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Secretary



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STATE OF WASHINGTON  
DEPARTMENT OF HEALTH

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August 5, 1992



Mr. Ron Gerton, Manager  
Tank Farms Project Office  
Department of Energy  
P. O. Box 550  
Richland, Washington 99352

Dear Mr. Gerton:

Enclosed please find our regulatory audit results for the 200-East Area Tank Farms. As you know, the field inspections were performed in March and April 1992. A close out meeting was held to give preliminary findings and audit results.

Please provide a Program Plan to address resolution and corrective actions for audit results. Include a listing of responsible persons and organizations and a reasonable schedule for completion for each audit result and its specified expected response(s). This information is required by November 15, 1992.

Please contact me at (206) 586-0254, or write to the above address if any clarification is needed.

Sincerely,

Allen W. Conklin, Head  
Air Emissions and Defense Waste  
Division of Radiation Protection

AWC/JB/jr

cc: T. R. Strong  
Rick Poeton  
Robert King  
Robert Mooney



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**A REGULATORY AUDIT  
OF  
RADIOACTIVE AIR EMISSIONS  
FROM THE  
200-EAST TANK FARMS  
AT  
HANFORD**

**By The  
Air Emissions And Defense Waste Section  
Division Of Radiation Protection  
Department Of Health  
State Of Washington**

August 4, 1992

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## EXECUTIVE SUMMARY

Under the authority of Washington State's Radioactive Air Emissions Program, a technical audit of airborne radioactive emissions from Hanford's 200-East Area Tank Farms was conducted by the Department of Health, Division of Radiation Protection, along with assistance from the Environmental Protection Agency (EPA) Region 10, and the Department of Ecology. Field evaluations were performed in March and April of 1992.

The purpose of this audit was to verify compliance with the federal and state Clean Air Acts' provisions for airborne radioactivity, and with conditions established in a facility permit originally issued in 1989 and renewed in August 1991 (Permit FF-01).

No findings were identified that adversely affect public health and safety, or that would call into question the facility's compliance with the offsite dose standard of 10 mrem/yr effective dose equivalent. However, the facility-related compliance issues identified by this audit will require verification and correction to assure the public is protected from potential releases of radioactive emissions.

The principle findings centered around shortcomings in compliance to the Reasonably Available Control Technology (RACT) engineering standard, mandated under WAC 173-480-050. In addition:

- ▶ Quality assurance oversight as it relates to radioactive air emissions was found to be limited;
- ▶ The lack of calibration of instruments used to measure and monitor for radioactive airborne emissions was observed;
- ▶ Irregularities in reporting for sampling data and in the calculation of emissions were found. Fugitive emissions (uncontrolled release of radionuclides) were found at several sites within the 200-East tank farms.
- ▶ Access was denied to information on past QA findings and corrective actions, and to radioactive source term data, contrary to permit conditions and prior agreements; and, an unresolved safety question (USQ) was also reported to the Department (tank criticality).

Several issues were found and included in this audit as Observations and as Best Management Practices. Noteworthy issues were: inadequate drawings, a user unfriendly PISCES database, difficulties with HEPA filter testing, a cumbersome document clearance process, an underutilized job control system (JCS) and QUEST database.

Several "other" issues were identified for further review by the Department or other regulatory authority at a future date. Also, positive observations were expressed.

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## INTRODUCTION

### Background

In August 1989, the Department of Health (Department) initially issued a permit to the Hanford facility, operated by the United States Department of Energy (USDOE), for a two year period, which was renewed in 1991. This permit (FF-01) was issued in accordance with Washington State's Radioactive Air Emissions Program under Washington Administrative Code (WAC) 402-80, which is now WAC 246-247 (ref. 1).

As part of that permit, USDOE registered 129 emission units (stacks and vents), including fifteen (15) associated with the 200-East Tank Farms. The following tank farms were included in the audit scope: A, AN, AP, AW, AY, AZ, B, BX, BY, and C Farms. Related facilities were not reviewed by this audit, although the CR Vault was reviewed as part of the C Tank Farm.

The Department has the responsibility to ensure compliance with all applicable regulations related to radioactive airborne emissions. As part of the verification process and prior to renewal of the sitewide permit in August 1991, the Department recognized the need to begin an in-depth review process of permitted facilities. The audit process began with a Technical Review of the Plutonium Finishing Plant (PFP). (ref. 2) As a continuation of the audit process, the 200-East Tank Farms was then selected. The reasons for the selection of these facilities include the following:

- ▶ The expected radioactive material source term is concentrated in the waste tanks. The 200-East Tank Farms contain the largest volume of high level radioactive waste material at Hanford, implying a large "potential to emit;"
- ▶ Several Unusual Occurrences were reported for the 200-East Tank Farms facilities by the USDOE under their occurrence reporting procedures that may impact air emissions;
- ▶ Power outages in the 200-East area have adversely affected operations in the area, causing ventilation systems to fail;
- ▶ It is a sufficiently complex facility to provide ample training for the Department's staff in reviewing facilities to the RACT engineering standard, and to further develop a professional working relationship with Westinghouse Hanford Company (WHC) and USDOE; and,
- ▶ Most importantly, to verify compliance to regulations.

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## Authority

The authority for the Department to regulate airborne radioactive emissions from federal facilities, and to conduct inspections and audits begins with Section 118 of the federal Clean Air Act, which states "... the Federal Government... shall be subject to, and comply with, all... state... requirements, administrative authority, and processes and sanctions respecting the control and abatement of air pollution..." (ref. 3).

Under the authority of the state Clean Air Act (ref. 4) Washington State promulgated it's own regulations, giving the Department of Ecology the authority to set standards for airborne radionuclides. These standards were established in 1986 in WAC 173-480 (ref. 5). The authority to enforce those standards was given to the Department of Health, as the radiation control agency (ref. 6). The Department of Health's WAC 246-247 was adopted on August 10, 1988.

One of the standards in WAC 173-480-050 (3) states that, "whenever another federal or state regulation or limitation in effect controls the emission of radionuclides to the ambient air, the more stringent control of emissions shall govern." The Department, therefore, also has authority to enforce (but not supersede the Environmental Protection Agency's authority for) the conditions established in 40 CFR 61, "National Emission Standards for Hazardous Air pollutants; Radionuclides.." (ref. 7). The Department is currently seeking delegation of authority from EPA for the direct enforcement of 40 CFR 61. Another standard in WAC 173-480-050-050 (1) states that, "All radionuclide emission units are required to meet the emission standards in this chapter. At a minimum, all existing emission units shall meet WAC 402-10-010 [now 246-220-007] requiring every reasonable effort to maintain radioactive materials in effluents to unrestricted areas, as low as reasonably achievable (ALARA). For the purposes of this chapter, control equipment of facilities operating under ALARA shall be defined as reasonably available control technology (RACT)." The definition of ALARA is interpreted in WAC 246-220-007, which states in part, "...The term "as low as reasonably achievable" means as low as is readily achievable taking into account the state of technology, and the economics of improvements in relation to benefits to the public health and safety and in relation to the utilization of nuclear energy, ionizing radiation, and radioactive materials in the public interest."

