for more details.

The monitoring and analysis standard for treatment, storage, and disposal of hazardous waste stipulates that monitoring, analysis, inspection, response, corrective actions, and reporting must ensure compliance with other sections of Part 264, as appropriate.

2.5.6.2 40 CFR 265: Interim Status Standards

The interim status standards in 40 CFR Part 265 cover the same general areas as Part 264, with data collection operations receiving about the same emphasis and specificity. The purpose of Part 265 is to define acceptable management of hazardous waste during an interim period of certification or closure of a waste facility. There are some differences in the number and content of the promulgated guidelines.

2.5.7 40 CFR 267: New Facility Standards

Managing solid waste and hazardous wastes is a continuing and growing problem. This fact is reflected in 40 CFR Part 267, which sets forth interim standards for owners and operators of new hazardous waste land disposal facilities. This Part establishes minimum national standards that define acceptable hazardous waste management practices.

2.6 COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT - "SUPERFUND"

The Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), more popularly known as "Superfund", and the Superfund Amendments and Reauthorization Act of 1986 (SARA), which amended CERCLA, provide the statutory basis for the identification, evaluation, and remediation of sites where hazardous substances were released or pose a substantial threat of release. Of particular concern were the discharges, or threat of discharges of oil from supertankers, and the investigation and cleanup of uncontrolled hazardous waste sites across the United States. To deal with emergency response to such situations, both the CERCLA Section 105 and the Clean Water Act Section 311(c)(2), stipulated development of a National Contingency Plan. A freestanding legislative program known as Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA) was also established in Title III of SARA.

The principal objectives of CERCLA, as amended, are to:

- o Identify sites from which releases of hazardous substances into the environment might occur or have occurred.

- o Establish a mechanism of response for the immediate cleanup of hazardous waste contamination from accidental spills or for the remediation of chronic environmental damage associated with abandoned hazardous waste sites.
- o Develop a system for the determination of liability at such sites and a mechanism for the compensation of costs incurred in the remediation of these sites.

A fund established by CERCLA (the Superfund), which is financed by hazardous substance generators, is used to finance emergency response actions and cleanups of abandoned hazardous waste sites when a financially responsible party cannot be found. Otherwise, parties responsible for the releases are liable for all costs incurred in the cleanup and restoration of the environment. CERCLA has also created a list, known as the National Priorities List (NPL), which designates those sites slated for cleanup under CERCLA. This list is revised periodically.

Section 120 of the CERCLA mandates that Federal facilities are required to comply with CERCLA to the same extent as private parties. Although Federal facilities are listed on the NPL, they are not eligible for monies from the Superfund program. In addition, DOE Order 5400.YY, Comprehensive Environmental Response, Compensation and Liability Act Requirements (draft) requires all DOE facilities to comply with CERCLA regardless of whether or not they are on the NPL. Executive Order 12580, Superfund Implementation (signed January 23, 1987), delegates some of the duties and powers assigned to the President in CERCLA to agency heads, such as the Secretary of Energy.

Specific exemptions for DOE to adhering to CERCLA are releases of source, byproduct, or special nuclear material from a nuclear accident, as those terms are defined in the Atomic Energy Act (AEA) of 1954, if such releases are subject to the requirements with respect to financial protection established by the Nuclear Regulatory Commission under Section 170 of the AEA, or releases of those materials from any processing site designated under Sections 102(a)(1) or 302(a) of the Uranium Mill Tailings Radiation Control Act of 1978.

2.6.1 40 CFR 300: National Contingency Plan

The "National Oil and Hazardous Substances Pollution Contingency Plan" applies to all Federal agencies and is in effect for: discharges, or substantial threats of discharges, of oil to or upon the navigable waters under the jurisdiction of the United States; releases, or substantial threats of releases, of hazardous pollutants into the environment; and releases of contaminants that may present an eminent danger to public health and welfare. The National Contingency Plan (NCP) provides for coordination with all other Federal agencies, and includes the following:

- o Division and specification among Federal, state, and local governments, and private entities
- o Establishment of a national response organization, including response personnel and resources
- o Establishment of Federal, regional, and local contingency plans
- o Procedures for removals under the Clean Water Act
- o Procedures for responses pursuant to the CERCLA
- o Designation of trustees for natural resources for the purposes of the CERCLA

- o Policies and procedures for the use of dispersants and other chemicals in removal and response acts

It is important to note that many Federal agencies have responsibilities for implementing the CERCLA as set forth in 40 CFR Part 300. Of most importance to QA are:

- o Hazardous site evaluation phase and national priorities list determination
- o Remedial investigations and feasibility studies to develop safe removal plans

Most of the QA is contained in Section 300.65, "Remedial Investigations and Feasibility Studies." Prior to any removal action, the nature and extent of the proposed threat of release must be determined by the lead Agency, or the party responsible for the removal action. If the remedial action is paid for out of the Superfund, a QA and sampling plan must be developed and approved by the Remedial Project Officer (RPM), with a coordination signature from the appropriate EPA Quality Assurance Office. In all other cases the lead agency must review and approve the remedial action and the cost recovery plan.

Relevant appendices to 40 CFR Part 300 include the following:

- o Uncontrolled Hazardous Waste Site Ranking System, A Users Manual
- o National Priorities List (By Rank)
- o Revised Standard Dispersant Effectiveness and Toxicity Tests

2.6.2 Other Requirements

Other Parts of the Subchapter covering Superfund deal with the designation of hazardous waste, reportable quantities, and notification; citizen awards for information on criminal violations under Superfund; reimbursement to local governments for emergency response actions; emergency planning thresholds, and notification for a list of extremely hazardous substances; and stipulated toxic chemical release reporting and community-right-to-know. The later information on toxic chemical reporting is at Part 372, which includes an extensive inventory of very hazardous substances, along with information of vital importance in an emergency episode requiring monitoring and measurements.

3.0 U.S. DOE QUALITY ASSURANCE PROGRAM REQUIREMENTS

The primary definition of DOE policy concerning quality assurance (QA) is found in DOE 5700.6B. The Order sets forth principles and assigns responsibilities for establishing, implementing, and maintaining programs of plans and actions to provide quality achievement in DOE programs. It is applicable to all DOE programs; however, it does not specifically refer to environmental surveillance and monitoring activities. It specifies that QA activities be identified through the judicious and selective application of appropriate, recognized standards. It identifies American National Standards Institute/American Society of Mechanical Engineers (ANSI/ASME) NQA-1 as the preferred standard for nuclear activities. Most DOE effluent and environmental monitoring is performed by contractors. The Order specifies that the DOE field organization and project office managers have overall responsibility and authority for defining and ensuring effective implementation of required QA activities to be established and implemented on DOE programs by contractors under their direction. DOE 5700.6B requires the

development of QA Plans. In addition to these plans, the Environmental Monitoring Plan should contain a section of QA as required by DOE 5400.1 and DOE 5400.3 and should cover the monitoring activities at each site, consistent with the 18-element format in ANSI/ASME NQA-1.

There are a number of published standards for QA. These include:

- o ANSI/ASME NQA-1a, Quality Assurance Program Requirements for Nuclear Facilities
- o U.S. EPA, QAMS-005-80, Interim Guidelines and Specifications for Preparing Quality Assurance Plans
- o U.S. EPA, QAMS-001/80, Strategy for the Implementation of the EPA's Mandatory Quality Assurance Program
- o EPA-600/4-79-020, Method for Chemical Analysis of Water and Wastes (includes sampling, collection, and preservation guidelines)
- o EPA-SW-846, 3rd edition, Test Methods for Evaluating Solid Waste
- o EPA-600/2-80-018, Samplers and Sampling Procedures for Hazardous Waste Streams
- o U.S. EPA Contract Laboratory Program, Office of Solid Waste and Emergency Response, Statement of Work, Inorganic Analysis, Multi-Media, Multi-Concentration, SOW No. 785 July 1985 (and subsequent updates)
- o U.S. EPA Contract Laboratory Program, Office of Solid Waste and Emergency Response, Attachment A, WA-87001, WA-87002, WA-87003, Statement of Work for Organic Analysis, Multi-Media, Multi-Concentration, October 1986 (and subsequent updates).

In accordance with DOE 5400.1, the QA standard for CERCLA and RCRA QA programs will be QAMS-005-80. (See Appendix 3 for specific guidance).

DOE Order 5480.2 establishes hazardous waste management procedures for facilities operated under authority of the Atomic Energy Act of 1954, as amended which follow, to the extent practicable, regulations issued by the Environmental Protection Agency pursuant to the Resource Conservation and Recovery Act of 1976.

Hazardous waste management programs shall comply with the standards of 40 CFR 260-265, except as provided in paragraph 1 of Chapter 1 of the Order.

A partial or complete variance from DOE Order 5700.6B may be granted when compliance with the Order may be inconsistent with external regulatory, legislative, or judicial requirements imposed on a DOE program. Such variances should be recorded by means of a memorandum of understanding (MOU) to be signed by the Assistant Secretary for Environment, Safety, and Health (EH-1) and by the requesting Program Senior Official (PSO). The MOU will contain the basis for the granting of the variance, the identification of the specific portion of the Order to which the variance applies, and when applicable, the alternative measures that will be implemented to accomplish the intent and purpose of the Order's requirements.

As stated in DOE Order 5700.6B, Departmental programs will benefit from quality assurance activities which, when properly implemented, will enhance quality, productivity and cost effectiveness and will complement established management control systems. The following 10 points are included on guidance to ensure proper implementation of Quality Assurance activities.

- a. Effective quality assurance programs should include, as a minimum, the following elements:
 - (1) Assignment of organization responsibility and authority for activities affecting quality and activities that assure quality achievement
 - (2) Definition of quality and quality assurance objectives and requirements
 - (3) Implementation of procedures and work instructions
 - (4) Independent verification of quality attainment and assurance program effectiveness
 - (5) Early detection and correction of deficiencies
- b. The quality assurance plan and actions required to implement the stated policy should be defined for each program/project/activity, as appropriate.
- c. Requirements for quality assurance activities should be established and resources provided based on analyses of DOE program needs and objectives at the earliest practicable time consistent with program schedules.
- d. Quality assurance activities should be implemented by DOE organizations and contractors using written procedures and instructions appropriate to the activities to be performed. Maximum use should be made of existing quality assurance practices that effectively support program needs and objectives.
- e. DOE program quality objectives should be defined in terms of measurable characteristics. Independent measurements should provide a means for determining the extent to which the quality objectives are met and for identifying and correcting deficiencies.
- f. Quality assurance activities and the requirements for those activities should be identified in program plans. In accordance with Federal and DOE standards policies, national consensus standards are to be applied where suitable ones are available. The judicious and selective application of elements of appropriate, recognized standards is encouraged. In the nuclear area, ANSI/ASME NQA-1 is the preferred standard for quality assurance.
- g. Confirmation of quality attainment and quality assurance program effectiveness may be accomplished by various means, such as program reviews, and surveillance of specific activities or results of technical significance.
- h. Internal quality assurance audits should be performed as a primary activity by any organization that implements quality assurance criteria or requirements, such as DOE laboratories, energy technology centers, power administrations and DOE contractors. DOE field organizations, project offices, and Headquarters program offices may also conduct internal quality assurance audits at their option in fulfillment of their responsibilities.

- i. Field organizations and project offices should perform external quality assurance audits of DOE laboratories and contractors under their direction, supported by other DOE organizations and consultants, as necessary.
- j. Causes of significant deficiencies should be identified and corrected to prevent recurrence.

DOE Order 5480.4, which specifies and provides requirements for the application of mandatory environmental, safety, and health (ES&H) standards applicable to all Department of Energy (DOE) and DOE contractor operations, is applicable in all situations where, under contractual arrangements for the work to be performed, DOE has authority to establish and enforce environmental protection, safety, and health protection program requirements.

(See Appendix 1 - Attachments 1, 2, and 3 for a listing of these standards).

The following defines three terms which are key to understanding the implementation of DOE Order 5480.4:

Standard means a specified set of rules or conditions concerned with: the class of components; delineation of procedures; definition of terms; specifications of materials, performance, design, or operations; or measures of quality in describing materials, products, systems, services, or practices. Standards may be specified as mandatory or reference.

Reference standards are those guides or standards of the Order adopted by DOE that DOE and its contractors should consider for guidance, as applicable, in addition to the mandatory standards.

Mandatory standards are those standards of the Order adopted by DOE that define the minimum requirements that DOE and its contractors must comply with to the extent they apply to the activities being conducted.

3.1 QUALITY ASSURANCE PLANS

A Quality Assurance Plan for environmental monitoring is required by DOE 5400.1 as a part of the Environmental Monitoring Plan to be prepared for each DOE-controlled site. Depending on the size of the monitoring program, it might be appropriate to prepare separate sections for each major component of the monitoring program, such as effluent, environmental, ground water, etc. This plan should specify the control elements (for QC) that will be applied to the monitoring activities. A QA plan is a document that contains or references the quality assurance elements established for an activity, group of activities, a scientific investigation or a project and describes how conformance with such requirements is to be assured for structures, systems, computer software, components, and their operation commensurate with (1) the scope, complexity, duration, and importance to satisfactory performance, (2) the potential impact on environment, safety and health, and (3) requirements for reliability and continuity of operation.

The QA Plan does not have to contain all procedures, guides, quality controls, calibration procedures, etc., but rather it should reference the control elements and assign responsibility for maintenance of documents and procedures. All of the elements of ANSI/ASME NQA-1 might not be applicable to or might not be the responsibility of the monitoring programs. In these cases, a statement qualifying the nonapplicability or a reference to the organization that is responsible for the particular element will be sufficient. The QA Plan should be prepared in conjunction with or approved by the QA organization of the site.

The QA Plan is the mechanism to be used for selectively applying QA requirements to the effluent and environmental monitoring programs.

Quality Assurance: QA involves all those planned and systematic actions necessary to provide adequate confidence that a facility, structure, system, or component will perform satisfactorily and safely in service. The goal of quality assurance is to assure that: research, development, demonstration, scientific investigations, and production activities are performed in a controlled manner; that components, systems and processes are designed, developed, constructed, tested, operated, and maintained according to engineering standards, quality practices, and Technical Specifications/Operational Safety Requirements; and that resulting technology data are valid and retrievable. Quality assurance includes quality control, which comprises all those actions necessary to control and verify the features and characteristics of a material, process, product, or service to specified requirements.

Quality control is a task-specific activity that provides quality of a product or service, as opposed to QA, which provides assurance of this quality. Quality control is generally performed by the line organization as part of their design or implementation functions. Quality assurance is in part an evaluation function that should be performed by an independent organization; however, it includes all of those planned systems and actions necessary to assure quality. Even though these two functions (QA and QC) can be considered separately, they are both necessary parts of a quality program.

The following section defines three operational terms which are key to understanding the goals of the QA/QC program:

Control refers to the act of identifying, reviewing, approving, documenting, and verifying the status of items affecting quality.

Verification is the act of reviewing, inspecting, testing, checking, auditing, or otherwise determining and documenting whether items, processes, services or documents conform to specified requirements.

Audit/Appraisal is a planned and documented activity performed in accordance with procedures to determine, by examination and evaluation of objective evidence, the adequacy of and extent to which applicable elements of the quality assurance program have been developed, documented, and effectively implemented in accordance with specified requirements. Audits can be internal examinations of programs or activities under an organization's control and within its organizational structure or external examinations of programs or activities of another organization.

Periodic audits should be performed to verify compliance with operational and QA procedures. The frequency of audits should be determined jointly with the site QA organization.

Planned and scheduled audits should be performed to verify compliance with all aspects of the quality assurance program and to determine its effectiveness. These audits should be performed in accordance with written procedures or checklists by personnel who do not have direct responsibility for performing the activities being audited. Audit results should be documented and reported to and reviewed by responsible management. Follow-up action should be taken where indicated.

3.1.1 Elements of a Quality Assurance Plan

The elements of a QA program are described in ANSI/ASME NQA-1 in the 18-criterion structure of 10 CFR Part 50. These are the basic requirements of the prescribed QA program. A summary and brief description of each element is provided below:

- o **Organization** - the organizational structure, functional responsibilities, levels of authority, and lines of communication for activities affecting quality will be documented.
- o **QA program** - a documented QA program will be planned, implemented, and maintained in accordance with ANSI/ASME NQA-1 or applicable portions thereof. The program will identify the activities and items to which it applies. The establishment of the program will include consideration of the technical aspects of the activities affecting quality. The program will provide control over activities affecting quality to an extent consistent with their importance.
- o **Design control** - the design will be defined, controlled and verified.
- o **Procurement document control** - applicable design bases and other requirements necessary to provide adequate quality will be included or referenced in documents for procurement of items and services.
- o **Instructions, procedures, and drawings** - activities affecting quality will be prescribed by and performed in accordance with documented instructions, procedures, or drawings of a type appropriate to the circumstances.
- o **Document control** - the preparation, issuing, and changing of documents that specify quality requirements or prescribe activities affecting quality will be controlled so that correct documents are being employed.
- o **Control of purchased items and services** - the procurement of items and services will be controlled to ensure conformance with specified requirements.
- o **Identification and control of items** - controls will be established so that only correct and accepted items are used or installed.
- o **Control of processes** - processes affecting quality of items or services will be controlled.
- o **Inspection** - inspections required to verify conformance of an item or activity to specified requirements will be planned and executed.
- o **Test control** - tests required to verify conformance of an item to specified requirements and to demonstrate that items will perform satisfactorily in service will be planned and executed.
- o **Control of measuring and test equipment** - tools, gages, instruments, and other measuring and test equipment used for activities affecting quality will be controlled and, at specified periods, calibrated and adjusted to maintain accuracy within necessary limits.

- o **Handling, storage, and shipping** - handling, storage, cleaning, packaging, shipping and preservation of items will be controlled to prevent damage or loss and to minimize deterioration.
- o **Inspection, test, and operating status** - the status of inspection and test activities will be identified either on the items or in documents traceable to the items where it is necessary to make sure that required inspections and tests are performed and that items which have not passed the required inspections and tests are not inadvertently installed, used, or operated.
- o **Control of nonconforming items** - items that do not conform to specified requirements will be controlled to prevent inadvertent installation or use.
- o **Corrective action** - conditions adverse to quality will be identified promptly and corrected as soon as practical.
- o **Quality assurance records** - records that furnish documentary evidence of quality will be specified, prepared, and maintained.
- o **Audits** - planned and scheduled audits will be performed to verify compliance with all aspects of the QA program and to determine effectiveness.

If the QAPP follows the format of ANSI/NQA-1 (1986 Edition), "Quality Assurance Programs Requirements for Nuclear Facilities", the following items should be adequately addressed and documented.

1. **Organization:**
 - a. **Organization Structure.**
 - b. **Functional responsibilities and levels of authority.**
 - c. **Lines of communication for activities affecting quality.**
 - d. **Have the following items been documented.**
 1. Persons or organizations responsible for assuring that an appropriate quality assurance program has been established and for verifying that activities affecting quality have been correctly performed shall have sufficient authority, access to work areas, and organizational freedom to: identify quality problems; initiate, recommend, or provide solutions to quality problems through designated channels; and assure that further processing, delivery, installation or use is controlled until proper disposition of a nonconformance, deficiency, or unsatisfactory condition has occurred.
 2. Persons or organizations as in 1. above shall have direct access to responsible management at a level where appropriate action can be effected, and such that required authority and organizational freedom are provided, including sufficient independence from cost and schedule considerations.

2. Quality Assurance Program:

- a. The QA program shall be planned, implemented, and maintained in accordance with this standard, or portions thereof.
- b. The program shall identify the activities and items to which it applies.
- c. The establishment of the program shall include consideration of the technical aspects of the activities affecting quality.
- d. The program shall provide control over activities affecting quality to an extent consistent with their importance.
- e. The program shall provide for the planning and accomplishment of activities affecting quality under suitable controlled conditions. Controlled conditions include the use of appropriate equipment, suitable environmental conditions for accomplishing the activity, and assurance that prerequisites for the given activity have been satisfied.
- f. The program shall provide for any special controls, processes, test equipment, tools, and skills to attain the required quality and for verification of quality.
- g. The program shall provide for indoctrination and training, as necessary of personnel performing activities affecting quality to assure that suitable proficiency is achieved and maintained.
- h. Management of those organizations implementing the quality assurance program, or portions thereof, shall regularly assess the adequacy of that part of the program for which they are responsible and shall assure its effective implementation.

3. Design Control:

- a. The design shall be defined, controlled, and verified.
- b. Design adequacy shall be verified by persons other than those who designed the item.
- c. Design changes, including field changes, shall be governed by control measures commensurate with those applied to the original design.

4. Procurement Document Control:

- a. Applicable design bases and other requirements necessary to assure adequate quality shall be included or referenced in documents for procurement of items and services. To the extent necessary, procurement documents shall require suppliers to have a quality assurance program consistent with the applicable requirements of this standard.

5. **Instructions, Procedures, and Drawings:**
 - a. Activities affecting quality shall be prescribed by and performed in accordance with documented instructions, procedures, or drawings or a type appropriate to the circumstances. These documents shall include or reference appropriate quantitative or qualitative acceptance criteria for determining that prescribed activities have been satisfactorily accomplished.
6. **Document Control:**
 - a. The preparation, issue, and change of documents that specify quality requirements or prescribe activities affecting quality shall be controlled to assure that correct documents are being employed. Such documents, including changes thereto, shall be reviewed for adequacy and approved for release by authorized personnel.
7. **Control of Purchased Items and Services:**
 - a. The procurement of items and services shall be controlled to assure conformance with specified requirement. Such control shall provide for the following as appropriate: source evaluation and selection, evaluation of objective evidence of quality furnished by the Supplier, source inspection, audit, and examination of items or services upon delivery or completion.
8. **Identification and Control of Items:**
 - a. Controls shall be established to assure that only correct and accepted items are used or installed. Identification shall be maintained on the items or in documents traceable to the items, or in a manner which assures that identification is established and maintained.
9. **Control of Processes:**
 - a. Processes affecting quality of items or services shall be controlled. Special processes that control or verify quality, shall be performed by qualified personnel using qualified procedures in accordance with specified requirements.
10. **Inspection:**
 - a. Inspections required to verify conformance of an item or activity to specified requirements shall be planned and executed.
 - o Characteristics to be inspected and inspection methods to be employed shall be specified.
 - o Inspection results shall be documented.
 - o Inspection for acceptance shall be performed by persons other than those who performed or directly supervised the work being inspected.

11. Test Control:

- a. Tests required to verify conformance of an item to specified requirements and to demonstrate that items will perform satisfactorily in service shall be planned and executed.**
 - o Characteristics to be tested and test methods to be employed shall be specified.**
 - o Test results shall be documented and their conformance with acceptance criteria shall be evaluated.**
 - o Tests required to collect data, shall be planned, executed, documented, and evaluated.**

12. Control of Measuring and Test Equipment:

- a. Tools, gages, instruments, and other measuring and test equipment used for activities affecting quality shall be controlled and at specified periods calibrated and adjusted to maintain accuracy within necessary limits.**

13. Handling, Storage, and Shipping:

- a. Handling, storage, cleaning, packaging, shipping, and preservation of items shall be controlled to prevent damage or loss and minimize deterioration.**

14. Inspection, Test, and Operating Status:

- a. The status of inspection and test activities shall be identified either on the items or in documents traceable to the items where it is necessary to assure that required inspections and tests are performed and to assure that items which have not passed the required inspections and tests are not inadvertently installed, used, or operated.**
 - o Status shall be maintained through indicators, such as physical location and tags, markings, shop travelers, stamps, inspection records, or other suitable means.**
 - o The authority for application and removal of tags, markings, labels, and stamps shall be specified.**

15. Control of Nonconforming Items:

- a. Items that do not conform to specified requirements shall be controlled to prevent inadvertent installation or use. Controls shall provide for identification, documentation, evaluation, segregation when practical, and disposition of nonconforming items, and for notification to affected organizations.**

16. Corrective Action:

- a. Conditions adverse to quality shall be identified promptly and corrected as soon as practical.**
 - o In the case of a significant condition adverse to quality, the cause of the condition shall be determined and corrective action taken to preclude reassurance.**
 - o The identification, cause, and corrective action for significant conditions adverse to quality shall be documented and reported to appropriate levels of management.**
 - o Follow-up action shall be taken to verify implementation of this corrective action.**

17. Quality Assurance Records:

- a. Records that furnish documentary evidence of quality shall be specified, prepared, and maintained.**
 - o Records shall be legible, identifiable, and retrievable.**
 - o Records shall be protected against damage, deterioration, or loss.**
 - o Requirements and responsibilities for record transmittal, distribution, retention, maintenance, and disposition shall be established and documented.**

18. Audits:

- a. Planned and scheduled audits shall be performed to verify compliance with all aspects of the quality assurance program and to determine its effectiveness.**
 - o These audits shall be performed in accordance with written procedures or checklists by personnel who do not have direct responsibility for performing the activities being audited.**
 - o Audit results shall be documented and reported to and reviewed by responsible management.**
 - o Follow-up action shall be taken where indicated.**

QUALITY ASSURANCE

APPENDICES

APPENDIX 1 - DOE Standards

Attachment 1 - Mandatory ES&H Standards (Statutory Requirements)

Attachment 2 - Mandatory Policy ES&H Standards (Policy Requirements)

Attachment 3 - Reference ES&H Standards (Non-mandatory)

APPENDIX 2 - Key Definitions

**APPENDIX 3 - EPA QA guidance to implement the Contract Laboratory Program (CLP)
quality assurance program**

APPENDIX 1

DOE STANDARDS

Attachment 1

MANDATORY ES&H STANDARDS (STATUTORY REQUIREMENTS)

This attachment addresses those standards that are mandatory as a result of non-DOE Federal or State ES&H statutes and /or implementing requirements. Additional ES&H standards may be mandatory as a result of applicable Federal or State ES&H and/or implementing requirements. These additional mandatory ES&H standards are to be treated the same as those that are listed in paragraph 2 of this Attachment, in terms of conformance therewith and exemption notification procedures therefore.

Standards that are mandatory as a result of non-DOE Federal ES&H statutes and/or implementing requirements include:

- o Executive Orders (E.O.)
 - E.O. 11514 and E.O. 11991, "Protection and Enhancement of Environmental Quality" (EPA)
 - E.O. 12088, "Federal Compliance with Pollution Control Standards" (EPA)
- o Title 42 U.S.C. 7401, et seq., "Clean Air Act."
 - Title 40 CFR 50, "EPA Regulations on National Primary and Secondary Ambient Air Quality Standards" (EPA).
 - Title 40 CFR 53, "EPA Regulations on Ambient Air Monitoring Reference and Equivalent Methods" (EPA).
 - Title 40 CFR 61, "EPA Regulations on National Emission Standards for Hazardous Air Pollutants" (EPA).
- o Title 33 U.S.C. 1251, et seq., "Clean Water Act."
 - Title 40 CFR 116, "EPA Designation of Hazardous Substances" (EPA).
 - Title 40 CFR 117, "EPA Regulations on Determination of Reportable Quantities for Hazardous Substances" (EPA).
 - Title 40 CFR 120, "EPA Regulations on Water Quality Standards" (EPA).
 - Title 40 CFR 122, "EPA Regulations on Consolidated Permit Program" (EPA).
 - Title 40 CFR 125, "EPA Regulations on Criteria and Standards for the Pollutant Discharge Elimination System" (EPA).
 - Title 40 CFR 129, "EPA Regulations on Toxic Pollutant Effluent Standards" (EPA).
 - Title 40 CFR 133, "EPA Regulations on Secondary Treatment Information"

- (EPA).
- Title 40 CFR 136, "EPA Regulations on Test Procedures for the Analysis of Pollutants" (EPA).
- Title 40 CFR 220-225, 227-229, "EPA Ocean Dumping Regulations and Criteria" (EPA).
- Title 40 CFR 403, "EPA Pretreatment Regulations for Existing and New Sources of Pollution" (EPA).
- Title 40 CFR 413, "EPA Regulations on Electroplating Point-Source Category" (EPA).
- Title 40 CFR 423, "EPA Regulations - Guidelines and Standards for Steam Electric Power Generation" (EPA).
- Title 40 CFR 457, "Effluent Guidelines and Standards for Explosive Manufacturing" (EPA).
- Title 40 CFR 459, "Effluent Guidelines for Photographic Processing" (EPA).
- Title 40 CFR 149, "Protection of Sole Source Aquifers" (EPA).
- Title 40 CFR 141, "EPA National Interim Primary Drinking Water Regulations" (EPA).
- Title 40 CFR 142, "EPA National Interim Primary Drinking Water Regulations Implementation" (EPA).
- Title 40 CFR 143, "EPA National Secondary Drinking Water Regulations" (EPA).
- Title 40 CFR 146, "EPA Criteria and Standards for Underground Injection Control Program" (EPA).
- o Radiation.
 - Title 10 CFR 712, "Grand Junction Remedial Action Criteria" (DOE).
 - Title 40 CFR 192, "EPA Standards for Protection Against Uranium Mill Tailings" (EPA).
- o Title 7 U.S.C. 136, et seq., "Federal Insecticide, Fungicide, and Rodenticide Act."
 - Title 40 CFR 162, "EPA Regulations for the Enforcement of the Federal Insecticide, Fungicide, and Rodenticide Act" (EPA).
 - Title 40 CFR 165, "EPA Regulations for the Acceptance of Certain Pesticides and Recommended Procedures for the Disposal and Storage of Pesticides and Pesticides Containers" (EPA).
 - Title 40 CFR 166, "EPA Regulations for Exemptions of Federal and State Agencies for Use of Pesticides Under Emergency Conditions" (EPA).

- Title 40 CFR 170, "EPA Regulations for Worker Protection Standard for Agricultural Pesticides" (EPA).
- Title 40 CFR 171, "EPA Regulations for Certification of Pesticides Applicators" (EPA).
- o Title 42 U.S.C. 6901, et seq., "Resource Conservation and Recovery Act of 1976."
 - Title 40 CFR 240 and 241, "EPA Guidelines for the Thermal Processing of Solid Waste and for Land Disposal of Solid Wastes" (EPA).
 - Title 40 CFR 243, "EPA Guidelines for Solid Waste Storage and Collection" (EPA).
 - Title 40 CFR 245, "EPA Guidelines for Resource Recovery Facilities" (EPA).
 - Title 40 CFR 256, "EPA Guidelines for Identification of Site Solid Waste Management Plans" (EPA).
 - Title 40 CFR 260, "EPA General Regulations for Hazardous Waste Management" (EPA).
 - Title 40 CFR 261, "EPA General Regulations for Identifying Hazardous Waste" (EPA).
 - Title 40 CFR 262, "EPA Regulations for Hazardous Waste Generators" (EPA).
 - Title 40 CFR 263, "EPA Regulations for Hazardous Waste Transporters" (EPA).
 - Title 40 CFR 264, "EPA Regulations for Owners and Operators of Permitted Hazardous Waste Facilities" (EPA).
 - Title 40 CFR 265, "EPA Interim Standards for Owners and Operators of Permitted Hazardous Waste Facilities" (EPA).
 - Title 40 CFR 267, "EPA Interim Standards for Owners and Operators of New Hazardous Waste Land Disposal Facilities" (EPA).
 - Title 15 U.S.C. 2601, et seq., "Toxic Substances Control Act," Title 40 CFR 761, "EPA Regulations on Polychlorinated Biphenyls; Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions: (EPA).

