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B. Document Number DOE/RL-99-30

C. Title
Radioactive Air Emissions Notice of Construction
241-SY-101 Crust Growth Near Term Mitigation

D. Internet Address

E. Required Information

1. Is document potentially Classified? (●) No ( ) Yes (MANDATORY)
   Eric M. Greager
   Manager's Signature Required

   If Yes ______ (●) No ( ) Yes Classified
   ADC Signature Required

2. Internal Review Required? (●) No ( ) Yes
   If Yes, Document Signatures Below
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F. Complete for a Journal Article

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Office of External Affairs	[ ]			Y / N
DOE-RL	[x]	Transmittal Letter		Y / N
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K. If Additional Comments, Please Attach Separate Sheet

A-6001-401 (02/98)

RADIOACTIVE AIR EMISSIONS NOTICE OF CONSTRUCTION 241-SY-101 CRUST GROWTH NEAR TERM MITIGATION

The following description and any attachments and references are provided to the Washington State Department of Health, Division of Radiation Protection, Air Emissions & Defense Waste Section as a notice of construction (NOC) in accordance with the Washington Administrative Code (WAC) 246-247, Radiation Protection - Air Emissions. The WAC 246-247-060, "Applications, registration and licensing", states "This section describes the information requirements for approval to construct, modify, and operate an emission unit. Any NOC requires the submittal of the information listed in Appendix A." Appendix A (WAC 246-247-110), lists the requirements that must be addressed.

Additionally, the following description, attachments and references are provided to the U.S. Environmental Protection Agency (EPA) as an NOC, in accordance with Title 40 Code of Federal Regulations (CFR), Part 61, "National Emission Standards for Hazardous Air Pollutants." The information required for submittal to the EPA is specified in 40 CFR 61.07. The potential emissions from this activity are estimated to provide less than 0.1 mrem/year total effective dose equivalent to the hypothetical offsite maximally exposed individual, and commencement is needed within a short time frame. Therefore, this application is also intended to provide notification of the anticipated date of initial startup in accordance with the requirement listed in 40 CFR 61.09(a)(1), and it is requested that approval of this application will also constitute EPA acceptance of this 40 CFR 61.09(a)(1) notification. Written notification of the actual date of initial startup, in accordance with the requirement listed in 40 CFR 61.09(a)(2), will be provided at a later date.

1. Location: 241-SY-101 Double Shell Tank, 296-P-23 Stack Vent, in the 200 West Area, of the Hanford Site.
   Coordinates: Latitude 46° 32' 25.2"
   Longitude 119° 37' 41.6"

2. Responsible Manager: Mr. J. E. Kinzer, Assistant Manager,
   Tank Waste Storage and Retrieval, Office of River Protection
   U.S. Department of Energy, Richland Operations Office
   P.O. Box 550, Richland, Washington 99352
   (509) 376-7591.

3. Proposed Action: This activity will be an insignificant modification to the existing registered 296-P-23 Stack. The planned activity will deploy a tool similar to a void fraction instrument into the tank waste to perforate the crust creating vent paths through the crust and dislodging trapped gas bubbles from the crust matrix. The crust has recently solidified across the surface of the waste and is rising due to the buoyancy of the trapped gas bubbles.

   This action is being undertaken for two main reasons: 1) slowing the crust growth now will provide more time to prepare for the transfer of waste from the tank (the long term mitigation

DOE/RL-99-30

Radioactive Air Emissions Notice of Construction 241-SY-101 Crust Growth Near-Term Mitigation

United States
Department of Energy
Richland, Washington

Approved for Public Release

RELEASE AUTHORIZATION

Document Number:	DOE/RL-99-30, Rev. 0
Document Title:	Radioactive Air Emissions Notice of Construction 241-SY-101 Crust Growth Near Term Mitigation

This document, reviewed in accordance with DOE Order 241.1, "Scientific and Technical Information Management," and DOE G 241.1-1, "Guide to the Management of Scientific and Technical Information," does not contain classified or sensitive unclassified information and is:

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Christine Willingham — 4/29/99

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RADIOACTIVE AIR EMISSIONS NOTICE OF CONSTRUCTION 241-SY-101 CRUST GROWTH NEAR TERM MITIGATION

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   This action is being undertaken for two main reasons: 1) slowing the crust growth now will provide more time to prepare for the transfer of waste from the tank (the long term mitigation action); and 2) as the waste is transferred out of the tank, the level of the gaseous crust layer will get closer to the intake level of the mixer pump. Removing the trapped gasses will allow more waste to be transferred without the mixer pump cavitating from the intake of gas bubbles.

4. State Environmental Policy Act (SEPA): The proposed action is categorically exempt from SEPA.

5. Chemical and Physical Processes: The tank generates about 100 cubic feet of gasses a day, which are evenly dispersed throughout the tank during the mixer pump runs. In the recent past, prior to the top of the crust becoming "sealed", those gasses were also gradually released at the surface during mixer pump runs. Of the 100 cubic feet a day of generated gasses, it is estimated that approximately 70 cubic feet are trapped in the crust. Based on current data, a total of approximately 10,000 cubic feet of gas is trapped in the crust. There are three layers to the crust (see Figure 1); a hard top layer with essentially zero void space (~ 2 feet deep), a middle viscous layer with approximately 30% void space (~2 feet deep), and a foamy bottom layer with approximately 50% void space (~2 feet deep). This bottom layer provides enough buoyancy to lift the rest of the crust, creating the crust growth and rising phenomena.