The Department, therefore, conducted this review under the following authorities:

- ▶ The conditions and limitations of permit FF-01, including the required supplemental information;
- ▶ The federal and state Clean Air Acts;
- ▶ The regulations in WAC 173-480 and WAC 246-247; and,
- ▶ The conditions of 40 CFR 61, with EPA, and as required in WAC 173-480.

Scope

The scope for this audit was limited to selectively chosen emission sources in the 200-East Tank Farms, which are considered to represent the entire facility. An emphasis was placed on the reasonably available control technology (RACT) engineering standard, permit registration, construction or modification approval and selected aspects of quality assurance. Radiation surveys and quality surveillances were included.

Audit staff included the following individuals:

<u>NAME</u>	<u>AREA OF REVIEW</u>
Al Conklin	Manager
John Blacklaw	Lead Auditor, Abatement Technology
Don Peterson	Indication, CAMs (NESHAPs)
Kathy Fox-Williams	Fugitive Emissions, Health Physics
Cindy Grant	Quality Assurance, Permits
Randy Acselrod	Controls (Auto./Admin.), U.O.s
Mike Robertson	Observer
Ed Bricker	Support
Al Danielson	Support
Rick Poeton	EPA Observer
Bob King	WDOE Observer

Specifically, the following areas were evaluated:

- \* Stack and air monitor flow procedures
- \* Air sampler procedures,
- \* HEPA Filter change and test procedures,
- \* Effluent system schematics,
- \* Source term data,
- \* Control technology and efficiencies,
- \* Sample Data,
- \* Organizational structure and lines of communication, and
- \* The overall quality assurance program.

Interviews were conducted with personnel responsible for the above areas; and, whenever possible, documents were evaluated.

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Background on the 200-East Tank Farms

The 200-East Area Tank Farms is located in 200-East Area of the Hanford complex. These facilities are centrally located within the reservation, and maximally isolated from the general public. At the tank farms, waste from the chemical reprocessing of reactor fuels is stored. Because these wastes will retain radioactivity for many years, they must be safely managed, contained, and disposed with regard to protection of the environment, employees, and the public. The radioactive liquid and solid wastes are stored in underground carbon steel tanks ranging from 55,000 to over 1 million gallons. (Reference 8)

One hundred and forty-nine (149) single-shell tanks (SSTs) were constructed between 1944 and 1964 at Hanford. All SSTs have been removed from active service. Twenty-Eight (28) double-shell tanks (DSTs), all having been build since 1968, are in active service. The DSTs are concrete-reinforced vessels with two concentric carbon steel liners, a tank within a tank. The annular space between the steel liners is monitored to detect any leakage from the inner tank and to trap any leakage so that it can be removed from the tank annulus space. Sixty-six of the single-shell tanks and 25 of the double-shell tanks are located in the 200-East Area. The remaining tanks are located in a similar configuration in the 200-West Area (about five miles from the 200-East Area). (Reference 3)

Safety evaluations have identified four (4) highest priority safety issues involving five double-shell tanks and 48 single-shell tanks:

- \* Flammable gas generation in Tank 101-SY and other tanks,
- \* Potential explosive mixtures of ferrocyanide in tanks,
- \* Potential organic-nitrate reactions in tanks, and
- \* Continued cooling required for high-heat generation in Tank 106-C.

An Unresolved Safety Question (USQ) was identified in May 1992:

- \* Tank Criticality being incredible (although very unlikely) is not proven by existing data and analysis.

The need for resolution of five (5) additional lower priority safety issues has been identified: (Reference 9)

- \* Tank Safe Operating Life,
- \* Excessive hydroxide consumption in Tank 107-AN,
- \* Intertank ventilation connections,
- \* insufficient tank contents characterization, and
- \* inadequate safety documentation.

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## RESULTS OF THE AUDIT

The audit was conducted during March and April, 1992, with significant efforts being expended in the weeks prior to accommodate access training requirements and to review documentation. During the Department's pre-audit efforts, liaison with USDOE counterparts in the Tank Farm organization was unsuccessfully attempted. The Department's compliance with training requirements was time consuming and limited the technical preparation for the audit. During the audit, access was denied for information regarding the Quality Assurance findings and corrective actions for radioactive air emissions at the 200-East Area Tank Farms, and the radioactive source term data for the AY and AZ tank farms, contrary to prior agreements and permit conditions. In spite of these difficulties, Westinghouse staff were very cooperative and helpful and understood that our audit was intended to assist them in bringing the facility into full compliance.

Compliance was evaluated, with findings and observations prepared as follows:

- ▶ Finding (Level I): This level of finding would have actual public health implications; i.e., levels of releases that could cause excessive risk to the general public.
- ▶ Finding (Level II): This level of finding would indicate that compliance problems with the 10 mrem/yr standard could exist.
- ▶ Finding (Level III): This level of finding indicates that, although the facility is in compliance with the dose standard, they are out of compliance with other technical requirements. These areas could affect the final dose calculations.
- ▶ Observation: This is an area of noncompliance that would not be expected to alter the dose calculations, but requires correction.
- ▶ Best Management Practice: This does not represent a significant area of noncompliance with specific regulations, but is, in the opinion of the reviewers, an area that needs improvement.
- ▶ "Other Issues": Several "Other issues" were identified outside of the scope of this audit that have merit for further review during future audits under this and/or other regulatory authority.
- ▶ Positive Issues: Several issues are of a positive nature and represent contributions to improvements in facility and management performance.

## Audit Results Format

The format for audit results is consistently expressed. A short description of the result is given directly after the numbered Finding, Observation, or Best Management Practice. Next, the regulatory authority for the audit result is quoted; e.g., WAC 246-247-050. Then, a general discussion of the basis for the result is given in some detail to augment the short description. Specific details are given or referenced. At the conclusion, indented statements of expected responses are given after the stars (\*). Corrective actions that result from this audit must conform to the expected responses given for each audit result. "Other Issues" and Positive Issues give only a short description of the audit result.

## AUDIT RESULTS

I. Finding (Level I): None were identified.

II. Finding (Level II): None were identified.

III. Finding (Level III):

1. **FINDING:** Potential temporary emission units (greenhouses) were found adjacent to the tank farms without prior approval of the Department. The potential emissions sources were inadequately controlled and not monitored.

**Requirement:** WAC 246-247-060, 070, and 080.

**Discussion:** In a Pre-audit inspection, seven "greenhouses" were observed that were posted as "airborne radioactivity," indicating that the site was a potential emissions unit. They provided inadequate containment, contained only breathing filters that were not Best Available Radionuclide Control Technology (BARCT), contained no monitoring equipment, and were not approved by the Department. We were told that the posting was precautionary only, and did not represent sources. USDOE and Westinghouse were verbally notified that they were not in compliance with the regulations. They were given the opportunity to provide documentation that Health's observation was incorrect. To date, however, no documentation has been provided.