APPENDIX 1

Attachment 2

MANDATORY ES&H STANDARDS (POLICY REQUIREMENTS)

The standards of this Attachment are mandatory as a matter of DOE policy.

Environmental Protection. The following hazardous waste regulations are mandatory for activities conducted under the Atomic Energy Act:

- o Title 40 CFR 260, "EPA General Regulations for Hazardous Waste Management" (EPA).
- o Title 40 CFR 261, "EPA General Regulations for Identifying Hazardous Waste" (EPA).
- o Title 40 CFR 262, "EPA Regulations for Hazardous Waste Generators" (EPA).
- o Title 40 CFR 263, "EPA Regulations for Hazardous Waste Transporters" (EPA).
- o Title 40 CFR 264, "EPA Regulations for Owners and Operators of Permitted Hazardous Waste Facilities" (EPA).
- o Title 40 CFR 265, "EPA Interim Standards for Owners and Operators of Permitted Hazardous Waste Facilities" (EPA).
- o Title 40 CFR 267, "EPA Interim Standards for Owners and Operators of New Hazardous Waste Land Disposal Facilities" (EPA).

APPENDIX 1

Attachment 3

REFERENCE ES&H STANDARDS (NON-MANDATORY)

The standards and guidelines of this Attachment are not mandatory. They are provided as references on good practice and general ES&H informational purposes.

The list of these reference ES&H standards and guidelines is as follows:

- o "Standard Methods for the Examination of Water and Wastewater" (AWWA).
- o "Manual of Water Quality and Treatment" (AWWA).
- o "Uniform Plumbing Code" (IAPMO).
- o ANSI N 545 (1975), "Performance Testing and Procedural Specifications for Thermoluminescence Dosimetry (Environmental Applications)" (ANSI).
- o Title 10 CFR part 20, "NRC Standards for Protection Against Radiation" (NRC).
- o Applicable Federal Radiation Council Reports (NRC).
- o Handbooks, "National Council on Radiation Protection and Measurement Recommendation" (NBS).
- o DOE/EP-0023, "A Guide for: Environmental Radiological Surveillance at U.S. Department of Energy Installations," 9-81 (DOE).
- o DOE/EP-0096, "A Guide for Effluent Radiological Measurements at DOE Installations," 9-83 (DOE).
- o DOE/EP-0100, "A Guide for Radiological Characterization and Measurements for Decommissioning of U.S. Department of Energy Surplus Facilities," 8-83 (DOE).

APPENDIX 2

KEY DEFINITIONS

- ACCURACY:** Accuracy means the nearness of a result or the mean ($\bar{X}$) of a set of results to the true value. Accuracy is assessed by means of reference samples and percent recoveries.
- ANALYTICAL BATCH:** The basic unit for analytical quality control is the analytical batch. The analytical batch is defined as samples which are analyzed together with the same method sequence and the same lots of reagents and with the manipulations common to each sample within the same time period or in continuous sequential time periods. Samples in each batch should be of similar composition.
- AUDIT/APPRAISAL:** Audit/appraisal is a planned and documented activity performed in accordance with procedures to determine, by examination and evaluation of objective evidence the adequacy of and extent to which applicable elements of quality assurance program have been developed, documented, and effectively implemented in accordance with specified requirements. Audits can be internal examinations of programs or activities under an organization's control and within its organizational structure or external examinations of programs or activities of another organization.
- BLANK:** A blank is an artificial sample designed to monitor the introduction of artifacts into the process. For aqueous samples, reagent water is used as a blank matrix; however, a universal blank matrix does not exist for solid samples, and therefore, no matrix is used. The blank is taken through the appropriate steps of the process.
- A reagent blank is an aliquot of analyte-free water or solvent analyzed with the analytical batch. Field blanks are aliquots of analyte-free water or solvents brought to the field in sealed containers and transported back to the laboratory with the sample containers. Trip blanks and equipment blanks are two specific types of field blanks. Trip blanks are not opened in the field. They are a check on sample contamination originating from sample transport, shipping and from conditions. Equipment blanks are opened in the field and the contents are poured appropriately over or through the sample collection device, collected in a sample container, and returned to the laboratory as a sample. Equipment blanks are a check on sampling device cleanliness.
- CALIBRATION CHECK:** Verification of the ratio of instrument response to analyte amount, a calibration check, is done by analyzing for analyte standards in an appropriate solvent. Calibration check solutions are made from a stock solution which is different from the stock used to prepare standards.
- CHECK SAMPLE:** A blank which has been spiked with the analyte(s) from an independent source in order to monitor the execution of the analytical method is called a check sample. The level of the spike shall be at the regulatory action

level when applicable. Otherwise, the spike shall be at the regulatory action level when applicable. Otherwise, the spike shall be at 5 times the estimate of the quantification limit. The matrix used shall be phase matched with the samples and well characterized: for an example, reagent grade water is appropriate for an aqueous sample.

DOE PROGRAM:

An organized set of activities within a resource areas having common objectives based on strategy set forth to meet assigned goals. It may include one or more projects and research and development activities in support of new, improved, or more efficient supply, or conservation systems or procedures.

**IMPLEMENTATION
PLAN:**

A concise description of the approach, resources, and time period planned for implementing DOE Order 5400.1 on a site-wide basis, including a description of the execution of quality assurance responsibilities and authorities by the field organization and any proposed generic exemptions to the Order.

**MATRIX/SPIKE-
DUPLICATE ANALYSIS:**

In matrix/spike duplicate analysis, predetermined quantities of stock solutions of certain analytes are added to a sample matrix prior to sample extraction/digestion and analysis. Samples are split into duplicate, spike and analyzed. Percent recoveries are calculated for each of the analytes detected. The relative percent difference between the samples is calculated and used to assess analytical precision. The concentration of the spike should be at the regulatory standard level or the estimated or actual method quantification limit. When the concentration of the analyte in the sample is greater than 0.1%, no spike of the analyte is necessary.

MQL:

The method quantification limit (MQL) is the minimum concentration of a substance that can be measured and reported.

PRECISION:

Precision means the measurement of agreement of a set of replicate results among themselves without assumption of any prior information as to the true result. Precision is assessed by means of duplicate/replicate sample analysis.

QUALITY ASSURANCE:

Quality assurance involves all those planned and systematic actions necessary to provide adequate confidence that a facility, structure, system, or component will perform satisfactorily and safely in service. The goal of quality assurance is to assure that: research, development, demonstration, scientific investigations, and production activities are performed in a controlled manner; that components, systems, and processes are designed, developed, constructed, tested, operated, and maintained according to engineering standards, quality practices, and Technical Specifications/Operational Safety Requirements; and that resulting technology data are valid and retrievable. Quality assurance includes quality control, which comprises all those actions necessary to control and verify the features and characteristics of a material, process, product, or service to specified requirements.

**QUALITY ASSURANCE
OVERVIEW:**

Quality assurance overview is an organized set of activities performed as independent functions. Its purpose is to assure that all aspects of quality-related activities at the program, project and contractor level of management are adequately addressed. Such activities include:

- o Periodic and timely reviews of program/project documents, activities, actions and plans;
- o Review of major procurements and management and operating contracts;
- o Review of extend/compete packages for management and operating contract; and
- o Review of DOE Orders with relevance to the incorporation of the DOE quality assurance policy, where necessary.

**QUALITY ASSURANCE
PLAN:**

Quality assurance plan is a document that contains or references the quality assurance elements established for an activity, group of activities, a scientific investigation or a project and described how conformance with such requirements is to be assured for structure, systems, computer software, components, and their operations commensurate with (1) the scope, complexity, duration and importance to satisfactory performance, (2) the potential impact on environmental, safety and health, and (3) requirements for reliability and continuity of operation.

REAGENT GRADE:

Analytical reagent (AR) grade, ACS reagent grade, and reagent grade are synonymous terms for reagents which conform to the current specifications of the Committee on Analytical Reagents of the American Chemical Society.

REPLICATE SAMPLE:

A replicate sample is a sample prepared by dividing a sample into two or more separate aliquots. Laboratory duplicate samples are considered to be two replicates.

STANDARD CURVE:

A standard curve is a curve which plots concentrations of known analyte standard versus the instrument response to the analyte.

SURROGATE:

Surrogates are organic compounds which are similar to analytes of interest in chemical composition, extraction, and chromatography, but which are not normally found in environmental samples. These compounds are spiked into all blanks, standards, samples and spiked samples prior to analysis. Percent recoveries are calculated for each surrogate.

WATER:

Reagent, analyte-free, or laboratory pure water means distilled or deionized water or Type II reagent water which is free of contaminants that may interfere with the analytical test in question.

APPENDIX 3
EPA QA GUIDANCE TO IMPLEMENT THE CONTRACT LABORATORY PROGRAM
(CLP) QUALITY ASSURANCE PROGRAM

1.0 INTRODUCTION

DOE Order 5480.2 establishes hazardous waste management procedures for facilities operated under authority of the Atomic Energy Act of 1954, as amended which follow, to the extent practicable, regulations issued by the Environmental Protection Agency pursuant to the Resource Conservation and Recovery Act of 1976.

The Order further states that in order to implement this policy, Hazardous Waste Management programs shall comply with the standards of 40 CFR 260-265, except as provided in paragraph 1 of Chapter 1 of the Order.

DOE Order 5480.14 states that DOE policy will comply with the CERCLA RI/FS program requirements in general, and specifically, rating non-radioactive sites with the site rating methodology described in the Hazard Ranking System, Appendix A, 40 CFR 300, while rating radioactive sites with DOE's Modified Hazard Ranking System.

Consequently, this appendix is provided as guidance for assessing environmental monitoring programs based on U.S. EPA requirements.

2.0 GENERAL REQUIREMENTS

In accordance with DOE Order 5480.2 and 5480.14, it is DOE's policy to conduct sufficient QA activities to demonstrate that all environmental data generated, processed or used within the Agency will be scientifically valid, defensible and of known quality. All reported data must include documented quality control performance summaries. Data must be complete, representative, comparable and must meet the QA requirements of CERCLA and RCRA.

General EPA policy, guidelines, and guidance materials have been developed that are applicable to CERCLA and RCRA studies although these documents do not necessarily establish specific Quality Assurance (QA) requirements for those involved in the collection and analysis of CERCLA and RCRA samples.

It is the basic premise of the U.S. EPA that all CERCLA and RCRA investigations conducted by Federal Agencies should be conducted in a manner equivalent to and consistent with CERCLA and RCRA investigations being performed by EPA and its contractors nationwide.

Equivalency and consistency will be measured in terms of the QA/QC activities which are part of:

- o QAMS-005-80 and related headquarter guidance documents,
- o The Contract Laboratory Program (CLP), and
- o Approved Alternate Test Procedures and other Standard Operating Procedures.

The DOE QA/QC checklist addresses all standards and requirements of an EPA (NEIC/EMSL) laboratory audit with the exception of personnel training requirements.

In order to assure that all environmental measurements done for EPA results in usable data of known quality, mandatory quality assurance requirements for all environmental measurements conducted for EPA were established in 1979 (Castle QA memorandum 1979). The following quality assurance (QA) information* and related documentation is used in determining the overall acceptability of data to be used by DOE, as assessed by EPA standards and requirements.

- o Written plans (Quality Assurance Project Plans, Field Operations Plans, Laboratory Analytical Protocols, Standard Operating Procedures, etc.) must be developed that include the oversight role of management, identification of personnel responsible for the QA programs, proper sample collection, use of approved measurement techniques, calibration standards and their verification, internal quality control practices, and appropriate data management controls.
- o As a condition of conducting an environmental study, acceptable performance must be demonstrated on audit samples, when available and applicable before analyses begin and throughout the duration of the study.
- o Provision shall be made for laboratory and/or field on-site evaluations at the option of the project. During the on-site visit, documentation, personnel, equipment and supplies will be evaluated to ensure that everything necessary for successful completion of the project has been, and is, available.

3.0 QUALITY ASSURANCE DOCUMENTATION

The reliability of a quality assurance program depends upon a complete written description of the quality assurance activities. It is necessary to document the quality assurance activities for the following reasons: (a) outlining responsibilities and a time frame for performing specific quality assurance tasks and detailing follow-up action required to eliminate identified deficiencies will unify the thinking of those involved with the quality assurance program; (b) program managers and staff will not have to rely solely on word-of-mouth descriptions of quality assurance policy and commitments; and (c) accurate data will be generated by the monitoring program, and the validity of this data can be demonstrated at a later date.

Quality assurance documentation is given various names, e.g., Quality Assurance Program Plans, Quality Assurance Project Plans, Sampling Plans, Field Operations Plans, Laboratory Analytical Protocols, Standard Operating procedures, etc. The difference between the types of documents is primarily in the level of detail and specificity. A study generally will have one program plan, several project plans, numerous sampling plans and innumerable standard operating procedures.

Environmental Protection Agency (EPA) policy requires participation by all EPA regional offices, program offices, EPA laboratories and States in a centrally-managed quality assurance (QA) program as stated in the Administrator's memorandum of May 30, 1979. This requirement applies to all environmental monitoring and measurement efforts mandated or supported by EPA through regulations, grants, contracts, or other formalized means not currently covered by regulation. The responsibility for developing, coordinating and directing the implementation of this program has been delegated to the Office of Research and Development (ORD), which has established the Quality Assurance Management Staff (QAMS) for this purpose.

Each office or laboratory generating data has the responsibility to implement minimum procedures which assure that precision, accuracy, completeness, and representativeness of its data are known and documented. In addition, an organization should specify the quality levels which data must meet in order to be acceptable. To ensure that this responsibility is met uniformly across the Agency, each EPA Office or Laboratory must have a written QA Project Plan covering each monitoring or measurement activity within its purview.

The U.S. EPA agency-wide Quality Assurance Policy states that every monitoring and measurement project must have a written and approved Quality Assurance (QA) Project Plan. The mandatory QA program covers all environmentally-related measurements. Environmentally-related measurements are defined as all field and laboratory investigations that generate data.

These include (1) the measurement of chemical, physical, or biological parameters in the environment, (2) the determination of the presence or absence of pollutants in waste streams, (3) assessment of health and ecological effect studies, (4) conduct of clinical and epidemiological investigations, (5) performance of engineering and process evaluations, (6) study of laboratory simulation of environmental events, and (7) study or measurement of pollutant transport and fate, including diffusion models. Each project within these activities must have a written and approved QA Project Plan.

QA Project Plans are written documents, one for each specific project or continuing operation (or group of similar projects or continuing operations), to be prepared by the responsible Program Office, Regional Office, Laboratory, Contractor, Grantee, or other organization. The QA Project Plan presents, in specific terms, the policies, organization, objectives, functional activities, and specific QA and quality control (QC) activities designed to achieve the data quality goals of the specific project (s) or continuing operation(s).

Each QA Project Plan can reference other QA supporting documentation, such as the Project or Work Plan and SOPs (such as Field Operations Plan, Laboratory Analytical Protocol, etc.) However, these documents must be available for review.

Sixteen elements are used as criteria to determine the completeness of the Quality Assurance Project Plan content. EPA has written and released a guidance document, "Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans" QAMS-005/80, December 29, 1980, which provides guidance for a combined work/QA plan. These documents address the required elements and provide guidance for preparing a sound QA project plan. The format recommended in the guidance document is used as criteria for review. (The DOE QA/QC checklist specifically lists the format requirements, including the "16-points.")

An important element of the QA Project Plan is the establishment of data quality objectives. (Refer to the U.S. EPA document, "Data Quality Objectives for Remedial Response Activities," March 1987 Oswer Directive 9355.0-7B, EPA/540/G-87/003 and EPA/540/G-87/004.

In the absence of DQOs developed by National Program Offices, specific DQOs for data collection activities initiated by the Region will be developed.

The results of the DQO development process will be generation of DQOs for use in preparation of the QA Project Plan and detailed design of the data collection activities.

3.2 STANDARD OPERATING PROCEDURES

Standard Operating Procedures (SOPs) must be prepared for all routine activities which have known or suspected direct impact on the quality of environmentally-related data. SOPs will be prepared in accordance with Section 7.0 of "Interim Guidelines and Specification for Preparing Quality Assurance Project Plans" (QAMS-005/80, December 29, 1980); where possible, current approved SOPs will be used (e.g., "Quality Assurance Field Operations Methods Manual" Vols. 1, 2, 3, and 4, prepared by CH₂M Hill, March 31, 1986), etc.

Such activities generally involve repetitious operations of field or laboratory sampling, laboratory or field analysis, instrument or method calibrations, preventive and corrective maintenance, internal quality control procedures, data reduction and analysis, etc., which are performed in the same uniform and consistent manner for various projects. Other areas of activities for which SOPs may be considered necessary are those which involve:

- o Network design
- o Site selection
- o Probe Placement and installation
- o Sample preparation and storage
- o Instrument/equipment selection and use
- o Preparation and use of split, paired, blind, and spiked samples
- o Determination of detection limits
- o Sample handling and transportation
- o Conduction of system audits
- o Conduction of performance audits
- o Data reduction
- o Analysis of data for precision
- o Analysis of data for accuracy
- o Analysis of data for completeness

The given SOP should cover the activities performed within a particular work group under the same supervisor.

In the QA Project Plan it would be necessary to include, physically or by reference, all of the above applicable SOPs.

The format and outline of SOPs may vary somewhat depending upon the nature of the activity. The following pages or sections should be included in most SOPs.

- o Title Page
- o Scope and Application
- o Summary or Principle
- o References
- o Definitions
- o Procedures
- o Miscellaneous Notes and Precautions

Each page of the SOP should contain a document control block in the upper right corner containing; SOP number, Date of issue, Revision number and Page number.

The draft of the prepared SOP should be reviewed by at least one other person intimately involved or knowledgeable with the activity. Prior to final approval, the step-by-step procedural portion of the SOP should be validated by the reviewer actually observing the step-by-step activities.

The final SOP will be approved by the immediate supervisor and the Quality Assurance Officer of the organization.

Each SOP will be readily available for reference by those persons actually performing the activities. A complete master listing and file of all SOPs must be maintained. The file should be complete, including the original issue and all subsequent revisions.

3.3 SAMPLING PLAN AND/OR FIELD OPERATIONS PLAN

Sampling Plan or a Field Operations Plan are documents that are prepared for either continuous or site specific data collection activities (air, water, pesticides, hazardous waste, etc.) The sampling plan should describe project organization and responsibilities, project description (objectives, scope, schedule of tasks and milestones, data usage, monitoring network/sampling and analysis design and rationale), data quality objectives, sampling procedures, calibration, analytical methods, documentation/data reduction/reporting, data assessment, audits, corrective action, reports and safety.

The procedures for the preparation, review, revision, etc., are to be the same as under the preparation of QA project plans.

All laboratories, agencies, potential responsible parties (PRPs), and facility owner/operators shall use field and laboratory procedures that are (in order of preference) (1) EPA standard, (2) EPA approved, or (3) EPA acceptable. This includes methods as specified in Methods for Analysis of Water and Wastewater, methods specified in the Statement of Work for the Contract Laboratory Program (CLP), revised SW846 and other methods available in EPA guidance manuals.

In order to insure conformity and comparability, those entities analyzing CERCLA and RCRA samples will be required to enter into an agreement with EPA which specifies requirements that must be followed in order for the analyses and QC requirements to be equivalent to the Agency's contract laboratory program (CLP). Any variations to these methods must be approved.

There are occasions where data of lesser quality may be generated. However, in cases where data is needed for confirmation, toxicology and/or all other program activities, the data must meet the minimum QA/QC requirements of the Contract Laboratory Program.

Field sampling should follow the CERCLA/RCRA, e.g., SW-846, 3rd edition guidelines for minimum QA/QC samples for the field sampling program.

4.0 OVERSIGHT

An important aspect of QA/QC is oversight and auditing. The purpose of these audits is to assess the adherence to and adequacy of the approved QA Plans and the ability of the laboratory to produce quality data. This includes all aspects of management, field, and laboratory operations. The approved QA documentation serves as tools for the audits. Whenever a problem is identified, corrective action should be initiated and pursued until corrected. Sample chain-of-custody procedures and raw data are checked as appropriate and results of blind QA/QC samples, routinely inserted into the sample load, are reviewed. Spot-checks of sampling methods and techniques, sampling and analysis calculations, and data transcription are performed. Checks are made to assess whether required documentation has been maintained and in an orderly fashion, that each of the recorded items is properly categorized, and cross-checking can be easily accomplished. Checks are made to insure that data recording conforms to strict document control protocols and to the program's QA/QC plan.

4.1 AUDITS

4.1.1 SYSTEM AUDIT

A system audit is usually conducted once per project after project laboratory startup. A system audit is an overall evaluation of a project to:

- o Verify that sampling methodology is being performed in accordance with program requirements,
- o Check on the use of appropriate QA/QC measures,
- o Check methods of sample handling, i.e., packaging, labeling preserving, transporting, and archiving in accordance with program requirements,
- o Identify any existing quality problems,
- o Check program documentation, i.e., records (site description, chain-of-custody collection and analytical tags, field and sample log books and field work sheets),
- o Initiate corrective action if a problem is identified,
- o Assess personnel experience and qualifications as required,

- o Provide on-site debriefings for sampling personnel, and
- o Provide a written evaluation of the sampling program.

The purpose of the system audit is to ensure that the QA/QC system planned for the project is in place and functioning well.

The auditor should review Work Plans, QA/QC Project Plans, and all QA/QC sampling results prior to the evaluation. Sample chain-of-custody procedures and raw data are checked as appropriate and results of blind QC samples routinely inserted in the sample load by field personnel are reviewed. Spot-checks of sampling methods and techniques, sampling and analysis calculations, and data transcription are performed.

4.1.2 FIELD AUDITS

Even with the best planning documents and the best field documentation, there is no substitute for independent observation by EPA in order to verify/deny that field work was conducted in accordance with the documentation.

Field oversight (observation) of field work should be performed.

The first sampling event for each medium should have full-time oversight. Subsequent sampling events will have oversight sufficient to collect about 5 to 15 percent splits (longer if necessary to iron out problems). The sample splits should be collected by EPA personnel or EPA contractor personnel. The split samples should be analyzed by two laboratories (CLP, State, or EPA laboratories).

Emphasis during a field audit is placed on:

- o Verifying that operational aspects and procedures are in accordance with the protocols and QA/QC plan,
- o Verifying the collection of all samples including duplicates and field blanks,
- o Verifying that documentation is in order and sufficient to establish the collection location of any sample collected,
- o Determining discrepancies that exist and initiating corrective action as appropriate, and
- o Collecting independent samples.

The on-site field audit is to inspect sample records and equipment. Records to be inspected should include:

- o Chain-of-Custody Forms,
- o Sample Tags,
- o Site Description Forms, and

- o Log Books.

The sampling procedures to be inspected should include:

- o Equipment,
- o Techniques,
- o Decontamination,
- o Collection of duplicate and field blank samples,
- o Security,
- o Sample storage and transportation,
- o Containers,
- o Contaminated waste storage and disposal
- o Site Description Form entries.

4.1.3 LABORATORY AUDITS

Before a laboratory (Federal Agency, state or potential responsible party) analyzes actual samples from a CERCLA or RCRA investigation, they should successfully analyze a performance evaluation (PE) sample. The PE sample will contain a representative array of compounds that would normally be the subject of analysis under this study. Analyte levels in the PE sample should be consistent with those expected in routine environmental samples. The PE samples (aqueous or solid) are obtained from EMSL/Las Vegas and the results (complete with required QA/QC back-up documentation) are reported.

The laboratory that successfully analyzes the PE sample should then participate in an on-site evaluation (system audit). The protocol that will be followed is that which is published for the CLP. The on-site laboratory evaluations help to assure that all the necessary quality control is being applied by the laboratory in order to deliver a quality product. Quality assurance evaluations allow the evaluators to determine that:

- o The organization and personnel are qualified to perform assigned tasks,
- o Adequate facilities and equipment are available,
- o Complete documentation, including chain-of-custody of samples is being implemented,
- o Proper analytical methodology is being used,
- o Adequate analytical quality control, including reference samples, control charts, and documented corrective action measures, is being provided, and
- o Acceptable data handling and documentation techniques are being used.

Lastly, the on-site visit allows the evaluation team to determine if the laboratory has implemented the recommended and/or required corrective actions, with respect to quality assurance, made during the previous on-site visit (if applicable).

After a laboratory successfully analyzes the PE sample, passes the on-site evaluation (if applicable), and signs the QA agreement, they can begin analyzing the CERCLA and/or RCRA samples. Oversight continues as long as the laboratory continues analyzing samples. Laboratory performance is measured by three major procedures;

1) Analysis of blind and known performance evaluation (PE) samples, 2) inorganics or organic data audits, and 3) on-site inspection of the laboratory to verify adequacy of personnel, instrumentation, and quality control functions.

The procedures to be used are as followed:

- o Blind samples - Submit PE samples blind into the natural sample train to the laboratory. PE sample are obtained from EMSL, re-tagged in the field to establish their "blind" nature, and shipped with natural samples to the laboratory.

The frequency of blind PE sample testing is once per sampling event with the additional requirement that PE samples are analyzed at least quarterly (to be consistent with the CLP).

- o Data review - The PRPs are required to have all raw data and supporting documentation from each laboratory available for review by the project manager or their designee. The reporting requirements are those stated in the CLP Statement of Work. At least one review should be performed for each type of sample, e.g. one audit for sediment sample results, one audit for groundwater sample results, etc.). The evaluation standards for the QA review consist of adherence to the requirements set forth in the CLP Statement of Work.

5.0 DATA QUALITY ASSESSMENT

The requirements for data precision, accuracy, representativeness, completeness and comparability in Superfund are very strict. All monitoring entities (Federal Agencies, PRPs, states, etc.) should perform data reduction and validation in accordance with accepted REM/FIT procedures or as specified in EPA's CLP where applicable.

Aspects of data quality which will be addressed are:

Precision - Standard Operating Procedures will contain a mechanism for demonstrating the reproducibility of each measurement process. Examples of activities to assess precision are replicate samples and instrument checks.

Accuracy - Standard Operating Procedures will contain mechanisms for demonstrating the relationship of the reported data compared to the "true" value(s).

Traceability of Standards - Standards and each measurement device will be calibrated against a standard of known accuracy. Calibration standards will be traceable to available standards of the National Bureau of Standards (NBS). If National Institute of Standards and Technology (NIST), formally NBS standards are not available, other available validated (primary) standards will be used.

Traceability of Data - Data will be documented to allow complete reconstruction from initial field records through data storage system retrieval.

Methodology - If available, EPA methods, equivalent or approved alternate test methods will be used; other methodology must be fully documented and justified.

Reference or Spiked Samples - Recoveries shall be within predetermined acceptance limits. Unacceptable recoveries are identified and documented.

Performance Audits - EPA Performance Audit Program results will be evaluated.

Representativeness, Comparability, Completeness - Where appropriate, statements on representativeness, comparability and completeness will be included.

LIST OF QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) CHECKLISTS

<u>Performance Checklist</u>	<u>Revision No.</u>	<u>Date</u>	<u>Checklist Title</u>
			Environmental Monitoring Program -
QA-EM-PP	0	12/29/89	Quality Assurance Project Plan
QA-EM-SA	0	12/29/89	Sampling and Analysis Plan
			Analytical Laboratory Evaluation -
QA-AL-O	0	12/29/89	Organization
QA-AL-P	0	12/29/89	Personnel
QA-AL-Q	0	12/29/89	Quality Assurance: General
QA-AL-D	0	12/29/89	Sample/Data Documentation and Tracking
QA-AL-M	0	12/29/89	Analytical Methodology
QA-AL-F	0	12/29/89	Facilities and Equipment

AUDITOR(S): _____

BLDG/AREA/UNIT(S): _____

DATE: ____/____/____

ESO NO.: _____

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
<u>Environmental Monitoring Program</u>			
1. Are QA and QC procedures documented in a manual (e.g., QA and/or QC manual) or in a hard-copy document (e.g., field operations plan) with content which meets DOE requirements (DOE Order 5700.6B)?	Y N		
<u>Quality Assurance Project Plan</u>			
2. Do the projects reviewed have an approved quality assurance project plan (QAPP) (DOE Order 5700.6B)?	Y N		
3. Does the QAPP contain detailed discussions of the following:			
a. QA Plan Elements?	Y N		
b. Document control?	Y N		
c. QA coordinator or officer designation and responsibilities?	Y N		
d. Standard Operating Procedures (by inclusion and/or reference)?	Y N		
- If YES or NOT APPLICABLE to Questions 1 - 3 d, ENTER STATUS "S".			
- If NO to any of Questions 1 - 3 d, ENTER STATUS "U".			
4. If project QA manual or other applicable document requires that U.S. EPA methodologies be followed, was the QAPP prepared according to the guidelines set forth in the U.S. EPA Documents, QAMS-001/80, "Strategy for the Implementation of the EPA's Mandatory Quality Assurance Program" and U.S. EPA QAMS-005-80, "Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans" (EPA-600/4-83-004, February 1983)?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
5. Does the QAPP discuss the following "16-point" items: a. Title page? Which should include the following: - o Title page. - o Organization, project, contract. - o Approval signature blocks. b. Table of contents? Which should include the following: - o Introduction. - o Listing of 16 QA components. - o Listing of appendices. - o Listing of recipients of plan. c. Project description? Which should include the following: - o General description. - o Flow diagrams, charts, and tables. - o Intended use of data. d. Project organization and responsibility? Which should include the following: - o Project organization and line authority. - o Identification of key QA personnel.	Y N Y N Y N Y N		

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AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
g. Sample custody? Which should include the following: - o Field sampling documentation. - o Preparation procedures. - o Sample acquisition. - o Sample preservation. - o Labels. - o Tracking forms. - o Laboratory operations. - o Identification of sample custodian. - o Sample custody log.	Y	N	
h. Calibration procedures and frequency? Which should include the following: - o Field instrumentation. - o Laboratory instrumentation.	Y	N	
i. Analytical procedures? Which should include the following: - o Referenced to DOE and EPA standard procedures. - o Non-standard procedures, including discussion of all modifications to standard protocols.	Y	N	
j. Data reduction, validation, and reporting? Which should include the following: o Data reduction scheme.	Y	N	

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
- o Equations to calculate concentration. - o Data validation criteria. - o Identification and treatment of outliers. - o Data flow and reporting scheme.			
k. Internal QC checks and frequency? Which should include the following: - o Duplicates. - o Spikes. - o Control charts. - o Blanks. - o Internal standards. - o QC samples. - o Calibration standards. - o Standard curves. - o Reagent checks. - o Blind field spikes and field duplicates. - o Blind standard reference materials and blind performance evaluation samples.	Y N		
l. Performance and system audits? Which should include the following: o Schedule.	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
- o Definitions and discussion. - o Reports to management. - o Corrective actions.			
m. Preventive maintenance? Which should include the following: - o Schedule. - o Procedures. - o Critical components.	Y N		
n. Assessment procedures for data acceptability?	Y N		
o. Corrective action? Which should include the following: - o Predetermined limits beyond which corrective action is required. - o Procedures. - o Identification of responsible personnel.	Y N		
p. Quality assurance reports to management? Which should include the following: - o Report requirements. - o Distribution and review and approval requirements. - o Feedback and implementation of corrective actions.	Y N		
- If YES or NOT APPLICABLE to Questions 4 - 5 p, ENTER STATUS "S".			
- If NO to any of Questions 4 - 5 p, ENTER STATUS "U".			

