U.S. Department of Energy
Office of River Protection
P.O. Box 450, MSIN H6-60
Richland, Washington 99352

SEP 2 5 2006

06-WTP-105

Mr. C. M. Albert, Project Manager
Bechtel National, Inc.
2435 Stevens Center Place
Richland, Washington 99354

Dear Mr. Albert:

CONTRACT NO. DE-AC27-01RV14136 – TRANSMITTAL OF U.S. DEPARTMENT OF ENERGY, OFFICE OF RIVER PROTECTION (ORP) DESIGN OVERSIGHT REPORT NUMBER D-06-DESIGN-027: REVIEW OF BECHTEL NATIONAL, INC.'S (BNI) RADIOCHEMICAL ANALYTICAL LABORATORY PNEUMATIC AUTOSAMPLING SYSTEM (ASX) DESIGN

ORP conducted an assessment to evaluate BNI's Pneumatic Transfer System (PTS) and ASX design in relation to functional and operational requirements. ORP acknowledges that BNI continues to progress, in their effort, to finalize the PTS and ASX design. In addition, the Design Oversight Team evaluated BNI's design with an understanding that the design has not been finalized. The resulting detailed report is transmitted by Attachment 1 to this letter. The plan by which the assessment was performed is also attached (Attachment 2).

ORP did not identify any Findings or Observations. However, ORP identified three Assessment Follow-up Items (AFI) described below:

(1) D-06-Design-027-AFI-01, Re-evaluate ASX design areas regarding: (a) ASX system redundancy (enabling the system to function during maintenance or partial system failures); (b) retrieval of stuck or broken bottle/carrier within the PTS; (c) ASX shielding design; (d) ASX system and glovebox maintenance accessibility; (e) pipe bend radius integral to ASX gloveboxes and receipt stations; (f) ASX Reliability, Availability and Maintainability (RAM) calculation, (g) ASX equipment, system, and software testing; and (h) ASX-ASJ System Descriptions/Documentation.

(2) D-06-Design-027-AFI-02, Re-evlauate the ISOLOK® design and ability to obtain a representative waste sample without solids accumulation or plugging.

(3) D-06-Design-027-AFI-03, Re-evaluate the revised High-Level Waste and Pretreatment Facility structural calculations for equipment using the revised seismic ground motion spectra.

Additional action, by BNI, as a result of this assessment is not required. ORP will re-evaluate the AFIs once BNI's PTS and ASX design matures.

This letter is not considered to constitute a change to the Contract. In the event the Contractor disagrees with this interpretation, it must immediately notify the Contracting Officer orally, and otherwise comply with the requirements of the Contract clause entitled 52.243-7, "Notification of Changes."

If you have any questions, please contact me, or your staff may call Lewis F. Miller Jr., Acting Director, Waste Treatment and Immobilization Plant Project, Engineering Division, (509) 376-6817.

Sincerely,

John R. Eschenberg, Project Manager
Waste Treatment and Immobilization Plant Project

WED:MAR

Attachments: (2)

cc w/attachs:
D. Burks, BNI
W. Clements, BNI
W. S. Elkins, BNI
G. Shell, BNI
BNI Correspondence

ATTACHMENT 1

DESIGN OVERSIGHT REPORT

REVIEW BECHTEL NATIONAL, INC.
RADIOCHEMICAL ANALYTICAL LABORATORY
PNEUMATIC AUTOSAMPLING SYSTEM DESIGN

JULY 2006

DESIGN OVERSIGHT: D-06-DESIGN-027

06-WTP-105

U.S. Department of Energy, Office of River Protection

DESIGN OVERSIGHT REPORT

REVIEW BECHTEL NATIONAL, INC. (BNI) RADIOCHEMICAL ANALYTICAL LABORATORY PNEUMATIC AUTOSAMPLING SYSTEM DESIGN

JULY 2006

DESIGN OVERSIGHT: D-06-DESIGN-027

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Waste Treatment and Immobilization Plant Project

Approved: 9/25/06

John R. Eschenberg, Project Manager
Waste Treatment and Immobilization Plant Project

EXECUTIVE SUMMARY

The Design Oversight Team was assembled to evaluate several areas of the Bechtel National, Inc. (BNI) autosampling system (ASX) design. The specific objectives of this assessment were to (1) verify that the pneumatic autosampling transfer system is designed in accordance with functional and operational requirements; (2) evaluate the ASX Reliability, Availability, and Maintainability design; and (3) evaluate the ASX design documents, specifications, calculations, test results, data sheets, plans, sections, instrumentation and control data related to the following elements: (a) the ASX system, and autosampler cell design including enclosed equipment located within the Pretreatment Facility (PTF), Low-Activity Waste Facility (LAW), High-Level Waste Facility (HLW), Balance of Facility (BOF), and Radiochemical Analytical Laboratory (LAB), (b) the pneumatic transfer piping design, (c) the ISOLOK® design, and (d) ASX electrical/controls as well as ventilation design.

The Design Oversight Team evaluated BNI's ASX design with an understanding that the design is not complete. In 2004, BNI awarded a contract to British Nuclear Group America (BNGA) for completion of the ASX design, which is currently on hold due to funding constraints. At the present time, BNI is progressing in their efforts to restart the BNGA contract and complete the ASX design. A number of subcontractor design documents have unresolved BNI comments that BNI will need to resolve prior to finalizing the ASX design. BNI's ASX Basis of Design is similar to the ASX system utilized at the Thermal Oxide Reprocessing Plant (THORP) at the Sellafield Site in the United Kingdom. BNI utilized THORP's 15 years of ASX operating experience by incorporating lessons learned information within the Waste Treatment and Immobilization Plant (WTP) ASX design/system. Other facilities with similar fully-automated ASX systems are the COGEMA LaHague Reprocessing Plant in France, and the Idaho National Laboratory.

BNI plans to complete the following tests within the next few years: (1) prototypic mock-up of design elements from the ISOLOK® sampler to the WTP tanks is scheduled to be completed at Catholic University of America in Washington D.C.; (2) shop testing during fabrication and design; (3) functional tests of the instrumentation and control systems utilizing BNI's software; and (4) During cold commissioning the LAB will receive carriers with sample bottles during water runs from sampling points at the WTP facility in support of ASX system operational/functional verification. Since the WTP ASX system relies heavily on automated functions, the Design Oversight Team considers the testing outlined in this report under paragraph 5.0 to be essential. Furthermore, additional testing of equipment, system and software may be required during cold and hot commissioning to ensure a fully functioning ASX system.

The Design Oversight Team did not identify any Findings or Observations. However, the team identified three Assessment Follow-up Items (AFI) involving areas of design, which will be re-evaluated upon design maturity. These AFI's are: (1) D-06-Design-027-AFI-01, Re-evaluate ASX areas of design regarding: (a) ASX system redundancy (enabling the system to function during maintenance or partial system failures), (b) retrieval of stuck or broken bottle/carrier within the PTS, (c) ASX shielding design, (d) ASX system and glovebox maintenance accessibility, (e) pipe bend radius integral to ASX gloveboxes and receipt stations, (f) ASX Reliability, Availability and Maintainability (RAM) calculation, (g) ASX equipment, system, and software testing, and (h) ASX-ASJ System Description/Documentation; (2) D-06-Design-027-AFI-02, Re-evauate the ISOLOK® design and ability to obtain a representative waste sample without solids accumulation or plugging; (3) D-06-Design-027-AFI-03, re-evaluate the revised HLW and PTF structural calculations for equipment using the revised seismic ground motion spectra. The areas of design listed in AFI (D-06-Design-027-AFI-01.b, c d, e, f, g, and h), D-06-Design-027-AFI-02, and D-06-Design-027-AFI-03 are also identified within BNI's document CCN: 133570, titled *Concurrence of ASX Risks and Risk Mitigation Strategies*, dated March 8, 2006. Within the CCN: 133570 document BNI depicts the areas of design needing resolution as ASX technical risks. Also, for each of these technical risks, BNI has developed mitigation strategies in an effort to resolve and finalize the ASX design once the design resumes in Fiscal Year 2007. In addition, BNI stated during ASX assessment meetings that they will investigate ways to provide some areas of ASX system redundancy; re-evaluation of ASX system redundancy is identified in D-06-Design-027-AFI 1.a.

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ABS	Acrylonitrile-Butadiene-Styrene
APC	Additional Protection Class
ASJ	autosampling control system
ASX	autosampling system
BNFL	British Nuclear Fuels, Ltd
BNGA	British Nuclear Group America
BNI	Bechtel National, Inc.
BOD	Basis of Design
BOF	Balance of Facilities
C&I	Control and Instrumentation
C&T	Commissioning and Training
CAF	controlled arrival facilities
CPS	carrier posting station
CUA	Catholic University of America in Washington, DC
HC	hot cell
HEPA	high-efficiency particulate air
HLW	High-Level Waste Facility
I/O	input/output
ICN	Integrated Control Network
INL	Idaho National Laboratory
ISO	International Standards Organization
LAB	Analytical Laboratory
LAW	Low-Activity Waste
LOI	line of inquiry
MHJ	mechanical handling control system
MTTR	Mean Time to Repair
ORD	Operations Requirements Document
ORP	Office of River Protection
P&ID	piping and instrumentation diagram
PCJ	plant control system
psia	pounds per square inch *absolute*
psig	pounds per square inch *gauge*
PTF	Pretreatment Facility
PTS	pneumatic transfer system
PVC	polyvinyl chloride
RAM	Reliability, Availability, and Maintainability
RGM	revised ground motion
SAP	sample and analysis plan
SC	seismic category
scfm	standard cubic feet per minute
SRS	Savannah River Site
SS	stainless steel
SSC	structures, systems, and components
THORP	Thermal Oxide Reprocessing Plant
WTP	Waste Treatment and Immobilization Plant

1.0 INTRODUCTION

The U.S. Department of Energy, Office of River Protection's (ORP) mission is to retrieve and treat Hanford's tank waste and close the tank farms to protect the Columbia River. In order to complete one major component of this mission, ORP awarded Bechtel National, Inc. (BNI) a contract for the design, construction, and commissioning of the Waste Treatment and Immobilization Plant (WTP) at the Hanford Site in Richland. In order to meet WTP contract, DE-AC27-01RV14136 requirements of supporting the continuous vitrification process, BNI is designing a Radiochemical Analytical Laboratory (LAB), in conjunction with an autosampling system (ASX). The ASX collects samples directly from process lines at various stages of treatment and transports these samples to the LAB for analysis by way of an ASX pneumatic transfer system (PTS). Utilization of the ASX sample and analysis system will support operations by providing process validation, process control, and demonstrate product waste form compliance. BNI is utilizing the Thermal Oxide Reprocessing Plant (THORP) ASX design/system at the Sellafield Site in the United Kingdom and THORP's 15 years of ASX operating experience as a model for the WTP ASX design/system.