- \* All current and future greenhouses and similar portable containment structures must be approved by the Department; or be documented that they are not potential sources.

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- 2. **FINDING:** Indications of potential fugitive emissions were found at several locations in the tank farms.

**Requirement:** WAC 173-480-050 (1) (RACT/ALARA)

**Discussion:** Smearable contamination was found at several locations that appear to be the result of airborne emissions. They were: CR Vault cover blocks; 241-AX Valve Pit; 241-A Valve Pit; 241-A-101 lead plate; the riser in CR vault area; observation ports over 241-B-112; 241-C-103; and tank farm fence lines. Low-level contamination in 200 East Area may, in part, originate from these fugitive emission sources.

- \* Evaluate the offsite impact of fugitive emissions from 200-East tank farm sources.
- \* Decontaminate and eliminate fugitive sources, wherever practical.
- \* Estimates of offsite doses from fugitive emissions must be included in the annual report to the Department.

- 3. **FINDING:** Of nine tank farm ventilation systems inspected, only three were operating. The others were "out of service."

**Requirement:** WAC 173-480-050 (1) (RACT/ALARA)

**Discussion:** The implications of the ventilation systems not operating is unknown, since the monitoring systems are ineffective for non-functioning stacks. Some of the stacks in question have large source terms in the form of waste tank contents. The 105-A and 106-C stacks are for high heat tanks, (high radioactivity and heat rates). The potential for fugitive emissions from these non-operating stacks appears to be high.

- \* Justify the elimination of ventilation systems that are unnecessary, and stabilize the "out-of service" condition, as soon as practical.
- \* For any ventilation systems that must operate, perform any and all maintenance necessary to reliably bring "out-of service" exhausters on-line as soon as practical, with a priority and a schedule agreed upon between the USDOE and the Department.

- 4. **FINDING:** A lack of emissions control is evident at the 105-A exhauster.

**Requirement:** WAC 173-480-050 (RACT/ALARA).

**Discussion:** A lack of control was evident at the 105-A exhauster. Evidence included contaminated water dripping from the vent into buckets under the ducts. This may result in the degradation of the downstream HEPA filters.

- \* This situation must be evaluated and corrected.

5. **FINDING:** Of the exhausters inspected, all have instruments with calibration stickers that were "out-of-date."

**Requirement:** 40 CFR 61, Method 114, App. B., 4.3

**Discussion:** All stack monitoring systems had at least one instrument (and in some cases, all) "out of calibration." The most updated calibration was noted on the CAMs. All pressure gages were "uncalibrated." In interviews with responsible staff, we were told that the PISCES database represented the "primary" data on calibration, while the calibration equipment tag was "secondary." We were not able to verify this by written policy or procedure, although it is universally accepted at the facility. Even so, the tags must be representative of the primary data, if it is located elsewhere, such as in the PISCES database. Our attempt to correlate a specific field calibration to the PISCES database was unsuccessful, even with help from trained staff. Either the equipment is "out of calibration" and we could not verify it in PISCES, or the calibration tags do not reflect the actual calibration represented by PISCES.

- \* Improve the calibration program. Base the program on realistic equipment requirements based on documented operating specifications.
- \* Install instruments that are calibrated to tolerances that can be assured within the calibration frequency chosen.
- \* Make the calibration tag and database system compatible and available for periodic inspections.
- \* Implement audit and corrective action programs to assure continued improvements in the calibration program.

6. **FINDING:** The implementation of the Quality Assurance Program Plan (QAPP), as required by the NESHAPs, is inadequate.

**Requirement:** 40 CFR 61, Method 114, App. B., 4.

**Discussion:** The QAPP document reviewed during the audit represents a positive contribution toward addressing the concerns of the Department. However, it lacks an effective implementation. The definition of organizational responsibilities within the QAPP is deficient as is the interface to the existing QA organization and its charters, policies, procedures, and organization structure. Some of the QA groups interviewed had not seen the QAPP or knew their specified duties as identified in the QAPP. No specific organization or group could be identified that was chartered with the responsibility of performing audits or corrective action for the NESHAPs. This is evidence of a lack of implementation by all parties who have been delegated authority to perform the QAPP responsibility.

- \* The USDOE and its contractors must implement a QAPP that meets the requirements of the NESHAPs. They must be implemented into an overall QA program that meets a national standard, such as NQA-1.

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- \* The QAPP must be planned and implemented in an organized manner with established interfaces, charters and responsibilities. Responsible staff must remain adequately trained.
- \* Provide a plan on implementation of the QAPP for Department review to include at least: requirements, organizational structure, interfaces, and oversight.
- \* Implement an audit and corrective action program to do oversight of the QAPP to assure compliance to the requirements.
- \* Include a listing of oversight responsibilities by organization as an addendum to any QAPP.
- \* The Department highly recommends that an independent QA consultant be hired to develop QAPPs that meet the requirements.

7. **FINDING:** The sampling probes for the AY and AZ tank farms are not isokinetic.

**Requirement:** WAC 173-480-050 (3) and 40 CFR 61, and 40 CFR 60, Method 5.

**Discussion:** The matching of probe and stack velocities is necessary to obtain an isokinetic condition. Representative sampling is jeopardized for stacks with larger particulate emissions, when the sample probe and stack do not have coincident velocities. Particle size distribution for the AY and AZ stacks is unknown.

The NESHAPs guidance under 40 CFR 60, Method 5, specifies a +/- 10% allowance, however, Hanford operates at +/- 20%.

The document (WHC-SD-WM-ER-054, Rev 0, 1989) stated that the AY and AZ sample probes were not operated isokinetically. A memo from Bramson, 1991, contradicted that document, stating that the A-20 stack requires modification, while the A-18 and A-19 stacks are "OK." Weekly stack flow data for A-40 and A-17 stacks show that the stack flow rates vary considerably with time, while the sampler flow rates also vary to a lesser degree, but not in coincidence with the stack flow rate. Also, the sample filter has a pressure drop which increases over the sampling period, as the filter loads up. This will affect the pressure at the sampler flow device, and therefore produce flow rates that need pressure compensation. Calculation of this error has been estimated to be as large as 20%.

- \* Evaluate the standard isokinetic condition, including any pressure and temperature compensations, for the AY and AZ sample probes.
- \* Evaluate the compliance requirements of the NESHAPs and determine the allowance (10% versus 20%) for isokinetic flow.
- \* Prepare a program plan to address the issue of meeting isokinetic flow requirements, to include any necessity to perform temperature and pressure compensations, or to adjust the sample flow coincident with stack flow variation.

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8. **FINDING:** Several flow meters, or rotameters had inadequate paper tapes attached denoting CFM (cubic feet per minute).

