Volume 1

24915-00-GPE-GGPT-00394

Resource Conservation and Recovery Act (RCRA)

Class 3 Hazardous Waste Storage & Treatment Permit Modification Request, Offsite Shipment and Disposal of Agent Hydrolysate

for the Blue Grass Chemical Agent-Destruction Pilot Plant
Blue Grass Army Depot, Richmond, Kentucky

EPA ID KY8-213-820-105

Submitted To:

Energy and Environment Cabinet
Kentucky Department for Environmental Protection
Division of Waste Management
300 Sower Blvd.
Frankfort, Kentucky 40601

Submitted By:

Blue Grass Army Depot
431 Battlefield Memorial Highway
Richmond, Kentucky 40475-5060

and

Bechtel Parsons Blue Grass
830 Eastern Bypass, Suite 106
Richmond, Kentucky 40475

Submitted 10-MAR-2021, Revision 1
Final Page Is 23

Table of Contents

1.0 Overview 3
2.0 Permit Modification Request 3
2.1 Class of Permit Modification 3
2.2 Justification for Permit Modification 3
2.3 Requested Changes and Related Supporting Documents 7
3.0 Description of Changes and Supporting Information 7
3.1 Part A Update 7
3.2 Part B Supplemental Information 7
3.2.1 Traffic Information 7
3.2.2 Transportation Risk Assessment 8
3.3 Part C Supplemental Information 8
3.4 Part D Supplemental Information 8
3.4.1 Container Storage 8
3.4.2 Tank Management 9
3.4.3 Miscellaneous Units 12
3.5 Part F Supplemental Information 12
3.6 Part G Supplemental Information 13
3.7 Part H Supplemental Information 13
3.8 Part I Supplemental Information 13
3.9 Part J Supplemental Information 13
3.10 Part K Supplemental Information 13
3.11 Part L Supplemental Information 13
Appendix A Permit Related Information or Documents Affected by PMR 14
Appendix B Proposed Permit Modifications 21
Appendix C Waste Analysis Plan 23

1.0 OVERVIEW

This document contains a Class 3 Permit Modification Request (PMR) for the Blue Grass Chemical Agent-Destruction Pilot Plant (BGCAPP) Main Plant hazardous waste storage and treatment permit. The BGCAPP Main Plant facility is located at 431 Battlefield Memorial Highway, Richmond, Kentucky. The Bechtel Parsons Blue Grass (BPBG) Joint Venture (JV) is the operator of the BGCAPP and is a Co-Permittee with Blue Grass Army Depot (BGAD) under the Resource Conservation and Recovery Act (RCRA) Part B Permit (EPA ID #KY8-213-820-105, AI #2805) issued by the Kentucky Department for Environmental Protection (KDEP), Division of Waste Management (DWM).

This PMR is being submitted in accordance with 401 Kentucky Administrative Regulation (KAR) 39:060 incorporating Title 40 Code of Federal Regulations (CFR) §270.42. The modifications to the permit that are being requested are:

- Off-site shipment of GB agent hydrolysate for treatment and disposal.
- Off-site shipment of VX agent hydrolysate for treatment and disposal.
- Discontinuance of Supercritical Water Oxidation (SCWO) development efforts for treatment of agent hydrolysate.
- Addition of piping and ancillary equipment to provide an alternate route for Off-gas Condensate Metal Parts Treater (OTM) condensate tanker loading for offsite shipment.

This PMR is being submitted as a Class 3 permit modification requiring KDEP approval in accordance with 40 CFR 270.42(c).

2.0 PERMIT MODIFICATION REQUEST

2.1 Class of Permit Modification

The proposed changes are being submitted as a Class 3 permit modification based on the criteria in 40 CFR §270.42(d)(2)(iii).

2.2 Justification for Permit Modification

Agent hydrolysates produced in the BGCAPP Main Plant Munitions Demilitarization Building (MDB) facility by caustic hydrolysis of agent were expected to be treated onsite by the SCWO process in the SCWO Process Building (SPB), as reflected in the current Part B permit requirements. The initial SCWO prototype development started in 1999. Throughout the Program Executive Office, Assembled Chemical Weapons Alternatives (ACWA) program, there has been extensive testing and evaluation of the SCWO system, including demonstration testing, engineering design studies testing, first-of-a-kind testing, and technical risk reduction testing, all of which were conducted prior to the installation of the SCWO system at BGCAPP. In addition, there were also several independent assessments conducted. Once installed at BGCAPP, systemization and systems demonstration testing were also performed.

Due to concerns regarding SCWO, and as an added level of safety, ACWA incorporated additional phases of testing for the SCWO system using a four phase systemization and operations approach: (1) systems demonstration (water, isopropyl alcohol), (2) shakedown testing (simulant and surrogate), (3) 4-month pre-operational assessment (simulant and surrogate), and (4) 6-month operational assessment (GB hydrolysate and energetic hydrolysate surrogate). The systems demonstration and shakedown testing were completed. However, during and following the shakedown testing, two significant safety events were encountered:

1. *Reactor Shutdowns:* During the 30-day (280 hour) Shakedown Test, SCWO Trains #1 and #3 experienced 103 unplanned reactor shutdowns with venting to the Emergency Relief Tank by two independent instrument control systems and safety relief rupture disks. During startup and operation, pressure fluctuations/spikes tripped the system high pressure control limits resulting in shutdown. Sixty-seven percent of shutdowns were deliberate, while 33% (34 events) were unplanned. In addition, and more critical, there were nine reactor venting events where the pressure safety relief disks, also known as the rupture disks, were activated. These rupture disks, which function or activate at 4300 pounds per square inch gauge (psig), serve as a final level of protection for the SCWO system from high pressure events to ensure integrity of the system is maintained, as the SCWO system is rated at 4300 psig and the piping is rated at 4500 psig. As a response and to reduce or eliminate the functioning of the rupture disks, a Facility Protection System (FPS) software change was executed. The FPS shutdown sequence was modified to add a two second delay for closing the fuel, feed water, and hydrolysate valves to enable the pumps to stop first and prevent further functioning of the rupture disks.

