

**U.S. Department of Energy  
Thomas Jefferson Site Office  
Jefferson Science Associates**



**Jefferson Lab**

**Joint Assessment Report for  
Environmental Permit and Hazardous Waste  
Management Programs December 2008**

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**ACRONYMS**

CAA	Central Accumulation Area
CFR	Code of Federal Regulations
DOT	Department of Transportation
EMS	Environmental Management System
EPA	Environmental Protection Agency
FIND	Finding
JLAB	Jefferson Laboratory
JSA	Jefferson Science Associates
PRO	Proficiency
RCRA	Resource Conservation and Recovery Act
SAA	Satellite Accumulation Area
TJNAF	Thomas Jefferson National Accelerator Facility
VAC	Virginia Administrative Code

## **DEFINITIONS**

Findings (FIND) - There are three levels of negative performance observations, based on the respective priority (P).

- P1 finding- Findings of major significance (examples included imminent threats to worker protections, public safety, or environmental quality or the presence of a major risk or vulnerability). Such findings can be a systematic breakdown in, or a failure to implement, a major work control element necessary for safety, quality, or the environment or a significant noncompliance with requirements.
- P2 Finding- Findings that represent non-conformances, deviations, deficiencies in the implementation of requirements, procedures, standards, and/or regulatory requirements
- P3 Finding- Observations that the assessor deems to be an isolated, minor, quick fix or non-adherence to best practices/internal procedures/accepted standards.

Proficiency (PRO) - a performance item that exhibits a level of performance deemed worthy of communicating to other organizations because it is innovative or may be indicative of the highest level of excellence. Formerly used terms that meant essentially the same thing were Noteworthy Practice and strength.

## **Joint Assessment Report for Environmental Permit and Hazardous Waste Management Programs**

### **1.0 INTRODUCTION**

A joint assessment of the Thomas Jefferson National Accelerator Facility (TJNAF, Laboratory, or JLab) was conducted December 2 - 3, 2008 by the Department of Energy Thomas Jefferson Site Office (DOE TJSO) and Jefferson Science Associates (JSA). JSA is a limited liability corporation created by Southeastern Universities Research Association and Computer Sciences Corporation specifically to manage and operate Jefferson Lab. The team lead was Patty Hunt, DOE TJSO, and the team members were Linda Even, Gina Dixon, and Bill Rainey, JSA. The assessment was conducted to evaluate JLab's environmental permit program and followed the Review Plan for the assessment as closely as possible, based on time constraints. The assessment focused on the areas of management, compliance, and oversight of the environmental permit and hazardous waste programs, and included records review, observation of work activities, and interviews with staff whose work directly impacts the programs. Detailed checklists were used to guide the questions and lines of inquiry.

### **2.0 BACKGROUND**

Hazardous waste operations and environmental processes that result in emissions require registration with regulatory authorities. In most cases this results in the issuing of a permit that controls the environmental hazards associated with the process. Management of work that affects permit status or other regulatory limits for TJNAF must ensure that requirements, such as sampling, equipment calibration, best management practices, and/or plans are implemented to ensure compliance. In all cases, JSA provides the required program management; however the TJSO manager is the permit holder of record. The Department of Energy is therefore ultimately responsible for environmental compliance.

The quantities of air emissions and means of handling hazardous waste at TJNAF do not require permits. The environmental permits that have been required for operation apply to water removal and discharge. The general categories are:

1. Authorization for groundwater removal to maintain structural integrity of underground experimental areas.
2. Control of discharges to surface water from processes such as cooling tower blow down and groundwater dewatering (One cooling tower at JLab discharges to the surface).
3. Control of storm water discharge from construction activities.
4. Control of storm water discharges from the TJNAF storm water collection system to offsite surface waters.
5. Control of industrial wastewater discharges to the local sanitary sewer. Examples include neutralized acid effluent from metal surface preparation processes, potentially

activated water from accelerator area sumps and beam dump cooling systems in the experimental endstations, and cooling tower discharges (most cooling towers at JLab discharge to the sanitary sewer).

JLab hazardous waste operations, a subset of solid waste, are managed as a small quantity generator, subject to federal and state Resource Conservation and Recovery Act (RCRA) regulations. Typical waste streams generated include waste acids from metal surface treatment, solvents used in metal cleaning, small quantities of expired chemicals used in R&D applications, and universal waste, such as waste fluorescent lamps containing mercury.

### **3.0 ASSESSMENT METHODS**

A complete list of requirements was identified and presented in the Review Plan for the functional areas of management, environmental permit compliance, and oversight. The requirements were derived from DOE O 450.1 Environmental Protection Program, state and federal requirements for treatment, storage and disposal of hazardous waste, federal requirements for the transportation of hazardous materials, internal JLab and TJSO procedures, and best management practices. The goal was to ensure that identified requirements are in place in JLab's programs and procedures and are adequately implemented in practice.