**Requirement:** 40 CFR 61, Method 114, App. B., 4.3.

**Discussion:** Paper tapes are inaccurate and lack permanency. Calibration of the paper tapes is not evident, calling into question the reliability and precision of data. Sampler flow data is reported on the envelope that holds the weekly record sample, for the start and end of the sample period. The integrity of the data, including chain-of-custody, is essential for emissions calculations.

- \* Remove all uncalibrated paper tapes, or replace the paper tapes with a permanent scale that is calibrated. Replace equipment, as necessary.
- \* Assure that all flow rate devices are calibrated.
- \* Prepare a plan to address the collection of flow data for stack samplers and CAMs to be consistent with the indication scales on the flow devices installed in the field. Revise any data sheets and data reduction procedures to include the appropriate units of measure.
- \* Evaluate the chain-of-custody for sampler flow rate data used to estimate the radioactive airborne emission rate included in the annual report to the Department.
- \* Train personnel in the correct method of collecting data and adjusting sampler and CAM flow rates.
- \* Implement an audit and corrective action program to assure that sampler and CAM flow rates are monitored and used correctly in the field, and that there is a chain of custody from data collection to inclusion in the annual report.

9. **FINDING:** The Department was denied access to the QUEST database on repeated occasions during audit preparation and during field inspections. The input data in the form of audits and corrective action documents were also requested, but not provided after repeated requests.

**Requirement:** 42 USA 7414 (a)(2) and 40 CFR 61, Method 114, App. B., 4.  
Permit FF-01

**Discussion:** Access to the QUEST database information relative to the regulation of radioactive airborne emissions was requested and denied. Even during the field inspections, the request was repeated with the allowance that the audit and corrective action reports that are the basis of the QUEST database would be sufficient. Upon repeated requests to review audits, none were provided. This is contrary to permit conditions and agreements made by USDOE that all information would be available, at least for onsite review.

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Since verification of the existence of audit results requires access of the QUEST database, access is, therefore, mandatory.

- \* Provide the Department access to the QUEST database to verify the existence of regulatory information pertaining to radioactive airborne emissions.
- \* Provide audit and corrective action reports that may be identified by the Department.
- \* Provide justification for denial of access to the QUEST database.
- \* Provide justification for not providing requested audit and corrective action reports.

10. **FINDING:** There are several sample periods missing for 1991 for the stacks evaluated.

**Requirement:** 40 CFR 61, and WAC 246-247-080(5)

**Discussion:** The Department reviewed EDP Code E059 weekly stack sample data for 296-A-17 and 296-A-40 stacks. If the exhausters and air sampler vacuum pumps were not operating during these periods, then the data would be accurate.

- \* Provide a log indicating the operating and non-operating time periods for the exhausters and air sampler vacuum pumps for the referenced stacks.
- \* Justify the occurrence of any time periods that have a no flow condition for the exhausters and air sample vacuum pumps.
- \* Justify any occurrence of the on/off periods out of coincidence for the stack fan versus the air sample vacuum pumps, for both referenced stacks.

11. **FINDING:** The total annual air volume calculation methodology for stacks is inadequate.

**Requirement:** 40 CFR 61 and WAC 246-247-080(5)

**Discussion:** The elapsed hours for calculating the total volume of air released from the stack appear to be based on the time that the sampler was operating. This would not be an accurate method of establishing the elapsed hours for the total stack volume, unless the air sample vacuum was hard wired to operate only when the stack is operating. Our field inspections have shown that air sampler vacuum pumps may be plugged into either direct power or "switched" power. Both conditions were observed.

- \* Provide the methodology used to determine the total annual stack air volume released from a stack during a calendar year.
- \* Evaluate the adequacy of the stack flow determination method and make corrections, as necessary.
- \* Provide the revised method to the Department for review.

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12. **FINDING:** The total CFM-hours for air samples at stacks 296-A-17 and 296-A-40 were often very low for 1991. These small samples reduce the detectability and increase the uncertainty in the dose calculation.

**Requirement:** 40 CFR 61, (ANSI N13.1), and WAC 246-247-080(5)

**Discussion:** The review of weekly stack data identified a high incidence of low volume samples, particularly for the last 3 months of 1991. The Westinghouse document WHC-EP-0479 (Facility Effluent Monitoring Plan for the Tank Farms Facilities) specifies that "the record sample flow rates shall be sized to provide optimum samples for laboratory analysis." The product of the sample flow rate and the sample collection time shall be at least 370 cfm-hours." This was not the case for any sample period during 1991 for these exhausters.

- \* Justify the sample analytical results based on the low cfm-hour samples.
- \* Justify the minimum sample size selection of 370 cfm-hours.
- \* Take corrective actions that assures adequate sample sizes are collected.

13. **FINDING:** Weekly stack data did not include all radionuclide results for all periods.

**Requirement:** 40 CFR 61 and WAC 246-247-080(5)

**Discussion:** Only 9 of 47 sample periods reported measurements for ruthenium, tin, antimony and iodine for stack 296-A-17. The 296-A-40 exhauster had results for all but 10 of the weeks sampled.

- \* Explain why these measurements are not reported weekly.

14. **FINDING:** The calibration methodology for the flow totalizer is inadequate, violates EPA, Method 2A requirements, and introduced unnecessary statistical bias into air sampler flow data.

**Requirement:** 40 CFR 60, App. A., Method 2A

**Discussion:** The rotameter, less precise than the gas meter (totalizer), is used to calibrate the gas meter. The 2% precision required for the gas meter by Method 2A is compromised by the calibration procedure used for flow totalizers.

- \* Prepare an organized approach to revise the calibration protocol.
- \* Revise the calibration procedure for flow totalizers to be consistent with the EPA Method 2A.
- \* Implement a QA audit and corrective action oversight program to assure compliance to the requirements.

15. **FINDING:** An **UNRESOLVED SAFETY QUESTION (USQ)** was declared regarding "criticality safety of tank farms," which may affect the air pathway.

**Requirement:** WAC 246-247-090

**Discussion:** An Unusual Occurrence was declared May 1, 1992, as follows. "On 4/30/92, at 1030 hours, following a plant operations review committee meeting (PRC), an unreviewed safety question concerning criticality safety issues in the tank farms was declared an 'event.' The basis for this determination is that the Facility Safety Analysis Reports (FSARs) regard a potential criticality as being incredible, where as, our ability to prove this is not possible within the available information and analysis. A preliminary justification .... is being considered for those activities that will be continued, those that will be put on hold, and the justifications for continuing with operations in the immediate future." A criticality event in a waste tank could potentially be very destructive and could result in radioactive airborne emissions that would have actual public health implications; i.e., levels of releases that could cause excessive risk to the general public. Since this issue represents a differing interpretation of existing data, rather than "new data", the issue is not a Category I finding. Nevertheless, resolution is required.

- \* Evaluate the likelihood and effect (consequence) of postulated criticality events.
- \* Concurrently, with the above effort, evaluate several potential mitigation technologies that have a high probability of either reducing the likelihood or the effect of criticality events.
- \* Communicate to the Department the results of the above efforts at their conclusion, and weekly by written progress reports or in attended status meetings.
- \* Reduce the risk, as soon as practical, by implementing mitigation strategies.

