Department of Energy
Washington, DC 20585

October 18, 2010

The Honorable Peter S. Winokur
Defense Nuclear Facilities Safety Board
625 Indiana Avenue, N.W., Suite 700
Washington, DC 20004-2901

Dear Mr. Chairman:

This is in response to your August 5, 2010, letter requesting that the Department of Energy (DOE) provide a briefing and report outlining the activities the DOE plans to take to address the deficiencies identified by the Defense Nuclear Facilities Safety Board (Board) staff during their visit to the Hanford Tank Farms in May 2010.

As a result of the review by the Board staff, a number of actions have been taken or are planned as follows:

(1) The Tank Farms Documented Safety Analysis and associated technical basis will be revised by January 7, 2011, to identify passive ventilation in double-shell tanks (DST) at the safety-significant level. This will include a test program to quantify the passive ventilation flow rates in the DSTs to validate the operational history that shows passive ventilation is sufficient to prevent the accumulation of flammable gases to hazardous levels. In addition, flammable gas monitoring will continue to be required to directly measure the flammable gas concentration and, in the event the concentration exceeds 25 percent of the lower flammability limit, initiate actions to reduce the concentration and/or eliminate potential ignition sources.

(2) The procedures implementing flammable gas controls will be revised to add more relevant details. For example, the requirement to perform a functional test of the tubing used to gather the sample has been added to the operating procedure. Previously this detail was included as part of the training on specific measuring devices. Similarly, the required minimum oxygen level to obtain a valid reading was added to the procedure (a requirement to measure the oxygen level was already included, but the minimum level of oxygen was not specified). A calibration frequency consistent with manufacturer's recommendations has also been specified.

(3) Additional assessments will be performed on the adequacy of Specific Administrative Control (SAC) implementation. Washington River Protection Solutions, LLC is currently performing an assessment of all SACs. An assessment will also be performed by Environmental Management Office of Safety and Security Program staff and is scheduled to begin in December 2010.

(4) Each tank farm will be surveyed for out-of-date or inadequate labels and signage. Labels and signs will be corrected or removed as appropriate to avoid confusion.

(5) The Quality Assurance documentation on the software used to support the waste compatibility assessment will be upgraded to be commensurate with the SAC it supports.

Completion of these planned improvements will enhance the reliability and improve the implementation of Technical Safety Requirement controls at Tank Farms. Passive preventative engineered controls will be used to maximize reliability. Also, the layer of protection provided through flammable gas monitoring and the required response when gas concentrations reach 25 percent of the lower flammability limit will be improved by the increased rigor of implementation of flammable gas monitoring.

The enclosure to this letter provides the context and a brief basis for the activities outlined above. A briefing for you has been requested to discuss these items in greater depth.

DOE appreciates the efforts taken by your staff to improve the safety analyses and controls at the Hanford Tank Farms, and will continue to work to maintain open lines of communication between DOE, the Tank Operations Contractor, and the Board staff.

If you have any further questions, please contact me or Dr. Steven L. Krahn, Deputy Assistant Secretary for Safety and Security Program at (202) 586-5151.

Sincerely,

Inés R. Triay

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Assistant Secretary for
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Enclosure

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SEPARATION

PAGE

Areas for Improvement

The areas for improvement identified by the review are grouped into three categories as follows: 1) selection and classification of controls; 2) specific administrative control (SAC) implementation; and 3) historic issues. A discussion is provided below to provide a context for selected improvements.

1.0 Selection and Classification of Controls

There are two major accidents associated with the concerns identified by the Defense Nuclear Facility Safety Board (Board) staff: 1) waste transfer events; and 2) flammable gas deflagrations in waste tanks. These design basis accidents are addressed in the tank farm Documented Safety Analysis (DSA) by selection of a set of controls consisting of safety-significant, defense-in-depth, design features, and safety management programs. The accidents are described below to provide a perspective on the selection and classification of controls.