2.0 BACKGROUND

In 2002, NUCHEM was awarded a contract to complete the WTP ASX design. BNI terminated this contract, re-bid and awarded an ASX contract to British Nuclear Fuels, Ltd. (BNFL)/ British Nuclear Group (BNG) America in 2004. In 2005, the BNGA contract was placed on hold due to funding constraints. Currently the ASX design is in various stages of completion and BNI plans to complete the design as soon as possible. In order to facilitate technical risk resolution once the ASX contract resumes, BNI has identified ASX risks within document CCN: 133570, *Concurrence of ASX Risks and Risk Mitigation Strategies*, dated March 8, 2006. Once the ASX contract resumes, the scope will consist of completing the design for the ASX equipment/gloveboxes, PTS, receipt stations, and all components integral to the ASX. Once the design is completed, procurement of the ASX equipment will be initiated. BNI will provide engineering for process pump/line sizing located to and from the samplers, drain and vent sizing, routing of PTS piping, equipment embeds, procurement of BNI designed components, and glovebox/equipment installation.

The system description for the ASX, document 24590-WTP-3YD-ASX-00001, *System Description for the Autosampling System*, states that the ASX system will be designed to meet WTP Contract requirements (see paragraph 1.2 of the ASX Design Oversight Plan (Attachment 2) for a listing of requirement documents). The ASX is configured with 10 autosamplers, 4 diverters, 3 LAB receipt stations, PTS exhausters, and a stand alone carrier posting station (CPS). A description of autosamplers per facility is listed below:

a. The Pretreatment Facility (PTF) houses five autosamplers. PTF samples are transported to hot cell (HC) receipt station 00039 in the LAB.

b. The High-Level Waste Facility (HLW) houses three autosamplers. HLW samples are transported to HC receipt station 00043 located in the LAB.

c. The Low-Activity Waste Facility (LAW) houses two autosamplers, and a CPS. LAW samples are transported to the fume hood receipt station 00034 located in the LAB.

d. The LAB houses two HC receipt stations and one fume hood receipt station.

The magazine loading stations fitted at each autosampler are manually loaded with new carriers and bottles, which are automatically introduced into the docking unit. Once a sample is initiated from the Central Control Room, located in PTF, the carrier and bottle are positioned at the sampler docking port by way of the docking unit. Once at the docking port, a robotic arm interfaces with the docking unit, removes the new sample bottle from the carrier, locates it into an ISOLOK® needle, and a sample is obtained. After the bottle is filled, the robotic arm returns the bottle to the docking unit and reinserts the bottle into the carrier. After the bottle is in the carrier, the sample/carrier is pneumatically transferred to a predetermined receipt station located in the LAB.

3.0 OBJECTIVES, SCOPE AND APPROACH

3.1 Objectives

The objectives of this assessment were to evaluate BNI's PTS and autosampling equipment/system design as defined in Paragraph 1.3, titled "*Objectives*" in the Design Oversight Plan (Attachment 2).

3.2 Scope

The Design Oversight Team evaluated design documents, specifications, calculations, test results, data sheets, plans, sections, instrumentation and control features as well as reliability, availability and maintainability data related to the following elements: (a) the autosampling PTS and autosampler glovebox design including enclosed equipment and materials throughout the PTF, LAW, HLW, Balance of Facility (BOF) and LAB facilities; (b) the ISOLOK® design; (c) the pneumatic transfer piping; and (d) autosampling PTS ventilation design. In general, the ASX boundaries were specified within the laboratory sample and analysis plan (SAP) and associated PTF, LAW, and/or HLW vessel process flow diagrams. The following sample requirements are not part of the ASX system:

- Health Physics (filler papers from activity in air monitors);
- Sampling outside the perimeter site;
- Samples taken and analyzed locally (i.e. contamination surveys);
- Tank Farm Characterization;
- BOF sampling;
- Ventilation and off gas sampling (including stack monitoring); and
- HLW glass shard sample collection.

3.3 Approach

While conducting this assessment the Design Oversight Team evaluated lines of inquiry (LOI) by performing design drawing reviews, procedural documentation reviews, and meetings with

BNI Engineering, as well as Commissioning and Training Group personnel. In addition, the Oversight Team obtained pneumatic ASX lessons learned information from THORP at the Sellafield Site, Idaho National Laboratory (INL) and COGEMA LaHague Reprocessing Plants in France.

4.0 RESULTS

4.1 Pneumatic Autosampler Equipment

The WTP autosampler design is in various stages of completion with LAW and LAB components approximately 80% complete, and HLW and PTF approximately 60% complete. In addition, BNI will revise the structural calculations for HLW and PTF equipment using the seismic revised ground motion spectra (RGM). The re-evaluation of this portion of the design is identified by AFI number D-06-Design-027-AFI-03. The RGM spectra applies to the design of structures, systems and components (SSC) designated as seismic category (SC) I or II. The RGM spectra revision may affect some of the ASX Safety Significant (SS) components. The ASX components credited as SS are listed below. These components are intended to prevent the release of radioactive waste and aerosols.

- The PTF and HLW Autosampler confinement including seals, carrier docking station, drain lines, ventilation connections, and other penetrations.
- The PTF and HLW sample feed and return line and ISOLOK® Sampler.
- The PTF and HLW Autosampler shielding.

In general, the ASX is designed to obtain a representative sample from a designated process vessel within PTF, HLW and LAW. The autosamplers are within gloveboxes that are either wall mounted or floor mounted. The autosampler/glovebox functions as a confinement device comprised of robotics and sampling equipment. The sample bottles and carriers will be constructed from Acrylonitrile-Butadiene-Styrene (ABS) material. Below is a summary of the Design Oversight Team's assessment.

a. <u>Pneumatic Autosampler Equipment Reliability Availability and Maintainability Calculations</u>: The ASX RAM calculation submitted to BNI from the subcontractor, number 24590-QL-HC4-HAHH-00001-11-00009, is 60% complete. The calculations are based on the system operating 24 hours, 7 days a week with the capability of processing 150 samples per week. Most of the RAM assumptions were derived utilizing the ASX operating experience at THORP. At 60% complete the RAM calculations show an overall availability greater than 99.34%. BNI formally sent this RAM calculation document along with review comments to the subcontractor for comment resolution. Currently, the subcontractor has not resolved BNI's review comments. However, the subcontractor will resolve comments and finalize the document once the ASX contract resumes. D-06-Design-027-AFI-01.f identifies the re-evaluation of the RAM calculations. Some of the unresolved comments are:

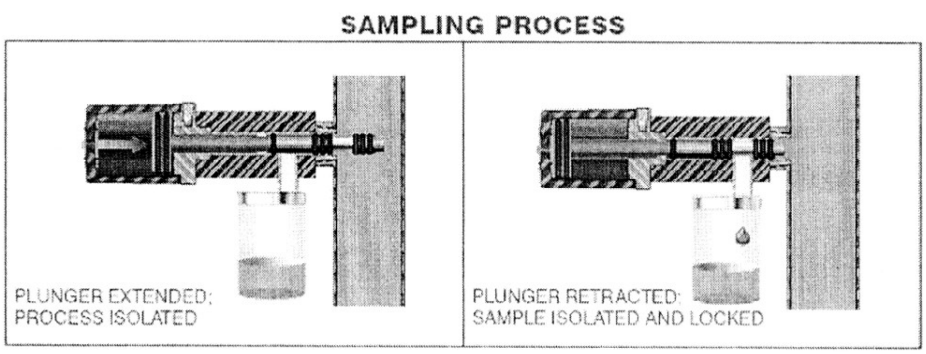
   - Mean Time to Repair (MTTR) for decontaminating equipment has not been calculated and incorporated into the RAM data. Some of the MTTR values did not match those in the ASX Startup Strategy O&M Plan;

- MTTR multiple component failures and/or time required to replace equipment was not calculated;
- MTTR for removal/repair of a stuck carrier within the PTS piping was not calculated; and
- RAM data was calculated with a HEPA filter MTTR value of 20 years, however, 5 years is required. Using 20 years underestimated the number of HEPA filter changes.

BNI stated during meetings that the subcontractor will address all of BNI's unresolved comments/questions as well as update the RAM calculations and RAM document prior to finalizing the ASX design.

b. ISOLOK® (Autosampler) Design: BNI raised concerns throughout last year's weekly ASX subcontractor meetings regarding whether the ISOLOK® as designed (off-the-shelf) will obtain a representative sample of the waste upon each sampling effort. Bristol/Sentry's ISOLOK® test in 2005 was inconclusive with respect to whether non-Newtonian process waste samples (containing solids) would leave residue trapped at the "line adaptor" (interface between the pipe and sampler). Bristol/Sentry's modeling only consisted of the ISOLOK® /sampling components. BNI is scheduling an accuracy and performance test consisting of a large prototypic-scaled system that includes a prototypic vessel, mechanical agitator, transfer pump, recirculation pump, and horizontal piping that directly supplies liquid/slurry to the ISOLOK® and the ISOLOK® mechanism. This test will be conducted at Catholic University of America (CUA) in Washington, DC. D-06-Design-027-AFI-02 identifies the re-evaluation of the ISOLOK testing.