2. *Quench Pump Failure:* Following the completion of the SCWO Shakedown Test in April 2020, the SCWO Train #1 High Pressure Quench Pump failed, resulting in the “fluid cylinder” separating from the power unit, causing irreparable damage to the pump. The pump head, which weighs approximately 4,000 lbs., impacted the Lexan barrier, which serves as the last line of defense for workers supporting the SCWO system. The tie stud torque was checked less than 750 hours prior to failure. After the event, SCWO testing and operations were halted by ACWA, and the BPBG JV had the vendor (Clyde-Union) conducted a failure analysis on the pump and its components.

The safety and operational reliability concerns resulting from the unplanned SCWO reactor shutdowns are three-fold:

1. Excessive Quantity of Shutdowns. Given the total hours operated, the amount of unplanned reactor shutdowns appear excessive and potentially are an indication of an inherent processing flaw. Reactor shutdowns should not be a common occurrence and could eventually lead to acceptance of these shutdowns by the operators as normal occurrences. Further evaluation is necessary in this area. It would be imperative to understand the cause(s) for these pressure fluctuations and eliminate or reduce them prior to agent hydrolysate operations. The reactor shutdown events drive concerns in the following operational criteria categories: safety, availability, and reliability.

2. Safety Relief Rupture Disks. There were multiple instances of safety relief rupture disks activating. These rupture disks serve as the last line of defense for the operating system and should not be a common occurrence; in fact, rupture should not occur at all. These rupture disks serve as the final level of protection for the SCWO systems from high pressure events to ensure integrity of the SCWO system and piping is maintained. If the rupture disks do not function or activate as designed, the system and piping could be compromised, which could lead to a catastrophic failure of the piping system and potential injury or death to an operator. This is a critical safety condition that must be

thoroughly understood and corrected; thus, additional analysis and evaluation, and potential testing would be required to better understand why the pressure fluctuations were occurring, and to prevent pressure fluctuations and stabilize SCWO operations. The safety relief rupture disk events drive concerns in the following operational criteria categories: safety, availability, and reliability.

3. Software Change – Two Second Delay. In addition, there is concern regarding the two-second FPS delay software change and work around to prevent further functioning of rupture disks. Although this software change was effective in reducing the occurrence of rupture disks functioning, there is concern regarding if (or what) pressure fluctuations actually occurred within the two-second delay. This unknown impacts the safety margin and could affect system integrity and operational dynamics. The holistic consequences of the change would need to be evaluated at the secondary and tertiary levels. The two second delay software change drives concern in the following operational criteria category: safety.

In addition, BGCAPP hazard analysis contains several pump failure events, but none that involve a catastrophic failure due to studs shearing or internal failures, determined as the cause of the quench pump failure. The SCWO system uses thousands of studs/bolts to attach pumps and other pieces of equipment that convey high pressure materials in the SCWO, making the integrity of the studs/bolts critical. Even if all studs are properly installed, lessons learned from baseline sites indicate that equipment/system failures have occurred due to studs/bolts loosening during operations, having flawed components or incorrect material hardness. Since there are multiple high-pressure pumps attached in a similar manner to the SCWO system, a thorough system inspection to verify the integrity and tightness of these studs would be needed. The pump failure event drives concerns in the following operational criteria categories: safety, availability, and maintainability.

In addition, the failure analysis also identified extensive wear (possible corrosion/erosion) of internal components for the pump, and similar wear is potentially occurring on the other SCWO pumps and piping/welds. These issues raise concern associated with all SCWO pumps and components and introduces uncertainties regarding the operating life of the SCWO pumps and the frequency and level of preventative maintenance required to maintain these pumps. A systems level evaluation of the entirety of SCWO pumps, components, and piping/welds would be necessary. The extensive wear drives concerns in the following operational criteria categories: availability, reliability, and maintainability.

Finally, the Lexan barrier serves as the last line of defense to protect the workforce from several hazards identified for operating the SCWO system. These panels were designed to protect the surrounding operators from hazards that result in gas or liquid stream jet impingement, generation of small (0.5” diameter) and large (2” diameter) projectiles, hose/tube whip, reactor decompression, and hot equipment surfaces. The Lexan barrier was evaluated only for these specific challenges, and not, for example, the catastrophic failure of a high-pressure pump impacting the barrier. Since there are multiple high-pressure pumps supporting each SCWO train, the Lexan barrier would require additional analysis for catastrophic high-pressure pump failure or a similar event to ensure the workers are appropriately protected. The Lexan barrier issue drives concerns in the following operational criteria category: safety.

ACWA met with Centers for Disease Control and Prevention (CDC) representatives in July 2020 and discussed the SCWO system safety events. The CDC has been engaged throughout the SCWO design, testing, and evaluation phases. The CDC conveyed safety concerns regarding the recent SCWO events with recommendations to: (1) Investigate and document each event resulting in a ruptured safety disk; (2) Perform a detailed Root Cause Analysis (RCA) on the pump failure and the reactor pressure fluctuations (swings/spikes); and (3) Conduct an

engineering study on the two-second delay to determine if there are any secondary and tertiary effects that exist on the upstream and downstream portions of the SCWO system. The CDC's professional opinion is that these analyses should be performed prior to restarting the SCWO system. They also raised concern with the long-term storage of GB agent hydrolysate based on lessons learned with corrosion issues at prior demilitarization facilities.

The planning and execution of analyses (including RCAs), the implementation of the findings and recommendations, and the restarting/continuation of the ACWA SCWO test strategy program will take considerable time. An independent, detailed RCA, focusing on the pump failure and the reactor system fluctuations, would be necessary. A physical inspection of the SCWO system would also be necessary to (1) verify integrity and proper installation of attached components (tie studs/bolts), and (2) identify any signs of excessive wear of pumps, piping, and welds. In addition, an engineering study on the two-second delay software change needs to be conducted. After completion of those analyses, inspections, and studies, there could be a need for follow-on analyses, evaluations, research, further development, and testing. Design and system revisions could also be required to fully mature the SCWO technology. Systems changes would need to be implemented, plans and procedures would need to be updated, and operators would need to be trained and certified. All of these efforts would need to be completed before the ACWA SCWO test strategy program could resume, with a repeat of the Shakedown Test, 4-month Pre-Operational Assessment Test, and 6-month Operational Assessment Test. Overall, it would potentially take three to five years before the SCWO system could support BGCAPP and process agent hydrolysate. Furthermore, even if these actions are performed, the extensive testing and systemization conducted to date indicate that the level of SCWO system maturity is not adequate for an operational system in a chemical demilitarization application, and safety and operation events create uncertainty as to whether SCWO can sustain continuous operations.