1.1 Waste Transfer Events

For all waste transfer events where controls are required based on the consequence analysis, the pressure boundary components are credited in the current DSA at the safety significant level to passively prevent a release. The pressure boundary components consist of the following passive design features: Primary Piping Systems, Hose-in-Hose Transfer Line, and Isolation Valves for Double Valve Isolation. To support the Isolation Valves for Double Valve Isolation, a SAC, Double Valve Isolation, is selected to ensure that two qualified valves are closed to isolate the pressure boundary. The previous DSA revision allocated an active mitigative control scheme that detected the leak and shut down the waste transfer pump.

Although most of the piping was not installed as safety-significant, all waste transfer piping was installed to national consensus codes, American Society of Mechanical Engineers (ASME) B31.1, *Power Piping*, or B31.3, *Process Piping*, as applicable at the time of installation. As part of the DSA implementation, waste transfer piping is credited as safety-significant. Instead of requiring a search for past documentation for existing "grandfathered" systems, an Independent Qualified Registered Professional Engineer (IQRPE) review of the qualification of the piping is used to provide documentation to support qualification of the piping. The IQRPE reports used for the grandfathered piping lists the applicable codes (either B31.1 or B31.3) used in the design of each piping system. Thus the grandfathered piping system is compliant with the code of record. An IQRPE review is required by the state of Washington, *Washington Administrative Code* 173.

For new piping systems (non-grandfathered) the qualification documentation provides evidence of ASME code compliance. The ASME piping codes are for design and are not intended to apply to the operation, examination, inspection, testing, maintenance, or repair of piping that has been placed in service. For grandfathered and new piping, a periodic IQRPE review has been established as an in-service inspection requirement to verify continued qualification of the piping.

The controls in the current DSA better match the hierarchy of controls recommended by DOE-STD-3009-94, CN 3 by crediting passive engineered features that are effective for spray leaks and potential flammable gas deflagrations in transfer structures that could result from a waste leak event. The previous DSA allocated an active mitigative control scheme that detected the leak and shut down the waste transfer pump. While the previous mitigative strategy was effective for minimizing exposures to the offsite public and onsite co-located worker, it was less effective for the facility worker. The determination of major contributors to defense in depth for the waste transfer events is discussed below in Section 1.3.1.

1.2 Flammable Gas Deflagrations in Double-Shell Tanks and Single-Shell Tanks

Flammable gas deflagrations can result from a steady state release of flammable gas or from a spontaneous or induced gas release event.

1.2.1 Steady State Gas Accumulation

For the double-shell tanks (DST) and single-shell tanks (SST) the flammable gas deflagration is prevented by controlling the concentration of flammable gas in the tank headspace (preferred) and/or by providing ignition controls in the tank headspace.

Analysis has been performed to determine the flammable gas generation rate for each tank and to evaluate the potential for reaching the lower flammability limit (LFL) in the tank. For all but two SSTs and seven DSTs, barometric breathing (i.e., the exchange of air caused by changes in the barometric pressure) is adequate to maintain the flammable gas concentration below the LFL.

For the two SSTs where barometric breathing is not shown to be adequate, the DSA clearly identifies the primary control is to provide passive ventilation[1] (DSA Section 4.5.2 and Technical Safety Requirements [TSR] Section 3.3). Also, to provide an additional level of control for these two tanks, flammable gas monitoring and a required response when gas concentrations reach 25 percent of the LFL are required.

For the DSTs, the DSA is not as clear. The intent of the DSA was to identify that the flammable gas concentration was maintained below the LFL through passive ventilation, as stated in DSA Section 3.3.2.4.1.4.1. However, it has been correctly

[1] In this discussion the terms barometric breathing and passive ventilation are not interchangeable. Passive ventilation refers to natural breathing beyond, and including, barometric breathing.