A list of procedures, documents and records to be reviewed was compiled and distributed to JSA staff one week before the review (Appendix 1). The assessment was conducted December 2-3, 2008. The assessment team members scheduled interviews with staff whose work directly impacts permit status and/or regulatory requirements (listed in Appendix 2), performed permit-related work observations (listed in Appendix 3), and conducted walkthroughs of permit-related work areas.

There were no open previously identified findings associated with the areas assessed.

### **4.0 SUMMARY OF RESULTS**

JLab has a mature Environmental Permit Program and Hazardous Waste Program with experienced and innovative staff. Program elements are managed to identify requirements and promote compliance with environmental permit requirements and hazardous waste management regulations. Results in each of the areas assessed are shown below. There were three P2 Findings, nine P3 findings, and six proficiencies.

#### **4.1 Program Management: Hazardous Waste and Environmental Permits**

Jefferson Lab is subject to extensive requirements that govern the conduct of its hazardous waste and environmental permit programs. These include Executive Orders, DOE Orders, federal laws and regulations, state and local law, regulations

and resulting permits. In addition to satisfying the legal requirements, the Executive and DOE Orders place requirements on the design and implementation of various management and reporting systems.

The Jefferson Lab Director is responsible for implementing the Lab's Environmental Management System, which is designed to manage the compliance with the various requirements, including those that relate to the hazardous waste and environmental permit programs. Roles and responsibilities for implementation flow down through relevant policy and procedures. The Contractor Requirements Document for DOE Order 450.1A, Environmental Protection Program, states that there should be "Clearly articulated roles and responsibilities related to environmental performance at all appropriate levels to ensure accountability for less than desired environmental performance."

The roles and responsibilities described in the Environmental Management System (EMS) and the flow-down documents (ES&H Manual Chapters, Environmental Protection Supplement, Environmental Management Procedures, Standard Operating Procedures, etc.) were hard to differentiate and track. For example, the responsibility for "Ensuring that the EMS requirements are fulfilled..." is assigned to Associate Directors, the EMS Management Representative, and the Division Safety Officers. The EMS organizational chart is not consistent with the text, and it is difficult to identify who has been assigned the important role of the EMS Management Representative. It is clear, however, that the hazardous waste and environmental permit programs are integrated into the EMS and that these concerns are being addressed.

The flow down of roles and responsibilities through the implementing procedures is also difficult to understand. Roles and responsibilities for implementing the hazardous waste program, for example, are spread through at least 6 documents; the EMS, ES&H Manual Chapters 6710, 6760, 6761, EPS 61, and finally an Industrial Hygiene SOP that actually implements the majority of the program in the field. Interviews with the key program individuals indicate that the roles and responsibilities are largely understood and met, however, this cannot be attributed to the program documentation (**FIND P3-001**). Ongoing revisions to EMS documents and ES&H manual chapters should mitigate this concern.

Training and qualification requirements have been identified and are understood by the key program individuals; however, a technical problem with the training database is currently preventing accurate recordkeeping. For example, although the training requirement was identified and satisfied, the training records for sample Industrial Hygiene staff did not include relevant DOT training (**FIND P3-002**).

Records review and interviews with key staff and customers indicate that adequate supervision and oversight of the programs is occurring. EMP-11, Evaluation of Compliance, requires an annual compliance audit but is not linked to other

documentation that addresses the monitoring of regulations for changes (**FIND P3-003**).

There are provisions in place to screen new activities for hazardous waste generation and new/revised permit status. The Environmental Aspects Analysis Worksheets, the PAE Environmental Review, the biennial EMS audit and the EMS record database reflect sufficient effort.

Records indicate that major EMS program elements such as pollution prevention and waste minimization are in place and integrated in daily activities. JLab received a Closing the Circle Award in 2007, and received two DOE Best in Class Awards in 2008.

With the exception of the roles and responsibilities discussed above, the subset of program descriptions and procedures reviewed appeared to be up-to-date, accurate and being managed according to EMP-07 Control of Documents. The tracking matrix contained in EMP-07 is not up-to-date, but it is reported as being scheduled for revision. Some improvements to use existing DocuShare™ software resources have been made, but as the current DocuShare™ system has more functionality it may allow for additional improvements in this system.

Permit milestones, commitments, and deliverables are formally tracked using the permit tracking list maintained by the JSA Environmental Engineer. An electronic system was developed by the Hazardous Waste Manager and is utilized for tracking of the monthly waste generation rates and inventory, which ensures real time accountability and accuracy (**PRO-001**).