   The crust-perforating tool will be deployed in one riser first. If the desired effect is achieved (release of enough gasses to mitigate crust growth), the activity will be repeated at other locations in the tank. Up to sixteen risers could be used for one deployment each if results are positive.

   The test activity will provide a minor disturbance to the crust and waste. Deployment of this tool is the same as the deployment of the void fraction meter with the exception of the arm's increased size (30-inch arm VS a 6-foot arm). Refer to Figure 2 for a sketch of the mitigation arm.

   Basic steps for deployment are:

   1. Continuous, real-time video surveillance will be attempted during the entire process.
   2. Use a water lance to create a small (approximately 4 inches in diameter) opening in the hard crust layer to insert the tool.
   3. Pull arm up to the 90 degrees position via a hydraulically actuated cable system that is manually operated (see Figure2).
   4. Position arm to just below the foamy layer of crust.
   5. Slowly hand-rotate the arm to dislodge gas bubbles.
   6. Wait for visual bubble release.
   7. Raise arm up several inches more into crust and rotate again.
   8. Repeat the rotations through all layers of the crust, if possible.
      - The process will be repeated until gasses stop being released.
      - There will be a small water purge, generally less than 1 gallon per minute and up to a maximum of 10 gallons per minute if needed, around the arm cable to keep waste

from plugging the mast. The water will also soften the crust as the tool is brought closer to the top of the crust.

- The arm may be raised through the top of the crust, depending on the strength of the tool and the firmness of the crust. Pulling the arm up out of the crust is not expected to occur to any great extent, however, due to the varying thickness of the hard top layer of crust, crust strength may not always prevent the arm from penetrating. Also, the intent of the activity is to release trapped gasses. Therefore, multiple vent paths created by the arm would be beneficial and pursued if conditions warrant. It is more likely that the small diameter of viscous waste material around the tool shaft, through which the gas will release, will grow to approximately 4 feet in diameter.
- Gas monitoring will take place during the deployment (In-tank Standard Hydrogen Monitoring System, in-tank Fourier-Transform Infrared Spectrometer, and ammonia monitoring at the stack). Approaching the 25% LFL of hydrogen in the headspace will suspend the activity until flammability levels drop via the tank ventilation system.

9. Remove the tool by lowering the arm back into a vertical position and pulling back up through the riser. The tool is decontaminated (water-wash spray ring) in the riser before emerging from the tank.

The tasks involved with this activity are described, and are included here by reference, in current TWRS ALARACT Demonstrations (ALARACT 13, *Installation, Operation, and Removal of Tank Equipment,* which also references ALARACTs 1 (*Riser Preparation/Operation*), 4 (*Packaging and Transportation of Waste*), 6, *Pit Access*), 10 (*Water Lancing*), and 12 (*Packaging and Transpiration of Equipment and Vehicles*) as potentially applicable).

Data collected during the test will be studied to determine if this method has any merit before continuing on to cover more surface area of the waste. An estimated 140 to 207 cubic feet of gasses may be released during one deployment of the tool (based on 50 to 75 percent of the available gasses in the 12-foot diameter cylinder of crust disrupted by the arm). If the tool were deployed in all sixteen risers, approximately 13% to 17% of the total tank surface area would be made available for gas release (based on a 4 foot diameter well of viscous waste material and approximately 2 square feet of surface area for lifting the arm out of the crust).

6. Proposed Controls: Control requirements will be the same as those called out in the ALARACT demonstrations referenced above. They are administratively defined, based on ALARA principles, and consist of proven ALARA techniques.

The existing ventilation and emissions control systems for the 241-SY Tank Farm will be in-place and operating during this activity. All three tanks in the 241-SY Tank Farm are ducted to this ventilation system. Exhaust air from the SY tanks flows through a moisture separator, a prefilter and two HEPA filters in series, before entering the fan and exiting through the stack. The HEPA filters are rated for 1000 cubic feet per minute. The fan is rated for 1000 cubic feet per minute of air at 200 degrees Fahrenheit.

7. Drawing of Controls: The SY Tank Farm ventilation, control and sampling systems have been inspected in the past by the WDOH and drawings are available upon request.

8. Radionuclides of Concern: Primarily Sr-90 and Am-241. Refer to Tables 1 and 2.

9. Monitoring: Either the existing primary or backup stack sampling and monitoring systems for the 241-SY Tank Farm will be in-place and operating during this activity. All three tanks in the 241-SY farm are ducted through the ventilation system to the primary 296-P-23 or the backup 296-P-28 sampling and monitoring system. From an air effluent monitoring and sampling standpoint, the system is not capable of differentiating between the individual tank exhaust streams. No changes will be made to the sampling and monitoring system as originally described in the approved Notice of Construction; *Application for Approval to Construct Mixer Pump Test in Tank 241-SY-101*. No changes will be made to the periodic confirmatory measurements currently taken at the primary and backup stacks for annual reporting purposes. Task specific periodic confirmatory monitoring called out in the TWRS ALARACT Demonstrations noted above are included here by reference.

10. Annual Possession Quantity: Refer to Table 1. The annual possession quantity is derived from crust samples (WHC-SD-WM-ER-409, *Tank Characterization Report for Double-Shell Tank 241-SY-101*, July 1995), consisting of total alpha and total beta analysis. The representative radionuclides, which are used in the emission calculations, are conservatively assumed to be Am-241 and Sr-90 respectively. A list of individual radionuclides, representing the tank's existing inventory as described in the *Hanford Site Radionuclide National Emission Standards for Hazardous Air Pollutants Stack Source Assessment*, HNF-1974, February 1998, and as described in the Best Basis Inventory for the tank (WHC-SD-WM-ER-409, Rev 0B, 1998), is shown in Table 2. These radionuclides may contribute to the total alpha and total beta measurements.

