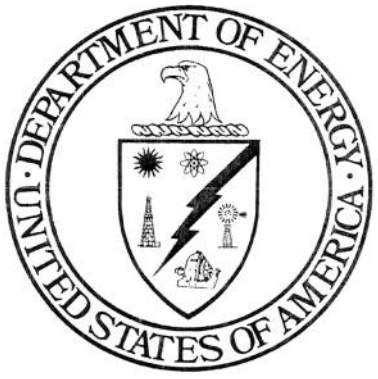
AUTHORIZED LIMITS FOR RELEASE OF OFF-SPECIFICATION AQUEOUS HYDROGEN FLUORIDE GENERATED DURING STARTUP OPERATIONS AT THE DEPLETED URANIUM HEXAFLUORIDE CONVERSION PROJECT IN PORTSMOUTH, OHIO



U.S. DEPARTMENT OF ENERGY
Portsmouth/Paducah Project Office

January 2012

This document has been approved for public release:
Henry Thomas (signature on file) 2-3-2012
Classification & Information Officer Date

Signature Page

Approved:

W E Murphie

William E. Murphie
Manager, PPPO

2/10/12
Date

Concurrence:

Andrew Wallo III
Deputy Director, HS-20
Office of Environmental Protection, Sustainability Support & Corporate Safety Analysis

Date

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Tab 1

APPROVAL MEMO

EM Environmental Management

safety ❖ performance ❖ cleanup ❖ closure

DOE F 1325.8
(3/02)

United States Government

Department of Energy
Portsmouth/Paducah Project Office

memorandum

DATE: FEB 10 2012

PPPO-01-1186-12

REPLY TO ATTN OF: PPPO:Dihel

SUBJECT: **AUTHORIZED LIMITS FOR RELEASE OF OFF-SPECIFICATION AQUEOUS HYDROGEN FLUORIDE GENERATED DURING STARTUP OPERATIONS AT THE DEPLETED URANIUM HEXAFLUORIDE CONVERSION PROJECT IN PORTSMOUTH, OHIO**

TO: Mr. Andrew Wallo, III, Deputy Director, Office of Environmental Protection, Sustainability Support and Corporate Safety Analysis, HS-20/FORS

The Portsmouth/Paducah Project Office (PPPO) is requesting your review of the attached *Authorized Limits for Release of Off-Specification Aqueous Hydrogen Fluoride Generated During Startup Operations at the Depleted Uranium Hexafluoride Conversion Project in Portsmouth, Ohio (November, 2011)* package. The Authorized Limits (AL) package has been prepared in accordance with Department of Energy (DOE) Order 5400.5, *Radiation Protection of the Public and the Environment,* and its accompanying guide DOE G 441.1-XX, *Control And Release Of Property With Residual Radioactive Material,* as well as the January 1997 DOE guidance entitled *Establishment and Coordination of Authorized Limits for Release of Hazardous Waste Containing Residual Radioactive Material* and incorporates the comments submitted to PPPO. This AL package, coupled with the 2005 approved AL package for unrestricted release of project generated aqueous hydrogen fluoride (AqHF), establishes the basis for defining a specific AL for releasing this AqHF solution for treatment and disposal in a Resource Conservation and Recovery Act (RCRA) facility.

The AL in the attached package would apply to approximately 4,700 gallons of off-specification AqHF generated during startup operations at the Depleted Uranium Hexafluoride Conversion Project at the Portsmouth Site.

This AL request is needed since Waste Control Specialists (WCS) is not licensed to disposition the radioactive component of the subject DOE waste stream. Tab 1 to the AL package provides the basis for approval. To assess the potential impacts, a site specific radioactive material dose assessment was conducted for the material after disposal using the Residual Radioactive (RESRAD) computer model (see Tab 3).

This review has been coordinated with the WCS facility and the state of Texas, Texas Commission on Environmental Quality. Both of these entities have concluded the waste is acceptable for disposal in the WCS RCRA landfill. Letters confirming this determination are included as Tabs 4 & 5 for your review. Also provided is a copy of the WCS proposal for treatment and disposal of the subject waste in their RCRA landfill (see Tab 6).

Finally, Tab 7 documents the State of Texas' regulatory authority granted from the Atomic Energy Act and amended by the Nuclear Regulatory Commission.

In accordance with the reference DOE documents, please review the attached AL package. The Office of Environmental Protection, Sustainability Support & Corporate Safety Analysis will notify PPPO within 30 days of receipt of this AL package if the limits or supporting material are incomplete or unacceptable. If notice of incompleteness or unacceptability is not received within 30 days, the AL may be considered approved without written approval from the Office of the Chief Health, Safety and Security Officer. If you have any questions or require additional information, please contact Don Dihel at (270) 441-6824.

William E. Murphie
Manager
Portsmouth/Paducah Project Office

Attachment:
Authorized Limits Package

e-copy w/attachment:
A. Williams, EM-44/CVLF
D. Dihel, PPPO/PAD
G. Vazquez, HS-22/FORS
J. Zimmerman, PPPO/LEX
W. Murphie, PPPO/LEX

Tab 2

BASIS FOR APPROVAL

Disposition of Off-Specification Aqueous Hydrogen Fluoride at

the Portsmouth Site Generated by Depleted Uranium Hexafluoride

Conversion Project Startup Operations (January, 2012)

Introduction:

The Department of Energy (DOE) owns the Portsmouth Gaseous Diffusion Plant (Portsmouth), located near Piketon, Ohio. During the course of Gaseous Diffusion facility operations, a large inventory of depleted uranium hexafluoride (DUF_6) was generated. This inventory of DUF_6 is stored in large cylinders on site. In 2011, DOE commenced the start-up of a conversion facility, which would chemically convert the DUF_6 into a more stable chemical form, depleted uranium oxide, and aqueous Hydrogen Fluoride (AqHF).

In preparation for the operations of the conversion plant, DOE approved Authorized Limits for the clearance (i.e., radiological release) of aqueous hydrogen fluoride, a co-product of the conversion process. These Authorized Limits, approved under DOE's Atomic Energy Act authority, were signed by William E. Murphie, Director of DOE's Portsmouth-Paducah Program Office (PPPO), on August 12, 2005. Andrew Wallo, with the DOE Headquarters Office of Air Water and Radiation, concurred on the limits on October 20, 2005. The Authorized Limits approve the unrestricted release of AqHF into commerce for beneficial reuse. The information contained in the approval package demonstrates that clearance of the AqHF adequately protects the public from the trace uranium contained in the AqHF. The Authorized Limits apply to AqHF with a nominal 55% HF content by weight and restricts the uranium content to no more than 3 picoCuires (pCi) per milliliter (ml).

During startup operations of the DUF_6 conversion plant, the facility generated some AqHF that does not meet these specifications. Specifically, the solution has a nominal concentration of 14% hydrogen fluoride with a uranium content of 32 micrograms per milliliter (ug/ml) or 12 picoCuries per gram (pCi/g). The volume of the off-specification material is approximately 4,700 gallons.

The DOE PPPO is identifying disposition options for this material. One disposition option would be to treat the solution as a waste. If it were considered a waste, it would be classified as a hazardous waste under the Resource Conservation and Recovery Act (RCRA) with the waste code U-134. Since the waste also includes radioactive materials, the waste would be considered a mixed waste. Consequently, the solution would be treated to neutralize the corrosive component and solidified prior to disposal. Once treated, the waste could be dispositioned in a low-level RCRA permitted radiological landfill. However, if Authorized Limits for this waste stream are approved, the same waste can be disposed into a RCRA permitted landfill. This document develops the technical basis for establishing a specific Authorized Limit for releasing this AqHF solution for treatment and disposal in a RCRA permitted facility. Other disposition

options are also viable, and the decision will be made based on a wide range of factors, including but not limited to, safety, protection of human health and the environment, cost, simplicity, compliance uncertainties, and schedule. This request is a onetime request.

Description of Material and Possible Treatment and Disposal

The material in question is ~4700 gallons (~18,000 liters) of 14% (by weight) off-specification AqHF. There are 32 micrograms/milliliter of depleted Uranium in the solution. The total uranium in 18,000 liters is 570 grams, or 1.3 pounds of depleted uranium.

The Uranium concentration can be converted to activity per gram by multiplying the volumetric concentration by the specific activity of depleted Uranium (3.6E-07 Curies (Ci) per gram (Ci/g)). The resulting activity concentration is 12 pCi/g.

The likely treatment of the material as a RCRA waste would involve neutralizing the acid with lime, limestone, or some other basic substance. Neutralization with lime or limestone would produce calcium fluoride (CaF_2). If the specific gravity of the AqHF solution is 1.05, each liter of solution will contain 900 grams of water and 150 grams of HF. Each liter of solution will produce 290 grams of CaF_2. With 32 milligrams of Uranium in 290 grams of CaF_2, the concentration of depleted uranium is 110 micrograms per gram or 110 parts per million. The total estimated weight of the CaF_2 solidified waste is 5.4 metric tons. During processing of the solution, the treatment process may use additional materials (sand, fly ash, gravel, Portland cement, etc.) as inert ingredients to stabilize and improve the handling properties of the treated waste. The usage of these inert ingredients would decrease the uranium concentration and increase the volume of waste proportionally.

The radiological concentration of the uranium in the waste can be determined by multiplying the specific activity of depleted uranium (3.6E-07 Ci/g) times the concentration, yielding 40 picoCuries depleted uranium (DU) per gram of CaF_2. The previously approved Authorized Limits for depleted Uranium (DU) in CaF_2 is 30 picoCuries. The usage of inert ingredients would further reduce the concentration of uranium and increase the volume of waste and lower the activity concentration.

If this material is determined to be a waste, it would likely be shipped to the Waste Control Specialists (WCS) facility in Andrews, Texas for treatment. At WCS, the material would be treated with limestone or lime to neutralize the acid. Once treated, the waste will be prepared for shipment to Energy*Solutions* for burial in their low-level radiological waste landfill, or, if Authorized Limits are established, retained on-site and placed in the WCS RCRA landfill. Other possible disposition choices would be based on previously identified factors.

Disposal Facility Description

The WCS facility in western Andrews County is the only commercial facility in the United States licensed to dispose of Class A, B and C low-level radioactive waste. It is licensed/permitted for RCRA and TSCA hazardous waste treatment, storage and disposal, and for the treatment and storage of low-level radioactive waste. WCS has safely and successfully served as a temporary storage facility for past DOE projects.

Situated in an arid and isolated location, the WCS facility sits atop a formation of 500 feet of impermeable red-bed clay which makes it an ideal setting for the storage and disposal of low-level radioactive waste. The state of Texas has determined the WCS facility does not sit above or adjacent to any underground drinking water formations.

The WCS RCRA Cell

Waste authorized for disposal in the WCS RCRA cell will be placed in a hazardous waste disposal cell with double plastic and clay liners and a double leachate collection system. The bottom of this cell extends well into the natural clay formation. An additional ten feet of compacted clay has been placed under the sidewall double liner from the surface down to the natural redbed clay, which provides an additional natural barrier for lateral migration near the surface.

Dose Evaluation

The possible radiation exposure of workers during the neutralization and treatment activities is amply addressed in the evaluation supporting the current, approved Authorized Limits (Murphie, 2005). The approved release limit of 3 picoCuries per milliliter (pCi/ml) for AqHF correlates to a release limit of 1.5 picoCuries per gram (pCi/g) in CaF_2. Based on a worst plausible use scenario discussed in section 4.3 in DUF6-G-Q-STU-001, Revision 3, *ALARA Analysis Supporting Approval of Authorized Limits for Unrestricted Release of Hydrogen Fluoride and Calcium Fluoride During DUF6 Conversion Operations*, the worker's internal radiation exposure from inhalation of CaF_2 particulates (with 1.5 pCi/g in CaF_2), assuming the 2.5mg/m^3 OSHA permissible airborne exposure limit for CaF_2 (as fluorine), is approximately 0.132 millirem per year (mrem/yr). The expected worker dose from external exposure to CaF_2 is on the order of 0.01 mrem/yr. Therefore, with a concentration of 12 pCi/g, the worker's exposure would be 0.53 mrem/yr (inhalation) and 0.04 mrem/yr (external). However, the worker exposure in DUF6-G-Q-STU-001 is based on an annual exposure to 21,000 metric tons per year. The possible disposal of the off-specification AqHF involves 18,000 liters of AqHF or (using a specific gravity of 1.05 and converting kilograms to metric tons) 19 metric tons. The ratio of concentration, exposure time, and volume reduces the worker internal exposure from 0.53 mrem/yr to 4.8E-4 mrem/yr and the external dose from 0.04 mrem/yr to 4E -5 mrem/yr. In addition, the dose to the worker in DUF6-G-Q-STU-001 is a chronic exposure while the exposure to this off-specification HF would be an acute dose. Potential biological effects depend

on how much and how fast a radiation dose is received. The body has time to repair damage because a smaller percentage of the cells need repair.

Also, the possible disposal of the treated waste in a landfill requires evaluation. WCS has stated that 620 cubic feet (ft^3) (~4700 gallons of HF) of the off-specification HF will generate 1400 ft^3 of solid waste when mixed with the Portland cement. This is equivalent to 40 cubic meters (m^3). The total curie content is 32 ug/ml x 4700 gallons x 3785 ml/gallon x 3.6E-7 Ci/g x 1E-6g/ug or 2.1E-4 Ci. Using a density of 2.3g/cm^3 for Portland cement, this gives us a concentration of 2.1E8 pCi / (40 m^3 *7. 1E6 cm^3/m^3 x 2.3 g/cm^3) or 3.0 pCi/g.

The RESRAD Code (Yu et al.), Version 6.5, was used for evaluating the land disposal of the material. The results are provided in Attachment 2, and show a dose of 0.16 millirem per year. The default parameters were used, with a few exceptions:

- The contamination area is set to 40 square meters, with the (default) thickness of the contaminated zone at 1 meter. This accounts for the volume of the material.
- The radionuclide concentrations (3.0 pCi/g) are set at 2.7 pCi/g of Uranium (U) -238, 0.033 pCi/g U-235, and 0.25 pCi/g of U-234. This is based on at 0.2 weight percent sample that had the following results:

    - Total U 3.70E-7 Ci/g
    - U-234 3.07E-8 Ci/g (8.3%)
    - U-235 4.32E-9 Ci/g (1.1%)
    - U-238 3.35E-7 Ci/g (91%)

This assumed exposure has numerous overly conservative assumptions. Here is a discussion of some of the assumptions:

- The material would be placed in a landfill. Landfills are always designed to have a cover. However, in these calculations, no allowance for a cover was made. Also, no credit was taken for the waste package, such as a steel drum.
- The calculations were made using a "resident farmer" land use. It is hardly likely that any farm would be constructed on a landfill or that institutional controls would fail. Farming on a landfill might very well be impossible, because the emplaced material might not support crops. However, this assumption does permit the bounding evaluation of a range of agricultural pathways even though the future use is dubious.
- The calculations assume that the "resident farmers" spend 50% of their time indoors on the 40 square meter area and 25% outdoors on the 3 square meter area. This is not plausible, but the assumption was made for the purpose of a bounding calculation.
- For the evaluation of possible future groundwater impacts, the calculations ignored the fact that the disposal cell includes a double plastic and clay liner and double leachate collection system. The bottom of the cell extends well into the natural clay formation.

An additional ten feet of compacted clay has been placed under the sidewall double liner from the surface down to the natural redbed clay which provides an additional natural barrier for lateral migration near the surface. This cell structure makes transmission of radioactivity to the groundwater very unlikely. The RESRAD calculations (using default groundwater parameters) show a dose from groundwater at 1000 years in the future at 0.22 mrem/year.

- The results of the calculations show the initial primary exposure pathway to be the result of direct gamma radiation with a minor contribution from inhalation of dust. The addition of a cover to the exposure scenario would cause the exposure to be zero. Any reduction in the occupancy would reduce the gamma radiation exposure.
- The calculation included exposure to Radon. No credit was given for the landfill cover or the waste package for containing Radon.
- The analysis includes a zero (0) erosion rate for the waste.

The results (Attachment 2) show the highest dose of 0.16 mrem/yr occurs at year 0 for evaluation of this Authorized Limit request.

ALARA Analysis

The ALARA process was used to evaluate the proposed release limits and prepare this analysis. The approach includes evaluating the expected dose to the workers and the public in the most likely and worst plausible use scenarios. The limits are practical and verifiable, and consistent with DOE guidance.

Doses have been calculated for workers and members of the public for this alternative being considered. For each exposed group, both maximally exposed individual doses are calculated. The expected dose equivalent from the exposure of HF with treatment and burial of CaF_2 are:

- For the worker, .00053 mrem (4.8E-4 mrem (inhalation) and 4E -5 mrem (external))
- For public exposure, 0.16 millirem per year.

To calculate the dose to the MEI, the following equation can be used:

$$X_1 = (\sum_{n=1}^{n=3} SRSG_n A_n)/{r_1}^2$$

where:
X_1 = Exposure rate
$SRSG_n$ = SRSG from RESRAD Run (See Attachment 2)
A = activity of the source in curies
r_1 = distance from source

n = nuclides identified in Authorized Limits request

To calculate the dose to a person at 50 miles, the following equation can be used:

$$X_2 = (\sum_{n=1}^{n=3} SRSG_n A_n)/{r_2}^2$$

where:
X_2 = Exposure rate
$SRSG_n$ = SRSG from RESRAD Run (See Attachment 2)
A = activity of the source in curies
r_2 = distance from source
n = nuclides identified in Authorized Limits request

Setting both equations to $(\sum_{n=1}^{n=3} \Gamma_n A_n)$ gives

$$X_1 {r_1}^2 = X_2 {r_2}^2$$

Since the MEI assumed to be 0.1 mile from the site and has a maximum dose of 0.22 mrem/yr, a person at 50 miles would have a dose of:

$$0.16 \frac{\text{mrem}}{\text{yr}} * (.1 \text{ miles})^2 = \text{X}_2 * (50 \text{ miles})^2$$

$$\text{X}_2 = 6.4\text{E} - 7 \frac{\text{mrem}}{\text{yr}}$$

As of the census of 2000, there were 9,652 people residing in the city. The population density was 2,017.5 people per square mile. A radius of 50 miles is $A = \pi r^2$ or 7850 square miles. Since the actual dispersion of the population is unknown, it can be assumed that the population is evenly distributed. Therefore, the average exposure for the population would be at 25 miles. At 25 miles, the exposure for the person would be:

$$0.16 \frac{\text{mrem}}{\text{yr}} * (.1 \text{ miles})^2 = \text{X}_2 * (25 \text{ miles})^2$$

$$\text{X}_2 = 2.6\text{E} - 6 \frac{\text{mrem}}{\text{yr}}$$

This makes the cumulative exposure (CE):

$$CE = 2.6E - 6 \frac{\frac{mrem}{yr}}{person} \times 7850\ miles^2 \times 2{,}018 \frac{persons}{mile^2} \times \frac{1\ rem}{10^3\ mrem}$$

$$CE = 0.041 \text{ person-rem}$$

Per DOE handbook, DOE-STD-ALARA 1 Draft, *Applying the ALARA Process for Radiation Protection of the Public and Environmental Compliance with 10CFR Part 834 and DOE 5400.5 ALARA Program Requirements,* the health-detriment costs for the release limit are estimated based on the DOE suggestion of $1,000 to $6,000 per person-rem. These costs represent the amount of expenditures that can be justified to implement additional measures to further mitigate risks from releases of uranium in the off-specification HF. The cost is 0.041 times $6000 or $250. The estimated cost for disposal as a mixed waste would be in excess of $200,000. It can be concluded that approval of the Authorized Limits request meets the requirements of DOE O 5400.5 for ALARA.

Basis for Approving Authorized Limits:

DOE Order 5400.5, Chapter II, establishes the basis for approving Authorized Limits for clearance (i.e., radiological release) of material from radiological controls. Guidance (Pelletir, 1995, and DOE Guide 441.1-XX) requires the following criteria to be met for Authorized Limits:

1. selected (and approved by DOE) on the basis of an assessment under the ALARA process to optimize the balance between risks and benefits (e.g., collective doses and costs) and to ensure individual doses to the public are less than 25 mrem in a year, with a goal of a few millirem in a year or less;

2. evaluated to ensure groundwater will be protected consistent with the objectives of the applicable State regulations and guidelines;

3. assessed to ensure release of the landfill property would not be expected to require remediation under DOE 5400.5 or other applicable requirements for release of property containing residual radioactive material as a result of DOE disposals; and

4. coordinated with and acceptable to the landfill authority (e.g., municipal or private operator) implementing the acceptance criteria, and with State representatives responsible for implementing solid waste regulations to ensure DOE releases do not violate landfill specific radiological protection requirements.

Since the material involves uranium, Radon was included in the RESRAD run and does not contribute significantly to the dose.

Further, the DOE Site Manager is authorized to approve the limits when the following criteria are met:

> Request reviewed and approved by DOE field elements in coordination with program office and submitted to EH-4 at least 45 working days prior to implementation. Submittal to EH-4 is mandatory. (From DOE G 441.1-XX, Table 3, Page 38)

Demonstration of Compliance with Authorized Limit Requirements:

The calculated radiation doses meet both the requirements for an authorized limit (a few mrems or less of cumulative exposure) and the requirement for the Field Office Manager to approve the limits (less than one mrem). The Field Office has coordinated with the program office (EM-43 and EM-44).

The RESRAD calculations show no significant effects on groundwater, even ignoring the site double liner and the thick clay layer underlying the site. It also did not credit any waste packaging that would minimize or delay the release of the residual radioactive materials.

There is little likelihood that the site might require future remediation as a result of the material disposition. The inventory of material is low and the concentration is in the range of cleanup criteria used for remediation of sites for free release of property. The affected area is also quite small.

The disposition of the material to WCS is acceptable to both WCS and the State of Texas. See the documentation in Attachments 4 & 5.

Summary:

Disposal of the off-specification aqueous HF solution meets DOE requirements for an authorized release at an off-site landfill, and also meets the requirements for the approval of the Authorized Limits by the Field Office Manager.