Other major safety elements, such as hazard analysis and personal protective equipment planning also appear to be well integrated into activities. Procedure reviews indicated good use of hazard analysis and good discussion of PPE. Waste characterization requirements are well defined in ES&H Manual Chapter 6760. Evidence of field compliance, such as the records associated with JLab's small quantity generator status, drum labeling, waste manifests, and site-wide postings, indicate good practices. Records also show compliant management of restricted wastes.

#### **4.2 Hazardous Waste Program Compliance**

Jefferson Lab complies with all federal and state regulations in its role as a Small Quantity Generator (SQG). As a SQG, up to 1000 kilograms (kg) of hazardous waste and up to 1 kg of acutely hazardous waste can be generated per month, with a maximum of 6000 kg permissible on-site at any time.

JLab generates a variety of hazardous wastes, including acids, etchants, lead-contaminated debris, and solvents. In FY 2007, about 4.1 tons of routine RCRA hazardous wastes were generated and disposed. The two largest volume hazardous wastes generated were a waste acid mixture used for niobium cavity processing and

waste solvents from cleaning operations. JLab neither transports hazardous wastes offsite nor operates any regulated treatment or disposal units. All wastes are disposed of through licensed waste handling transporters and facilities.

Wastes are managed at several Satellite Accumulation Areas (SAAs) and at the Central Accumulation Area (CAA) of Building 33. The Industrial Hygiene Group is responsible for setting up SAAs, transferring waste to the CAA, management of the CAA, and documentation of inspections. Line managers/process owners ensure the proper operation of the SAAs in their areas of responsibility. Procedures are documented in SOP- IH-700-01.

All SAAs were visited and assessed; each was found to be in compliance with applicable regulations, with adequate secondary containment, labeling, inspection frequency, and documentation.

The CAA (Bays 2 and 4 of Building 33) was found to comply with all applicable requirements, and in some notable areas such as improved processes to login new items and the signage for contacts, exceeded those requirements (**PRO-002**).

Joint Assessment team members conducted two work observations associated with hazardous waste. The first was the crushing of fluorescent lamps, a RCRA-regulated Universal Waste, with a bulb crushing apparatus that collects any mercury therein. An SOP for this procedure was available at the work location and was reviewed. One deviation from the procedure was noted during the observation: the technician is instructed at one point to place his gloved hand over the tube unto which the bulbs are fed, to test for negative pressure. The technician did not perform that step, stating that he could tell from the sound of the apparatus that suction was being applied (**FIND P3-004**). In addition to this deviation, one minor regulatory compliance issue was noted. There is a requirement that the accumulation start date is included on universal waste labels, and that date was initially lacking (**FIND-P2-001**). That information was added within 24 hours.

The second work observation was of the transfer of hazardous waste from an SAA to the CAA. Waste acid from the Production Chem. Room was transferred to Building 33 (Bay 4). The hazardous properties of this acid dictate the use of extensive precautions, which included secure containment to protect spillage during transport. The transfer was conducted in a safe and efficient manner, and follow-up activities at the CAA (such as container re-labeling) were completed promptly.

### **4.3 Environmental Program Compliance**

#### **4.3.1 VA Permit 0089320**

TJNAF is permitted by the State of Virginia, Division of Environmental Quality to discharge to surface waters under the Virginia Pollutant Discharge Elimination System, permit number VA0089320. This permit

requires periodic monitoring of the quality of groundwater on the site to ensure no radiological effects from accelerator operation would be noted beyond the site boundary. It also controls the discharge to surface of one cooling tower, and the discharge from groundwater dewatering activities at the experimental endstations. There have been no technical or administrative violations assessed over the past three years.

The radiological monitoring is managed by the Radiation Control Department (RCD) Environmental Engineer. A sampling and analysis protocol is required to be maintained for the groundwater monitoring. It was last revised summer of 2008. Sample monitoring reports from 2006 and 2008 and the protocol were reviewed and comply with the permit. Of note, the quality assurance for monitoring for the radiological sampling is well established, and a written procedure is in place (HPP-ENV-005). The procedure ensures quality control of the reports submitted by the subcontracted laboratory, Universal Laboratory. **(PRO- 003)** Other monitoring performed by the subcontractor lab, while simpler, would establish a comparable quality assurance procedure. The RCD Environmental Engineer also maintains an audit plan for the Universal Laboratory.

The last record of submission of chemical inventory for the cooling tower unit does not reflect the current inventory of cooling tower chemicals in use **(FIND P2 – 002)**. The permit requires that the updated inventory be submitted 30 days prior to any intended changes. There is evidence of the permit-required annual inspection for the cooling tower; in fact inspections are conducted more frequently. There have been no reports of unusual or extraordinary discharges associated with the permit.