11. Physical Form: Particulate, gaseous and aerosol.

12. Release Form: Particulate, gaseous and aerosol.

13. Release Rates: The potential-to-emit (PTE) resulting from these gas-venting activities is expected to be very low. The PTE was calculated by using radionuclide concentrations of the crust from tank sample data (WHC-SD-WM-ER-409), determining the amount of disrupted crust that would conservatively represent the annual possession quantity, and applying the 40 CFR 61 Appendix D release factor for particulates to that annual possession quantity.

    The disrupted crust amounts are based on two subtasks within the overall tool deployment: 1) lancing the tool into the waste, and 2) the possibility of pulling the extended arm up through the top of the crust. Other tasks in the overall deployment (as described in the referenced ALARACT demonstrations) may create emissions, however, these two tasks will amply envelope all tasks and will adequately represent all emissions from the activity.

    The amount (grams) of crust contributing to the annual possession quantity from lancing, and all other activities except the arm lifting out of the crust, was determined by multiplying the volume created from the 4-inch lance diameter and 6 feet of crust depth by the density of the crust. Less mass in the 30 and 50 percent void layers of the crust was accounted for in the 6-foot depth. Refer to Table 1.

The amount (grams) of crust contributing to the annual possession quantity from pulling the arm up through the crust was determined by multiplying the volume created from the surface area of the arm (3.5 inches O.D. by 6 feet long) and the affected crust depth (1 foot) by the crust density.

To obtain the total annual possession quantity, the amounts of disrupted crust from each task were added together and multiplied by the waste concentration values for total alpha and total beta in the crust. The 40 CFR 61 Appendix D release factor for particulates was then applied to the source term to estimate the unabated emissions from the activity. The conservatively estimated potential emissions are shown in Table 1.

Abated emissions were estimated by dividing the unabated emission by a decontamination factor of 3,000 for the HEPA filter treatment train. The conservatively estimated abated emissions are shown in Table 1.

14. Location of the MEI: The maximally exposed individual is located approximately 15 miles (24 km) east of the 200 West Area.

15. TEDE to the MEI: The potential annual unabated total effective dose equivalent (TEDE) to the hypothetical offsite maximally exposed individual (MEI) from this activity is 5.68 E-02 mrem/yr. The radionuclides that contribute greater than 10 percent of the unabated TEDE to the MEI are assumed to be represented by Sr-90 and Am-241. The potential annual unabated and abated dose estimates are shown in Table 1.

    The unit dose factors and the information required to develop the unit dose factors from the Clean Air Assessment Package 1988 (CAP-88), main frame computer model are included in *Unit Dose Calculation Methods Summary of Facility Effluent Monitoring Plan Determinations* (WHC-EP-0498), which have been previously submitted to the WDOH.

    The reported TEDE to the MEI from all CY 1997 Hanford Site air emissions (point sources, diffuse and fugitive sources, and Radon and Thoron) was 0.026 millirem/year (DOE/RL-98-33, *Radionuclide Air Emissions Report for the Hanford Site, Calendar Year 1997*, June 1998). The estimated emissions resulting from the SY-101 near term mitigation activities, in conjunction with other operations at the DOE Hanford Site, will not result in an exceedance of the National Emissions Standard of 10 millirem per year.

16. Cost Factors if no Analysis: Not Applicable

17. Duration or Lifetime: Initial deployment is scheduled to take place the first week in May 1999, or sooner if design and construction of the tool is completed. It takes one work shift to complete one deployment. Deployment in all 16 risers may be completed prior to the first waste transfer out of the tank (September 1999). Or, some deployments may be undertaken

between waste transfers as the tank waste level lowers and the gaseous crust layer threatens to interfere with the intake of the mixer and transfer pumps. All deployments should be completed in CY 1999, but no later than the end of CY 2001 (project end date for surface level rise remediation).

18. Standards: The potential TEDE to the MEI from the SY-101 near term crust mitigation activities is less than 0.1 millirem/year. Therefore, the emission unit design and construction must meet, as applicable and to the extent justifiable by a cost/benefit evaluation, the technology standards listed under WAC 246-247-130. The following summarizes compliance of the primary and backup stack ventilation and monitoring systems with the listed technology standards.

Primary Ventilation System (296-P-23)

ASME/ANSI AG-1:
This equipment specific code consists of five primary sections, which are applicable to this unit. The applicable sections are fans (Section BA), ductwork (Section SA), HEPA filters (Section FC), dampers (Section DA) and Quality Assurance (QA) (Section AA). AG-1 contains other sections, however they do not apply to this system. This ventilation system was constructed and installed prior to the AG-1 Standard being issued, however, the system is compliant, with the following exceptions.

The fan section (Section BA) covers the construction and testing requirements for fans. This fan meets the applicable criteria, except as follows. It was constructed to the Air Movement and Control Association (AMCA) 99-401, Spark Resistant Construction criteria, and was tested to the applicable sections of AMCA 210. However, it can not be shown that the shaft leakage criteria is met (Section BA 4142.2). This is proposed as acceptable because the fan is located downstream of the high efficiency particulate air (HEPA) filters and the area of opening around the shaft is minimal.