The extensive time and effort required for continued development of SCWO as the only disposal path for agent hydrolysate creates a substantial obstacle for BGCAPP operation. A multiyear pause in processing to allow continued SCWO development is not sustainable if BGCAPP is to fulfill its mission of demilitarization of chemical agent munitions to minimize storage risk and to meet international treaty obligations. Initial estimates indicate only enough agent hydrolysate storage capacity in the Hydrolysate Storage System (HSS) tanks through mid to late 2021, requiring a halt in munitions processing once these are filled. Consequently, another disposal option for GB agent hydrolysate and VX agent hydrolysate is necessary. Offsite shipment for treatment and disposal of agent hydrolysate has a proven success record at prior neutralization chemical demilitarization facilities, including PCAPP, as well as during Operation Swift Solution, which was the destruction of three-ton containers of GB nerve agent at BGAD in 2009.

This PMR proposes offsite shipment for treatment and disposal of GB agent hydrolysate and VX agent hydrolysate from agent neutralization in the MDB that meet compliance limits associated with destruction and removal efficiency (DRE) as well as the waste control limits (WCLs) promulgated by the U.S. Army Public Health Command (USAPHC) for protection of workers at the receiving treatment and disposal facility. It also proposes discontinuance of SCWO development efforts for onsite treatment of agent hydrolysate. The proposed changes will allow BGCAPP and ACWA to meet treaty-imposed schedule and thereby reduce storage risks associated with chemical agents, corrosion risks due to long-term agent hydrolysate storage in the HSS, and safety and operational risks due to uncertainties with agent hydrolysate treatment by SCWO. The offsite facility that will receive agent hydrolysate will have the capability to safely manage, treat, and disposal of the material in accordance with state and federal regulations as well as ACWA and international treaty requirements. The proposed modifications are therefore justified as these will be more protective of human health and the environment compared to uncertainties associated with agent hydrolysate treatment by SCWO.

In addition to allowing installation of process lines and ancillary equipment to support agent hydrolysate truck loading, permit modification Item No. 158, *Class 1 Modification Approval Request - SCR-01461, Supercritical Water Oxidation (SCWO) Line Additions - SCWO Bypass*, provided pathways for tanker loading of OTM condensate meeting permit requirements for offsite shipment. The current permitted pathways could result in potential co-mingling of OTM condensate with agent hydrolysate. To prevent this from occurring, an additional line and ancillary equipment will be added that ensures segregation of OTM condensate and agent hydrolysate during tanker loading. This modification will be more protective of human health and the environment as it will prevent accidentally mixing of the two waste streams and subsequent improper disposal.

2.3 Requested Changes and Related Supporting Documents

Per 401 KAR 39:060 Section 5 and 40 CFR §270.42(c)(1)(iv), Appendix A provides a list of the proposed PMR impacts to applicable information required by 40 CFR 270.13 through 270.22; 40 CFR 270.62, 270.63, and 270.66 are not applicable to BGCAPP.

Proposed permit changes are identified in Appendix B, with deletions as strikeouts and additions in red. Detailed supporting information is provided in Section 3.

3.0 DESCRIPTION OF CHANGES AND SUPPORTING INFORMATION

3.1 Part A Update

The SCWO facility permitted units are listed in the latest BGCAPP Main Plant Part A forms with the legal status code PI (Permitted) and with operating status code CN (Constructed, Not Yet Managing Hazardous Waste). Under this PMR, the currently permitted SCWO units will not receive and manage hazardous waste. In addition, offsite waste shipment is not included on Part A forms. Consequently, no updates to the Part A forms are required.

3.2 Part B Supplemental Information

3.2.1 Traffic Information

The use of SCWO processing for treatment of agent hydrolysate would have resulted in substantial dilution as a result of reactor effluent quench. Consequently, the number of offsite tanker truck shipments will decrease. Table 3-1 provides an estimate of the quantity of agent hydrolysate generated and number of agent hydrolysate waste shipments required.

Table 3-1. Estimated Number of Offsite Waste Shipments

Agent/Munition Campaign	Estimated Production of Agent Hydrolysate	
GB Projectiles	150,000	Gal
VX Projectiles	80,500	Gal
VX Rockets	190,750	Gal
GB Rockets	1,386,000	Gal
Total	1,807,250	Gal
Estimated Number of Agent Hydrolysate Shipments	**452**	

The total estimated number of agent hydrolysate shipments, 452, is an order of magnitude less than the projected number of shipments to have been required for RO Reject (as many as 3,000).

3.2.2 Transportation Risk Assessment

Shipment of GB agent hydrolysate and VX agent hydrolysate will use the same transport mitigation measures in the Bounding Transportation Risk Assessment (BTRA) that are used for > 1 vapor screening level (VSL) waste shipments as well as any additional requirements provided in the specific transportation risk assessments conducted for GB agent hydrolysate and VX agent hydrolysate. The GB agent hydrolysate and VX agent hydrolysate will also meet USAPHC WCLs for GB and VX, respectively.

Transportation risk assessments (TRAs) have been conducted for GB agent hydrolysate and VX agent hydrolysate. These have been reviewed by CDC, and comments from CDC have been addressed. The TRAs and CDC comment resolution form are included in Volume 3.

3.3 Part C Supplemental Information

The BGCAPP Main Plant Waste Analysis Plan (WAP) has been updated to reflect additional characterization requirements for off-site shipment of GB agent hydrolysate and VX agent hydrolysate.

The updated WAP is provided in Appendix C.

3.4 Part D Supplemental Information

3.4.1 Container Storage

The Waste Transfer Station (WTS) consists of field-fabricated container storage buildings, a tanker parking and storage pad for bulk liquids, and a concrete pad used to store roll-off boxes for bulk solids. These areas are used for staging wastes generated in BGCAPP prior to offsite shipment to final treatment and disposal facilities. The WTS has approximately 176,500 gallon storage capacity for process and secondary wastes.

The tanker storage area for bulk liquid wastes has a capacity of 120,000 gallons, which is equivalent to twenty-four 5,000 gallon tankers. This area has three separate containment areas with eight slots per containment with a 40,000 gallon tanker storage capacity in each of the three containments. Secondary containment for liquid wastes has been sized in accordance with regulatory and project requirements. The tanker storage area will be used for storing tankers of agent hydrolysate[1] and OTM condensate[1] prior to offsite shipment.