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
6. Does the QAPP follow the content and format requirements of ANSI/NQA-1 (1986 Edition), "Quality Assurance Program Requirements for Nuclear Facilities"?	Y N		
7. Have the following items been addressed in the QAPP:			
a. Organization? Which should include the following:	Y N		
o Organizational structure.			
o Functional responsibilities and levels of authority.			
o Lines of communication for activities affecting quality.			
o Do persons or organizations responsible for ensuring that an appropriate quality assurance program has been established and for verifying that activities affecting quality have been correctly performed have sufficient authority, access to work areas, and organizational freedom to: identify quality problems; initiate, recommend, or provide solutions to quality problems through designated channels; and ensure that further processing, delivery, installation, or use is controlled until proper disposition of a nonconformance, deficiency, or unsatisfactory condition has occurred.			
o Do persons or organizations described immediately above have direct access to responsible management at a level where appropriate action can be effected, and such that required authority and organizational freedom are provided, including sufficient independence from cost and schedule considerations.			
b. Quality assurance? Which should include the following:	Y N		
o The QA program shall be planned, implemented, and maintained in accordance with this Standard, or portions thereof.			

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
- o The program shall identify the activities and items to which it applies. - o The establishment of the program shall include consideration of the technical aspects of the activities affecting quality. - o The program shall provide control over activities affecting quality to an extent consistent with their importance. - o The program shall provide for the planning and accomplishment of activities affecting quality under suitable controlled conditions. - o Controlled conditions include the use of appropriate equipment, suitable environmental conditions for accomplishing the activity, and assurance that prerequisites for the given activity have been satisfied. - o The program shall provide for any special controls, processes, test equipment, tools, and skills to attain the required quality and for verification of quality. - o The program shall provide for indoctrination and training, as necessary of personnel performing activities affecting quality to ensure that suitable proficiency is achieved and maintained. - o Management of those organizations implementing the quality assurance program, or portions thereof, shall regularly assess the adequacy of that part of the program for which they are responsible and shall ensure its effective implementation. c. Design control? Which should include the following: - o The design shall be defined, controlled, and verified.	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
- o Design adequacy shall be verified by persons other than those who designed the item. - o Design changes, including field changes, shall be governed by control measures commensurate with those applied to the original design.			
d. Procurement document control? Which should include the following: - o Applicable design bases and other requirements necessary to ensure adequate quality shall be included or referenced in documents for procurement of items and services. - o To the extent necessary, procurement documents shall require suppliers to have a quality assurance program consistent with the applicable requirements of this Standard.	Y N		
e. Instructions, procedures, and drawings? Which should include the following: - o Activities affecting quality shall be prescribed by and performed in accordance with documented instructions, procedures, or drawings or a type appropriate to the circumstances. - o These documents shall include or reference appropriate quantitative or qualitative acceptance criteria for determining that prescribed activities have been satisfactorily accomplished.	Y N		
f. Document control? Which should include the following: o The preparation, issue, and change of documents that specify quality requirements or prescribe activities affecting quality shall be controlled to ensure that correct documents are being employed.	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
- o Such documents, including changes thereto, shall be reviewed for adequacy and approved for release by authorized personnel. g. Control of purchased items and services? Which should include the following: - o The procurement of items and services shall be controlled to ensure conformance with specified requirements. - o Such control shall provide for the following as appropriate: source evaluation and selection, evaluation of objective evidence of quality furnished by the supplier, source inspection, audit, and examination of items or services upon delivery or completion. h. Identification and control of items? Which should include the following: - o Controls shall be established to ensure that only correct and accepted items are used or installed. - o Identification shall be maintained on the items or in documents traceable to the items, or in a manner which ensures that identification is established and maintained. i. Control of processes? Which should include the following: - o Processes affecting quality of items or services shall be controlled. - o Special processes that control or verify quality shall be performed by qualified personnel using qualified procedures in accordance with specified requirements.	Y N Y N Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
j. Inspection? Which should include the following: - o Inspections required to verify conformance of an item or activity to specified requirements shall be planned and executed. - o Characteristics to be inspected and inspection methods to be employed shall be specified. - o Inspection results shall be documented. - o Inspection for acceptance shall be performed by persons other than those who performed or directly supervised the work being inspected.	Y N		
k. Test control? Which should include the following: - o Tests required to verify conformance of an item to specified requirements and to demonstrate that items will perform satisfactorily in service shall be planned and executed. - o Characteristics to be tested and test methods to be employed shall be specified. - o Test results shall be documented and their conformance with acceptance criteria shall be evaluated. - o Tests required to collect data shall be planned, executed, documented, and evaluated.	Y N		
l. Control of measuring and test equipment? Which should include the following: o Tools, gauges, instruments, and other measuring and test equipment used for activities affecting quality shall be controlled and at specified periods calibrated and adjusted to maintain accuracy within necessary limits.	Y N		

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AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
p. Corrective action? Which should include the following: - o Conditions adverse to quality shall be identified promptly and corrected as soon as practical. - o In the case of a significant condition adverse to quality, the cause of the condition shall be determined and corrective action taken to preclude recurrence. - o The identification, cause, and corrective action for significant conditions adverse to quality shall be documented and reported to appropriate levels of management. - o Follow-up action shall be taken to verify implementation of this corrective action.	Y N		
q. Quality assurance records? Which should include the following: - o Records that furnish documentary evidence of quality shall be specified, prepared, and maintained. - o Records shall be legible, identifiable, and retrievable. - o Records shall be protected against damage, deterioration, or loss. - o Requirements and responsibilities for record transmittal, distribution, retention, maintenance, and disposition shall be established and documented.	Y N		
r. Audits? Which should include the following: o Planned and scheduled audits shall be performed to verify compliance on all aspects of the quality assurance program to determine its effectiveness.	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
- o These audits shall be performed in accordance with written procedures or checklists by personnel who do not have direct responsibility for performing the activities being audited. - o Audit results shall be documented and reported to and reviewed by responsible management. - o Follow-up action shall be taken where indicated. - If YES or NOT APPLICABLE to Questions 6 - 7 r, ENTER STATUS "S". - If NO to any of Questions 6 - 7 r, ENTER STATUS "U". This checklist is complete.			

AUDITOR(S): _____
_____BLDG/AREA/UNIT(S): _____

DATE: __/__/

ESO NO.: _____

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
<u>Sampling and Analysis Plan</u>			
1. Does the project have a sampling and analysis plan (SAP) or field operations plan (FOP)?	Y N		
2. Has an approved SAP or FOP been implemented for this project?	Y N		
a. Does it conform in all its procedures to requirements specified in the approved project quality assurance plans?	Y N		
b. Are all discrepancies, changes and modifications justified with written documentation?	Y N		
- If YES or NOT APPLICABLE to Questions 1 - 2 b, ENTER STATUS "S".			
- If NO to any of Questions 1 - 2 b, ENTER STATUS "U".			
3. Do approved field procedures, adequately address the following items:			
a. Delineation of project sampling coordinator responsibilities and duties?	Y N		
1) Is a specific individual identified?	Y N		
2) Are procedures for implementing and documenting changes to the SAP specified?	Y N		
b. Interpretation of sampling and analytical QA efforts, e.g., preparation and submittal of blind field duplicates for analysis?	Y N		
c. Approved sampling procedures, including those required for obtaining representative samples?	Y N		
d. Approved sample custody, transfer of custody, and sample shipping procedures (e.g., DOT regulations)?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
e. Procedures for preparing defensible sampling paperwork?	Y N		
1) Field logbooks documentation procedures including use of a permanently bound book having consecutively numbered pages?	Y N		
2) Use of indelible ink with non-obliterative corrections being initialed and dated?	Y N		
3) Sample collection records, including documentation of split samples and all QC samples?	Y N		
4) Sample tags?	Y N		
5) Chain-of-custody records?	Y N		
6) Sample shipping paperwork?	Y N		
7) Field analytical methods documentation and results reporting (including instrument calibration)?	Y N		
8) Custody and security of all field records?	Y N		
9) Photographs, maps, and other documents?	Y N		
f. Consistency of procedures with U.S. EPA standard methods and with U.S. DOE standard procedures (e.g., as contained in the U.S. DOE document, "Environmental Survey Manual", Appendices E-K, 2nd Edition, January 1989)?	Y N		
g. Preparation methods and frequency for field QC sample collection?	Y N		
h. Sample preservation?	Y N		
i. Use and calibration of field analytical equipment (including calibration procedures)?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
j. Personnel training procedures and requirements? - If YES or NOT APPLICABLE to Questions 3 a - j, ENTER STATUS "S". - If NO to any of Questions 3 a - j, ENTER STATUS "U".	Y N ☐		
4. Are all SAP-approved sampling procedures followed without exception or deviation, except as appropriately documented, approved, and directed by the sampling coordinator or responsible authorized individual?	Y N		
5. Does the field logbook contain the following information:			
a. Date and time of all site entries and exits for all personnel (to document legal access)?	Y N		
b. Date and time of sample collection and field measurements (e.g., pH, DO)?	Y N		
c. Location, description, and identification of the sampling point?	Y N		
d. Are photographs of sampling sites or which document other aspects of the monitoring program coded to correspond to field records (e.g., field logbook)?	Y N		
1) Do the corresponding field records include documentation of photographer, date, time, site location, and site description?	Y N		
2) Are all photographs handled in a documented and secure fashion so as to maintain chain-of-custody?	Y N		
e. Name and address of field contact?	Y N		
f. Identification of sampling crew members?	Y N		
g. Number and volume of samples collected and sample containers used?	Y N		
h. Type of sample and sample identification numbers and analyses requested?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
i. Suspected waste composition, including estimated concentrations or hazard level?	Y N		
j. Sample collection methods, including documentation of all deviations from standard operating procedures?	Y N		
k. Documentation or reference of all procedures used for preparation of reagents or supplies which become an integral part of the sample (e.g., filters and preservative reagents)?	Y N		
l. Sample preservation?	Y N		
m. Field observations, including all factors affecting sample quality and integrity?	Y N		
n. Meteorological conditions?	Y N		
o. Field analyses including instrument calibration and analytical method?	Y N		
p. Field QC samples taken, including collection and preparation methods?	Y N		
q. Sampling equipment and documentation procedures?	Y N		
r. Sample distribution and transportation method (e.g., split samples, laboratory name, shipping agent)?	Y N		
s. Chain-of-custody information including COC record number and sample shipping airbill number?	Y N		
t. Signature and date by sampling crew leader and personnel responsible for recording observations and information?	Y N		
- If YES or NOT APPLICABLE to Questions 4 - 5 t, ENTER STATUS "S".			
- If NO to any of Questions 4 - 5 t, ENTER STATUS "U".			

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
6. Are quality assurance and quality control protocols contained in the sampling and analysis plan, quality assurance project plan, and field operations plan consistent with those required, as appropriate, by the regulatory based programs listed as follows: a. Federal assistance programs? o 40 CFR 30 (General requirements and QA). b. Clean Air Act? o 40 CFR 50 (NAAQS). o 40 CFR 51 and 52 (Implementation plans). o 40 CFR 58 (Ambient air quality surveillance). o 40 CFR 60 (New stationary sources). o 40 CFR 61 (NESHAPs). c. Water programs? o 40 CFR 122 and 125 (NPDES). o 40 CFR 130 (Water quality planning and management). o 40 CFR 136 (Test procedures). o 40 CFR 141 (NPDR regulations). o 40 CFR 142 (NPDR implementation). o 40 CFR 143 (NSDWR). o 40 CFR 144 (Underground injection control). o 40 CFR 402-699 (Effluent guidelines and standards).	Y N Y N Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
- o 40 CFR 227 (Ocean dumping permit evaluation). - o 40 CFR 228 (Managing disposal sites).			
d. Pesticide programs (FIFRA)?	Y N		
- o 40 CFR 160 (GLP, mandatory QA). - o 40 CFR 162-180.			
e. TSCA?	Y N		
- o 40 CFR 761 (PCBs). - o 40 CFR 763 (Asbestos). - o 40 CFR 766 (PCDD/PCDF). - o 40 CFR 792 (GLPs). - o 40 CFR 795-798 (Testing guidelines).			
f. RCRA programs?	Y N		
- o 40 CFR 240 and 241 (Waste disposal methods). - o 40 CFR 252 (Guidelines for waste disposal management). - o 40 CFR 260 (Hazardous waste management). - o 40 CFR 261 (Hazardous waste identification). - o 40 CFR 262 and 263 (Generator/transporters).			

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
- o 40 CFR 264 (Standards for hazardous waste management). - o 40 CFR 265 (Interim status standards). - o 40 CFR 266 (Recycled waste standards). - o 40 CFR 267 (New facility standards). - o 40 CFR 268 (High risk hazardous waste). - o 40 CFR 270 (Hazardous waste permit program). - o 40 CFR 280 (Underground storage tanks).			
g. CERCLA programs?	Y N		
- o 40 CFR 300 (NCP). - o 40 CFR 372. - o Title 42 U.S.C. 9601, <u>et seq.</u>			
- If YES or NOT APPLICABLE to Questions 6 a - g, ENTER STATUS "S".	☐		
- If NO to any of Questions 6 a - g, ENTER STATUS "U".			
This checklist is complete.			

QA - ANALYTICAL LABORATORY EVALUATION - ORGANIZATION

(QA-AL-O, 1/2)

SITE ID: _____

AUDITOR(S): _____

BLDG/AREA/UNIT(S): _____

DATE: ____/____/____

ESO NO.: _____

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
<u>Laboratory Organization</u>			
1. Has a QA program been implemented so as to ensure that persons or organizations responsible for ensuring that an appropriate quality assurance program has been established and for verifying that activities affecting quality have been correctly performed shall have sufficient authority, access to work areas, and organizational freedom to: identify quality problems; initiate, recommend, or provide solutions to quality problems through designated channels; and ensure that further processing, delivery, installation, or use is controlled until proper disposition of a nonconformance, deficiency, or unsatisfactory condition has occurred?	Y	N	
2. Has the laboratory manager been identified?	Y	N	
3. Has the laboratory QA officer been identified?	Y	N	
4. Has a sample custodian been identified?	Y	N	
5. Has a document custodian been identified?	Y	N	
6. Have all analysts assigned to projects and contracts been identified?	Y	N	
7. Are QC responsibilities and reporting relationships clearly defined?	Y	N	
8. Do personnel assigned to projects and contracts have the educational background and/or applicable experience to successfully accomplish the objectives of the program?	Y	N	
9. Is the organization staffed so as to meet project commitments?	Y	N	
10. Do responses to the laboratory evaluation indicate that project and supervisory personnel place positive emphasis on QA and QC?	Y	N	

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
11. Have responses by laboratory personnel with respect to QA and QC aspects of the project been open and direct? - If YES or NOT APPLICABLE to Questions 1 - 11, ENTER STATUS "S". - If NO to any of Questions 1 - 11, ENTER STATUS "U". This checklist is complete.	Y N ☐		

QA - ANALYTICAL LABORATORY EVALUATION - PERSONNEL

(QA-AL-P, 1/2)

SITE ID: _____

AUDITOR(S): _____

BLDG/AREA/UNIT(S): _____

DATE: ____/____/____

ESO NO.: _____

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
Laboratory Personnel			
1. Have all laboratory personnel been trained according to site requirements?	Y N		
2. Are all assigned laboratory personnel qualified to perform the work assigned to them in accordance with laboratory QA and QC manual requirements?	Y N		
- If YES or NOT APPLICABLE to Questions 1 and 2, ENTER STATUS "S".			
- If NO to Question 1 or 2, ENTER STATUS "U".			
3. Do the inorganic analysts assigned to specific projects and contracts have the level and type of experience to successfully perform the analyses assigned to them, as defined by requirements in the site QA manual, QA project plans, DOE orders, or other applicable requirements (e.g., CLP protocols)?	Y N		
- If YES or NOT APPLICABLE, ENTER STATUS "S".			
- If NO, ENTER STATUS "U".			
4. Do the organic analysts assigned to specific projects and contracts have the level and type of experience to successfully perform the analyses assigned to them as defined by requirements in the site QA manual, QA project plans, DOE orders, or other applicable requirements (e.g., CLP protocols)?	Y N		
- If YES or NOT APPLICABLE, ENTER STATUS "S".			
- If NO, ENTER STATUS "U".			

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
5. Do the radiochemical analysts assigned to specific projects and contracts have the level and type of experience to successfully perform the analyses assigned to them as defined by requirements in the site QA manual, QA project plans, DOE orders, or other applicable requirements (e.g., CLP protocols)? - If YES or NOT APPLICABLE, ENTER STATUS "S". - If NO, ENTER STATUS "U". This checklist is complete.	Y N ☐		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
j. Feedback and corrective action?	Y N		
k. Instrument calibration?	Y N		
l. Recordkeeping, data storage, and security?	Y N		
m. Sample custody and handling?	Y N		
n. Internal audits?	Y N		
o. Personnel training procedure?	Y N		
7. Are the QA and QC procedures specified in the manual followed as required?	Y N		
8. Are there established written procedures for training staff to perform analytical methods?	Y N		
a. Do these procedures contain specific precision and accuracy levels to be achieved by the analysts before they can begin working on actual samples?	Y N		
b. Are training records maintained?	Y N		
c. Are quality assurance procedures documented and available to the analysts?	Y N		
d. Do interview and inspections of records indicate that personnel are trained so as to meet laboratory objectives?	Y N		
9. Have maintenance procedures been written for each instrument used for analysis?	Y N		
a. Is a manufacturer's manual available to support these written procedures?	Y N		
b. Are dedicated instrument operation logs maintained for each analytical instrument?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
10. Are records maintained in a logbook of all instrument maintenance?	Y N		
11. Have the instruments been maintained in accordance with the applicable QA and QC manual and instrument operations manual?	Y N		
12. Have calibration procedures been prepared for each instrument used for sample analysis?	Y N		
13. Are the analytical procedures used for instrument standardization the same as those used for actual samples?	Y N		
a. Have written analytical procedures for all analyses been provided to the analyst?	Y N		
14. Are laboratory analytical standards traceable to recognized standard reference materials such as NIST materials?	Y N		
a. Is a standards preparation and tracking logbook maintained?	Y N		
b. Are reference materials and standards labeled with concentrations, date of preparation, date of expiration, and the identity of the person preparing the sample?	Y N		
15. Are unknown, round-robin performance evaluation standards from EPA and DOE routinely analyzed?	Y N		
a. Are results documented?	Y N		
b. Are all results within applicable QC limits?	Y N		
c. Have corrective actions been documented?	Y N		
16. Have standard curves and quality control limits been adequately documented?	Y N		
a. Are quality control charts maintained for each routine analysis?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
17. Does the analytical and QC data meet the QC criteria as specified in the applicable QAPP, SAP, and QA and QC manuals?	Y N		
18. Do QC records show corrective action when analytical results fail to meet QC criteria?	Y N		
19. Do records indicate corrective action that have been taken on rejected (unreportable) data?	Y N		
20. Are quality control data accessible for all analytical results?	Y N		
21. Are data calculations documented?	Y N		
a. Are data calculations checked by a second person?	Y N		
b. Do supervisory personnel routinely review the data and QC results?	Y N		
22. Are limits of detection determined and reported for each analyte or parameter?	Y N		
23. Are all data and records retained under security for the time period required by the applicable project QA plan and applicable sampling and analysis plans?	Y N		
24. Are reagent grade or higher purity chemicals used to prepare standards?	Y N		
a. Is the chemical, grade or purity, manufacturer, and dates of manufacture, expiration, and container opening recorded?	Y N		
- If YES or NOT APPLICABLE to Questions 1 - 24 a, ENTER STATUS "S".			
- If NO to any of Questions 1 - 24 a, ENTER STATUS "U".			
This checklist is complete.			

QA - ANALYTICAL LABORATORY EVALUATION - SAMPLE/DATA DOCUMENTATION AND TRACKING (QA-AL-D, 1/7)

SITE ID: _____

AUDITOR(S): _____

BLDG/AREA/UNIT(S): _____

DATE: ____/____/____

ESO NO.: _____

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
<u>Sample/Data Documentation and Tracking</u>			
1. Is a sample custodian designated?	Y N		
a. Are sample custodian procedures and responsibilities documented?	Y N		
2. Are chain-of-custody procedures documented?	Y N		
a. Is there evidence that one individual, e.g., QA officer, has been assigned the responsibility to ensure that these procedures have been met?	Y N		
b. Does implementation of these procedures require that only authorized personnel collect, transfer, store, analyze, and dispose of or destroy samples?	Y N		
3. Is sample custody traceable after receipt by laboratory?	Y N		
a. Is sample receipt (sample ID, identity of receiver, date and time of receipt) documented?	Y N		
b. Is a unique sample identification code assigned to each sample?	Y N		
c. Is condition of sample upon receipt routinely documented (including pH check to verify acceptable preservation)?	Y N		
d. Is secure and acceptable (e.g., locked for NPDES) sample storage documented?	Y N		
1) Is sample storage location routinely recorded?	Y N		
2) As appropriate, are samples stored in the dark and/or at 4°C to maintain appropriate preservation?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
3) Is sample removal from storage routinely documented in terms of date and time of removal from storage and responsible person, date and time returned to storage and responsible person, and volume of sample removed?	Y N		
4) Are sample extracts and digestates stored under appropriate custody and security and other conditions necessary to maintain sample integrity?	Y N		
5) Is date and time of sample disposal (including all extracts and digestates) routinely recorded, along with identity of disposer, in a logbook?	Y N		
4. Has a document custodian been designated?	Y N		
a. Are document custody procedures written and accessible to all appropriate individuals?	Y N		
b. Are written document preparation and custody procedures available to all appropriate personnel?	Y N		
5. Does the laboratory maintain project files which include all sample and laboratory custody and analysis data, documents, and records?	Y N		
a. Are all documents in a project file uniquely and sequentially numbered?	Y N		
6. Does the facility have a secure designated area where all laboratory and sampling records are stored?	Y N		
a. Is access to this area restricted to authorized individuals?	Y N		
b. Are all records maintained permanently?	Y N		
c. Is a master inventory list maintained?	Y N		
1) Are records present as represented by the inventory?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
7. Are detailed sample logbooks routinely maintained?	Y N		
a. Do they include the following details:			
1) Sampling time and location?	Y N		
2) Sampler identification and client identification?	Y N		
3) Contract and project code?	Y N		
4) Field sample identification code and laboratory assigned identification code?	Y N		
5) Analysis requested?	Y N		
6) Documentation of sample preservation?	Y N		
7) Sample analysis dates?	Y N		
8) Data reporting dates?	Y N		
9) Documentation of date, time, shipping record, sample identification for sample splits sent off-site?	Y N		
10) Documentation of sample disposal (including sample extracts and digestates)?	Y N		
8. Is all sample data traceable to all points from sample receipt to sample analysis reports?	Y N		
a. Are written procedures documented for preparation of analyst notebooks?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
b. Are analyst laboratory notebooks routinely completed for all analyses? 1) If not, are hard-copy records of sample analysis procedures and data routinely prepared? c. Are the analyst records permanently bound with preprinted consecutively numbered pages? d. Do analyst logbooks routinely contain the applicable information? Which should include the following: - o Identification of analyst. - o Analysis type (analyte and parameter). - o Analysis methods and sample prep used (e.g., referenced to lab SOP). - o Samples analyzed. - o Date and time of each analysis. - o Date and time of sample preparation. - o Volume of sample used and dilution factors. - o Analytical results. - o Analytical problems encountered and corrective actions taken. - o All factors affecting reported results, including QC limits exceeded. - o All raw and reduced data, including, e.g., chromatograms. e. Has the analyst avoided obliterating entries to logbooks and other data and documentation?	Y N Y N Y N Y N Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
f. Are the logbooks maintained in a legible manner?	Y N		
g. Are all corrections to data and documentation initialed and dated?	Y N		
h. Are inserts (e.g., chromatograms, instrument printouts) permanently affixed in the logbook and signed across insert edge and page?	Y N		
i. Where applicable, is the analyst referencing reports or memoranda pertinent to the contents of an entry?	Y N		
j. Has the supervisor of the individual maintaining laboratory records (e.g., logbooks, computer records, data system) examined the records periodically, and certified (with the date, signature, and appropriate comments) whether the records are being maintained in the required manner?	Y N		
k. Are there written procedures and protocols for data handling, storage, and processing?	Y N		
1) Are there established procedures for determining the degree of data completeness and adequacy?	Y N		
2) Does the data system include a user log which prevents undetected and unreported access to the system?	Y N		
3) Are there established procedures for verifying the correctness of data entry?	Y N		
4) Are these procedures routinely implemented?	Y N		
5) Are there established procedures for verifying the correctness and consistency of data output in relation to entered raw data?	Y N		
6) Are these procedures routinely implemented?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
I. Has the laboratory or facility established and implemented a data management system? 1) If so, does the system provide for adequate organization and integration of data? 2) Does the system permit a natural representation of data without computer-imposed restrictions or modifications? 3) Can the system be used for all relevant applications without duplication of data? 4) Does the system include numeric data and textual description of the numeric data? 5) Are the numeric data self-contained to the extent that they include this information: Where and when the data were collected (station number, depth, etc.), parameter identification, and observed values of each parameter? 6) Does the textual description include information as to why the data were collected, who collected the data, how the data were collected, what the numeric data consist of, and where the numeric data are stored? 7) Are the data reasonably accessible to authorized users? 8) Is the data system secure against unauthorized use? 9) Are data reduction and manipulation techniques acceptable and well documented? 10) Has a suitable format for reporting data been established?	Y N Y N Y N Y N Y N Y N Y N Y N Y N Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
11) Are hard-copy backup records of data management system files routinely prepared and filed? - If YES or NOT APPLICABLE to Questions 1 - 8 11), ENTER STATUS "S". - If NO to any of Questions 1 - 8 11), ENTER STATUS "U". This checklist is complete.	Y N ☐		

QA - ANALYTICAL LABORATORY EVALUATION - ANALYTICAL METHODOLOGY

(QA-AL-M, 1/11)

SITE ID: _____

AUDITOR(S): _____

BLDG/AREA/UNIT(S): _____

DATE: ____/____/____

ESO NO.: _____

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
1. Are the methods required for use by the specific project sampling and analysis plans and/or QA plan used without exception and without modification?	Y N		
2. Are all deviations from the SOP documented?	Y N		
3. Are all modifications of SOP documented as revisions of the original procedure?	Y N		
4. Have all modifications to or changes of analytical methodology been approved by DOE prior to implementation?	Y N		
a. Have all factors affecting data quality (e.g., MDL, spike recovery, analytical specificity) been documented in a defensible, concise manner?	Y N		
b. Are written Quality Control Sample (e.g., duplicates, spikes, blanks) preparation procedures provided to the persons responsible for preparing these samples?	Y N		
5. Are written analytical methods provided to the analysts?	Y N		
a. Do they state the required purity of all reagents?	Y N		
b. Are these procedures consistent with those developed by DOE and EPA or other standard methods?	Y N		
6. Is there evidence of any unauthorized deviation from project methodology (e.g., as required by the project sampling and analysis plan or the QA plan)?	Y N		
7. Is the instrumentation used in accordance with the required protocols?	Y N		
8. Do the analysts record all bench data, including sample preparation data, and do so in a neat and concise manner?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
9. Have the quality control procedures been routinely implemented as required by the project QA plan, the project sampling and analysis plan, and referenced analytical methods?	Y N		
10. Are analytical instruments recalibrated by a qualified person prior to analysis of each set of samples and are acceptable and stable instrument performance and calibration verified during analysis of each sample set?	Y N		
11. Are check standards (i.e., standards of concentrations different from calibration standards) analyzed with each sample set?	Y N		
12. Are preparation blanks (i.e., blanks carried through entire sample preparation and analysis sequence) analyzed at a frequency consistent with that required by the project plans or referenced methods or if not specified, at a minimum frequency of one per every 20 samples?	Y N		
13. Are analytical blanks (i.e., blanks not carried through the sample preparation sequence) analyzed at a frequency consistent with that required by the project plans or referenced methods or, if not specified, at a minimum frequency of one per every 20 samples?	Y N		
14. Are matrix spikes prepared and analyzed at a frequency consistent with project plans or referenced documents, or, if not specified, at a minimum frequency of one per every 20 samples?	Y N		
15. Where appropriate, (e.g., GFAA analyses) are analytical and post-digest spikes prepared and analyzed at a frequency consistent with project plans or referenced documents, or, if not specified, at a minimum frequency of one per every 20 samples?	Y N		
16. Are laboratory duplicate samples prepared and analyzed at a frequency consistent with project plans or referenced documents, or, if not specified, at a minimum frequency of one per every 20 samples?	Y N		
17. Are standard reference materials prepared and analyzed at a frequency consistent with project plans or referenced documents, or, if not specified, at a minimum frequency of one per every 20 samples?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
18. For organic analysis, and where appropriate, are surrogate compounds spiked into each sample as required by the project plans and/or referenced methods?	Y N		
19. For ICP analysis, have the following QC procedures been implemented:			
a. Are interference check samples (ICS) prepared and analyzed at a frequency consistent with project plans or referenced documents, or, if not specified, at a minimum frequency of one per every 20 samples?	Y N		
b. Is serial dilution analysis performed at a frequency consistent with project plans or referenced documents, or, if not specified, at a minimum frequency of one per every 20 samples?	Y N		
c. Has the linear range of quantitation been verified by analysis of both a low range (e.g., 2X the CRDL) standard and a linear range verification check standard (i.e., upper end of quantitation range)?	Y N		
d. Were all samples containing values that exceeded the documented linear range diluted (to be within the linear range) and re-analyzed prior to reporting results?	Y N		
20. For GFAA analysis were the following QC procedures implemented:			
a. Is the analytical spike prepared and analyzed at a frequency consistent with project plans or referenced documents, or, if not specified, at a minimum frequency of one per every 20 samples?	Y N		
b. Where required (based on spike recovery results), was the method of standard additions (MSA) used to quantitate results?	Y N		
- If YES or NOT APPLICABLE to Questions 1 - 20 b, ENTER STATUS "S".			
- If NO to any of Questions 1 - 20 b, ENTER STATUS "U".			

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
21. Are sample analysis procedures for CERCLA program requirements implemented according to project and contract requirements as defined in the project QAPP, SAP, or FOP?	Y N		
a. Do the analysis procedures comply, as appropriate, pursuant to the following requirements?	Y N		
o 40 CFR 300 (NCP).			
o 40 U.S.C. 6901 et seq. (CERCLA/SARA).			
o U.S. EPA Contract Laboratory Program statement of work (SOW) procedures and protocols.			
o U.S. EPA standard analytical methods.			
- If YES or NOT APPLICABLE to Questions 21 and 21 a, ENTER STATUS "S".			
- If NO to Question 21 or 21 a, ENTER STATUS "U".			
22. Are sample analysis procedures for RCRA program requirements implemented according to U.S. EPA SW-846, <u>Test methods for Evaluating Solid Water</u> , 2nd Edition protocols or where appropriate SW-846 3rd Edition protocols? Verify with technical media specialist.	Y N		
a. Do the hazardous waste identification guidelines and test procedures comply, as appropriate, pursuant to the following requirements?	Y N		
o 40 CFR 240 & 241 (guidelines for thermal processing of solid wastes).			
o 40 CFR 250 (recycled paper products).			
o 40 CFR 260 (hazardous waste management system).			
o 40 CFR 261 (hazardous waste characterization and identification, including sampling methods).			