Tab 3

RESRAD SUMMARY REPORT

[This document supports condition 1 (maximum annual dose is less than 1 mrem and collective dose is less than 10 person-rem) for expedited approval]
(This also supports that ALARA requirements are met, which satisfies condition 3.c for expedited approval)

Table of Contents

Part I: Mixture Sums and Single Radionuclide Guidelines

Dose Conversion Factor (and Related) Parameter Summary
Dose Library: FGR 12 & FGR 11

Menu	Parameter	Current Value#	Base Case*	Parameter Name
A-1	DCF's for external ground radiation, (mrem/yr)/(pCi/g)			
A-1	Ac-227 (Source: FGR 12)	4.951E-04	4.951E-04	DCF1(1)
A-1	At-218 (Source: FGR 12)	5.847E-03	5.847E-03	DCF1(2)
A-1	Bi-210 (Source: FGR 12)	3.606E-03	3.606E-03	DCF1(3)
A-1	Bi-211 (Source: FGR 12)	2.559E-01	2.559E-01	DCF1(4)
A-1	Bi-214 (Source: FGR 12)	9.808E+00	9.808E+00	DCF1(5)
A-1	Fr-223 (Source: FGR 12)	1.980E-01	1.980E-01	DCF1(6)
A-1	Pa-231 (Source: FGR 12)	1.906E-01	1.906E-01	DCF1(7)
A-1	Pa-234 (Source: FGR 12)	1.155E+01	1.155E+01	DCF1(8)
A-1	Pa-234m (Source: FGR 12)	8.967E-02	8.967E-02	DCF1(9)
A-1	Pb-210 (Source: FGR 12)	2.447E-03	2.447E-03	DCF1(10)
A-1	Pb-211 (Source: FGR 12)	3.064E-01	3.064E-01	DCF1(11)
A-1	Pb-214 (Source: FGR 12)	1.341E+00	1.341E+00	DCF1(12)
A-1	Po-210 (Source: FGR 12)	5.231E-05	5.231E-05	DCF1(13)
A-1	Po-211 (Source: FGR 12)	4.764E-02	4.764E-02	DCF1(14)
A-1	Po-214 (Source: FGR 12)	5.138E-04	5.138E-04	DCF1(15)
A-1	Po-215 (Source: FGR 12)	1.016E-03	1.016E-03	DCF1(16)
A-1	Po-218 (Source: FGR 12)	5.642E-05	5.642E-05	DCF1(17)
A-1	Ra-223 (Source: FGR 12)	6.034E-01	6.034E-01	DCF1(18)
A-1	Ra-226 (Source: FGR 12)	3.176E-02	3.176E-02	DCF1(19)
A-1	Rn-219 (Source: FGR 12)	3.083E-01	3.083E-01	DCF1(20)
A-1	Rn-222 (Source: FGR 12)	2.354E-03	2.354E-03	DCF1(21)
A-1	Th-227 (Source: FGR 12)	5.212E-01	5.212E-01	DCF1(22)
A-1	Th-230 (Source: FGR 12)	1.209E-03	1.209E-03	DCF1(23)
A-1	Th-231 (Source: FGR 12)	3.643E-02	3.643E-02	DCF1(24)
A-1	Th-234 (Source: FGR 12)	2.410E-02	2.410E-02	DCF1(25)
A-1	Tl-207 (Source: FGR 12)	1.980E-02	1.980E-02	DCF1(26)
A-1	Tl-210 (Source: no data)	0.000E+00	-2.000E+00	DCF1(27)
A-1	U-234 (Source: FGR 12)	4.017E-04	4.017E-04	DCF1(28)
A-1	U-235 (Source: FGR 12)	7.211E-01	7.211E-01	DCF1(29)
A-1	U-238 (Source: FGR 12)	1.031E-04	1.031E-04	DCF1(30)
B-1	Dose conversion factors for inhalation, mrem/pCi:			
B-1	Ac-227+D	6.724E+00	6.700E+00	DCF2(1)
B-1	Pa-231	1.280E+00	1.280E+00	DCF2(2)
B-1	Pb-210+D	2.320E-02	1.360E-02	DCF2(3)
B-1	Ra-226+D	8.594E-03	8.580E-03	DCF2(4)
B-1	Th-230	3.260E-01	3.260E-01	DCF2(5)
B-1	U-234	1.320E-01	1.320E-01	DCF2(6)
B-1	U-235+D	1.230E-01	1.230E-01	DCF2(7)
B-1	U-238	1.180E-01	1.180E-01	DCF2(8)
B-1	U-238+D	1.180E-01	1.180E-01	DCF2(9)
D-1	Dose conversion factors for ingestion, mrem/pCi:			
D-1	Ac-227+D	1.480E-02	1.410E-02	DCF3(1)
D-1	Pa-231	1.060E-02	1.060E-02	DCF3(2)
D-1	Pb-210+D	7.276E-03	5.370E-03	DCF3(3)
D-1	Ra-226+D	1.321E-03	1.320E-03	DCF3(4)
D-1	Th-230	5.480E-04	5.480E-04	DCF3(5)
D-1	U-234	2.830E-04	2.830E-04	DCF3(6)
D-1	U-235+D	2.673E-04	2.660E-04	DCF3(7)

Dose Conversion Factor (and Related) Parameter Summary (continued)
Dose Library: FGR 12 & FGR 11

Menu	Parameter	Current Value#	Base Case*	Parameter Name
D-1	U-238	2.550E-04	2.550E-04	DCF3(8)
D-1	U-238+D	2.687E-04	2.550E-04	DCF3(9)
D-34	Food transfer factors:			
D-34	Ac-227+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(1,1)
D-34	Ac-227+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-05	2.000E-05	RTF(1,2)
D-34	Ac-227+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-05	2.000E-05	RTF(1,3)
D-34				
D-34	Pa-231 , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(2,1)
D-34	Pa-231 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.000E-03	5.000E-03	RTF(2,2)
D-34	Pa-231 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(2,3)
D-34				
D-34	Pb-210+D , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(3,1)
D-34	Pb-210+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-04	8.000E-04	RTF(3,2)
D-34	Pb-210+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	3.000E-04	3.000E-04	RTF(3,3)
D-34				
D-34	Ra-226+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(4,1)
D-34	Ra-226+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(4,2)
D-34	Ra-226+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(4,3)
D-34				
D-34	Th-230 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(5,1)
D-34	Th-230 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(5,2)
D-34	Th-230 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(5,3)
D-34				
D-34	U-234 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(6,1)
D-34	U-234 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(6,2)
D-34	U-234 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(6,3)
D-34				
D-34	U-235+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(7,1)
D-34	U-235+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(7,2)
D-34	U-235+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(7,3)
D-34				
D-34	U-238 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(8,1)
D-34	U-238 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(8,2)
D-34	U-238 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(8,3)
D-34				
D-34	U-238+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(9,1)
D-34	U-238+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(9,2)
D-34	U-238+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(9,3)
D-5	Bioaccumulation factors, fresh water, L/kg:			
D-5	Ac-227+D , fish	1.500E+01	1.500E+01	BIOFAC(1,1)
D-5	Ac-227+D , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(1,2)
D-5				
D-5	Pa-231 , fish	1.000E+01	1.000E+01	BIOFAC(2,1)
D-5	Pa-231 , crustacea and mollusks	1.100E+02	1.100E+02	BIOFAC(2,2)
D-5				
D-5	Pb-210+D , fish	3.000E+02	3.000E+02	BIOFAC(3,1)
D-5	Pb-210+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(3,2)
D-5				

Dose Conversion Factor (and Related) Parameter Summary (continued)
Dose Library: FGR 12 & FGR 11

Menu	Parameter	Current Value#	Base Case*	Parameter Name
D-5	Ra-226+D , fish	5.000E+01	5.000E+01	BIOFAC(4,1)
D-5	Ra-226+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(4,2)
D-5				
D-5	Th-230 , fish	1.000E+02	1.000E+02	BIOFAC(5,1)
D-5	Th-230 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(5,2)
D-5				
D-5	U-234 , fish	1.000E+01	1.000E+01	BIOFAC(6,1)
D-5	U-234 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(6,2)
D-5				
D-5	U-235+D , fish	1.000E+01	1.000E+01	BIOFAC(7,1)
D-5	U-235+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(7,2)
D-5				
D-5	U-238 , fish	1.000E+01	1.000E+01	BIOFAC(8,1)
D-5	U-238 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(8,2)
D-5				
D-5	U-238+D , fish	1.000E+01	1.000E+01	BIOFAC(9,1)
D-5	U-238+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(9,2)

#For DCF1(xxx) only, factors are for infinite depth & area. See ETFG table in Ground Pathway of Detailed Report.
*Base Case means Default.Lib w/o Associate Nuclide contributions.

Site-Specific Parameter Summary

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R011	Area of contaminated zone (m**2)	4.000E+01	1.000E+04	---	AREA
R011	Thickness of contaminated zone (m)	1.000E+00	2.000E+00	---	THICK0
R011	Fraction of contamination that is submerged	0.000E+00	0.000E+00	---	SUBMFRACT
R011	Length parallel to aquifer flow (m)	4.000E+01	1.000E+02	---	LCZPAQ
R011	Basic radiation dose limit (mrem/yr)	1.000E+00	3.000E+01	---	BRDL
R011	Time since placement of material (yr)	0.000E+00	0.000E+00	---	TI
R011	Times for calculations (yr)	1.000E+00	1.000E+00	---	T(2)
R011	Times for calculations (yr)	3.000E+00	3.000E+00	---	T(3)
R011	Times for calculations (yr)	1.000E+01	1.000E+01	---	T(4)
R011	Times for calculations (yr)	3.000E+01	3.000E+01	---	T(5)
R011	Times for calculations (yr)	1.000E+02	1.000E+02	---	T(6)
R011	Times for calculations (yr)	3.000E+02	3.000E+02	---	T(7)
R011	Times for calculations (yr)	1.000E+03	1.000E+03	---	T(8)
R011	Times for calculations (yr)	1.000E+04	0.000E+00	---	T(9)
R011	Times for calculations (yr)	not used	0.000E+00	---	T(10)
R012	Initial principal radionuclide (pCi/g): U-234	1.900E-01	0.000E+00	---	S1(6)
R012	Initial principal radionuclide (pCi/g): U-235	2.500E-02	0.000E+00	---	S1(7)
R012	Initial principal radionuclide (pCi/g): U-238	2.100E+00	0.000E+00	---	S1(8)
R012	Concentration in groundwater (pCi/L): U-234	not used	0.000E+00	---	W1(6)
R012	Concentration in groundwater (pCi/L): U-235	not used	0.000E+00	---	W1(7)
R012	Concentration in groundwater (pCi/L): U-238	not used	0.000E+00	---	W1(8)
R013	Cover depth (m)	0.000E+00	0.000E+00	---	COVER0
R013	Density of cover material (g/cm**3)	not used	1.500E+00	---	DENSCV
R013	Cover depth erosion rate (m/yr)	not used	1.000E-03	---	VCV
R013	Density of contaminated zone (g/cm**3)	2.300E+00	1.500E+00	---	DENSCZ
R013	Contaminated zone erosion rate (m/yr)	0.000E+00	1.000E-03	---	VCZ
R013	Contaminated zone total porosity	4.000E-01	4.000E-01	---	TPCZ
R013	Contaminated zone field capacity	2.000E-01	2.000E-01	---	FCCZ
R013	Contaminated zone hydraulic conductivity (m/yr)	1.000E+01	1.000E+01	---	HCCZ
R013	Contaminated zone b parameter	5.300E+00	5.300E+00	---	BCZ
R013	Average annual wind speed (m/sec)	2.000E+00	2.000E+00	---	WIND
R013	Humidity in air (g/m**3)	not used	8.000E+00	---	HUMID
R013	Evapotranspiration coefficient	5.000E-01	5.000E-01	---	EVAPTR
R013	Precipitation (m/yr)	1.000E+00	1.000E+00	---	PRECIP
R013	Irrigation (m/yr)	2.000E-01	2.000E-01	---	RI
R013	Irrigation mode	overhead	overhead	---	IDITCH
R013	Runoff coefficient	2.000E-01	2.000E-01	---	RUNOFF
R013	Watershed area for nearby stream or pond (m**2)	1.000E+06	1.000E+06	---	WAREA
R013	Accuracy for water/soil computations	1.000E-03	1.000E-03	---	EPS
R014	Density of saturated zone (g/cm**3)	2.000E+00	1.500E+00	---	DENSAQ
R014	Saturated zone total porosity	4.000E-01	4.000E-01	---	TPSZ
R014	Saturated zone effective porosity	2.000E-01	2.000E-01	---	EPSZ
R014	Saturated zone field capacity	2.000E-01	2.000E-01	---	FCSZ
R014	Saturated zone hydraulic conductivity (m/yr)	1.000E+02	1.000E+02	---	HCSZ
R014	Saturated zone hydraulic gradient	2.000E-02	2.000E-02	---	HGWT
R014	Saturated zone b parameter	5.300E+00	5.300E+00	---	BSZ
R014	Water table drop rate (m/yr)	1.000E-03	1.000E-03	---	VWT
R014	Well pump intake depth (m below water table)	1.000E+01	1.000E+01	---	DWIBWT

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R014	Model: Nondispersion (ND) or Mass-Balance (MB)	ND	ND	---	MODEL
R014	Well pumping rate (m**3/yr)	2.500E+02	2.500E+02	---	UW
R015	Number of unsaturated zone strata	1	1	---	NS
R015	Unsat. zone 1, thickness (m)	4.000E+00	4.000E+00	---	H(1)
R015	Unsat. zone 1, soil density (g/cm**3)	1.500E+00	1.500E+00	---	DENSUZ(1)
R015	Unsat. zone 1, total porosity	4.000E-01	4.000E-01	---	TPUZ(1)
R015	Unsat. zone 1, effective porosity	2.000E-01	2.000E-01	---	EPUZ(1)
R015	Unsat. zone 1, field capacity	2.000E-01	2.000E-01	---	FCUZ(1)
R015	Unsat. zone 1, soil-specific b parameter	5.300E+00	5.300E+00	---	BUZ(1)
R015	Unsat. zone 1, hydraulic conductivity (m/yr)	1.000E+01	1.000E+01	---	HCUZ(1)
R016	Distribution coefficients for U-234				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC(6)
R016	Unsaturated zone 1 (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCU(6,1)
R016	Saturated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCS(6)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	4.336E-03	ALEACH(6)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(6)
R016	Distribution coefficients for U-235				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC(7)
R016	Unsaturated zone 1 (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCU(7,1)
R016	Saturated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCS(7)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	4.336E-03	ALEACH(7)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(7)
R016	Distribution coefficients for U-238				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC(8)
R016	Unsaturated zone 1 (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCU(8,1)
R016	Saturated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCS(8)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	4.336E-03	ALEACH(8)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(8)
R016	Distribution coefficients for daughter Ac-227				
R016	Contaminated zone (cm**3/g)	2.000E+01	2.000E+01	---	DCNUCC(1)
R016	Unsaturated zone 1 (cm**3/g)	2.000E+01	2.000E+01	---	DCNUCU(1,1)
R016	Saturated zone (cm**3/g)	2.000E+01	2.000E+01	---	DCNUCS(1)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.079E-02	ALEACH(1)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(1)
R016	Distribution coefficients for daughter Pa-231				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC(2)
R016	Unsaturated zone 1 (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCU(2,1)
R016	Saturated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCS(2)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	4.336E-03	ALEACH(2)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(2)

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for daughter Pb-210				
R016	Contaminated zone (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCC(3)
R016	Unsaturated zone 1 (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCU(3,1)
R016	Saturated zone (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCS(3)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.171E-03	ALEACH(3)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(3)
R016	Distribution coefficients for daughter Ra-226				
R016	Contaminated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCC(4)
R016	Unsaturated zone 1 (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCU(4,1)
R016	Saturated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCS(4)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.099E-03	ALEACH(4)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(4)
R016	Distribution coefficients for daughter Th-230				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(5)
R016	Unsaturated zone 1 (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCU(5,1)
R016	Saturated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCS(5)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.623E-06	ALEACH(5)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(5)
R017	Inhalation rate (m**3/yr)	8.400E+03	8.400E+03	---	INHALR
R017	Mass loading for inhalation (g/m**3)	1.000E-04	1.000E-04	---	MLINH
R017	Exposure duration	3.000E+01	3.000E+01	---	ED
R017	Shielding factor, inhalation	4.000E-01	4.000E-01	---	SHF3
R017	Shielding factor, external gamma	7.000E-01	7.000E-01	---	SHF1
R017	Fraction of time spent indoors	5.000E-01	5.000E-01	---	FIND
R017	Fraction of time spent outdoors (on site)	2.500E-01	2.500E-01	---	FOTD
R017	Shape factor flag, external gamma	1.000E+00	1.000E+00	>0 shows circular AREA.	FS
R017	Radii of shape factor array (used if FS = -1):				
R017	Outer annular radius (m), ring 1:	not used	5.000E+01	---	RAD_SHAPE(1)
R017	Outer annular radius (m), ring 2:	not used	7.071E+01	---	RAD_SHAPE(2)
R017	Outer annular radius (m), ring 3:	not used	0.000E+00	---	RAD_SHAPE(3)
R017	Outer annular radius (m), ring 4:	not used	0.000E+00	---	RAD_SHAPE(4)
R017	Outer annular radius (m), ring 5:	not used	0.000E+00	---	RAD_SHAPE(5)
R017	Outer annular radius (m), ring 6:	not used	0.000E+00	---	RAD_SHAPE(6)
R017	Outer annular radius (m), ring 7:	not used	0.000E+00	---	RAD_SHAPE(7)
R017	Outer annular radius (m), ring 8:	not used	0.000E+00	---	RAD_SHAPE(8)
R017	Outer annular radius (m), ring 9:	not used	0.000E+00	---	RAD_SHAPE(9)
R017	Outer annular radius (m), ring 10:	not used	0.000E+00	---	RAD_SHAPE(10)
R017	Outer annular radius (m), ring 11:	not used	0.000E+00	---	RAD_SHAPE(11)
R017	Outer annular radius (m), ring 12:	not used	0.000E+00	---	RAD_SHAPE(12)

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R017	Fractions of annular areas within AREA:				
R017	Ring 1	not used	1.000E+00	---	FRACA(1)
R017	Ring 2	not used	2.732E-01	---	FRACA(2)
R017	Ring 3	not used	0.000E+00	---	FRACA(3)
R017	Ring 4	not used	0.000E+00	---	FRACA(4)
R017	Ring 5	not used	0.000E+00	---	FRACA(5)
R017	Ring 6	not used	0.000E+00	---	FRACA(6)
R017	Ring 7	not used	0.000E+00	---	FRACA(7)
R017	Ring 8	not used	0.000E+00	---	FRACA(8)
R017	Ring 9	not used	0.000E+00	---	FRACA(9)
R017	Ring 10	not used	0.000E+00	---	FRACA(10)
R017	Ring 11	not used	0.000E+00	---	FRACA(11)
R017	Ring 12	not used	0.000E+00	---	FRACA(12)
R018	Fruits, vegetables and grain consumption (kg/yr)	1.600E+02	1.600E+02	---	DIET(1)
R018	Leafy vegetable consumption (kg/yr)	1.400E+01	1.400E+01	---	DIET(2)
R018	Milk consumption (L/yr)	9.200E+01	9.200E+01	---	DIET(3)
R018	Meat and poultry consumption (kg/yr)	6.300E+01	6.300E+01	---	DIET(4)
R018	Fish consumption (kg/yr)	5.400E+00	5.400E+00	---	DIET(5)
R018	Other seafood consumption (kg/yr)	9.000E-01	9.000E-01	---	DIET(6)
R018	Soil ingestion rate (g/yr)	3.650E+01	3.650E+01	---	SOIL
R018	Drinking water intake (L/yr)	5.100E+02	5.100E+02	---	DWI
R018	Contamination fraction of drinking water	1.000E+00	1.000E+00	---	FDW
R018	Contamination fraction of household water	1.000E+00	1.000E+00	---	FHHW
R018	Contamination fraction of livestock water	1.000E+00	1.000E+00	---	FLW
R018	Contamination fraction of irrigation water	1.000E+00	1.000E+00	---	FIRW
R018	Contamination fraction of aquatic food	5.000E-01	5.000E-01	---	FR9
R018	Contamination fraction of plant food	-1	-1	0.200E-01	FPLANT
R018	Contamination fraction of meat	-1	-1	0.200E-02	FMEAT
R018	Contamination fraction of milk	-1	-1	0.200E-02	FMILK
R019	Livestock fodder intake for meat (kg/day)	6.800E+01	6.800E+01	---	LFI5
R019	Livestock fodder intake for milk (kg/day)	5.500E+01	5.500E+01	---	LFI6
R019	Livestock water intake for meat (L/day)	5.000E+01	5.000E+01	---	LWI5
R019	Livestock water intake for milk (L/day)	1.600E+02	1.600E+02	---	LWI6
R019	Livestock soil intake (kg/day)	5.000E-01	5.000E-01	---	LSI
R019	Mass loading for foliar deposition (g/m**3)	1.000E-04	1.000E-04	---	MLFD
R019	Depth of soil mixing layer (m)	1.500E-01	1.500E-01	---	DM
R019	Depth of roots (m)	9.000E-01	9.000E-01	---	DROOT
R019	Drinking water fraction from ground water	1.000E+00	1.000E+00	---	FGWDW
R019	Household water fraction from ground water	1.000E+00	1.000E+00	---	FGWHH
R019	Livestock water fraction from ground water	1.000E+00	1.000E+00	---	FGWLW
R019	Irrigation fraction from ground water	1.000E+00	1.000E+00	---	FGWIR
R19B	Wet weight crop yield for Non-Leafy (kg/m**2)	7.000E-01	7.000E-01	---	YV(1)
R19B	Wet weight crop yield for Leafy (kg/m**2)	1.500E+00	1.500E+00	---	YV(2)
R19B	Wet weight crop yield for Fodder (kg/m**2)	1.100E+00	1.100E+00	---	YV(3)
R19B	Growing Season for Non-Leafy (years)	1.700E-01	1.700E-01	---	TE(1)
R19B	Growing Season for Leafy (years)	2.500E-01	2.500E-01	---	TE(2)
R19B	Growing Season for Fodder (years)	8.000E-02	8.000E-02	---	TE(3)
R19B	Translocation Factor for Non-Leafy	1.000E-01	1.000E-01	---	TIV(1)