3.4.2 Tank Management

Permit modification Item No. 158, *Class 1 Modification Approval Request - SCR-01461, Supercritical Water Oxidation (SCWO) Line Additions - SCWO Bypass*, approved by KDEP on 10/11/2018, allowed the following plant configuration changes:

- Addition of piping, instruments, and ancillary equipment that would allow agent hydrolysate to be directly loaded from the Hydrolysate Storage Area (HSA) tanks to tankers at the SPB Reverse Osmosis (RO) Reject Truck Loading Station for shipment off-site for treatment and disposal.
- Addition of piping, instruments, and ancillary equipment that would allow energetics hydrolysate to be directly loaded from the HSA tanks to tankers at the RO Reject Truck Loading Station for shipment off-site for treatment and disposal.
- Addition of piping, instruments, and ancillary equipment that would allow OTM condensate to be directly loaded from the OTM System in the MDB to tankers at the RO Reject Truck Loading Station for shipment off-site for treatment and disposal, as well as allow OTM condensate to be directly loaded from HSA tanks to tankers at the RO Reject Truck Loading Station for shipment off-site for treatment and disposal.
- Tie-in of the added piping, instruments, and ancillary equipment into existing facility equipment and systems, including modification of the RO Reject Truck Loading Station as needed to support loading.

Piping, valve, and other details were provided in the approved permit modification as well as in subsequent permit modifications that were submitted and approved:

- Item No. 689

  STARTUP CHANGE REQUEST (SCR-1546) - FOLLOW UP TO SCR 1461 (SCWO BYPASS) TO REVISE SDD, VALVE LIST AND LINE LIST

  Minor modifications in support of the approved permit mod for SCR-1461 SCWO Bypass have been performed. P&IDs are marked up to correct valve type, add line breaks between inside and outside the SCWO, show chain actuator on valves, and reverse the sequence of the drain and vent valves.

  In addition, pump impellers are upgraded in MP-HSS-0107A/B, MP-HSS-0108A/B and MP-HSS-0208A/B.

  Drawings Impacted

  24915-07-M6-OTM-00008, 24915-10-M6-RO-00012, 24915-10-M6-SCWO-00055, 24915-11-M6-HSS-00002, 24915-11-M6-HSS-00005, 24915-11-M6-HSS-00008

  Approved by KDEP: 04/11/2019

[1] With or without co-mingled Spent Decontamination Solution.

- Item No. 700

  STARTUP CHANGE REQUEST (SCR-1689) - ADDITION OF ISOLATION VALVE FOR SWCO BYPASS VENT LINE

  Valve added to prevent SCWO Bypass vent gas from tanker truck filling (SCR-1461 modifications) from feeding into the AFS tanks, as the vent line is shared. The manual valve will provide isolation when the bypass is venting and the AFS tanks are offline. The valve is located in the SPB on line 10-EH-1086-4”-AD-, downstream of the branch from tank MT-AFS-1012.

  Drawings Impacted

  24915-10-M6-AFS-00003

  Approved: 04/11/2019

- Item No. 957

  STARTUP CHANGE REQUEST (SCR-1545) - THIS IS A WORK AUTHORIZED CHANGE - ELECTRICAL AND INSTRUMENTATION DESIGN TO SUPPORT SCWO BYPASS

  Modifications in support of the approved permit mod for SCR-1461 SCWO Bypass involving design and installation details for additional electrical conduit and lines and instrumentation required for operation. As noted in the approved permit mod for SCR-1461, use of the SCWO Bypass for hydrolysate will require submission and approval of additional permit modifications.

  Drawings Impacted:

  24915-10-M6-SCWO-00055

  Approved: 11/08/2019

- Item No. 1114

  AS-BUILT - SCWO PROCESSING BUILDING MPT CONDENSATE DISTRIBUTION IN SCWO P&ID

  Document issued for As-Built. Incorporates SCR-00451 (Item #262 submitted on 4 October 2018), SCR-01309 (Item #708 submitted on 4 April 2019), SCR-02004 (Item to be submitted at next quarterly submittal), SCR-01461 (Item #158 submitted on 29 August 2018 and approved on 11 October 2018), SCR-01545 (Item #957 submitted on 31 October 2019), SCR-01796 (Item #972 submitted on 31 October 2019), SDR-00624 (Item #387 submitted on 4 October 2018), and SDR-00824 (Item #399 submitted on 4 October 2018).

  Approved: 02/20/2020

- Item No. 1160

  STARTUP CHANGE REQUEST (SCR-1938) - SCWO-ADDITION OF HEAT TRACE AND INSULATION TO AGENT HYDROLYSATE BYPASS LINE

  Heat tracing and insulation will be added to the agent hydrolysate bypass line in the SPB. This corrects an oversight of addition of these lines added by the previously submitted permit modification SCR-01461 Supercritical Water Oxidation (SCWO) Line Additions - SCWO Bypass.

  Drawings Impacted:

24915-10-M6-RO-00012 24915-11-M6-HSS-00005

Approved: 04/24/2020

These modifications have been field implemented and have been successfully used for shipment of OTM condensate in accordance with Part B permit condition A.III.A.(6)(b). Consequently, no physical changes to the BGCAPP facility are necessary to support offsite shipment of agent hydrolysate. Transfer of GB agent hydrolysate will occur through the existing agent hydrolysate line from HSS tanks MT-HSS-0105 or MT-HSS-0205 to the SPB. At the SPB, the agent hydrolysate line is manifolded to two common transfer lines, added as part of the approved SCWO bypass PMRs, that lead to the RO Reject Truck Loading Station. Transfer of VX agent hydrolysate from HSS tank MT-HSS-0104 will be performed the same way, through the existing agent hydrolysate line from the HSS tank to the SPB and then through the common transfer lines to the RO Reject Truck Loading Station. Prior to offsite shipment, each batch of GB agent hydrolysate and VX agent hydrolysate will be sampled and analyzed to ensure that these meet both DRE requirements and USAPHC WCLs, as described in the WAP (see Section 3.3). Note that agent hydrolysate will also potentially contain Spent Decontamination Solution (SDS) that has been cleared to permit required limits and transferred outside of the MDB to the HSS agent hydrolysate tanks.