The ductwork section (Section SA) covers acceptable material, fabrication, and testing criteria. The ductwork is a combination of both metal and flexible polymer. The ductwork meets the applicable criteria, except as follows. No records can be found as to whether or not the ductwork was pressure tested per the ASME N510 criteria. This is proposed as acceptable because the ductwork is located above ground and can be visually inspected. In addition there are two different types of joints in the ductwork, welded and flanged. In both cases, there seems to be no indications of degradation or leakage. In the case of the flanged connections, these are standard flanges with standard bolt configurations.

The criteria identified in the HEPA filter section (Section FC) were previously located in military specification 51068 and ASME 509. The filters currently installed meet the 51068 criteria. Replacement filters, which may be installed in the exhauster at some future date, will meet the applicable sections of AG-1, except for two areas dealing with filter qualification testing. Justification for this exception was discussed with and approved by WDOH at the December 1998 Routine Technical Assistance Meeting.

The damper section (Section DA) includes criteria for design, construction and testing. It can not be shown that all the dampers installed in this system meet the applicable criteria. The valves are butterfly style. The only valves that are manipulated during operation are those located on the exit ductwork of each tank. These are manipulated to adjust the flow rates from each tank. These valves do not provide an isolation function. The only valves that provide an isolation function are the inlet valve to the exhauster and the valves currently isolating the backup 296-P-28 system from the new 296-S-25 ventilation system (not installed yet). These valves meet the applicable testing and construction criteria identified in N509 (the basic criteria, which was identified in N509, is very similar to AG-1). Based on the above discussion, the valves are proposed as acceptable for the functions they are providing.

The quality assurance section (Section AA) references ASME NQA-1. Specific component/system criteria are located in each section throughout AG-1. It can not be shown that the exhauster meets applicable AG-1 criteria. This system was constructed many years ago. Modifications made to the system in the recent past, such as the new non-sparking exhaust fan, meet the applicable criteria. Any future replacements will also meet the applicable criteria. The remainder of the system is proposed acceptable as is, based on past operating experience.

ASME/ANSI N509:
This standard deals with the individual components and how they relate to the overall system. The primary section of N509 that will be discussed is the filter housing section and heater section.

The filter housing for this exhauster is not compliant with the applicable sections of the N509 criteria. The deficiencies have been identified in several past field visits and technical meetings with the WDOH. These include the design of the housings, which are similar to self-contained HEPA filter housings. Although the system does not meet the applicable criteria, it has been agreed during past disclosures with the WDOH (DOE letter 95-TOP-013, J.E. Rasmussen to A.W. Conklin, *Washington State Department of Health 1992 Audit Findings, Audit Number 28, Hanford 200 Area Tank Farms Corrective Action Plan, 1/29/95)* that the system is acceptable as is.

There is no heater used in this exhauster, therefore, it does not meet the N509 criteria. The heater was removed from service approximately 4 years ago. The reason for the heater was to ensure the relative humidity of the air stream was below 70%, reducing the opportunity for condensation in the filter housing. An engineering study (WHC-SD-WM-ES-363) was completed prior to removing the heater to verify the relative humidity of the air stream would not be sufficient to cause condensation to occur in the filter housing. Based on this study and a Routine Technical Assistance Meeting discussion with the WDOH, operation of the system without the heater is proposed as acceptable as is.

ASME/ANSI N510:
This standard pertains to the testing of nuclear air cleaning systems. The requirement identified to perform a pressure decay test, to ensure there are no infiltration or outward leak paths from the system, has not been performed. The system is proposed acceptable as is

because it operates under negative pressure, and if leaks were present, they would be into the housing, thus eliminating the potential release of contamination.

This system does not meet the aerosol leak test criteria. As discussed under the N509 section, the filter housings are not fully compliant with N509 requirements. Upstream sampling prior to the first filter is performed to verify 100% challenge. However, an upstream sample can not be performed for the second filter. Aerosol is injected prior to the second filter to perform the penetration leak test, but it is not verified that the filter is being challenged properly. Although this does not meet the applicable N510 criteria, it has been agreed with the WDOH that the system is acceptable as is (DOE letter 95-TOP-013, J.E. Rasmussen to A.W. Conklin, *Washington State Department of Health 1992 Audit Findings, Audit Number 28, Hanford 200 Area Tank Farms Corrective Action Plan, 1/29/95; and April 18, 1995 RTAM)*.

ANSI/ASME NQA-1:
The system's compliance with NQA-1 is discussed in the AG-1 QA section above. Quality assurance is currently addressed by HNF-MP-599 Rev. 2, *Project Hanford Quality Assurance Program Description* (Chapter 2 Section 3.3 and Chapter 7 Section 3.2), and by HNF-0528-3, *NESHAP Quality Assurance Project Plan for Radioactive Airborne Emissions*, (all of Sections 2.0, 3.0 and 5.0) as a compatible alternative to NQA-1

ANSI/ASME NQA-2:
The standard is no longer an active National Standard and has been incorporated into NQA-1. Compliance with NQA-1 is addressed above.

ANSI N13.1:
The standard pertains to sampling airborne radioactive materials. The sampling system is compliant with applicable sections of the standard, with the following exception.

The particle deposition in sample lines is estimated using a computer software program titled *Deposition 2.0* (referenced as Anand, N. K.; McFarland, A. R.; Wong, F. S.; Kocmound, C. J.; NRC NuReg/GR-006, Serial #2145, March 8, 1993, Aerosol Technology Laboratory, Department of Mechanical Engineering, Texas A&M University College Station, TX 77843).