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R19B	Translocation Factor for Leafy	1.000E+00	1.000E+00	---	TIV(2)
R19B	Translocation Factor for Fodder	1.000E+00	1.000E+00	---	TIV(3)
R19B	Dry Foliar Interception Fraction for Non-Leafy	2.500E-01	2.500E-01	---	RDRY(1)
R19B	Dry Foliar Interception Fraction for Leafy	2.500E-01	2.500E-01	---	RDRY(2)
R19B	Dry Foliar Interception Fraction for Fodder	2.500E-01	2.500E-01	---	RDRY(3)
R19B	Wet Foliar Interception Fraction for Non-Leafy	2.500E-01	2.500E-01	---	RWET(1)
R19B	Wet Foliar Interception Fraction for Leafy	2.500E-01	2.500E-01	---	RWET(2)
R19B	Wet Foliar Interception Fraction for Fodder	2.500E-01	2.500E-01	---	RWET(3)
R19B	Weathering Removal Constant for Vegetation	2.000E+01	2.000E+01	---	WLAM
C14	C-12 concentration in water (g/cm**3)	not used	2.000E-05	---	C12WTR
C14	C-12 concentration in contaminated soil (g/g)	not used	3.000E-02	---	C12CZ
C14	Fraction of vegetation carbon from soil	not used	2.000E-02	---	CSOIL
C14	Fraction of vegetation carbon from air	not used	9.800E-01	---	CAIR
C14	C-14 evasion layer thickness in soil (m)	not used	3.000E-01	---	DMC
C14	C-14 evasion flux rate from soil (1/sec)	not used	7.000E-07	---	EVSN
C14	C-12 evasion flux rate from soil (1/sec)	not used	1.000E-10	---	REVSN
C14	Fraction of grain in beef cattle feed	not used	8.000E-01	---	AVFG4
C14	Fraction of grain in milk cow feed	not used	2.000E-01	---	AVFG5
STOR	Storage times of contaminated foodstuffs (days):				
STOR	Fruits, non-leafy vegetables, and grain	1.400E+01	1.400E+01	---	STOR_T(1)
STOR	Leafy vegetables	1.000E+00	1.000E+00	---	STOR_T(2)
STOR	Milk	1.000E+00	1.000E+00	---	STOR_T(3)
STOR	Meat and poultry	2.000E+01	2.000E+01	---	STOR_T(4)
STOR	Fish	7.000E+00	7.000E+00	---	STOR_T(5)
STOR	Crustacea and mollusks	7.000E+00	7.000E+00	---	STOR_T(6)
STOR	Well water	1.000E+00	1.000E+00	---	STOR_T(7)
STOR	Surface water	1.000E+00	1.000E+00	---	STOR_T(8)
STOR	Livestock fodder	4.500E+01	4.500E+01	---	STOR_T(9)
R021	Thickness of building foundation (m)	1.500E-01	1.500E-01	---	FLOOR1
R021	Bulk density of building foundation (g/cm**3)	2.400E+00	2.400E+00	---	DENSFL
R021	Total porosity of the cover material	not used	4.000E-01	---	TPCV
R021	Total porosity of the building foundation	1.000E-01	1.000E-01	---	TPFL
R021	Volumetric water content of the cover material	not used	5.000E-02	---	PH2OCV
R021	Volumetric water content of the foundation	3.000E-02	3.000E-02	---	PH2OFL
R021	Diffusion coefficient for radon gas (m/sec):				
R021	in cover material	not used	2.000E-06	---	DIFCV
R021	in foundation material	3.000E-07	3.000E-07	---	DIFFL
R021	in contaminated zone soil	2.000E-06	2.000E-06	---	DIFCZ
R021	Radon vertical dimension of mixing (m)	2.000E+00	2.000E+00	---	HMIX
R021	Average building air exchange rate (1/hr)	5.000E-01	5.000E-01	---	REXG
R021	Height of the building (room) (m)	2.500E+00	2.500E+00	---	HRM
R021	Building interior area factor	0.000E+00	0.000E+00	code computed (time dependent)	FAI
R021	Building depth below ground surface (m)	-1.000E+00	-1.000E+00	code computed (time dependent)	DMFL
R021	Emanating power of Rn-222 gas	2.500E-01	2.500E-01	---	EMANA(1)
R021	Emanating power of Rn-220 gas	not used	1.500E-01	---	EMANA(2)
TITL	Number of graphical time points	32	---	---	NPTS
TITL	Maximum number of integration points for dose	17	---	---	LYMAX
TITL	Maximum number of integration points for risk	257	---	---	KYMAX

Summary of Pathway Selections

Pathway	User Selection
1 -- external gamma	active
2 -- inhalation (w/o radon)	active
3 -- plant ingestion	active
4 -- meat ingestion	active
5 -- milk ingestion	active
6 -- aquatic foods	active
7 -- drinking water	active
8 -- soil ingestion	active
9 -- radon	active
Find peak pathway doses	suppressed

Contaminated Zone Dimensions		Initial Soil Concentrations, pCi/g	
Area:	40.00 square meters	U-234	1.900E-01
Thickness:	1.00 meters	U-235	2.500E-02
Cover Depth:	0.00 meters	U-238	2.100E+00

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 1.000E+00 mrem/yr
Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years):	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03	1.000E+04
TDOSE(t):	1.558E-01	1.551E-01	1.538E-01	1.492E-01	1.368E-01	1.012E-01	4.316E-02	1.167E-01	2.635E-03
M(t):	1.558E-01	1.551E-01	1.538E-01	1.492E-01	1.368E-01	1.012E-01	4.316E-02	1.167E-01	2.635E-03

Maximum TDOSE(t): 1.558E-01 mrem/yr at t = 0.000E+00 years

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
U-234	3.381E-05	0.0002	8.960E-04	0.0058	3.918E-09	0.0000	4.670E-04	0.0030	1.541E-06	0.0000	3.777E-06	0.0000	5.875E-05	0.0004
U-235	8.129E-03	0.0522	1.099E-04	0.0007	0.000E+00	0.0000	5.814E-05	0.0004	1.932E-07	0.0000	4.695E-07	0.0000	7.306E-06	0.0000
U-238	1.316E-01	0.8447	8.856E-03	0.0568	3.068E-14	0.0000	4.901E-03	0.0315	1.617E-05	0.0001	3.964E-05	0.0003	6.166E-04	0.0040
Total	1.398E-01	0.8971	9.861E-03	0.0633	3.918E-09	0.0000	5.426E-03	0.0348	1.791E-05	0.0001	4.389E-05	0.0003	6.826E-04	0.0044

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.461E-03	0.0094
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.305E-03	0.0533
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.461E-01	0.9373
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.558E-01	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
U-234	3.367E-05	0.0002	8.922E-04	0.0058	2.736E-08	0.0000	4.650E-04	0.0030	1.534E-06	0.0000	3.761E-06	0.0000	5.850E-05	0.0004
U-235	8.094E-03	0.0522	1.094E-04	0.0007	0.000E+00	0.0000	5.808E-05	0.0004	1.965E-07	0.0000	4.675E-07	0.0000	7.281E-06	0.0000
U-238	1.311E-01	0.8447	8.817E-03	0.0568	4.589E-13	0.0000	4.880E-03	0.0315	1.610E-05	0.0001	3.947E-05	0.0003	6.139E-04	0.0040
Total	1.392E-01	0.8971	9.819E-03	0.0633	2.736E-08	0.0000	5.403E-03	0.0348	1.783E-05	0.0001	4.370E-05	0.0003	6.797E-04	0.0044

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.455E-03	0.0094
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.269E-03	0.0533
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.454E-01	0.9373
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.551E-01	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
U-234	3.340E-05	0.0002	8.845E-04	0.0058	1.439E-07	0.0000	4.610E-04	0.0030	1.521E-06	0.0000	3.729E-06	0.0000	5.799E-05	0.0004
U-235	8.024E-03	0.0522	1.085E-04	0.0007	0.000E+00	0.0000	5.798E-05	0.0004	2.031E-07	0.0000	4.635E-07	0.0000	7.231E-06	0.0000
U-238	1.299E-01	0.8447	8.741E-03	0.0568	5.323E-12	0.0000	4.837E-03	0.0315	1.596E-05	0.0001	3.913E-05	0.0003	6.086E-04	0.0040
Total	1.380E-01	0.8971	9.734E-03	0.0633	1.439E-07	0.0000	5.356E-03	0.0348	1.769E-05	0.0001	4.332E-05	0.0003	6.738E-04	0.0044

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.442E-03	0.0094
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.198E-03	0.0533
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.442E-01	0.9373
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.538E-01	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
U-234	3.257E-05	0.0002	8.582E-04	0.0058	1.264E-06	0.0000	4.472E-04	0.0030	1.476E-06	0.0000	3.617E-06	0.0000	5.627E-05	0.0004
U-235	7.785E-03	0.0522	1.056E-04	0.0007	0.000E+00	0.0000	5.764E-05	0.0004	2.250E-07	0.0000	4.497E-07	0.0000	7.067E-06	0.0000
U-238	1.260E-01	0.8447	8.480E-03	0.0568	1.382E-10	0.0000	4.693E-03	0.0315	1.549E-05	0.0001	3.796E-05	0.0003	5.904E-04	0.0040
Total	1.339E-01	0.8971	9.444E-03	0.0633	1.264E-06	0.0000	5.198E-03	0.0348	1.719E-05	0.0001	4.203E-05	0.0003	6.537E-04	0.0044

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+01 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.401E-03	0.0094
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.956E-03	0.0533
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.399E-01	0.9373
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.492E-01	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
U-234	3.116E-05	0.0002	7.872E-04	0.0058	1.012E-05	0.0001	4.102E-04	0.0030	1.353E-06	0.0000	3.317E-06	0.0000	5.161E-05	0.0004
U-235	7.143E-03	0.0522	9.827E-05	0.0007	0.000E+00	0.0000	5.680E-05	0.0004	2.796E-07	0.0000	4.126E-07	0.0000	6.654E-06	0.0000
U-238	1.156E-01	0.8446	7.776E-03	0.0568	3.181E-09	0.0000	4.303E-03	0.0314	1.420E-05	0.0001	3.481E-05	0.0003	5.414E-04	0.0040
Total	1.227E-01	0.8970	8.662E-03	0.0633	1.012E-05	0.0001	4.770E-03	0.0349	1.583E-05	0.0001	3.854E-05	0.0003	5.997E-04	0.0044

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+01 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.295E-03	0.0095
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.305E-03	0.0534
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.282E-01	0.9372
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.368E-01	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
U-234	3.519E-05	0.0003	5.822E-04	0.0058	9.176E-05	0.0009	3.038E-04	0.0030	1.002E-06	0.0000	2.450E-06	0.0000	3.817E-05	0.0004
U-235	5.290E-03	0.0523	7.791E-05	0.0008	0.000E+00	0.0000	5.305E-05	0.0005	3.959E-07	0.0000	3.055E-07	0.0000	5.477E-06	0.0001
U-238	8.532E-02	0.8434	5.742E-03	0.0568	9.215E-08	0.0000	3.178E-03	0.0314	1.049E-05	0.0001	2.570E-05	0.0003	3.998E-04	0.0040
Total	9.064E-02	0.8961	6.402E-03	0.0633	9.185E-05	0.0009	3.534E-03	0.0349	1.188E-05	0.0001	2.846E-05	0.0003	4.434E-04	0.0044

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+02 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.055E-03	0.0104
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.427E-03	0.0537
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.467E-02	0.9359
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.012E-01	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
U-234	8.178E-05	0.0019	2.472E-04	0.0057	5.032E-04	0.0117	1.338E-04	0.0031	4.402E-07	0.0000	1.044E-06	0.0000	1.628E-05	0.0004
U-235	2.245E-03	0.0520	3.976E-05	0.0009	0.000E+00	0.0000	3.592E-05	0.0008	3.932E-07	0.0000	1.295E-07	0.0000	3.018E-06	0.0001
U-238	3.585E-02	0.8306	2.414E-03	0.0559	1.374E-06	0.0000	1.336E-03	0.0310	4.408E-06	0.0001	1.081E-05	0.0003	1.681E-04	0.0039
Total	3.817E-02	0.8845	2.701E-03	0.0626	5.046E-04	0.0117	1.506E-03	0.0349	5.242E-06	0.0001	1.198E-05	0.0003	1.874E-04	0.0043

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+02 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.838E-04	0.0228
U-235	6.978E-05	0.0016	3.352E-08	0.0000	0.000E+00	0.0000	2.144E-07	0.0000	5.926E-11	0.0000	1.304E-10	0.0000	2.394E-03	0.0555
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.978E-02	0.9217
Total	6.978E-05	0.0016	3.352E-08	0.0000	0.000E+00	0.0000	2.144E-07	0.0000	5.926E-11	0.0000	1.304E-10	0.0000	4.316E-02	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+03 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
U-234	1.983E-04	0.0017	1.624E-05	0.0001	1.373E-03	0.0118	2.492E-05	0.0002	7.976E-08	0.0000	9.474E-08	0.0000	1.379E-06	0.0000
U-235	1.117E-04	0.0010	3.086E-06	0.0000	0.000E+00	0.0000	4.001E-06	0.0000	5.672E-08	0.0000	6.411E-09	0.0000	2.648E-07	0.0000
U-238	1.724E-03	0.0148	1.163E-04	0.0010	8.467E-06	0.0001	6.447E-05	0.0006	2.127E-07	0.0000	5.208E-07	0.0000	8.100E-06	0.0001
Total	2.034E-03	0.0174	1.357E-04	0.0012	1.382E-03	0.0118	9.339E-05	0.0008	3.492E-07	0.0000	6.220E-07	0.0000	9.744E-06	0.0001

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+03 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
U-234	9.398E-03	0.0805	5.774E-07	0.0000	5.221E-06	0.0000	2.892E-05	0.0002	1.395E-07	0.0000	5.268E-07	0.0000	1.105E-02	0.0946
U-235	5.387E-03	0.0461	1.705E-06	0.0000	0.000E+00	0.0000	1.658E-05	0.0001	2.258E-07	0.0000	7.160E-08	0.0000	5.525E-03	0.0473
U-238	9.792E-02	0.8389	5.185E-06	0.0000	7.566E-08	0.0000	3.013E-04	0.0026	1.426E-06	0.0000	5.506E-06	0.0000	1.002E-01	0.8580
Total	1.127E-01	0.9655	7.468E-06	0.0001	5.296E-06	0.0000	3.468E-04	0.0030	1.791E-06	0.0000	6.105E-06	0.0001	1.167E-01	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+04 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
U-234	1.964E-04	0.0745	4.114E-06	0.0016	1.363E-03	0.5173	1.874E-05	0.0071	5.947E-08	0.0000	4.528E-08	0.0000	5.907E-07	0.0002
U-235	1.755E-21	0.0000	1.891E-22	0.0000	0.000E+00	0.0000	3.438E-22	0.0000	5.607E-24	0.0000	9.703E-26	0.0000	1.871E-23	0.0000
U-238	1.424E-06	0.0005	2.982E-08	0.0000	9.881E-06	0.0037	1.358E-07	0.0001	4.310E-10	0.0000	3.282E-10	0.0000	4.281E-09	0.0000
Total	1.979E-04	0.0751	4.144E-06	0.0016	1.373E-03	0.5211	1.888E-05	0.0072	5.990E-08	0.0000	4.561E-08	0.0000	5.950E-07	0.0002

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+04 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
U-234	9.588E-04	0.3638	6.854E-07	0.0003	3.917E-05	0.0149	2.962E-06	0.0011	3.462E-08	0.0000	3.998E-08	0.0000	2.585E-03	0.9809
U-235	1.206E-16	0.0000	4.385E-20	0.0000	0.000E+00	0.0000	3.712E-19	0.0000	6.694E-21	0.0000	4.026E-22	0.0000	1.210E-16	0.0000
U-238	3.717E-05	0.0141	2.654E-08	0.0000	1.528E-06	0.0006	1.148E-07	0.0000	1.342E-09	0.0000	1.553E-09	0.0000	5.031E-05	0.0191
Total	9.960E-04	0.3779	7.119E-07	0.0003	4.070E-05	0.0154	3.076E-06	0.0012	3.596E-08	0.0000	4.154E-08	0.0000	2.635E-03	1.0000

*Sum of all water independent and dependent pathways.

Dose/Source Ratios Summed Over All Pathways
Parent and Progeny Principal Radionuclide Contributions Indicated

Parent (i)	Product (j)	Thread Fraction	DSR(j,t) At Time in Years (mrem/yr)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03	1.000E+04
U-234	U-234	1.000E+00	7.689E-03	7.655E-03	7.589E-03	7.362E-03	6.750E-03	4.982E-03	2.092E-03	4.908E-02	1.668E-16
U-234	Th-230	1.000E+00	6.690E-08	1.989E-07	4.608E-07	1.360E-06	3.783E-06	1.078E-05	2.218E-05	3.013E-05	2.770E-05
U-234	Ra-226+D	1.000E+00	2.370E-08	1.656E-07	8.707E-07	7.649E-06	6.122E-05	5.552E-04	3.045E-03	8.477E-03	9.503E-03
U-234	Pb-210+D	1.000E+00	1.813E-12	2.344E-11	2.464E-10	5.782E-09	1.146E-07	2.272E-06	1.809E-05	5.599E-04	4.075E-03
U-234	∑DSR(j)		7.689E-03	7.656E-03	7.591E-03	7.371E-03	6.816E-03	5.551E-03	5.178E-03	5.815E-02	1.361E-02
U-235+D	U-235+D	1.000E+00	3.322E-01	3.307E-01	3.279E-01	3.181E-01	2.917E-01	2.153E-01	9.047E-02	5.075E-02	1.621E-16
U-235+D	Pa-231	1.000E+00	5.235E-06	1.600E-05	3.730E-05	1.090E-04	2.906E-04	7.067E-04	8.861E-04	3.868E-02	1.226E-15
U-235+D	Ac-227+D	1.000E+00	1.413E-07	9.584E-07	4.864E-06	3.861E-05	2.383E-04	1.053E-03	4.417E-03	1.316E-01	3.453E-15
U-235+D	∑DSR(j)		3.322E-01	3.308E-01	3.279E-01	3.182E-01	2.922E-01	2.171E-01	9.577E-02	2.210E-01	4.841E-15
U-238	U-238	5.400E-05	3.663E-07	3.648E-07	3.616E-07	3.508E-07	3.217E-07	2.375E-07	9.977E-08	2.395E-06	8.349E-21
U-238+D	U-238+D	9.999E-01	6.955E-02	6.925E-02	6.865E-02	6.660E-02	6.106E-02	4.508E-02	1.894E-02	4.755E-02	1.629E-16
U-238+D	U-234	9.999E-01	1.089E-08	3.254E-08	7.529E-08	2.191E-07	5.837E-07	1.420E-06	1.783E-06	1.394E-04	4.796E-18
U-238+D	Th-230	9.999E-01	6.367E-14	4.398E-13	2.300E-12	2.012E-11	1.600E-10	1.425E-09	7.459E-09	1.908E-08	2.185E-08
U-238+D	Ra-226+D	9.999E-01	1.678E-14	2.512E-13	2.914E-12	7.566E-11	1.742E-09	5.045E-08	7.524E-07	4.855E-06	9.830E-06
U-238+D	Pb-210+D	9.999E-01	1.082E-18	2.862E-17	6.409E-16	4.404E-14	2.566E-12	1.743E-10	4.136E-09	6.704E-07	1.411E-05
U-238+D	∑DSR(j)		6.955E-02	6.925E-02	6.865E-02	6.660E-02	6.107E-02	4.508E-02	1.894E-02	4.769E-02	2.396E-05

The DSR includes contributions from associated (half-life ≤ 180 days) daughters.

Single Radionuclide Soil Guidelines G(i,t) in pCi/g
Basic Radiation Dose Limit = 1.000E+00 mrem/yr

Nuclide (i)	t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03	1.000E+04
U-234	1.301E+02	1.306E+02	1.317E+02	1.357E+02	1.467E+02	1.802E+02	1.931E+02	1.720E+01	7.350E+01
U-235	3.010E+00	3.023E+00	3.049E+00	3.142E+00	3.422E+00	4.607E+00	1.044E+01	4.525E+00	*2.161E+06
U-238	1.438E+01	1.444E+01	1.457E+01	1.502E+01	1.638E+01	2.218E+01	5.279E+01	2.097E+01	4.174E+04

*At specific activity limit

Summed Dose/Source Ratios DSR(i,t) in (mrem/yr)/(pCi/g)
and Single Radionuclide Soil Guidelines G(i,t) in pCi/g
at tmin = time of minimum single radionuclide soil guideline
and at tmax = time of maximum total dose = 0.000E+00 years

Nuclide (i)	Initial (pCi/g)	tmin (years)	DSR(i,tmin) (pCi/g)	G(i,tmin) (pCi/g)	DSR(i,tmax)	G(i,tmax) (pCi/g)
U-234	1.900E-01	1450 ± 3	6.316E-02	1.583E+01	7.689E-03	1.301E+02
U-235	2.500E-02	0.000E+00	3.322E-01	3.010E+00	3.322E-01	3.010E+00
U-238	2.100E+00	0.000E+00	6.955E-02	1.438E+01	6.955E-02	1.438E+01

Individual Nuclide Dose Summed Over All Pathways
Parent Nuclide and Branch Fraction Indicated

Nuclide (j)	Parent (i)	THF(i)	DOSE(j,t), mrem/yr								
		t=	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03	1.000E+04
U-234	U-234	1.000E+00	1.461E-03	1.455E-03	1.442E-03	1.399E-03	1.283E-03	9.466E-04	3.975E-04	9.325E-03	3.169E-17
U-234	U-238	9.999E-01	2.287E-08	6.834E-08	1.581E-07	4.602E-07	1.226E-06	2.981E-06	3.744E-06	2.927E-04	1.007E-17
U-234	∑DOSE(j)		1.461E-03	1.455E-03	1.442E-03	1.399E-03	1.284E-03	9.496E-04	4.013E-04	9.618E-03	4.176E-17
Th-230	U-234	1.000E+00	1.271E-08	3.779E-08	8.756E-08	2.584E-07	7.188E-07	2.048E-06	4.215E-06	5.724E-06	5.263E-06
Th-230	U-238	9.999E-01	1.337E-13	9.235E-13	4.830E-12	4.224E-11	3.360E-10	2.992E-09	1.566E-08	4.007E-08	4.588E-08
Th-230	∑DOSE(j)		1.271E-08	3.779E-08	8.757E-08	2.584E-07	7.191E-07	2.051E-06	4.231E-06	5.764E-06	5.309E-06
Ra-226	U-234	1.000E+00	4.502E-09	3.145E-08	1.654E-07	1.453E-06	1.163E-05	1.055E-04	5.786E-04	1.611E-03	1.806E-03
Ra-226	U-238	9.999E-01	3.525E-14	5.275E-13	6.119E-12	1.589E-10	3.657E-09	1.060E-07	1.580E-06	1.019E-05	2.064E-05
Ra-226	∑DOSE(j)		4.502E-09	3.146E-08	1.654E-07	1.453E-06	1.164E-05	1.056E-04	5.802E-04	1.621E-03	1.826E-03
Pb-210	U-234	1.000E+00	3.444E-13	4.454E-12	4.681E-11	1.099E-09	2.178E-08	4.317E-07	3.436E-06	1.064E-04	7.743E-04
Pb-210	U-238	9.999E-01	2.272E-18	6.010E-17	1.346E-15	9.249E-14	5.388E-12	3.661E-10	8.686E-09	1.408E-06	2.963E-05
Pb-210	∑DOSE(j)		3.444E-13	4.454E-12	4.681E-11	1.099E-09	2.178E-08	4.320E-07	3.445E-06	1.078E-04	8.039E-04
U-235	U-235	1.000E+00	8.305E-03	8.269E-03	8.197E-03	7.952E-03	7.292E-03	5.383E-03	2.262E-03	1.269E-03	4.054E-18
Pa-231	U-235	1.000E+00	1.309E-07	3.999E-07	9.325E-07	2.725E-06	7.265E-06	1.767E-05	2.215E-05	9.671E-04	3.065E-17
Ac-227	U-235	1.000E+00	3.532E-09	2.396E-08	1.216E-07	9.652E-07	5.957E-06	2.632E-05	1.104E-04	3.289E-03	8.632E-17
U-238	U-238	5.400E-05	7.693E-07	7.660E-07	7.594E-07	7.367E-07	6.755E-07	4.987E-07	2.095E-07	5.029E-06	1.753E-20
U-238	U-238	9.999E-01	1.460E-01	1.454E-01	1.442E-01	1.399E-01	1.282E-01	9.467E-02	3.977E-02	9.985E-02	3.421E-16
U-238	∑DOSE(j)		1.461E-01	1.454E-01	1.442E-01	1.399E-01	1.282E-01	9.467E-02	3.977E-02	9.985E-02	3.422E-16

THF(i) is the thread fraction of the parent nuclide.