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
- o 40 CFR 262 & 263 (standards for generators and transporters of hazardous waste). - o 40 CFR 264 (owner/operator of hazardous waste treatment, storage, and disposal facilities). - o 40 CFR 265 (interim status standards). - o 40 CFR 266 (standards for management). - o 40 CFR 267 (new land disposal facilities). - o 40 CFR 268 (land disposal restrictions). - o 40 CFR 270 (permit program). - o 40 CFR 280 (underground storage tanks).			
- If YES or NOT APPLICABLE to Questions 22 <u>and</u> 22 a, ENTER STATUS "S". - If NO to Question 22 <u>or</u> 22 a, ENTER STATUS "U".	☐		
23. Are sample analysis procedures for TSCA program requirements implemented pursuant to requirements specified in 40 CFR 792 and 796-799, where appropriate? Verify with technical media specialist.	Y N		
a. Do the analysis procedures comply, as appropriate, pursuant to the following requirements?	Y N		
o 40 CFR 704 (reporting & recordkeeping).			

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
- o 40 CFR 710 (general reporting requirements). - o 40 CFR 716 (health & safety data reporting). - o 40 CFR 761-763, and 766 (PCB sampling and testing, asbestos sampling and testing, dioxins and furans sampling and testing). - o 40 CFR 792 (good laboratory practice standards). - o 40 CFR 796 (chemical fate testing). - o 40 CFR 797 (environmental fate). - o 40 CFR 798 (health effects). - o 40 CFR 799 (identification of testing requirements).			
- If YES or NOT APPLICABLE to Questions 23 and 23 a, ENTER STATUS "S".	☐		
- If NO to Question 23 or 23 a, ENTER STATUS "U".			
24. Are sample analysis procedures for CAA program requirements implemented pursuant to requirements specified in 40 CFR 50 and 53, where appropriate? Verify with technical media specialist.	Y N		
a. Do the analysis procedures comply, as appropriate, pursuant to the following requirements?	Y N		
- o 40 CFR 50 (National Ambient Air Quality Standards; Reference methods). - o 40 CFR 53 (Reference/equivalent methods). - o 40 CFR 61 (NESHAPs).			

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
- If YES or NOT APPLICABLE to Questions 24 and 24 a, ENTER STATUS "S".			
- If NO to Question 24 or 24 a, ENTER STATUS "U".			
25. Are sample analysis procedures for CWA program requirements implemented pursuant to requirements specified in 40 CFR 136, 141, and 143, where appropriate? Verify with technical media specialist.	Y N		
a. Do the analysis procedures comply, as appropriate, pursuant to the following requirements?	Y N		
o 40 CFR 122 (NPDES).			
o 40 CFR 125 (NPDES criteria and standards).			
o 40 CFR 129 (toxic pollutant effluent standards).			
o 40 CFR 130 (water quality planning and management).			
o 40 CFR 136 (test procedures and sample handling).			
o 40 CFR 402 (implementing effluent limitations).			
o 40 CFR 403 (general pretreatment regulations).			
o 40 CFR 141 (NPDWR monitoring and analytical requirements).			
o 40 CFR 143 (NSDWR monitoring and analytical requirements).			
o 40 CFR 144-147 (underground injection control monitoring and data reports).			
o 40 CFR 228 (managing disposal sites, monitoring and survey requirements).			
o 40 CFR 402-609 (effluent standards and guidelines).			

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
If YES or NOT APPLICABLE to Questions 25 <u>and</u> 25 a, ENTER STATUS "S". If NO to Question 25 <u>or</u> 25 a, ENTER STATUS "U".			
26. Are radiochemical analysis procedures implemented according to DOE Environmental Measurements Laboratory Procedures Manual, 26th Edition, 1983 and/or to other standard DOE/EPA methods?	Y N		
a. For radiochemical analyses have all QA and QC procedures specified in the project QA manual, QAPP, SAP, or FOP been implemented as required?	Y N		
1) Have standard reference materials (e.g., U.S. EPA EMSL-LV National Quality Assurance Program standards or NIST-certified standards) and/or standard performance evaluation materials (e.g., U.S. EPA EMSL-LV cross-check compounds) been analyzed as specified, or, if not specified, at a minimum frequency consistent with good laboratory practice?	Y N		
2) Are the results documented in a permanent record?	Y N		
3) If results do not meet applicable QC criteria, are corrective actions taken which identify and correct the problem?	Y N		
4) Are written records which document the routine implementation of these procedures maintained?	Y N		
b. For liquid scintillation systems are the following QA and QC procedures implemented:			
1) Analysis with every analytical batch of radiation standards in aqueous solutions?	Y N		
2) Biannual calibration of ^3H and ^{222}Rn ?	Y N		
3) Annual calibration of ^{14}C ?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
c. For radon emanation are the following QA and QC procedures implemented:			
1) Analysis with every analytical batch of standard ^{226}Ra solutions?	Y N		
2) Annual calibration?	Y N		
d. For beta particle counting (low background) methods are the following QA and QC procedures implemented?	Y N		
1) Determination of correct operating voltage at least once each month, after the gas supply is changed, after any electronic maintenance, or after any modification is made on a detector?	Y N		
2) Calibration (i.e., of counting efficiency) for each radionuclide?	Y N		
3) Calibration on a quarterly basis and after mechanical modifications are made on a detector?	Y N		
4) Background determination with both an overnight measurement and a measurement at the beginning of each workday for the length of time that routine samples are counted?	Y N		
5) Determination of the self-absorption correction factor?	Y N		
6) Performance of daily counter operation check using a standard check source?	Y N		
7) Analysis of standards with each analytical batch of predetermined weights of strontium carbonate and yttrium oxalate precipitates with known amounts of ^{87}Sr , ^{90}Sr , and ^{90}Y ?	Y N		
e. For alpha particle counting methods are the following QA and QC procedures implemented:			
1) Determination of correct operating voltage at least once each month, after the gas supply is changed, after any electronic maintenance, and after any modification is made on a detector?	Y N		
2) Calibration (i.e., of counting efficiency) for each radionuclide?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
3) Calibration on a quarterly basis and after mechanical modifications are made on a detector?	Y N		
4) Background determination with both an overnight measurement and a measurement at the beginning of each workday for the length of time that routine sample are counted?	Y N		
5) Determination of the self-absorption correction factor?	Y N		
6) Performance of daily counter operation check using a standard check source?	Y N		
7) Decontamination of detector every six months and any time the background increases above the level normally encountered?	Y N		
8) Analysis with every analysis batch for specific isotope analysis of standard solutions of ^{235}U , ^{238}U , and ^{239}Pu on planchets and of standard uranium solutions and of self-absorption standards?	Y N		
9) Monthly calibration for specific isotope analysis?	Y N		
f. For gamma ray spectroscopic methods are the following QA and QC procedures implemented:			
1) Are the samples homogeneous and in calibrated configuration?	Y N		
2) Are both required types of calibration performed, i.e., gamma ray energy-channel number relationship and gamma ray counting efficiency, for each nuclide to be measured quantitatively?	Y N		
3) Analysis of spectral data, e.g., by "stripping" methods or by "matrix (simultaneous solution)" method?	Y N		
4) Annual instrument calibration?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
5) Analysis with each analytical batch of standard radioisotope solution? - If YES or NOT APPLICABLE to Questions 26 - 26 f 5), ENTER STATUS "S". - If NO to any of Questions 26 - 26 f 5), ENTER STATUS "U". This checklist is complete.	Y N ☐		

QA - ANALYTICAL LABORATORY EVALUATION - FACILITIES AND EQUIPMENT

(QA-AL-F, 1/3)

SITE ID: _____

AUDITOR(S): _____

BLDG/AREA/UNIT(S): _____

DATE: ____ / ____ / ____

ESO NO.: _____

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
1. Does the laboratory appear to have adequate workspace?	Y N		
2. Are voltage control devices used on major instrumentation?	Y N		
3. Does the laboratory have a source of distilled or demineralized water?	Y N		
4. Is the conductivity of distilled or demineralized water routinely checked and recorded?	Y N		
5. Is the analytical balance located away from draft and areas subject to rapid temperature changes?	Y N		
6. Has the balance been calibrated within one year by a certified technician?	Y N		
7. Is the balance checked with class S standards before each use and recorded in a logbook?	Y N		
8. Are exhaust hoods provided to allow efficient work with volatile materials?	Y N		
9. Is the laboratory maintained in a clean and organized manner?	Y N		
10. Are adequate facilities provided for separate storage of sample, extracts, and standards, including cold storage?	Y N		
11. Is the temperature of the cold storage units recorded daily in logbooks?	Y N		
12. Is the temperature of the cold storage units verified by an independent temperature recording device?	Y N		
13. Are laboratory areas provided for trace level analytical work appropriately designed to prevent sample contamination?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
14. Can the laboratory document that trace-free water is available for preparation of standards and blanks?	Y N		
15. Are pH- and ion-selective meters operational and properly maintained?	Y N		
16. Is a UV-visible spectrophotometer operational and properly maintained?	Y N		
17. Is the laboratory secure?	Y N		
18. Are all instruments properly vented?	Y N		
19. Are all instrument modifications documented in a permanent record?	Y N		
20. The following apply to the GC/MS instrumentation:			
a. Has the instrument been modified in any way?	Y N		
b. Are appropriate traps in place and is the instrument properly vented?	Y N		
c. Is a glass jet separator in place and operational?	Y N		
d. Is a magnetic tape storage device being utilized?	Y N		
1) Is it secure from unauthorized use or tampering?	Y N		
e. Is a split/splitless capillary injector in place?	Y N		
f. Is the column direct to the source?	Y N		
g. Is the mass spectral library the 1985 or most recent version of the National Institute of Standards and Technology (NIST) library?	Y N		
h. Are there documented procedures and requirements for mass spectral data interpretation and compound identification in addition to the use of the mass spectral library/data system?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
I. Do mass spectral data interpretation and compound identification procedures ensure that data quality will meet project objectives as defined in the QAPP, SAP, or FOP? - If YES or NOT APPLICABLE to Questions 1 - 20 I, ENTER STATUS "S". - If NO to any of Questions 1 - 20 I, ENTER STATUS "U". This checklist is complete.	Y N ☐		



SECTION 15

RADIATION

This protocol applies to Department of Energy facilities that utilize, store or generate radioactive material. It includes a discussion of the relevant statutes and regulations and procedures for determining applicability of the regulations and for evaluating the facilities performance in meeting the applicable requirements.

1.0 INTRODUCTION

The Atomic Energy Act of 1954 (AEA) and its amendments is the Federal law which mandates DOE to control radioactive materials to protect public safety and health. The AEA and its amendments is the cornerstone of all nuclear energy related regulations. DOE Orders, EPA and NRC regulations are based on the policy of the AEA. Under the AEA, as amended, DOE is responsible for establishing and maintaining an environmental, health and safety protection program. The DOE implements AEA requirements through a system of orders which is discussed in Section 1.2.

1.1 FEDERAL REGULATIONS

The Nuclear Waste Policy Act (NWSA) of 1982 established requirements for the high-level waste repository as identified in 10 CFR 960. The NWSA, under authority of the AEA, established criteria in evaluating the suitability of sites for the development of a waste repository. These requirements will only apply to the planned geologic repository at the Yucca Mountain site. The Low Level Radioactive Waste Policy Amendments Act (LLRWPA) of 1985 established requirements for the disposal of low-level radioactive waste. The LLRWPA, under authority of the AEA, established criteria for the implementation of state compacts to create and operate regional disposal facilities for low-level radioactive waste. Waste that is owned or generated by DOE is exempt from this regulation. DOE requirements for low-level radioactive waste are discussed in Section 1.2.

The applicable federal regulations promulgated under authority of the AEA cover the following areas:

- o Standards for Protection Against Radiation (10 CFR 20).
- o Requirements for Disposal of High-Level Radioactive Waste (10 CFR 60).
- o Requirements for Land Disposal of Low-Level Radioactive Waste (10 CFR 61).
- o Environmental Standards for Management and Disposal of Spent Nuclear Fuel, High-Level and Transuranic Wastes (40 CFR 191).
- o Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings (40 CFR 192).

Although DOE facilities are generally exempt from NRC regulations (excluding licensing requirements for the proposed High-Level Waste Repository), the facilities should meet the intent of these regulations.

1.2 DOE ORDERS

The major DOE Orders associated with radiation are DOE Order 5400.xx, Radiation Protection of the Public and the Environment; DOE Order 5400.xy, Radiological Effluent Monitoring and Environmental Surveillance; DOE Order 5820.2A, Radioactive Waste Management and DOE Order 15500.3, Emergency Planning. Most of the federal regulations (Section 1.1) are referenced by these four major DOE Orders. DOE Order 5400.1, General Environmental Protection Program, is the umbrella order for the above mentioned orders.

DOE Order 5400.xx, Radiation Protection of the Public and the Environment, adopts current guidance and standards issued by national and international authoritative bodies on radiation protection; incorporates current regulatory requirements applicable to DOE operations; and consolidates and upgrades DOE monitoring, surveillance, and control practices. Requirements of this Order address:

- o Radiation protection standards for the public (dose limits).
- o ALARA assessments.
- o Radiation protection standards for the environment.
- o Treatment of liquid radioactive waste streams.
- o Elimination of the use of soil columns for waste disposal.
- o Standards for liquid waste discharges to sanitary sewerage.
- o Effluent monitoring and environmental surveillance requirements.
- o Dose calculation methods.
- o Reporting of non-routine occurrences.

DOE Order 5400.xy, Radiological Effluent Monitoring and Environmental Surveillance, establishes requirements and guidance for radiological effluent monitoring and environmental surveillance conducted in support of DOE operations and activities. Requirements of this Order address:

- o Radiological liquid effluent release monitoring requirements.
- o Radiological atmospheric effluent release monitoring requirements.
- o Meteorological monitoring.
- o Environmental surveillance.
- o Laboratory measurements.
- o Data analysis and statistical treatment.
- o Public radiation dose estimation.
- o Record keeping and reporting.
- o Quality assurance.

DOE Order 5820.2A, Radioactive Waste Management, establishes policies, guidelines and minimum requirements by which the DOE manages its radioactive and mixed waste and contaminated facilities. Requirements of this Order address:

- o Design requirements for new and existing waste facilities.
- o Waste characterization.
- o Storage and transfer operations.
- o Monitoring, surveillance and leak detection.
- o Contingency actions.
- o Waste treatment and minimization.
- o Waste acceptance criteria.
- o Decommissioning of contaminated facilities.

DOE Order 5500.3, Emergency Planning, established policies, guidelines and minimum requirements for DOE Emergency Response Programs for the protection/assessment of impacts of/to the public and the environment in a emergency situation.

13 KEY DEFINITIONS

The following are some important definitions relating to radiation. These definitions are extracted from the requirements found in the DOE Orders.

Absorbed Dose (D) is the energy imparted to matter by ionizing radiation per unit mass of irradiated material at the place of interest in that material. The absorbed dose is expressed in units of rad (gray) where 1 rad = 0.01 joule/kg material (1 gray = 100 rad).

ALARA (As Low As Reasonably Achievable) is a phrase and acronym used to describe an approach to radiation exposure control or management whereby the exposures and resulting doses to members of the public are maintained as far below the specified limits as economic, technical and practical considerations will permit.

Aliquot is the fraction of a field sample taken for complete processing through an analytical procedure (a "laboratory sample" of a field sample).

Best Available Technology (BAT) is the best technology available for liquid waste treatment processing, taking into account factors such as the age of equipment being used and of facilities involved, the process employed, the engineering aspects of the application of various types of control techniques, process changes, the cost of achieving effluent reduction, and non-water quality environmental impact and public policy considerations.

Collective Dose Equivalent is the sum of the dose equivalents of all individuals in an exposed population within 50 mi. It is expressed in units of person-rem or person-sieverts (1 person-Sv = 100 person-rem).

Collective Effective Dose Equivalent is the sum of the effective dose equivalents of all individuals in an exposed population within 50 mi. It is expressed in units of person-rem or person-sieverts (1 person-Sv = 100 person-rem).

Committed Dose Equivalent (H_{50}) is the predicted total dose equivalent to a tissue or organ over a 50-year period after a known intake of a radionuclide into the body. It does not include contributions from external dose. Committed dose equivalent is expressed in units of rem (or sievert).

Committed Effective Dose Equivalent (H_{E50}) is the sum of the committed dose equivalents to various tissues in the body, each multiplied by the appropriate weighing factor. Committed effective dose equivalent is expressed in terms of rem (or sievert).

Critical Organ is the human organ or tissue receiving the largest fraction of a specified dose limit.

Critical Pathway is the specific route of transfer of radionuclides from one environmental component to another (e.g., from one trophic level to another) that results in the greatest fraction of an applicable dose limit to a population group or an individual's whole body, organ or tissue.

Critical Population Group is the population group showing the greatest fraction of an applicable radiation dose limit as a result of site releases.

Derived Concentration Guide (DCG) is the lesser of the concentrations of a radionuclide in air or water that, under conditions of continuous exposure by one exposure mode (i.e., ingestion of water, or submersion in air, or inhalation) for one year for a "reference man", would result in either an effective dose equivalent of 100 mrem (1 mSv) or a dose equivalent of 5 rem (50 mSv) to any tissue, including the skin and lens of the eye.

Dose Equivalent is the product of the absorbed dose in rads (grays) in tissue, a quality factor and other modifying factors. Dose equivalent is expressed in units of rem (or sievert) (1 rem = 0.01 sievert). For purposes of this Order, the dose equivalent to an organ, tissue, or whole body in a year will be that received from the direct exposure plus the 50-year committed dose equivalent received from radionuclides taken into the body during the year.

Effective Dose Equivalent (H_E or EDE) is the summation of the products of the dose equivalent received by specified tissues of the body and a tissue-specific weighing factor. This sum is a risk-equivalent value and can be used to estimate the health-effects risk of the exposed individual. The tissue-specific weighing factor represents the fraction of the total health risk resulting from uniform whole-body irradiation that would be contributed by that particular tissue. The effective dose equivalent includes the committed effective dose equivalent from internal deposition of radionuclides and the effective dose equivalent due to penetrating radiation from sources external to the body; it is expressed in units of rem (or sievert).

Environmental Detection Limit is the smallest level at which a radionuclide in an environmental medium can be unambiguously distinguished for a given confidence level using a particular combination of sampling and measurement procedures, sample volume, analytical detection limit, and processing procedure.

Lower Limit of Detection (LLD) is the smallest amount of a contaminant that can be distinguished in a sample by a given measurement procedure at a given confidence level.

Outlier is an extreme value in a data set so far removed from the other values with which it is associated that the chance probability of its being a valid member of the group is very small. Such a questionable value may be eliminated from the group on the basis of further statistical investigations of the data set.

Quality Factor (Q) is the principal modifying factor used to calculate the dose equivalent from the absorbed dose. For purposes of DOE 5400.3 and this Order, the following quality factors are to be used:

<u>Radiation Type</u>	<u>Quality Factor</u>
X-rays, gamma rays, positrons, electrons (including tritium)	1
Neutrons, < 10 keV	3
Neutrons, < 10 keV Protons and single-charged particles of unknown energy with rest mass greater than one atomic mass unit	10
Alpha particles and multiple-charged particles (and particles of unknown charge) of unknown energy	20

For neutrons of known energies, the more detailed quality factors given in DOE 5480.11 may be used.

Radioactive Material refers to any material or combination of materials that spontaneously emits ionizing radiation.

Reference Man refers to a hypothetical aggregation of human (male and female) physical and physiological characteristics arrived at by international consensus (ICRP Publication 23). These characteristics may be used by researchers and public health workers to standardize results of experiments and to relate biological insult from ionizing radiation to a common base. "Reference man" is assumed to inhale 8400 m³ of air in a year and to ingest 730 L of water in a year.

Spiked Sample is a normal sample of material (gas, liquid or solid) to which a known amount of some substance of interest is added. Spiked samples are used to check on the performance of a routine analysis or the recovery efficiency of an analytical method.

Weighting Factors (WF) are tissue-specific and represent the fraction of the total health risk resulting from uniform, whole-body irradiation that could be contributed to that

particular tissue. They are used in the calculation of annual and committed effective dose equivalent to equate the risk arising from the irradiation of tissue T to the total risk when the whole body is uniformly irradiated. The weighting factors recommended by the ICRP (Publication 26) and used here are:

<u>Organ or Tissue</u>	<u>Weighting Factor</u>
Gonads	0.25
Breasts	0.15
Red Bone Marrow	0.12
Lungs	0.12
Thyroid	0.03
Bone Surfaces	0.03
Remainder 1	0.03

- 1/ Remainder means the five other organs with the next highest risk, including liver, kidney, spleen, thymus, adrenals, pancreas, stomach, small intestine or upper and lower large intestine, but excluding skin, lens of the eye, and extremities. The weighting factor for each such organ is 0.06.

2.0 USE OF THE RADIATION PROTOCOL

Because there are a number of DOE Orders and Federal Regulations which are applicable to radiation/radioactive material at DOE facilities, these orders and regulations have been organized into performance checklists covering four functional areas. These areas and titles are:

- o Effluent and Environmental Monitoring.
- o Radioactive Waste Management/Disposal.
- o Protection of the Public and the Environment.
- o Emergency Planning and Response Program (Air Activities).

Each of the four performance checklists contains the requirements from DOE Orders and Federal Regulations which apply to that functional area. Additionally, the requirements of the Orders and regulations are grouped by title so that the user can quickly ascertain the source of the requirement. The beginning of each performance checklist has generic questions which quickly enable the user to determine the applicability of the specific requirements. If the requirements do not apply, the user is not directed to that part of the checklist. However, if the requirements do apply the user is directed to the section of the performance checklist which is applicable. This method enables the user to quickly review all areas in the first few pages and then follow with the detailed review.

It should also be noted that DOE Orders 5400.xx and 5400.xy are in draft. Therefore, these are currently not DOE requirements. However, two memos have been issued by DOE which require the implementation of parts of 5400.xx. These parts are noted as "(Tseng/Vaughan Memoranda) and should be viewed as DOE requirements.

LIST OF RADIATION CHECKLISTS

<u>Performance Checklist</u>	<u>Revision No.</u>	<u>Date</u>	<u>Checklist Title</u>
RA-EEM	0	12/29/89	Effluent and Environmental Monitoring
RA-RWM	0	12/29/89	Radioactive Waste Management/Disposal
RA-PPE	0	12/29/89	Protection of the Public and the Environment
RA-EPR	0	12/29/89	Emergency Planning and Response Program (Air Activities)

RAD - EFFLUENT AND ENVIRONMENTAL MONITORING

(RA-EEM, 1/23)

SITE ID: _____

AUDITOR(S): _____

BLDG/AREA/UNIT(S): _____

DATE: ____ / ____ / ____

ESO NO.: _____

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
1. Does this facility release any radionuclides to the environment? - If YES, proceed to Questions 19 - 26. - If NO, checklist is complete.	Y N		
2. Does this facility have an Environmental Monitoring Plan? - If YES, ENTER STATUS "S". - If NO, ENTER STATUS "U".	Y N 		
3. Do these releases include radionuclide effluents to the atmosphere? - If YES, proceed to Questions 42 - 52. - If NO, proceed with checklist.	Y N		
4. Do these releases include radionuclide liquid effluents to the environment? - If YES, complete Questions 27 - 41. - If NO, proceed with checklist.	Y N		
5. Does this facility conduct environmental surveillance? - If YES, proceed to Questions 10 - 13 and 53 - 97. - If NO, ENTER STATUS "U".	Y N 		
6. Does this facility perform analytical measurements in-house? - If YES, proceed to Questions 98 - 115. - If NO, proceed to Question 106 and return to Question 7.	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
7. Does this facility have a Quality Assurance Plan for the effluent and environmental monitoring programs? - If YES, proceed to Questions 121 - 126. - If NO, ENTER STATUS "U".	Y N ☐		
8. Does this facility estimate public radiation doses? - If YES, proceed to Questions 116 - 120. - If NO, ENTER STATUS "U".	Y N ☐		
9. Does this facility issue any Environmental Monitoring Program reports? - If YES, proceed to Questions 14 - 18. - If NO, ENTER STATUS "U". - This checklist is complete.	Y N ☐		
<u>DOE Order 5484.1: Environmental Protection, Safety, and Health Protection Information Reporting Requirements</u> <u>Chapter III: Effluent and Environmental Monitoring Program Requirements</u> <u>Section I: Monitoring New Sites, Processes, and Facilities</u>			
10. Since 1982 has this site or facility begun operations or started up a new process which releases or disposes of radionuclides? - If YES, proceed with checklist. - If NO, proceed to Question 12.	Y N		
11. a. Has an environmental survey been conducted prior to the start of the new site, facility, or process which will process, release, or dispose of pollutants?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
- If YES, proceed with checklist.	☐		
- If NO, ENTER STATUS "U" and proceed to Question 12.			
b. Was this survey begun 1 year prior to start of operation?	Y N		
- If YES, proceed with checklist.	☐		
- If NO, ENTER STATUS "U" and proceed with checklist.			
Section II: Monitoring Existing Sites			
12. An environmental monitoring program is maintained at this facility to determine the following:			
a. Are containment and control of releases of radionuclides from site operations functioning as planned?	Y N		
b. Are environmental measurements of radionuclides and other pollutants released from this facility complying with applicable standards?	Y N		
- If YES to Questions 12 a and b, ENTER STATUS "S".	☐		
- If NO to Question 12 a or b, ENTER STATUS "U".			
Section III: Quality Assurance			
13. Has the environmental monitoring program been modified to establish background information with respect to those radionuclides or other pollutants likely to be released and those environmental parameters likely to be affected by operation of the facility?	Y N		
- If YES, ENTER STATUS "S" and proceed to Question 53.	☐		
- If NO, ENTER STATUS "U" and proceed to Question 53.			

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
<u>Section IV: Scope and Content of Environmental Monitoring Program, Reports, and Summaries</u>			
14. Is the facility in compliance with the requirements of DOE Order 5480.1, Chapters I, XI and XII?	Y N		
15. Are the background levels and facility contribution of radionuclides and as appropriate, other pollutants, measured in the site environs?	Y N		
16. Is the facility in compliance with applicable environmental quality and public exposure limits and other environmental commitments?	Y N		
17. a. Has the environmental monitoring report been completed and submitted?	Y N		
- If YES, proceed to Question 18.			
- If NO, proceed with checklist.			
b. Has an environmental summary been completed?	Y N		
18. Have the dose assessments been completed and incorporated into the annual environmental monitoring report?	Y N		
- If YES to Questions 14 - 18, ENTER STATUS "S".			
- If NO to any of Questions 14 - 18, ENTER STATUS "U".			
- This checklist is complete.			
<u>Section V: Effluent Monitoring</u>			
19. Have radioactive effluents been monitored to determine compliance with DOE Order 5400.1 requirements?	Y N		
20. Have radioactive effluents been monitored to evaluate the effectiveness of effluent treatment and control?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
21. Have radionuclides released to on-site waste treatment or disposal systems been monitored to assess the efficacy of treatment and control?	Y N		
22. Has there been a report on the annual summary of the radionuclides released on-site?	Y N		
23. Have effluents been monitored for radionuclide inventory purposes?	Y N		
24. Have effluents been monitored in compliance with all DOE, EPA, State agency, etc., effluent limits and other environmental commitments?	Y N		
- If YES to Questions 19 - 24, ENTER STATUS "S".			
- If NO to any of Questions 19 - 24, ENTER STATUS "U".			
25. Monitoring should be conducted in a manner that provides accurate measurements of the quantity and concentration of liquid and airborne pollutants in effluents for accordance with the following:			
a. Has compliance been met with applicable discharge and effluent control limits, including self-imposed administrative limits designed to ensure compliance with in-plant operating limits, effluent standards or guides, and with environmental standards or guides?	Y N		
b. Has there been an evaluation of the adequacy and effectiveness of containment and waste treatment and control as well as of efforts toward achieving levels of radionuclides which are as low as reasonably achievable considering technical and economic constraints?	Y N		
c. Is there a compiling of an annual inventory of the radionuclides released in effluents and on-site discharges?	Y N		
d. Have the measurements of volume, rate of discharge, content, etc., been made, insofar as is practical, at the point at which the data most closely represents what is being released?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
e. Are effluents being monitored at the point at which the applicable standards apply?	Y N		
f. Is the monitoring location specified in a discharge or operating permit?	Y N		
g. Is there a sampling schedule?	Y N		
h. Has the method of sampling been mentioned in an applicable regulation or permit?	Y N		
i. If so, is it being followed?	Y N		
j. For purposes of reporting radiological data, gross radioactivity measurements are generally inadequate. They are adequate when the following Questions have a YES answer:			
1) Are gross radionuclides releases a small fraction of the Off-site derived Concentration Guides (OCG's) for "unidentified mixtures" and are of no health or environmental significance?	Y N		
2) Are the relative concentrations of specific radionuclides so well known by other means that gross radionuclide measurements are truly indicative of the activity being released?	Y N		
3) Is the activity of waste streams so low as to preclude specific radionuclide measurements?	Y N		
- If YES to Questions 25 a - j 3), ENTER STATUS "S".			
- If NO to any of Questions 25 a - j 3), ENTER STATUS "U".			
k. Are the radioactive effluents and on-site discharge monitoring and reporting adequate to provide an annual average concentration and an annual summary of the quantities of radionuclides released?	Y N		
l. Is the annual summary complete to the extent that all significant releases are reported?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
m. Is the annual average flow and the specific concentration in each waste stream known?	Y N		
n. Is the data being collected and recorded in the units in which relevant standards are expressed?	Y N		
o. Have the on-site discharge and effluent data reports been used to compile a DOE-wide summary of radioactivity which has been released on-site and to the off-site environment from its facilities?	Y N		
- If YES to Questions 25 k - o, ENTER STATUS "S".			
- If NO to any of Questions 25 k - o, ENTER STATUS "U".			
<u>Chapter I: Notification of Occurrences</u>			
26. Relating to radionuclides, have all procedures been followed regarding notification (classification)?	Y N		
- Return to Question 2.			
<u>DOE 5400.XY, Chapter II: Radiological Liquid Effluent Release</u>			
27. Are all effluent streams evaluated and assessed for their potential for release of radioactive material?	Y N		
28. Is the rationale for liquid effluent monitoring systems documented?	Y N		
29. Do facility operators:			
a. Monitor liquid effluents in accordance with the requirements of DOE Orders 5400.1 and 5400.xx? (See Checklist RA-PPE).	Y N		
b. Quantify radionuclides discharged from each release point?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
c. Alert process operators of changes to processes and emission controls?	Y N		
- If YES to Questions 27 - 29 c, ENTER STATUS "S".	☐		
- If NO to any of Questions 27 - 29 c, ENTER STATUS "U".			
30. Is the overall accuracy of monitoring results ($\pm$ % of accuracy and the % of confidence level) documented?	Y N		
31. Were provisions for monitoring liquid effluents during an emergency included when determining routine monitoring program needs?	Y N		
32. Were liquid effluent monitoring systems selected or modified based on the:			
a. Nature of the sources?	Y N		
b. Pollutant characteristics and quantities?	Y N		
c. Sample collection system?	Y N		
d. Treatment systems?	Y N		
e. Final release points?	Y N		
33. Is a preoperational assessment of the types and quantities of liquid effluents expected from all new or modified facilities in order to establish the effluent monitoring needs of these facilities documented?	Y N		
34. Is the performance of the effluent monitoring systems sufficient to determine whether effluent releases of radioactive material are within the limits specified in DOE Order 5400.xx?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
35. Are the detection levels of analytical and monitoring systems based on the characteristics of the radionuclides present or expected to be present in the effluent?	Y N		
36. Do liquid sampling systems collect representative samples that provide an adequate record of releases from a facility and allow prediction trends and long term monitoring needs?	Y N		
- If YES to Questions 30 - 36, ENTER STATUS "S".			
- If NO to any of Questions 30 - 36, ENTER STATUS "U".			
37. Are liquid sampling and monitoring equipment calibrated when installed and recalibrated following any maintenance or modification of the equipment?	Y N		
38. Are liquid sampling and monitoring systems recalibrated on an annual basis and routinely checked with sources of known activity to verify proper operability?	Y N		
39. Are environmental conditions (such as temperature, humidity, radiation level, dusts, and vapors) considered when locating effluent monitoring systems to avoid any influence on system operability?	Y N		
- If YES to Questions 37 - 39, ENTER STATUS "S".			
- If NO to any of Questions 37 - 39, ENTER STATUS "U".			
40. a. Are there any liquid effluent streams where continuous monitoring, sampling, and recording of liquid effluent would be necessary?	Y N		
b. Are the extenuating circumstances which prevent the continuous monitoring and recording of liquid effluent quantity for a specific liquid effluent stream documented?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
41. Do liquid continuous monitoring systems have alarms to warn when concentrations of radionuclides increase significantly in order to prevent public or environmental exposures from exceeding the limits given in DOE Order 5400.3? - If YES to Question 40 a <u>and</u> YES to all others <u>or</u> NO to Question 40 a, ENTER STATUS "S". - If YES to Question 40 a <u>and</u> NO to any of others, ENTER STATUS "U". - Return to Question 5.	Y N 		
<u>DOE 5400.XY, Chapter III: Radiological Atmospheric Effluents</u>			
42. Does the Environmental Monitoring Plan document the evaluation and assessment of all sources of airborne emissions from each facility for their potential release of radionuclides?	Y N		
43. Is the rationale for the atmospheric effluent monitoring system documented in the Environmental Monitoring Plan?	Y N		
44. Are atmospheric emissions from DOE-controlled facilities monitored in accordance with the requirements of DOE Orders 5400.1 and 5400.xx? (See checklist RA-PPE).	Y N		
45. Does the Environmental Monitoring Plan document a preoperational assessment of the types and quantities of atmospheric emissions expected from all new or modified facilities in order to establish the emission monitoring needs of these facilities? - If YES to Questions 42 - 45, ENTER STATUS "S". - If NO to any of Questions 42 - 45, ENTER STATUS "U".	Y N 		
46. Is the performance of the emission monitoring systems sufficient to determine whether the releases of radioactive material are within the limits specified in DOE Order 5400.xx?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
47. Were atmospheric sampling and monitoring equipment calibrated when installed and recalibrated following any maintenance or modification of the equipment?	Y N		
48. Are atmospheric sampling and monitoring systems recalibrated annually and routinely checked with sources of known activity to verify proper operability?	Y N		
49. Are provisions for monitoring atmospheric emissions during an emergency considered when determining routine monitoring program needs?	Y N		
50. Have diffuse atmospheric sources been identified and assessed for potential to contribute to the public dose, and considered in designing the site effluent monitoring and environmental surveillance program?	Y N		
51. Do airborne effluent sampling and monitoring systems provide timely, representative, and adequately sensitive quantification of airborne emissions?	Y N		
52. Do atmospheric continuous monitoring systems have alarms to warn when concentrations of radionuclides increase significantly in order to prevent public or environmental exposures from exceeding the limits given in DOE Order 5400.xx?	Y N		
- If YES to Questions 46 - 52, ENTER STATUS "S".	☐		
- If NO to any of Questions 46 - 52, ENTER STATUS "U".			
- Return to Question 4.			
<u>DOE 5400.XY, Chapter IV: Meteorological Monitoring</u>			
53. Has the facility established a meteorological monitoring program?			
a. Has the meteorological monitoring program been designed so that it:			
1) Is appropriate to the activities at the site?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
2) Is appropriate to the topographical characteristics of the site?	Y N		
3) Is appropriate to the distance to the critical receptors?	Y N		
54. Is the scope of the meteorological monitoring program based on:			
a. An evaluation of the regulatory requirements?	Y N		
b. The meteorological data needed for impact assessments?	Y N		
c. Environmental surveillance activities?	Y N		
d. Emergency response?	Y N		
e. The mathematical procedures, models, and input data requirements necessary for computing atmospheric transport and diffusion computations?	Y N		
f. Performing dose assessments?	Y N		
55. Is the meteorological monitoring program documented?	Y N		
- If YES to Questions 53 - 55, ENTER STATUS "S".			
- If NO to any of Questions 53 - 55, ENTER STATUS "U".			
56. a. Are meteorological data from an off-site source used?	Y N		
- If YES, proceed with checklist.			
- If NO, proceed to Question 57.			