Figure 4-1. ISOLOK® Diagram for Liquid and Slurries



www.sentry-equip.com

c. Autosampler Glovebox Maintenance Accessibility: The gloveboxes which house ASX equipment are designed for hands-on maintenance. In general, the gloveboxes occupy a space of 7-ft x 7-ft x 7-ft with a maintenance envelope/cell dimension of 15-ft x 10-ft x 10-ft. Performing hands-on maintenance will depend on the ability of maintenance personnel to decontaminate components that have many seals, close fitting parts and intricate mechanisms all within a compact equipment filled glovebox. The Design Oversight Team's assessment of maintaining equipment within gloveboxes is that maintenance will be time-consuming and may lead to significant downtime with respect to the melter line or pretreatment process. The Savannah River and the West Valley vitrification projects both utilize ASX equipment directly within the HCs, with manipulators, to obtain high level radioactive samples. Currently, BNI has unresolved questions related to ease of glovebox maintenance regarding subcontractor document 24590-QL-HC4-HAHH-00001-15-00001, *Maintenance Procedures for Autosampling System*. BNI formally sent this document along with review comments to the subcontractor for comment resolution. This document and unresolved questions will be finalized by the subcontractor once the ASX contract resumes. D-06-Design-027-AFI-01.d identifies the re-evaluation of the autosampler glovebox maintenance accessibility.

d. <u>Pneumatic Autosampler Equipment System Redundancy</u>: The robotic equipment is electrically–driven by way of input from an autosampler control system providing the following functions: (1) removal of a sample bottle from carrier, (2) impaling a sample bottle on sample needle, and (3) transferring a sample bottle to the PTS carrier and line.

- The Design Oversight Team found that redundancy within the ASX design was minimal. Other portions of the WTP design such as the PTF, HLW, and LAW process lines and tanks include redundancy to significantly minimize single point failures that would terminate or slow the vitrification process. The Design Oversight Team noted that a single-point failure within the ASX, such as a failed diverter valve, failed receipt station equipment or trapped carrier within equipment or transfer lines would shutdown parts of the ASX system. If a major component in the glovebox failed, such as the robotic arm or docking unit, the entire vitrification operation within the affected area could be significantly affected until the failure was investigated and repaired. BNI stated during ASX assessment meetings that they will investigate ways to provide some areas of ASX system redundancy. D-06-Design-027-AFI-01.a. identifies the re-evaluation of ASX system redundancy.

e. <u>Pneumatic Autosampler Equipment Shielding Design</u>: BNI has not completed the ASX shielding design. The Oversight Design Team noted the following shielding areas were inconsistent. These inconsistencies should be resolved as the design progresses and D-06-Design-027-AFI-01.c identifies the re-evaluated of the ASX shielding design:

- Currently the ASX shielding calculations do not match the shielding specified on the drawings. Also, shielding below the ISOLOK® sampler is shown inside the glove box, which will be difficult to decontaminate prior to glovebox maintenance.

- HLW and PTF docking units on gloveboxes show a door with external steel shielding. This external shield door must be opened to access the docking unit. However, if the docking unit malfunctions with the carrier inside, the operating personnel, upon opening the door, will be exposed to high radiation when attempting to replace and/or maintain the docking unit.

- PTS Polyvinyl Chloride (PVC) piping and shielding have not been designed. PVC piping in PTF and HLW vertically rising out of the glovebox should be shielded from the glovebox up to an elevation that will protect personnel on the operating aisle.

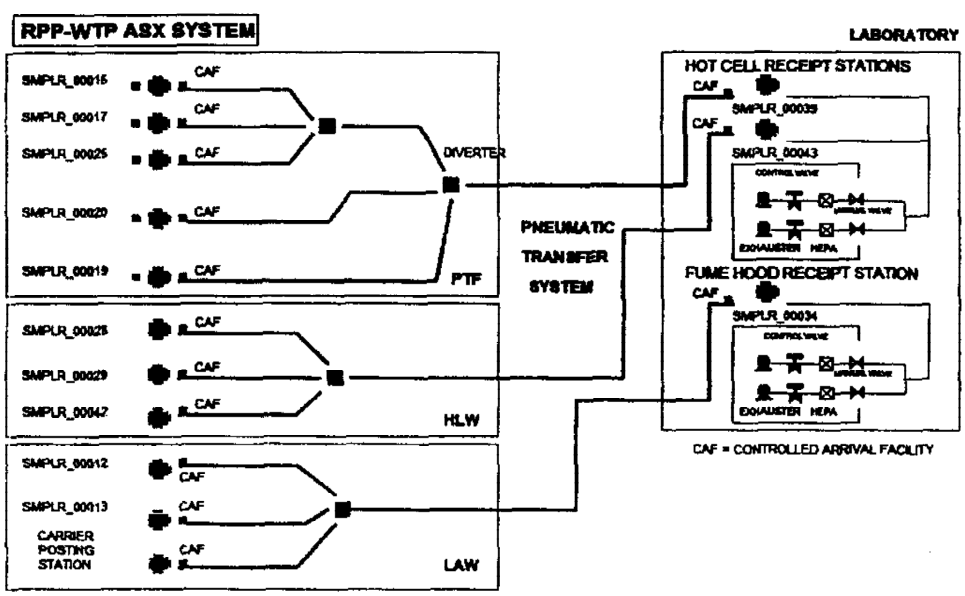
f. <u>Pneumatic Autosampler Equipment System Maintenance Accessibility</u>: The following maintenance accessibility issues/areas were noted and should be resolved as the design progresses. D-06-Design-027-AFI-01.d identifies the re-evaluation of ASX system maintenance accessibility:

- The carrier receipt station SMPLR-00039 and SMPLR-00043 in the LAB does not have easily assessable remote repair capability: (1) the HC assess door is not easily removed; and (2) if a component malfunctions or fails this could significantly affect and possibly shut down operations within HLW or PTF.
- The carrier receipt station SMPLR-00034 in the LAB does not have easy assessable remote repair capability if a component malfunctions or fails.

4.2 Pneumatic Transfer System

The PTS design is approximately 60% complete. The PTS piping is commercial grade, the PTS tracking system is APC, the seismic category of the PTS system is SC-III. The PTS consists of a network of transport tubes, diverters, and exhausters with HEPA filters, controlled arrival facilities (CAF), and LAB receipt stations along with a standalone CPS. The LAB receives three PTS lines, one from LAW, one from HLW, and one from PTF. The PTS is a vacuum-induced transfer system that will automatically transfer sample bottles/carriers to the LAB. This system is uni-directional (one-way) and transfers (one-time-use) carriers with sample bottles from PTF, HLW or LAW across the WTP Site to a dedicated receipt station located within the LAB. The uni-directional system was chosen to optimize square footage within the LAB, and the one-time-use carrier/bottles optimized both the LAB footprint as well as reduced the combustible loading within the LAB HCs. The following information is the Design Oversight Team's assessment, as well as lessons learned information obtained from the Sellafield Site and INL in Idaho.

Figure 4-2. Autosampling System Overview
(Diagrammatic Sketch)



SP-0105469-M-00002.Rev.A
BNI Pneumatic Transfer Design Specification

a. Pneumatic Piping System: The piping is designed "Normal Fluid Service" as designated by American Society of Mechanical Engineers (ASME) B31.3, *Process Piping*, and is rated for air service under vacuum and atmospheric pressure conditions only. PTS maximum internal design pressure is 14.7 pounds per square inch absolute (psia) and minimum design pressure is 10.3 psia. Both stainless steel (SS) and PVC PTS piping will be Schedule 40 and have a nominal 3-in outside diameter, and 3.068-in inside diameter with a piping wall thickness of 0.216-in.

   - SS piping material will be constructed between WTP facilities (exterior) with an outdoor temperature rating of -23° F to 113° F.
   - PVC piping material will be utilized for the PTS piping within WTP facilities with an indoor temperature rating of 59° F to 95° F.

- Pipe Bend Radius (integral to ASX gloveboxes and receipt stations): The carriers are commercial grade quality. The bottles are APC quality to provide confinement of sample materials in the hotcells. The length of sample carriers is 7.5-in with an outside diameter of 2.878-in. The Design Oversight Team determined from performing a basic geometric modeling calculation, as well as reviewing ASX lessons learned from THORP and INL, that a large centerline pipe-bending-radius is required to provide uninhibited carrier transfer though the PTS. By incorporating lessons learned from THORP, BNI is designing the PTS pipe, outside the autosampling envelope, with a 48-in. minimum centerline pipe bend-radius. However, PTS piping integral to the autosampling envelope and receipt stations are subcontractor designed with a 20-in. centerline pipe bend-radius in an area where carrier speed is reduced. BNI is currently investigating the functionality of allowing subcontractor designed piping with a 20-in. centerline piping bend-radius. As stated above in paragraph 4.1.a, there are unresolved RAM calculation comments related to BNI's acceptance of the subcontractor's 20-in. pipe bends integral to the autosampling envelope. These BNI's submittal comments that were formally sent to the subcontractor will be resolved once the ASX Contract resumes. D-06-Design-027-AFI-01.e identifies the re-evaluation of the ASX bend radius for piping integral to the gloveboxes and receipt stations.

  a. The THORP system has PVC piping similar to the transfer piping design for the Waste Treatment Plant. THORP originally used a relatively sharp centerline pipe bend radius of 24-in. which was changed, during operations, to 48-in. Before THORP began using a larger centerline bend radius, pipe abrasion from the carriers and cracking within the piping system occurred. Approximately six cracks per year occurred. THORP used the following two mitigation strategies: (1) replacing the piping with larger radius bends and (2) hardening bends with thicker or additional PVC. INL also experienced carrier and sharp bend radius issues, which were modified by incorporating larger bending radii. In addition, INL experienced breakage of carriers at the docking units, which was solved by creating an air pocket in front and back of the carrier. The WTP ASX design and the THORP design include control arrival facilities/equipment that significantly decreases the speed of the sample carrier upon arrival at the docking units.