ANSI N42.18:
The standard only applies to CAMs. The CAM is compliant with the standard, however, it is installed under DOE requirements, and will not be used for Clean Air Act compliance.

40 CFR 60 Appendix A Test Methods: 1, 1A; 2, 2A, 2C, 2D; 4, 5; and 17:
Test methods 1 through 2D are used to determine gas velocities and volumetric flow rates in stacks. The system is tested in accordance with Methods 1A and 2C.

Test method 4 determines the moisture content in stack gases. This method is tailored for laboratory use and is very impractical for field implementation, therefore, it has not been applied to this system. Moisture content is determined by using a hygrometer to measure relative humidity and combining that with the temperature, absolute stack static pressure, and vapor pressure of the water at the temperature of concern.

Test methods 5 and 17 determine particulate emissions from stationary sources. These test methods are not used. Particulate emissions are sampled using ANSI 13.1 methods.

ERDA 76.21:
This document (The Nuclear Air Cleaning Handbook) provides information and guidance pertaining to the design, fabrication and testing of nuclear air treatment systems. It provides definitions and examples that can be used for air cleaning systems and explains details such as options for material to be used in the design and construction. The acceptance criterion for aerosol testing HEPA filters (0.05% penetration) is the only guidance currently applied to this system from ERDA 76.21.

ACGIH 1988:
This document (The Industrial Ventilation Book) also provides information and guidance. It discusses methods for choosing the correct fan for an application, explains how to calculate pressure loss, how to take flow measurements, as well as provides information pertaining to the characteristics of air. This system was constructed and installed prior to the ACGIH Standard being issued. The system has shown itself, through past operating experience, to operate reliably and to provide the necessary capacity and function.

Backup Ventilation System (296-P-28)

ASME/ANSI AG-1:
This equipment specific code consists of five primary sections, which are applicable to this unit. The applicable sections are fans (Section BA), ductwork (Section SA), HEPA filters (Section FC), dampers (Section DA) and Quality Assurance (QA) (Section AA). AG-1 contains other sections, however they do not apply to this system. This ventilation system was constructed and installed prior to the AG-1 Standard being issued, however, the system is compliant, with the following exceptions.

The fan section (Section BA) covers the construction and testing requirements for fans. It can not be shown that this fan meets the applicable AG-1 criteria. This system was constructed many years ago and no documentation is available to show whether or not the fan was designed, constructed or tested under the AMCA criteria. Although it can not be shown that the fan meets the criteria, it is proposed that the system is acceptable as is based on past operating experience, which has shown the system to perform reliably with respect to its function.

The ductwork section (Section SA) covers acceptable material, fabrication, and testing criteria. The ductwork is a combination of both metal and flexible polymer. The ductwork meets the applicable criteria, except as follows. No records can be found as to whether or not the ductwork was pressure tested per the ASME N510 criteria. This is proposed as acceptable because the ductwork is located above ground and can be visually inspected. In addition, there are two different types of joints in the ductwork, welded and flanged. In both cases, there seems to be no indications of degradation or leakage. In the case of the flanged connections, these are standard flanges with standard bolt configurations.

The criteria identified in the HEPA filter section (Section FC) were previously located in military specification 51068 and ASME 509. It can not be shown whether or not the filters installed in the backup exhauster meet the applicable criteria. Aerosol testing is completed on this system annually to verify the integrity of the filters. Replacement filters, which may be installed in the exhauster at some future date, will meet the applicable sections of AG-1, except for two areas dealing with filter qualification testing. Justification for this exception was discussed with and approved by WDOH at the December 1998 Routine Technical Assistance Meeting.

The damper section (Section DA) includes criteria for design, construction and testing. It can not be shown that all the dampers installed in this system meet the applicable criteria. The valves are butterfly style. The only valves that are manipulated during operation are those located on the exit ductwork of each tank. These are manipulated to adjust the flow rates from each tank. These valves do not provide an isolation function. The only valves that provide an isolation function are the inlet valves to the exhauster and the valves currently isolating the backup 296-P-28 system from the new 296-S-25 ventilation system (not completely installed yet). These valves meet the applicable testing and construction criteria identified in N509 (the basic criteria, which was identified in N509, is very similar to AG-1). Based on the above discussion, the valves are proposed as acceptable for the functions they are providing.

The quality assurance section (Section AA) references ASME NQA-1. Specific component/system criteria are located in each section throughout AG-1. It can not be shown that the exhauster meets applicable AG-1 criteria. This system was constructed many years ago and is proposed as acceptable as is, based on past operating experience.

ASME/ANSI N509:
This standard deals with the individual components and how they relate to the overall system. The primary section of N509 that will be discussed is the filter housing section and heater section.

It can not be shown that the filter housing for this exhauster is compliant with the applicable sections of the N509 criteria. The deficiencies have been identified in several past field visits and technical meetings. These include the fabrication and fabrication testing of the housings. The design of the housing does allow for both filters to be aerosol tested independently. Although the system does not meet the applicable criteria, it has been agreed during past disclosures with the WDOH that the system is acceptable as is (DOE letter 95-TOP-013, J.E. Rasmussen to A.W. Conklin, *Washington State Department of Health 1992 Audit Findings, Audit Number 28, Hanford 200 Area Tank Farms Corrective Action Plan, 1/29/95)*.

There is no heater used in this exhauster, therefore, it does not meet the N509 criteria. The heater was removed from service approximately 4 years ago. Since the heater was electric, it was disconnected because of flammable gas concerns and possible ignition. The engineering study referenced above for the primary system's heater (WHC-SD-WM-ES-363) serves as the technical basis for not requiring the heater in this backup system as well.