pointed out that the passive ventilation system is not identified as the selected control in the DSA. Therefore, the Department of Energy Office of River Protection (ORP) intends to revise the DSA to clearly identify passive ventilation for the DSTs as the primary control. The current analysis for time to LFL uses conservative parameters in the calculations (e.g., the highest measured temperature over the last year plus a margin of 9° F [5° C]). These conservative theoretical analyses identify that the required passive ventilation flow rate to maintain the flammable gas concentration to less than the LFL is less than one cubic foot per minute (CFM). Past tracer gas testing on SSTs recorded passive ventilation flow rates between one CFM and 25 CFM. Additionally, for the AY and AZ DST Farms, there have been two instances where the active ventilation was inoperable for extended periods. Although the theoretical analyses predicted the accumulation of hazardous levels of flammable gas in as little as 45 days with no ventilation, actual measurements during this period when active ventilation was inoperable showed that the flammable gas concentrations remained below 25% of the LFL (peaking at 15% of the LFL). The passive ventilation rate for these two farms (these are the DSTs with the least time to LFL), was calculated based on the measured temperature, waste level, and flammable gas concentration during these outages. These calculated passive ventilation flow rates were about an order of magnitude higher than the flow rate required to maintain the flammable gas concentration less than the LFL. The adequacy of the DST passive ventilation flow rate will be demonstrated through a planned improvement to perform tracer gas testing of the DSTs. The test plan for performing the tracer gas tests will be issued by
November 15, 2010.

1.2.2 Gas Release Events--Spontaneous and Induced

SSTs and DSTs are classified according to the quantity of retained gas and the potential for a spontaneous or induced gas release event:

- Waste Group A tanks have sufficient retained gas that if all of the retained gas is released instantaneously, the flammable gas concentration in the tank headspace could reach or exceed 100% of the LFL. Due to the physical properties of the waste, Waste Group A tanks have a potential for a buoyant displacement gas release event (BDGRE). Hence, the Waste Group A tanks are susceptible to both spontaneous and induced gas release events.

- Waste Group B tanks have sufficient retained gas that if all of the retained gas is released instantaneously, the flammable gas concentration in the tank headspace could reach or exceed 100 % of the LFL. Due to the physical properties of the waste, Waste Group B tanks do not have the potential for a BDGRE and are only susceptible to induced gas release events.

- Waste Group C tanks do not have sufficient retained gas to reach 100 % of the LFL in the tank headspace even if all of the retained gas is released instantaneously.

1.2.2.1 Waste Group A Tanks (Currently Five DSTs)

Although Waste Group A tanks theoretically contain more than enough gas to exceed the LFL if it were all to be released instantaineously, operating experience with the current Group A tanks indicate a spontaneous gas release event will not reach 100 % of the LFL as identified in Section 3.3.4.1.4.2.2 of the DSA. A major contributor to defense in depth (TSR control) is established to require all equipment in the headspace and connected spaced directly above the headspace of the Waste Group A tanks to meet ignition controls (i.e., evaluated to not provide an ignition source) thus preventing a deflagration even if a large quantity of gas were spontaneously released. For steady state gas accumulation, as discussed above, the DSA will be updated to credit passive ventilation.

Furthermore, there are no authorized activities in a Waste Group A tank that could induce a gas release event (e.g., large water additions or waste transfers are not currently allowed in Waste Group A tanks). Future retrieval or waste feed delivery activities in Waste Group A tanks will require further analysis and the formulation of a control strategy, which would be approved through ORP's formal proposed DSA revision process.

1.2.2.2 Waste Group B Tanks (Currently 12 DSTs)

The only authorized activities in Waste Group B tanks are water, chemical, waste additions into and waste transfers out of the tanks. For water, chemical, or waste additions, there are two existing SACs. One is a SAC requirement to perform an analysis to determine if the induced gas release due to the dissolution of soluble solids in the receiving DST is sufficient to reach 100% of the LFL assuming the flammable gas is instantaneously released and there is zero ventilation. If this analysis indicates that 100% of the LFL can be reached, the second SAC is to require the tank headspace to be at a negative pressure prior to starting the activity and to stop the water, chemical, or waste addition if the tank headspace exceeds 0 psig. The analysis for this accident was performed several years ago and the controls were put in place due to a lack of information on flammable gas release rates. Safety was provided through stopping the water, chemical, or waste addition. No change to the analysis or control was made during the recent DSA upgrade.
DOE-STD-3009, Section 4.5.X.2 states 'Identify SSCs whose failure would result in losing the ability to complete the action required by the SAC.' If the DST ventilation system fails, the actions of the SAC

(i.e., stop the water, chemical or waste addition; monitor flammable gas concentration; and implement ignition controls) can still be completed, therefore, the DST ventilation system was not classified as safety-significant.