Individual Nuclide Soil Concentration
Parent Nuclide and Branch Fraction Indicated

Nuclide (j)	Parent (i)	THF(i)	S(j,t), pCi/g t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03	1.000E+04
U-234	U-234	1.000E+00	1.900E-01	1.892E-01	1.875E-01	1.819E-01	1.668E-01	1.231E-01	5.170E-02	2.481E-03	2.733E-20
U-234	U-238	9.999E-01	0.000E+00	5.927E-06	1.763E-05	5.700E-05	1.568E-04	3.858E-04	4.862E-04	7.783E-05	8.685E-21
U-234	∑S(j):		1.900E-01	1.892E-01	1.876E-01	1.820E-01	1.670E-01	1.235E-01	5.219E-02	2.558E-03	3.601E-20
Th-230	U-234	1.000E+00	0.000E+00	1.707E-06	5.098E-06	1.674E-05	4.810E-05	1.387E-04	2.863E-04	3.853E-04	3.485E-04
Th-230	U-238	9.999E-01	0.000E+00	2.672E-11	2.391E-10	2.603E-09	2.212E-08	2.016E-07	1.063E-06	2.630E-06	2.526E-06
Th-230	∑S(j):		0.000E+00	1.707E-06	5.098E-06	1.674E-05	4.812E-05	1.389E-04	2.874E-04	3.879E-04	3.510E-04
Ra-226	U-234	1.000E+00	0.000E+00	3.695E-10	3.308E-09	3.609E-08	3.083E-07	2.861E-06	1.580E-05	4.319E-05	4.289E-05
Ra-226	U-238	9.999E-01	0.000E+00	3.857E-15	1.035E-13	3.753E-12	9.535E-11	2.860E-09	4.308E-08	2.663E-07	3.108E-07
Ra-226	∑S(j):		0.000E+00	3.695E-10	3.308E-09	3.609E-08	3.084E-07	2.864E-06	1.584E-05	4.346E-05	4.320E-05
Pb-210	U-234	1.000E+00	0.000E+00	3.799E-12	1.005E-10	3.469E-09	7.730E-08	1.596E-06	1.284E-05	3.993E-05	4.010E-05
Pb-210	U-238	9.999E-01	0.000E+00	2.980E-17	2.370E-15	2.749E-13	1.874E-11	1.345E-09	3.239E-08	2.429E-07	2.907E-07
Pb-210	∑S(j):		0.000E+00	3.799E-12	1.005E-10	3.470E-09	7.732E-08	1.597E-06	1.287E-05	4.017E-05	4.039E-05
U-235	U-235	1.000E+00	2.500E-02	2.489E-02	2.468E-02	2.394E-02	2.195E-02	1.620E-02	6.808E-03	3.273E-04	3.699E-21
Pa-231	U-235	1.000E+00	0.000E+00	5.267E-07	1.566E-06	5.065E-06	1.393E-05	3.425E-05	4.308E-05	6.853E-06	7.054E-22
Ac-227	U-235	1.000E+00	0.000E+00	8.277E-09	7.201E-08	7.124E-07	4.696E-06	2.120E-05	3.270E-05	5.550E-06	5.851E-22
U-238	U-238	5.400E-05	1.134E-04	1.129E-04	1.119E-04	1.086E-04	9.957E-05	7.350E-05	3.088E-05	1.485E-06	1.678E-23
U-238	U-238	9.999E-01	2.100E+00	2.091E+00	2.073E+00	2.011E+00	1.844E+00	1.361E+00	5.719E-01	2.749E-02	3.107E-19
U-238	∑S(j):		2.100E+00	2.091E+00	2.073E+00	2.011E+00	1.844E+00	1.361E+00	5.719E-01	2.749E-02	3.107E-19

THF(i) is the thread fraction of the parent nuclide.

RESCALC.EXE execution time = 6.63 seconds

Tab 4

WCS NOTICE OF ACCEPTANCE & WASTE PROFILE

(This documents WCS' evaluation and acceptance of the proposed waste stream for treatment and disposal)

WASTE CONTROL
SPECIALISTS LLC

August 26, 2011

Dr. Hans Weger
Waste Licensing Reviewer, Radioactive Materials Division
Texas Commission on Environmental Quality
P.O. Box 13087, MC-233
Austin, TX 78711-3087

Re: Notification of Prospective Acceptance of TCEQ Exempt Waste for RCRA Land Disposal
WCS Waste Profile Number: WP-019660
TCEQ Radioactive Material License No. R04971
TCEQ RCRA Permit No. 50358

This letter provides notification that after fourteen days following the date of this letter, Waste Control Specialists LLC (WCS) intends to accept waste for disposal that contains radioactive materials that are subject to an exemption by the Texas Department of State Health Services (TDSHS). This notification is made in accordance with Provision IV.B.7 of the Texas Commission on Environmental Quality (TCEQ) Resource Conservation and Recovery Act (RCRA) Permit No. 50358, issued October 5, 2005.

Exemption is authorized under Title 30, Section 336.5(c) and Title 25, Section 289.251(d)(1) of the Texas Administrative Code. Attachment A to this letter provides information required by Provision IV.B.7 of the referenced TCEQ permit and other potentially pertinent information. Attachment B provides waste description and analytical data, as applicable, provided by the generator regarding the off specification hydrofluoric acid (HF).

If you have any questions, feel free to contact me at (575) 394-4300.

Sincerely,

J. Scott Kirk, CHP
Vice President, Licensing, Corporate Compliance and Radiation Safety Officer

Cc: Srinath Venkataramiah, TCEQ, Austin
Ralph Johnson, TCEQ, Region 7, Midland

Corporate
5430 LBJ Freeway, Ste. 1700
Three Lincoln Centre
Dallas, TX 75240
Ph. 972.715.9800
Fx. 972.448.1419

Facility
P.O. Box 1129
Andrews, TX 79714
Ph. 888.789.2783
Fx. 505.394.3427

ATTACHMENT A

GENERAL INFORMATION

Generator:	**B&W Conversion Services, LLC**
Generator License #:	**N/A**
Address:	**3930 US Route 23 South**
	Piketon, OH
Source of waste generation:	**In their process, depleted uranium hexafluoride is reacted with steam and hydrogen to produce uranium oxide and hydrofluoric acid (HF). During hot functional testing, uranium levels were detected in the HF product. The uranium levels were higher than the specification requirements allowed for the release of the HF product. As a result, the off-spec HF must be disposed as waste.**
Waste Profile	**See Attachment B for Waste Profile and Radiological Profile Attachment**
Waste Volume:	**Approximately 4900 gallons**
Physical Form:	**13.6% Hydrofluoric Acid**
Sampling Plan:	**See Attachment C for Sampling Plan**
	See Attachment D for Data Quality Objectives
Radiological Analysis:	**See Attachment E for Piketon United States Enrichment Corporation (USEC) Laboratory DOECAP 2011 Audit Executive Summary**
	See Attachment F for Piketon USEC Utah Certification
	See Attachment G for Depleted Uranium Analysis
Certification Letter of Exemption:	**N/A**
Transportation Method:	**Truck**
Transportation Containers:	**275-gal IBC totes and 55-gal plastic drums**
Regulatory Exemption Reference:	**30 TAC 336.5(c) / 25 TAC 289.259(d)(1)**

ATTACHMENT B

WASTE PROFILE SHEET AND RADIOLOGICAL PROFILE ATTACHMENT

Physical Address for Manifest:	Analytical Samples via FedEx Address:	WASTECONTROL SPECIALISTS LLC	Business Mailing Address:	Site Contacts:
9998 W. Hwy. 176 Andrews, TX 79714	9998 W. Hwy. 176 Eunice, NM 88231		PO Box 1129 Andrews, TX 79714	Ph #: (888) 789-2783 or (432) 525-8500 Fax #: (575) 394-3427

Sales Representative

Waste Profile Sheet (OP-1.1-1)

Profile Number **WP-019660**

Requested Facility (check all that apply):	
	☒ RCRA TSDF- EPA ID # TXD988088464 State ID# HW-50358
	☐ LLRW/LLMW Treatment/Storage Facility- TCEQ Lic. # R04971
	☐ Byproduct Materials Landfill TCEQ Lic. # R05807

Regulatory Status of Material or Waste/Attachments (check all that apply)		
	☒ RCRA Hazardous Waste	☒ Exempt Radioactive Waste
	☐ Licensed Radiological Waste	☐ PCBs regulated by TSCA
	☐ Non-Hazardous Waste	☐ Asbestos: ☐ Friable ☐ Non-friable

Attachments: ☐ Chain of Custody ☒ MSDS ☒ Attachment for Radioactive Material (includes NORM/Exempt) ☐ Other ☒ RCRA Analytical ☒ Radiological Analytical **Representative Sample:** ☐ Yes ☒ No

List any unacceptable treatment methods:

PO Required for Invoicing: ☒ Yes ☐ No

SECTION 1:	☐ Check if billing information is the same address.
Generator Name: B&W Conversion Service, LLC	**Billing Company:** B&W Conversion Services, LLC
Physical Address: 3930 U.S. Route 23 South	**Mail Address:** 1020 Monarch Ste. 300
City, State, Zip: Piketon, OH 45661	**City, State, Zip:** Lexington, KY 40513
Technical Contact: Rick Chapman **e-mail:** rlchapman@duf6.com	**Billing Contact:** Sheri Ratliff **e-mail:** sdratliff@duf6.com
Phone #: (740) 289-5445 **Fax #:** (740) 289-5545	**Phone #:** (859) 685-9248 **Fax #:** (895) 685-9148
Manifest Return Address: Rick Chapman 3930 US Route 23 South Piketon, OH 45661	

SECTION 2: Generator Regulatory Status				State ID#: D0039		EPA ID#: OHR000158121	
☒ Industrial	☐ Municipal	☐ PST Waste	☐ Universal Waste	☒ SQG	☐ CESQG	☐ Oil & Gas Exempt	☐ Oil & Gas Non-Exempt

SECTION 3: General Description and Regulatory Information **State Waste Code #:** OUTS105H

Waste Name: Tank 554 Off Spec HF

Process Generating Waste: In our process, depleted uranium hexafluoride is reacted with steam and hydrogen to produce uranium oxide and hydrofluoric acid (HF). During hot functional testing, uranium levels were detected in the HF product. The uranium levels were higher than specification requirements allowed for the release of the HF product. As a result, the off-spec HF must be disposed of as waste.

Is this a US EPA hazardous waste? ☒ Yes ☐ No **If yes, list all codes and LDR subcategories in table below (if additional space is required, use form *OP-1.1-8, Land Disposal Notification and Certification Form*).**

Waste Code	Subcategory	Waste Code	Subcategory	Waste Code	Subcategory
U134	None				

Other Regulatory Information (Please read each question carefully)	N/A	Yes	No	RCRA Exempt Waste (List Reference____)	N/A	Yes	No
Regulated Subpart CC Waste (VOC >500 ppm)		☐	☒	Does waste contain sorbents If yes, are sorbents biodegradable?		☐ ☐	☒ ☐
Regulated Ozone Depleting Substance		☐	☒	Waste soil subject to LDR alternate treatment standards		☐	☒
Benzene NESHP Regulated ☐ With Controls ☐ With Out Controls		☐	☒	Waste debris subject to LDR alternate treatment standards		☐	☒
Does non-debris waste requiring treatment contain <500 ppm VOC's?	☐	☒	☐	Does debris contain <500 ppm VOC's?	☒	☐	☐
Does material contain any regulated UHC's		☐	☒	If yes, list: _____			

Waste Profile Sheet continued (OP-1.1-1) Waste Profile Number: WP- 019660

SECTION 4: Waste Composition ☒ Percentage by Weight ☐ Percentage by Volume

Physical Composition	Actual/ Avg.	Range		Physical Composition	Actual/ Avg.	Range	
Hydrofluoric acid	13.6%	2%	15%		%	%	%
Water	86.4%	85%	98%		%	%	%
	%	%	%		%	%	%

Range Totals Must Be ≥ 100%

Metals ☐ TCLP ☒ Totals ☒ Generator's Knowledge ☒ ppm ☐ ppb

Antimony: BRL	Beryllium: BRL	Lead: .146	Silver: .055	Mercury: BRL If waste carries D009, please check appropriate box below
Arsenic: .147	Cadmium: .018	Nickel: 7.23	Thallium: BRL	☐ Mercury<260 ppm totals
Barium: .012	Chromium: .138	Selenium: BRL	Zinc: 1.72	☐ Mercury >260 ppm totals

Inorganic Constituents: ☒ % by Wt ☐ % by Vol

Chlorine: 0% Bromine: 0%

Cyanides: 0Total 0 Amenable 0Reactive

Sulfides: 0Total 0 Reactive

Organic Constituents: ☒ ppm ☐ ppb ☐ % by Wt ☐ % by Vol

Organics: 0	☐ TCLP	☒ Totals	☒ Gen. Knowledge
PCB's: <50 ppm	☐ TCLP	☐ Totals	☒ Gen. Knowledge

Use attachment for additional chemical constituents.

Average VOC content in ppm: 0 **(this box is required to be completed for all waste streams shipped to WCS)**

SECTION 5: Waste Characteristics

Liquid 100% Solid ____%

Sludge ____% Debris ____%

☒% by Weight ☐% by Volume

Specific Gravity 1.15 Density with units 9.60 lbs/gal

Other Characteristics: None

# of Layers1

Color Colorless

Odor Pungent

Flashpoint °F	pH	Turbidity	Viscosity
____ Actual	☒ 0-2	☒ Transparent	☒ Light (water)
☒ >200	☐ >2.1-4	☐ Translucent	☐ Medium (syrup)
☐ >140-200	☐ >4-10	☐ Opaque	
☐ >100-139	☐ >10-12.4	☐ Other____	☐ Heavy (tar)
☐ <100	☐ >12.5-14	☐ N/A	☐ N/A

Other Characteristics of Waste ☒ None Apply

Yes	No		Yes	No		Yes	No	
☐	☐	Oxidizer	☐	☐	Dioxin Listed (Storage Only)	☐	☐	Liquid Organic Peroxide (not acceptable)
☐	☐	Explosive (not acceptable)	☐	☐	Infectious or Etiological (not acceptable)	☐	☐	Fuming/Smoking Waste
☐	☐	Pyrophoric (not acceptable)	☐	☐	Putrescible (not acceptable)	☐	☐	Pressurized Gasses (other than aerosols, not acceptable)
☐	☐	Water Reactive	☐	☐	Autopolymerizable	☐	☐	Solid Organic Peroxide

SECTION 6: Shipping Information **DOT Shipping Name:** RQ, Waste Hydrofluoric acid, solution, with not more than 60% strength

Hazard Class/Div. 8, (6.1)	ID# (UN/NA)UN1790	Packing Group (PG) II	RQ 100 lbs
☐ Soft Top Rolloff	☐ B-25 ☐ B-12	☒ 55gal. ☐ Metal ☒ Poly ☐ Fiber	Quantity 17 Totes and 6 x 55 gal
☐ Hard Top Rolloff	☐ Cu Yd Box or Super Sack	☐ 30gal. ☐ Metal ☐ Poly ☐ Fiber	Frequency One Time
☐ Gondola	☐ Shrink Wrapped Pallet	☐ 15gal. ☐ Metal ☐ Poly ☐ Fiber	Overpacked Drums:
☐ Intermodal	☐ Tanker	☐ 5 gal. ☐ Metal ☐ Poly ☐ Fiber	Type ____ Size ____

☒ Other, please specify: 275 gal Intermediate Bulk Container (poly) UN31HA1

SECTION 7: Certification

The information contained herein is based on ☒ generator's knowledge and/or ☒ analytical data. I hereby certify that the above and attached description is complete and accurate to the best of my knowledge and ability to determine that no deliberate or willful omissions of composition properties exists and that all know suspected hazards have been disclosed. I certify that the sample(s) provided to WCS is representative of all materials described by this document, that the materials tested are representative of all materials described by this document, and that the methods of analysis used are the appropriate analytical methods as specified in the current editions of EPA (SW-846) or equivalent methods.

Tom McCarty, WCS	Tom McCARTY	24 Aug 2011
Signature	Printed/Typed Name	Date

WASTECONTROL
SPECIALISTS LLC

Radiological Profile Attachment (OP-1.1-2)

PROFILE #: WP- 019660

Check Appropriate Box:	☐ Storage Only ☐ Direct Disposal	☒ Treatment/Disposal ☐ Treatment/Return to Generator	☐ Treatment/3rd Party Disposal Disposal Site:

Chemical Form: Aqueous Hydrofluoric Acid

Is material waste (Check one): ☒ Yes ☐ No | Is material exempt (Check one): ☒ Yes ☐ No (WAC Section 3.2.1)

If Waste, what waste class (Check one): ☐ A ☐ B ☐ C or ☐ >C ☒ NA (see Title 10 CFR 61.55 and 30 TAC 336.362

Is material NORM (Check one): ☐ Yes ☒ No | Is material source material (Check one): ☒ Yes ☐ No

If NORM radium, please indicate Radon emanation rate: NA pCi/m^2/sec

SNM present? ☐ yes ☒ no; If yes list total grams for Profile: Pu _____ U-233 _____ U-235 _____ | If material/waste contains special nuclear material, please complete WCS OP-1.2.22 Attachment 1

Highest dose rate in mR/hr: On contact <.2mR/hr At 1 ft. <.2mR/hr

Are the containers overpacked? (Check one): ☐ Yes ☒ No

Describe the packaging: 275 gal Intermediate Bulk Container (poly) UN31HA1
36.76Total Cubic Feet per tote X 17 totes. 55 Gal UN1H1, 7.35 Total Cubic Feet per drum X 4 drums.

Radioactive Constituents:
List all radionuclides present in the waste, the concentration pCi/gm and the total activity in millicuries. (Attach additional sheets if necessary-please use the same table format as below.)

Nuclide	Concentration Range (pCi/gm) Min.	Max.	Avg.	Total Activity (mCi)
Depleted Uranium	0.5	16	13.8	0.24

Generator's Certification:
The information contained herein is based on ☒ generator knowledge and/or ☒ analytical data. I hereby certify that the above and attached description is complete and accurate to the best of my knowledge and ability to determine that no deliberate or willful omissions of composition properties exist and that all known or suspected hazards have been disclosed. I certify that the sample(s) provided to WCS is representative of all materials described by this document, that the materials tested are representative of all materials described by this document, and that the methods of analysis used are the appropriate analytical methods as specified in the current editions of EPA (SW-846) and HASL-300 or equivalent methods.

Authorized Signature: _____ **Date:** 24 Aug 2011

Printed Name: _____ **Title:** WCO

ATTACHMENT C

SAMPLING PLAN

I. INTRODUCTION

A. Scope

This plan defines the requirements and activities Uranium Disposition Services (UDS) personnel will use to sample Hydrofluoric Acid (HF) from a specified HF storage tank. A sample will be taken for all storage tanks prior to the batch being approved for loadout into a tank truck or tank car for off-site shipment. The sample data will be utilized to ensure the HF meets all the specifications set forth by the Purchaser of the end product.

The quantity of material in a given storage tank will be considered the batch for the sampling event. Once the batch has been loaded out, any new HF loaded into the tank will be considered a new batch. The batch sampled will be identified as follows: HF-Plant ID-tank number-date sampled. The Plant ID will depend upon the UDS Plant from which the sample originates. "X" will be used for the Portsmouth Plant and "C" will be used for the Paducah Plant.

1. Sampling Population / Inventory

The samples will be collected from 1 of 5 HF storage tanks at Portsmouth or 1 of 6 storage tanks at Paducah located in the HF loadout area. The specific tank to be sampled will be identified prior to the start of the sampling event. This is a repetitive task and must be completed for all HF storage tanks prior to loadout and off-site shipment. The frequency will be determined by Waste Management & Transportation (WM&T) as HF storage tanks are filled and WM&T is notified by the Facility Manager.

2. Generating Process

The HF is a product generated from the conversion of Depleted Uranium Hexafluoride (DUF6) to Uranium Oxide.

3. Process Knowledge

The process will generate approximately 55 wt% HF.

4. **Existing Data**

   See attached material safety data sheet for hydrofluoric acid (Attachment A). Analytical data that is obtained as a result of these sampling activities will be recorded and saved in the ILAS/IDAS system.

II. DATA QUALITY OBJECTIVES (DQOs)

The following is a list of Data Quality Objectives that will be used for the expectations of this sampling event:

- The HF will be evaluated to ensure the radiological, chemical and physical properties correspond with the specifications of the Purchaser (Attachment B).

III. ANALYSIS REQUIREMENTS

IDENTIFIER	NO. OF SAMPLES	SAMPLE METHOD	QA/QC	ANALYSIS REQUIRED	ANALYTICAL METHOD
HF-Plant ID-Tank Number-Date Sampled-Sample Designation	2	Grab	Duplicate Sample	Confirmation of:	
				Wt% HF ~55%	ASTM E271
				Si <13 ppm	ICP
				NVA <50 ppm	ASTM E271
				S < 16 ppm	ICP
				Fe <10 ppm	ICP
				As <10 ppm	ICP
				Cl <20 ppm	Turbidimetric Methodology
				U < 4 ppm	ICP
				Color clear/water white	Visual Inspection

IV. PROCEDURE

A. Pre-job Instructions

1. Sample Identification

The tank from which the samples will be taken will be identified prior to the sampling event. In order for the samples to be tracked back to the original tank/batch number, the sample bottles will be numbered as follows: HF-Plant ID-tank number-date collected-sample designation (for the duplicate sample), i.e. HF-X-550-101609-D. The Plant ID will depend upon the UDS Plant from which the sample originates. "X" will be used for the Portsmouth Plant and "C" will be used for the Paducah Plant. The Primary Sample sent to the lab for analysis will have no sample designation while a "D" will be used for the Duplicate Sample that will be maintained at UDS. The sample bottle labels will be pre-printed from ILAS or other electronic means. Hand written labels can be used as an alternative.

2. Collection and Preparation Steps for Physical Data Samples

A grab sample will be used to collect the HF for analysis. The sample will be collected in a 250 ml Nalgene HDPE wide mouth bottle. Specific steps required to collect the HF samples can be found in UDS-X/C-OPS-0401, *HF Sampling*.