- Retrieval of Stuck or Broken Bottle/Carrier within PTS: The Design Oversight Team identified the following areas of concern: (1) Details of the process in which a portable exhauster will be used to pull a stuck carrier, close to the sampler, within the PTS back toward the sampler has not been documented. However, BNI plans to develop a procedure of this process as the design matures. Demonstrating removal of a stuck carrier will be included during Factory Acceptance Testing as stated in BNI answers to LOI.02 (Table 2) question 17. (2) Retrieval of carriers getting stuck within docking units has not been developed. However, BNI answers to LOI.01 (Table 1) questions 16 and 17 states that carrier removal details will be developed, and (3) currently, BNI does not have a strategy to locate a broken or stuck carrier beyond the piping integral to the glovebox that is pneumatically transferred within the transfer piping. The THORP facility has had success with pressure gauges placed periodically in the PTS which enabled personnel to quickly locate any pipe break that was associated with loss of system vacuum pressure. Based on the documentation, WTP does not plan on using periodic pressure differential gauges and it is currently not clear how breaks would be located over potentially significant runs of transfer piping. BNI's responses to the 3 areas of concern, identified above, are acceptable due to BNI's current percentage of design completion. In addition, BNI stated during ASX meetings that these 3 concerns will be resolved during design maturity. D-06-Design-027-AFI-01.b identifies the re-evaluation for the retrieval of a stuck/broken carrier or bottle.

a. Also, the Design Oversight Team did not see a mechanism in the WTP ASX design to ensure that the sample bottle was in the sample carrier upon leaving the docking station. The position indicator switches only measure the location of the sample carrier within the PTS piping. At THORP there were instances of carriers leaving the sampler docking stations without the sample bottle, which was still attached to the sample needle. However in response to LOI.02 (Table 2) question 019, BNI stated that the bottle will be attached to the carrier lid and the lid locked onto the robotic arm while in the glovebox which will resolve this concern. The Design Oversight Team found BNI's carrier lid and bottle design to be satisfactory.

4.3 Ventilation of Autosampling and Pneumatic Transfer System

The ASX/PTS has its own ventilation system separate from the LAB ventilation system. The LAB ventilation safety requirements vary per component and are listed in BNI document number 24590-WTP-PSAR-ESH-01-002-06, Rev 1b. Four exhausters are located within the laboratory in a C-3 area that provides motive force to transport the carriers from autosampler units to the LAB receipt stations. During normal operations the exhausters' vacuum is 12.3 psia at 100 standard cubic feet per minute (scfm). Carriers with bottles are transferred by evacuating the piping in front of the carrier and admitting air into the piping behind the carrier (i.e., exhaust system pulls carrier through the transfer piping). To ensure rapid acceleration and soft arrival, the air inlet/vacuum is controlled via 4-way control valves and rotary shutoff valves that are located at the carrier departure/receipt facilities at each device. Two exhausters are dedicated to the pneumatic transfer piping in HLW and PTF, and two exhausters are dedicated to LAW's pneumatic transfer piping. The following information was obtained from BNI's ASX design documentation, the Sellafield Site and INL:

b. <u>Pounds of air within BNI's Piping System</u>: The system carrier speed is designed to be 25+/-5 ft/sec though most of its transfer. The carrier slows near the docking ports in a process called soft docking. The PVC piping used for most of the system internal to the facilities is 3 in. schedule 40 piping and has a nominal internal diameter of 3.068 in. The exhauster is operated at a normal air flow rate of 128 scfm, which results in 43 ft/sec, as the maximum speed the carrier can travel. However, friction in the transfer piping will slow the carrier. A transfer speed of 25 ft/sec will cover 1,500 ft in 1 minute and 3,000 ft in 2 minutes. In the case of a stuck carrier, the systems air flow can be reversed within the lines by temporarily installing a portable exhauster at the sampler if a carrier is near an arrival or docking unit. BNI uses administrative controls such as, height of pneumatic transfer lines, speed of carrier transport, restricting access to pneumatic transfer components and shielding on the pneumatic transfer line inside the facility to reduce a direct radiation hazard. However, a stuck or broken carrier deep within the pneumatic piping system may take a significant amount of time to recover and the radiation field from the sample carrier may potentially render a space unusable, due to the length of time a carrier is stationary within the PTS piping. An abrasion calculation of the interior pipe wall in relation to carrier movement has not been completed. However, the abrasion/erosion design basis will be documented prior to completion of the final design.

c. Speed of Carrier (deceleration/technique): To ensure rapid acceleration and soft arrival, the air inlet/vacuum is controlled by 4-way control valves and rotary shutoff valves. These valves are located at the carrier departure/receipt facilities at each device.

d. HEPA Filters: the air intake for the exhausters is located at the autosampler carrier departure facilities within PTF, HLW and LAW. Air is exhausted directly through HEPA filters.

- INL found that venting the ASX directly through HEPA filters first caused the filters to clog. Clogged filters caused slow air movement within the PTS caused carriers to slow down or become stuck within the piping system. INL found that filter clogging was reduced if air was first vented within an ASX cell/room and then through HEPA filters. BNI stated, in response LOI.02 (Table 2) question 04, that the proper differential pressure will be utilized when sizing the PTS equipment. In addition, there is a pressure transmitter for monitoring pressure drop across the filters.

4.4 Autosampling Control System

Currently the design is in various stages of development. The ASX electrical design is 80% complete. The ASX control and instrumentation design is 80% complete for equipment within the autosample enclosure and 30% complete for the design of equipment outside the autosample enclosure. The ASJ provides the control functions for the ASX and the safety requirements vary per component which are listed in BNI document number 24590-WTP-PSAR-ESH-01-002-06, Rev 1b. High level requirements associated with the ASJ are provided within the Basis of Design (BOD) and the Operations Requirements Document (ORD). Justification for a fully automated PTS is provided in the BOD (Section 11.6.7).

The ASJ is responsible for control and monitoring of ASX equipment that obtains samples directly from PTF, HLW, and LAW process lines and transports them to the LAB receipt stations. The ASJ is one of three plant control systems comprising the Integrated Control Network (ICN) for the WTP. The other two systems within the ICN are the Plant Control System (PCJ) and the Mechanical Handling Control System (MHJ). The ASJ consists of a network of controllers that provide the control functions for various mechanical devices involved in the sampling process. The ASJ interfaces with the PCJ and drives intelligent (microprocessor based) devices. The ASJ is comprised of the following elements:

- Controller Cabinets (ASJ Equipment mounted internally to associated device)
- I/O Cabinets
- Controllers for motors
- Carrier tracking switches (along pneumatic transfer lines).

Based on the ASX System Description (SD), 24590-WTP-3YD-ASX-00001, *System Description for the Autosampling System,* automatic sample requests are initiated by the PCJ at pre-defined points in the process and are communicated from the PCJ to the ASJ. Manual (operator-initiated) requests are requested through the ASJ operator console. According to the ASJ System Description (SD), 24590-WTP-3YD-ASX-00001, *System Description for the Autosampling Control System,* the ASJ uses a network of controllers to control and monitor the equipment that obtains process samples and then transports those samples to the laboratory.

ASJ Review Results:

- Based on BNI's system descriptions (SD) for the ASX and the ACJ in relation to subcontractor documentation titled *Autosampling Control System Interface Specification,* it is not clear what the interface is between the Asea Brown Boveri (ABB) system controllers and ASX mechanical devices. For example, in the subcontractor document mentioned above, it is stated that the only interface will be between the autosamplers and the PCJ via Ethernet. Yet, the ASJ SD indicates there will be controllers for several types of mechanical devices including autosamplers, the pneumatic transfer system, etc. This is an indication that the SD's need to be updated. In addition, updates to the BNI documentation, specifically SD's, need to be made in order to be consistent with the subcontractor design terminology. This is most evident in regards to terms such as, Carrier Storage Station versus Carrier Posting Facility; Bottle Storage Station versus Buffer Store and Auto Bottle Dispatch Facility, etc. These inconsistencies should be resolved as the design progresses and AFI number D-06-Design-027-AFI-01.h, identifies the re-evaluation of ASX/ASJ System Descriptions/Documentation.
- It is not readily apparent in the ASX documentation what the interface is between the BNI scope of software development and the subcontractor scope or how the two entities collaborate. However, discussions during informal meetings with BNI and BNI's response to LOI.02 (Table 2) question 014 provide a clear delineation of scope development and interface. No further action or follow-up is necessary.
- A detailed description of the complete control system operation including process steps, logic, timing, and a delineation of specific equipment controllers and their functions would be useful. Currently, this type of information resides in several lower-level technical specifications, mostly Device Control Template specifications and minimally in the ASJ SD. AFI number D-06-Design-027-AFI-01.h, identifies the re-evaluation of ASX/ASJ System Descriptions/Documentation.

5.0 FUTURE SYSTEM TESTING (PRIOR TO INSTALLATION)

The following future testing has been documented within BNI's answers to LOI.01 (Table 1) and LOI.02 (Table 2) questions, number P9 – Testing at (CUA) of the Issue Resolution Plan (IPT) documentation and current commissioning plan documents:

- BNI will perform testing at CUA in Washington DC as outline in paragraph 4.1 above.
- Shop testing during (fabrication and design) and functional tests of the instrumentation and control systems utilizing BNI's software will be conducted. A fully integrated test, including the autosampler, PTS transfer, receipt station and exhauster system will be performed during shop testing. Shop tests will be controlled using prototypic WTP control hardware and software with WTP control engineers present to observe any problems and incorporate any necessary changes.
- BNI's WTP Commissioning Plan – Part B, section 4.1.3, states that processing samples will be taken during cold commissioning to verify sampler operability but the actual performance testing of the samplers will be completed via the R&T testing program. The R&T program for sampling is directed towards the two vitrification plants, but it is assumed that if the sample performance is adequate for the vitrification plants then it will be adequate for pretreatment. Also, section 4.1.7.2 states that the Lab will receive sample bottles and carriers during water runs in support of ASX system functional and operational verification as well as support training and proficiency evolutions. The Lab is not required to perform analysis to support water runs."