ASME/ANSI N510:
This standard pertains to the testing of nuclear air cleaning systems. The requirement identified to perform a pressure decay test, to ensure there are no infiltration or outward leak paths from the system, has not been performed. The system is proposed as acceptable as is. This is based on the fact that it operates under negative pressure, and if leaks were present, they would be into the housing, thus eliminating the potential release of contamination.

The aerosol leak test is acceptable per the N510 criteria, based on the design of the system. An upstream sample, to verify the 100% baseline, is taken prior to the first and second filter. A test manifold is installed between the first and second filter to ensure sufficient mixing of the aerosol prior to reaching the second filter.

ANSI/ASME NQA-1:
The system's compliance with NQA-1 is provided in the AG-1 QA section above. Quality assurance is currently addressed by HNF-MP-599 Rev. 2, *Project Hanford Quality Assurance Program Description* (Chapter 2 Section 3.3 and Chapter 7 Section 3.2), and by HNF-0528-3, *NESHAP Quality Assurance Project Plan for Radioactive Airborne Emissions*, (all of Sections 2.0, 3.0 and 5.0) as a compatible alternative to NQA-1.

ANSI/ASME NQA-2:
The standard is no longer an active National Standard and has been incorporated into NQA-1. Compliance with NQA-1 is addressed above.

ANSI N13.1:
The standard pertains to sampling airborne radioactive materials. The sampling system is compliant with applicable sections of the standard, with the following exceptions.

The particle deposition in sample lines is estimated using a computer software program titled *Deposition 2.0* (referenced as Anand, N. K.; McFarland, A. R.; Wong, F. S.; Kocmound, C. J.; NRC NuReg/GR-006, Serial #2145, March 8, 1993, Aerosol Technology Laboratory, Department of Mechanical Engineering, Texas A&M University College Station, TX 77843).

ANSI N42.18:
The standard only applies to CAMs. The CAM is compliant with the standard, however, it is installed under DOE requirements, and will not be used for Clean Air Act compliance.

40 CFR 60 Appendix A Test Methods: 1, 1A; 2, 2A, 2C, 2D; 5; and 17:
Test methods 1 through 2D are used to determine gas velocities and volumetric flow rates in stacks. The system is tested in accordance with Methods 1A and 2C.

Test method 4 determines the moisture content in stack gases. This method is tailored for laboratory use and is very impractical for field implementation, therefore, it has not been applied to this system. Moisture content is determined by using a hygrometer to measure relative humidity and combining that with the temperature, absolute stack static pressure, and vapor pressure of the water at the temperature of concern.

Test methods 5 and 17 determine particulate emissions from stationary sources. These test methods are not used. Particulate emissions are sampled using ANSI 13.1 methods.

ERDA 76.21:
This document (The Nuclear Air Cleaning Handbook) provides information and guidance pertaining to the design, fabrication and testing of nuclear air treatment systems. It provides definitions and examples that can be used for air cleaning systems and explains details such as options for material to be used in the design and construction. The acceptance criterion for aerosol testing HEPA filters (0.05% penetration) is the only guidance currently applied to this system from ERDA 76.21.

ACGIH 1988:
This document (The Industrial Ventilation Book) also provides information and guidance. It discusses methods for choosing the correct fan for an application, explains how to calculate pressure loss, how to take flow measurements, as well as provides information pertaining to the characteristics of air. This system was constructed and installed prior to the ACGIH Standard being issued. The system has shown itself, through past operating experience, to operate reliably and to provide the necessary capacity and function.

19. Conditions and/or Clarifications:

Conditions and limitations are attached.

20. Signatures:

EMG [signature] 4-13-99
J. A. Winterhalder, WMH
Environmental Services
Date

[signature] 4-13-99
for B. G. Erlandson, LMHC
Environmental
Date

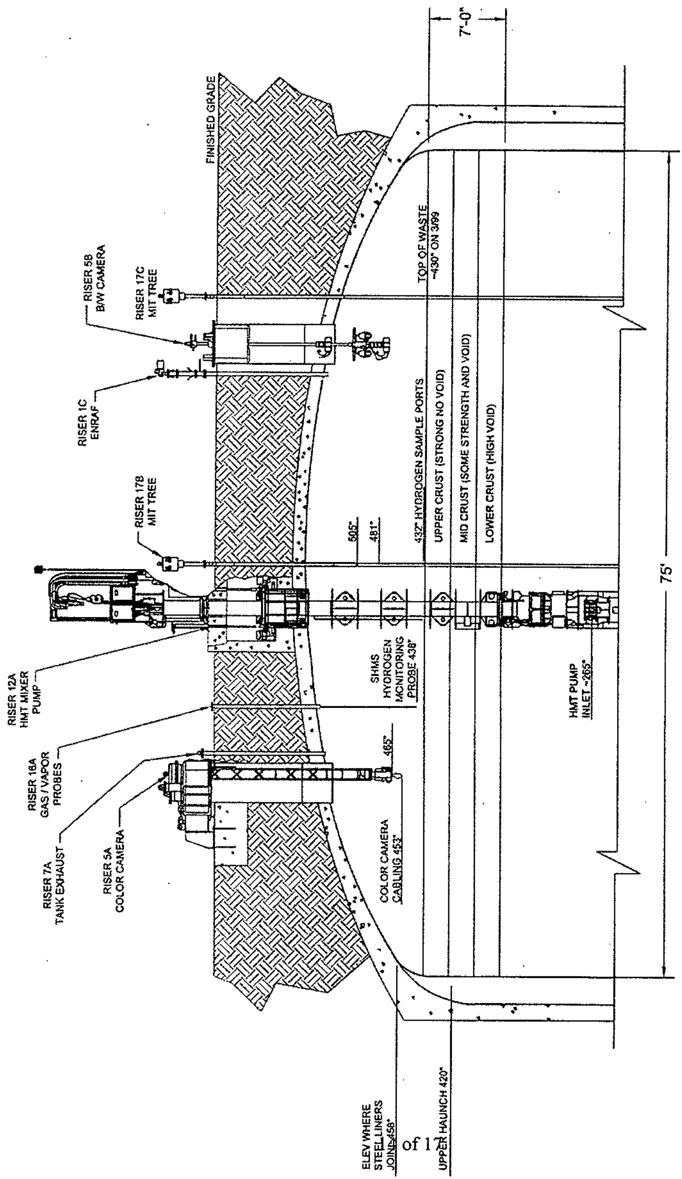
[signature] 4/14/99
L. E. Borneman, FDH
Environmental Integration
Date