16. **FINDING:** The USDOE showed a lack of responsiveness to this audit resulting in lost time and efficiency.

**Requirement:** 40 CFR 61, and WAC 246-247

**Discussion:** The 200-East tank farm audit was announced verbally at a monthly status meeting between the USDOE (and contractors) and the Department in December, 1991. Written notice was provided in a letter sent to USDOE from the Department, dated January 22, 1992. The scope of the audit, the audit team, and the audit schedule for field work were specified. A request for information was made for liaison: "We need to obtain a listing of names, titles, responsibilities, addresses and phone numbers for the DOE and WHC staff, with instructions on areas of responsibility for this audit. This information is needed before February 10, 1992." Westinghouse provided liaison from the Facility Compliance group (Cindy Stout). She provided several points of contact from Westinghouse informally. Her efforts have been commendable. She also communicated the Department's concern to WHC management and the USDOE that there was no response from the USDOE for liaison, as requested.

There has been no communication regarding liaison for this audit from the USDOE. There were no USDOE staff involved in the audit directly. [Please refer to an article in the Hanford Reach, May 11, 1992 that describes a well planned audit with established liaison and protocol.]

Our staff was unable to make sufficient contact with audit counterparts in advance of field inspections. This resulted in the necessity to return for follow-up reviews. Several issues were also identified that will be carried over to future audits due to a lack of audit efficiency.

- \* In the future, provide audit liaison to the Department that conforms to that described in the Hanford Reach article, "Hanford 'Progress Assessment' starts today", May 11, 1992, by Howard Rew (Quality Assurance). Include USDOE representation.

17. **FINDING:** The HEPA (High Efficiency Particulate) filter in-place efficiency test is inadequate.

**Requirement:** 173-480-050(1) (RACT/ALARA)

**Discussion:** Upon review of Procedure 7-GN-055, Rev. 3, Chg. A, "In-place Testing of HEPA Filter Systems (Single Stage and Overall Filter Test)," deficiencies were identified. This test procedure is used to determine leaks in the air filter systems containing HEPA filters. The aerosol material (DOP, or equivalent) is not specified directly in the procedure. The efficiency used for the pass condition is 99.95% (0.05% penetration, 2000 DF). This is derated from HEPA and procurement specifications requiring 99.97% (0.03% penetration, 3333 DF). The pass condition is for single stage filters, as well as for multiple stage (series) filter systems. For multiple stage configurations, no credit is allowed for the added efficiency of the additional filtration stage. This limits the potential of multiple stage filter systems for a higher efficiency evaluation. We recognized that some systems at Hanford are not testable to a representative test for each stage, and that multiple stage tests are the only representative test available. However, the limit of 99.95% for multiple stage systems is inadequate.

- \* Modify the procedure(s) to include a direct reference to the aerosol used.
- \* Evaluate the performance (efficiency) expected for multiple HEPA filter systems and determine an appropriate efficiency value to use as a test limit.

18. **FINDING:** A RACT engineering evaluation was incomplete due to a lack of access to radioactive source term data.

**Requirement:** USC 7414 (a)(2), 40 CFR 61, WAC 246-247, WAC 173-480-050 (1), and the facility operating permit FF-01

**Discussion:** All engineering and health physics evaluations require the source term. The appropriateness of the control devices and configuration for the mitigation of radioactive airborne emissions must be evaluated against the available source material. The monitoring system is

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likewise a result of evaluations of source material and its mitigation by the control system. The source term for the AY and AZ tank farms was requested and has not been made available for review. This is contrary to permit conditions and previous commitments made by USDOE for accessibility to all necessary data.

- \* Provide source term data for the AY and AZ tank.
- \* Evaluate the control and monitoring system for the AY and AZ tanks against the RACT engineering standard, as specified in the proposed revision of WAC 246-247, Appendix C.

19. **FINDING:** The ventilation systems inspected did not lend themselves to efficiency testing. The aerosol injection ports, sample ports and general configuration are not sufficient to perform representative single stage in-place HEPA filter efficiency testing. Efficient performance can not be assured.

**Requirement:** WAC 173-480-050 (1) (RACT/ALARA)

**Discussion:** A physical inspection was performed on 8 ventilation systems in the 200-East tank farms. The AP annulus ventilation system (296-A-41) is a relatively new installation and appears to be appropriately designed. The AP main ventilation system (296-A-040) may be acceptable. The injection and sample ports are not obvious from a physical inspection. All other systems inspected (AY annulus, AZ annulus, 702-A main, 105-A, 106-C, and CR Vault) lacked an obvious capability for representative efficiency testing. Details of the sample and injection ports were unavailable for review. We reviewed WHC-SD-WM-WP-147, "Test Procedure Upgrade Program for Ventilation Systems in Tank Farms", which addresses this issue by means of assuring an improvement in the test capability for the existing systems. It does not address the adequacy of the equipment itself and it's testability. Ventilation systems must meet an Air-Aerosol Mixing Uniformity Test, as specified in ANSI N510, 9. to be testable.

- \* Evaluate the existing ventilation systems for compliance with the ANSI N510, 9. Air-Aerosol Mixing Uniformity Test.
- \* Review results of testing with the Department.
- \* Evaluate any required modifications to existing ventilation systems to allow for representative efficiency testing of HEPA filters.
- \* Modify equipment, as required.

20. **FINDING:** Older ventilation equipment is antiquated and requires modification or replacement.

**Requirement:** WAC 173-480-050 (1)

**Discussion:** A detailed physical inspection was made of the ventilation system for tank 105-A. cursory physical inspections of several other older ventilation systems were also made. All older ventilation systems are fabricated with the HEPA filters mounted permanently inside the

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ductwork. Therefore, the entire ventilation duct must be replaced if the HEPA filter is damaged, or can not pass the filter efficiency test. During replacement, the source term is not protected by adequate containment because of the lack of negative pressure zone control. The potential for fugitive emissions is high during replacement. Modern ventilation systems have bulkheads that are easily removed for prompt replacement of HEPA filters through bag-in/bag-out procedures. By proper design for redundancy, filters can be changed without removing the exhauster from service.

- \* Evaluate the necessity for older ventilation systems.
- \* Evaluate the combination of annulus flow through the main exhauster stack.
- \* Evaluate any other requirement for modification of ventilation systems.
- \* Prepare recommendations for modification or replacement of older ventilation systems for Department review and concurrence.

21. **FINDING:** Operators have observed water coming from the 106-C stack.