The Design Oversight Team considers the testing described above as pertinent. Furthermore, due to the ASX design relying heavily on automated systems, additional testing of equipment, system and software may be required during cold and hot commissioning to ensure a fully functioning ASX system. D-06-Design-027-AFI-01.g identifies the re-evaluation of BNI's equipment, system and software test plans and test results that will be conducted by BNI at a future date.

6.0 CONCLUSION

The Design Oversight Team reviewed BNI's ASX design with the understanding that the design has not yet been completed. BNI is progressing in their efforts to complete the ASX design. A number of subcontractor design documents have unresolved BNI comments that BNI and the subcontractor will need to resolve prior to finalizing the ASX design. BNI is utilizing THORP's ASX design along with THORP's 15 years of operating experience as a model for designing the WTP ASX. Other facilities with similar ASX systems are located at the COGEMA LaHague Reprocessing Plant in France and INL in Idaho. Since the WTP ASX system relies heavily on automated functions, the Design Oversight Team considers the testing outlined in this report under paragraph 5.0 to be essential. Also noted under Paragraph 5.0, is that additional testing of equipment, systems and software may be required during cold and hot commissioning to ensure a fully functioning ASX system. AFI number, D-06-Design-027-AFI-01.g identifies the re-evaluation of ASX equipment, system and software testing.

The Design Oversight Team identified three "Assessment Follow-up Items" (AFI) delineated in paragraph 7.0 of this document. The areas of design listed in AFI (D-06-Design-027-AFI-01.b, c d, e, f, g, and h), D-06-Design-027-AFI-02, and D-06-Design-027-AFI-03 are also identified within BNI's document CCN 133570, titled *Concurrence of ASX Risks and Risk Mitigation Strategies*, dated March 8, 2006. Within the CCN 133570 document BNI depicts the areas of design needing resolution as ASX technical risks. Also, for each of these technical risks, BNI has developed mitigation strategies in an effort to resolve and finalize the ASX design once the design resumes in FY2007. In addition, BNI stated during ASX assessment meetings that they will investigate ways to provide some areas of ASX system redundancy; re-evaluation of ASX system redundancy is identified in D-06-Design-027-AFI 1.a.

7.0 RECOMMENDATIONS, ASSESSMENT FOLLOW-UP ITEMS, OBSERVATIONS OR FINDINGS

The Design Oversight Team did not identify any Findings or Observations during this assessment. However, the following three Assessment Follow-up Items (AFI) have been identified and assigned numbers.

- D-06-Design-027-AFI-01: (1) D-06-Design-027-AFI-01, Re-evaluate ASX design areas regarding: (a) ASX system redundancy (enabling the system to function during maintenance or partial system failures), (b) retrieval of stuck or broken bottle/carrier within the PTS, (c) ASX shielding design, (d) ASX system and glovebox maintenance accessibility, (e) pipe bend radius integral to ASX gloveboxes and receipt stations, (f) ASX Reliability, Availability and Maintainability (RAM) calculation, (g) ASX equipment, system, and software testing, and (h) ASX-ASJ System Descriptions/Documentation.
- D-06-Design-027-AFI-02: Re-evaluate the ISOLOK® design and ability to obtain a representative sample including the ability to obtain a representative waste sample with lack of solid accumulation or plugging.
- D-06-Design-027-AFI-03 Re-evaluate the HLW and PTF structural calculations for equipment once calculation revisions using the seismic spectra RGM has been completed.

8.0 REFERENCES

24590-WTP-PSAR-ESH-01-002-06, Rev 1b, *Safety Envelope Document; LAB Facility Specific Information, Rev 1b*, August 16, 2006.

24590-WTP-PSAR-ESH-01-002-06, *Preliminary Safety Analysis Report to Support Construction Authorization; Lab Facility Specific Information*, Rev. 2, March 31, 2006.

24590-WTP-PSAR-ESH-01-002-04, *Preliminary Safety Analysis Report to Support Construction Authorization; HLW Facility Specific Information*, Rev. 2, March 31, 2006.

24590-WTP-PSAR-ESH-01-002-02, *Preliminary Safety Analysis Report to Support Construction Authorization; PT Facility Specific Information*, Rev. 2, March 31, 2006.

24590-WTP-PSAR-ESH-01-002-03, *Preliminary Safety Analysis Report to Support Construction Authorization; LAW Facility Specific Information*, Rev. 2, March 31, 2006.

24590-WTP-RPT-OP-0 l-001, Rev. 2, *Operations Requirements Document*, May 5, 2003.

24590-QL-HC4-HAHH-00001-15-00001, *Maintenance Procedures for Autosampling System*, Rev. 00B, June 9, 2005.

24590-WTP-DB-ENG-01-001, *Basis of Design*, Rev. 1G, July 5, 2006.

24590-WTP-SRD-ESH-01-001-02, S*afety Requirements Document Volume II*, Rev. 4a, April 12, 2006.

CCN: 133570, *Concurrence of ASX Risks and Risk Mitigation Strategy*, March 8, 2006.

CCN: 142020, Issue Response Plan for External Flowsheet Review Team (EFRT) Issues, dated July 07, 2006.

24590-WTP-3PN-MHSS-00005, *Multiple Updates to ASX Specification* (Includes incorporation of SDDR no. 24590-WTP-SDDR-PROC-05-00154), May 26, 2005.

24590-QL-HC4-HAHH-00001-13-00002, *WTP Autosampling System Operator Manual*, Rev. A, January 20, 2005.

24590-WTP-GPG-ENG-081, *Design Guide/Guide Desk Instruction: Protection from Effects of Pipe Break*, Rev. A, June 25, 2004.

24590-QL-HC4-HAHH-00001-10-00001, *WTP Autosampling System Design Specification for Pneumatic Transfer System (PTS)*, Rev. D, August 5, 2005.

24590-WTP-3YD-ASX-00001, *System Description for the Autosampling System (ASX)*, Rev. A, April 10, 2002.

24590-WTP-3PS-MHSS-T0002, *Engineering Specification Autosampling System (ASX)*, Rev. 0, June 16, 2004.

24590-QL-HC4-HAHH-00001-11-00009, *Autosampling System ASX Reliability Assessment Calculation*, Rev. A, January 21, 2005.

24590-QL-HC4-HAHH-00001-12-00001, *WTP Autosampling System Reliability Assessment*, Rev. A, January 21, 2005.

24590-QL-HC4-HAHH-00001-11-00015, *Structural Analysis of Autosampler Transport Piping*, Rev. A, September 22, 2005.

24590-QL-HC4-HAHH-00001-04-00001, *Test Plan - ISOLOK Sampler Device Component Performance Test Plan*, September 14, 2004.

24590-WTP-PL-G-01-002, *WTP Commissioning Plan Part A*, Rev. 0, July 1, 2002.

24590-WTP-PL-OP-05-0002, *WTP Commissioning Plan Part B*, Rev. A, September 14, 2005.

24590-WTP-3YD-ASJ-00001, *System Description for Autosampling Control System*, Rev. A, November 8, 2001.

24590-QL-HC4-HAHH-00001-07-00001, *WTP Autosampling System, Autosampling Control System Specification*, Rev. 00D, September 14, 2005.

24590-QL-HC4-HAHH-00001-07-00023, *WTP Autosampling System, Autosampling Control System Interface Specification*, Rev. 00C, September 14, 2005.

NHC 8373, *The Inter-laboratory Pneumatic Transfer Network for Radioactive Samples Operated in the Analytical Laboratories of the COGEMA La Hague Reprocessing Plants (France)*, Rev. 0, June 2001.

NHC 8374, *The Computerized Data Management System Operated in the Analytical Laboratories of the COGEMA La Hague Reprocessing Plants (France)*, Rev. 0, June 2001.

NHC 8375, *Analysis Operating Times Observed in the Analytical Laboratories of the COGEMA La Hague Reprocessing Plants (France)*, Rev. 0, June 2001.

TABLE 1 and **TABLE 2** contain ORP questions/LOIs that BNI provided responses to. The responses were used along with ASX drawings, specification, and descriptions as reference information utilized during the Design Oversight Teams evaluation of BNI's ASX design.

Table 1. LINES OF INQUIRY (LOI'S.01) DATED MAY 09, 2006

ORP LOI's	Responses Directly Written by BNI on ORP LOI Form
01. Describe the sequence of operations from start to finish, describing each component in the autosampler and the PTS; from start to finish, for the HLW autosampler.	24590-QL-HC4-HAHH-00001-01-00004 or BNFL document number OM-0105469-M-00001 "WTP Autosampling System Start Up Strategy, Sequence of Operations, and Maintenance Plans" documents the sequence of operations for an autosampling system. There are three autosampling systems located in the HLW facility. Figure 1 in Section 3.2 is a Flow Chart detailing the step by step sequence of operations for the Autosampler.
02. Describe the HLW vessel mixing system, the three supply lines, pumps, and valves; from the vessels to autosampler 029.	24590-HLW-3YD-HFP-00001, Rev. 1 "System Description for HLW Concentrate Receipt and Melter Feed Process Systems (HCP and HFP) describe the requested systems. Note: This is not part of the ASX system....
03. What is the plan, for reuse or disposal, for the carrier and sample bottles after each use?	Since the ASX is designed as a one-way transfer system, the carriers and sample bottles will be used only one time. After the sample integrity is verified (right sample, has not leaked, etc.) the carrier is disposed to solid waste. To minimize the combustible material loading in the hotcells, the sample will be transferred from plastic sample bottle to a glass container for distribution through the hotcells. The plastic sample bottle will be rinsed and disposed to solid waste.
04. How do you detect if the needle is clogged? How do you know if there actually is a sample in the sample bottle, prior to sending it to the laboratory?	WTP has the same comment on document 24590-QL-HC4-HAHH-00001-01-00004 (question #1)that is yet to be resolved. See comments from Doug Perkins - Comment number 21, 60, 61, 62, 72.
05. Where does the inlet air to the PTS (in the autosampler) come from; the glove box or the operating aisle?	The operating aisle. See the inlet filter to Controlled Arrival Facility. Ref. WTP Doc #: 24590-QL-HC4-HAHH-00001-06-00099 BNGA Doc #: DWG-0105469-M1-3040002-01
06. What problems did BNFL experience at Sellafield with this system?	Other than discussions and presentations given during the bid process, we do not have any published information regarding Sellafields experience with this system. Sellafield documents are referenced in the sub-contractor's reliablity calculations. These documents will be obtained by WTP in the coming months, as they will be unavailable after Energy Solutions completes the acquisition of BNGA.