[signature] 15 Apr 99
for J. C. Peschong, DOE-RL
~~Tank Waste Remediation System~~ OFFICE OF RIVER PROTECTION
Date

[signature] 4/19/99
J. E. Rasmussen, DOE-RL
Environmental Assurance, Permits, and Policy
Date

[signature] 4/23/99
A. W. Conklin, WDOH
Division of Radiation Protection,
Air Emissions & Defense Section
Date

FIGURE 1



3/99 WASTE LEVEL AND CRUST BREAKDOWN

FIGURE 2
CRUST MITIGATION TOOL

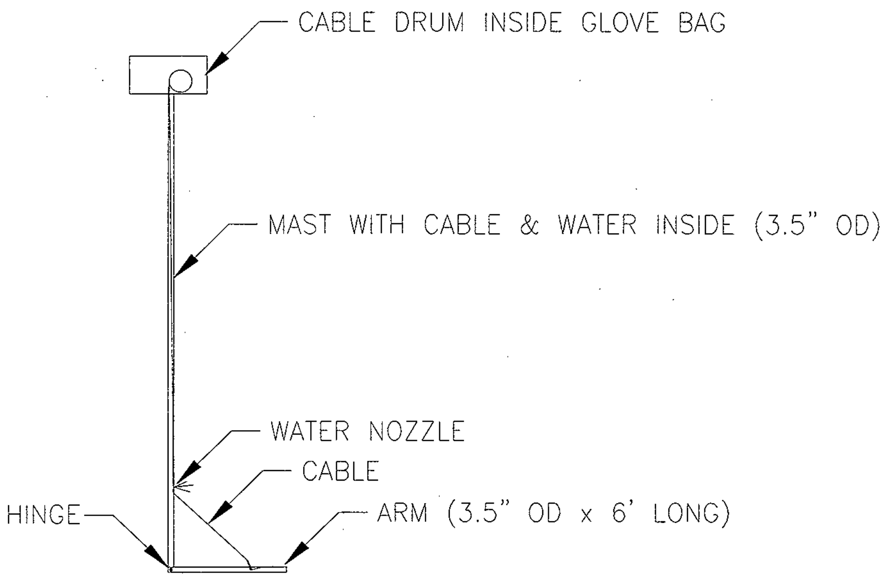


TABLE 1
POTENTIAL ANNUAL EMISSIONS AND OFFSITE DOSE FROM SY-101 NEAR TERM CRUST MITIGATION ACTIVITIES

Number of Deployments	16.00							
Crust Density	1.75	gm/mL						
Lance Diameter	4.00	inches						
Hard Layer Depth	24.00	inches	**Arm Diameter**	3.50	inches			
Hard Layer Volume	4,825.49	inches^3	**Arm Length**	72.00	inches			
Hard Layer Volume	79,075.55	cm^3	**Arm Surface Area**	252.00	inches^2			
Hard Layer Mass (0% void layer)	138,382.22	gm	**Arm Surface Disturbance Depth**	12.00	inches			
30% Void Layer Mass (24 inches deep)	96,867.55	gm	**Arm Surface Disturb. Volume**	48,384.00	inches^3			
50% Void Layer Mass (24 inches deep)	69,191.11	gm	**Arm Surface Disturb. Volume**	792,871.70	cm^3			
Lancing Crust Mass	304,440.88	gm	**Arm Surface Disturb. Mass**	1,387,525.48	gm	**Total Crust Mass Disturbed**	1.69E+06	gm
CONSTITUENT	**CRUST WASTE**	**TOTAL ANNUAL POSSESSION QUANTITIY**	**RELEASE FACTOR** (40 CFR 61 Appendix D)	**UNABATED RELEASE**	**OFFSITE DOSE FACTOR** (WHC-EP-0498)	**UNABATED OFFSITE DOSE**	**ABATED RELEASE**	**ABATED OFFSITE DOSE**
	uCi/gram	**Ci**		**Ci**	**mrem/Ci**	**mrem/yr**	**Ci**	**mrem/yr**
Total Alpha (Am-241)	5.30E-01	8.97E-01	1.00E-03	8.97E-04	1.31E+01	1.17E-02	2.99E-07	3.92E-06
Total Beta (S-r90)	6.08E+02	1.03E+03	1.00E-03	1.03E+00	4.38E-02	4.51E-02	3.43E-04	1.50E-05
Total Dose						5.68E-02		1.89E-05