The rate of gas release and the required ventilation rate for controlling flammable gas release due to water, chemical, or waste addition has recently been evaluated. The preliminary results of the evaluation identify that the required ventilation flow rate to limit flammable gas concentration below the LFL is less than one CFM. As identified above, passive ventilation in the DSTs is sufficient to prevent the flammable gas concentration from reaching the LFL for these activities.

For waste transfers out of the DST, the flammable gas release mechanism is uncovering solids. There is an SAC to limit the amount of supernatant removed such that the flammable gas concentration will not reach the LFL, assuming instantaneous release and no active or passive ventilation. Therefore, for waste removal, ventilation is not credited.

The analysis demonstrating that passive ventilation is adequate for water, chemical, or waste addition will be issued. The tank farm DSA will be revised to identify passive ventilation as a safety-significant control for water, chemical, or waste additions in Waste Group B tanks. This better matches the hierarchy of controls in identifying a passive engineered feature to prevent the event.

As discussed, this control strategy addresses only the authorized activities in Waste Group B tanks: water, chemical and waste additions into and waste transfers out of the tanks. Future retrieval or waste feed delivery activities in Waste Group B tanks will require further analysis and will likely require a revision of the control strategy.

1.2.2.3 Waste Group C Tanks

Gas release events are not applicable since there is not sufficient retained gas to reach the LFL. However, as mentioned above, the tank farm DSA will be revised to identify the passive ventilation system as a safety-significant control for steady state gas accumulation in these tanks.

1.2.3 Flammable Gas Monitoring

To supplement the planned allocation of passive ventilation to all tanks, the existing SAC for flammable gas monitoring will be maintained for all tanks. This SAC provides a second method to demonstrate the ventilation flow rate (either active ventilation or passive ventilation when the active system is not operating) is adequate to prevent the flammable gas concentration from reaching the LFL.

To provide a margin of safety, action is required when the flammable gas concentration reaches 25% of the LFL. For conditions where active ventilation is not operating, the 25% action level provides adequate early warning to allow time to take action to restore ventilation.

1.2.4 Future Retrieval or Waste Feed Delivery Activities

As additional activities are proposed, they will be evaluated to determine if additional controls are required. Of particular note are mixer pumps. Mixer pumps will be required in some of the DSTs to blend waste prior to delivery to the Waste Treatment and Isolation Plant. This would be a new waste disturbing activity that could result in an induced gas release much faster than is currently plausible and analyzed. Thus, the contractor has defined and will implement the requirements necessary to procure ventilation systems for these tanks at a quality level such that it could be upgraded to safety significant if active ventilation is required.

1.3 Major Contributors to Defense-in-Depth

The determination of major contributors to defense in depth was performed for each accident during the control decision meetings that were held as part of the development of the DSA. DOE-STD-1189, Appendix D was used to provide guidance in the selection of major contributors to defense-in-depth.

1.3.1 Waste Transfer Events

The leak detectors and master pump shutdown were not selected as major contributors to defense in depth in the current DSA. In the previous DSA, there were two events for which leak detectors were credited; large pool leak and a flammable gas deflagration in a waste transfer structure following a waste transfer leak. For the large pool event, the total quantity of material released during the 2-hour event does not challenge any guidelines, nor is it a significant facility worker hazard; therefore no TSR controls are warranted. The previous DSA assumed an 8-hour event which resulted in significantly higher consequences. The 8-hour duration was changed to be consistent with guidance in DOE-STD-3009 where a 2-hour duration is specified unless the release scenario is especially slow to develop. For the flammable gas deflagration in a waste transfer structure to result in an unacceptable consequence, the following must occur: 1) there must be a significant leak (thousands of gallons of waste) into the structure; 2) there must be a buildup of flammable gas in the structure (the structure has multiple openings); 3) there must be an ignition source above the waste level that results in a deflagration; 4) the deflagration must be sufficient to cause fragments from the structure or equipment; and; 5) a worker must be in the vicinity and be impacted by the fragments. In addition to the safety-significant pressure boundary components used to prevent the leak, there are multiple means to detect a significant leak (e.g., leak detectors, material balance, radiation monitors, and detection of chemical vapors). Given the low probability of the event, the safety-significant controls to prevent the event, and the multiple levels of defense in depth to detect the leak, no controls were identified as major contributors to defense-in- depth. Transfer leak detection and response, however, was retained as a defense in depth feature to provide an additional layer of protection.