Table 1. LINES OF INQUIRY (LOI'S.01) DATED MAY 09, 2006	
ORP LOI's	**Responses Directly Written by BNI on ORP LOI Form**
07. Describe what radiation zones (R2/R3) are present for the HLW autosampler 029, the PTS piping inside the building, the outside overhead piping, the PTS system in the laboratory, and the receipt station.	Sampler 29 is in an C3/R2 area. PTS piping has not been routed yet by plant design, but is planned to route through C2/R2 corridors. In the lab, PTS piping runs through a C2/R2 area and a C2/R3 area where it terminates at the receipt stations. Ref. 24590-HLW-P1-P01T-00004
08. Verify the latest revision to calculations 24590-LAB-LAB-ZOC-80-00002(Rev C) and BNFL calculation CALC-0105469-NS-00001(Rev A).	24590-LAB-Z0C-80-00002, Rev. C (Latest Revision) CALC-0105469-NS-00001, Rev. D (Latest Revision) Includes 100% design level for LAW and LAB only. CALC-0105469-NS-00001, Rev. C Includes 90% design level for all facilities
09. The drawings do not show any interior shielding on top of the autosampling glove box. Why is 2 ½ inches of shielding considered to be sufficient?	We have yet to receive detailed assembly drawings for the internal shielding in HLW. It does appear that there is internal shielding on top of the process lines. This issue will be addressed with BNGA during design completion. Ref. WTP Doc #: 24590-QL-HC4-HAHH-00001-06-00721, Rev. A BNGA Doc #: DWG-0105469-M2-3040008-02, Rev A
10. Describe the signals/alarms that are transmitted to the control station if a carrier gets stuck in the autosampler or the PTS system. Describe what action the person at the control station takes.	Tracking switches along the PTS lines sense the carrier pass by during transfer. If the carrier is stuck, the control system will know where the carrier is +/- 25'. (Tracking switches are installed a maximum of 50' apart.) Response plans have not been developed, but conceptually, an operator will be able to alarm the area surrounding the stuck sample to take appropriate action.
11. Is any portion of the PTS piping shielded, and if so, describe the amount of shielding.	None of the PTS piping is shielded.
12. What is the elevation (above the floor level) of the PVC piping in the HLW building?	HLW PTS piping has not yet been routed. Dimensions are not available.
13. What is the elevation (above the floor level) of the PVC piping in the HLW building?	HLW PTS piping has not yet been routed. Dimensions are not available.

Table 1. LINES OF INQUIRY (LOI'S.01) DATED MAY 09, 2006	
ORP LOI's	**Responses Directly Written by BNI on ORP LOI Form**
14. The docking unit on the autosampler does not have 5 inches of shielding. Why is 2 ½ inches considered to be sufficient?	The small volume of the sample bottle requires less shielding than the volume contained in the flooded sample lines. More shielding is required at these lines than is necessary for shielding the bottled sample. Ref. WTP Doc #: 24590-QL-HC4-HAHH-00001-15-00001, Rev. C BNGA Doc #: CALC-0105469-NS-00001, Rev. C (Includes 90% design level for all facilities)
15. Describe how each major component will be maintained/replaced in the glove box and the receipt station.	Maintenace procedures were received from BNGA and returned with comments for resubmittal. Ref. WTP Doc #: 24590-QL-HC4-HAHH-00001-15-00001 BNGA Doc #: OM-0105469-M-00002
16. When a carrier becomes stuck in the PTS system, describe how it will be removed, how you will transport it, and where will it be taken to.	The concept is to use a portable exhauster at the sampler to pull the carrier back toward the sampler. Details of this process have not yet been developed or documented.
17. If a carrier (with a sample) gets stuck in the docking unit, or the docking unit malfunctions, how do you remove the carrier?	This has not been identified as a failure mode in the Reliability Assessment Calculation. There are Maintenance procedures for dismantling the docking unit, but not specific to recovery of a sample carrier. Details will be developed as part of the retrieval issue in Item 16. Ref. WTP Doc #: 24590-QL-HC4-HAHH-00001-15-00001 BNGA Doc #: OM-0105469-M-00002 WTP Doc #: 24590-QL-HC4-HAHH-00001-11-00009 BNGA Doc #: Calc-0105469--EG-00001
18. Describe how the supply and return lines will be flushed/decontaminated.	For HLW samplers… The 3-way valve at the inlet to each sampler station will be used to provide flush water to the supply and return line. The valve is shown as a manual valve. A design change is in process to automate this valve. Ref. WTP Doc #: 24590-QL-HC4-HAHH-00001-06-00100 BNGA Doc #: DWG-0105469-M1-3040002-02
19. Describe how the interior/exterior of the components, and glove box interior, will be flushed/decontaminated.	Wash nozzles and wash wands in the glove box are used to flush/decontaminate the components in the glove box Ref. WTP Doc #: 24590-QL-HC4-HAHH-00001-01-00004 BNGA Doc #:OM-0105469-M-00001 Section 5.2.5

Table 1. LINES OF INQUIRY (LOI'S.01) DATED MAY 09, 2006

ORP LOI's	Responses Directly Written by BNI on ORP LOI Form
20. Is there a monorail located above the glove box and the receipt station?	There is not a monorail above the receipt stations or the glove boxes.
21. Describe the internal design of the 3-way valve in the supply lines.	This valve has not been procured. Data sheets have not been issued and are not yet part of a material requisition. Detailed design is not yet available from the vendor. Note: This is not part of the ASX system....
22. Are there any means to visually see inside the glove box other that the glove box window?	No.
23. How long will it take to replace: (1) a diverter valve, (2) a component failure in the receipt station, (3) a major component failure in the glove box, or (4) remove/repair a stuck carrier in the PTS piping?	Maintenance times are documented in Table 4 of the "ASX Reliability Assessment Calculation". Not all of the equipment is referenced in this table. Inclusion of all of the equipment is a comment on the vendor drawing requiring resolution by BNGA. Ref. WTP Doc #: 24590-QL-HC4-HAHH-00001-11-00009 BNGA Doc #: CALC-0105469-EG-00001
24. What minimum radius will be used for the PTS system?	PTS system piping bends have a minimum radius of 48". Bends at the equipment are 20" radius. (Open comment to BNGA asking for justification of reduced radius at equipment) Ref. WTP Doc #: 24590-QL-HC4-HAHH-00001-10-00001 BNGA Doc #: SP-0105469-M-00002 Section 11.1.3

Table 1. LINES OF INQUIRY (LOI'S.01) DATED MAY 09, 2006	
ORP LOI's	**Responses Directly Written by BNI on ORP LOI Form**
25. Please provide the schedule for: design completion, Isolok testing, mock glove box testing, fabrication start, first article fab completion, first article testing, combined glove box component testing, and glove box installation.	Design Completion- The sub-contract for design completion is currently in planning and negotiations. A schedule for design completion will be available October 1, 2006. Isolok Testing- Testing for sample accuracy is complete. The report is in the review cycle and comments have not been assembled for issue back to BNGA. BNGA has completed needle/septum testing to show that the puctured septum will seal properly and needle flushing will not compramise the sample taken. The report has not yet been issued to the project. Mock Glove Box Testing- None scheduled. See Shop Testing. Fabrication Start- Schedule in work. Intend to start LAW/LAB fabrication in FY07. All Shop Testing- Shop Testing is defined in Section 6.1 of the equipment specification: 24590-WTP-3PS-MHSS-T0002-00002. Scheduled for completion prior to equipment delivery, including a fully integrated test: glove box - PTS system - receipt station. Glove Box Installation- To be planned and negotiated after the design completion schedule is developed.
26. What is the radiation level at the floor level (top of concrete) above the glove box?	The areas above the HLW samplers are designated as C2/R2. Ref. 24590-HLW-P1-P01T-00005
27. Where does the contaminated liquid out of the ISOLOK® vent flow to? Is there piping from this vent?	"Isolok flush line to be terminated inside drain line."-Note 2 Ref. WTP Doc #: 24590-QL-HC4-HAHH-00001-06-00101 BNGA Doc #: DWG-0105469-M1-3040002-03 (This is better depicted on the LAW P&ID's. See 24590-QL-HC4-HAHH-00001-06-00081)
28. How many samples will be taken from each sample station per day/week/year? The number of samples is requested, not the pounds of sample.	The frequency of sampling each process vessel depends entirely on the fill rate of the vessel. The frequency varies from 1230 samples/year from each HLW MFPV vessel to 1 sample/month for several of the liquid and spent resin vessels. A complete listing of the frequency per sample point is given in the Integrated Sampling and Analysis Requirements Document (ISARD) Rev 0. (Chris: Should we extract the frequency for each sample point as a separate input?) *The attached spreadsheet (CCN 073212) defines the basis for the minimum magazine capacity. The sample frequency was conservatively estimated on a per shift basis.*

Table 1. LINES OF INQUIRY (LOI'S.01) DATED MAY 09, 2006

ORP LOI's	Responses Directly Written by BNI on ORP LOI Form
29. What part of the engineering will be done by BNI?	BNI Engineering: • Process Pump/Line sizing to/from samplers. • Drain/Vent sizing. • Routing of PTS Piping. • Wall/Floor embeds for all equipment.
30. Are radiation monitors installed in, or near, the glove box?	No radiation monitores are installed in the glove box.
31. What actions will be taken if there is complete flooding of the glove box?	Level detection switches at the glove box drain will detect any flooding of the glove box. A flooded switch alarm will stop all flow from process lines to the glove box.
32. The systems description describes "a supply line isolation valve will be appropriately designed to secure the recirculation process upon completion of sampling". Where is this valve located?	3-way valves for HFP systems are located in a jumper "as close to the vessel as possible". Ref. 24590-HLW-M6-HFP-00001: P&ID, HFP-VSL-00001 *Note 11 24590-HLW-M6-HFP-20001: P&ID, HFP-VSL-00005 *Note 11 All other HLW samples are pumped directly to the samplers with dedicated pumps for each sample. No isolation valve is in the line.