3. Collection and Preparation Steps for Chemical Data Samples

A grab sample will be used to collect the HF for analysis. The sample will be collected in a 250 ml Nalgene HDPE wide mouth bottle. Specific steps required to collect the HF samples can be found in UDS-X/C-OPS-0401, *HF Sampling*.

4. Collection and Preparation Steps for Radiological Data Samples

A grab sample will be used to collect the HF for analysis. The sample will be collected in a 250 ml Nalgene HDPE wide mouth bottle. Specific steps required to collect the HF samples can be found in UDS-X/C-OPS-0401, *HF Sampling*.

5. Quality Control Samples

The steps required to collect HF samples can be found in UDS-X/C-OPS-0401, *HF Sampling*. A duplicate sample will be obtained for each sampling event for use in conformational analysis if requested by the Purchaser. The duplicate sample will be retained in a locked storage cabinet for a period of 90 days. To ensure the integrity of the duplicate sample, a separate Chain of Custody (COC) form will be stored with the duplicate sample bottle.

6. HF Facility Log Book

Operations personnel will maintain an HF facility logbook for HF sampling. The following will be recorded for each sampling event:

- Sample and tank ID
- Date and time of starting and ending recirculation
- Date and time sample taken
- Recording/Sampling personnel
- Sample appearance
- Unusual activity in the area that may cross contaminate the sample

7. Chain of Custody (COC) Forms

From the time of sampling through receipt at the laboratory, the integrity of the samples is ensured by documenting the chain of possession through using the COC form(s). COC forms can be printed from ILAS or hand written if necessary. The COC forms will be obtained from WM&T personnel and a completed copy will be maintained with the project files.

ILAS will pre-populate the COC forms with required information. The Sampler will be required to perform the following in regards to the COC forms (use blue or black ink):

- Enter the date the sample was taken (if not already populated).
- Print the name of the Sampler.
- Include any additional information in the miscellaneous section.
- Contact WM&T to arrange hand-off of sample bottles at HF Sample Storage Cabinet.
- Sign and indicate the date/time on the appropriate "Sample Relinquished By" line.

WM&T personnel will perform the following with regard to the sample bottles and the COC forms.

- Sign and indicate the date/time on the appropriate "Received by" lines.
- Place the COC forms along with the sample bottles in the HF Sample Storage Cabinet.
- Lock the HF Sample Store Cabinet

COC forms will not be relinquished to the receiving facility/transporter until all samples, sample numbers, quantities and other information of the COC form has been verified.

8. Sample Bottle Labels

The sample bottle labels may be pre-printed from ILAS or by other electronic means or hand written if necessary. The Sampler will ensure the label is applied to the sample bottle.

9. Tools or Special Equipment

- ☐ 250 ml, HF compatible, wide mouth bottle
- ☐ Printed or hand written container labels
- ☐ Wypall absorbent wipe or equivalent, if necessary
- ☐ Kimwipe absorbent wipe or equivalent, if necessary
- ☐ Nasco Whirl-Pak plastic bag or equivalent, if necessary
- ☐ Sample carrier
- ☐ Sample storage cabinet

B. Action Steps

For sampling the HF storage tanks, complete the action steps as identified in UDS-X/C-OPS-0401, *HF Sampling.*

V. QUALITY CONTROL / QUALITY ASSURANCE

A duplicate sample will be obtained for each sampling event for use in conformational analysis if requested by the Purchaser. The duplicate sample will be retained in a locked storage cabinet for a period of 90 days. To ensure the integrity of the duplicate sample, the Chain of Custody (COC) form will be stored with the individual sample bottle.

VI. ENVIRONMENTAL SAFETY & HEALTH / SECURITY

This activity must be evaluated and controlled by Health and Safety personnel. All activities must be accompanied by controls listed in an activity hazard analysis, radiological work permit and other documentation determined to be necessary by Environmental Safety and Health personnel. All personnel have the authority to suspend or stop work if there is a perception of an unsafe condition or unsafe act that may threaten personnel or the environment. All personnel are encouraged to provide feedback to improve the quality, safety and efficiency of the sampling operations.

All Primary Samples obtained through this Sampling and Analysis Plan will be maintained in a locked storage cabinet until relinquished to the contracted analytical lab. All Duplicate Samples will remain in UDS possession and will be maintained in a locked storage cabinet.

VII. RECORDS MANAGEMENT / DOCUMENT CONTROL

Records and documents will be managed as required in the following procedures:

- UDS-X/C-OPS-0401, *HF Sampling*
- UDS-U-DMP-0001, *Document Control*
- UDS-U-DMP-0002, *Records Management*

VIII. ATTACHMENTS

A. HF MSDS

B. Purchaser Specifications

Attachment A

MSDS for Hydrofluoric Acid

SAFETY DATA SHEET
North American Version

HYDROFLUORIC ACID 30-55 % (AQUEOUS SOLUTION)

1. PRODUCT AND COMPANY IDENTIFICATION

1.1. Identification of the substance or preparation

Product name	:	HYDROFLUORIC ACID 30-55 % (AQUEOUS SOLUTION)
Chemical Name	:	Hydrofluoric acid
Molecular formula	:	HF
Molecular Weight	:	20 g/mol

1.2. Use of the Substance/Preparation

Recommended use :
- Etching agent
- Electronic industry
- Photovoltaïc industry
- Chemical industry
- Glass industry
- Metallurgy
- Fuel additive
- Chemical intermediate

1.3. Company/Undertaking Identification

Address : SOLVAY FLUORIDES, LLC
3333 RICHMOND AVENUE
HOUSTON TX 77098-3099
United States

1.4. Emergency and contact telephone numbers

Emergency telephone	:	1 (800) 424-9300 CHEMTREC ® (USA & Canada) 01-800-00-214-00 (MEX. REPUBLIC)
Contact telephone number (product information):	:	US: +1-713-525-6500 (Product information) US: +1-800-765-8292 (Product information)

2. HAZARDS IDENTIFICATION

2.1. Emergency Overview:

NFPA	:	H= 4 F= 0 I= 1 S= none
HMIS	:	H= 4 F= 0 R= 1 PPE = Supplied by User; dependent on local conditions

General information

Appearance	:	liquid
Colour	:	colourless
Odour	:	pungent

Main effects
- Very toxic by inhalation, in contact with skin and if swallowed.

SOLVAY Fluorides

SOLVAY

- Causes severe burns.
- Hazardous decomposition products formed under fire conditions.

2.2. Potential Health Effects:

Inhalation
- Inhalation of vapours is irritating to the respiratory system, may cause throat pain and cough.
- Breathing difficulties
- Aspiration may cause pulmonary oedema and pneumonitis.
- At high concentrations, risk of hypocalcemia with nervous problems (tetany) and cardiac arrhythmia.
- Repeated or prolonged exposure: sore throat, Nose bleeding, chronic bronchitis.

Eye contact
- May cause permanent eye injury.
- May cause blindness.
- Intoxication hazards by simultaneous inhalation of the product.
- Symptoms: Burn, Lachrymation, Redness, Swelling of tissue.

Skin contact
- Causes severe burns.
- Risk of shock.
- In case of contact with fingernails, severe pain after several hours.
- Risk of hypocalcemia following the extend of the lesions.
- Intoxication hazards by simultaneous inhalation of the product.
- Symptoms: Irritation, Redness, Swelling of tissue.

Ingestion
- If ingested, severe burns of the mouth and throat, as well as a danger of perforation of the oesophagus and the stomach.
- Risk of throat (o)edema and suffocation.
- Risk of chemical pneumonitis from product inhalation.
- risk of hypocalcemia with nervous problems (tetany) and cardiac arrhythmia
- Risk of convulsions, loss of consciousness, deep coma and cardiopulmonary arrest.
- Symptoms: Nausea, Bloody vomiting, Abdominal pain, Diarrhoea, Cough, Severe shortness of breath.

Other toxicity effects
- See section 11: Toxicological Information

2.3. Environmental Effects:
- See section 12: Ecological Information

3. COMPOSITION/INFORMATION ON INGREDIENTS

Hydrogen fluoride

CAS-No.	:	7664-39-3
Concentration	:	**30.0 - 55.0 %**

4. FIRST AID MEASURES

4.1. Inhalation
- In case of accident by inhalation: remove casualty to fresh air and keep at rest.
- Oxygen or artificial respiration if needed.
- Victim to lie down in the recovery position, cover and keep him warm.
- Call a physician immediately.
- Take victim immediately to hospital.

4.2. Eye contact
- Immediate medical attention is required.
- Take victim immediately to hospital.
- Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.
- Rinse the eyes with a calcium gluconate 1% solution in physiological serum (10 ml of calcium gluconate 10% in 90 ml of physiological serum)
- In the case of difficulty of opening the lids, administer an analgesic eye wash (oxybuprocaine).

4.3. Skin contact
- Call a physician immediately.
- Take victim immediately to hospital.
- Take off contaminated clothing and shoes immediately.
- Wash off with plenty of water.
- Immediately apply calcium gluconate gel 2.5% and massage into the affected area using rubber gloves; continue to massage while repeatedly applying gel until 15 minutes after pain is relieved.
- If fingers/finger nails are touched, even if there is no pain, dip them in a bath of 5% calcium gluconate for 15 to 20 minutes.
- Keep warm and in a quiet place.

4.4. Ingestion
- Call a physician immediately.
- Take victim immediately to hospital.

If victim is conscious:
- If swallowed, rinse mouth with water (only if the person is conscious).
- Give to drink a 1% aqueous calcium gluconate solution.
- Do NOT induce vomiting.
- Artificial respiration and/or oxygen may be necessary.

If victim is unconscious but breathing:
- Oxygen or artificial respiration if needed.

5. FIRE-FIGHTING MEASURES

5.1. Suitable extinguishing media
- Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

5.2. Extinguishing media which shall not be used for safety reasons
- Water may be ineffective.

5.3. Special exposure hazards in a fire
- The product is not flammable.
- Not combustible.
- Heating can release hazardous gases
- Gives off hydrogen by reaction with metals.
- Contact with water may produce heat release and presents risks of splashing.

5.4. Hazardous decomposition products
- Hydrogen

5.5. Special protective equipment for fire-fighters
- Wear self-contained breathing apparatus and protective suit.
- Fire fighters must wear fire resistant personnel protective equipment.
- Wear chemical resistant oversuit
- Protect intervention team with a water spray as they approach the fire.

5.6. Other information
- Cool containers / tanks with water spray.

- Keep from any possible contact with water.
- Approach from upwind.
- Suppress (knock down) gases/vapours/mists with a water spray jet.
- After the fire, proceed rapidly with cleaning of surfaces exposed to the fumes in order to limit equipment damage.

6. ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions

- Refer to protective measures listed in sections 7 and 8.
- Approach from upwind.
- Isolate the area.
- Wear self-contained breathing apparatus in confined spaces, in cases where the oxygen level is depleted, or in case of significant emissions.
- Prevent further leakage or spillage if safe to do so.
- Keep away from incompatible products.
- Suppress (knock down) gases/vapours/mists with a water spray jet.
- Avoid spraying the leak source.
- Protect intervention team with a water spray as they approach the fire.

6.2. Environmental precautions

- If the product contaminates rivers and lakes or drains inform respective authorities.
- Do not flush into surface water or sanitary sewer system.

6.3. Methods for cleaning up

- Prevent product from entering drains.
- Dilute with water.
- Contact with water may produce heat release and presents risks of splashing.
- Keep in properly labelled containers.
- Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

7.1. Handling

- Clean and dry piping circuits and equipment before any operations.
- Keep away from water.
- Used in closed system
- Handle small quantities under a lab hood.
- Use only in well-ventilated areas.
- Use only equipment and materials which are compatible with the product
- Keep away from incompatible products.
- Preferably transfer by pump or gravity.
- For further information, please contact:
- Manufacturer, importer, supplier

7.2. Storage

- Keep container tightly closed.
- Keep in a cool, well-ventilated place.
- Keep away from heat.
- Keep away from incompatible products.
- Prevent spreading over a wide area (e.g. by containment or oil barriers).
- Information about special precautions needed for bulk handling is available on request.

7.3. Packaging material

- Plastic drum
- Polyethylene

7.4. Other information

- Provide tight electrical equipment well protected against corrosion.
- For personal protection see section 8.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Exposure Limit Values

Hydrogen fluoride

- PEL (OSHA / USA)
  TWA = 3 ppm
- US. ACGIH Threshold Limit Values 2007
  time weighted average = 0.5 ppm
  Remarks: as F
- US. ACGIH Threshold Limit Values 2007
  Ceiling Limit Value = 2 ppm
  Remarks: as F
- US. OSHA Table Z-2 (29 CFR 1910.1000) 02 2006
  time weighted average = 3 ppm
- US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000) 02 2006
  Permissible exposure limit = 2.5 mg/m3
  Remarks: as F
- US. OSHA Table Z-1-A (29 CFR 1910.1000) 1989
  time weighted average = 3 ppm
  Remarks: as F
- US. OSHA Table Z-1-A (29 CFR 1910.1000) 1989
  Short term exposure limit = 6 ppm
  Remarks: as F
- US. ACGIH Threshold Limit Values 2008
  Remarks: as F, Can be absorbed through skin.
- US. Tennessee. OELs. Occupational Exposure Limits. Table Z1A 06 2008
  time weighted average = 3 ppm
  Remarks: as F
- US. Tennessee. OELs. Occupational Exposure Limits. Table Z1A 06 2008
  Short term exposure limit = 6 ppm
  Remarks: as F

ACGIH® and TLV® are registered trademarks of the American Conference of Governmental Industrial Hygienists.
SAEL = Solvay Acceptable Exposure Limit, Time Weighted Average for 8 hour workdays. No Specific TLV STEL (Short Term Exposure Level) has been set. Excursions in exposure level may exceed 3 times the TLV TWA for no more than a total of 30 minutes during a workday and under no circumstances should they exceed 5 times the TLV TWA.

8.2. Engineering controls

- Provide appropriate exhaust ventilation at machinery.
- Apply technical measures to comply with the occupational exposure limits.
- Refer to protective measures listed in sections 7 and 8.

8.3. Personal protective equipment

8.3.1. Respiratory protection

- In the case of dust or aerosol formation use respirator with an approved filter.

- Self-contained breathing apparatus in medium confinement/insufficient oxygen/in case of large uncontrolled emissions/in all circumstances when the mask and cartridge do not give adequate protection.
- Use only respiratory protection that conforms to international/ national standards.
- Use NIOSH approved respiratory protection.

8.3.2. Hand protection

- Take note of the information given by the producer concerning permeability and break through times, and of special workplace conditions (mechanical strain, duration of contact).
- Protective gloves - impervious chemical resistant;
- Suitable material: butyl-rubber

8.3.3. Eye protection

- Face-shield
- Chemical resistant goggles must be worn.

8.3.4. Skin and body protection

- impervious clothing
- Apron/boots of butyl rubber if risk of splashing.
- Do not wear leather shoes.

8.3.5. Hygiene measures

- Use only in an area equipped with a safety shower.
- Take off contaminated clothing and shoes immediately.
- Wash contaminated clothing before re-use.
- May not get in touch with:
- Leather
- Handle in accordance with good industrial hygiene and safety practice.
- Consult the industrial hygienist or the safety manager for the selection of personal protective equipment suitable for the working conditions.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1. General information

Appearance	:	liquid
Colour	:	colourless
Odour	:	pungent

9.2. Important health safety and environmental information

pH	:	< 1
Boiling point/boiling range	:	106 °C (223 °F)
Flash point	:	*Remarks*: not applicable
Flammability	:	*Remarks*: The product is not flammable.
Explosive properties	:	*Explosion danger* *Remarks*: With certain materials (see section 10).
Oxidizing properties	:	*Remarks*: not applicable
Vapour pressure	:	30.7 mbar *Temperature*: 20 °C (68 °F)
Relative density / Density	:	1.16 *Temperature*: 25 °C (77 °F)

Solubility	:	Water *Remarks*: completely miscible, Reacts violently with water.
Partition coefficient: n-octanol/water	:	*Remarks*: not applicable
Vapour density	:	2.4 *Temperature*: 20 °C (68 °F)

9.3. Other data

Freezing point:	:	-36.1 °C (-33.0 °F)

10. STABILITY AND REACTIVITY

10.1. Stability
- Stable under recommended storage conditions.
- Reacts violently with water.
- Corrosive in contact with metals
- Gives off hydrogen by reaction with metals.
- Risk of violent reaction.
- Risk of explosion.

10.2. Conditions to avoid
- Exposure to moisture.

10.3. Materials to avoid
- Water, glass, Metals, Strong bases, Alkali metals

10.4. Hazardous decomposition products
- Hydrogen

11. TOXICOLOGICAL INFORMATION

Toxicological data

Acute oral toxicity
- LD 100, guinea pig, 80 mg/kg (2 % solution)

Acute inhalation toxicity
- LC50, 1 h, rat, 850 - 1,070 mg/m3

Irritation (other route)
- Corrosive

Chronic toxicity
- Inhalation, Prolonged exposure, rat, Target Organs: Respiratory system, Kidney, Liver, testes, observed effect, (gas)
- Inhalation, Prolonged exposure, rat, Target Organs: cardio-vascular system, nervous system, observed effect, (gas)

Remarks
- corrosive effects
- Liver and kidney injuries may occur.
- Chronic exposure may entail dental or skeletal fluorosis
- The carcinogenic effect is not demonstrated in human
- risk of effect to:
- toxic effects for reproduction

12. ECOLOGICAL INFORMATION

12.1. Ecotoxicity effects

Acute toxicity
- Fishes, Salmo gairdneri, LC50, 96 h, 51 mg/l (Fluorides)
- Crustaceans, Mysidopsis, EC50, 96 h, 10.5 mg/l (Fluorides)
  Remarks: salt water
- Crustaceans, Daphnia magna, EC50, 48 h, 97 mg/l (Fluorides)
  Remarks: fresh water

Chronic toxicity
- Fishes, Salmo gairdneri, LC50, 21 Days, 2.7 - 4.7 mg/l (Fluorides)
- Crustaceans, Daphnia magna, NOEC, 21 Days, 3.7 mg/l (Fluorides)
- Algae, Scenedesmus sp., EC50, 96 h, 43 mg/l (Fluorides)

12.2. Mobility
- Air
  Remarks: mobility as solid aerosols
- Water, Solubility, Mobility
- Soil/sediments, (fluoride)
  Conditions: pH
  Remarks: potential adsorption

12.3. Persistence and degradability

Abiotic degradation
- Air
  Result: neutralization by natural alkalinity
- Water, Soil
  Result: ionization/neutralization
- Water, Soil
  Result: complexation/precipitation of inorganic materials

Biodegradation
- Remarks: The methods for determining the biological degradability are not applicable to inorganic substances.

12.4. Bioaccumulative potential
- Bioaccumulative potential: log Pow
  Result: not applicable
- (Fluorides)
  Result: accumulation into vegetable leafs

12.5. Other adverse effects
- no data available

12.6. Remarks
- No data is available on the product itself.
- Ecological data therefore refers only to the effects of the decomposition products.
- Harmful to aquatic organisms.
- Nevertheless, hazard for the environment is limited due to product properties;
- . low chronic toxicity.
- Product fate is highly dependent on environmental conditions: pH, temperature, redox potential, mineral and organic content of the medium,...

13. DISPOSAL CONSIDERATIONS

13.1. Waste from residues / unused products

- or

13.2. Packaging treatment

- Clean container with water.
- The empty and clean containers are to be reused in conformity with regulations.
- To avoid treatments, as far as possible, use dedicated containers.

13.3. RCRA Hazardous Waste

- Listed RCRA Hazardous Waste (40 CFR 302) - Yes
- Unlisted RCRA Hazardous Waste (40 CFR 302) - Yes
- D002 (corrosive waste)

14. TRANSPORT INFORMATION

UN-Number	**1790**
IATA-DGR	
Class	8
Sub-risks	Toxic
Packing group	II
ICAO-Labels	CORROSIVE + TOXIC
Proper shipping name: HYDROFLUORIC ACID	
IMDG	
Class	8
Sub-risks	toxic
Packing group	II
ICAO-Labels	CORROSIVE + TOXIC
HI/UN No.	1790
Proper shipping name HYDROFLUORIC ACID	
U.S. Dept of Transportation	
Class (Subsidiary)	8 (6.1)
Packing group	II
Label (Subsidiary)	Corrosive (toxic)
Marine pollutant:	no
Emergency info:	ERG: 157
Proper shipping name HYDROFLUORIC ACID	
Canada (TDG)	
Class (Subsidiary)	8 (6.1)
Packing group	II
Label (Subsidiary)	Corrosive (Toxic)
Marine pollutant:	no
Emergency info:	ERG: 157
Proper shipping name: HYDROFLUORIC ACID	

15. REGULATORY INFORMATION

15.1. Inventory Information

Australian Inventory of Chemical Substances (AICS)	: -	In compliance with inventory.
Canadian Domestic Substances List (DSL)	: -	In compliance with inventory.
Inventory of Existing Chemical Substances (China) (IECS)	: -	In compliance with inventory.
Japan (ENCS) List (ENCS (JP))	: -	In compliance with inventory.
New Zealand Interim Inventory of Chems. (NZ CLSC)	: -	In compliance with inventory.
Toxic Substance Control Act list (TSCA)	: -	In compliance with inventory.
EU list of existing chemical substances (EINECS)	: -	In compliance with inventory.
Korea Existing Chemicals Inv. (KECI) (KECI (KR))	: -	In compliance with inventory.
Philippines PICCS (PICCS (PH))	: -	In compliance with inventory.

15.2. Other regulations

US. EPA Emergency Planning and Community Right-To-Know Act (EPCRA) SARA Title III Section 302 Extremely Hazardous Substance (40 CFR 355, Appendix A)
- yes.

SARA Hazard Designation (SARA 311/312)
- Acute Health Hazard: Yes.
- Chronic Health Hazard: Yes.

US. EPA Emergency Planning and Community Right-To-Know Act (EPCRA) SARA Title III Section 313 Toxic Chemicals (40 CFR 372.65) - Supplier Notification Required
- yes.

US. EPA CERCLA Hazardous Substances (40 CFR 302)
- This product is reportable under 40 CFR Part 302.4 because it contains the following substance(s):

US. New Jersey Worker and Community Right-to-Know Act (New Jersey Statute Annotated Section 34:5A-5)
- yes.

US. Pennsylvania Worker and Community Right-to-Know Law (34 Pa. Code Chap. 301-323)
- yes.

US. California Safe Drinking Water & Toxic Enforcement Act (Proposition 65)
- not regulated.

15.3. Classification and labelling

Canada. Canadian Environmental Protection Act (CEPA). WHMIS Ingredient Disclosure List (Can. Gaz., Part II, Vol. 122, No. 2)
- D1A Very Toxic Material Causing Immediate and Serious Toxic Effects
- E Corrosive Material

Remarks: This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

EC Label

- Hazardous components which must be listed on the label: Hydrogen fluoride
- The product is classified and labelled in accordance with Directive 1999/45/EC.