For a spray event in a pit the piping is below the top of the pit and "as low as reasonably achievable" (ALARA) concerns prevent direct access to the pit during a transfer. Because of this there can be scenarios where there is no detection that a spray has occurred, and leak detection may not provide reliable defense in depth. Requiring the pit covers to be installed will provide defense-in-depth against a fine spray event that could impact the co-located worker and against a wetting spray event that could impact the facility worker. Therefore, for the fine spray leak, the requirement to install the pit covers was selected as a major contribution to defense-in-depth. Again, waste transfer leak detection and response was retained as a defense-in-depth feature to provide an additional layer of protection.

1.3.2 Flammable Gas Deflagration in the Double-Shelled Tanks

The currently installed DST Primary Ventilation Systems were designed and installed to control vapor emissions as required by local regulatory permits. The control logic for the systems are such that the interlocks (high pressure across the filters, stack monitors, etc.) will shut the ventilation fans down. Therefore, it is anticipated that there will be times when the ventilation system is unavailable. Although every effort is being made to ensure the ventilation system has a high reliability, the control logic does not ensure availability. In order for the ventilation system to have a high availability, a considerable upgrade to the system would be required (e.g., redundant monitors, automatic start of second train on loss of first train [standby feature]). Based on the low probability of this event, the low consequences to the onsite worker while considering the significant facility worker hazard (a missile impact to a worker in the area when the deflagration occurs) and the current evidence that passive ventilation provides more than sufficient flow to prevent the hazard, the DST Primary Ventilation System was not selected as a major contributor to defense-in-depth. As discussed above, the DSA will be revised to clearly credit passive ventilation as a safety significant control. The DST Primary Ventilation System is identified as a defense-in-depth control in Chapter 3 of the DSA and will continue to be operated in the same manner it has been operated in the past (i.e., to meet environmental regulatory requirements and to control tank emissions to the worker in accordance with ALARA principles). It is noted that in the previous DSA revision when the ventilation system was classified as safety-significant for steady state flammable gas releases, the functional requirement was to maintain the flammable gas concentration from steady state releases to $\leq$ 25% of the LFL.

The surveillance was to perform flammable gas monitoring. There were no specific flow rates monitored for each of the DSTs. Additionally, the DSA did not specify any specific code or standard requirements for the system.

2.0 SAC Implementation

2.1 Flammable Gas Monitoring

The concerns identified by the Board staff with the implementation of the SAC are addressed below.

2.1.1 Functional Testing of Tubing

During the development of the SAC for flammable gas monitoring, the issue with the flexible tubing was identified. The requirement to perform a functional test on the tubing was included in the training of industrial hygiene technicians. To enhance the reliability of the control, the requirement to perform the functional test of the tubing has been added to the operating procedures.

2.1.2 Oxygen Level

Operations personnel who operate flammable gas monitoring equipment are trained and qualified on the use of the instrumentation. Operations personnel who use flammable gas instrumentation are trained to check the oxygen level prior to beginning the flammable gas measurement. To enhance the reliability of the control, the required oxygen level has been added to the procedure and round sheet.

2.1.3 Flammable Gas Control Limiting Condition for Operation Entry Condition

The Flammable Gas SACs are used to ensure adequate ventilation is always present by directly monitoring for the hazard so corrective actions can be taken. These SACs are written in a Limiting Condition for Operation format to capture surveillance requirements and required actions.

- To account for uncertainties, the surveillance frequency requirement for the SAC is based on zero ventilation (Currently all the DSTs are monitored weekly).
- During normal operation, the active ventilation system will be operating.
- When the active ventilation system is not operating, the ventilation is provided passively. The time from when the active system fails to when the surveillance is performed is always less than the time for the flammable gas concentration to increase by 25% of the LFL assuming zero ventilation.

- Therefore, there will be adequate time to take action to reestablish the ventilation (e.g., open a damper, replace a filter, etc.).