Table 2. LINES OF INQUIRY (LOI'S.02) DATED MAY 24, 2006

ORP's LOI's	Responses Directly Written by BNI on ORP LOI Form
01. The ASX-SMPLR-00012 P&ID shows the ISOLOK vent drain leading to the glove box drain. Is this an over-flow to the drain, or is there piping involved.	The Isolok Vent/Drain is routed through 1/4 tubing to the floor of the glove box at the drain. Ref. BNGA #: DWG-0105269-M2-3010433-01 BNI #: 24590-QL-HC4-HAHH-00001-06-00774
02. The ASX-SMPLR-00012 P&ID, Section B-B, has a bubbled comment on drawing stating "***the glove box drain pipe need not be double-wall.***" Please Explain why the drain pipe leaving the glove box does not need to be double-wall pipe	Supply and return lines pass through an area that require a secondary boundary. The drain line does not pass through any areas that require a secondary boundary.
03. The ASX-SMPLR-00012 P&ID does not show 3-way motorized valves in the sample supply lines within the glove box. Please explain reason for not requiring 3-way valves for 00012 lines.?	Flushing of sample lines is supplied in a separate bulge. Example Ref. 24590-LAW-M6-LFP-00003 P&ID-LAW Melter Feed Process System Melter 2 Feed Preparation And Feed
04. Documents indicate that the PTS system vents to filters what will prevent the rabbit/carrier from getting hung-up when filters are clogged?	The issue with stuck carriers due to venting in the cell vs HEPA filter is underestimating the pressure drop across the HEPA filter, thus reducing the pneumatic transport air for moving the carrier. WTP will ensure that the proper delta P is used in sizing the PTS equipment. There is a pressure transmitter for monitoring pressure drop across the filters.
05. Plastic (ABS) disposable bottles are noted as being used; have calculations or similar data been completed to verify that there are not any compatibility issues between the plastic and waste/sample product?	INEEL has acidic wastes, thus their lessons-learned do not apply to WTP in that our wastes are caustic. However, SRS also identified a issue with ABS bottles, but this issue was related to very specific research experiment that required them to use glassware. This chemistry concern is not applicable to WTP.

Table 2. LINES OF INQUIRY (LOI'S.02) DATED MAY 24, 2006

ORP's LOI's	Responses Directly Written by BNI on ORP LOI Form
06. 24590QL-HC4-HAHH-00001-06-00523 and similar ISO drawings shows very sharp piping elbows/bends that the carriers will have to maneuver/travel in; and Document 24590-QL-HC4-HAHH-00001-10-00001 states that there are 20-inch centerline bend radius as part of piping integral to some of the equipment. What design provisions, beyond portable exhausters, have been incorporated to avoid carriers from becoming stuck? Is this still an open question to BNGA as indicated in BNI's response to LOI.01?	Piping shown on 24590-QL-HC4-HAHH-00001-06-00523 is for supply/return process piping to/from the Isolok Sampler, not PTS piping for routing of the sample carrier. PTS Piping integral to the samplers and receipt stations has a 20-inch bend radius, where the carrier speed is reduced. A comment from BNI regarding justification of the reduced speed/radius remains open. PTS Piping outside these samplers has a 48-inch bend radius. There are currently no design provisions beyond the portable exhausters. Open questions to BNGA are still in work, as discussed in LOI.01.
07. Document 24590-QL-HC4-HAHH-00001-10-00001 show very limited redundancy built within the PTS piping design beyond the sampler CAF at the sample point to the CAF within the LAB. What design provisions have been incorporated to continue plant and sampling operations if leaks are detected or carriers are stuck within the PTS system? (Both in easily assessable and not easily assessable areas.)	Availability of the PTS lines are part of the overall reliability assessment of the ASX system. Open comments still need to be addressed by the vendor. Ref. BNI #: 24590-QL-HC4-HAHH-00001-11-00009 BNGA #: CALC_EG-00001 Calculation - Autosampling System ASX Reliability Assessment Calculation BNI #: 24590-QL-HC4-HAHH-00001-12-00001 BNGA #: RPT_EG-00001 Assessment - WTP Autosampling System Reliability Assessment
08. Does the ASX design meet the revised Seismic criteria and/or do additional calculations and changes need to be implemented?	Revised Seismic criteria has not been implemented into the design. Structural calculations for HLW and PTF equipment will be re-done. Design changes may be necessary for one machine, and there are likely no changes to the balance of the machines. Calculations need to be completed to verify the designs.
09. Who will configure the stepper drive controller software, BNGA or BNI? If this work is performed by BNGA, will BNI become knowledgeable enough to modify the programming?	Configurable devices are initially configured by the vendor(s). Documentation and software required to configure these devices are specified as required deliverables from the vendor and will be provided as part of this sub-contract. This includes and documentation, software, and hardware required to configure the device. All of this is then managed by the project through commissioning and start-up. In addition, items are tested by our C&I group, to verify the communication interface between the drive controller and the WTP control system. This is done prior to Factory Acceptance Testing.

Table 2. LINES OF INQUIRY (LOI'S.02) DATED MAY 24, 2006

ORP's LOI's	Responses Directly Written by BNI on ORP LOI Form
010. What support arrangement has been or will be established regarding future upgrades to the Parker Hannifin 'Motion Planner 4.3.1' software?	The version of the utility software used to configure the drives will be managed as part of the acquired software for this procurement. A copy of the version used will be kept by the project for future use if needed.
011. Do the stepper drive controllers only run with 'Motion Planner' software or is there other COTS software that can be utilized?	Typically, the drive/motor vendor only offers one software utility to configure a particular component.
012. What support arrangement has been or will be established regarding spare stepper motors and stepper drive controllers?	No support arrangement is currently in place. Any necessary arrangements for spare components will be made by Operations at a future date.
013. Can form, fit and function requirements for the stepper motors and drive controllers be met by manufacturers other than Parker Hannifin?	The component selection was done by BNGA as part of their design sub-contract. There may be alternative components available to meet the design requirement, but they have not been identified.
014. What collaboration is planned or currently exists between BNI (C&I) and BNGA regarding ASX/ASJ software development?	There is currently very little collaboration, as the subcontract is just now being resumed. When the subcontract was in full execution, we met weekly with BNI/BNGA C&I groups to be sure all of BNI's expectations were being met with regard to documentation/design of the control system. BNGA is providing functional specifications/logic of the control system, and BNI is implementing these spec's into the WTP control system(s). Factory Acceptance Testing is to be completed using software/hardware provided by BNI. BNI C&I personel will be present to execute the tests using WTP software, platforms, etc.
015. The Auto Sampling System Data Sheet (M2D-ASX-00001) indicates only vessels, IX columns, and a scrubber are sampled. However, the P&ID's (M6-ASX-00005/7) indicate sampling of service racks. Explain the inconsistency.	Lines shown from service racks are to provide flush water to the samplers, not to sample the service racks.
016. The design documents indicate a velocity of about 25 ft/s for the canister. Based on the size of the transfer piping and the exhauster, the air flow velocity is up to 43 ft/s. Is there a calculation relating air velocity to canister velocity? Is there a maximum allowed velocity?	No calculations were provided by the vendor. No maximum allowable velocities for the carrier were provided. However, design completion does require a technical basis for the selection of air flow velocity.
017. Will the removal of a stuck canister be demonstrated? If so, how will it be demonstrated?	Removal of stuck carriers is currently not a required demonstration for Factory Acceptance Testing. The spec is currently being revised and will include an added shop test requirement for removal of stuck carriers.

Table 2. LINES OF INQUIRY (LOI'S.02) DATED MAY 24, 2006		
ORP's LOI's		**Responses Directly Written by BNI on ORP LOI Form**
018. Corrosion and erosion calculations are performed for vessels. Has a similar evaluation been performed for the transfer piping to predict the abrasion/erosion that will occur through the life of the facility? Does B31.3 require an erosion calculation? Have points (such as bends/elbows) for potential accelerated abrasion/erosion been identified?		No corrosion/erosion calculations have been completed for the PTS piping. PVC piping is specified to have a 48" bend radius, rather than the 50 cm (20") in the Sellafield design. The 20" bend radius piping only occurs at the equipment, where the carrier speed is reduced. A comment from BNI regarding justification of the reduced speed/radius remains open. Erosion/corrosion design basis (wall thickness of the PTS piping) will be documented prior to completion of final design.
019. Can a canister leave a docking station without the sample bottle (the sample bottle is stuck on the needle)? If so how can this be detected?		No. See a description of this process in Section 3.1.1 of the Autosampling System Operator Manual. The bottle is attached to the carrier lid. The lid is locked into the robotic arm while in the glovebox. Ref. BNI #: 24590-QL-HC4-HAHH-00001-13-00002 BNGA #: OM-0105469-M-00003
020. If a break were to occur in a line, can it be located quickly? For example are pressure gauges placed periodically in the line to help locate breaks?		Pressure indicators are not part of the current design for detecting line breaks or cracks.
021. Radiation monitors are placed approximately every 50 m. Does that take into account different rooms in the length? Will monitors be placed in each room the transfer piping passes through?		Radiation monitors are not placed along the PTS piping. Tracking switches that sense the carrier magnet pass by are placed every 50 feet. The switches "see" every carrier pass by. If a carrier is stuck, the operator will be able to identify the last switch that was passed by the carrier and locate the carrier +/- 25 feet.