OTM condensate will also continue to be transferred from the MDB to energetics hydrolysate tanks MT-HSS-0604 and MT-HSS-0704, where it will be stored prior to shipment offsite. Permit modification Item No. 158 provided pathways for tanker loading of OTM condensate meeting permit requirements for offsite shipment. The current permitted pathways include transfer from the HSS tanks through the energetics hydrolysate line to the SPB where the energetics line is manifolded to the common lines that will also carry agent hydrolysate to the RO Reject Truck Loading Station. This could result in potential co-mingling of OTM condensate with agent hydrolysate. To prevent this from occurring, an additional line and ancillary equipment will be added that ensures segregation of OTM condensate and agent hydrolysate during tanker loading:

- New piping will be adding connecting line EH-1020-2”-AD- from the HSS tanks to line MPTC-1053-2”-AD-ET. Line MPTC-1053-2”-AD-PP will then carry OTM condensate the remaining way to the RO Reject Truck Loading Station.
- Line MPTC-1053-2”-AD-ET will be air gapped to prevent OTM condensate transfer to the SCWO Blend Tanks or the Aluminum Precipitation Reactors.
- Valve V8342 installed on line EH-1020-2”-AD- will be normally closed to isolate OTM condensate from the downstream manifold of the energetics hydrolysate and agent hydrolysate lines (see PMR Item No. 158 markup drawings).

Appendix A contains a markup of the impacted permit drawing, 24915-10-M6-SCWO-00055. A professional engineer stamped version will be provided as-built in a future PMR.

Prior to shipment of any agent hydrolysate and installation of the additional line and ancillary equipment listed above, OTM condensate will continue to be transferred from the HSS tanks through the energetics hydrolysate line to the SPB and to the common manifolded energetics hydrolysate and agent hydrolysate common lines that lead to the RO Reject Truck Loading Station. This option is necessary to support shipment of any OTM condensate that is potentially generated before field changes are completed, such as during testing of the thermal oxidizers in support of agent changeover and maintenance activities.

Prior to agent hydrolysate transfer over the manifolded energetics hydrolysate and agent hydrolysate common lines from the SPB to the RO Reject Truck Loading Station, the lines will be flushed with process water to remove residual OTM condensate. As this flushing will be similar to that which occurred during agent changeover and will occur during closure, OTM condensate waste codes will not be applied to agent hydrolysate that is transferred through the common lines to RO Reject Truck Loading Station after this flush.

As a result of discontinuance of SCWO development efforts for treatment of agent hydrolysate, the following SCWO permitted tanks will not be used for waste storage and will remain in inactive status (operating status code CN, Constructed, Not Yet Managing Hazardous Waste):

- Aluminum Precipitation Reactors MV-APS-0101 and MV-APS-0102
- Off-Spec Effluent Tank MT-SCWO-0041
- Emergency Relief Tank MT-SCWO-0040
- Hydrolysate Blend Tanks MT-SCWO-0030 and MT-SCWO-0031
- Batch Hydrolysate Holding Tank MT-SCWO-0032
- Aluminum Filtration Feed Tanks MT-AFS-1010 and MT-AFS-2010
- Aluminum Filtrate Tank MT-AFS-1012
- RO Reject Tanks MT-RO-0106 and MT-RO-0206
- SCWO Effluent Tanks MT-SCWO-0101, MT-SCWO-0201, and MT-SCWO-0301
- RO Permeate Tanks MT-SWS-0101 and MT-SWS-0201.

Consistent with PMR Item 1200 (MAIN PLANT REVISED INTERLOCK TESTING SUSPENSION AND MINICAMS MONITORING CHANGES FOR INACTIVE SYSTEMS) approved by KDEP, interlock testing will not be performed for these inactive systems.

3.4.3 Miscellaneous Units

As a result of discontinuance of SCWO development efforts for treatment of agent hydrolysate, the following SCWO permitted miscellaneous units will not be used for waste treatment and will remain in inactive status (operating status code CN, Constructed, Not Yet Managing Hazardous Waste):

- Aluminum Filtration Units ML-AFS-1040 and ML-AFS-2040
- RO Units ML-RO-0101, ML-RO-0201, and ML-RO-0301
- SCWO Reactors MV-SCWO1030, MV-SCWO-2030, and MV-SCWO3030.

Consistent with PMR Item 1200 (MAIN PLANT REVISED INTERLOCK TESTING SUSPENSION AND MINICAMS MONITORING CHANGES FOR INACTIVE SYSTEMS) approved by KDEP, interlock testing will not be performed for these inactive systems.

3.5 Part F Supplemental Information

No updates to Part F, Procedures to Prevent Hazards, are required to address off-site shipment of agent hydrolysate.

3.6 Part G Supplemental Information

No updates to Part G, Contingency Plan and Emergency Procedures, are required to address off-site shipment of agent hydrolysate.

3.7 Part H Supplemental Information

No updates to Part H, Personnel Training, are required to address off-site shipment of agent hydrolysate.

3.8 Part I Supplemental Information

No updates to Part I, Closure Plan, are required to address off-site shipment of agent hydrolysate. However, Section 3.4.2 provides additional information related to flushing and decontamination of agent hydrolysate and OTM condensate common transfer lines between transfer of waste streams.

3.9 Part J Supplemental Information

No updates to Part J, Other Federal Laws, are required to address off-site shipment of agent hydrolysate.

3.10 Part K Supplemental Information

No updates to Part K, Waste Minimization, are required to address off-site shipment of agent hydrolysate.

3.11 Part L Supplemental Information

No updates to Part L, Subpart AA, Subpart BB, and Subpart CC (Organic Air Emissions), are required to address off-site shipment of agent hydrolysate.