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
b. Is the data representative of conditions at the DOE facility?	Y N		
c. Is the data statistically valid, and is hourly data consistent with on-site monitoring requirements?	Y N		
- If YES to Questions 56 a - c, ENTER STATUS "S".			
- If NO to any of Questions 56 a - c, ENTER STATUS "U".			
57. Were meteorological information requirements for each facility based on:			
a. The magnitude of potential source terms?	Y N		
b. The nature of potential releases from the facility?	Y N		
c. Possible pathways to the atmosphere?	Y N		
d. Distances from release points to critical receptors?	Y N		
e. The proximity of the site to other DOE facilities?	Y N		
- If YES to Questions 57 a - e, ENTER STATUS "S".			
- If NO to any of Questions 57 a - e, ENTER STATUS "U".			
58. Were meteorological information requirements for the facility based on environmental monitoring and surveillance requirements?	Y N		
59. Does the meteorological monitoring program for the facility provide site-specific data for use in atmospheric transport and diffusion computations?	Y N		
60. Have the assumptions upon which models are based been evaluated and documented?	Y N		
- If YES to Questions 58 - 60, ENTER STATUS "S".			
- If NO to any of Questions 58 - 60, ENTER STATUS "U".			
61. Is the facility required to perform on-site meteorological measurements?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
62. Does the meteorological program using off-site meteorological data include:			
a. A description of climatology in the vicinity of the site?	Y N		
b. Ready access to representative meteorological data?	Y N		
- If NO to Question 61 <u>and</u> YES to Questions 62 a <u>and</u> b, ENTER STATUS "S".			
- If YES to Question 61 <u>and</u> NO to Question 62 a <u>or</u> b, ENTER STATUS "U".			
63. Were the following considered in developing the on-site measurements program:			
a. Potential release modes?	Y N		
b. Distances from release points to receptors?	Y N		
c. Meteorological conditions?	Y N		
- If YES to Questions 63 a - c, ENTER STATUS "S".			
- If NO to any of Questions 63 a - c, ENTER STATUS "U".			
64. Are meteorological measurements made in locations that provide data representative of the atmospheric conditions into which material will be released and transported?	Y N		
65. Are instruments used in the monitoring program capable of continuous operation in the normal range of atmospheric conditions at the facility?	Y N		
66. Are wind measurements made at a sufficient number of altitudes to adequately characterize the wind at potential release heights?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
67. Are instruments mounted on booms extending from the tower oriented in a direction that minimizes the potential effects of the tower on measurements? Note: The instruments must be at least two tower diameters from the tower, but should be three to four diameters from the tower.	Y N		
68. Does the meteorological monitoring program provide for routine daily or weekly inspection of the data and scheduled maintenance and calibration of the instrumentation and data acquisition system?	Y N		
69. Are inspections, maintenance, and calibrations conducted in accordance with written procedures?	Y N		
70. Are logs of the inspections, maintenance, and calibrations kept and maintained as permanent records?	Y N		
71. Does the instrument system provide data recovery of at least 90 percent annually for:			
a. Wind direction?	Y N		
b. Wind speed?	Y N		
c. Atmospheric stability?	Y N		
d. Other meteorological elements required for dose assessment?	Y N		
- If YES to Questions 64 - 71 d, ENTER STATUS "S".			
- If NO to any of Questions 64 - 71 d, ENTER STATUS "U".			

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
72. Has the topographic setting of the facility and the distances from the facility to points of public access been considered to evaluate the need for supplementary instrumentation?	Y N		
73. Are supplementary measurements made if meteorological measurements at a single location cannot adequately represent atmospheric conditions for transport and diffusion computations?	Y N		
74. If this is a multifacility site, has a site-wide meteorological monitoring program been established to provide a comprehensive database that can be used for all facilities located within the site?	Y N		
- If YES to Questions 72 - 74, ENTER STATUS "S".	☐		
- If NO to any of Questions 72 - 74, ENTER STATUS "U".			
<u>DOE 5400.XY, Chapter V: Environmental Surveillance</u>			
75. Is the evaluation used as the basis for establishing an environmental surveillance program documented?	Y N		
76. Is the environmental surveillance program conducted in accordance with the requirements of DOE Orders 5400.1 and 5400.xx? (See Checklist RA-PPE.)	Y N		
77. Are site-specific criteria for environmental surveillance programs documented?	Y N		
78. Has the need for environmental sampling and analysis been evaluated by exposure pathway analysis for each site radionuclide effluent or emission (liquid or airborne)?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
79. Has a critical pathway analysis (radionuclide and media) been performed, documented, and referenced in the Annual Site Environmental Report?	Y N		
80. Have provisions been made for the detection and quantification of unplanned releases?	Y N		
- If YES to Questions 75 - 80, ENTER STATUS "S".			
- If NO to any of Questions 75 - 80, ENTER STATUS "U".			
81. Are the calibrations of dosimeters and exposure-rate meters based on traceability to NIST standards?	Y N		
82. Are gross radioactivity analyses used only as trend indicators unless documented supporting analyses provide a reliable relationship to specific radionuclide concentrations or doses?	Y N		
83. Does the site document the overall accuracy ($\pm$ % accuracy) and approximate minimum detectable concentration at a specified % confidence level for environmental measurements of alphas, beta, gammas, and neutrons?	Y N		
84. Are sample preservation methods consistent with the analytical procedures used?	Y N		
85. Are environmental surveillance techniques designed to take representative sample or measurement of the applicable radiation exposure pathway?	Y N		
86. Does the site document the sampling or measurement frequencies for each significant radionuclide or environmental medium (those contributing 10 percent or more to the off-site dose), taking into account the half-life of the radionuclides to be measured?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
87. Are background or control location measurements made for each significant radionuclide and pathway (those contributing 10 percent or more to the off-site dose) for which environmental measurements are used in the dose calculations?	Y N		
- If YES to Questions 81 - 87, ENTER STATUS "S".			
- If NO to any of Questions 81 - 87, ENTER STATUS "U".			
88. Is an annual review of the radionuclide composition of effluents or emissions made and compared with those used to establish the site Environmental Monitoring Plan?	Y N		
89. Are any deviations from routine environmental surveillance requirements, including sampling or measurement station placement, documented?	Y N		
90. Is the total air flow or total running time (air sampling rate) consistent to within ± 20 percent?	Y N		
91. Are air sampling systems leak-tested, flow-calibrated, and tested and inspected on a routine basis?	Y N		
92. Are State and local game officials consulted prior to sampling any protected species?	Y N		
93. Have State and regional EPA offices been consulted to determine site-specific requirements for all groundwater monitoring programs?	Y N		
94. Are composite surface water samples analyzed without filtering?	Y N		
- If YES to Questions 88 - 94, ENTER STATUS "S".			
- If NO to any of Questions 88 - 94, ENTER STATUS "U".			

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
95. Are drinking water systems that might be reasonably impacted by site operations monitored in accordance with the frequency requirements of 40 CFR Part 141.26?	Y N		
96. If neutron monitoring is required, are methods based on the anticipated flux and energy spectrum?	Y N		
97. Is the basis sample exchange frequency for nonparticulate samples site-specific and documented?	Y N		
- If YES to Questions 95 - 97, ENTER STATUS "S".			
- If NO to any of Questions 95 - 97, ENTER STATUS "U".			
- Return to Question 6.			
<u>DOE 5400.XY, Chapter VI: Laboratory Measurement</u>			
98. Do this facility's laboratories participate in the DOE interlaboratory quality assurance program?	Y N		
99. Are laboratory practices documented?	Y N		
100. Does the facility have a sample identification system that positively identifies samples and aliquots of samples throughout the analytical process?	Y N		
101. Does the sample identification system incorporate a method for tracking all pertinent information obtained in the sampling process?	Y N		
102. Do the site's laboratories:			
a. Adhere to written procedures designed to minimize the possibility of cross contamination between samples?	Y N		
b. Separate high-activity from low-activity samples?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
c. Use proper preservation and handling practices that are compatible with analytical methods?	Y N		
- If YES to Questions 99 - 102 c, ENTER STATUS "S".			
- If NO to any of Questions 99 - 102 c, ENTER STATUS "U".			
103. Does the facility have specific analytical methods for radionuclides in the facility inventory or effluent that contribute significantly to the public dose or environmental contamination associated with the site?	Y N		
104. Are standard analytical methods used for radionuclide analyses (when available)?	Y N		
105. Are modifications of standard analytical methods documented?	Y N		
106. Do analytical contracts with outside laboratories specify the methods, requirements, and necessary documentation associated with sample analyses?	Y N		
107. Does the facility have available gamma spectroscopy systems (either in-house or outside) capable of analyzing routine, special, or emergency samples?	Y N		
108. Is all counting equipment calibrated and periodically verified with check sources?	Y N		
- If YES to Questions 103 - 108, ENTER STATUS "S".			
- If NO to any of Questions 103 - 108, ENTER STATUS "U".			
<u>DOE 5400.XY, Chapter VII: Data Analysis and Statistical Treatment</u>			
109. Are the statistical techniques used to produce the concentration estimates and corresponding measures of reliability designed to accommodate the characteristics of effluent and environmental data?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
110. Are the statistical techniques used to compare radionuclide data between sampling and/or measurement points and time designed to accommodate the characteristics of the effluent and environmental data?	Y N		
111. Are proper sampling, sample handling, and data management techniques used to reduce the variability due to sampling?	Y N		
112. Is the level of accuracy of radiological analyses estimated by analyzing blanks and spiked samples?	Y N		
113. Is the precision of radionuclide analytical results reported as a range, variance, standard deviation, standard error, or confidence interval?	Y N		
114. Are data examined and entered into the database promptly after analysis?	Y N		
115. Are outliers (data points outside an expected range) excluded from data sets if attributable to error?	Y N		
- If YES to Questions 109 - 115, ENTER STATUS "S".			
- If NO to any of Questions 109 - 115, ENTER STATUS "U".			
- Return to Question 7.			
<u>DOE 5400.XY, Chapter VIII: Public Radiation Dose Estimation</u>			
116. Are models for the environmental dose assessments representative of the physical and environmental situation encountered?	Y N		
117. Is complete documentation of models, input data, and computer programs available?	Y N		
118. Are default values used in model applications documented and evaluated to determine appropriateness to the specific modeling situation?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
119. Is a complete set of human exposure pathways considered when performing human food chain assessments?	Y N		
120. Are surface and groundwater modeling conducted to conform with the applicable State and regional EPA requirements?	Y N		
- If YES to Questions 116 - 120, ENTER STATUS "S".			
- If NO to any of Questions 116 - 120, ENTER STATUS "U".			
- Return to Question 9.			
<u>DOE 5400.XY, Attachment 3, Section 9: Recordkeeping and Reporting</u>			
121. Are auditable records (including calculations, computer programs, and other data handling) relating to environmental surveillance and effluent monitoring maintained?	Y N		
- If YES, ENTER STATUS "S".			
- If NO, ENTER STATUS "U".			
<u>DOE 5400.XY, Attachment 3, Section 10: Quality Assurance</u>			
122. Does the facility have a Quality Assurance Plan consistent with the format in ANSI/ASME NQA-1?	Y N		
123. Are periodic audits performed to verify compliance with operational procedures, quality control procedures, and all aspects of the QA program?	Y N		
124. Are the audits performed in accordance with written procedures or checklists by personnel who do not have direct responsibility for performing the activities being audited?	Y N		
125. Are audit results documented and then reported to and reviewed by responsible management?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
126. Is radiation measuring equipment, including portable instruments, environmental dosimeters, in situ monitoring equipment, and laboratory instruments, calibrated with standards traceable to the NIST or other standards recognized by the DOE? - If YES to Questions 122 - 126, ENTER STATUS "S". - If NO to any of Questions 122 - 126, ENTER STATUS "U". - Return to Question 8. This checklist is complete.	Y N		

RAD - RADIOACTIVE WASTE MANAGEMENT AND DISPOSAL

(RA-RWM, 1/46)

SITE ID: _____

AUDITOR(S): _____

BLDG/AREA/UNIT(S): _____

DATE: ____/____/____

ESO NO.: _____

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
1. Does this facility generate, transport, store, process, treat, dispose, or have on-site permanent disposal of any radioactive waste, or have any radioactively contaminated buildings? - If YES, proceed to Question 8. - If NO, checklist is complete.	Y N		
2. Does this waste include high-level waste (HLW)? Note: HLW is defined as the highly radioactive waste material that results from the reprocessing of spent nuclear fuel (including liquid waste produced directly in reprocessing and any solid waste derived from the liquid) and that contains a combination of transuranic waste and fission products in concentrations requiring permanent isolation. - If YES, proceed to Questions 43 - 55. - If NO, proceed with checklist.	Y N		
3. Does this waste include transuranic (TRU) waste? Note: TRU waste is defined as radioactive waste that, without regard to source or form, is contaminated with alpha-emitting transuranic radionuclides with half-lives greater than 20 years and concentrations greater than 100 n Ci/g at the time of assay. Heads of Field Elements can determine that other alpha-contaminated wastes peculiar to a specific site must be managed as transuranic waste.	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
- If YES, proceed to Questions 56 - 111. - If NO, proceed with checklist.			
4. Does this waste include low-level waste (LLW)? Note: LLW is defined as waste that contains radioactivity and is not classified as HLW, TRU waste, spent nuclear fuel, or byproduct material. Test specimens of fissionable material irradiated for research and development only, and not for the production of power or plutonium, may be classified as LLW, provided the concentration of transuranic waste is less than 100 n Ci/g. - If YES, proceed to Questions 112 - 158. - If NO, proceed with checklist.	Y N		
5. Does this waste include AEA byproduct material, naturally occurring radioactive material, or accelerator-produced radioactive material? Note: Byproduct material is defined as 1) any radioactive material (except special nuclear material) yielded in, or made radioactive by, exposure to the radiation incident or to the process of producing or utilizing special nuclear material or 2) the tailings or waste produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source material content. Naturally occurring and accelerator-produced radioactive material is defined as any radioactive material that can be considered naturally occurring and is not source, special nuclear, or byproduct material or material that is produced in a charged particle accelerator.	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
- If YES, proceed to Questions 159 - 163. - If NO, proceed with checklist.			
6. Does this facility have any radioactively contaminated facilities?	Y N		
- If YES, proceed to Questions 164 - 176. - If NO, proceed with checklist.			
7. a. Does this facility have a Waste Management Plan?	Y N		
b. Does the Waste Management Plan meet the requirements of DOE Order 5820.2A?	Y N		
- If YES to Questions 7 a <u>and</u> b, ENTER STATUS "S". - If NO to Question 7 a <u>or</u> b, ENTER STATUS "U" and proceed to Question 177.			
<u>10 CFR 60: Disposal of High-Level Wastes</u>			
<u>10 CFR 60.1: Applicability</u>			
8. Is the facility of the repository type?	Y N		
- If YES, proceed with checklist. - If NO, return to Question 2.			
9. Are the implementation guidelines as described in 10 CFR 60 considered to determine applicability of regulatory criteria?	Y N		
- If YES, proceed to Questions 11 - 35. - If NO, ENTER STATUS "U".			

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
10. Are the requirements as specified in 40 CFR Part 191 addressed?	Y N		
If YES, proceed to Questions 36 - 42.	☐		
- If NO, ENTER STATUS "U".			
- Return to Question 2.			
<u>10 CFR 60.15: Site Characterization</u>			
11. Was the subsurface exploratory drilling, excavation, and in situ testing before and during construction planned and coordinated with geologic repository operations area design and construction activities?	Y N		
- If YES, ENTER STATUS "S".	☐		
- If NO, ENTER STATUS "U".			
<u>10 CFR 60.16: Site Characterizations Plan Required</u>			
12. Was a site characterization plan submitted by DOE to the Director for review and comment?	Y N		
- If YES, ENTER STATUS "S".	☐		
- If NO, ENTER STATUS "U".			
<u>10 CFR 60.17: Contents of Site Characterization Plan</u>			
13. Did the site characterization plan include:			
a. A description of the area?	Y N		
b. The extent of planned excavations?	Y N		
c. Plans for any other onsite testing with radioactive material?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
d. Plans for any investigation activities that may affect the capability of such area to isolate high-level radioactive waste?	Y N		
e. Plans to apply quality assurance to data collection, recording, and retention?	Y N		
- If YES to Questions 13 a - e, ENTER STATUS "S".			
- If NO to any of Questions 13 a - e, ENTER STATUS "U".			
<u>10 CFR 60.31: Construction Authorization</u>			
14. Upon review and consideration of the application, did the following two factors meet the standards of the commission:			
a. Safety?	Y N		
b. Common defense and security?	Y N		
- If YES to Question 14 a <u>and</u> b, ENTER STATUS "S".			
- If NO to Question 14 a <u>or</u> b, ENTER STATUS "U".			
<u>10 CFR 60.71: General Recordkeeping and Reporting Requirements</u>			
15. Does DOE maintain records as required by the regulatory criteria promulgated in accordance with the Atomic Energy Act and the Energy Reorganization Act?	Y N		
16. Is there a complete history of the movement of the waste from the shipper through all phases of transportation?	Y N		
- If YES to Questions 15 <u>and</u> 16, ENTER STATUS "S".			
- If NO to Question 15 <u>or</u> 16, ENTER STATUS "U".			

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
<u>10 CFR 60.111: Performance of the Geologic Repository Operations Area Through Permanent Closure</u>			
17. Is the geologic repository operations area designed so that, until permanent closure has been completed, radiation exposures and radiation levels and releases of radioactive materials to unrestricted areas are maintained within the specified limits?	Y N		
<u>10 CFR 60.112: Overall System Performance Objective for the Geologic Repository After Permanent Closure</u>			
18. Are the engineered barrier systems, the shafts, and boreholes designed to minimize the releases of radioactive materials to the environment following permanent closure such that standards established by EPA are met?	Y N		
- If YES to Questions 17 <u>and</u> 18, ENTER STATUS "S".			
- If NO to Question 17 <u>or</u> 18, ENTER STATUS "U".			
<u>10 CFR 60.113: Performance of Particular Barriers After Permanent Closure</u>			
19. Does the repository have an engineered barrier system?	Y N		
- If YES, proceed with checklist.			
- If NO, proceed to Question 20.			
a. Is the engineered barrier system designed to release radionuclides in small increments?	Y N		
- If YES, ENTER STATUS "S".			
- If NO, ENTER STATUS "U".			

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
<u>10 CFR 60.131: General Design Criteria for the Geologic Repository Operations Area</u>			
20. Is the geologic repository operations area designed to include explosion and fire detection alarm systems?	Y N		
21. Are the structures, systems, and components important to safety designed to maintain control of radioactive waste and radioactive effluents?	Y N		
22. Does the facility have a system for prompt termination of operations and evacuation of personnel during an emergency?	Y N		
23. Does the facility have a program for periodic inspection, testing, and maintenance as necessary?	Y N		
24. Does the design include provisions for instrumentation and control systems to monitor and control the behavior of systems important to safety?	Y N		
<u>10 CFR 60.132: Additional Design Criteria for Surface Facilities in the Geologic Repository Operations Area</u>			
25. If required, is the facility designed to facilitate decontamination or dismantlement?	Y N		
26. Does the facility have surface facility ventilation?	Y N		
- If YES to Questions 20 - 26, ENTER STATUS "S".			
- If NO to any of Questions 20 - 26, ENTER STATUS "U".			
<u>10 CFR 60.135: Criteria for the Waste Package and its Components</u>			
27. Is a label provided for each waste package?	Y N		
28. Are the waste packages designed to maintain waste containment during transportation, emplacement, and retrieval?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
29. Are the combustible radioactive wastes reduced to a noncombustible form? - If YES to Questions 27 - 29, ENTER STATUS "S". - If NO to any of Questions 27 - 29, ENTER STATUS "U".	Y N ☐		
<u>10 CFR 60.141: Confirmation of Geotechnical and Design Parameters</u>			
30. Does the facility have a program of surveillance, measurement, testing and geologic mapping to ensure that geotechnical and design parameters are confirmed and to ensure that appropriate action is taken to inform the Commission of any changes needed?	Y N		
<u>10 CFR 60.142: Design Testing</u>			
31. Does the facility conduct in site testing of features such as borehole and shaft seals, backfill, and the thermal interaction effects of the waste packages, backfill, rock, and groundwater? - If YES to Questions 30 and 31, ENTER STATUS "S". - If NO to Question 30 or 31, ENTER STATUS "U".	Y N ☐		
<u>10 CFR 60.143: Monitoring and Testing Waste Packages</u>			
32. Does the facility have a program at the geologic repository operations area for monitoring the condition of the waste packages?	Y N		
33. Does the program continue as long as practical up to the time of permanent closure?	Y N		
<u>10 CFR 60.152: QA Implementation</u>			
34. Does the facility implement a quality assurance program based on the criteria of Appendix B of 10 CFR Part 50 as applicable, and appropriately supplemented by additional criteria as required by 60.151?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
<u>10 CFR 60.161: Training and Certifications Program</u>			
35. Does the facility have a program for training, proficiency testing, certification and requalification of operating and supervisory personnel?	Y N		
- If YES to Questions 32 - 35, ENTER STATUS "S".			
- If NO to any of Questions 32 - 35, ENTER STATUS "U".			
- Return to Question 10.			
<u>40 CFR 191: Environmental Standards for Radioactive Wastes</u>			
<u>Environmental Radiation Protection Standards for Management and Disposal of Spent Nuclear Fuel High-level and Transuranic Radioactive Wastes</u>			
36. Is management and storage of spent nuclear fuel, high-level, or transuranic radioactive wastes from all facilities that are operated by the Department, but not regulated by the Commission or by Agreement States, conducted in such a manner as to provide reasonable assurance that the combined annual dose-equivalent to any member of the public in the general environment from discharges of radioactive material and direct radiation from such management and storage does not exceed:			
a. 25 millirem to the whole body?	Y N		
b. 75 millirem to any critical organ?	Y N		
- If YES to Questions 36 a <u>and</u> b, ENTER STATUS "S".			
- If NO to Question 36 a <u>or</u> b, ENTER STATUS "U".			

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
40 CFR 191.13: Containment Requirements			
37. Are the disposal systems for spent nuclear fuel, high-level, or transuranic radioactive wastes designed to provide a reasonable expectation that the cumulative releases of radionuclides to the accessible environment for 10,000 years after disposal from all significant processes:			
a. Will have less than 1 chance in 10 of exceeding the quantities calculated according to Table 1 (Appendix A)?	Y N		
b. Will have less than 1 chance in 1,000 of exceeding 10 times the quantities calculated according to Table 1 (Appendix A)?	Y N		
38. Is there a reasonable expectation, on the basis of the record before the implementing agency, that compliance with Part 191.13(a) will be achieved?	Y N		
- If YES to Questions 37 a <u>or</u> b <u>and</u> 38, ENTER STATUS "S".			
- If NO to Question 37 a <u>and</u> b <u>or</u> 38, ENTER STATUS "U".			
40 CFR 191.14: Assurance Requirements			
39. If this facility is not regulated by the Commission, are the following provisions followed for disposal of spent nuclear fuel, high-level, or transuranic wastes:			
a. Active institutional controls over disposal sites are maintained for as long a period of time as practicable after disposal?	Y N		
b. Disposal systems are monitored after disposal to detect substantial and detrimental deviations from expected performance, using techniques that do not jeopardize the isolation of the wastes, and will be conducted until there are no significant concerns to be addressed by further monitoring?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
c. Disposal sites are designated by the most permanent markers, records, and other passive institutional controls practicable to indicate the dangers of wastes and their location?	Y N		
d. Disposal systems use different types of barriers to isolate the wastes from the accessible environment, including engineered and natural barriers?	Y N		
e. Are places where there has been mining for resources, where there is expectation of exploration for scarce or easily accessible resources, and where there is significant concentration of any material that is not widely available from other sources avoided as disposal sites?	Y N		
f. Disposal systems are selected so that removal of most of the wastes is not precluded for a reasonable period of time after disposal?	Y N		
- If YES to Questions 39 a - f, ENTER STATUS "S".			
- If NO to any of Questions 39 a - f, ENTER STATUS "U".			
<u>40 CFR 191.15: Individual Protection Requirements</u>			
40. Are the disposal systems for spent nuclear fuel, high-level, or transuranic radioactive wastes designed to provide a reasonable expectation that for 1,000 years after disposal, undisturbed performance of the disposal system shall not cause the annual dose equivalent from the disposal system to any member of the public in the accessible environment to exceed:			
a. 25 millirem to the whole body?	Y N		
b. 75 millirem to any critical organ?	Y N		
- If YES to Questions 40 a <u>and</u> b, ENTER STATUS "S".			
- If NO to Question 40 a <u>or</u> b, ENTER STATUS "U".			

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
40 CFR 191.16: Groundwater Protection Requirements			
41. Are the disposal systems for spent nuclear fuel, high-level, or transuranic radioactive wastes designed to provide a reasonable expectation that for 1,000 years after disposal, undisturbed performance of the disposal system shall not cause the radionuclide concentrations averaged over any year in water withdrawn from any portion of a special source of groundwater to exceed:			
a. 5 picocuries per liter of radium-226 and radium-228?	Y N		
b. 15 picocuries per liter of alpha-emitting radionuclides (including radium-226 and radium-228 but excluding radon)?	Y N		
c. The combined concentrations of radionuclides that emit either beta or gamma radiation that would produce an annual dose equivalent to the total body or any internal organ greater than 4 millirems per year if an individual consumed 2 liters per day of drinking water from such a source of groundwater?	Y N		
- If YES to Questions 41 a - c, ENTER STATUS "S".			
- If NO to any of Questions 41 a - c, ENTER STATUS "U"			
42. Do any of the average annual radionuclide concentrations existing in a special source of groundwater before construction of the disposal system already exceed the limits in Part 191.16(a)?	Y N		
- If YES, proceed with checklist.			
- If NO, return to Question 2.			