Symbol(s)	T+ C	Very toxic Corrosive
R-phrase(s)	R26/27/28 R35	Very toxic by inhalation, in contact with skin and if swallowed. Causes severe burns.
S-phrase(s)	S 1/2 S 7/9 S26 S36/37 S45	Keep locked up and out of the reach of children. Keep container tightly closed and in a well-ventilated place. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear suitable protective clothing and gloves. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

16. OTHER INFORMATION

Ratings :

NFPA (National Fire Protection Association)
Health = 4 Flammability = 0 Instability = 1 Special =none

HMIS (Hazardous Material Information System)
Health = 4 Fire = 0 Reactivity = 1 PPE : Supplied by User; dependent on local conditions

Further Information

- HF-Antidote Gel from IPS Healthcare is recommended as treatment for injuries from hydrofluoric acid.
- Update
  This data sheet contains changes from the previous version in section(s): 1.2
- Distribute new edition to clients
- Environmental Protection Agency (EPA) requirements for a Risk Management Plan must be followed anytime at least 1000 lbs. of Hydrogen fluoride/Hydrofluoric acid (conc 50% or greater) are used or stored. Refer to 40 CFR 68.150 for specific details.
- Occupational Safety and Health Administration (OSHA) requirements for process safety management must be followed anytime at least 1000 lbs. of Hydrogen Fluoride are used or stored. Refer to 29 CFR 1910.119 for specific details.

Material Safety Data Sheets contain country specific regulatory information; therefore, the MSDS's provided are for use only by customers of the company mentioned in section 1 in North America. If you are located in a country other than Canada, Mexico or the United States, please contact the Solvay Group company in your country for MSDS information applicable to your location. The previous information is based upon our current knowledge and experience of our product and is not exhaustive. It applies to the product as defined by the specifications. In case of combinations or mixtures, one must confirm that no new hazards are likely to exist. In any case, the user is not exempt from observing all legal, administrative and regulatory procedures relating to the product, personal hygiene, and integrity of the work

11/12

environment. (Unless noted to the contrary, the technical information applies only to pure product). To our actual knowledge, the information contained herein is accurate as of the date of this document. However, neither the company mentioned in section 1 nor any of its affiliates makes any warranty, express or implied, including merchantability or fitness for use, or accepts any liability in connection with this information or its use. This information is for use by technically skilled persons at their own discretion and risk and does not relate to the use of this product in combination with any other substance or any other process. This is not a license under any patent or other proprietary right. The user alone must finally determine suitability of any information or material for any contemplated use in compliance with applicable law, the manner of use and whether any patents are infringed. This information gives typical properties only and is not to be used for specification purposes. The company mentioned in section 1 reserves the right to make additions, deletions or modifications to the information at any time without prior notification. Trademarks and/or other products of the company mentioned in section 1 referenced herein are either trademarks or registered trademarks of the company mentioned in section 1 or its affiliates, unless otherwise indicated.

Attachment B
Purchaser Specifications

EXHIBIT A

DUF6 Conversion Project - HF Specifications

Uranium	pCi/ml	<3.0
Concentration	HF wt%	~55%
Impurities		
- H2SiF6	ppmw	<70
- H2SO4	ppmw	<50
- SO2	ppmw	<50
- Fe2	ppmw	<10
- As	ppmw	<10
- Cl	ppmw	<20
Color		Clear/ Water White

ATTACHMENT D

DATA QUALITY OBJECTIVES

Data Quality Objectives, UDS Form 3402

Sampling Activity Title: Hydrofluoric acid confirmation sampling

DQO Element	Resolution
1. STATE THE PROBLEM. Concisely describe the problem to be studied. Review prior studies and existing information to gain a sufficient understanding for defining the problem.	
What is the description of the material or waste? Include the type of media and the quantity.	The material to be sampled will be Hydrofluoric Acid (HF). Unlimited quantities of aqueous HF will be produced on a continual basis throughout the life span of the facility.
Where and when was it generated? Where is it currently located?	The HF will be generated during the DUF6 conversion process. The end product will be collected in storage tanks in the HF Loadout Area.
What was the process that led to the generation of the material or waste?	HF will be produced as a by-product of the conversion of Depleted Uranium Hexafluoride (DUF6) to uranium oxide.
2. IDENTIFY THE DECISION. Identify the information that needs to be obtained and the measurements that need to be taken to resolve the decision statement.	
Who needs information about the material or waste?	UDS WM&T, DOE and the purchaser.
Why do they need the information (onsite decision making vs. disposal requirements)	The analytical information will be needed to ensure the HF meets specification set forth in the sales agreement with the Purchaser. If the HF is unacceptable for sale, it must be re-blended or dispositioned as off-spec product.
What are the contaminates of concern for the decision?	Uranium isotopes, H2SiF6, H2SO4, SO2, Fe2, As, Cl
What parameters are required to meet the disposal facility's waste acceptance criteria?	The HF is intended to be sold as a product and should not normally be a waste material. In the event that the HF does not meet the Purchaser's specifications, analytical results will be used to ensure the HF to be dispositioned will meet the waste acceptance criteria of the approved disposal facility.
3. IDENTIFY THE INPUTS TO THE DECISION. Identify the information that needs to be	

Data Quality Objectives, UDS Form 3402

obtained and the measurements that need to be taken to resolve the decision statement.	
What historical data exists? Is it adequate for use?	No historical data exists for this sampling event. The generation of the HF is a new process and the initial analytical will be the first data obtained for the HF produced.
What process knowledge exists? Is it adequate for use? Is it properly documented?	No process knowledge exists for HF. The material is yet to be generated.
4. DEFINE THE STUDY BOUNDARIES. Specify the time periods and spatial area to which decision will apply. Determine when and where data should be collected. What subgroup of material or waste does this sampling represent?	The sampling event applies to the lifetime of the conversion project or as long as HF is produced for sale or disposition. Data will be collected from a specified tank at the HF Loadout Area at the direction of the Waste Management and Transportation Specialist as the storage tanks are filled.
What physical characteristics of the material or waste might affect the sampling design?	None
What is the location of the potential contamination within the material or waste-volumetric or surface, is the contamination distributed throughout or could hotspots exist?	Although highly unlikely, potential contamination could come within the storage tank if there is an upset in the conversion process.
How is the material containerized?	The HF is stored in 10,000 gallon tanks.
Are there sampling constraints?	None
5. DEVELOP A DECISION RULE. Define the statistical parameter of interest, specify the action level, and integrate the previous DQO outputs into a single statement that describes the logical basis for choosing among alternative actions.	
Determine action levels and incorporate them into the sampling strategy.	If the sample results meet the specifications of the purchaser, the batch in the storage tank will be approved for loadout. If the sample results do not meet the specifications of the purchase, then it must be blended to attempt to meet specifications or it must be dispositioned at an approved TSDF.

Data Quality Objectives, UDS Form 3402

State the type of data to be obtained- screening, confirmation, etc?	The analytical data obtained will be used to confirm HF collected in the storage tanks meets the specifications required by the Purchaser.
State the approach to sample selection- grab, composite, random, etc.	Grab samples will be obtained from the identified HF storage tank.
5. SPECIFY TOLERABLE LIMITS ON DECISON ERRORS. Define the decision maker's tolerable decision error rates based on a consideration of the consequences of making an incorrect decision.	
What results would trigger further testing, verification or action?	If the analytical indicates the HF in the storage tank does not meet the specification of the Purchaser, blending will be require in an attempt to reach parameters that will be acceptable to the Purchaser.
What confidence intervals are needed?	The analytical results must be within the specifications of the Purchaser 100% of the time.
What Quality Assurance/Quality Control measures will be implemented?	
Consider the potential liability for making an incorrect decision based on the data and steps that will be taken to minimize the risk.	An incorrect decision could result in the Purchaser rejecting the product after the HF shipment has been received at its destination facility. In order to minimize the risk of an incorrect decision, a peer review of the data will be initiated with each sampling event.
6. OPTIMIZE DESIGN. Evaluate information from the previous steps and determine the most effective sampling design that meets all DQOs.	See the Sampling and Analysis plan for HF.

Preparer Rob Chapman Date 5-6-10

WM & Transportation Specialist [signature] Date 5-6-10

Waste Certification Official Tammy Stapleton Digitally signed by Tammy Stapleton DN: CN = Tammy Stapleton, C = US, O = Project Controls Manager, OU = UDS Date: 2010.05.20 09:27:08 -04'00' Date

UDS FORM 3402 R0, (12/08)

ATTACHMENT E

PIKETON UNITED STATES ENRICHMENT CORPORATION (USEC) LABORATORY DOECAP 2011 AUDIT EXECUTIVE SUMMARY

Department of Energy
Consolidated Audit Program
Continuing Audit of
Portsmouth Analytical Services and
the Applied Nuclear Technology Group
Piketon, Ohio

EXECUTIVE SUMMARY

The Department of Energy Consolidated Audit Program (DOECAP) conducted a continuing audit of the United States Enrichment Corporation (USEC) Portsmouth Analytical Services Laboratory and the Applied Nuclear Technology Group (PORTS) located in Piketon, Ohio, May 10-12, 2011. The objective of this audit was to assess management systems and operational activities at PORTS, and to verify the laboratory's ability to meet requirements of the Department of Energy (DOE) for the analyses and safe handling of DOE samples. At the time of the audit, PORTS was being utilized by the following DOE sites: USEC-Paducah, USEC-Portsmouth Stoller, Babcock & Wilcox Conversion Services (formerly Uranium Disposition Services), and Paducah Remediation Services (LATA Environmental Services of Kentucky).

This audit focused on all areas of the facility that had the potential for analyzing, processing, or handling DOE samples. During the course of the audit, laboratory personnel at all levels were interviewed, procedures were reviewed, instrumentation was inspected, and records were verified. The audit focused on the following functional areas: Quality Assurance (QA) systems and general laboratory practices; data quality for organic, inorganic, and radiochemistry analyses; and non-destructive assay determinations.

The laboratory implements an established QA program and generally demonstrates performance to DOE analytical QA requirements. The laboratory has established and maintains mechanisms, protocols, and procedures that standardize quality practices throughout analytical and support operations. Work processes provide acceptable sample control, implement laboratory activities, and maintain data integrity. The laboratory QA Plan is modeled after the American Society of Mechanical Engineers Quality Assurance Requirements for Nuclear Facility Applications, and incorporates the Quality Systems for Analytical Services (QSAS) concepts. One finding was identified in the QA area related to clarifying corrective action directions to resolve proficiency testing failures.

The PORTS organic laboratory is equipped with sufficient instrumentation to analyze the current volume and types of samples received by the laboratory. The staffing level is adequate for the current work volume and the staff has multiple years of experience in organic analytical methodology. PORTS has suspended operation of gas chromatograph/mass spectroscopy semi-volatile organic analyses due to continuing instrument failures. The volatile organic analyses, pesticide, polychlorinated biphenyl, and herbicide analyses are still operational. There were no findings issued in the organic area.

The PORTS inorganic and wet chemistry analysis laboratories have a well-established program staffed by highly experienced and technically qualified personnel, which currently support several onsite analytical programs. Instrumentation and equipment are sufficient to provide a full range of metals, mercury, and wet chemistry analyses. The PORTS laboratory has the necessary equipment and personnel providing analytical support for inorganic and wet chemistry for industrial hygiene (i.e., metals, asbestos, and beryllium) and environmental analysis. The PORTS laboratory maintains American Industrial Hygiene Association laboratory accreditation and Utah certification for environmental analysis. One new finding was issued in the inorganic area for the lack of temperature control during TCLP extractions.

The PORTS radiochemistry department has knowledgeable and experienced staff, many of whom have been with the laboratory for two decades or more. The department has the necessary instrumentation to accurately perform a variety of radiochemical methods of interest to DOE and meet QSAS requirements. Review of data packages, instrument run logs, standard operating procedures, calibration data, and other support documents demonstrate that processes and procedures are in place to operate a radiochemical laboratory. A finding was issued regarding properly tagging out uncalibrated equipment in the radiochemistry area.

This audit also assessed implementation of Non-Destructive Assay (NDA) determinations performed by the Applied Nuclear Technology group. This group currently meets data quality objectives for Nuclear Regulatory Commission nuclear criticality safety and nuclear material control and accountability programs, but has not fully incorporated requirements of the QSAS necessary to use NDA data for waste disposal and decontamination and decommissioning activities. At this time, the NDA program's ability to meet DOECAP requirements is not adequate. The group currently has the organizational management, the quality systems, and the equipment necessary to eventually implement a NDA program that meets QSAS requirements, but this will not occur until contractor transition has been completed later this year and additional activities are added to the NDA scope. Multiple findings were identified in the NDA area of review, including not performing variability measurements; not confirming initial calibrations; incomplete standard operating procedure documentation; not verifying calibration sources; not having a procedure to specify acceptance criteria for reference materials; lack of control for acquired commercial software or in-house developed software; not maintaining quality control charts; not identifying Subject Matter Expert competency requirements; and not identifying corrective actions for identified biases.

This DOECAP audit identified several issues of concern relative to PORTS analytical and operational activities that will need to be considered by each DOE entity potentially utilizing the facility. These issues and PORTS's corrective actions, completed or planned, should be evaluated by DOE sites relative to their utilization of PORTS. It is ultimately the responsibility of each DOE site to determine the adequacy of this facility to meet their analytical needs.

ATTACHMENT F

PIKETON USEC LABORATORY UTAH CERTIFICATION

State of Utah
GARY R HERBERT
Governor
GREGORY S BELL
Lieutenant Governor

Utah Department of Health
W. David Patton, Ph.D
Executive Director

Disease Control and Prevention
Patrick F. Luedtke, MD, MPH.
Director Unified State Labs: Public Health

Bureau of Laboratory Improvement
David B Mendenhall, MPA, MT (ASCP)
Bureau Director

6/6/2011

United States Enrichment Corporation - Piketon
Deborah K Perez
3930 US Route 23 South
Piketon OH 45661

ID # LOCK2
EPA ID: OH00292

Director,

On the basis of your most recent assessment, Proficiency Testing results and continuing compliance with the ELCP requirements, the laboratory listed is certified for environmental monitoring under the Resource Conservation and Recovery Act and authorized to perform the following methods, for the analytes and matrix listed:

Characteristics

	Solid	Non-Potable Water	
1010	☐	☑	Ignitability
1110	☐	☑	Corrosivity Toward Steel
1311	☑	☑	Toxicity Characteristic Leaching Procedure Metals
1311	☑	☑	Toxicity Characteristic Leaching Procedure Semi-Volatiles
1311	☑	☑	Toxicity Characteristic Leaching Procedure Volatiles
Sec 7.3.3 [1	☑	☐	Reactive Cyanide [12/1996]
Sec 7.3.4 [1	☑	☐	Reactive Sulfide [12/1996]

Inorganics

	Solid	Non-Potable Water	
9010 A	☑	☑	Amenable Cyanide
9010 A	☑	☑	Total Cyanide
9023	☑	☑	Extractable Organic Halides (EOX)
9030 A	☑	☑	Acid-Soluble and Acid-Insoluble Sulfides
9040 B	☐	☑	pH
9045 C	☑	☐	Soil and Waste pH
9056 [1994]	☑	☑	Bromide
9056 [1994]	☑	☑	Chloride
9056 [1994]	☑	☑	Fluoride
9056 [1994]	☑	☑	Nitrate
9056 [1994]	☑	☑	Sulfates
9060	☐	☑	Total Organic Carbon
9095 B	☑	☐	Paint Filter Liquids Test

The expiration for the laboratory's certification is 12/31/2011. The Utah Environmental Laboratory Certification Program (ELCP) encourages clients and data users to verify the most current certification letter for the authorized method.

Metal Digestion

	Solid	Non-Potable Water	
3005 A	☐	☑	Acid Digestion Total Recoverable or Dissolved Metals
3010 A	☐	☑	Acid Digestion for Total Metals
3015	☐	☑	Microwave Acid Digestion of Aqueous Samples and Extracts
3050 B	☑	☐	Acid Digestion of Sediments, Sludges and Soils

Metals

	Solid	Non-Potable Water	
6010 B	☑	☑	Aluminum
6010 B	☑	☑	Antimony
6010 B	☑	☑	Arsenic
6010 B	☑	☑	Barium
6010 B	☑	☑	Beryllium
6010 B	☑	☑	Boron
6010 B	☑	☑	Cadmium
6010 B	☑	☑	Calcium
6010 B	☑	☑	Chromium
6010 B	☑	☑	Cobalt
6010 B	☑	☑	Copper
6010 B	☑	☑	Iron
6010 B	☑	☑	Lead
6010 B	☑	☑	Lithium
6010 B	☑	☑	Magnesium
6010 B	☑	☑	Manganese
6010 B	☑	☑	Molybdenum
6010 B	☑	☑	Nickel
6010 B	☑	☑	Phosphorus
6010 B	☑	☑	Potassium
6010 B	☑	☑	Selenium
6010 B	☑	☑	Silicon
6010 B	☑	☑	Silver
6010 B	☑	☑	Sodium
6010 B	☑	☑	Thallium
6010 B	☑	☑	Tin
6010 B	☑	☑	Titanium
6010 B	☑	☑	Vanadium
6010 B	☑	☑	Zinc
7196 A	☐	☑	Chromium, Hexavalent (Chromium, VI)
7470 A	☑	☑	Mercury
7471 A	☑	☐	Mercury

Miscellaneous

	Solid	Non-Potable Water	
5050	☑	☐	Bomb Preparation

Organic Cleanup

	Solid	Non-Potable Water	
3620 B	☑	☐	Florisil Cleanup

Organic Extraction

	Solid	Non-Potable Water	
3510 C	☐	☑	Separatory Funnel Liquid-Liquid Extractions
3520 B	☐	☑	Continuous Liquid-Liquid Extraction
3540 B	☑	☐	Soxhlet Extraction
3550 B	☑	☐	Ultrasonic Extraction
3580 A	☑	☐	Waste Dilution

Organic Instrumentation

	Solid	Non-Potable Water	
8081A	☑	☑	4,4'-DDD
8081A	☑	☑	4,4'-DDE
8081A	☑	☑	4,4'-DDT
8081A	☑	☑	Aldrin
8081A	☑	☑	alpha-BHC(alpha-hexachlorocyclohexane)
8081A	☑	☑	alpha-Chlordane
8081A	☑	☑	beta-BHC(beta-hexachlorocyclohexane)
8081A	☑	☑	Chlordane (technical)
8081A	☑	☑	delta-BHC(delta-hexachlorocyclohexane)
8081A	☑	☑	Dieldrin
8081A	☑	☑	Endosulfan I
8081A	☑	☑	Endosulfan II
8081A	☑	☑	Endosulfan sulfate
8081A	☑	☑	Endrin
8081A	☑	☑	Endrin Aldehyde
8081A	☑	☑	Endrin Ketone
8081A	☑	☑	gamma-BHC (Lindane, gamma-hexachlorocyclohexane)
8081A	☑	☑	gamma-Chlordane
8081A	☑	☑	Heptachlor
8081A	☑	☑	Heptachlor Epoxide
8081A	☑	☑	Methoxychlor
8081A	☑	☑	Organochlorine Pesticides
8081A	☑	☑	Toxaphene [Chlorinated camphene]
8082	☑	☑	Aroclor 1268
8082	☑	☑	Aroclor-1016 [PCB-1016]
8082	☑	☑	Aroclor-1221 PCB-1221]
8082	☑	☑	Aroclor-1232 [PCB-1232]
8082	☑	☑	Aroclor-1242 [PCB-1242]
8082	☑	☑	Aroclor-1248 [PCB-1248]
8082	☑	☑	Aroclor-1254 [PCB-1254]
8082	☑	☑	Aroclor-1260 [PCB-1260]
8082	☑	☑	PCBs
8151 A	☑	☑	2,4,5-T
8151 A	☑	☑	2,4,5-TP (Silvex)
8151 A	☑	☑	2,4-D
8151 A	☑	☑	Chlorinated Herbicides
8151 A	☑	☑	Dicamba
8260 B	☑	☑	1,1,1,2-Tetrachloroethane
8260 B	☑	☑	1,1,1-Trichloroethane
8260 B	☑	☑	1,1,2,2-Tetrachloroethane
8260 B	☑	☑	1,1,2-Trichloro-1,2,2-trifluoroethane
8260 B	☑	☑	1,1,2-Trichloroethane

Organic Instrumentation

	Solid	Non-Potable Water	
8260 B	☑	☑	1,1-Dichloroethane
8260 B	☑	☑	1,1-Dichloroethylene (-ethene)[Vinylidene Chloride]
8260 B	☑	☑	1,1-Dichloropropene
8260 B	☑	☑	1,2,3-Trichlorobenzene
8260 B	☑	☑	1,2,3-Trichloropropane
8260 B	☑	☑	1,2,4-Trichlorobenzene
8260 B	☑	☑	1,2,4-Trimethylbenzene
8260 B	☑	☑	1,2-Dibromo-3-chloropropane (DBCP, Dibromochloropropane)
8260 B	☑	☑	1,2-Dibromoethane (EDB, Ethylene dibromide)
8260 B	☑	☑	1,2-Dichloro-1,1,2-trifluoroethane
8260 B	☑	☑	1,2-Dichlorobenzene
8260 B	☑	☑	1,2-Dichloroethane
8260 B	☑	☑	1,2-Dichloropropane
8260 B	☑	☑	1,3,5-Trimethylbenzene
8260 B	☑	☑	1,3-Dichlorobenzene
8260 B	☑	☑	1,3-Dichloropropane
8260 B	☑	☑	1,4-Dichlorobenzene
8260 B	☑	☑	2,2-Dichloropropane
8260 B	☑	☑	2-Chlorotoluene
8260 B	☑	☑	2-Hexanone
8260 B	☑	☑	2-Nitropropane
8260 B	☑	☑	4-Chlorotoluene
8260 B	☑	☑	4-Methyl-2-pentanone (MIBK, Isopropylacetone, Hexone)
8260 B	☑	☑	Acetone
8260 B	☑	☑	Acetonitrile
8260 B	☑	☑	Acrylonitrile
8260 B	☑	☑	Benzene
8260 B	☑	☑	Bromobenzene
8260 B	☑	☑	Bromochloromethane
8260 B	☑	☑	Bromodichloromethane
8260 B	☑	☑	Bromoform
8260 B	☑	☑	Carbon Disulfide
8260 B	☑	☑	Carbon Tetrachloride
8260 B	☑	☑	Chlorobenzene
8260 B	☑	☑	Chlorodibromomethane [Dibromochloromethane]
8260 B	☑	☑	Chloroethane
8260 B	☑	☑	Chloroform
8260 B	☑	☑	cis-1,2-Dichloroethene (-ethylene)
8260 B	☑	☑	cis-1,3-dichloropropene
8260 B	☑	☑	Cyclohexanone
8260 B	☑	☑	Dibromomethane
8260 B	☑	☑	Dichlorodifluoromethane
8260 B	☑	☑	Dichloromethane (DCM, Methylene chloride)
8260 B	☑	☑	Diethyl Ether (Ethyl Ether)
8260 B	☑	☑	Ethyl Acetate
8260 B	☑	☑	Ethylbenzene
8260 B	☑	☑	Hexachlorobutadiene
8260 B	☑	☑	Hexane
8260 B	☑	☑	Iodomethane (Methyl Iodide)
8260 B	☑	☑	Isobutyl Alcohol (2-Methyl-1-propanol)
8260 B	☑	☑	Isopropylbenzene