Appendix A Permit Related Information or Documents Affected by PMR

Regulatory Citation(s) 401 KAR 39 (incorporating 40 CFR Part 264 where applicable)	Description of Requirement	Modified or Clarified Information		
		Yes	No	Sections of the Part B Permit Modified or Supplemental Information Required
39:090 Sec. 1 (264 Subpart B)	**General Facility Standards**			
39:090 Sec. 1 (§264.11)	Identification number		✓	No change
39:090 Sec. 1 (§264.12)	Required notices		✓	No Change
39:090 Sec. 1 (§264.13)	General waste analysis		✓	No change
39:090 Sec. 1 (§264.14)	Security		✓	No change
39:090 Sec. 1 (§264.15)	General inspection requirements		✓	No change
39:090 Sec. 1 (§264.16)	Personnel training		✓	No change
39:090 Sec. 1 (§264.17)	General requirements for ignitable, reactive, or incompatible wastes		✓	No change
39:090 Sec. 1	Location standards Geological Information		✓	No change
39:090 Sec. 1 (§264.19)	Construction quality assurance program		✓	No change
39:090 Sec. 1 (264 Subpart C)	**Preparedness and Prevention**			
39:090 Sec. 1 (§264.31)	Design and operation of facility		✓	No change
39:090 Sec. 1 (§264.32)	Required equipment		✓	No change
39:090 Sec. 1 (§264.33)	Testing and maintenance of equipment		✓	No change
39:090 Sec. 1 (§264.34)	Access to communication or alarm system		✓	No change
39:090 Sec. 1 (§264.35)	Required aisle space		✓	No change
39:090 Sec. 1 (§264.37)	Arrangements with local authorities		✓	No change
39:090 Sec. 1 (264 Subpart D)	**Contingency Plan and Emergency Procedures**			
39:090 Sec. 1 (§264.51)	Purpose and implementation of contingency plan		✓	No change
39:090 Sec. 1 (§264.52)	Content of contingency plan		✓	No Change
39:090 Sec. 1 (§264.53)	Copies of contingency plan		✓	No change
39:090 Sec. 1 (§264.54)	Amendment of contingency plan		✓	No change
39:090 Sec. 1 (§264.55)	Emergency coordinator		✓	No change
39:090 Sec. 1 (§264.56)	Emergency procedures		✓	No change
39:090 Sec. 1 (264 Subpart E)	**Manifest System, Recordkeeping, and Reporting**			
39:090 Sec. 1 (§264.71)	Use of the manifest system		✓	No change
39:090 Sec. 1 (§264.72)	Manifest discrepancies		✓	No change
39:090 Sec. 1 (§264.73)	Operating record		✓	No change

Regulatory Citation(s) 401 KAR 39 (incorporating 40 CFR Part 264 where applicable)	Description of Requirement	Modified or Clarified Information		
		Yes	No	Sections of the Part B Permit Modified or Supplemental Information Required
39:090 Sec. 1 (§264.74)	Availability, retention, and disposition of records		✓	No change
39:090 Sec. 1	Annual report		✓	No change
39:090 Sec. 1 (§264.76)	Unmanifested waste report		✓	No change
39:090 Sec. 1	Additional reports		✓	No change
39:090 Sec. 1 (264 Subpart F)	**Releases from Solid Waste Management Units**			
39:090 Sec. 1 (§264.91)	Required programs		✓	No change
39:090 Sec. 1 (§264.92)	Ground-water protection standard		✓	No change
39:090 Sec. 1 (§264.93)	Hazardous constituents		✓	No change
39:090 Sec. 1	Concentration limits		✓	No change
39:090 Sec. 1 (§264.95)	Point of compliance		✓	No change
39:090 Sec. 1 (§264.96)	Compliance period		✓	No change
39:090 Sec. 1 and §264.97	General ground-water monitoring requirements		✓	No change
39:090 Sec. 1 (§264.98)	Detection monitoring program		✓	No change
39:090 Sec. 1 (§264.99)	Compliance monitoring program		✓	No change
39:090 Sec. 1 (§264.100)	Corrective action program		✓	No change
39:090 Sec. 1	Releases from solid waste management units - corrective action for solid waste management units		✓	No change
39:090 Sec. 1	Incorporation by reference - groundwater analysis and report forms		✓	No change
39:090 Sec. 1 (264 Subpart G)	**Closure and Post-Closure**			
39:090 Sec. 1 (§264.111)	Closure performance standard	✓		Additional line flush details provided in Part D.
39:090 Sec. 1 and §264.112	Written plan, content of plan, amendment of plan, notification of partial closure and final closure, removal of wastes and decontamination or dismantling of equipment		✓	No change
39:090 Sec. 1 and §264.113	Time allowed for closure		✓	No change
39:090 Sec. 1 (§264.114)	Disposal or decontamination of equipment, structures, and soils		✓	No change
39:090 Sec. 1 (§264.115)	Certification of closure		✓	No change
39:090 Sec. 1 (§264.116)	Survey plat		✓	No change
39:090 Sec. 1 and §264.117	Post-closure care and use of property		✓	No change
39:090 Sec. 1 and §264.118	Post-closure plan and amendment of plan		✓	No change
39:090 Sec. 1 (§264.119)	Post-closure notices		✓	No change