U.S. DEPARTMENT OF ENERGY (DOE), OFFICE OF RIVER PROTECTION (ORP) DESIGN OVERSIGHT PLAN

REVIEW
BECHTEL NATIONAL, INC. (BNI)
RADIOCHEMICAL
ANALYTICAL LABORATORY
PNEUMATIC AUTOSAMPLING SYSTEM DESIGN

MAY 2006

Design Oversight: D-06-DESIGN-027

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RECEIVED
MAY 03 2006
DOE-ORP/ORPCC

1.0 BACKGROUND, PURPOSE AND OBJECTIVES

1.1 Background

The Waste Treatment Plant (WTP) consists of three treatment facilities; Pretreatment (PTF), High Level Waste (HLW) and Low Activity Waste (LAW). The Radiochemical Analytical Laboratory (LAB) and Balance of Facilities support the three treatment facilities. In support of the vitrification process as well as providing process validation and control, waste samples are collected directly from the process waste lines at various treatment stages and analyzed. The autosampling system (ASX) will provide the means for remotely collecting waste samples from the PTF, HLW and LAW process waste lines. Waste samples will be deposited into disposable sample bottles and transported by way of pneumatic transfer piping to receipt stations inside the Laboratory.

The ASX pneumatic transfer system is comprised of the following:

a. Ten Autosampling Units (AU): five AU's in PTF, Three AU's in HLW, and two AU's in LAW
b. Pneumatic Transfer System piping and pneumatic transfer process isolation valves
c. Receipt stations
d. Magazine loading stations at each Autosampling Unit
e. Carrier docking stations with robotic arm
f. Disposable sample bottles/carrier design
g. Diverters
h. Autosample shielding
i. HVAC System, exhaust system robotics, and I&C local control panels

1.2 Purpose

The purpose of this Design Oversight is to assess BNI's Pneumatic Autosampling System design in relation to functional and operational requirements as defined in BNI's design requirements documentation and by the following:

NOTE: (The WTP ASX facility design is at different percentages of completion)

Requirement	List of Document Section/Paragraph (and as applicable)	
DE-AC27-01RV14136 WTP Contract	• C.7 (a)(11) • C.8 Operational Specifications • Standard 3(c)(4) Calculations Equipment Sizing • Standard 3(c)(15) Facility Ventilation System Design	• Standard 3 (c)(18) Analytical Facility Design • Standard 6 (f) Product Qual., Characterization & Certification • Specification 12:12.2.2.1, 12.4 Representative Sample
24590-WTP-DB-ENG-01-001 Basis of Design (BOD)	• 6.2.4 WTP Laboratory • 6.6.1 Sampling Philosophy • 7.2.1 Control Rooms • 7.2.1 Control Room	• 9.6.3 ASX Control System • 11.6.7 Process Sampling Systems • 11.14.3 Product Quality Data • 14.14 Process Sample
24590-WTP-RPT-OP-01-001 Operations Requirements Document	• 10.6 WTP Laboratory • 11.8 ASX Control System	• 11.9 Laboratory Identification System • Appendix A

24590-WTP-PSAR-ESH-01-002-06 (PSAR) Preliminary Safety Analysis Report/Laboratory Specific.

- 2.3.2 Building Description Summary
- 2.4.14.1.1 Hotcell Bay/Air Lock
- 2.4.14.1.2 Hotcells
- 2.4.14.1.5 Radiological Laboratories
- 2.4.14.1.11 Misc C2/R2 Areas
- 2.4.14.2.4.2 Control/Safety
- 2.5.2.1 General Hotcell Description
- 2.5.3.1 General Radiological Laboratory Description
- 2.5.6.1 C2 Floor Drain Collection
- 2.5.6.2 Laboratory Area Sink Drain Collection
- 2.5.9 Process Vacuum System
- 2.5.10 autosampling System
- 3.3.3.1 Analytical Hotcell Laboratory
- 3.3.3.2 Analytical Rad Laboratory
- 3.3.3.3 Autosampling System
- 3.3.6.1.1 Worker Exposure
- 3.3.6.2 Loss of Contamination Control
- 3.4.2.1.3.2 Radiological Consequences
- 3.4.2.1.7 Uncertainties Conservatisms
- 5.5.4.1 Admin Control/Inventory
- Appendix A

1.3 Objectives

The specific objectives of this Design Oversight are:

a. Verify that the pneumatic autosampling transfer system is being designed in accordance with design/functional and operational requirements.

b. Specific areas to evaluate in addition to the overall pneumatic autosampling transfer system are as follows:

- Evaluate BNI's pneumatic autosampling transfer systems reliability, availability, and maintainability design reports
- ISOLOK – verify that the current ISOLOK design (off-the-shelf) will meet WTP operational requirements and consistently obtain a representative waste sample
- Radius of transfer piping system, (i.e. elbows, etc)
- Design of sample carrier (including calculations of transit through pneumatic piping system)
- Pneumatic transfer system shielding design, and accessibility for maintenance.
- Equipment and piping material compatibility
- Fluid system piping (to the auto-sampler station), pump, isolation, and return piping design
- Remote handling equipment design/capability
- Ventilation design and pounds of air utilized within the pneumatic piping system
- Speed of rabbit/carrier through the system (and deceleration technique/design).
- Auto-sampler and hot cell receipt station cell design, robotics, remote capability, HVAC, and shielding
- Operation sequence for sample bottle/carrier re-supply, sample collection, sample bottle capping, decontamination, sample bottle/carrier loading, pneumatic transfer, and receipt station retrieval.
- Future testing prior to installation.

2.0 SCOPE

The scope of this Design Oversight is to assess the Pneumatic Autosampling System design throughout the PTF, LAW, HLW and LAB facilities. The Oversight Team will assess design documents, specifications, calculations, test results, data sheets, plans, sections, instrumentation and control data, as well as reliability, availability and maintainability data related to the following:

a. Autosampling System (ASX), Pneumatic Transfer System (PTS) and Autosampling Control System (ACJ) design.
b. ISOLOK design.
c. Facilities pneumatic transfer system ventilation design.
d. Autosampler cell design with enclosed equipment/materials.

3.0 PREPARATION

a. Identify ORP assessment team; see cover page of this Design Oversight Plan.
b. Identify BNI points of contact (POC)'s for this review: Chris Musick and Janet Roth
c. Identify documents to review and results of previous Contractor external or internal ASX assessments.
e. Identify Contract requirements and Contractor Design requirements.
f. Prepare and implement schedule of Design Oversight activities.
g. Gather "lessons learned" regarding other ASX systems.

4.0 EVALUATE, IDENTIFY AND RESOLVE

The Design Oversight Team will evaluate BNI's pneumatic autosampling system design in relation to functional and operational requirements as defined in paragraph 1.2 above. Lines of inquiry/questions will be identified and transmitted to BNI via e-mail to obtain Contractor responses in an effort to meet oversight objectives. In addition to LOI's, information will be obtained during formal and informal meetings/reviews between Contractor personnel and Design Oversight Team personnel to resolve any additional inquiries.

5.0 REPORTING

The Design Oversight Team Lead will brief DOE management and the Contractor point of contact (POC) periodically during the assessment and prepare a draft report that summarizes activities, results, conclusions, and recommendations of the Design Oversight. The Design Oversight draft report will be issued by the team lead to team members and DOE management for review and comment. In addition the draft report will be issued to the Contractor for a "factual accuracy review". The final report will resolve comments received on the draft report.

6.0 SCHEDULE OF ACTIVITIES

Attachment 1 summarizes the schedule for completion of this Design Oversight.

7.0 DOCUMENTATION

Any findings, assessment follow-up items (AFI)'s or open items (OI)'s identified in this review shall be listed in the final report, and assigned an item number that will be tracked to resolution through CARS. These shall also be tracked to resolution by the Contractor through the Recommendation and Issues Tracking System (RITS) and/or Corrective Actions Report System (CARS) that will be assigned to the transmittal of the report from DOE to the Contractor.

8.0 CLOSURE

The completion of the design review will be upon issuance of the final oversight report by ORP. In addition, once the report is issued, the Team Leader, with concurrence of the Engineering Division Director, will confirm that any findings, assessment follow-up items and/or open items from this review are adequately resolved.

9.0 REFERENCES

DOE Order 226.1, DOE Oversight Policy
ORP M 220.1 Integrated Assessment Program, Rev 4
ORP M 412.1 Consolidated Action Reporting System (CARS)
DE-AC27-01RV14136 WTP Contract
FAR, dated July 1, 2004

ATTACHMENT 1

Schedule of Design Oversight Activities

Activity Description	Responsibility	Early Finish	Late Finish
Develop and Issue Design Oversight Plan	Ryan	April 17 2006	May 1 2006
Identify Team Members	Ryan/Hamel	April 17 2006	May 01 2006
Advise BNI of Oversight; provide Review Plan for identification of BNI information/support.	Ryan	April 03 2006	May 01 2006
Design Oversight Entrance Meeting	ORP Team/BNI	May 08 2006	May 08 2006
Obtain Information/Conduct Assessment	ORP Team/BNI	April 03 2006	May 26 2006
Complete Assessment	BNI and ORP Team Lead/Reviews	May 03 2006	May 26 2006
ORP Individual Team Reviewers Prepare Report to ORP Team Lead	ORP Team Reviewers	May 15 2006	May 26 2006
BNI Factual Accuracy Check of ORP Design Oversight Draft Report	ORP Team Lead and BNI	May 17 2006	June 10 2006
Resolve comments and issue Final Report	ORP Team	June 10 2006	June 15 2006

NOTES:
(1) Schedule subject to change through Design Oversight Team Lead.
(2) Team Lead will notify BNI POC of schedule changes as applicable.