**Requirement:** 173-480-050 (1) (RACT/ALARA)

**Discussion:** Operators have reported that the 106-C stack has experienced outbursts of liquid water. 106-C is a high heat tank that has periodic input of water for cooling and to compensate for the possible evaporation of liquid. The heat rate in this tank exceeds the design limits of the single shell tanks and must be compensated for by additions of water and with ventilation of the vapor space. Water must be exiting the tank at a relatively high rate, probably in the form of evaporation (atmospheric pressure steam, or water vapor). This high humidity air passes out the stack by way of the ventilation ducts and HEPA filters. HEPA filters are not compatible with excessively high humidity air streams, and especially for liquid entrained in the air. If, in fact, there is liquid water exiting the stack, it implies that there is a by-pass in the HEPA filters or their gasketed mounting. This is not a favorable condition, and requires correction.

- \* Verify, or rule out, the occurrence of liquid water in 106-C stack, after the next start-up of the exhauster.
- \* Inspect the HEPA filters and evaluate the potential for high humidity airstream conditions.
- \* Test for HEPA efficiency and for psychrometry at the inlet of the tank and at the stack.
- \* Make any equipment configuration changes, as necessary, before continuing to operate.

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IV. Observations

- 1. **OBSERVATION:** Many drawings do not reflect equipment conditions in the field, or are unavailable.

**Requirement:** WAC 173-480-050 (1) (RACT/ALARA)

Discussion: Several drawings were reviewed for accuracy and completeness with respect to facilities in the East-Area tank farms. Drawings for the AP tank farm were representative. Several drawings of A-Farm monitoring equipment had some deficiencies, which were corrected immediately by the Cognizant Engineer. Drawings were requested for the ventilation system for the 105-A portable exhauster, but were unavailable. Details of the HEPA filter testing ports and HEPA mounting geometry could not be evaluated from design drawings because they were also unavailable. General comments in interviews and in reports indicated that the drawings can not be trusted, and any potential modification must be "walked down" to determine the "as-built" condition. Older facilities and equipment suffers the most from this condition.

- \* Adopt a configuration control procedure that keeps the drawings compatible with the facility condition.
- \* Drawings for older facilities must be updated to the as-built condition as the opportunity presents itself and according to a priority basis.

- 2. **OBSERVATION:** The data entry and the source data provided by instrument technicians to PISCES have not been evaluated by QA procedures or practices.

**Requirement:** 40 CFR 61, Method 114, App. B., 4.

Discussion: The PISCES database is used for status and data collection on the calibration and testing of essential equipment. Data entry is performed subject to several quality control procedures devised by the PISCES staff. Input data that is provided to the data entry function has had no known formal quality assurance or quality control procedures. The preparation of there data has not been evaluated by QA audits The instrument technicians perform the data assurance without oversight.

- \* Develop a set of data quality objectives as requirements for an oversight QA program.
- \* Implement an oversight QA program of audits and corrective actions, as necessary, to assure the data quality that is input to the PISCES database.

- 3. **OBSERVATION:** The lower limit of detection (LLD) calculation cannot be verified.

**Requirement:** 40 CFR 61 and WAC 246-247-080(5)

**Discussion:** The Department is concerned that the LLD is not based on the ACV or other scientific values.

- \* Describe all the parameters used to calculate the LLD for I-129, Cs-137, total alpha, and total beta.
- \* Describe the methodology for determination of the LLD. Describe how the collection efficiency, detector efficiency and self-absorption are included.

4. **OBSERVATION:** The 1991 release quantities of Sr-90 and Cs-137 could not be verified from the weekly stack data provided.

**Requirement:** 40 CFR 61 and WAC 246-247-080(5)

**Discussion:** Quarterly results for Sr-90 and Cs-137 are reported on EDP Code X059. The reported elapsed hours were 9,732.6 for A-17 and 10,412.3 for A-40. These values exceed the elapsed hours reported on E059 (and the total hours in a quarter) by more than 2000 hours.

- \* Provide the methodology and a sample calculation used to estimate the release quantity for Sr-90 and Cs-137 for stacks 296-A-17 and 296-A-40, as reported in the ODIS, and in the annual reports to the Department.

5. **OBSERVATION:** There is a potential discrepancy between the 1990 and 1991 release quantities reported for stacks 296-A-17 and 296-A-40.

**Requirement:** 40 CFR 61 and 246-247-080(5)

**Discussion:** The emissions of Ru-103, Ru-106, Sn-113, Sb-125 and I-131 decreased to zero during 1991 for both stacks. The 1990 ODIS report listed positive release quantities for those radionuclides. Stack 296-A-40 reported zero emissions for Cs-137 and total alpha in 1991. Emissions for Sr-90 for the 296-A-17 stack reduced by a factor of 360 from 1990 to 1991.

- \* Review the concern and explain the potential discrepancies noted.

6. **OBSERVATION:** The reported emissions for Sr-90 exceeded the total beta value for stack 296-A-40 for 1991.

**Requirement:** 40 CFR 61 and 246-247-080(5)

**Discussion:** The results for Sr-90 (a high energy beta emitter) exceeded the total beta result in stacks 296-A-17 and 296-A-40.

- \* Explain why total beta is not at least as great as the total of all beta emitters.

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7. **OBSERVATION:** According to procedures (5.2.2.6 of the HP manual), a checklist and a Radiological Survey Report (RPR) is prepared weekly. Records showed discrepancies in completeness and correct dates.

**Requirement:** 173-480-050(1) (RACT/ALARA)

**Discussion:** The Department reviewed of procedures and required reporting for radiological issues. The HPT "Gaseous Effluent Sampling/Monitoring System Evaluation Checklist" is prepared weekly, along with the scheduled Radiological Survey Report (RSR). Together they are used to inform management of radiological equipment problems. The shift supervisor either writes up a request for work through the JCS system, or sends the information to SCES directly. Recent records indicate that the checklist is not always filled out completely, nor correctly. One recent record did not include an out of calibration rotameter and flow totalizer (ED code E903, AN farm K-2 exhaustor). A date of 2/26 on the RSR did not match the date of 2/24 on the checklist. A date of 3/3 had nothing entered and was not signed.

- \* The procedures should be either revised to match the practice, or diligently followed.
- \* Implement a QA oversight of this function to include audit and corrective action, as needed.

8. **OBSERVATION:** The document clearance process is cumbersome and results in excessive lost response time in performing official investigations and inquiries.

**Requirement:** WAC 246-247, 40 CFR 61, Permit FF-01

**Discussion:** The clearance process is in place at the USDOE facility for the purpose of review for classified (security classification) and proprietary information. Completeness, accuracy and public relations are also reviewed. The USDOE and contractors each have a review cycle for document clearance for release to the public. The Department is considered the public with regard to the clearance process. Department official inquiries require the release or availability of information to perform the duties as provided by regulation. As documents are requested, they are sent through a document review process. If no facilitator is present, the requested document may be placed "on-hold", or "refused", without explanation. Even with facilitation, the managers who review have not provided delegated authority to expedite the approval process. Clearance can be held up by the successive non-availability of review managers. If changes, deletions or additions are required, the review must be recycled. Document clearance on average takes over a month. The Department requires an improved response time to document clearance requests. An alternative is that radioactive air emissions related documents and/or data be kept available onsite for inspections.