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
a. Is the disposal system designed to provide a reasonable expectation that, for 1,000 years after disposal, undisturbed performance of the system shall not increase the existing average annual radionuclide concentrations in water withdrawn from that special source of groundwater by more than the limits established in Part 191.16(a)? - If YES, ENTER STATUS "S". - If NO, ENTER STATUS "U". - Return to Question 2. <u>DOE Order 5820.2A: Radioactive Waste Management</u> <u>Chapter I: High-level Waste</u> <u>Design</u> 43. Requirements for new facilities should meet the following criteria: a. Have the design objectives for new facilities ensured the protection of the public and operating personnel from hazards associated with normal high-level radioactive waste operations, accident conditions, and the effects of natural phenomena? b. Is the facility in compliance with DOE policies regarding the following: 1) Nuclear safety? 2) Quality assurance? 3) Fire protection?	Y N ☐ Y N Y N Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
4) Pollution control?	Y N		
5) Safeguards and security protection for high-level waste?	Y N		
6) Protection of essential operations for the effects of potential nuclear accidents?	Y N		
c. Do the designs for new radioactive storage facilities meet the requirements of DOE Order 6430.1, applicable EH Orders and 40 CFR 864?	Y N		
d. Do the designs for new storage facilities incorporate features to facilitate retrieval capabilities?	Y N		
- If YES to Questions 43 a - d, ENTER STATUS "S".			
- If NO to any of Questions 43 a - d, ENTER STATUS "U".			
<u>Storage Operations</u>			
44. Waste Characterization:			
a. Is liquid and solidified high-level radioactive waste characterized consistent with radiation protection requirements to determine its hazardous components in accordance with 40 CFR 261 and 40 CFR 264?	Y N		
b. Has waste characteristics and compatibility information been documented in a Safety Analysis Report?	Y N		
45. Storage and Transfer Operations:			
a. Is double containment used in all high-level waste handling, transfer, and storage facilities?	Y N		
b. Have secondary containment systems been installed that are capable of containing liquids that leak into them from the primary system?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
c. Are these secondary systems equipped with transfer capability to retrieve the leaked liquid?	Y N		
d. Do secondary containment systems for solidified high-level waste provide for physical isolation of the waste from the environment?	Y N		
e. Has waste been segregated by type to make accessibility for future processing easier?	Y N		
f. Have ventilation and filtration systems been provided to maintain radionuclide releases within the guidelines specified in DOE Order 5481.1B and applicable EH Orders?	Y N		
g. Have engineering controls been incorporated to provide liquid volume inventory data and to prevent spills, leaks, and overflows from tanks or containment systems?	Y N		
h. Have nuclear criticality safety considerations and controls been evaluated for normal operations to protect against an uncontrolled nuclear criticality incident?	Y N		
i. Does the facility utilize remote maintenance features and other appropriate techniques to minimize personnel radiation exposure in accordance with DOE Order 5481.1B?	Y N		
- If YES to Questions 44 <u>and</u> 45, ENTER STATUS "S".			
- If NO to Question 44 <u>or</u> 45, ENTER STATUS "U".			
46. Monitoring, Surveillance, and Leak Detection:			
a. Is the following, at a minimum, being measured:			
1) Temperature?	Y N		
2) Pressure?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
3) Radioactivity in ventilation exhaust?	Y N		
4) Liquid high-level effluent streams?	Y N		
b. Is the following (for facilities storing liquid high-level waste) being measured:			
1) Liquid levels?	Y N		
2) Sludge volume?	Y N		
3) Tank chemistry?	Y N		
4) Condensate and cooling water?	Y N		
c. Have leak detection systems been designed and operated so that they will detect the failure of the primary containment boundary and the occurrence of waste release of accumulated liquid in the secondary containment system?	Y N		
d. Has a method for periodically assessing waste storage system integrity been established?	Y N		
e. Are the electrical monitoring and leak detection devices essential to safe operations provided with backup power to ensure operability under emergency conditions?	Y N		
f. Are surface water systems associated with the high-level waste storage area being monitored?	Y N		
g. Is there a system of groundwater monitoring wells meeting the Resource Conservation and Recovery Act requirements of 40 CFR 264 around clusters of liquid waste storage tanks?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
- If YES to Questions 46 a - g, ENTER STATUS "S". - If NO to any of Questions 46 a - g, ENTER STATUS "U".			
47. Contingency Actions:			
a. Has there been a leak or spill from a tank or secondary containment system into the surrounding soil?	Y N		
- If YES, proceed with checklist. - If NO, proceed to Question 48.			
b. Was the tank or secondary containment system removed from service evaluated fully?	Y N		
c. Are there any tanks or secondary containment system that have not been removed from the system?	Y N		
d. If a release occurred, were steps taken to prevent further migration of the release to soil or surface water?	Y N		
e. Was contaminated soil removed?	Y N		
f. Is there a schedule and procedure for monitoring, surveillance, and calibration checks?	Y N		
g. Are there high-level facility emergency response procedures?	Y N		
- If YES to Questions 47 b - g, ENTER STATUS "S". - If NO to any of Questions 47 b - g, ENTER STATUS "U".			

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
48. Waste Treatment and Minimization:			
a. Have processing programs been developed and implemented for the purpose of economy and enhancing the safety of high-level waste storage by reducing the quantity of waste being sent to storage?	Y N		
b. Have programs been developed and implemented to treat high-level waste to control corrosion within design limits for the storage system been changed to address each treatment process as necessary?	Y N		
c. Has the chemistry of liquid high-level waste been adjusted to control corrosion within design limits for the storage system?	Y N		
d. Have waste generation and waste management systems that change the chemical and physical forms of the waste been assessed to assure compatibility and retrievability?	Y N		
- If YES to Questions 48 a - d, ENTER STATUS "S".			
- If NO to any of Questions 48 a - d, ENTER STATUS "U".			
49. Storage and Transfer Operations:			
a. Are individual contained tank systems being used to store fresh high-level waste from fuel reprocessing operations only under emergency conditions?	Y N		
b. Are Safety Analysis Reports being complied with for storage and transfer operations?	Y N		
c. Are engineered systems being incorporated into the operation to provide waste volume inventory data?	Y N		
d. Are remote maintenance features being used to maintain personnel radiation exposure as low as reasonably achievable?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
e. Have systems been provided to maintain radionuclide releases at the point of discharge?	Y N		
- If YES to Questions 49 a - e, ENTER STATUS "S".			
- If NO to any of Questions 49 a - e, ENTER STATUS "U".			
50. Monitoring, Surveillance, and Leak Detection:			
a. Does monitoring and surveillance capability exist to provide liquid volume, waste inventory data, and identification of failed containment?	Y N		
b. Does a method exist for periodically assessing waste storage tank facility?	Y N		
51. Contingency Action:			
a. Does a contingency action plan for response to spills or leaks and other credible emergencies exist?	Y N		
b. Is the appropriate equipment being maintained to be used for emergency situations involving pumpable liquid?	Y N		
- If YES to Questions 50 a - 51 b, ENTER STATUS "S".			
- If NO to any of Questions 50 a - 51 b, ENTER STATUS "U".			
<u>Disposal</u>			
52. Have new and readily retrievable wastes been processed and the high-level waste fraction disposed of in a geologic repository?	Y N		
53. Have options for permanent disposal of other wastes been evaluated and did those options include such methods as in-place stabilization as well as retrieval and processing?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
54. Are new and readily retrievable existing high-level wastes being processed to a final immobilized form in facilities such as the Defense Waste Processing Facility and the Hanford Waste Vitrification Plant in preparation for permanent disposal in a deep geologic repository?	Y N		
55. Other Waste:			
a. Is high-level waste that is not readily retrievable monitored periodically?	Y N		
b. Have field offices re-evaluated the safety of such wastes to determine the need for corrective measures as necessary?	Y N		
c. Have options for permanent disposal of tank waste in single containers been evaluated and made to include such methods as in-place stabilization as well as retrieval and processing?	Y N		
- If YES to Questions 52 - 55 c, ENTER STATUS "S".			
- If NO to any of Questions 52 - 55 c, ENTER STATUS "U".			
- Return to Question 3.			
Chapter II: Management of Transuranic Waste			
Waste Classification			
56. Has any material that has been known to be or suspected of being contaminated with transuranic radionuclides been evaluated within the generating process?	Y N		
57. Was it determined to be recoverable material, transuranic waste, low level waste, mixed waste, or non-radioactive trash?	Y N		
58. Has the lower concentration limit for transuranic waste been checked as it relates to the contents of any single waste package at the time of assay?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
- If YES to Questions 56 - 58, ENTER STATUS "S". - If NO to any of Questions 56 - 58, ENTER STATUS "U".			
<u>Transuranic Waste Generation and Treatment</u>			
59. Have technical and administrative controls been directed to reducing the gross volume of waste generated and/or the amount of radioactivity requiring disposal?	Y N		
60. Have volume reduction techniques such as incineration, compaction, extraction, and shredding, been implemented?	Y N		
61. Have these facilities been permitted by the proper authorities?	Y N		
62. Has transuranic waste been assayed or otherwise evaluated to determine the kinds and quantities of transuranic waste present prior to storage?	Y N		
63. Have hazardous waste quantities been estimated?	Y N		
64. Have hazardous wastes been analyzed for contents?	Y N		
65. Have mixed transuranic wastes been treated to destroy the hazardous waste components?	Y N		
66. Has transuranic waste that has been classified for security reasons been treated to remove or destroy the classified characteristics prior to certification?	Y N		
- If YES to Questions 59 - 66, ENTER STATUS "S". - If NO to any of Questions 59 - 66, ENTER STATUS "U".			
<u>Transuranic Waste Certification</u>			
67. Has transuranic waste been certified pursuant to the Waste Isolation Pilot Plant-Waste Acceptance Criteria?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
68. Have all transuranic waste certification sites prepared a certification plan which describes how the waste meets each waste acceptance criterion described in WIPP - DOE - 069?	Y N		
69. Does the certification plan define controls and other measures to ensure that each element of the certification plan is performed adequately as described?	Y N		
70. Have certification plans been submitted to Waste Isolation Pilot Plant-Waste Acceptance Criteria Certification?	Y N		
71. Has the Waste Isolation Pilot Plant-Waste Acceptance Criteria Certification Committee submitted certification plans to the State of New Mexico's Environmental Evaluation group for review prior to approval of such plans?	Y N		
72. Have the comments of Environmental Evaluation groups on certification and QA plans been resolved between the site and Waste Isolation Pilot Plant-Waste Acceptance Criteria Certification Committee?	Y N		
73. Have the approved certification and associated QA plans been implemented by the generating sites using specific written operations procedures?	Y N		
74. Does each certification plan define controls and other measures to ensure that each element of the certification is performed adequately as described?	Y N		
75. Have certification activities conducted under approved plans and procedures been audited periodically?	Y N		
76. Has the Waste Isolation Pilot Plan-Waste Acceptance Criteria Certification Committee issued a formal audit report to the responsible field organization?	Y N		
- If YES to Questions 67 - 76, ENTER STATUS "S".			
- If NO to any of Questions 67 - 76, ENTER STATUS "U".			

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
<u>Transuranic Waste Packaging</u>			
77. Has newly generated transuranic waste been placed in noncombustible packaging that meets DOT requirements?	Y N		
78. Are all Type A transuranic waste containers equipped with a method to prevent pressure buildup?	Y N		
79. Have the waste packages been marked, labeled, and sealed in accordance with the Waste Isolation Pilot Plant-Waste Acceptance Criteria, EPA and DOT requirements?	Y N		
- If YES to Questions 77 - 79, ENTER STATUS "S".			
- If NO to any of Questions 77 - 79, ENTER STATUS "U".			
<u>Temporary Storage at Generating Sites</u>			
80. Has transuranic waste been segregated or otherwise clearly identified to avoid the commingling of transuranic waste streams with high-level waste or low-level waste?	Y N		
81. Has certified transuranic waste been commingled with noncertified transuranic waste or been stored in a manner likely to alter its certification status?	Y N		
82. Has transuranic waste in storage areas been protected from unauthorized access?	Y N		
83. Have transuranic wastes in storage been monitored periodically to ensure that the wastes are not releasing their radioactive and/or hazardous constituents?	Y N		
84. Have transuranic waste storage facilities been designed, constructed, maintained, and operated to minimize the possibility of fire, explosion, or accidental release of hazardous components of the waste to the environment?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
85. Do the facilities which store transuranic waste have a contingency plan designed to minimize the adverse impacts of fire, explosion, or accidental release of hazardous components of the waste to the environment?	Y N		
86. Is transuranic waste being stored so as to maintain radiation exposures as low as reasonably achievable?	Y N		
- If YES to Questions 80 - 86, ENTER STATUS "S".			
- If NO to any of Questions 80 - 86, ENTER STATUS "U".			
<u>Transportation/Shipping to the Waste Isolation Pilot Plant</u>			
87. Do transuranic waste shipments comply with the provisions of DOE and DOT regulations, pursuant to DOE 5400.1?	Y N		
88. Are the transuranic waste shipments by truck done by a DOE-controlled carrier system?	Y N		
89. Is all transuranic waste transported in certified Type B packaging?	Y N		
90. Have the appropriate EPA and State authorizations and permits been obtained for the transport system?	Y N		
91. Has the placarding of shipments been carried out, as required by the regulations of DOT?	Y N		
92. Are all shipments of transuranic waste in or on "exclusive use" vehicles?	Y N		
93. Have shipments been made as expeditiously as possible and tracked from origin to destination using a real-time tracking communications system?	Y N		
94. Have there been any deviations from "preferred routes", or any delays or other irregularities that have been detected?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
95. Have they been investigated with a report sent to Waste Isolation Pilot Plant within 90 days?	Y N		
96. Is there a transuranic waste transportation management and operations plan done by the Albuquerque Operations Office that addresses the following:			
a. Communication between transport vehicle and traffic management?	Y N		
b. Shipping tracking in transit?	Y N		
c. Security?	Y N		
d. Emergency notification and response?	Y N		
e. Shipment routing?	Y N		
f. Shipment notification as appropriate?	Y N		
g. Driver training and qualifications?	Y N		
h. Vehicle maintenance and inspection?	Y N		
i. State surveillance and inspection?	Y N		
j. Inspection and recertification of transport packaging?	Y N		
- If YES to Questions 87 - 96 j, ENTER STATUS "S".			
- If NO to any of Questions 87 - 96 j, ENTER STATUS "U".			
<u>Interim Storage</u>			
97. Have interim storage sites been designated for storage of:			
a. Waste certified by off-site generators?	Y N		
b. Waste certified by on-site generators?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
c. Waste certified by interim storage personnel?	Y N		
d. Uncertified waste received from on-site and off-site generators that is awaiting processing and certification?	Y N		
- If YES to Questions 97 a - d, ENTER STATUS "S".			
- If NO to any of Questions 97 a - d, ENTER STATUS "U".			
98. Have all new interim storage facilities been sited, designed, constructed, and operated consistent with RCRA with the following:			
a. Proximity to groundwater and areas of seismic activity or flood plains have been identified and potential impacts been evaluated?	Y N		
b. The facility has been designed and operated to minimize runoff and precipitation?	Y N		
c. An environmental monitoring program has been provided to detect any release and migration of major radioactive and hazardous components?	Y N		
d. The storage facility design minimizes the possibility for the unauthorized entry of persons?	Y N		
e. Incompatible waste types have been placed in separate packages and stored in segregated areas to prevent accidental ignition or chemical reaction?	Y N		
f. Waste storage facilities are designed and operated to minimize the exposure of personnel to radiation and chemicals?	Y N		
g. The storage facility operator has inspected or verified routinely the condition of waste packages at the storage site for determination of conditions that may threaten human health or cause release of hazardous or radioactive components to the environment?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
h. The storage facility operator has prepared plans that identify and describe how the site will be closed at the end of its active life?	Y N		
i. Sites that use underground storage tanks for the storage of transuranic waste comply with the requirements of RCRA? (See RCRA-UST checklist)	Y N		
j. Have permits been acquired for appropriate regulatory entities for all the interim storage facility activities listed above?	Y N		
- If YES to Questions 97 a - 98 j, ENTER STATUS "S".			
- If NO to any of Questions 97 a - 98 j, ENTER STATUS "U".			
99. Have existing interim storage sites been reviewed for consistency with the items?	Y N		
100. Have any necessary corrective actions been performed based on a compliance schedule approved by appropriate regulatory authorities?	Y N		
101. Has certified waste been stored in a manner unlikely to alter the certification of the waste package?	Y N		
102. Has the operator received data package information for each waste package from the generator?	Y N		
103. Did the operator store the waste generator's data and use the data to prepare a new data package at the time of shipment to the Waste Isolation Pilot Plant?	Y N		
104. Has the generator of the certified waste described the form of waste and the waste package content?	Y N		
105. Has the waste that has been certified by a generator and shipped to an interim storage site been reshipped to the Waste Isolation Pilot Plant by the interim storage site in the following manner:			

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
a. The generator/certifier has been identified as the generator/certifier and shipping originator?	Y N		
b. The interim storage site has been identified as the reshipper?	Y N		
c. The shipping originator has been responsible for certifiability of the waste form, waste package content, waste container procurement documentation, related data package, information and proper marking, labeling, and placarding of the shipment?	Y N		
d. The reshipper has been responsible for complete data package assembly and transmittal, for proper marking, labeling, and placarding, for verifying the adequacy of the exterior condition of the container and for proper shipment loading?	Y N		
e. Has the reshipper performed radiation dose rate and contamination analysis on each package?	Y N		
106. Have agreements been developed between off-site waste generators and interim storage site operators/certifiers to define clearly their respective responsibilities?	Y N		
- If YES to Questions 99 - 106, ENTER STATUS "S".			
- If NO to any of Questions 99 - 106, ENTER STATUS "U".			
<u>Buried Transuranic - Contaminated Waste</u>			
107. Has each waste site been inventoried to include information on types and quantities of radioactive and hazardous chemicals?	Y N		
108. Has this information been verified by appropriate sampling, analysis and monitoring techniques?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
109. Do the characterization and verification activities also include determination of waste migration from the burial sites and potential environmental and health impacts?	Y N		
110. Has DOE site developed a closure strategy for the waste site utilizing the waste characterization data?	Y N		
111. Has the DOE site developed a site closure plan which includes the following:			
a. NEPA requirements?	Y N		
b. Applicable Federal, State and local requirements?	Y N		
c. Required permits?	Y N		
d. Selected closure strategy and justification?	Y N		
e. A waste retrieval strategy?	Y N		
f. Budget requirements by fiscal year?	Y N		
g. Strategy for schedule of closure?	Y N		
h. Post-closure monitoring and controls?	Y N		
- If YES to Questions 107 - 111h, ENTER STATUS "S".			
- If NO to any of Questions 107 - 111h, ENTER STATUS "U".			
- Return to Question 4.			
Chapter III: Management of Low-Level Waste			
Performance Objectives			
112. Has DOE low-level waste, not disposed of prior to issuance of the DOE Order 5820.2A, been managed on the schedule developed in the Implementation Plan to accomplish the following:			

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
a. Protect public health and safety in accordance with standards specified in applicable EH Orders and other DOE Orders?	Y N		
b. Ensure that external exposure to the waste and concentration of radioactive material which may be released into the environment, results in an effective dose equivalent that does not exceed 25 mrem/yr to any member of the public?	Y N		
c. Do releases to the atmosphere meet requirements of 40 CFR 61?	Y N		
113. Has the facility ensured that the committed effective dose equivalents received by individuals who inadvertently may intrude onto the facility after the loss of active institutional control (100 yrs) will not exceed 100 mrem/yr. for continuous exposure or 500 mrem for a single acute exposure?	Y N		
114. Are groundwater resources protected consistent with Federal, State and local requirements?	Y N		
- If YES to Questions 112 a - 114, ENTER STATUS "S".			
- If NO to any of Questions 112 a - 114, ENTER STATUS "U".			
<u>Performance Assessment</u>			
115. Have field organizations with disposal sites prepared and maintained a site-specific radiological performance analysis for the disposal of waste?	Y N		
116. Has the field organization prepared and maintained an overall waste management systems performance assessment?	Y N		
117. Is there an operational monitoring system?	Y N		
- If YES to Questions 115 - 117, ENTER STATUS "S".			
- If NO to any of Questions 115 - 117, ENTER STATUS "U".			

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
<u>Waste Generation</u>			
118. Have technical and administrative controls reduced the gross volume of waste generated and/or the amount of radioactivity requiring disposal?	Y N		
119. Has the DOE low-level waste generator established auditable programs to ensure that the amount of low-level waste generated and shipped for disposal is minimized?	Y N		
120. Has the DOE low-level waste generator separated uncontaminated waste from low-level waste to facilitate cost-effective treatment and disposal?	Y N		
121. Has the DOE low-level waste generator preparing design for a new process change incorporated principles into the design that will minimize the generation of low-level waste?	Y N		
- If YES to Questions 118 - 121, ENTER STATUS "S".			
- If NO to any of Questions 118 - 121, ENTER STATUS "U".			
<u>Waste Characterization</u>			
122. Has low-level waste been characterized with sufficient accuracy to permit proper segregation, treatment, storage, and disposal?	Y N		
123. Does this characterization ensure that upon generation and after processing, the actual physical and chemical characteristics and major radionuclide contents are recorded and known during all stages of the waste management process?	Y N		
124. Have the waste characterization data been recorded on a waste manifest?	Y N		
- If YES to Questions 122 - 124, ENTER STATUS "S".			
- If NO to any of Questions 122 - 124, ENTER STATUS "U".			

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
<u>Waste Management</u>			
125. Is waste shipped from one field organization to another for treatment, storage, or disposal in accordance with the requirements established by the operations office having responsibility for operations of the receiving facility?	Y N		
126. Have waste acceptance criteria been established for each low-level waste treatment, storage, and disposal facility and submitted to the cognizant field organization?	Y N		
127. Have generators of waste implemented low-level waste certification programs to provide assurance that the waste acceptance criteria for any area that the generators are not?	Y N		
128. Do the waste acceptance criteria for storage, treatment, and disposal facilities address the following:			
a. Allowable quantities and concentrations of specific radioisotopes to be handled, processed, stored, or disposed of?	Y N		
b. Criticality safety requirements?	Y N		
c. Restrictions regarding low-level waste classified for security reasons?	Y N		
d. External radiation and internal heat generation?	Y N		
e. Restrictions on the generation of harmful gases, vapors, or liquids in waste?	Y N		
f. Chemical and structural stability of waste packages, radiation effects, microbial activity, chemical reactions, and moisture?	Y N		
g. Restrictions for chelating and complexing agents having the potential for mobilizing radionuclides?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
h. Quantity of free liquids?	Y N		
- If YES to Questions 125 - 128 h, ENTER STATUS "S".			
- If NO to any of Questions 125 - 128 h, ENTER STATUS "U".			
<u>Waste Treatment</u>			
129. Is waste being treated by appropriate methods so that the disposal site can meet performance objectives?	Y N		
130. Are waste treatment techniques such as incineration, shredding, and compaction to reduce volume and provide more stable waste forms being implemented as necessary to meet performance requirements?	Y N		
131. Is the development of large-scale waste treatment facilities being supported by the appropriate NEPA documentation?	Y N		
132. Is the operation of waste treatment facilities being supported by adequate documentation?	Y N		
- If YES to Questions 129 - 132, ENTER STATUS "S".			
- If NO to any of Questions 129 - 132, ENTER STATUS "U".			
<u>Shipment</u>			
133. Is the volume of waste and number of shipments of low-level waste being minimized and the shipments being conducted based on plans developed by the field organizations?	Y N		
134. Do generators provide an annual forecast in the 3rd quarter of the fiscal year to the field organizations managing the off-site disposal facility to which the waste is to be shipped?	Y N		
135. Is the certification program auditable and able to withstand independent review?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
136. Does each package of waste comply with labeling requirements of DOE Order 1540.1?	Y N		
- If YES to Questions 133 - 136, ENTER STATUS "S".			
- If NO to any of Questions 133 - 136, ENTER STATUS "U".			
<u>Long-Term Storage</u>			
137. Is low-level waste being stored by appropriate methods?	Y N		
138. Are records being maintained for all low-level waste that enters and leaves the storage facility?	Y N		
139. Is the development and operation of a waste storage facility supported by the following documentation:			
a. Analysis which identifies the need for the storage facility?	Y N		
b. A Construction Design Report, including projected waste volume, storage, construction, and operating cost estimates?	Y N		
c. A Safety Analysis Report and NEPA documentation?	Y N		
140. Is storage of waste to allow for nuclides to decay or storage of wastes until they can be disposed of by approved methods are acceptable available?	Y N		
- If YES to Questions 137 - 140, ENTER STATUS "S".			
- If NO to any of Questions 137 - 140, ENTER STATUS "U".			
<u>Disposal</u>			
141. Is low-level waste being disposed by methods appropriate to achieve the performance objectives?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
142. Are engineered modifications for specific waste types and for specific waste composition for each disposal site being developed through the performance assessment model?	Y N		
143. Have an Oversight and Peer Review Panel Office Contractor and other specialists in performance assessments been selected?	Y N		
144. Is disposition of waste designated as greater-than-class C being handled as special cases?	Y N		
145. Are these requirements being followed:			
a. Waste must not be packaged for disposal in cardboard or fiberboard boxes, unless such boxes meet DOT requirements and contain stabilized waste with a minimum of void space. For all types of containers, void spaces within the waste and between the waste and its packaging shall be reduced as much as practical?	Y N		
b. Liquid wastes, or wastes containing free liquid, must be converted into a form that contains as little freestanding and noncorrosive liquid as is reasonably achievable, but in no case shall the liquid exceed 1 percent of the volume of the waste when the waste is in a disposal container, or 0.5 percent of the volume of the waste processed to a stable form?	Y N		
c. Waste must not be readily capable of detonation or of explosive decomposition or reaction at normal pressures and temperatures, or of explosive reaction with water?	Y N		
d. Waste must not contain, or be capable of generating, quantities of toxic gases, vapors, or fumes harmful to persons transporting, handling, or disposing of waste. This does not apply to radioactive gaseous waste packages as identified in paragraph 3i(5)(e) of Chapter III of the Order?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
e. Waste in a gaseous form must be packaged at a pressure that does not exceed 1.5 atmospheres at 20 degrees Celsius?	Y N		
f. Since the waste must not be pyrophoric, are the pyrophoric materials contained in the waste treated, prepared, and packaged to be non-flammable?	Y N		
146. Disposal Facility and Disposal Site Design:			
a. Have design criteria been established prior to selection of new disposal facilities, new disposal sites, or both?	Y N		
b. Have disposal units been designed consistent with disposal site hydrology, geology, and waste characteristics and in accordance with the NEPA process?	Y N		
147. Disposal Facility Operations:			
a. Have field organizations developed and implemented operating procedures for low-level waste disposal facilities that protect the environment, the health and safety of the public, and facility personnel; that ensure the security of the facility and minimize the need for long-term control; and that meet the requirements of the closure/post closure plan?	Y N		
b. Have necessary permanent identification markers for disposal excavations and monitoring wells been completed?	Y N		
c. Do operating procedures include training for disposal facility operating personnel, emergency response plans, and a system of reporting unusual occurrences?	Y N		
d. Does waste placement into disposal units minimize voids between containers?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
e. Are operations conducted so that active waste disposal operations will not have an adverse effect on filled disposal units?	Y N		
- If YES to Questions 141 - 147 e, ENTER STATUS "S".			
- If NO to any of Questions 141 - 147 e, ENTER STATUS "U".			
<u>Disposal Site Closure and Post-Closure</u>			
148. Have field organizations developed site specific comprehensive closure plans for new and existing operating low-level waste disposal sites?	Y N		
149. During closure and post-closure, do residual radioactivity levels for surface soils comply with existing DOE decommissioning guidelines?	Y N		
150. Have corrective measures been applied to new disposal sites or individual disposal units if condition occur or are forecasted that could jeopardize attainment of the performance objectives at DOE?	Y N		
151. Do all sites adhere to CERCLA, RCRA, Superfund, and all other applicable laws and regulations? (See those checklists.)	Y N		
152. Have closure plans been reviewed by the appropriate field organization?	Y N		
- If YES to Questions 148 - 152, ENTER STATUS "S".			
- If NO to any of Questions 148 - 152, ENTER STATUS "U".			
<u>Environmental Monitoring</u>			
153. Is each operational or nonoperational low-level waste treatment, storage and disposal facility monitored by an environmental monitoring program?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
154. Is the environment monitoring program designed to measure the following:			
a. Operational effluent releases?	Y N		
b. Migration of radionuclides?	Y N		
c. Disposal unit subsidences?	Y N		
d. Changes in disposal facility and disposal site parameters?	Y N		
155. Does the program monitoring include:			
a. Surface soil?	Y N		
b. Air?	Y N		
c. Surface water?	Y N		
d. Subsurface water?	Y N		
156. Is the program capable of detecting changing trends?	Y N		
- If YES to Questions 153 - 156, ENTER STATUS "S".			
- If NO to any of Questions 153 - 156, ENTER STATUS "U".			
<u>Records and Reports</u>			
157. Has the field organization developed and maintained a recordkeeping system?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
158. Are records kept and do they accompany each waste package from generator through final disposal? - If YES to Questions 157 <u>and</u> 158, ENTER STATUS "S". - If NO to Question 157 <u>or</u> 158, ENTER STATUS "U". - Return to Question 5.	Y N ☐		
<u>Chapter IV: Management of Waste Containing AEA Byproduct Material and Naturally Occurring and Accelerator Produced Radioactive Material</u>			
159. If quantities of this waste are too large for acceptance at DOE LLW disposal sites: a. Is this waste managed according to the requirements of 40 CFR Part 192? b. Is this waste disposed of at specially designated DOE sites or tailing disposal sites established under the Uranium Mill Tailings Radiation Control Act of 1978? - If YES to Questions 159 a <u>and</u> b, ENTER STATUS "S". - If No to Question 159 a <u>or</u> b, ENTER STATUS "U".	Y N Y N ☐		
160. Have small volumes of this waste been disposed of at DOE LLW sites? - If YES, proceed with checklist. - If NO, proceed to Question 162.	Y N 		
161. Was the appropriate approval of the field organization obtained as described in DOE Order 5820.2A? - If YES, ENTER STATUS "S". - If NO, ENTER STATUS "U".	Y N ☐		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
162. Has this waste been mixed with Resource Conservation and Recovery Act hazardous chemicals? - If YES, proceed with checklist. - If NO, return to Question 6.	Y N		
163. Is this waste managed as a hazardous waste under the Resource Conservation and Recovery Act? (See RCRA checklist) - If YES, ENTER STATUS "S". - If NO, ENTER STATUS "U" and return to Question 6.	Y N 		
<u>Chapter V: Decommissioning of Radioactively Contaminated Facilities</u>			
<u>General</u>			
164. Does each field organization prepare and maintain a complete list of contaminated facilities both operational and excess under its jurisdiction?	Y N		
165. Is a continuous record of jurisdictional program responsibility for all contaminated facilities maintained by the cognizant field organization for use in preparing decommissioning plans?	Y N		
166. Has planning for facility decommissioning been initiated during the design phase for new facilities and prior to termination of operations for existing operational facilities?	Y N		
167. Has the program officer taken responsibility for placing the facility in a site storage condition? - If YES to Questions 164 - 167, ENTER STATUS "S". - If NO to any of Questions 164 - 167, ENTER STATUS "U".	Y N 		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
168. Has the responsibility for contaminated facilities been transferred from one program organization to another? - If YES, enter details in Comments. <u>Facility Design</u> 169. Have facilities in which radioactive or other hazardous materials are utilized been designed to simplify decontamination and decommissioning and increase the potential for reuse? 170. Have features and procedures that simplify and facilitate decommissioning been identified during the planning and design phase based upon a proposed decommissioning method or conversion to other use? - If YES to Questions 169 <u>and</u> 170, ENTER STATUS "S". - If NO to Question 169 <u>or</u> 170, ENTER STATUS "U". <u>Post-Operational Activities</u> 171. Have projects consisting of one or more facilities been identified as appropriate for these post-operational activities, and priorities been developed based on the following: a. Maintaining employee and public health and safety? b. Protection of the environment? c. Compliance with NEPA, RCRA, CERCLA, and Superfund amendments? d. Cost-effective program management? - If YES to Questions 167 a - d, ENTER STATUS "S". - If NO to any of Questions 167 a - d, ENTER STATUS "U".	Y N Y N Y N ☐ Y N Y N Y N Y N ☐		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
<u>Decommissioning Project Activities</u>			
172. Characterization:			
a. Has baseline data for each project been collected to support a thorough physical, chemical, and radiological characterization to fulfill the requirements?	Y N		
b. Does the baseline data include:			
1) Drawings, photographs, and other records reflecting the as-built and as-modified condition of the facility and grounds?	Y N		
2) The condition of all structures, existing protective barriers, and systems installed to ensure public, occupational, and environmental safety?	Y N		
3) The type, form, quantity, and location of hazardous chemical and radioactive material from past operations at the site?	Y N		
4) Information on factors that could influence the selection of decommissioning alternatives?	Y N		
- If YES to Questions 172 a - b 4), ENTER STATUS "S".	☐		
- If NO to any of Questions 172 a - b 4), ENTER STATUS "U".			
173. Engineering:			
a. Has technical engineering planned for each project been conducted during the environmental review process to ensure that alternative actions and associated environmental issues are identified and assessed, and to support preparation of environmental documentation?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
b. Has a Decommissioning Project Plan been prepared for approval by the appropriate program office?	Y N		
c. Does this plan include the following:			
1) Physical, chemical, and radiological characterizational data or references to such data?	Y N		
2) A summary evaluation of decommissioning alternatives for the facility including the preferred alternative?	Y N		
3) Plans for meeting requirements from the environmental review process?	Y N		
4) Radiological criteria to be used?	Y N		
5) Projections of occupational exposure?	Y N		
6) Estimated quantities of radioactive waste to be generated?	Y N		
7) Detailed administrative, cost, schedule, and management information?	Y N		
- If YES to Questions 173 a - c 7), ENTER STATUS "S".			
- If NO to any of Questions 173 a - c 7), ENTER STATUS "U".			
174. Decommissioning Operations:			
a. Has the decommissioning project been conducted in accordance with guidance from the Headquarters program officer and the Decommissioning Project Plan?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
b. Have the significant deviations been challenged by the responsible field organization in consultation with the appropriate program office?	Y N		
c. Has the approval of the MA-22 office been obtained before initiating activities to demolish a DOE-owned facility?	Y N		
d. Are status reports on project activities prepared in accordance with the requirements of DOE Order 1332.1A or 4700.1, as appropriate?	Y N		
e. Is information on waste generation been provided to the Integrated Data Base Program?	Y N		
f. Have decommissioning operations been considered a waste generator operation and comply with generator requirements?	Y N		
175. Post-decommissioning activities:			
a. If decommissioning has occurred, have the following been accomplished:			
1) A final radiological and chemical survey report and project final report?	Y N		
2) The responsible field organization has compiled a Project Data Package?	Y N		
3) The responsible program organization ensured that any necessary long-term maintenance and surveillance or other safety controls are provided for the decommissioned property?	Y N		
- If YES to Questions 174 a - 175 a 3), ENTER STATUS "S".	☐		
- If NO to any of Questions 174 a - 175 a 3), ENTER STATUS "U".			