Collection of permit-required radiological samples was the activity observed. An SOP for the procedure was available at the workplace, but was out of date. The updated procedure was provided. There were no permit-related issues noted for the work observation, however there was one safety finding noted: The pump used as a backup for discharge of groundwater has exposed moving parts that are not adequately shielded. Radiation control personnel take water samples in the vicinity of this pump. This finding has since been addressed, but may warrant an extent of condition assessment. **(FIND P3 -005)**



Figure 1 and 2: close-up of unguarded moving part and shot showing ISCO Sampling Pump proximity

During the walkthrough of the permitted area it was noted that there is a crossover gate valve between the endstation dewatering collection sump and the endstation condensate sump. The gate was put into place to allow discharge of excess water in the event of a significant rainfall event such as a tropical storm or hurricane to mitigate potential flooding of the endstations. The gate has no record of inspection, as its location and nature of flow prohibit this to occur. Failure of this gate could allow potentially tritiated water to be discharged to surface waters (**FIND P3- 006**).

#### 4.3.2 HRSD Permit

TJNAF is permitted by Hampton Roads Sanitation District to discharge industrial wastewater as a non-significant industrial user. The permit covers required water meter readings, and control of discharges associated with commercial kitchen grease interceptor, oil/water separators, acid cleaning of metals, and cooling tower discharges. Radiological discharges are also permitted and include tritiated water discharges from experimental endstation and accelerator sumps and beam dump cooling water. Monitoring is required by the permit. There was one notice of violation issued by HRSD on September 26, 2006 for low pH. The low pH was caused by a series of errors culminating in a manual discharge from a Cooling Tower. The direct cause was a treatment chemical pump malfunction that allowed continuous flow of treatment chemical. No other administrative or technical violations were assessed during the past three years.

Monthly reading of HRSD water meters, at least two of which are located in a below grade confined space (one in front of Building 28, the other located on Jefferson Avenue by the City of Newport News pumping station), is required by the permit. An upgrade to the city water meters by the City of Newport News makes it difficult to see the meters, which are near the bottom of a confined space (about 8 feet below grade). This has resulted in errors in required readings, and places the operator at risk for lowering his head into the space to see the meter, as observed during a work observation during the assessment. The Facilities Maintenance and

Logistics Civil Engineer recognized the problem and has purchased an instrument to remotely take the reading. This will eliminate the necessity to open a confined space (**PROF- 004**). The instrument is in use as of the time of this final report.



*Figure 3 and 4: Confined space for meter readings*

One safety-related finding associated with the observation was noted: confined space signage has fallen off the water meter pit cover in front of VARC Building 28. This finding warrants an extent of condition assessment (**FIND P2-003**).

The permit requires that inspection and maintenance logs be kept for the interceptor and oil/water separators. Evidence was provided that inspections and maintenance are performed according to permit requirements. There is no evidence that the CEBAF Center grease interceptor waste hauler has an HRSD indirect wastewater discharge permit, as required by the permit (**FIND P3- 007**). The contractor is no longer in business. A list of permitted haulers was subsequently provided by HRSD, and could be used to select the next service provider. A work observation was conducted during the assessment of a typical inspection of the grease interceptor. The inspection requires the removal of the very heavy cover of the interceptor; the operators have devised a procedure using a wedge and hammer to ease the cover up, which can then be easily laterally transferred, reducing risk of lifting injuries (**PROF- 005**).



*Figure 5: wedge system for removing interceptor cover*

Interview with technician whose work directly impacts this permit had not read the permit and did not know what the permit requirements were for the interceptor. He did not know what the JLab Environmental Management System (EMS) was, or recall receiving EMS awareness training (**FIND P3-008**). Follow-up indicated that he was trained.

With respect to acid neutralization, the permit requires that the acid neutralization system be maintained according to manufacturer's recommendations. A monthly calibration of pH sensors that control release of treated effluent is required. The calibration of the pH sensors was observed during the assessment for one of three acid neutralization systems that operate under this permit. Records of discharges from one of three systems were not retrievable for the time period December 2007 to time of audit (**FIND P3- 009**). Monthly grab samples are required by the permit to be collected to monitor pH. Sample reports were reviewed for 2006, 2007, and 2008. The sampling and analytical work is conducted by the subcontractor Universal Laboratory. Interviews of personnel whose work directly impacts this permit had not read the permit and did not know the permit pH limit, although their estimate of the limit was conservative. They did not know what the JLab Environmental Management System (EMS) was, or recall receiving EMS awareness training (**FIND P3-008, second instance**). Follow-up indicated that they were trained.