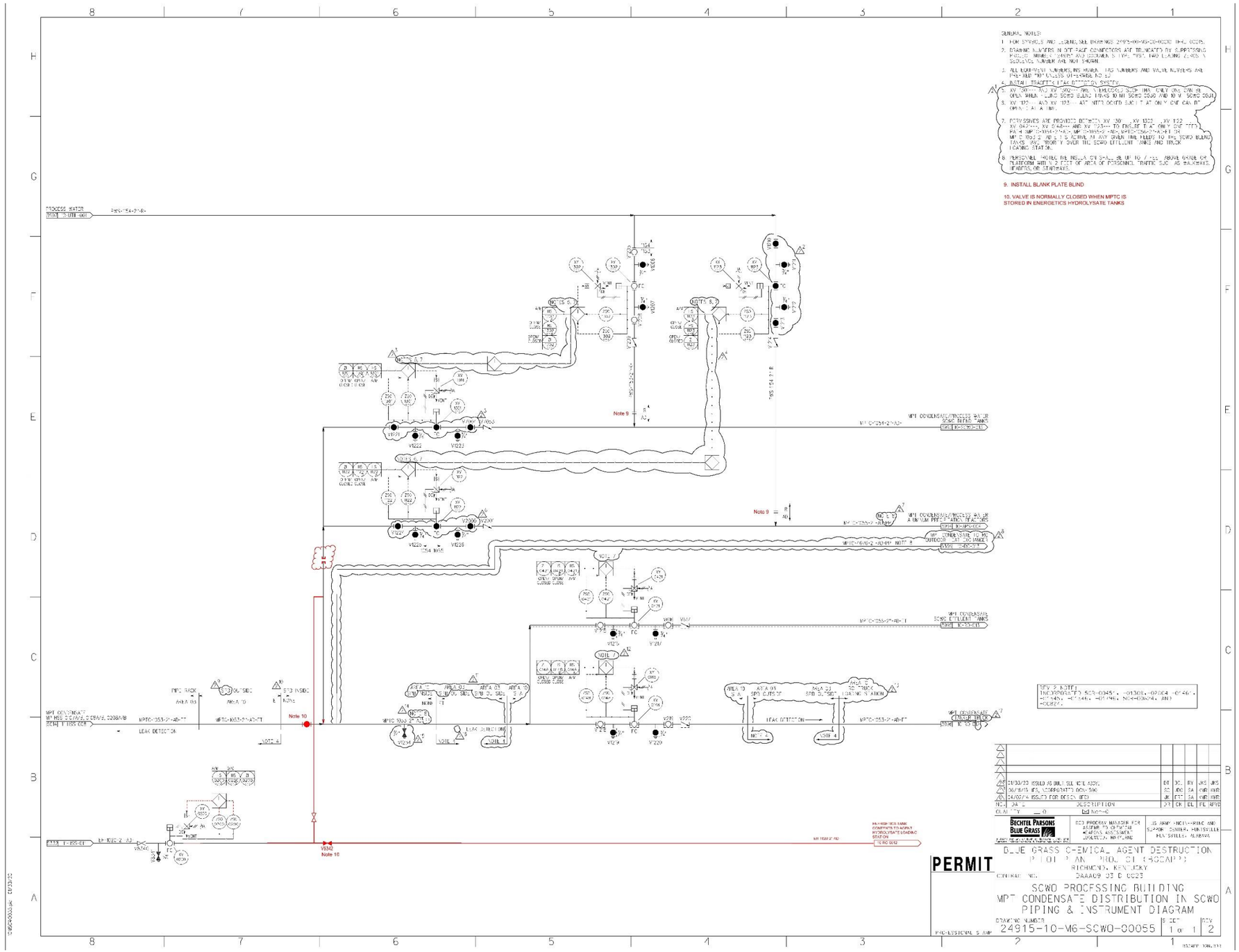
Regulatory Citation(s) 401 KAR 39 (incorporating 40 CFR Part 264 where applicable)	Description of Requirement	Modified or Clarified Information		
		Yes	No	Sections of the Part B Permit Modified or Supplemental Information Required
39:090 Sec. 1 (§264.120)	Certification of completion of post-closure care		✓	No change
39:090 Sec. 1 (264 Subpart H)	**Financial Requirements**		✓	Not applicable
39:090 Sec. 1 (264 Subpart I)	**Use and Management of Containers**			
39:090 Sec. 1 (§264.171)	Condition of containers		✓	No change
39:090 Sec. 1 (§264.172)	Compatibility of waste with containers		✓	No change
39:090 Sec. 1 (§264.173)	Management of containers	✓		Part D - WTS
39:090 Sec. 1 (§264.174)	Inspections		✓	No change
39:090 Sec. 1 (§264.175)	Containment		✓	No change
39:090 Sec. 1 (§264.176)	Special requirements for ignitable or reactive waste		✓	No change
39:090 Sec. 1 (§264.177)	Special requirements for incompatible wastes		✓	No change
39:090 Sec. 1 (§264.178)	Closure		✓	No change
39:090 Sec. 1 (§264.179)	Air emission standards		✓	No change
39:090 Sec. 1 (264 Subpart J)	**Tank Systems**			
39:090 Sec. 1 (§264.191)	Assessment of existing tank system's integrity		✓	No change
39:090 Sec. 1 (§264.192)	Design and installation of new tank systems or components		✓	No change
39:090 Sec. 1 (§264.193)	Containment and detection of releases		✓	No change
39:090 Sec. 1 (§264.194)	General operating requirements	✓		Parts B, C, and D
39:090 Sec. 1 (§264.195)	Inspections		✓	No change
39:090 Sec. 1 (§264.196)	Response to leaks or spills and disposition of leaking or unfit-for-use tank systems		✓	No change
39:090 Sec. 1 (§264.197)	Closure and post-closure care		✓	No change
39:090 Sec. 1 (§264.198)	Special requirements for ignitable or reactive wastes		✓	No change
39:090 Sec. 1 (§264.199)	Special requirements for incompatible wastes		✓	No change
39:090 Sec. 1 (§264.200)	Air emissions standards		✓	No change
39:090 Sec. 1	Effective dates		✓	No change
39:090 Sec. 1 (264 Subpart X)	**Miscellaneous Units**			
39:090 Sec. 1 (§264.601)	Environmental performance standards		✓	No change
39:090 Sec. 1 (§264.602)	Monitoring, analysis, inspection, response, reporting, and corrective action		✓	No change
39:090 Sec. 1 (§264.603)	Post-closure care		✓	No change
39:090 Sec. 6	**Treatment of Nerve and Blister Agents**		✓	No change

Regulatory Citation(s) 401 KAR 39 (incorporating 40 CFR Part 264 where applicable)	Description of Requirement	Modified or Clarified Information		
		Yes	No	Sections of the Part B Permit Modified or Supplemental Information Required
Appendices				
39:090 Sec. 1 (264 Appendix I)	Recordkeeping instructions		✓	No change
39:090 Sec. 1 (264 Appendix IV)	Cochran's approximation to the Behrens-Fisher Students' T-Test		✓	No change
39:090 Sec. 1 (264 Appendix V)	Examples of potentially incompatible waste		✓	No change
39:090 Sec. 1 (264 Appendix IX)	List of hazardous constituents for groundwater monitoring		✓	No change