Organic Instrumentation

	Solid	Non-Potable Water	
8260 B	☑	☑	meta-Xylene
8260 B	☑	☑	Methyl bromide [Bromomethane]
8260 B	☑	☑	Methyl chloride [Chloromethane]
8260 B	☑	☑	Methyl Ethyl Ketone (MEK, 2-Butanone)
8260 B	☑	☑	Naphthalene
8260 B	☑	☑	n-butanol [1-Butanol, n-Butyl Alcohol]
8260 B	☑	☑	n-Butylbenzene
8260 B	☑	☑	n-Propylbenzene
8260 B	☑	☑	ortho-Xylene
8260 B	☑	☑	para-Xylene
8260 B	☑	☑	p-Isopropyltoluene
8260 B	☑	☑	sec-Butylbenzene
8260 B	☑	☑	Styrene
8260 B	☑	☑	tert-Butylbenzene
8260 B	☑	☑	Tetrachloroethylene (Perchloroethylene -ethene)
8260 B	☑	☑	Toluene
8260 B	☑	☑	trans-1,2-Dichloroethylene (-ethene)
8260 B	☑	☑	trans-1,3-Dichloropropylene (-propene)
8260 B	☑	☑	trans-1,4-dichloro-2-butene
8260 B	☑	☑	Trichloroethene (Trichloroethylene)
8260 B	☑	☑	Trichlorofluoromethane
8260 B	☑	☑	Vinyl Acetate
8260 B	☑	☑	Vinyl Chloride
8260 B	☑	☑	Volatile Organic Compounds
8260 B	☑	☑	Xylenes, Total
8270 C	☑	☑	1,2,4-Trichlorobenzene
8270 C	☑	☑	1,2-Dichlorobenzene
8270 C	☑	☑	1,3-Dichlorobenzene
8270 C	☑	☑	1,4-Dichlorobenzene
8270 C	☑	☑	2,4,5-Trichlorophenol
8270 C	☑	☑	2,4,6-Trichlorophenol
8270 C	☑	☑	2,4-Dichlorophenol
8270 C	☑	☑	2,4-Dimethylphenol
8270 C	☑	☑	2,4-Dinitrophenol
8270 C	☑	☑	2,4-Dinitrotoluene (2,4-DNT)
8270 C	☑	☑	2,6-Dinitrotoluene (2,6-DNT)
8270 C	☑	☑	2-Chloronaphthalene
8270 C	☑	☑	2-Chlorophenol
8270 C	☑	☑	2-Methyl-4,6-dinitrophenol (4,6-Dinitro-2-methylphenol)
8270 C	☑	☑	2-Methylphenol (o-cresol, 2-Hydroxytoluene)
8270 C	☑	☑	2-Nitrophenol
8270 C	☑	☑	3-Methylphenol (m-cresol, 3-Hydroxytoluene)
8270 C	☑	☑	4-Bromophenyl Phenyl Ether
8270 C	☑	☑	4-Chloro-3-methylphenol
8270 C	☑	☑	4-Chlorophenyl Phenyl Ether
8270 C	☑	☑	4-Methylphenol (p-cresol, 4-Hydroxytoluene)
8270 C	☑	☑	4-Nitrophenol
8270 C	☑	☑	Acenaphthene
8270 C	☑	☑	Acenaphthylene
8270 C	☑	☑	Anthracene
8270 C	☑	☑	Azobenzene (1,2-Diphenylhydrazine)

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Organic Instrumentation

	Solid	Non-Potable Water	
8270 C	☑	☑	Benzo(a)anthracene
8270 C	☑	☑	Benzo(a)pyrene
8270 C	☑	☑	Benzo(b)fluoranthene
8270 C	☑	☑	Benzo(g,h,i)perylene
8270 C	☑	☑	Benzo(k)fluoranthene
8270 C	☑	☑	bis(2-chloroethoxy)methane
8270 C	☑	☑	bis(2-Chloroethyl)ether
8270 C	☑	☑	bis(2-chloroisopropyl)ether
8270 C	☑	☑	bis(2-Ethylhexyl) phthalate (DEHP)
8270 C	☑	☑	Butyl Benzyl Phthalate
8270 C	☑	☑	Chrysene
8270 C	☑	☑	Dibenzo(a,h)anthracene
8270 C	☑	☑	Diethyl Phthalate
8270 C	☑	☑	Dimethyl Phthalate
8270 C	☑	☑	Di-n-butyl phthalate
8270 C	☑	☑	Di-n-octyl Phthalate
8270 C	☑	☑	Fluoranthene
8270 C	☑	☑	Fluorene
8270 C	☑	☑	Hexachlorobenzene
8270 C	☑	☑	Hexachlorobutadiene
8270 C	☑	☑	Hexachlorocyclopentadiene
8270 C	☑	☑	Hexachloroethane
8270 C	☑	☑	Indeno(1,2,3-cd)pyrene
8270 C	☑	☑	Isophorone
8270 C	☑	☑	Naphthalene
8270 C	☑	☑	Nitrobenzene
8270 C	☑	☑	n-Nitrosodimethylamine
8270 C	☑	☑	n-Nitroso-di-n-Propylamine
8270 C	☑	☑	n-Nitrosodiphenylamine
8270 C	☑	☑	Pentachlorophenol
8270 C	☑	☑	Phenanthrene
8270 C	☑	☑	Phenol
8270 C	☑	☑	Pyrene
8270 C	☑	☑	Pyridine
8270 C	☐	☐	Semivolatile Organic Compounds

Radiochemistry

	Solid	Non-Potable Water	
9310	☑	☑	Gross Alpha and Gross Beta

Volatile Organic Preparation

	Solid	Non-Potable Water	
5030 A	☑	☑	Purge-and-Trap for Aqueous Samples
5035	☑	☐	Purge-and-Trap and Extraction for Volatile Organics

The effective date of this certificate letter is: 4/11/2011.

The analytes by method which a laboratory is authorized to perform at any given time will be those indicated in the most recent certificate letter. The most recent certification letter supersedes all previous certification or authorization letters. It is the certified laboratory's responsibility to review this letter for discrepancies. The certified laboratory must document any discrepancies in this letter and send notice to this bureau within 15 days of receipt. This certificate letter will be recalled in the event your laboratory's certification is revoked.

Respectfully,

Patrick F. Luedtke, MD, MPH.
Director of Public Health Laboratories
Deputy Director of Epidemiology and Laboratory

UTAH DEPARTMENT OF HEALTH

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ATTACHMENT G

DEPLETED URANIUM ANALYSES

WP-019660 Conversion of Generator's Uranium Data to pCi/g

Generator Sample ID	Method	Analyte	Result pCi/mL	Result µg/mL	Result µg/L	Specific Gravity from profile	Converted to pCi/g by dividing by SG	Converted µg/L to µg/mL	Converted to µg/g by dividing by SG	Converted to g/g (*1E-6)	Converted to Ci/g (* 5E-7)	Converted to pCi/g (*1E+12)
000554120710A	Alpha Spectroscopy	U-233/234	2.164E+00			1.15	1.882E+00					
000554120710A	Alpha Spectroscopy	U-235	1.680E-01			1.15	1.461E-01					
000554120710A	Alpha Spectroscopy	U-236	1.677E-02			1.15	1.458E-02					
000554120710A	Alpha Spectroscopy	U-238	1.022E+01			1.15	8.887E+00					
HF554100510A	Total Uranium	Uranium		3.086E+01		1.15			2.683E+01	2.683E-05	1.342E-11	1.342E+01
HF554100510A	Metals	Uranium		3.040E+01		1.15			2.643E+01	2.643E-05	1.322E-11	1.322E+01
HF554090210	Total Uranium	Uranium		2.164E-03		1.15			1.882E-03	1.882E-09	9.409E-16	9.409E-04
HF554090210	Metals	Uranium			1.220E+03	1.15		1.220E+00	1.061E+00	1.061E-06	5.304E-13	5.304E-01
HF554082610	Total Uranium	Uranium		1.224E-05		1.15			1.064E-05	1.064E-11	5.322E-18	5.322E-06
HF554082610	Metals	Uranium			2.400E+03	1.15		2.400E+00	2.087E+00	2.087E-06	1.043E-12	1.043E+00
HF554082310	Total Uranium	Uranium		2.039E-03		1.15			1.773E-03	1.773E-09	8.865E-16	8.865E-04
HF554082310	Metals	Uranium			1.600E+03	1.15		1.600E+00	1.391E+00	1.391E-06	6.957E-13	6.957E-01
HF-X-554-080310	Total Uranium	Uranium		4.268E-03		1.15			3.711E-03	3.711E-09	1.856E-15	1.856E-03
HF-X-554-080310	Metals	Uranium			1.620E+02	1.15		1.620E-01	1.409E-01	1.409E-07	7.043E-14	7.043E-02
HF554092810	Metals	Uranium			2.180E+04	1.15		2.180E+01	1.896E+01	1.896E-05	9.478E-12	9.478E+00
HF554100510B	Total Uranium	Uranium		3.183E+01		1.15			2.768E+01	2.768E-05	1.384E-11	1.384E+01

Sample Chain of Custody Record

HF Tank 554 Profile

Sample ID	000554120710A
Date/Time Sampled	
Project ID	X-DECON
Station	PORTS
Sample Type:	GRAB
LAB COC NO.	UDS10-070 USEC-PORT
MaterialDesciption:	HF Tank 554 Profile
SampleLocation:	PORTS

X101208007001

Chain of Custody

Sample Relinquished By		Date/Time
Received By		Date/Time 12/7/10 1346
Sample Relinquished By		Date/Time 12/7/10 1350
Received By		Date/Time 12/7/10 1350
Sample Relinquished By		Date/Time 2-3-11 1245
Received By		Date/Time 2-3-11 1245
Sample Relinquished By		Date/Time 2/8/11 1332
Received By		Date/Time 2/8/11 1332
Sample Relinquished By		Date/Time
Received By		Date/Time
Sample Relinquished By		Date/Time
Received By		Date/Time

HF Analysis Matrix: LIQUID

Bottle: 250 ml HDPE Pres: None

SOW Numbers: X-DECON-3

6010B	Total Metals	Ag, Ba, Cd, Ca, Pb, Ni, Cu, Zn, Se, As per DJ Hannah TES 12-7-10
7470A	Mercury	
PER PORTS METHOD	pH	
XP4-TS-RL-7300	Tc-99	
XP4-TS-RL-7500	Am-241	Np-237
Pu-238, Pu-239/240	U233/234, U235, U236, U238	

Miscellaneous: 2 Bottles Marked
1 of 2 and 2 of 2
To make one sample
1 wk TAT per DJ Hannah TES 12-7-10

Sample returned 2/16/11 dr

Cust. Sample Id:	**000554120710A**	Sample Desc:		Sampled:	12/07/10 00:00
Customer:	Uranium Disposition Services LLC	Matrix:	Liquid	Received:	12/07/10 13:50
Project/Subproj:	UDS-X-DECON - DECON	Location:		Needed:	12/08/10
COC # :				Approved:	12/15/10 14:12
SDG # :				Status:	Released

Sample Level Comments:

Inorganic lab tests

Analytical Test/Method: Hg7470A / SW846-7470A — Analytical Run: R10008910 — Date Approved: 12/15/10 14:12
Prep Method: - — Rpt Basis: Not corrected — Analyzed: 60563_KAD 12/15/2010 — Approver: 9858_TES

Analyte Name	Result	+/-	Unit	Qual.	Fn.	LCR	Dilu	HT
Mercury	50.0		ug/L	U		50.0	1	

Analytical Test/Method: METALS-No-Prep / SW846-6010B — Analytical Run: R10008777 — Date Approved: 12/10/10 07:57
Prep Method: - — Rpt Basis: Not corrected — Analyzed: 9322_ELS 12/08/2010 12:50 — Approver: 60563_KAD

Analyte Name	Result	+/-	Unit	Qual.	Fn.	LCR	Dilu	HT
Arsenic	147	0	ug/L	B		100	10	
Barium	4.11	0	ug/L	U		4.11	10	
Cadmium	10.0	0	ug/L	B		2.98	10	
Chromium	55.0	0	ug/L	B		9.72	10	
Copper	7770	0	ug/L			10.4	10	
Lead	58.0	0	ug/L	B		43.5	10	
Nickel	5930	0	ug/L			72.7	10	
Selenium	237	0	ug/L	U		237	10	
Silver	29.8	0	ug/L	U		29.8	10	
Zinc	522	0	ug/L	B		76	10	

Inorganic EPA Qualifiers

- B - Analyte result less than PQL and greater than IDL
- U - Below Detection Limit LCR
- * - Duplicate analysis not within control limits
- J - Estimated value
- W - Post-digestion spike recovery out of contol limits
- N - Sample spike recovery not within control limits

Inorganic Footnotes

- B - Backup Pad
- S - NCS Significant
- T - Analyses were performed using SW846-1311 extract.
- W - Cassette Wipe

Radiological lab tests

Analytical Test/Method: ALPHA-AM-AS / Ports-XP4-TS-RL7500 — Analytical Run: R10008791 — Date Approved: 12/15/10 11:49
Prep Method: Ports-XP4-TS-RL7510 — Rpt Basis: Not corrected — Analyzed: 60426_JPB 12/08/2010 15:45 — Approver: 60473_CDG

Analyte Name	Result	+/-	Unit	Qual.	Fn.	TPE	MDA	Dec Lvl
Americium-241	1.359E-02	1.359E-02	pCi/ml	U		1.366E-02	9.207E-03	9.207E-03

Analytical Test/Method: ALPHA-U-AS / Ports-XP4-TS-RL7500 Analytical Run: R10008796 Date Approved: 12/15/10 12:21
Prep Method: Ports-XP4-TS-RL7510 Rpt Basis: Not corrected Analyzed: 60426_JPB 12/08/2010 15:47 Approver: 60473_CDG

Analyte Name	Result	+/-	Unit	Qual.	Fn.	TPE	MDA	Dec Lvl
Uranium-233/234	2.164E+00	2.090E-01	pCi/ml			3.663E-01	1.367E-02	1.367E-02
Uranium-235	1.680E-01	6.468E-02	pCi/ml			6.877E-02	1.687E-02	1.687E-02
Uranium-236	1.677E-02	2.499E-02	pCi/ml	U		2.509E-02	4.112E-02	2.813E-02
Uranium-238	1.022E+01	4.536E-01	pCi/ml			1.516E+00	1.364E-02	1.364E-02

Analytical Test/Method: ALPHA-PU-AS / Ports-XP4-TS-RL7500 Analytical Run: R10008793 Date Approved: 12/15/10 11:53
Prep Method: Ports-XP4-TS-RL7510 Rpt Basis: Not corrected Analyzed: 60426_JPB 12/10/2010 15:26 Approver: 60473_CDG

Analyte Name	Result	+/-	Unit	Qual.	Fn.	TPE	MDA	Dec Lvl
Neptunium-237	3.314E-03	1.147E-02	pCi/ml	U		1.147E-02	2.436E-02	1.667E-02
Plutonium-238	-3.292E-03	1.476E-02	pCi/ml	U		1.476E-02	3.552E-02	2.224E-02
Plutonium-239/240	-3.298E-03	6.596E-03	pCi/ml	U		6.608E-03	2.429E-02	1.662E-02

Analytical Test/Method: ALPHA-AM-Sep / Ports-XP4-TS-RL7510 Analytical Run: R10008787 Date Approved: 12/09/10 14:56
Prep Method: Ports-XP4-TS-RL7505 Rpt Basis: Not corrected Analyzed: 60426_JPB 12/09/2010 14:55 Approver: Auto

Analyte Name	Result	+/-	Unit	Qual.	Fn.	TPE	MDA	Dec Lvl
Am/Cm Separation	Complete							

Analytical Test/Method: ALPHA-PU-Sep / Ports-XP4-TS-RL7510 Analytical Run: R10008788 Date Approved: 12/09/10 14:58
Prep Method: Ports-XP4-TS-RL7505 Rpt Basis: Not corrected Analyzed: 60426_JPB 12/09/2010 14:57 Approver: Auto
Ports-XP4-TS-RL7510

Analyte Name	Result	+/-	Unit	Qual.	Fn.	TPE	MDA	Dec Lvl
Np/Pu Separation	Complete							

Analytical Test/Method: ALPHA-U-Sep / Ports-XP4-TS-RL7510 Analytical Run: R10008789 Date Approved: 12/09/10 15:00
Prep Method: Ports-XP4-TS-RL7505 Rpt Basis: Not corrected Analyzed: 60426_JPB 12/09/2010 14:59 Approver: Auto

Analyte Name	Result	+/-	Unit	Qual.	Fn.	TPE	MDA	Dec Lvl
U Separation	Complete							

Analytical Test/Method: BETA-ACT-LS / Ports-XP4-TS-RL7305 Analytical Run: R10008829 Date Approved: 12/15/10 09:59
Prep Method: Ports-XP4-TS-RL7510 Rpt Basis: Not corrected Analyzed: 60380_RMB 12/13/2010 14:00 Approver: 6288_WRW

Analyte Name	Result	+/-	Unit	Qual.	Fn.	TPE	MDA	Dec Lvl
Technetium-99	1.84E-01	2.13E-01	pCi/mL	U		2.13E-01	3.50E-01	1.71E-01

Analytical Test/Method: RAD-PREP-LS / Ports-XP4-TS-RL7510 Analytical Run: R10008828 Date Approved: 12/13/10 12:07

Prep Method: Ports-XP4-TS-RL7505 Rpt Basis: Not corrected Analyzed: 60380_RMB 12/13/2010 11:30 Approver: Auto

Analyte Name	Result	+/-	Unit	Qual.	Fn.	TPE	MDA	Dec Lvl
PREPARED	Complete							

Radiological EPA Qualifiers

- V - Below Decision Level DL
- U - Below Detection Limit MDA
- J - Estimated value
- I - Insufficient Sample
- T - Test purposes only

Radiological Footnotes

- N - Sample preserved to a pH <2 with Nitric Acid
- S - NCS Significant
- X - Insufficient amount of Uranium present to determine enrichment

An asterisk (*) beside a Cust Smpl Id, Test, Analyte ID, Aliquot, or TIC CAS Id indicates a modification after re-open.

USEC PORTS Analytical Lab
P.O. Box 628, Piketon, OH 45661 740-897-5702
Lab Director: Deborah K. Perez

***** END OF REPORT *****

Sample Chain of Custody Record

U Analysis of DECON

Sample ID	HF554100510A	
Date/Time Sampled	10/5/2010	1739
Project ID	X-DECON	
Station	PORTS	
Sample Type:	GRAB	
LAB COC NO.	UDS10-034	USEC-PORT
MaterialDesciption:	HF	
SampleLocation:	PORTS	

X101006 005 & 01

Chain of Custody

Sample Relinquished By	Gregg Maynard	Date/Time 10-5-2010 1743
Received By		Date/Time 10/5/10 1743
Sample Relinquished By		Date/Time 10-6-10 0817
Received By	John R. Hamer	Date/Time 10-06-10 0817
Sample Relinquished By	John R Hamer	Date/Time 10-06-10 0856
Received By	Tim Lucas	Date/Time 10-06-10 0856
Sample Relinquished By	John R. Hamer	Date/Time 10-21-10 0806
Received By		Date/Time 10-21-10 0806
Sample Relinquished By		Date/Time
Received By		Date/Time
Sample Relinquished By		Date/Time
Received By		Date/Time

HF Analysis Matrix: LIQUID

Bottle: 1 L Nalgene HDPE wide mouth Pres: None

SOW Numbers: X-DECON-1

ALPHASPEC	U and Assay

Miscellaneous:

10/21: Noted that sample was not relinquished to John Hamer from lab

Sample returned 10/21/10 JH

Portsmouth Analytical Laboratory
Official Report

X101006005001
HF554100510A

Cust. Sample Id:	**HF554100510A**	Sample Desc:		Sampled:	10/05/10 17:39
Customer:	Uranium Disposition Services LLC	Matrix:	Liquid	Received:	10/06/10 08:56
Project/Subproj:	UDS-X-DECON - LIQUID	Location:		Needed:	10/07/10
COC # :				Approved:	10/07/10 09:03
SDG # :				Status:	Released

Sample Level Comments:

Radiological lab tests

Analytical Test/Method: RAD-PREP / Ports-XP4-TS-RL7505 Analytical Run: R10007047 Date Approved: 10/07/10 08:08
Prep Method: - Rpt Basis: Not corrected Analyzed: 60426_JPB 10/06/2010 13:00 Approver: Auto

Analyte Name	Result	+/-	Unit	Qual.	Fn.	TPE	MDA	Dec Lvl
PREPARED	Complete							

Analytical Test/Method: ALPHA-U-AS / Ports-XP4-TS-RL7500 Analytical Run: R10007049 Date Approved: 10/07/10 09:03
Prep Method: Ports-XP4-TS-RL7510 Rpt Basis: Not corrected Analyzed: 7394_SJJ 10/06/2010 16:00 Approver: 60426_JPB

Analyte Name	Result	+/-	Unit	Qual.	Fn.	TPE	MDA	Dec Lvl
Assay	2.440E-01	0	Wt%			1.060E-01	0	0
Total Uranium	3.086E+01	0	µg/mL			4.529E+00	1.118E-01	0

Analytical Test/Method: ALPHA-U-Sep / Ports-XP4-TS-RL7510 Analytical Run: R10007048 Date Approved: 10/07/10 08:12
Prep Method: Ports-XP4-TS-RL7505 Rpt Basis: Not corrected Analyzed: 60426_JPB 10/06/2010 16:00 Approver: Auto

Analyte Name	Result	+/-	Unit	Qual.	Fn.	TPE	MDA	Dec Lvl
U Separation	Complete							

Radiological EPA Qualifiers

- V - Below Decision Level DL
- U - Below Detection Limit MDA
- J - Estimated value
- ! - Insufficient Sample
- T - Test purposes only

Radiological Footnotes

- N - Sample preserved to a pH <2 with Nitric Acid
- S - NCS Significant
- X - Insufficient amount of Uranium present to determine enrichment

An asterisk (*) beside a Cust Smpl Id, Test, Analyte ID, Aliquot, or TIC CAS Id indicates a modification after re-open.