Cooling towers have upgraded process controllers which incorporate a feed to building monitoring system (computer based controls system for adjacent buildings have capability to incorporate remote alarming). Indicators such as flow, conductivity readings, trigger auto- notification of Facilities Maintenance and Logistics Engineer, allowing problems to be detected earlier. This allows for reduction in unnecessary discharges of chemicals and water, and saves on downtime associated with repairs (**PROF- 006**). Three additional cooling towers have not yet been upgraded. Interview with Facilities and Maintenance and Logistics Engineer whose work directly impacts this permit indicated that he had not read the permit. He did know what the JLab Environmental Management System (EMS) was, but was not familiar with the EMS definition of an aspect or significant aspect. This may be occurring because the definition is not in the Integrated Safety Management (ISM) core function vocabulary (**FIND P3-008, third instance**). Follow-up indicated that he was trained in EMS awareness.

Radiological discharges are limited by the permit. The JLab RCD Environmental Engineer is responsible for sampling and analytical work performed to meet the permit requirements. Quality Assurance procedures are detailed and periodically reviewed and revised. The JLab Radiation

Control Engineer had copies of applicable permits and had history of involvement with the JLab EMS program.

- 4.4 Oversight:** Due to time constraints, the oversight assessment was limited to a review of external assessments, a limited JSA oversight assessment and a self assessment of TJSO oversight.

**4.4.1 Environmental Permit Program**

External Regulatory oversight: Annual inspections for the HRSD permit 0117 are conducted by the HRSD regulatory authority and are attended by JLab and TJSO personnel. There were no findings in the past three annual inspections. During the 2007 inspection the question was raised whether the acid treatment of metals should be considered categorical industrial processes. Follow-up with the Environmental Protection Agency confirmed that the processes are exempt from categorical limitations, because the parts are not sold in commerce.

The last DEQ annual inspection for the VA0089320 permit was in August 2005. There were no findings.

An EPA audit was conducted in June 2006. There were no findings associated with the two permits selected for review in this assessment.

TJSO oversight: All permit-required monitoring reports are reviewed by TJSO. In 2008, a standard operating procedure for Oversight of Environmental Authorizations was issued, SOPP 2.2 (rev.0). This SOPP aligns oversight activities for environmental activities with the Office of Science Management System (SCMS) Environmental Authorization Management System and gives responsibility for oversight of environmental programs to the TJSO Environmental Program Manager. In 2008, the database ORION was put into service for recording walkthroughs. Sixteen Walkthroughs were conducted in 2008 in the functional area of environmental permits. There were three P2 findings associated with the walkthroughs. Two of these were directly associated with the permit for VA Permit 0089320: The sampling and analysis protocol was not current, and a calibration standard in use for groundwater conductivity was out of date. The third P2 finding was related to chemical safety for storage and use of cooling tower chemicals: no eyewash/safety shower was available in the area of use of these corrosive chemicals. All P2 findings were closed. There were 10 P3 findings and 6 proficiencies noted.

JSA Oversight

The JSA Environmental Engineer reviews permit-required monitoring reports, and follows up on off-normal events that are permit-related.

Evidence is documented in Notable Event Reports for 2006-2008. A significant example is the follow up on a permit-required pH monitoring result associated with the acid neutralization system in 2008: lower than normal pH was noted in January 2008. Although the pH was within permit limits, the JSA Environmental Engineer required an investigation. The cause was significant, in that the pH sensor governing discharge to the city was located in a mixing tank that was not always at equilibrium. The sensor was moved to the final collection tank, where steady state conditions exist to ensure discharge at pH greater than 5 (PRO-007).

#### **4.4.2 Hazardous Waste Program**

External Regulators: The last external audit of the program was conducted by the EPA and the State DEQ in June 2006. There were three findings associated with the hazardous waste program. All findings were closed prior to the closeout of the audit:

- Hazardous waste labels were not present on individual containers in lab packs
- In two satellite accumulation areas, the satellite container was deemed to be too far from the process generating the waste.

TJSO oversight: In 2008, the database ORION was put into service for recording walkthroughs of hazardous waste areas. Five walkthroughs were conducted in the functional area of hazardous waste management. There were 6 P3 findings and five proficiencies noted. All hazardous waste pickups were observed by TJSO representatives.

JSA does perform oversight as evidenced with monthly hazardous waste generation reports, however, due to time constraints assessment of JSA Oversight was not conducted.

**5.0 CONCLUSIONS**

JLab has a functioning environmental permit and hazardous waste management programs. Personnel whose work impact compliance directly display innovation and consistent attention to detail. The programs are adequately managed to promote compliance.

Areas of particular priority and emphasis for JLab should include

- Continue to clarify roles and responsibilities in documentation of the environmental programs and integration with the Environmental Management System.
- Ensure that staff whose work directly impacts permit compliance are knowledgeable of the permit requirements.