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
<u>Quality Assurance</u>			
176. Have waste management practices been conducted in accordance with applicable requirements of American National Standards Institute/American Society of Mechanical Engineers Nuclear Quality Assurance-17	Y N		
- If YES, ENTER STATUS "S".			
- If NO, ENTER STATUS "U".			
- Return to Question 7.			
177. Is the facility subject to NRC regulation?	Y N		
- If YES, proceed with checklist.			
- If NO, checklist is complete.			
178. Does the facility generate radioactive wastes?	Y N		
- If YES, proceed with checklist.			
- If NO, checklist is complete.			
<u>10 CFR Part 61.55: Waste Classification</u>			
179. Does the facility have a procedure in place to classify wastes as Class A, Class B, Class C, or greater than Class C wastes?	Y N		
180. If wastes are classified on the basis of analytical measurements, are the procedures and quality controls adequate to meet the requirements of 10 CFR Part 61.55?	Y N		
181. If wastes are classified using correlations to radiation levels or gamma-emitting radionuclides, are there factors adequately documented and validated?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
182. If the wastes are classified on the basis of inventory balances, are the records adequate to support classification?	Y N		
- If YES to Questions 179 - 182, ENTER STATUS "S".	☐		
- If NO to any of Questions 179 - 182, ENTER STATUS "U".			
183. Does the facility have a procedure in place to verify that waste characteristics meet site acceptance criteria?	Y N		
184. Is the procedure adequate to ensure that the requirements of 10 CFR 61.56 are satisfied?	Y N		
<u>10 CFR Part 61.57: Labeling</u>			
185. Does the facility have a procedure to ensure that the labeling requirements of 10 CFR Part 61.57 are satisfied?	Y N		
- If YES to Questions 183 - 185, ENTER STATUS "S".	☐		
- If NO to any of Questions 183 - 185, ENTER STATUS "U".			
This checklist is complete.			

AUDITOR(S): _____
_____BLDG/AREA/UNIT(S): _____

DATE: ____ / ____ / ____

ESO NO.: _____

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
DOE Order 5400.1: General Environment Protection Program			
1. Have exemptions to the mandatory environmental protection standards been granted? - If YES, discuss exemptions in Comments. - If NO, proceed to Question 3.	Y N		
2. If exemptions to the mandatory environmental protection standards have been granted, have the procedures set forth in DOE 5400.1, Chapter I, Section 4 been followed? - If YES, ENTER STATUS "S". - If NO, ENTER STATUS "U".	Y N 		
3. Does this facility release any radionuclides to the environment? - If YES, proceed with checklist. - If NO, this checklist is complete.	Y N		
4. Is this facility governed by NRC regulations? - If YES, proceed with checklist. - If NO, proceed to Question.	Y N		
5. Has this facility had a nonroutine release of any radionuclides? - If YES, proceed to Question 27. - If NO, proceed to Question 37.	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
<u>10 CFR 20.105: Permissible Levels of Radiation in Unrestricted Areas</u>			
6. Does the license have values for permissible levels of radiation in unrestricted areas? - If YES, proceed with checklist. - If NO, proceed to Question 12.	Y N		
7. Is the facility in compliance with these limits? - If YES, ENTER STATUS "S" and proceed to Question 12. - If NO, ENTER STATUS "U".	Y N 		
<u>10 CFR 20.106: Radioactivity in Effluents to Unrestricted Areas</u>			
8. Does this facility have application for higher limits?	Y N		
9. Does this facility have the following information:			
a. Flow rate?	Y N		
b. Description of the properties of the effluents including:			
1) Chemical compositions?	Y N		
2) Physical characteristics?	Y N		
3) The hydrogen ion concentrations (pH) of liquid effluents?	Y N		
4) The size range of particulates in effluents released into air?	Y N		
10. Is there a description of the anticipated human occupancy in the unrestricted area where the highest concentration of radioactive material from the effluent is expected?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
11. Is there information as to the highest concentration of each radionuclide in an unrestricted area? - If YES to Questions 8-11, ENTER STATUS "S". - If NO to any of Questions 8-11, ENTER STATUS "U".	Y N ☐		
<u>10 CFR 20.201: Surveys</u>			
12. Does the licensee make an evaluation of the radiation hazards incident to the production, use, release, disposal, or presence of radioactive materials or other sources of radiation under a specific set of conditions? - If YES, ENTER STATUS "S". - If NO, ENTER STATUS "U".	Y N ☐		
<u>10 CFR 20.203: Caution Signs, Labels, Signals and Controls</u>			
13. Is each radiation area conspicuously posted with a sign or signs bearing the purple and yellow radiation caution symbol and the words: CAUTION Radiation Area			
14. Is each entrance or access point equipped with entry control devices which function automatically?	Y N		
15. Is the entrance checked by a physical radiation measurement to ensure that prior to the first individual's entry into the area after any use of the source, the radiation level in the area is below that at which it would be possible for an individual to receive a dose in excess of 100 mrem in one hour?	Y N		
<u>10 CFR 20.205: Procedures for Picking Up, Receiving and Opening Packages</u>			
16. Does this facility monitor the external surfaces of a package for radioactive contamination caused by leakage?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
17. Does this facility establish and maintain procedures for safely opening packages in which licensed material is received, and ensure that such procedures are followed?	Y N		
<u>10 CFR 20.207: Storage and Control of Licensed Materials in Unrestricted Areas</u>			
18. Does this facility have constant surveillance for licensed materials in unrestricted areas and not in storage?	Y N		
- If YES to Questions 13-18, ENTER STATUS "S".	☐		
- If NO to any of Questions 13-18, ENTER STATUS "U".			
<u>10 CFR 20.302: Method for Obtaining Approval of Proposed Disposal</u>			
19. Has this facility applied to the commission for approval of proposed procedures to dispose of licensed material?	Y N		
20. Did this facility ever apply for a license for sea disposal?	Y N		
<u>10 CFR 20.303: Disposal by Release into Sanitary Sewerage Systems</u>			
21. Does this facility discharge licensed material into a sanitary sewerage system?	Y N		
- If YES, proceed with checklist.			
- If NO, proceed to Question 22.			
a. Is the material soluble or dispersible in water?	Y N		
b. Is this facility in compliance with the discharge limits in 10 CFR Part 20?	Y N		
- If YES to Questions 21 a <u>and</u> b, ENTER STATUS "S".	☐		
- If NO to Question 21 a <u>or</u> b, ENTER STATUS "U".			

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
<u>10 CFR 20.305: Treatment of Disposal by Incineration</u>			
22. Has this facility ever treated or disposed licensed material by incineration?	Y N		
- If YES, proceed with checklist.			
- If NO, proceed to Question 24.			
23. Were these activities in compliance with the provisions of 10 CFR Part 20?	Y N		
- If YES to Questions 22 <u>and</u> 23, ENTER STATUS "S".			
- If NO to Question 22 <u>or</u> 23, ENTER STATUS "U".			
<u>10 CFR 20.306: Disposal of Specific Wastes</u>			
24. Does the licensee maintain records showing the receipt, transfer, and disposal of byproduct material?	Y N		
<u>10 CFR 20.311: Transfer for Disposal and Manifests</u>			
25. When a shipment of radioactive waste is sent to a licensed land disposal facility, does the facility include the following:			
a. Name, address, and telephone number of person generating waste?	Y N		
b. Does the manifest also include the name, address, and telephone number or the name and EPA hazardous waste identification number of the person transporting the waste to the disposal facility?	Y N		
c. Does the licensee include in the manifest a physical description of the waste, the volume, radionuclide identity and quality, the total radioactivity, and the principal chemical form?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
- If YES to Questions 24 <u>and</u> 25, ENTER STATUS "S". - If NO to Question 24 <u>or</u> 25, ENTER STATUS "U".			
10 CFR 20.402: Reports of Theft or Loss of Licensed Material			
26. Did licensee ever have a theft or loss of licensed material?	Y N		
- If NO, return to Question 5. - If YES, did the report contain the following:			
a. Description of licensed material involved, kind, quantity, chemical identity, and physical form?	Y N		
b. Description of circumstances under which loss or theft occurred?	Y N		
c. Statement of deposition or probable disposition of the licensed material involved?	Y N		
d. Radiation exposures to individuals, circumstances under which the exposures occurred, and extent of possible hazard to persons in unrestricted areas?	Y N		
e. Actions taken to recover material?	Y N		
f. Procedures or measures adopted to prevent a recurrence of the loss or theft of licensed material?	Y N		
- If YES to Questions 26 a - f, ENTER STATUS "S". - If NO to any of Questions 26 a - f, ENTER STATUS "U".			

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
<u>Chapter II, Section 2: Notification of Environmental Occurrences to EH-1</u>			
27. Consistent with the notification requirements contained in DOE 5484.1 and DOE 5000.3, and the DOE Orders in the 5500 series dealing with emergency management, has the Headquarters Emergency Operations Center (EOC) been notified of the significant nonroutine release of any pollutant or hazardous substance?	Y N		
28. Has notification been concurrent with that to any regulatory agencies?	Y N		
29. Has a written report of follow-up and resolution of any reported environmental occurrence which has environmental significance been prepared in accordance with the requirements of DOE Orders 5484.1 and 5000.3?	Y N		
30. Has documentation of responses to environmental occurrences been maintained?	Y N		
31. Is documentation of environmental occurrences available for regulatory agency inspectors, DOE auditors, and the general public?	Y N		
32. Have annual summary reports on environmental occurrence activities been prepared and included in the Annual Site Environmental Report?	Y N		
- If YES to Questions 27 - 32, ENTER STATUS "S".			
- If NO to any of Questions 27 - 32, ENTER STATUS "U".			
<u>Chapter II, Section 5: Reports on Radioactive Effluent/Onsite Discharge/Unplanned Releases</u>			
33. Have Radioactive Effluent and On-Site Discharge Data Reports covering the previous calendar year been submitted to the Waste Information Systems Branch, EG&G Idaho, Inc., Idaho Falls, Idaho 83415, by April 1 and a copy of the cover letter been sent to EH-1? (See MC-R checklist.)	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
34. Has the report format in DOE Order 5400.1, Chapter II, Section 5 a been followed? - If YES to Questions 33 <u>and</u> 34, ENTER STATUS "S". - If NO to Question 33 <u>or</u> 34, ENTER STATUS "U".	Y N ☐		
35. Is a Form DOE F-5821.1 used to report unplanned releases of radioactive materials in effluents to the Information System Branch, EG&G Idaho, Inc. a. Have any errors been identified in Form DOE F-5821. - If YES, proceed with checklist. - If NO, proceed to Question 37.	Y N Y N		
36. Are errors in Form DOE F-5821.1 reported promptly to the Information Systems Branch, EG&G Idaho, Inc.? - If YES to Questions 35 <u>and</u> 36 ENTER STATUS "S". - If NO to Question 35 <u>or</u> 36, ENTER STATUS "U".	Y N ☐		
<u>Chapter II, Attachment I: Suggested Content and Format for Annual Site Environmental Reports</u>			
37. Has this facility issued an Annual Site Environmental Report? - If YES, proceed with checklist. - If NO, ENTER STATUS "U" and proceed to Question 41.	Y N ☐		
38. Does the Summary contain: a. Population dose estimates and the dose to the individuals receiving the highest doses?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
b. The total quantity of radioactive material by radionuclide released as airborne and liquid effluents? - If YES to Questions 38 a <u>and</u> b, ENTER STATUS "S". - If NO to Question 38 a <u>or</u> b, ENTER STATUS "U".	Y N ☐		
39. Does the Environmental Radiological Program Information section provide information on the following as specified in DOE 5400.1, Chapter II, Attachment II, Section 8: a. Radioactive effluent data? b. Environmental sampling for radionuclides? c. Report of the maximum potential doses to the public? d. Are the reporting units as specified? - If YES to Questions 39 a - d, ENTER STATUS "S". - If NO to any of Questions 39 a - d, ENTER STATUS "U".	Y N Y N Y N Y N ☐ ☐		
40. Does this facility estimate public radiation doses? - If YES, proceed with checklist. - If NO, ENTER STATUS "U" and proceed to Question 57.	Y N ☐		
<u>DOE 5400 Ch. II 1a: Dose Limits (Tseng/Vaughan Memoranda)</u>			
41. Have any members of the public received an effective dose equivalent greater than 100 mrem in a year as a result of routine DOE activities or remedial actions at this facility?	Y N		
42. Have exposures caused a dose equivalent for any tissue greater than 5 rem in a year for members of the public?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
- If YES to Question 41 <u>or</u> 42, ENTER STATUS "U". - If NO to Questions 41 <u>and</u> 42, ENTER STATUS "S".	☐		
43. Are doses calculated as the sum of external effective dose equivalents and internal committed effective dose equivalents during the year for exposure to radiation from all sources except natural background radiation?	Y N		
44. Are all exposure modes considered for dose evaluation?	Y N		
Note: The methods of evaluations are addressed in Chapter II.6.			
- If YES to Questions 43 <u>and</u> 44, ENTER STATUS "S". - If NO to Question 43 <u>or</u> 44, ENTER STATUS "U".	☐		
45. Has the facility requested a temporary public dose limit higher than 100 mrem?	Y N		
- If YES, proceed with checklist. - If NO, proceed to Question 47.			
46. Did the justification for a temporary increase discuss the need for the increase, consider alternatives, and apply the ALARA process?	Y N		
- If YES, ENTER STATUS "S". - If NO, ENTER STATUS "U".	☐		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
<u>DOE 5400.XX, Ch.II, 1b: Airborne Emissions (Tseng/Vaughan Memoranda)</u>			
47. Do any members of the public receive a dose equivalent greater than 25 mrem (whole body) or greater than 75 mrem (any organ) in a year as a result of atmospheric releases from DOE activities, excluding radon and its daughters?	Y N		
48. Are the evaluations of potential doses to individuals from airborne emissions made using AIR DOS/RADRISK, also known as Clean Air Act Code (CAAC)?	Y N		
49. Is compliance with the provisions of Question 7 demonstrated through environmental or effluent measurements using EPA-approved techniques?	Y N		
- If NO to Question 47 <u>and</u> YES to Questions 48 <u>and</u> 49, ENTER STATUS "S".			
- If YES to Question 47 <u>or</u> NO to Question 48 <u>or</u> 49, ENTER STATUS "U".			
<u>DOE 5400.XX, Ch. II, 1c: Disposal Emissions</u>			
50. Do any members of the public receive a dose equivalent greater than 25 mrem (whole body) or greater than 75 mrem (any organ) in a year as a result of direct radiation or radioactive material released from DOE management and storage activities at a disposal facility not regulated by the NRC?	Y N		
51. Are all exposure modes evaluated?	Y N		
- If NO to Question 50 <u>and</u> YES to Question 51, ENTER STATUS "S".			
- If YES to Question 50 <u>or</u> NO to Question 51, ENTER STATUS "U".			

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
DO 5400.XX, CH.II, 1d: Drinking Water Pathway			
52. Do any persons consuming water from a public water supply operated by or for the DOE receive an effective dose equivalent greater than 4 mrem in a year, excluding naturally occurring radionuclides?	Y N		
53. Do the combined concentrations of radium-226 and radium-228 exceed 5pCi/l?	Y N		
54. Does gross alpha activity exceed 15pCi/l?	Y N		
- If YES to any of Questions 52 - 54, ENTER STATUS "U".	☐		
- If NO to Questions 52 - 54, ENTER STATUS "S".			
55. Are there any private or public drinking water systems downstream of the discharge point of any liquid effluents?	Y N		
- If YES, proceed with checklist.			
- If NO, proceed to Question 57.			
56. Do discharges cause any public or private drinking water supplies to exceed the radiological limits of 40 CFR 141?	Y N		
- If YES, ENTER STATUS "U".	☐		
- If NO, ENTER STATUS "S".			
DOE 5400.XX, Ch.II 2 ALARA			
57. Has the facility implemented the ALARA process for exposures for members of the public from all sources of radiation from DOE activities?	Y N		
58. Does the ALARA process at this facility include societal, technological, economic, and public policy considerations?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
59. Does the ALARA process consider, as a minimum:			
a. The maximum dose to members of public?	Y N		
b. The collective dose to the population?	Y N		
60. Have cost-benefit evaluations been performed (either qualitative or quantitative)?	Y N		
- If YES to Questions 57 - 60, ENTER STATUS "S".			
- If NO to any of Questions 57 - 60, ENTER STATUS "U".			
<u>DOE 5400.XX, Ch.II, 3a: Discharges of Liquid Waste to Surface Waters</u>			
61. Are there liquid waste streams that could be discharged at concentrations greater than derived concentration guides (DCG) values (Chapter III) without treatment with the Best Available Technology economically achievable (BAT), excluding tritium?	Y N		
- If YES, proceed with checklist.			
- If NO, ENTER STATUS "S" and proceed to Question 65.			
62. Are the recommended BAT selection factors (Ch.II, 3 a (1) (a)) considered?	Y N		
63. Is the ALARA process applied for tritium releases?	Y N		
64. Is the time schedule for implementing BAT the earliest practical?	Y N		
65. Are liquid waste streams containing multiple radionuclides treated with BAT when the sum of fractional DCG values at the point of discharge would otherwise exceed unity?	Y N		
- If YES to Questions 62 - 65, ENTER STATUS "S".			
- If NO to any of Questions 62 - 65, ENTER STATUS "U".			

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
66. Are liquid waste streams containing settleable solids concentrations exceeding five pCi per gram of alpha-emitting nuclides or 50 pCi per gram of beta-gamma emitting nuclides released to natural waterways?	Y N		
67. Does the absorbed dose to native aquatic organisms exceed one rad per day from exposure to liquid wastes discharged to natural waterways?	Y N		
- If YES to Question 66 <u>or</u> 67, ENTER STATUS "S".			
- If NO to Questions 66 <u>and</u> 67, ENTER STATUS "U".			
<u>DOE 5400.XX, Ch.II, 3b: Discharges of Liquid Waste to Aquifers and Soil Columns</u>			
68. Are liquids containing radioactive materials treated by BAT prior to discharge to soil columns?	Y N		
69. Does an approved plan exist to replace the use of soil columns (for liquid radioactive waste) with alternative waste water treatment methods?	Y N		
70. Have new or increased discharges of liquid waste to active or virgin soil columns been eliminated?	Y N		
- If YES to Questions 68 - 70, ENTER STATUS "S".			
- If NO to any of Questions 68 - 70, ENTER STATUS "U".			
<u>DOE 5400.XX, Ch. II, 3: Management of Soil Columns and Groundwater Previously Contaminated with Radioactive Material</u>			
71. Are liquid discharges to inactive release areas prohibited, even though the waste discharged is not contaminated?	Y N		
- If YES, ENTER STATUS "S".			
- If NO, ENTER STATUS "U".			

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
<u>DOE 5400.XX, CH. II, 3d: Discharges to Sanitary Sewerage</u>			
72. Are liquid wastes greater than five times the DCG values treated with BAT prior to discharge into sanitary sewerage?	Y N		
73. Are the discharges to public sewers coordinated with the operators of the waste water treatment works?	Y N		
74. Are the concentrations limited to control long-term buildup of radionuclides in solids at sewage disposal plants?	Y N		
- If YES to Questions 72 - 74, ENTER STATUS "S".	☐		
- If NO to any of Questions 72 - 74, ENTER STATUS "U".			
<u>DOE 5400.XX, Ch. II 3e: Exceptions for Liquid Waste Control Requirements</u>			
75. Has the facility been able to comply with the requirements of Chapter II, paragraph 3?	Y N		
76. Have interim control strategies been developed and adopted?	Y N		
- If YES to Question 75 <u>and</u> NO to Question 76, ENTER STATUS "U".	☐		
- If NO to Question 75 <u>and</u> YES to Question 76, ENTER STATUS "S".			
77. Have alternatives that reduce the amount of tritium entering waste streams been evaluated?	Y N		
- If YES, ENTER STATUS "S".	☐		
- If NO, ENTER STATUS "U".			

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
<u>DOE 5400.XX, Ch. II, 5a: Release of Real Property</u>			
78. Has the facility released real property?	Y N		
79. Have the requirements for residual radioactive material DOE Order 5400.XX, Ch. IV been satisfied?	Y N		
- If YES to Questions 78 <u>and</u> 79 <u>or</u> NO to Question 78, ENTER STATUS "S".			
- If YES to Question 78 <u>and</u> NO to Question 79, ENTER STATUS "U".			
<u>DOE 5400.XX, Ch. II, 5b: Release of Personal Property</u>			
80. Are surveys made to verify that potentially contaminated property is within the contamination limits of DOE 5400.XX, Figure IV-1?	Y N		
- If YES, ENTER STATUS "S".			
- If NO, ENTER STATUS "U".			
<u>DOE 5400.XX, Ch. II, 5c: Release of Materials and Equipment</u>			
81. Are surveys performed to verify that contamination levels are within the limits of DOE 5400.xx, Figure IV-1?	Y N		
82. Do records of released property include a description of the property date of the last radiation survey, identity of the organization and individual who performed the monitoring operation, type and identification number of the monitoring instruments used, and the results of the monitoring operation?	Y N		
- If YES to Questions 81 <u>and</u> 82, ENTER STATUS "S".			
- If NO to Question 81 <u>or</u> 82, ENTER STATUS "U".			
<u>DOE 5400.XX, Ch. II, 6a: Monitoring and Surveillance</u>			
83. Are routine monitoring and surveillance programs performed?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
84. Are the plans and schedule implementations followed as specified in DOE 5400.1 and DOE 5400.XY? - If YES to Questions 83 <u>and</u> 84, ENTER STATUS "S". - If NO to Question 83 <u>or</u> 84, ENTER STATUS "U". <u>DOE 5400 . Ch.II, 6b Dose Evaluations (Tseng/Vaughan Memorandum)</u>	Y N ☐ 		
85. Does the site evaluate doses to members of the public in the vicinity of the facility?	Y N		
86. Does the site annually evaluate collective doses to the public within 80 km of the site?	Y N		
87. Are the modeling evaluations performed for compliance with dose limits?	Y N		
88. Do the analytical models used all types of emissions, transport media, and exposure pathways using appropriate dispersion parameters and demographic and land use information?	Y N		
89. Are proper dose conversion factors used in these analytical models? Note: Refer to documents EPA-520/1-88-020, Federal Guidance Report, DOE/EH-0070, and DOE/EH-0071.	Y N		
90. Are doses calculated as realistically as possible?	Y N		
91. Are assumed parametric values sufficiently conservative?	Y N		
92. Are all parameters values documented?	Y N		
93. Are doses reported in conformance with the requirements specified in DOE Orders 5400.1 and 5484.1? (see checklists RA-DGE and RA-DE) - If YES to Questions 85 - 93, ENTER STATUS "S". - If NO to any of Questions 85 - 93, ENTER STATUS "U".	Y N ☐ 		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
94. Do facility dose assessment records include characterization of releases and probable impacts developed? - If YES, ENTER STATUS "S". - If NO, ENTER STATUS "U". <u>DOE 5400.XX, Ch.IV, 4a: Residual Radionuclides in Soil</u>	Y N		
95. Are the following generic guidelines for residual concentrations of Ra-226, Ra-228, Th-230, and Th-232 used: a. 5 pCi/g, averaged over the first 15 cm of soil below the surface? b. 15 pCi/g, averaged over layers 15 cm thick of soil more than 15 cm below the surface? <u>DOE 5400.XX, Ch.IV, 4b: Radon Decay Products</u>	Y N Y N		
96. Are reasonable efforts made to achieve an annual average radon decay product concentration (including background) not to exceed 0.02 working level (WL)? - If YES to Questions 95 - 96, ENTER STATUS "S". - If NO to any of Questions 95 - 96, ENTER STATUS "U". <u>DOE 5400.XX, Ch.IV, 4: External Gamma Radiation</u>	Y N ☐		
97. Does the average level of gamma radiation inside any building or habitable structure on a site to be released for unrestricted use exceed the background level by more than 20 uR/h? Note: Structures scheduled for demolition and buried foundations may be exempted under certain conditions denoted in this Order. - If YES, ENTER STATUS "S". - If NO, ENTER STATUS "U".	Y N ☐		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
<u>DOE 5400.XX, Ch. IV 4: Surface Contamination</u>			
98. Are the surface contamination guidelines provided in Figure IV-1 applied to existing structures and equipment to be released for unrestricted use?	Y N		
- If YES, ENTER STATUS "S".	☐		
- If NO, ENTER STATUS "U".			
<u>DOE 5400.XX, Ch. IV 5: Authorized Limits for Residual Radioactive Material</u>			
99. Has the facility conducted remedial actions on sites with radioactive contamination?	Y N		
- If YES, proceed with checklist.			
- If NO, checklist is complete.			
100. Have authorized contamination limits for each property been developed and approved by DOE Headquarters?	Y N		
- If YES to Questions 99 and 100, ENTER STATUS "S".	☐		
- If YES to Question 99 and NO to Question 100, ENTER STATUS "U".			
<u>DOE 5400.XX, Ch. IV 6: Control of Residual Radioactive Material</u>			
101. Has the facility conducted any remedial actions that resulted in residual radioactive material in excess of the guidelines?	Y N		
- If YES, proceed with checklist.			
- If NO, checklist is complete.			
102. Has any property been placed in interim storage?	Y N		
- If YES, proceed with checklist.			
- If NO, proceed Question 108.			

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
103. Have control and stabilization features been designed to provide an effective life of 50 years with a minimum life of 25 years?	Y N		
104. Have controls been designed such that radon-222 concentration in that atmosphere, above background levels, will not exceed:	Y N		
a. 100 pCi/l at any given point?	Y N		
b. An average annual concentration of 30 pCi/l over the facility site?	Y N		
c. An average concentration of 3 pCi/l outside the facility site?	Y N		
105. Have controls been designed to ensure that concentrations of radionuclides in groundwater do not exceed applicable Federal or State standards?	Y N		
106. Have appropriate controls been established to control access to property and use of on-site material contaminated by radioactive material, with an effective life for the controls of at least 25 years?	Y N		
- If YES to Questions 103 - 106, ENTER STATUS "S".			
- If NO to any of Questions 103 - 106, ENTER STATUS "U"			
107. Are any properties with radioactive contamination in excess of guidelines being maintained under an interim management arrangement?	Y N		
- If YES, proceed with checklist.			
- If NO, proceed with Question 109.			
108. Are interim management controls in effect to control access and limit activities that might disturb material or cause it to migrate?	Y N		
- If YES, ENTER STATUS "S".			
- If NO, ENTER STATUS "U".			