- \* Requested documents must be provided or made available either at the time requested or after a time found reasonable by the Department.

- \* A procedure and protocol must be prepared that specifically addresses this issue and improves the response time.

9. **OBSERVATION:** HEPA filter testing backlog has increased and many filters are past due (as of 5/1/92).

**Requirement:** WAC 173-480-050 (1) (RACT/ALARA)

**Discussion:** HEPA filter testing and other vent and balance procedures have lost priority and are not being performed on time. Many classes of filters have been down-graded from OSR to OSD. An official authorization for this change could not be produced. Breather filters for passive ventilation of single shell tanks have a 90 to 120 day filter test cycle because of past history of problems with liquid accumulation in the filter. All breather filters are past due, as of May 1, 1992. Filters are not being tested on time because of the down-graded priority and because safety personnel (HPTs and sniffers) are not trained and available to assist vents and balance workers. The vents and balance psychometric (flow and relative humidity) testing per procedure 7-GN-063, 12/89, has not occurred since October or November, 1991 due to the work back-log.

- \* Increase the priority by appropriate administrative means so that the vents and balance procedures are performed "on-time."
- \* Review the inspection times and make any appropriate changes necessary to assure proper and efficient function of the ventilation systems.
- \* Implement an audit and corrective action program to assure the performance of ventilation systems.

10. **OBSERVATION:** Monitoring systems are unreliable.

**Requirement:** WAC 173-480-050 (1)

**Discussion:** The monitoring systems experience excessive down-time and maintenance. The GAST air pump is reported as being 90% of the problems causing alarms. An alarm circuit is connected to a pressure switch that indicates a flow or no flow condition. Failed air pumps cause the electrical breaker to actuate.

- \* Evaluate the root cause of monitoring system failures.
- \* Improve the monitoring system reliability (percent up-time).

V. Best Management Practices

1. **BMP:** The Job Control System (JCS) backlog has increased from hundreds to thousands of work orders, resulting in reduced equipment and operations effectiveness.

**Requirement:** WAC 173-480-050 (1) (RACT/ALARA)

**Discussion:** The cause of this increase in work load is known to include: (1) equipment showing age and deferred maintenance, (2) Increased emphasis on the JCS system, including additional requirements and protocols, (3) recent JCS system changes and lack of trained staff, and (4) a lack of flexibility to respond according to a priority. Because of the increase in backlog and increased response time, many safety and priority systems are left "out-of-service," including OSR (Operational Safety Requirements) equipment, such as exhausters and monitoring equipment.

- \* Add a priority component to the JCS system, train staff and implement the system site-wide.
- \* Add any required inputs from regulatory, quality (QUEST), ALARA, calibration and testing (PISCES), or other corrective action programs.
- \* Make the system user friendly and available for immediate use in the field, where it is needed.
- \* Perform Quality Assurance audits of the progress in meeting these goals.

2. **BMP:** Alarms are allowed to continue without timely responses.

**Requirement:** WAC 173-480-080 (1) (RACT/ALARA)

**Discussion:** Several alarms were noted during field inspections. Field investigation, at the time, was effective in determining the cause, correcting the condition, and resetting of the alarm, for some of the observed alarms. Operations could respond in a timely fashion to correct these conditions. Also, several local conditions are wired to the same general alarm circuit. These general circuits are monitored in the 242-A control room and by CASS. One alarm condition that is allowed to continue, even though not of a major significance, masks other alarms. Some alarms were observed in the alarm condition over several days. There needs to be a response criteria that requires a response time for clearance of alarms.

- \* Prepare an alarm response procedure to include: (1) a response criteria giving a maximum response time for clearing an alarm, and (2) an inspection protocol for masked alarms.
- \* Implement an audit and corrective action program to assure compliance with this procedure.

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3. **BMP:** There is contradictory information on stack CAMs as OSR items.

**Requirement:** 40 CFR 61, and WAC 173-480-050 (1) (RACT/ALARA)

**Discussion:** PISCES indicates that stack CAMs are not OSR related items; however, the responsible instrument technicians claim that they are. The OSR classification is used for establishing priority for maintenance and upgrade of equipment and facilities, and impacts the JCS system, as well as general management concern. It is important that instruments of "regulatory concern" are managed to be functional and calibrated with a high degree of reliability. Record samplers, CAMs and associated instruments are considered regulated by either the NESHAPs, or the RACT engineering standard. It is vital that both PISCES and the instrument technician groups accept the same requirements. WHC suggested that there may be a justification for establishing a new classification category to address instruments and equipment that is required by regulation.

- \* Evaluate the benefit of establishing an Environmental, or Regulatory classification category.
- \* Determine the proper, or appropriate classification for stack monitoring CAMs and communicate the requirement to all organizations that must respond to the requirements.
- \* Manage the instruments associated with effluent control and monitoring of radioactive air emissions in a reliable manner for functionality and calibration.
- \* Implement an audit and corrective action program that assures proper calibration and maintenance of regulated equipment and instruments.

4. **BMP:** QUEST (Quality Environmental Safety Tracking) is a tracking system, but does not perform quality trending. The system is under utilized and is not available to responsible staff and regulatory personnel with a need to know.

**Requirement:** 40 CFR 61, Method 114, App. B., 4.

**Discussion:** The QUEST database contains environmental and quality assurance audit findings and assigned outcomes for management of corrective action. It contains, or should contain, issues pertaining to radioactive air emissions regulations enforceable by the Department. It was found through interviews that the distribution and access within the affected organizations is strictly limited and that only 200, staff site-wide, have been trained in root cause analysis and corrective actions for effective use of QUEST. At the present, QUEST is used only for tracking issue resolution. The potential of using this database system for trending (and root cause analysis) is not being utilized. The system is reported as user unfriendly.

- \* Provide training and availability to the QUEST database for responsible staff, and quality assurance and regulatory oversight personnel.

- \* Develop procedures for input from audit findings and for completion of corrective actions. Fully authorize and manage the QUEST system for the benefit of all stake holders.
- \* Implement a trending function into QUEST to assure correction of issues of general applicability, and for root cause determination.
- \* Implement findings developed by audits and inspections performed by the Department into the QUEST database.
- \* Provide the Department with access to the QUEST database for regulatory review and oversight.

5. **BMP:** The tritium sampler for the 702-A stack has been non-functional for over 2 years.

**Requirement:** 40 CFR 61, 61.93, (b)(4)(i)

**Discussion:** The tritium monitor was first installed in the 702-A building stack (296-A-17) as a prototype. It was not meant for permanent installation, but for sensor development. For an unknown reason, it was abandoned over 2 years ago. The QUEST system has now identified it for implementation to bring it on line for this stack. The basis for the QUEST finding is unknown because the Department was denied access to the database. In reviewing the source term documents made available during the audit, it appeared that the tritium source term may be below the 10% requirement of the NESHAPs for radionuclides that must be monitored.