TABLE 2
ANNUAL POSSESSION QUANTITY
COMPLETE LIST OF RADIONUCLIDES

RADIONUCLIDE	REFERENCED IN BEST BASIS	REFERENCED IN HNF-1974
H3	X	
C14	X	
Ni59	X	
Co60	X	
Se79	X	
Sr90	X	X
Y90	X	X
Zr93	X	
Nb93m	X	
Tc99	X	
Ru106	X	
Cd113m	X	
Sb125	X	
Sn126	X	
I129	X	
Cs134	X	
Cs137	X	X
Ba137m	X	
Sm151	X	
Eu152	X	
Eu154	X	X
Eu155	X	
Ra226	X	
AC227	X	
Ra228	X	
Th229	X	
Pa231	X	
Th232	X	
U232	X	
U233	X	
U234	X	
U235	X	
U236	X	
Np237	X	
Pu238	X	X
U238	X	
Pu239	X	X
Pu240	X	X
Am241	X	X
Pu241	X	X
Cm242	X	
Pu242	X	X
Am243	X	
Cm243	X	
Cm244	X	

BEST AVAILABLE COPY

ATTACHMENT

DEPARTMENT OF HEALTH
CONDITIONS AND LIMITATIONS
FOR SHORT FORM NOTICE OF CONSTRUCTION

RADIOACTIVE AIR EMISSIONS NOTICE OF CONSTRUCTION
241-SY-101 CRUST GROWTH NEAR TERM MITIGATION

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DEPARTMENT OF HEALTH
CONDITIONS AND LIMITATIONS
FOR SHORT FORM NOTICES OF CONSTRUCTION

Title of NOC: _Radioactive Air Emissions Notice of Construction for 241-SY-101 crust growth near term mitigation

Date of NOC: April 1999 ________________

NOTE: All checked items apply to this NOC.

__X___ U.S. DOE shall comply with all requirements and limitations of this license .

__X___ This approval, with its conditions and limitations, constitutes an amendment to the Department's Radioactive Air Emissions License. This amendment must be included in the next revision of the Hanford Air Operating Permit.

__X___ If the department finds that the emission unit described in this NOC, is not in compliance with the standards in WAC 246-247-040 during construction (as described in this NOC, or during operation, it reserves the right to require modifications to bring it into compliance.

_____ The facility shall notify the department at least seven days prior to any planned preoperational testing of the emission unit's emissions control, monitoring or containment systems. The department reserves the right to observe such tests.

__X___ Periodic confirmatory sampling is required. It must consist of : _As described in the Noc, the task specific periodic confirmatory monitoring called out in the TWRS ALARACT Demonstration____________

__X___ U.S. DOE shall monitor this project or emission unit as follows: _As stated in this NOC and the original NOC titled Mixer pump test in tank 241-SY-101__________

__X___ The department retains the right to conduct its own stack sampling, environmental monitoring or other testing, as required around this unit to assure compliance. If the department so decides, the facility must make provision for such testing .

__X___ The facility must be able to demonstrate that the workers associated with this emission unit are adequately trained in the use and maintenance of emission control and monitoring systems, and in the performance of associated test and emergency response procedures.

__X___ The facility must be able to demonstrate the reliability and accuracy of emission data and other test results from this unit (WAC 246-247-075(13) and WAC 246-247-075(6)).

__X__ The facility must be able to demonstrate that it has a quality assurance program compatible with applicable national standards listed in, or equivalent to, those listed in the above cited regulation.

__X___ The department reserves the right to inspect and audit this unit during construction and operation, including all activities, equipment, operations, documents, data, and other records related to compliance with the regulations.

__X__ The department may require an ALARACT demonstration at any time.

__X___ All reports and records must be kept and reported according to 40 CFR 61, Subpart H.

__X___ All measured or calculated emissions must be reported annually.

__X___ If there is an unexpected release of radioactivity or if there is a shutdown or other condition that, if it were allowed to persist, would result in emissions of radionuclides in excess of any standards or limitations in the license or that lasts more than four hours, it must be reported to the department within 24 hours. (Note: Applicable standards (WAC 246-247-040) include unit specific emission limits (paragraph 5), the offsite dose standard (paragraph 1), BARCT (paragraph 3) or ALARACT (paragraph 4), whichever is applicable, or any limitations included in this approval (paragraph 5)).

__X___ When this project is completed, or operations cease, the facility shall notify the department via a report of closure, including whether or not any potential for airborne release occur.

__X__ The facility must maintain a log in an approved format for this activity or emission unit.
__X__ Records must be readily (promptly) available for this unit. Those records must be maintained onsite, and must be retained for at least 5 years.
__X__ This unit must be fully accessible to Department of Health inspectors. If there are any specific training requirements or have restrictions or special requirements for entry, they must be given to the department when they are known to allow for unannounced inspections. At a minimum, for unannounced inspections, such requirements or restrictions must be told to inspectors that morning, with the opportunity for the inspectors to meet those requirements. For prior announced inspections, such notification must occur far enough in advance for the inspectors to have reasonable time to meet the requirements.
__X__ The facility shall make requested documents available in a timely manner for review.
__X__ The process is limited to the exact description described in the NOC.
__X__ The required controls are: As per NOC______.
__X__ The radionuclides re limited to: _As per NOC______.
__X__ The annual possession quantity is limited to: As per NOC______
______.
__X__ The abated emission limit is _1.89E-5_mrem/yr to the MEI.
____ Other conditions: ______
______
______.

Reviewer signature: ______
Signature Date: ______

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