2.1.4 Instrument Calibration

The calibration frequencies recommended by the manufacturer were not fully implemented in the calibration process. The calibration is performed annually and not monthly as recommended by the manufacturer. However, a functional test is performed both prior to use and after use each day. The manufacturer reviewed the functional test and stated that it meets all calibration recommendations. All other requirements related to calibration were consistent with the manufacturer's recommendation.

- The functional test recommended by the manufacturer is performed prior to use and after use each day. This fulfills the calibration frequency requirements.
- The calibration gas used has been reviewed with the manufacturer (Ref. RPP-45645) and meets all requirements.
  The percent of LFL reading is based on catalytic recombination at approximately 500° C. Since potential gas stream temperatures in the tank farms application are less than 180° F, the gas stream temperature has negligible effect on the percent of LFL reading of the instrument. The gas stream is heated to approximately 500° C to achieve recombination (burning).

2.1.5 Labels

Outdated administrative labels were found on some of the valves as identified by the Board staff. This is a conduct of operation issue and is being corrected. All labels are being modified to remove the requirement to contact the "Standard Hydrogen Monitoring System engineer."

2.1.6 Independent Verific[a]tion

For the development of each SAC, a checklist was completed that addressed each of the criteria in DOE-STD-1186 and DOE-STD-3009, including the consideration of independent verification. In the development of the flammable gas control SACs, the use of independent verification was considered, but not selected since the activity was to take a reading and it was done at an interval that ensures multiple readings are taken prior to reaching the LFL. TSRs do not, in general, require independent verification unless the TSR requires manipulation of a structure, system, or component, or an operator induced change of state. Thus, independent verification is required by the safety basis to confirm an isolation valve has been closed while measurements of parameters do not require independent verification.

2.2 Additional SAC Reviews

2.2.1 Contractor Reviews

In addition to the review of the flammable gas monitoring SAC, all SACs were re-reviewed by Washington River Protection Solutions LLC (WRPS) with the same level of rigor. Proposed enhancements in the implementation were identified in Problem Evaluation Requests. In no case was the SAC found to be inadequate to ensure adequate safety.

2.2.2 Department of Energy Headquarters Independent Review

DOE Headquarters has scheduled an independent review of the implementation of SACs across the DOE complex. The review will be performed in December 2010.

2.3 Waste Compatibility Assessments

The waste compatibility assessment is part of the TSR administrative control used to ensure the surveillance frequency for the flammable gas monitoring remains adequate considering new information about the waste and waste transfers. The software used for waste compatibility assessments was generated and maintained under a procedure that implements NQA-1 software requirements.

The spreadsheet used to support waste compatibility assessments was classified as Safety Management and Administrative Control Software in 2007. The classification was performed in accordance with tank farm procedures that implemented the criteria of DOE G 414.1-4. These criteria were written prior to the introduction of SACs and therefore do not directly address SACs. The classification as Safety Management and Administrative Control Software is based on the following software function as described in DOE G 414.1-4: "software that performs a hazard control function in support of nuclear facility or radiological safety management programs or Technical Safety Requirements (TSR) or other software that performs a control function necessary to provide adequate protection from nuclear facility or radiological hazards. This software supports eliminating, limiting, or mitigating nuclear hazards …." Since the software is part of a TSR administrative control, this classification was selected.

Based on the use of the software, it could have been classified as Safety and Hazard Analysis Software and Design Software. This classification would be based on identifying the evaluation of the time to LFL as part of the hazard analysis process versus the criteria of supporting the implementation of a TSR administrative control.

The software testing requirements are equivalent between the two classifications. The required testing of the software was completed as part of the original software qualification.

The software used to support the waste compatibility assessment will be rescreened, and based on the new screening, the software Quality Assurance documentation will be revised as appropriate.

2.4 Equipment to Support SACs

As part of the development of each SAC, the permanent plant equipment, as well as the measuring and test (M&TE) equipment, required to support the implementation of the SAC was identified. A determination was made if the equipment should be classified as safety-significant. Permanent plant equipment that required manipulation in support of the SAC (e.g., valve positioning equipment) was classified as safety-significant. Permanent plant equipment or M&TE (e.g., flammable gas monitors) that did not provide an automated control function was not classified as safety-significant. Permanent plant equipment or M&TE that is used to provide an indication to operations personnel is required to be calibrated prior to use. For example, calibration of the flammable gas monitors is performed under the WRPS QA program prior to and following each reading.