The TJSO oversight of the program was limited to a self assessment, which indicated that oversight frequency and adequacy are in line with Office of Science Management System Procedures in the area of environmental authorizations.

**Assessed By:**

  
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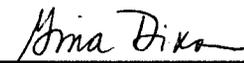
**Management of Programs:**

**Bill Rainey, Team Member**

  
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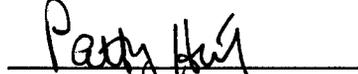
**Hazardous Waste Compliance**

**Linda Even,**

  
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**Gina Dixon, Team Members**

**Environmental Permit Compliance**

  
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**Patty Hunt, Team Leader**

**Concurred By:**

  
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**Patty Hunt, Team Leader**

## 6.0 FINDINGS AND PROFICIENCIES

### 6.1 Findings

**FIND P2 -001:** The accumulation start date was not marked on universal waste labels, in accordance with 40 CFR273 (c) (1).

**FIND P2 -002:** The last record of submission of chemical inventory for the cooling tower unit does not reflect the current inventory of cooling tower chemicals in use in accordance with DEQ VPDES permit 0089320. The permit requires that the updated inventory be submitted 30 days prior to any intended changes.

**FIND P2 -003:** Confined space signage has fallen off the water meter pit cover in front of VARC Building. Permit-required confined spaces must be posted per 1910.146 (c) (2) and warrants an extent of condition assessment.

**FIND P3 -001:** The roles and responsibilities described in the EMS and the flow-down documents (ES&H Manual Chapters, Environmental Protection Supplement, Environmental Management Procedures, Standard Operating Procedures, etc.) were hard to differentiate and track. Ongoing revisions to EMS documents and ES&H manual chapters should mitigate this concern.

**FIND P3 -002:** Official training records for Industrial Hygiene staff did not reflect that they had completed required DOT training, despite repeated requests from the IH group to the JLab Training Office to update the records.

**FIND P3 -003:** EMS system requires an annual compliance audit but is not linked to other documentation that addresses the monitoring of regulations for changes.

**FIND P3 -004:** An SOP handling universal waste was available at the work location and was reviewed. One deviation from the SOP procedure was noted during the observation of fluorescent bulb crushing: technician did not perform negative pressure test for local exhaust control before crushing bulbs.

**FIND P3 -005:** A pump used as a backup for discharge of groundwater has exposed moving parts that were not adequately shielded. This finding has since been addressed, but may warrant an extent of condition assessment.

**FIND P3 -006:** Crossover gate valve between a dewatering sump and a condensate sump has no record of inspection. Failure of this gate valve could allow potentially tritiated water to be discharge to surface waters.

**FIND P3 -007:** There is no evidence that the CEBAF Center commercial kitchen interceptor waste hauler has an HRSD indirect wastewater discharge permit, as required by the permit.

**FIND P3 -008:** Some personnel whose work directly impacts environmental permit compliance were not aware of permit contents and relation to JLab Environmental Management System (EMS), although EMS Awareness training was given.

**FIND P3 -009:** Records of discharges from one of three acid neutralization systems were not retrievable from records from December 2007 to the time of audit, due to failure of computer backup function

## 6.2 **Proficiencies**

**PRO- 001:** Electronic system for monthly tracking of hazardous waste generation and inventory ensures real time accountability and accuracy

**PRO- 002:** Improvements in processes to login new waste streams at the CAA and emergency response signage exceeds requirements.

**PRO- 003:** Of note, the quality assurance for monitoring for the radiological sampling is well established, and a written procedure is in place (HPP-ENV-005). The procedure ensures quality control of the reports submitted by the subcontracted laboratory, Universal Laboratory. (PRO- 00) Other monitoring performed by the subcontractor lab, while simpler, would establish a comparable quality assurance procedure.

**PRO- 004:** The Facilities Maintenance and Logistics Engineer purchased an instrument to remotely take water meter readings; eliminating the necessity to open a confined space .The instrument is in use as of the time of this final report.

**PRO- 005:** Ergonomic improvements reduce back strain associated with interceptor inspections and maintenance.

**PRO- 006:** Cooling towers have upgraded process controllers which incorporate a feed to building monitoring system. This allows for reduction in unnecessary discharges of chemicals and water, and saves on downtime associated with repairs (Three additional cooling towers have not yet been upgraded.)

**PRO-007:** JSA ENV Engineer required follow-up on off-normal analytical result that was still within permit limits. This resulted in identification of a significant failure mode that could cause a permit failure, which was corrected.