1

Regulatory Citation(s) 401 KAR 39 (incorporating 40 CFR Part 270 where applicable)	Description of Requirement	Modified or Clarified Information		
		Yes	No	Sections of the Part B Permit Modified or Supplemental Information Required
39:060 Sec. 5 (270 Subpart A)	**General Information**			
39:060 Sec. 5	Considerations under Federal law		✓	No change
39:060 Sec. 5 (§270.4)	Effect of a permit		✓	No change
39:060 Sec. 5	Prohibition of use of unpermitted facility		✓	No change
39:060 Sec. 5 (§270.5)	Noncompliance and program reporting by the cabinet		✓	No change
39:060 Sec. 5 (270 Subpart C)	**Permit Conditions**			
39:060 Sec. 5 and §270.30	Conditions applicable to all permits		✓	No change
39:060 Sec. 5 (§270.31)	Requirements for recording and reporting of monitoring results		✓	No change
39:060 Sec. 5 and §270.32	Establishing permit conditions	✓		Appendix B
39:060 Sec. 5 (§270.33)	Schedules of compliance		✓	No change
39:060 Sec. 5	**Contents of Part A of the Permit Application (Form 7058A)**		✓	No change
39:060 Sec. 5	**General Contents of Part B Application**			
39:060 Sec. 5 (§270.14(a))	Contents of Part B: General requirements Certified documents	✓		Parts B, C, and D
39:060 Sec. 5 and §270.14	General information requirements General description Topographic map Seismic considerations Subsurface geology and Karst features Groundwater monitoring Floodplain requirements Traffic information Alternative analysis plan Past compliance record Financial responsibility to construct and operate	✓		Part B Traffic Information
39:060 Sec. 5 (§270.14(b) (11))	Location information		✓	No change
39:060 Sec. 5 (§270.14(c))	Additional groundwater protection information requirements		✓	No change
39:060 Sec. 5 (§270.14(d))	Information requirements for solid waste management units		✓	No change
39:060 Sec. 5 (§270.15)	**Specific Part B information requirements for containers**	✓		Part D - WTS
39:060 Sec. 5 (§270.16)	**Specific Part B information requirements for tanks** Number, location, and types of tanks Tank dimensions and capacity		✓	No change

	Procedures for handling incompatible, ignitable, or reactive wastes Material of construction, volume, dimensions and all design details Type of waste contained in tanks Operating pressure and temperature Description of the feed systems, safety cutoff, bypasses systems, and pressure controls Diagrams of piping, instrumentation and process flow for each tank system			
39:060 Sec. 5 (§270.23)	Description Treatment unit design/construction details Site assessments Potential exposure pathways Effectiveness of treatment		✓	No changes


GENERAL NOTES:
9. INSTALL BLANK PLATE BLIND
10. VALVE IS NORMALLY CLOSED WHEN MPTC IS STORED IN ENERGETICS HYDROLYSATE TANKS
PROCESS WATER
Note 9
Note 10
LEAK DETECTION
PERMIT
BLUE GRASS CHEMICAL AGENT DESTRUCTION PILOT PLANT (BGCAPP)
RICHMOND, KENTUCKY
SCWO PROCESSING BUILDING
MPT CONDENSATE DISTRIBUTION IN SCWO
PIPING & INSTRUMENT DIAGRAM
24915-10-M6-SCWO-00055

Appendix B Proposed Permit Modifications

~~A.III.A.(11) SCWO Effluent~~

~~During the Permit Compliance Testing for SCWO, SCWO effluent shall be tested for agent and the quantitative results shall be provided to the Hazardous Waste Branch Manager. SCWO effluent shall be tested for total organic carbon and cleared to 50 ppm prior to SCWO effluent or RO reject being shipped off-site.~~

~~*[KRS 224.46-530(1)(g), KRS 224.50-130(3)]*~~

A.III.A.(14) Reporting Requirements

The Permittee shall submit quarterly reports to the Hazardous Waste Branch, no later than 30 days after the end of each calendar quarter, that document the treatment activities for that calendar quarter. The report shall include:

a. Type and number of munitions processed
b. Quantity of agent processed
c. Quantity of agent hydrolysate generated
d. Documentation for each batch of agent hydrolysate that was rejected
e. Quantity of energetics hydrolysate generated
f. Documentation for each batch of energetics hydrolysate that was rejected
g. Date, time and concentration of any confirmed agent detection at the MDB stack
h. Quantity of agent hydrolysate ~~processed by SCWO~~ shipped offsite for treatment and disposal
~~i. Quantity of energetics hydrolysate processed by SCWO~~
~~j. Documentation of any off spec SCWO effluent~~
i. Type and quantity of wastes shipped to TSD facilities
j. Details of off normal conditions (as described in the Pilot Test Demonstration Plan "off normal" table) experienced and corrective measures taken

[KRS 224.50-130(3), KRS 224.46-530(1)(g), 401 KAR 39:060 Section 5]

A.III.A.(15) Limitations of Permit

This Permit is for storage and treatment of chemical warfare agents. Agent hydrolysate ~~and energetics hydrolysate shall be treated by supercritical water oxidation, except that energetics hydrolysate that is generated during the rocket leaker campaign and is at or below the compliance limit~~ may be shipped off-site for treatment and disposal. H-Mustard secondary waste, as specified in condition A.III.A.(1), generated at the EDT facility may also be stored at the Waste Transfer Station.

[KRS 224.50-130(3), 401 KAR 39:060 Section 5]

A.III.B.(9)(d) Restrict Shipment

The Permittee shall determine if any hazardous waste generated needs to be treated before it can be land disposed. The Permittee shall provide certification with each hazardous waste shipment that the waste meets land disposal requirements or a written notice that the waste does not meet the treatment standard.

Chemical related hazardous waste shipped off-site for treatment or disposal shall comply with the Waste Analysis Plan, Attachment C of the permit application.

Off-site shipments of secondary waste with headspace monitoring resulting in greater than 1 Vapor Screening Level (VSL), shall be disposed of at an appropriately permitted TSDF with direct feed to the receiving facility's treatment unit.

The Permittee shall adhere to the requirements of the Bounding Transportation Risk Assessment as well as the DA Memorandum (Requirements for Implementation of the US Army Chemical Materials Agency Bounding Transportation Risk Analysis for Shipment of Greater Than 1 Vapor Screening Level Chemical Agent Contaminated Secondary Waste) dated 15 September 2008; however, for greater than 0.5 IDLH shipments, the Permittee shall notify the Division and request and obtain approval from the Division prior to shipment.

The Permittee shall only ship agent hydrolysate offsite for treatment and disposal if it meets DRE requirements and USAPHC waste control limits.

[401 KAR 39:060 Section 4 (40 CFR 268 Subpart C), KRS 224.46-530, KRS 224.50-130]

APPENDIX A. Compliance Schedule

~~5. Submit to the Division, **System Shakedown Pre-Operational Assessment for Supercritical Water Oxidation Units.**~~

~~a. Submit report of SCWO Pre-Operational Assessment as a supplement to the SCWO Shakedown Report~~

~~b. Submit prior to the receipt of agent hydrolysate at the SPB~~

Appendix C Waste Analysis Plan

See Volume 2.