2.5 Installed Permanent Plant Equipment as Safety Significant-Structures, Systems, and Components

The Board identified a number of instances in which non-safety-significant equipment was being used to fulfill safety functions, specifically the Flammable Gas SAC. The particular components are those instruments associated with the flammable gas program for DSTs and Double Contained Receiver Tanks (DCRTs). These include permanently installed temperature sensors, permanently installed DST annulus waste level and DCRT primary tank level (tank contents), and the portable Continuous Gas Monitor (CGM). Temperature: The temperature detectors are not specifically identified or credited in the SAC. Temperature is a programmatic key element identified in section 5 (5.5.3.1) of the DSA. Temperature is used in the flammable gas program as a variable in determining the flammable gas generation rate. Temperature is taken weekly on all DSTs and DCRTs. A maximum temperature value has been established of 5 degrees Celsius/9 degrees Fahrenheit above the highest observed annual temperature (to account for seasonal variations). If this maximum temperature value is reached or exceeded, Tank Farm Operations has two weeks to evaluate if new flammable gas surveillance requirements need to be imposed via a recommendation to the Office of River Protection (ORP). The reason the temperature limit is set higher than the seasonal average is to provide margin for the temperature variations anticipated during authorized DST transfers and water additions. As discussed earlier, the control, which ORP is working to incorporate into its flammable gas control program is the ability to credit passive DST ventilation. In conclusion, temperature is not a parameter measured to support the flammable gas SAC therefore, temperature components are not required to be identified as Safety Significant (SS) Structures, Systems and Components (SSCs).

Continuous Gas Monitor: The CGM is controlled and calibrated under the M&TE program as a portable piece of test equipment. Control of M&TE is programmatically

controlled under the Quality Assurance program as captured in the DSA, therefore does not meet the requirement to be classified as SS-SSC.
DST annulus liquid level and DCRT primary tank level detection: The DST annulus liquid level detector (ENRAF or manual tape) are set to detect liquid intrusion into the annulus by placing the bob at ¼ inch above the floor of the annulus as required by environmental permits. The level set-point associated with the DSA is 15 inches. The ENRAFs are maintained under a calibration program. Manual tapes are verified for accuracy upon initial receipt, but are not subject to periodic recalibration. Unlike temperature discussed above, level does provide a safety function in the flammable gas SAC because the level detectors are used as a direct input in determining whether an operator action is required. As such, it is appropriate for these instruments to be thoroughly evaluated for consideration by DOE as SS-SSCs. Accordingly, ORP is taking action to evaluate the DST annulus liquid level detectors for upgrading to SS-SSC. Similarly, the DCRT primary tank liquid level can have variations in liquid level caused by water intrusion (no waste or water additions are permitted into the three DCRTs). The potential increase in liquid level in the DCRT has a direct correlation to increases in flammable gas concentrations. Therefore, ORP is taking an action to evaluate the liquid level detectors (manual tape or dip tubes) used in the DCRT primary tanks for upgrading to SS-SSCs.

DST primary tank liquid level: DST liquid level is determined using either ENFRAF or manual tape measurement. As stated above, the ENRAFs are maintained under a calibration program, and manual tapes level devices are verified for accuracy upon initial receipt but are not subject to periodic recalibration. Like temperature, DST primary liquid tank level is not a flammable gas parameter, accordingly does not required identification as a SS-SSC.

3.0 Historic Issues

As part of the closure of Board Recommendation 93-5, the Best Basis Inventory (BBI) process was developed for waste characterization. The BBI represents the best estimate of each individual analyte of each layer of each waste tank. When these estimates are put together into a unit liter dose or sum of fraction for the entire tank it is done in a conservative fashion to obtain a reasonably conservative source term. Since the closure of 93-5, the BBI has been maintained through the incorporation of additional waste sampling and waste transfer information. The process for waste characterization remains consistent with that used to close the 93-5 Board Recommendation in 1999. Incorporation of information into the BBI is included within the Waste Characteristics TSR control.