**APPENDIX 1 List of records requested for 2008 Environmental Surveillance**

<b>Record</b>	<b>To be provided by:</b>
<b>Permit VA 0089320</b>	Linda Even
Randomly select sampling records for two reports submitted under the current permit period, at least one year apart. (Two for Cooling Tower sampling and two for Rad con related schedule): These reports will be used to evaluate compliance with other records requested.	Debra Brand Gina Dixon
Copies of correspondence for Permit VA 0089220 to Regulator for year to date 2008	Linda Even
Procedure for Annual Inspection of Cooling Tower required by the permit	Debra Brand
Procedure for Radcon sampling procedures required by the permit (q2)	Gina Dixon
Quality Control Procedures for JLab sampling under the permit (q1)	Gina Dixon
Quality Control Procedures for Subcontractor sampling under the permit	Linda Even/Gina Dixon/Debra Brand
Evidence that maximum quantitation limits are used in sampling	Gina Dixon
Evidence that list of cooling tower chemicals are on file with Regulatory Authority	Linda Even/Debra Brand
Subcontractor Safety and Health Plan	Gina Dixon
Subcontractor Sampling and Analysis protocol	Gina Dixon/Debra Brand
Evidence of oversight activities	Patty Hunt

<b>HRSD Permit 0117</b>	
Copy of Permit	Linda Even
Randomly select sampling records for two reports submitted under the current permit period, at least one year apart (pH, meter readings, and radiological records) These reports will be used to evaluate compliance with other records requested.	Linda Even
Provide evidence of grease trap (interceptor) maintenance log	Debra Brand
Provide evidence that grease haulers hold HRSD indirect wastewater discharge permits	Debra Brand
Provide Health and Safety Plan for subcontractor grease haulers	Debra Brand
Provide list of oil/water separators	Debra Brand

Provide evidence that oil/water separators are maintained in accordance with manufacturer's recommendations	Debra Brand
Provide evidence that neutralization system is maintained in compliance with the permit	Tony Reilly
Copy of procedures associated with operation of the acid neutralization systems	Tony Reilly
Maintenance logs for acid neutralization systems	Tony Reilly
Provide evidence that radiological samples results are kept on file for HRSD review.	Gina Dixon
Evidence of oversight activities	Patty Hunt/ Linda Even

<b>Hazardous Waste Program</b>	
Provide a random set of records from two hazardous waste shipments, one from 2008 and one from between November 2005 and the present time. These records will be used to evaluate compliance with other evidence.	Jennifer Williams
Provide evidence of satellite accumulation inspections	Jennifer Williams
Provide evidence of central accumulation area inspections	Jennifer Williams
Provide evidence of controls for air emissions associated with hazardous waste operations (drums, puncturing aerosol cans, crushing bulbs)	Jennifer Williams
Provide Procedures related to control of satellite accumulation area	Jennifer Williams
Provide procedures related to control of Central Accumulation Area	Jennifer Williams
Manifests and Land Bans for compliance	Jennifer Williams
Evidence that waste is characterized	Jennifer Williams
Evidence that small quantity generator status is monitored	Linda Even
Training records for hazardous waste staff and satellite accumulation area staff	Linda Even
Evidence of oversight activity	Patty Hunt/Linda Even

**APPENDIX 2 Interviewees**

Henry	Adams	FML technician	HRSD permit 117
Debra	Brand	FML Civil Engineer	HRSD permit 117
Derrick	Dail	Acid neutralization technician	HRSD permit 117
Gina	Dixon	Radcon Environmental Engineer	VPDES Permit 0089320 HRSD permit 117
Carroll	Jones	FML HVAC Engineer	VPDES Permit 0089320 HRSD permit 117
Todd	Jones	FML technician	Hazardous Waste Program
Richard	Owen	IH Group Leader	Hazardous Waste Program
Tony	Reilly	Acid Processes Chemical Engineer	HRSD permit 117
Keith	Welch	Radcon Deputy Manager	VPDES Permit 0089320 HRSD permit 117
Jennifer	Williams	HW Manager	Hazardous Waste Program
Steve	Witt	FML technician	HRSD permit 117

### **APPENDIX 3 Work Observations**

Fluorescent bulb crushing

Waste acid transfer, Building 58 to Building 33,

Calibration of pH sensor head, Acid Neutralization Building

Radiological sample collection, Counting House Basement

Water meter reading, pit in front of VARC Building

## APPENDIX 4 Records Reviewed

Correspondance : Response to HRSD Notice of Violation

### **Regulatory requirements pertaining to the operations assessed:**

EO 12088, Sect 1-1; Federal Facilities Compliance Act

Virginia State Implementation of Clean Water Act: *State Water Control Law*;

*Hampton Roads Sanitation District Industrial Wastewater Discharge Regulations*

Department of Transportation Hazardous Materials Regulations (HMR) *49CFR 107 and 171-180*.