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
109. Do any properties require long-term management? - If YES, proceed with checklist. - If NO, checklist is complete.	Y N		
110. Have control and stabilization features been designed to provide an effective life of 1000 years and a minimum life of 200 years?	Y N		
111. Have controls been designed to limit radon-222 emanation to the atmosphere to 20 pCi/m ² /s?	Y N		
112. Have controls been designed to prevent off-site increases of radon-222, above background, to 0.5 pCi/L?	Y N		
113. Are controls in place to control concentrations of radionuclides in groundwater to be below applicable State and Federal regulations?	Y N		
114. Are long-term management controls in effect to control access, and have the controls been designed for a life of 200 years? - If YES to Questions 110 - 114, ENTER STATUS "S". - If NO to any of Questions 110 - 114, ENTER STATUS "U".			
115. Does 40 CFR Part 192 apply to this facility? - If YES, proceed with checklist. - If NO, checklist is complete.	Y N		
<u>40 CFR 192 - Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings</u>			
116. Are the facility's control standards designed to: a. Be effective for up to 1,000 years, to the extent reasonably achievable, and for at least 200 years?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
b. Provide reasonable assurance that releases of radon-222 from residual radioactive material to the atmosphere will not: 1) Exceed an average release rate of 20 pCi/m²/s? 2) Increase the annual average concentration of radon-222 in air at or above any location outside the disposal site by more than 0.5 pCi/l? <u>40 CFR 192.12: Standards for Cleanup of Land and Buildings Contaminated with Residual Radioactive Materials from Inactive Uranium Processing Sites</u> 117. Can the facility provide reasonable assurance that, as a result of residual radioactive materials from any designated processing site: a. The concentration of radium-226 in land averaged over any area of 100 square meters shall not exceed the background level by more than: 1) 5 pCi/g, averaged over the first 15 cm of soil below the surface? 2) 15 pCi/g, averaged over layers 15 cm thick of soil more than 15 cm below the surface? b. In any occupied or habitable building: 1) The objective of remedial action shall be an annual average radon decay product concentration (including background) that does not exceed 0.02 WL? 2) The level of gamma radiation shall not exceed the background level by more than 20 uR/h? - If YES to Questions 117 a 1) - b 2), ENTER STATUS "S". - If NO to any of Questions 117 a 1) - b 2), ENTER STATUS "U".	Y N Y N Y N Y N Y N Y N ☐		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
<u>40 CFR 192.22 Supplemental Standards</u>			
118. When any of the criteria of Part 192.21 (a) through (f) apply, do the implementing agencies select and perform remedial actions that come as close to meeting the applicable standard as is reasonable under the circumstances?	Y N		
119. When Part 192.21 (f) applies, do remedial actions reduce other residual radioactivity to levels that are as low as reasonably achievable (in addition to satisfying the standards of Subparts A and B)?	Y N		
120. If general determinations concerning remedial actions under this section that will apply to all locations or for a specific location are made by implementing agencies does the Department of Energy inform any private owners and occupants of the affected locations and solicit their comments?	Y N		
a. Are these comments provided to the other implementing agencies?	Y N		
b. Does DOE inform EPA of general and individual determinations?	Y N		
- If YES to Questions 118 - 120 b, ENTER STATUS "S".	☐		
- If NO to any of Questions 118 - 120 b, ENTER STATUS "U".			
<u>40 CFR 192.32: Standards for Management of Uranium Byproduct Materials Pursuant to Section 84 of the Atomic Energy Act of 1954, as Amended</u>			
<u>Prior To Closure</u>			
121. Are uranium byproduct materials managed so as to conform to the groundwater protection standard in Part 264.92?	Y N		
a. To the list of hazardous constituents referenced in Part 264.93 are the chemical elements molybdenum and uranium added?	Y N		
b. To the concentration limits provided in Table 1 of Part 264.94 are the radioactivity limits in Table A added?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
c. Are detection monitoring programs required under Part 264.98 to establish the standards required under Part 264.92 completed within 1 year of promulgation?	Y N		
d. Are any alternate concentration limits established as specified under Part 264.94(b) towards ALARA compliance outside of site boundary?	Y N		
e. Are the functions and responsibilities designated in Part 264 carried out?	Y N		
122. Are the provisions of 40 CFR 190 confirmed?	Y N		
123. Are the provisions of 40 CFR 440 confirmed?	Y N		
124. Are the radiation doses from radon emissions from surface impoundments of uranium byproduct materials as far below the Federal Radiation Protection Guide as it practicable?	Y N		
- If YES to Questions 121 - 124, ENTER STATUS "S".	☐		
- If NO to any of Questions 121 - 124, ENTER STATUS "U".			
<u>After The Closure</u>			
125. Does the radium-226 resulting from uranium byproducts exceed 5 pCi/g averaged over 100 square meters surface cover and the first 15 centimeters below the surface?	Y N		
- If YES, proceed with checklist.			
- If NO, checklist is complete.			
126. Do disposal areas comply with closure performance standards specified in Part 264.11 for radiological control?	Y N		
127. Are dose limits effective for 1,000 years?	Y N		
128. Are dose limits effective for 200 years?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
129. Do radon-222 releases exceed 20 pCi/m ² /s?	Y N		
- If YES to Questions 125 - 129, ENTER STATUS "S".			
- If NO to any of Questions 125 - 129, ENTER STATUS "U".			
<u>40 CFR 192.33: Corrective Action Programs</u>			
130. If the groundwater standards established under provisions of Part 192.32(a)(2) are exceeded at any licensed site is a corrective action program put into operation within 18 months?	Y N		
- If YES, ENTER STATUS "S".			
- If NO, ENTER STATUS "U".			
<u>40 CFR 192.41: Standards for Management of Thorium Byproduct Materials Pursuant to Section 84 of the Atomic Energy Act of 1954, as Amended</u>			
131. Do provisions of Subpart D of this part, including Parts 192.31, 192.32, and 192.33, apply to thorium byproduct material?	Y N		
a. Do provisions applicable to the element uranium also apply to the element thorium?	Y N		
b. Do provisions applicable to radon-222 also apply to radon-220?	Y N		
c. Do provisions applicable to radium-226 also apply to radium-228?	Y N		
d. Annual dose equivalent does not exceed:			
1) 25 millirem to whole body?	Y N		
2) 75 millirem to thyroid?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
3) 25 millirem to any other organ of any member of the public? - If YES to Questions 131 - 131 d 3), ENTER STATUS "S". - If NO to any of Questions 131- 131 d 3), ENTER STATUS "U". <u>40 CFR 192.42: Substitute Provisions</u> Note: Can the regulatory agency, with the concurrence of EPA, substitute for any provisions of 192.41 of this subpart alternative provisions it deems more practical that will provide at least an equivalent level of protection for human health and the environment? This checklist is complete.	Y N		

SSB - DOE ORDER 5480.14 - WASTE SITES

(SB-AWS, 1/2)

SITE ID: _____

AUDITOR(S): _____

BLDG/AREA/UNIT(S): _____

DATE: ____ / ____ / ____

ESO NO.: _____

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
DOE Order 5480.14: Active Waste Sites			
1. Pursuant to this Order, are there active soil column disposal sites? - If YES, give date sites began use. - If NO, proceed with checklist.	Y N		
2. Are there any active liquid waste sites that began after July 17, 1989? Note: Such sites are prohibited after this date pursuant to this Order.	Y N		
3. Are there records to demonstrate rates of discharge of liquid wastes into these active sites?	Y N		
DOE Order 5480.14: Inactive Waste Sites			
4. Pursuant to this Order, are there inactive soil columns or natural drainage system disposal sites? - If YES, proceed with checklist. - If NO, checklist is complete.	Y N		
5. Do any of these inactive disposal sites contain radioactive materials? - If YES, discuss provision in the Comments. - If NO, ENTER STATUS "S".	Y N ☐		

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AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
6. Have provisions been made to ensure that these inactive waste disposal sites will not receive future liquid discharges, radioactive or otherwise? Note: Such discharges are prohibited pursuant to this Order. - If YES, discuss provisions in the Comments. - If NO, ENTER STATUS "U". This checklist is complete.	Y N ☐		

AUDITOR(S): _____

BLDG/AREA/UNIT(S): _____

DATE: ____/____/____

ESO NO.: _____

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
DOE Order 5400.XX: Waste Streams			
1. Pursuant to this Order, are liquid process waste streams containing radioactive material in the form of settleable solids being released into natural waterways from any of the site's facilities? - If YES, proceed with checklist. - If NO, checklist is complete.	Y N		
2. Does the site test for radioactive solids in waste streams? - If YES, ENTER STATUS "S". - If NO, ENTER STATUS "U".	Y N ☐		
3. Does the site test native aquatic animals and organisms for radioactive contamination? - If YES, ENTER STATUS "S". - If NO, ENTER STATUS "U". This checklist is complete.	Y N ☐		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
5. If a remedial action has been completed, did the remedial action result in residual risk on- or off-site? - If YES, ENTER STATUS "U". - If NO, ENTER STATUS "S". This checklist is complete.	Y N		

AUDITOR(S): _____

BLDG/AREA/UNIT(S): _____

DATE: ____/____/____

ESO NO.: _____

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
<u>Executive Order 12580: Proposed National Contingency Plan, National Contingency Plan, DOE Order 5400.4, CERCLA 104 B and 122 J</u>			
1. Prior to an RI/FS or EE/CA (Engineering Evaluation and Cost Analysis) action, and pursuant to the above Orders, Plans, and Acts, has the site identified whether there are impacts to natural resources? - # YES, ENTER STATUS "S". - # NO, ENTER STATUS "U".	Y N ☐		
2. Has the site notified the cognizant trustees of the potential natural resource impacts? - # YES or NOT APPLICABLE, ENTER STATUS "S". - # NO, ENTER STATUS "U".	Y N ☐		
3. If site operations have affected on-site or off-site natural resources, has the site notified the cognizant trustees of any negotiations of Federal facility compliance agreements, of interagency agreements, or of consent decrees? - # YES or NOT APPLICABLE, ENTER STATUS "S". - # NO, ENTER STATUS "U".	Y N ☐		
4. Concurrent with notification of the cognizant trustees, has the site sought to coordinate plans, studies, or other cleanup activities with the cognizant trustees? - # YES or NOT APPLICABLE, ENTER STATUS "S". - # NO, ENTER STATUS "U".	Y N ☐		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
14. Do the records maintained include all data necessary to show that the low-level waste was properly classified, treated, stored, shipped, and/or disposed of? - If YES, ENTER STATUS "S". - If NO, ENTER STATUS "U". Note: The data maintained in the system shall be included in the data recorded on waste manifests. See RCRA checklists. This checklist is complete.	Y N ☐		

AUDITOR(S): _____
_____BLDG/AREA/UNIT(S): _____

DATE: ____ / ____ / ____

ESO NO.: _____

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
<u>DOE Order 5820.2A: Radioactive Waste Management - General</u>			
1. Does this facility generate, treat, store, transport, and/or dispose of radioactive wastes? - If YES, comment on what activities are being engaged in, and which radioactive wastes are handled. - If NO, checklist is complete.	Y N		
<u>DOE Order 5820.2A: Radioactive Waste Management - High-Level Waste</u>			
2. Is there evidence of soil contamination from high-level radioactive leaks or spills from tanks, bins, pipelines, capsules, etc. - If YES, identify locations in Comments. - If NO, proceed to Question 6.	Y N		
3. Have these areas been reported or evaluated? - If YES, note date in Comments.	Y N		
4. Whether or not the soil sites have been reported and evaluated, have steps been taken to prevent further migration of the release to soil or surface water? - If YES, discuss mitigation measures.	Y N		
5. If the soil area has been reported and evaluated, have steps been taken to remove or stabilize the soil? (These mitigation measures are not required if compliance would cause greater harm to human health or the environment.)	Y N		

AUDITOR(S): _____

BLDG/AREA/UNIT(S): _____

DATE: ____/____/____

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AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
40 CFR 192.12: General Radioactive Materials			
1. Has testing revealed or is there reason to believe there are any processing sites, backfill piles, or tailing areas with residual radioactive materials?	Y N		
- If YES, proceed with checklist.			
- If NO, checklist is complete.			
2. Have the areas been tested to determine the levels of radioactive material in the soil or sediment?	Y N		
- If YES, ENTER STATUS "S".			
- If NO, ENTER STATUS "U".			
3. Does the site temporarily store or dispose of residual thorium or uranium in soils or sediments on-site?	Y N		
- If YES, proceed with checklist.			
- If NO, checklist is complete.			
4. Pursuant to the NRC (1981) guidelines, has testing indicate the following derived concentrations for uranium in soil:			
a. Less than or equal to 10 pCi/g for natural uranium?	Y N		
b. Less than or equal to 35 pCi/g for depleted uranium?	Y N		
c. Less than or equal to 30 pCi/g for enriched uranium?	Y N		
- If YES to Questions 4 a - c, ENTER STATUS "S".			
- If NO to any of Questions 4 a - c, ENTER STATUS "U".			
This checklist is complete.			

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
- If YES, comment on mitigation methods. - If NO, comment on reasons given for lack of action.			
<u>DOE Order 5820.2A: Radioactive Waste Management - Transuranic Waste</u>			
6. Does the site manage transuranic waste?	Y N		
- If YES, proceed with checklist. - If NO, proceed to Question 9.			
7. Is there any evidence of soil erosion caused by precipitation driven runoff being minimized?	Y N		
- If YES, ENTER STATUS "S". - If NO, ENTER STATUS "U".			
8. Where there is soil erosion and/or contaminant migration to natural waterways, is there a collecting and sampling system in place for analyzing the concentrations of the contaminants in the soil, sediment, or waterways?	Y N		
- If YES, ENTER STATUS "S". - If NO, ENTER STATUS "U".			
<u>DOE Order 5820.2A: Radioactive Waste Management - Low Level Waste</u>			
9. Does this facility manage solid low-level waste?	Y N		
- If YES, proceed with checklist. - If NO, checklist is complete.			

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
10. Are measures in place to ensure that exposure to low-level wastes and radioactive material which may be released to soils, plants, and animals does not cause an individual to receive a dose that exceeds an effective dose equivalent of 25 mrem/yr? - # YES, ENTER STATUS "S", identify system that is in place, and see Radiation Checklists. - # NO, ENTER STATUS "U".	Y N ☐ 		
11. For each active or inactive low-level waste treatment, storage, and disposal facility, does the site have an environmental monitoring program in place designed to measure: a. Releases of radionuclides? b. Disposal unit subsidence? - # YES to Questions 11 a <u>and</u> b, ENTER STATUS "S". - # NO to Question 11 a <u>or</u> b, ENTER STATUS "U".	Y N Y N ☐ 		
12. Based on the characteristics of the facility being monitored, does the environmental monitoring program monitor surface soil for low-level waste contamination? - # YES, ENTER STATUS "S". - # NO, ENTER STATUS "U".	Y N ☐ 		
13. Pursuant to this Order, has the site developed or does it maintain a recordkeeping system on historical records of waste generated, treated, stored, shipped, and/or disposed of, at the facilities under its cognizance? - # YES, ENTER STATUS "S". - # NO, ENTER STATUS "U".	Y N ☐ 		

AUDITOR(S): _____

BLDG/AREA/UNIT(S): _____

DATE: ____/____/____

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AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
<u>Clean Water Act and DOE Order 5400.XY: Biological Monitoring or Testing</u>			
1. Is biological monitoring required by any State or local regulations or by an operating permit (e.g., NPDES permit) for the operation of any facility? - If YES, proceed with checklist. - If NO, proceed to Question 3.	Y N		
2. Are the biological monitoring provisions of the regulation or permit being met? - If YES, proceed with checklist. - If NO, comment on how monitoring does not meet requirements.	Y N		
3. Is biological monitoring of terrestrial or aquatic organisms being conducted? - If YES, comment on for what types of organisms and for what constituents. - If NO, checklist is complete.	Y N		
4. Pursuant to the Federal Water Quality Criteria developed by EPA under the authority of the Clean Water Act, does the site monitor the levels of inorganic and organic compounds in aquatic organisms (fresh and marine) against criteria established by EPA (see EPA Quality Criteria for Water 1986)?	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
5. Pursuant to DOE Order 5400.XY, does the site collect and analyze agricultural products for radionuclides potentially present from site operations within 16 km of the site? - If YES, ENTER STATUS "S". - If NO, ENTER STATUS "U".	Y N ☐		
6. Are there migratory or resident game animals that could have been exposed to radionuclides (either directly or through ingestion of vegetation) that are being or could be harvested for human consumption? - If YES, proceed with checklist. - If NO, checklist is complete.	Y N		
7. Are these game animals that could be consumed being tested or analyzed for acceptable levels of radionuclides for human consumption? (See list of acceptable levels in humans in Memorandum to Distribution by John Tseng, "Clarification of Applicable Radiation Protection Standards for the Public and the Environment", U.S. Department of Energy, November 4, 1987; also Draft DOE Order 5400.XX.) - If YES, ENTER STATUS "S". - If NO, ENTER STATUS "U". This checklist is complete.	Y N ☐		

AUDITOR(S): _____

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AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
40 CFR 257: Disposal of Solid or Sewage Wastes on Agricultural Lands			
1. Are solid wastes or sewage wastes from DOE facilities disposed of on or below lands used for crop production or livestock grazing? - If YES, proceed with checklist. - If NO, checklist is complete.	Y N		
2. Are solid or sewage wastes being disposed of on the surface or within one meter of the surface of the land? - If YES, proceed with checklist. - If NO, checklist is complete.	Y N		
3. For areas with such wastes deposited from 0 - 1 m depth, has testing of the soil-waste mix indicated a pH greater than or equal to 6.5, and concentrations of cadmium below 2 mg/kg (dry weight) (See 40 CFR 257.3 - 5)? - If YES, ENTER STATUS "S". - If NO, ENTER STATUS "U".	Y N 		
4. Are any lands on which solid or sewage wastes are being disposed from 0 - 1 m depth used for grazing by dairy animals? - If YES, proceed with checklist. - If NO, checklist is complete.	Y N		

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
5. On lands used for dairy animals, has testing demonstrated PCB concentrations of less than 1.5 mg/kg in milk fat and 0.2 mg/kg (actual weight) in animal feed pursuant to 40 CFR 257.3 - 5? - If YES, ENTER STATUS "S". - If NO, ENTER STATUS "U". Note: See TSCA checklist. This checklist is complete.	Y N ☐		

AUDITOR(S): _____

BLDG/AREA/UNIT(S): _____

DATE: ____/____/____

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AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
40 CFR 761.120-125: PCB Spills			
1. Have there been any reported or suspected incidents of PCB spills on the DOE facility?	Y N		
- If YES, proceed with checklist.			
- If NO, checklist is complete.			
2. Have the spills of PCB material contaminated any soil or sediment?	Y N		
- If YES, check TSCA checklist for requirements of notification of EPA, cleanup and excavation of contaminated material, and restoration of contaminated areas.			
- If NO, checklist is complete.			
This checklist is complete.			

AUDITOR(S): _____

BLDG/AREA/UNIT(S): _____

DATE: ____/____/____

ESO NO.: _____

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
40 CFR 165.8: Disposal of Pesticides in Soil			
1. Are or have pesticides been disposed of using the soil injection method at the site? - If YES, proceed with checklist. - If NO, checklist is complete.	Y N		
2. If a soil injection method for pesticide disposal is being used, has a Regional EPA Director been contacted for advice on the method, as is recommended? - If YES, ENTER STATUS "S". - If NO, ENTER STATUS "U".	Y N ☐		
Note: The environmental impact of the soil injection method has not been clearly defined nationally, and therefore this disposal method should be undertaken only with specific guidance. Also refer to the FIFRA checklists. This checklist is complete.			

SECTION 16

SOIL/SEDIMENT/BIOTA

1.0 INTRODUCTION

This protocol has been developed to assist auditors during an environmental audit/assessment at DOE facilities to ascertain the status of these media because of known or suspected chemical or radiological contamination. Compared to air and water, relatively few standards have been promulgated directly for soil, sediment, or biota. However, some guidelines exist for both radiological and non-radiological contaminants and serve as the basis for some of the questions that follow in the protocol checklists. In addition, audit protocols have also been derived from regulations and guidelines established under environmental laws such as the Clean Air Act, Clean Water Act, RCRA, CERCLA, TSCA, and FIFRA. A discussion of the applicable statutes and regulations together with citation of DOE orders relating to these media precedes the checklist.

Although a distinction is made between soil and sediment in this discussion, regulations and guidelines for one are, in general, applicable to the other. In addition, the use of the term soil in regulations is frequently extended to "all unconsolidated materials normally found near the surface of the earth including, but not limited to, silts, clays, sands, gravel, and small rocks" (40 CFR 192.11).

Protocols herein for biota primarily concern regulations, guidelines, and orders concerning bioaccumulation of contaminants. Protocols addressing biotic preservation and habitat management are included under the protocols for Natural/Cultural Resources Protection.

1.1 SOIL

Three principle sources of soil contamination at DOE facilities include:

- o Chemical and radiological effluent discharges from on-site facilities.
- o Disposal and management of hazardous and radiological material and waste.
- o Spills/discharges during handling and transport of hazardous and radiological materials.

In addition, gaseous and particulate contaminants in air, such as sulfurous and nitrous oxides and radioactive particle emissions from stacks of production facilities, may settle on soil surfaces far from their source. Local soil contamination can also result from landfills containing municipal solid waste which invariably contains discarded pesticides, cleaning agents, and chemicals.

Guidelines on soil contamination clean-up come mainly from CERCLA regulations for the clean-up of sites involving hazardous substance discharges, spills, and releases; PCB regulations; transportation accidents involving hazardous materials; and RI/FS studies for active and inactive waste management units.

Petroleum and other chemical contamination of soils and sediments are of particular importance in areas of releases from hazardous material transport vehicles. Guidelines set by EPA or state regulators, and site-specific Applicable or Relevant and Appropriate Requirements (ARARS) developed during CERCLA remedial activities could be reviewed and adhered to while inspecting or auditing sites with soil contamination.

There are no Federally mandated criteria, however, to determine an acceptable level of petroleum hydrocarbon (TPH) contamination. California and New Jersey state regulations specify 100 mg/kg TPH in soil as a maximum allowable level. TSCA regulations for PCBs denote the level of clean-up required after a PCB spill incident (40 CFR 761.125). Guidelines are also available from RCRA including restrictions on disposal of solid or sewage wastes on or below agricultural lands.

Guidelines on permissible radioactivity levels in solid materials and liquid waste streams disposed of or discharged to soil or sediment are addressed in DOE Orders (5400.xx). In addition, standards used for remedial action on residual radioactive material from inactive uranium processing sites (40 CFR 192) could be applied to any sites where such material is present in soil or sediments above background levels. Similar standards are being used for remediation at FUSRAP sites (DOE 1985).

1.2 SEDIMENT

Since sediments may originate as soil, any contaminant, especially on the surface, can be washed into water bodies where it may settle out of suspension. Consequently, regulations and guidelines applicable to soils could also serve for sediments and vice-versa. To a lesser extent, contaminated plants and animals, including aquatic organisms, could also contribute to sediment contamination.

Chemical and radiological contamination of sediments is of concern on DOE sites for some of the following reasons:

- o Contaminated sediments may be in equilibrium with pore water and thus could contaminate aquatic life, particularly benthic invertebrates.
- o Dredging operations of harbors and estuaries can generate large volumes of excavated sediments which, because of possible unacceptable levels of metals or other contaminants, could pose problems in handling and disposal.
- o Contaminated sediments can also be disturbed, resuspended, and redeposited on land surfaces during flood events.

Bottom sediments of water bodies generate the potential for continued environmental degradation even when water-column contaminant levels comply with established water quality criteria since the sediments can first act as a sink for contaminants and then as a source during resuspension.

1.3 BIOTA

Organisms may take-in contaminants through ingestion, inhalation, absorption, and to a lesser extent, skin contact. Ingestion of contaminated vegetation and soil is a potential exposure route to animals because of plant up-take of soil contaminants. Movement of large mammals and birds from on-site to off-site is a pathway of contaminant transport away from DOE facilities. In addition, winds may disperse radionuclides away from and off DOE sites with potential effects on crops.

Bioaccumulation is the principle cause of high concentrations of toxic chemicals in aquatic life. Chlorinated hydrocarbons, PCBs, methyl mercury, and radionuclides are directly available for bioaccumulation in the food chain.

EPA "Quality Criteria for Water 1986", developed under authority of section 304(a)(1) of the Clean Water Act, requires the EPA to publish and periodically update ambient water quality criteria. It includes the concentration levels in water (ug/L) for many potentially toxic chemicals; data is provided for fresh water and marine organisms, both acute and chronic effects. The criteria are not rules and have no regulatory impact. However, the criteria present scientific data and guidance on the environmental effects of pollutants which can be useful for deriving regulatory requirements for aquatic biota.

2.0 REGULATORY FRAMEWORK

Regulatory framework for protecting soil, sediment, and biota at DOE sites comes from such laws as the Clean Air Act, Clean Water Act, RCRA, CERCLA, TSCA, and FIFRA, as well as DOE orders. Specific regulations are promulgated by the FDA, EPA, States and local regulatory agencies. The Clean Water Act is the basis for development of much of the sediment quality criteria and criteria that can be applicable to addressing soil contamination.

2.1 APPLICABLE DOE ORDERS AND GUIDELINES

Reports and orders that contain specific directives and guidelines to DOE facilities for compliance with environmental laws and regulations concerning soil, sediment, and biota include the following:

- o "DOE Guidelines for Residual Radioactivity and Formerly Utilized Site Remedial Action Program and Remote Surplus Facilities Management Program Sites", and "A Manual for Implementing Residual Radioactivity Guidelines" (DOE 1985). These reports provide clean-up standards for non-functioning nuclear facilities.
- o DOE 5400-4. "Radiation Protection of the Public and the Environment" establishes standards and requirements for the DOE and DOE contractors with respect to protection of the public and the environment against undue risk from radiation.
- o DOE 5400-XY. "Radiological Effluent Monitoring and Environmental Surveillance" states DOE policy to conduct effluent monitoring and environmental surveillance programs for determining whether the public and environment are adequately protected during DOE operations and whether the operations are in compliance with DOE and other Federal, State, and local radiation standards and requirements.
- o DOE 5480.14 "Comprehensive Environmental Response Compensation, and Liability Act Program" and 5400.4 "Comprehensive Environmental Response Compensation, and Liability Act Requirements". These orders provide instruction for implementing DOE CERCLA programs. It defines actions to identify and evaluate inactive hazardous waste disposal sites, and remedial actions to improve control of hazardous substance migration from such sites.
- o DOE Order 5480.2. "Hazardous and Radioactive Mixed Waste management". This Order establishes waste management procedures for facilities operated under authority of the Atomic Energy Act of 1954, as amended.
- o DOE Order 5480.2A "Radioactive Waste Management" establishes policies, guidelines, and minimum requirements by which the DOE manages its radioactive waste, mixed waste, and contaminated facilities, and provides guidance for developing containment quality criteria.

2.2 OTHER GUIDELINES AND REPORTS

- o EPA 1977 Proposed Guidelines on Dose Limits for Persons Exposed to Transuranium in the General Environment, EPA 520/4-77-016, Washington, D.C.
- o EPA Quality Criteria for Water, 1986 ("Yellow Book")
- o NRC 1981 Memorandum from W.S. Dircks to Commissioners: Disposal of On-Site Storage of Residual Thorium or Uranium Present from Post-Operations. Section 81-576.

2.3 APPLICABLE REGULATIONS

- o 40 CFR 240-280, EPA guidelines and requirements for disposal of solid wastes.
- o 40 CFR 241, EPA guidelines and requirements for land disposal facilities.
- o 40 CFR 267, EPA guidelines and requirements for hazardous waste disposal facilities.
- o 40 CFR 165.7-11, EPA, recommended procedures for the disposal and storage of pesticides and pesticide containers, including recommendations against certain soil injection procedures.
- o 40 CFR 320 and 323, EPA regulations concerning discharge of dredged or fill material.
- o 40 CFR 192.1-2, EPA regulations concerning residual radioactive materials.

3.0 REFERENCES

- o Analytical Methods for U.S. EPA Priority Pollutants and 301(h) Pesticides in Estuarine and Marine Sediments, Marine Operations Division, Office of Marine and Estuarine Protection, U.S. Environmental Protection Agency, Washington, D.C. May, 1986.
- o Briefing Report to the EPA Advisory Board on the Equilibrium Partition Approach to Generating Sediment Quality Criteria, Office of Water Resources and Standards, Criteria and Standards, Washington, D.C. April, 1989.
- o DOE 19851 Guidelines for Residual Radioactivity at Formerly Utilized Site Remedial Action Program and Remote Surplus Facilities Management Program Sites, Appendix B, Washington, D.C., July, 1985.
- o EPA Proposed Guidance on Dose Limits for Persons Exposed to Transuranium Elements in the General Environment, U.S. EPA 520/4-77-016, Washington, D.C. 1977.
- o EPA Quality Criteria for Water. Office of Water Regulations and Standards, Standards Branch, U.S. EPA, Washington, D.C., September, 1986.
- o Gilbert, T.L., K.F. Eckerman, W.R. Hansen, J.W. Healy, W.E. Kennedy, Jr., B.A. Napier, and J.K. Soldat, A Manual for Implementing Residual Radioactivity Guidelines, U.S. DOE, Washington, D.C. 1985.

- o **Guidelines and Register for Evaluation of Great Lakes Dredging Projects. Report of the Dredging Subcommittee to the Quality Program Committee of the Great Lakes Water Quality Board, January 1982.**
- o **Natural Resource Damage Assessment", Technical Information Document, "Approaches to the Assessment of Injuries to Soil Arising from Discharges of Hazardous Substances and Oil", U.S. Department of the Interior, Washington, D.C., 1986.**
- o **Nuclear Regulatory Commission, Memorandum from W.S. Dircks to Commissioners: Disposal of On-Site Storage of Residual Thorium or Uranium Present in Post-Operations, Section 81-576, Washington, D.C., 1981.**

LIST OF SOIL/SEDIMENT/BIOTA (SSB) CHECKLISTS

<u>Performance Checklist</u>	<u>Revision No.</u>	<u>Date</u>	<u>Checklist Title</u>
SB-PS	0	12/29/89	PCB Spills
SB-DPS	0	12/29/89	Disposal of Pesticides in Soil
SB-DSS	0	12/29/89	Disposal of Solid or Sewage Wastes on Agricultural Lands
SB-BMT	0	12/29/89	Biological Monitoring or Testing
SB-GRM	0	12/29/89	General Radioactive Materials
SB-RWM	0	12/29/89	Radioactive Waste Management
SB-PNC	0	12/29/89	Proposed National Contingency Plan
SB-WS	0	12/29/89	Waste Streams
SB-AWS	0	12/29/89	Waste Sites

RAD - EMERGENCY PLANNING AND RESPONSE PROGRAM (AIR ACTIVITIES)

(RA-EPR, 1/2)

SITE ID: _____

AUDITOR(S): _____

BLDG/AREA/UNIT(S): _____

DATE: ____/____/____

ESO NO.: _____

AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
DOE Order 5500.3: Emergency Planning			
1. Is a site-specific emergency plan required for this site?	Y N		
- If NO, this checklist is complete.			
- If YES, proceed with checklist.			
2. Have site-specific emergency planning zones (i.e., areas potentially affected by a radiological emergency) been established?	Y N		
- If YES, note in the comments section the technical references on how the emergency planning zones were established.			
3. Are technical specialists available for modeling the release and assessing the radiological hazards associated with a site emergency?	Y N		
4. Have specific individuals responsible for performing the dose assessment been designated?	Y N		
5. Are adequate measurement, monitoring, and meteorological systems in place for use during an emergency?	Y N		
6. Is the capability in place to:			
a. Coordinate monitoring teams?	Y N		
b. Calculate radiation dose projections?	Y N		
c. Collect monitoring data?	Y N		
d. Recommend protective actions for the emergency planning zones?	Y N		

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AUDIT QUESTIONS AND PROCEDURES	RESPONSE	REFERENCE	COMMENTS
7. Is the documentation for the offsite radiation dose calculative method up-to-date and reflective of the methodology in place? - If YES to Questions 2 - 7, ENTER STATUS "S". - If NO to any of Questions 2 - 7, ENTER STATUS "U". This checklist is complete.	Y N		