- \* Provide the QUEST finding related to the 702-A tritium monitor for the Department's review.
- \* Evaluate the application at the 702-A stack for the necessity for tritium monitoring.
- \* As a result of the evaluation, either stabilize the tritium monitor as "out of service," or upgrade it and begin tritium monitoring, as soon as practical.

6. **BMP:** The shift change for the Health Physics Technicians is not smooth and lacks an adequate hand-off.

**Requirement:** No requirement.

**Discussion:** Discussions with HPTs and operators in the field identified an issue associated with shift change hand-off. The operators hold a briefing at the shift change to update the next shift on the job being performed. The operators depend on the HPTs to perform radiation surveys and to identify radiation health and safety risks. Safe operations would not be assured without this service. At shift change, the HPTs do not hold their own briefings nor participate in the operator's briefings. Therefore, the conditions at the facility from the previous shift are not communicated in any consistent or formal manner.

- \* Include both HPTs and operators in joint briefings at the shift change to assure safe operations.

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- 7. **BMP:** PISCES database information is independent from the QUEST database, and is, therefore, not able to meet it's potential as a tool for corrective action.

**Requirements:** 40 CFR 61, Method 114, App. B., 4.

**Discussion:** The PISCES database includes status for on time and over time for essential operations such as calibration and testing. Any over time status is, generally speaking, a violation of procedures, or requirements (DOE Orders, or state and federal regulations). As such, the status of these conditions must be known by management. And since the QUEST database is the essential management tool for corrective action, this information needs to be included.

- \* Evaluate the PISCES database for the types of information that is applicable to the QUEST database system, and prepare a justification for merging the databases (at least corrective action issues).
- \* As appropriate, make PISCES data automatically available to the QUEST database.

- 8. **BMP:** The overall QA program is not well implemented by USDOE. In particular, QA oversight was found lacking.

**Requirement:** 40 CFR 61, Method 114, App. B., 4.

**Discussion:** The overall QA program was reviewed as it relates to the QAPP and to the regulation of radioactive airborne emissions subject to regulation by the Department. Although the overall QA program is not specifically mentioned in the NESHAPs, an overview QA structure must be implemented and effective to support the requirements of the NESHAPs QA Methods. Specifically, QA oversight to assure the proper implementation and operation of activities instituted by the QAPP is necessary. An effective oversight QA program would address and correct the issues associated with the finding related to the QAPP. This corrective action is not evident. The oversight group within DOE chartered with QA and Environmental oversight has begun performing this oversight function. The responsiveness to accept this responsibility is commendable.

- \* Continue the communication between the QA/Environmental oversight group at USDOE and the Department to develop expectations for oversight assurance of meeting regulatory requirements.
- \* Build a working relationship between the QA/Environmental oversight group at USDOE and the Department, to assure timely response to Department audits and corrective actions.

- 9. **BMP:** There is a discrepancy between the design of stack monitoring equipment and EPA requirements.

**Requirement:** 40 CFR 60, App. A.

**Discussion:** A review was performed of the generic stack pack design (based on blueprints and field observations) versus the EPA Method 5 requirement. The EPA Method 5 has the flow totalizer (or rotameter) installed downstream of the air pump. This position is insensitive to pressure variations caused by filter loading. The effort and complication involved in pressure compensation of flow data is greatly diminished with this configuration. The design of the stack pack has the flow totalizer and/or rotameter installed between the sample filter and the air pump. Pressures due to filter loading of 10 inches of mercury vacuum have been recorded at the pressure gage. A compensation for this pressure would be on the order of 20% when compared with standard conditions. The pressure gage was uncalibrated for all stack packs inspected. These instruments must be calibrated if used for pressure compensation.

The stack sampling system at Hanford accounts for pressure, but not for temperature. The stack pack or exhaustor stacks do not in general provide temperature indication. 40 CFR 60, Appendix A, Method 17 states that "temperature generally has a greater effect on effluent particulate sampling than pressure." Some DOE stacks operate significantly above standard temperature. The specifics of flow totalizer and rotameter calibration are not known, but are expected to be performed at standard temperature and pressure. The 40 CFR 60, Appendix A, Method 2 requires the calculation of temperature and pressure compensations, or shown to be insignificant. Similarly, relative humidity (moisture content) also affects the flow determination. While the Vents and Balance group is capable of performing measurements of moisture content, it is not routinely evaluated and not compensated for in the flow determinations affecting calculation of emission rates. The 40 CFR 60, Appendix A, Methods 4 and 5 contain requirements for compensation of flow for moisture content. This issue is a BMP, rather than a finding, since EPA retains the lead on it's resolution.

- \* Evaluate the improvement expected by revision of stack packs to be consistent with the EPA Methods. Evaluate the logistics and program requirements necessary to implement the evaluated changes.
- \* Present the evaluation to the Department and the EPA for review and concurrence.

VI. **"Other Issues":** The following issues not related to the Department's regulatory program, were identified. Follow up is recommended.

- + Recent power outages experienced in the 200-East tank farms have produced plant conditions below emergency response contingency plans. Emergency back-up systems failed to operate.
- + The exhaustors at AP, AW, and AN tank farms are shut-down automatically as a result of indications due to the high radiation (gamma probes) alarms. Some of the older facilities do not have this control feature.

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- + Tank level indicators were reviewed and found to be adequate, although all back-up systems have been lost due to deferred maintenance. Some measurements have not been made because of lack of access and ALARA considerations.
- + Some thermocouple systems are out-of-service for monitoring tank waste temperatures.
- + Operators at the CASS (Computer Automated Surveillance System) are not fully trained in the TMACS (Tank Monitoring and Control System).
- + Condensers (heat exchangers) used to remove liquids from ventilation air streams use exorbitant volumes of water that must be discharged to the environment. Potential low concentrations of radionuclides may be released due to leaks or equipment failure. Water discharged near past release points drives soil contamination to the ground water and hastens the dispersion of contaminated ground water.

VII. Positive Issues:

- Staff witnessed of a lock-and-tag removal. It was considered appropriate and authorized.
- The ALARA program at Westinghouse is in an upgrade mode to include other than radiation hazards. It appears understaffed for its purpose, however.
- The AY/AZ tank ventilation system upgrade project (Project W.O. 030) was reviewed by the Department and by the Department of Ecology and found in the cursory overview to be a significant improvement over the existing ventilation system.
- Westinghouse staff had a very positive attitude about making improvements to their programs and equipment. They were very cooperative.

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# CORRESPONDENCE DISTRIBUTION COVERSHEET

\*REISSUE

Author: A. W. Conklin, DOH      Addressee: R. E. Gerton, RL      Correspondence No.: Incoming: 9205905

Subject: REGULATORY AUDIT RESULTS FOR 200 EAST AREA TANK FARMS

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\*Reissue on 8/25/92 to show HD Harmon as the correct Assignee.  
Letter only, except letter/enc to Harmon.