Virginia State Implementation of Hazardous Waste Requirements *9VAC60*

Resource Conservation and Recovery Act (RCRA) *40 CFR 124-279*;

HRSD Permit 0117

VPDES Permit VA0089320

### **Chapters of the Jefferson Laboratory Environmental, Safety, and Health Manual pertaining to the operations being assessed:**

ESH Chapter 6710 Environmental Protection Program

ESH Chapter 6711: Environmental Monitoring

ESH Chapter 6730: Water Quality Management

ESH Chapter 6731: Groundwater Protection

ESH Chapter 6760 Waste and Recyclable Material Management

ESH Chapter 6761: Hazardous Waste Management

ESH Chapter 6770: Waste Minimization and Pollution Prevention

Environmental Protection Supplement to ESH Manual

Environmental Management System Level II Documentation

### **Additional standards pertaining to the operations being assessed:**

DOE O 226.1 Implementation of Department of Energy Oversight Policy

DOE 450.1 Environmental Protection Program

SCMS Environmental Safety and Health Procedures 1 – 4, dated 3-11-2008: Environmental Authorization Management System Description

### **JLab EMS System Documents and Standard Operating Procedures**

EMS Plan

Environmental Management Procedure (EMP) 07

EMP 11

Spill Prevention and Countermeasures Plan (SPCC)

HPP-ENV-001: Environmental Sampling-Water, Soil, and Sediment, 5/27/2008

HPP-ENV-003: HRSD Monitoring for Experimental Hall Floor Drain Sump Pit, 3/15/06

HPP ENV-004: Accelerator Sump Pit Monitoring, 5/27/08

HPP-ENV-005: Groundwater Data Entry, Review, and Transmission, 10/1/2003  
HPP-ENV-006: Disposal of Liquid Scintillation Cocktail  
HPP-OSP-008: Calibration of Pipetter, 3/18/2008  
HPP-QAP-019: Gross Beta Analysis Using the Packard Tri-Carb Liquid Scintillation Counter, 11/4/1996  
HPP-QA-004: QA of the Calibration Lab, 4/26/2006  
HPP-QAP-018: Tritium Analysis using the Packard Tri-Varb Liquid Scintillation Counter, 1/16/08  
HPP-ADM-006: Laboratory Instrument Quality Control Program, 9/14/93  
HPP-ADM-010 : Audit Plan for Groundwater Radioanalytical Subcontractor, 12/8/95  
UL860: Universal Laboratories Standard Operating Procedure for Sampling, 5/29/2008  
IH 700-01: Hazardous Waste Management

### **Analytical Data**

Performance Work Statement for Groundwater Monitoring, March 29/2006 for chemical and radiochemical analysis of water samples by Universal Laboratory

October 2008 Tritium Release Report :

- Chain of custody
- Data for Permit 0117: Universal Laboratories Order ID 0810217: Tritium and other radionuclides analysis report for quarterly HRSD sampling of 10/24/2008
- Report to file

November 2008 Facilities Management Sampling report:

- Sewer Flow Report Calculation Sheet (HRSD)
- Chain of custody for manhole D and EF and Cooling Tower samples
- Universal Laboratories Order ID 0811014 dated 11-10-08, pH report
- Universal Laboratories Order ID 0809358 dated 10/07/08 : chemical parameters sampling report for Cooling Tower (VPDES permit)

Universal Laboratories Order ID 0701361, 5-10-07, : chemical parameters sampling report for Cooling Tower (VPDES permit)

Quarterly Report for Groundwater Monitoring Well GW-27

Monitoring Well Data Bench Sheet 4/4/2007

Field Reports

### **Maintenance Logs**

Oil water separator Maintenance history for subcontractor Hoffman  
Invoice for maintenance of oil/water separator for subcontractor Hoffman  
Interceptor Maintenance and inspection history for interceptor  
Activity Hazard analysis report for interceptor maintenance  
Manufacturer's instructions for interceptor maintenance

### **Audit reports**

Multimedia Compliance Inspection EPA Region II Office of Enforcement, Compliance and Environmental

Notable Event Report: Release of Low pH water, 1/29/2008

Notable Event Report: Potable Water Spill from Building 31, 12/18/2007  
Notable Event Worksheet, Release of Low pH water, 5/11/2007

**Training Records**

EMS Awareness Training Records for Facilities Maintenance and Logistics Employees  
Training Powerpoint Presentation for Service Subcontractor Orientation that includes EMS awareness training, rev 11/26/07

MSDS for Cooling Tower Water Treatment Chemicals

Formula 1909, Coastline Chemicals  
Chemtreat CL1360, Chemtreat, Inc.  
Chemtreat CL-4856, Chemtreat, Inc.  
Chemtreat CL-49, Chemtreat, Inc  
Chemtreat CT-30, Chemtreat, Inc  
Chemtreat BL-1821, Chemtreat, Inc