USEC PORTS Analytical Lab
P.O. Box 628, Piketon, OH 45661 740-897-5702
Lab Director: Deborah K. Perez

******* END OF REPORT *******

Portsmouth Analytical Laboratory
Official Report

Cust. Sample Id:	**HF554100510A**	Sample Desc:		Sampled:	10/05/10 17:39
Customer:	Uranium Disposition Services LLC	Matrix:	Liquid	Received:	10/06/10 08:56
Project/Subproj:	UDS_HF - HF-X-SPEC	Location:		Needed:	11/05/10
COC # :				Approved:	10/25/10 12:09
SDG # :				Status:	Released

Sample Level Comments:

Inorganic lab tests

Analytical Test/Method: METALS-No-Prep / SW846-6010B — Analytical Run: R10007355 — Date Approved: 10/21/10 12:31
Prep Method: - — Rpt Basis: Not corrected — Analyzed: 9322_ELS 10/19/2010 12:17 — Approver: 9858_TES

Analyte Name	Result	+/-	Unit	Qual.	Fn.	LCR	Dilu	HT
Arsenic	0.169		µg/mL	U		0.169	10	
Calcium	0.597		µg/mL			0.138	10	
Iron	5.08		µg/mL			0.0144	10	
Magnesium	1.01		µg/mL			0.0145	10	
Manganese	0.196		µg/mL			0.00155	10	
Silicon	13.8		µg/mL			.222	10	
Uranium	30.4		µg/mL			.463	10	

Lab Test Comments: S= .463 u ppm (none detected.

Analytical Test/Method: HF7602 / Ports-XP4-TS-ST7602 — Analytical Run: R10007419 — Date Approved: 10/25/10 12:09
Prep Method: - — Rpt Basis: Not corrected — Analyzed: 9858_TES — Approver: 9858_TES

Analyte Name	Result	+/-	Unit	Qual.	Fn.	LCR	Dilu	HT
Visual Inspection	Clear							

Analytical Test/Method: HF7601 / Ports-XP4-TS-ST7601 — Analytical Run: R10007477 — Date Approved: 10/25/10 09:05
Prep Method: - — Rpt Basis: Not corrected — Analyzed: 65625_TWN 10/20/2010 — Approver: 9858_TES

Analyte Name	Result	+/-	Unit	Qual.	Fn.	LCR	Dilu	HT
Chloride	2.00		ppm	U		2.0		

Analytical Test/Method: HF7600 / Ports-XP4-TS-ST7600 — Analytical Run: R10007395 — Date Approved: 10/21/10 10:39
Prep Method: - — Rpt Basis: Not corrected — Analyzed: 65625_TWN 10/19/2010 — Approver: 9858_TES

Analyte Name	Result	+/-	Unit	Qual.	Fn.	LCR	Dilu	HT
Hydrofluoric Acid	13.6		%			0.1		

Inorganic EPA Qualifiers

- B - Analyte result less than PQL and greater than IDL
- U - Below Detection Limit LCR
- * - Duplicate analysis not within control limits
- J - Estimated value
- W - Post-digestion spike recovery out of contol limits
- N - Sample spike recovery not within control limits

Inorganic Footnotes

- B - Backup Pad
- S - NCS Significant
- T - Analyses were performed using SW846-1311 extract.
- W - Cassette Wipe

An asterisk (*) beside a Cust Smpl Id, Test, Analyte ID, Aliquot, or TIC CAS Id indicates a modification after re-open.

USEC PORTS Analytical Lab
P.O. Box 628, Piketon, OH 45661 740-897-5702
Lab Director: Deborah K. Perez

******* END OF REPORT *******

Sample Chain of Custody Record

HF analysis during HFT

Sample ID	HF554090210
Date/Time Sampled	9/2/2010 14:06
Project ID	HF-X-HFT-02
Station	PORTS
Sample Type:	GRAB
LAB COC NO.	UDS10-026 USEC-PORT
MaterialDesciption:	HF
SampleLocation:	TANK 554

19 JT 9-3-10

X1009030H6001

Chain of Custody

Sample Relinquished By	R Richard	Date/Time 9/2/10 1413
Received By	Debra Hamner	Date/Time 9/2/10 1413
Sample Relinquished By	Debra Hamner	Date/Time 9/2/10 1434
Received By	John R. Hamner	Date/Time 9/2/10 1434
Sample Relinquished By	John R. Hamner	Date/Time 9/2/10 1503
Received By	Tim Shook	Date/Time 9/2/10 1503
Sample Relinquished By	Tim Shook	Date/Time 9-29-10 0752
Received By	Debra Hamner	Date/Time 9-29-10 0752
Sample Relinquished By	Debra Hamner	Date/Time 10/21/10 1204
Received By	Tim Shook	Date/Time 10/21/10 1204
Sample Relinquished By	Tim Shook	Date/Time 10/21/10 1218
Received By		Date/Time 10/21/10 1218
Relig.	Tim Shook	11/15/10 1247
Rec.	F.A. Blankenship	11/15/10 1248

Sample returned 11/15/10

HF Analysis Matrix: Liquid

Bottle: 1 L Nalgene HDPE wide mouth Pres: None

SOW Numbers: HF-X-HFT

Calculated	pH	
ICP/ICPMS	Arsenic	Barium
Cadmium	Chromium	Copper
Lead	Mercury	Nickel
Selenium	Silver	U
Zinc		
XP4-TS-ST7600	HF Wt%	

Miscellaneous: New Starlims # assigned under Project UDS-HF HF-X-Spec for this Sample X1010210220004- analysis: Alpha U-AS (TOTAL)

10-21-10 KAH per T. Shook

original COC filed under Starlims # X1010210220004

Portsmouth Analytical Laboratory
Official Report

Cust. Sample Id:	**HF554090210**	Sample Desc:		Sampled:	09/02/10 14:06
Customer:	Uranium Disposition Services LLC	Matrix:	Liquid	Received:	10/21/10 12:18
Project/Subproj:	UDS_HF - HF-X-SPEC	Location:		Needed:	11/20/10
COC # :				Approved:	10/22/10 11:30
SDG # :				Status:	Released

Sample Level Comments:

Radiological lab tests

Analytical Test/Method: RAD-PREP / Ports-XP4-TS-RL7505 Analytical Run: R10007428 Date Approved: 10/21/10 15:31
Prep Method: - Rpt Basis: Not corrected Analyzed: 60426_JPB 10/21/2010 15:30 Approver: Auto

Analyte Name	Result	+/-	Unit	Qual.	Fn.	TPE	MDA	Dec Lvl
PREPARED	Complete							

Analytical Test/Method: ALPHA-U-AS / Ports-XP4-TS-RL7500 Analytical Run: R10007430 Date Approved: 10/22/10 11:30
Prep Method: Ports-XP4-TS-RL7510 Rpt Basis: Not corrected Analyzed: 7394_SJJ 10/21/2010 15:45 Approver: 60473_CDG

Analyte Name	Result	+/-	Unit	Qual.	Fn.	TPE	MDA	Dec Lvl
Total Uranium	2.164E-03	0	µg/mL	U		3.073E-03	3.513E-03	0

Analytical Test/Method: ALPHA-U-Sep / Ports-XP4-TS-RL7510 Analytical Run: R10007429 Date Approved: 10/21/10 15:33
Prep Method: Ports-XP4-TS-RL7505 Rpt Basis: Not corrected Analyzed: 60426_JPB 10/21/2010 15:32 Approver: Auto

Analyte Name	Result	+/-	Unit	Qual.	Fn.	TPE	MDA	Dec Lvl
U Separation	Complete							

Radiological EPA Qualifiers

- V - Below Decision Level DL
- U - Below Detection Limit MDA
- J - Estimated value
- ! - Insufficient Sample
- T - Test purposes only

Radiological Footnotes

- N - Sample preserved to a pH <2 with Nitric Acid
- S - NCS Significant
- X - Insufficient amount of Uranium present to determine enrichment

An asterisk (*) beside a Cust Smpl Id, Test, Analyte ID, Aliquot, or TIC CAS Id indicates a modification after re-open.

USEC PORTS Analytical Lab
P.O. Box 628, Piketon, OH 45661 740-897-5702
Lab Director: Deborah K. Perez

******* END OF REPORT *******

Sample Chain of Custody Record

HF analysis during HFT

Sample ID	HF554090210
Date/Time Sampled	9/2/2010 14:06
Project ID	HF-X-HFT-02
Station	PORTS
Sample Type:	GRAB
LAB COC NO.	UDS10-026 USEC-PORT
MaterialDesciption:	HF
SampleLocation:	TANK 554

19 JUT 9-3-10

X100903046001

Chain of Custody

Sample Relinquished By	R Blanchard	Date/Time 9/2/10 1413
Received By	Debra Hamner	Date/Time 9/2/10 1413
Sample Relinquished By	Debra Hamner	Date/Time 9/2/10 1434
Received By	John R. Hamner	Date/Time 9/2/10 1434
Sample Relinquished By	John R. Hamner	Date/Time 9/2/10 1503
Received By	Tim Shook	Date/Time 9/2/10 1503
Sample Relinquished By	Tim Shook	Date/Time 9-29-10 0752
Received By	Debra Hamner	Date/Time 9-29-10 0752
Sample Relinquished By	Debra Hamner	Date/Time 10/21/10 1204
Received By	Tim Shook	Date/Time 10/21/10 1204
Sample Relinquished By	Tim Shook	Date/Time 10/21/10 1218
Received By		Date/Time 10/21/10 1218

HF Analysis Matrix: Liquid

Bottle: 1 L Nalgene HDPE wide mouth Pres: None

Relig. Tim Shook 11/15/10 1247

REC. F.R. Blankenship 11/15/10 1248

Sample returned 11/15/10

SOW Numbers: HF-X-HFT

Calculated	pH	
ICP/ICPMS	Arsenic	Barium
Cadmium	Chromium	Copper
Lead	Mercury	Nickel
Selenium	Silver	U
Zinc		
XP4-TS-ST7600	HF Wt%	

Miscellaneous: New Sterlim # assigned under Project UDS-HF. HF-X-Spec for this Sample X101021022004 - analysis - alpha U-AS (TOTAL)

10-21-10 KAH per T. Shook

original COC filed under Sterlim # X101021022004

Cust. Sample Id:	HF554090210	Sample Desc:		Sampled:	09/02/10 14:06
Customer:	Uranium Disposition Services LLC	Matrix:	Liquid	Received:	09/02/10 15:03
Project/Subproj:	UDS-HF - HF-X-HFT-01	Location:		Needed:	09/03/10
COC # :				Approved:	09/07/10 10:35
SDG # :				Status:	Released

Sample Level Comments:

Inorganic lab tests

Analytical Test/Method: Hg7470A / SW846-7470A — Analytical Run: R10006134 — Date Approved: 09/07/10 06:54
Prep Method: - — Rpt Basis: Not corrected — Analyzed: 60563_KAD 09/03/2010 — Approver: 9858_TES

Analyte Name	Result	+/-	Unit	Qual.	Fn.	LCR	Dilu	HT
Mercury	50.0		ug/L	U		50.0	1	

Analytical Test/Method: METALS-No-Prep / SW846-6010B — Analytical Run: R10006140 — Date Approved: 09/07/10 08:08
Prep Method: - — Rpt Basis: Not corrected — Analyzed: 60563_KAD 09/03/2010 12:25 — Approver: 9858_TES

Analyte Name	Result	+/-	Unit	Qual.	Fn.	LCR	Dilu	HT
Arsenic	150	0	ug/L	U		150	15	
Barium	6.16	0	ug/L	U		6.16	15	
Cadmium	18.0	0	ug/L	B		4.47	15	
Chromium	85.5	0	ug/L	B		14.6	15	
Copper	9590	0	ug/L			15.6	15	
Lead	65.2	0	ug/L	U		65.2	15	
Nickel	6370	0	ug/L			109	15	
Selenium	356	0	ug/L	U		356	15	
Silver	44.7	0	ug/L	U		44.7	15	
Uranium	1220	0	ug/L	U		1220	15	
Zinc	651	0	ug/L	B		114	15	

Analytical Test/Method: HF7600 / PORTS-XP4-TS-ST7600 — Analytical Run: R10006162 — Date Approved: 09/07/10 10:34
Prep Method: - — Rpt Basis: Not corrected — Analyzed: 9858_TES 09/03/2010 09:00 — Approver: 60563_KAD

Analyte Name	Result	+/-	Unit	Qual.	Fn.	LCR	Dilu	HT
Hydrofluoric Acid	13.6		%			0.1		

Lab Test Comments: pH result = 1.72
Recovery for laboratory control samples = 99.0% and 99.0%
Sample duplicate results within acceptable control limits.

Inorganic EPA Qualifiers

- B - Analyte result less than PQL and greater than IDL
- U - Below Detection Limit LCR
- * - Duplicate analysis not within control limits
- J - Estimated value
- W - Post-digestion spike recovery out of contol limits
- N - Sample spike recovery not within control limits

Inorganic Footnotes

- B - Backup Pad
- S - NCS Significant
- T - Analyses were performed using SW846-1311 extract.
- W - Cassette Wipe

An asterisk (*) beside a Cust Smpl Id, Test, Analyte ID, Aliquot, or TIC CAS Id indicates a modification after re-open.

USEC PORTS Analytical Lab
P.O. Box 628, Piketon, OH 45661 740-897-5702
Lab Director: Deborah K. Perez

******* END OF REPORT *******

Sample Chain of Custody Record

HF analysis during HFT

Sample ID	HF554082610
Date/Time Sampled	8/26/10
Project ID	HF-X-HFT-02
Station	PORTS
Sample Type:	GRAB
LAB COC NO.	UDS10-023 USEC-PORT
MaterialDesciption:	HF
SampleLocation:	TANK 554

X100827007001

Chain of Custody

Sample Relinquished By	B Reynolds	Date/Time 8/26/10 1807
Received By	F.R. Blankenship	Date/Time 8/27/10 1808
Sample Relinquished By	F.R. Blankenship	Date/Time 8/27/10 0803
Received By	John R. Hamer	Date/Time 8/27/10 0803
Sample Relinquished By	John R Hamer	Date/Time 8/27/10 0819
Received By	Tim Shoot	Date/Time 8/27/10 0819
Sample Relinquished By	Tim Shoot	Date/Time 11/15/10 1247
Received By	F.R. Blankenship	Date/Time 11/15/10 1248
Sample Relinquished By		Date/Time
Received By		Date/Time
Sample Relinquished By		Date/Time
Received By		Date/Time

HF Analysis Matrix: Liquid

Bottle: 1 L Nalgene HDPE wide mouth Pres: None

SOW Numbers: HF-X-HFT

Calculated	pH	
ICP/ICPMS	Arsenic	Barium
Cadmium	Chromium	Copper
Lead	Mercury	Nickel
Selenium	Silver	U
Zinc		
XP4-TS-ST7600	HF Wt%	

Sample returned 11/15/10 JV

Miscellaneous:

Original COC filed under Starlims # X101021022003

Sample Chain of Custody Record

HF analysis during HFT

Sample ID	HF554082610
Date/Time Sampled	8/26/10
Project ID	HF-X-HFT-02
Station	PORTS
Sample Type:	GRAB
LAB COC NO.	UDS10-023 USEC-PORT
MaterialDesciption:	HF
SampleLocation:	TANK 554

X100827007001

Chain of Custody

Sample Relinquished By	R Reynolds	Date/Time 8/26/10 1807
Received By	F.R. Blankenship	Date/Time 8/27/10 1808
Sample Relinquished By	F.R. Blankenship	Date/Time 8/27/10 0803
Received By	John R. Hamer	Date/Time 8/27/10 0803
Sample Relinquished By	John R Hamer	Date/Time 8/27/10 0819
Received By	Tim Sloot	Date/Time 8/27/10 0819
Sample Relinquished By	Tim Sloot	Date/Time 9-29-10 0752
Received By	Debra Hamer	Date/Time 9-29-10 0752
Sample Relinquished By	Debra Hamer	Date/Time 10/21/10 1204
Received By	Tim Sloot	Date/Time 10/21/10 1204
Sample Relinquished By		Date/Time
Received By		Date/Time

HF Analysis Matrix: Liquid

Bottle: 1 L Nalgene HDPE wide mouth Pres: None

SOW Numbers: HF-X-HFT

Calculated	pH	
ICP/ICPMS	Arsenic	Barium
Cadmium	Chromium	Copper
Lead	Mercury	Nickel
Selenium	Silver	U
Zinc		
XP4-TS-ST7600	HF Wt%	

Miscellaneous:

Portsmouth Analytical Laboratory
Official Report

Cust. Sample Id:	**HF554082610**	Sample Desc:		Sampled:	08/26/10 00:00
Customer:	Uranium Disposition Services LLC	Matrix:	Liquid	Received:	10/21/10 12:18
Project/Subproj:	UDS_HF - HF-X-SPEC	Location:		Needed:	11/20/10
COC # :				Approved:	10/22/10 11:30
SDG # :				Status:	Released

Sample Level Comments:

Radiological lab tests

Analytical Test/Method: RAD-PREP / Ports-XP4-TS-RL7505 — Analytical Run: R10007428 — Date Approved: 10/21/10 15:31
Prep Method: - — Rpt Basis: Not corrected — Analyzed: 60426_JPB 10/21/2010 15:30 — Approver: Auto

Analyte Name	Result	+/-	Unit	Qual.	Fn.	TPE	MDA	Dec Lvl
PREPARED	Complete							

Analytical Test/Method: ALPHA-U-AS / Ports-XP4-TS-RL7500 — Analytical Run: R10007430 — Date Approved: 10/22/10 11:30
Prep Method: Ports-XP4-TS-RL7510 — Rpt Basis: Not corrected — Analyzed: 7394_SJJ 10/21/2010 15:45 — Approver: 60473_CDG

Analyte Name	Result	+/-	Unit	Qual.	Fn.	TPE	MDA	Dec Lvl
Total Uranium	1.224E-05	0	µg/mL	U		1.722E-05	3.400E-03	0

Analytical Test/Method: ALPHA-U-Sep / Ports-XP4-TS-RL7510 — Analytical Run: R10007429 — Date Approved: 10/21/10 15:33
Prep Method: Ports-XP4-TS-RL7505 — Rpt Basis: Not corrected — Analyzed: 60426_JPB 10/21/2010 15:32 — Approver: Auto

Analyte Name	Result	+/-	Unit	Qual.	Fn.	TPE	MDA	Dec Lvl
U Separation	Complete							

Radiological EPA Qualifiers

- V - Below Decision Level DL
- U - Below Detection Limit MDA
- J - Estimated value
- ! - Insufficient Sample
- T - Test purposes only

Radiological Footnotes

- N - Sample preserved to a pH <2 with Nitric Acid
- S - NCS Significant
- X - Insufficient amount of Uranium present to determine enrichment

An asterisk (*) beside a Cust Smpl Id, Test, Analyte ID, Aliquot, or TIC CAS Id indicates a modification after re-open.

USEC PORTS Analytical Lab
P.O. Box 628, Piketon, OH 45661 740-897-5702
Lab Director: Deborah K. Perez

******* END OF REPORT *******

Sample Chain of Custody Record

Page 1 of 1

HF analysis during HFT

Sample ID	HF554082610
Date/Time Sampled	8/26/10
Project ID	HF-X-HFT-02
Station	PORTS
Sample Type:	GRAB
LAB COC NO.	UDS10-023 USEC-PORT
MaterialDesciption:	HF
SampleLocation:	TANK 554

X100827007001

Chain of Custody

Sample Relinquished By	R Boyd	Date/Time 8/26/10 1807
Received By	F.R. Blankenship	Date/Time 8/27/10 1808
Sample Relinquished By	F.R. Blankenship	Date/Time 8/27/10 0803
Received By	John R. Hamer	Date/Time 8/27/10 0803
Sample Relinquished By	John R Hamer	Date/Time 8/27/10 0819
Received By	Tim Sloot	Date/Time 8/27/10 0819
Sample Relinquished By	Tim Sloot	Date/Time 9-29-10 0752
Received By	Debra Hamm	Date/Time 9-29-10 0752
Sample Relinquished By	Debra Hamm	Date/Time 10/21/10 1204
Received By	Tim Sloot	Date/Time 10/21/10 1204
Sample Relinquished By		Date/Time
Received By		Date/Time

HF Analysis Matrix: Liquid

Bottle: 1 L Nalgene HDPE wide mouth Pres: None

SOW Numbers: HF-X-HFT

Calculated	pH	
ICP/ICPMS	Arsenic	Barium
Cadmium	Chromium	Copper
Lead	Mercury	Nickel
Selenium	Silver	U
Zinc		
XP4-TS-ST7600	HF Wt%	

Miscellaneous:

Portsmouth Analytical Laboratory
Official Report

X100827007001
HF554082610

Cust. Sample Id:	**HF554082610**	Sample Desc:		Sampled:	08/26/10 00:00
Customer:	Uranium Disposition Services LLC	Matrix:	Liquid	Received:	08/27/10 08:19
Project/Subproj:	UDS-HF - HF-X-HFT-01	Location:		Needed:	08/28/10
COC # :				Approved:	08/31/10 11:59
SDG # :				Status:	Released

Sample Level Comments:

Inorganic lab tests

Analytical Test/Method: Hg7470A / SW846-7470A — Analytical Run: R10006001 — Date Approved: 08/31/10 11:59
Prep Method: - — Rpt Basis: Not corrected — Analyzed: 60563_KAD 08/30/2010 — Approver: 9322_ELS

Analyte Name	Result	+/-	Unit	Qual.	Fn.	LCR	Dilu	HT
Mercury	50.0		ug/L	U		50.0	1	

Analytical Test/Method: METALS-No-Prep / SW846-6010B — Analytical Run: R10005906 — Date Approved: 08/31/10 11:10
Prep Method: - — Rpt Basis: Not corrected — Analyzed: 9322_ELS 08/27/2010 11:13 — Approver: 60563_KAD

Analyte Name	Result	+/-	Unit	Qual.	Fn.	LCR	Dilu	HT
Arsenic	150	0	ug/L	U		150	15	
Barium	6.16	0	ug/L	U		6.16	15	
Cadmium	15.0	0	ug/L	B		4.47	15	
Chromium	138	0	ug/L	B		14.6	15	
Copper	11300	0	ug/L			15.6	15	
Lead	65.2	0	ug/L	U		65.2	15	
Nickel	7230	0	ug/L			109	15	
Selenium	356	0	ug/L	U		356	15	
Silver	44.7	0	ug/L	U		44.7	15	
Uranium	2400	0	ug/L	U		2400	15	
Zinc	746	0	ug/L	B		114	15	

Lab Test Comments: The pH of the sample was found to be 20. using method SW846-9040B.

Laboratory Control Sample results were 47.3% and 47.6% HF . Acceptance control limit for the laboratory control sample is 46.1 - 52.0 % HF. The Reagent Blank result was 0.10 U % HF

Analytical Test/Method: HF7600 / PORTS-XP4-TS-ST7600 — Analytical Run: R10005903 — Date Approved: 08/27/10 12:28
Prep Method: - — Rpt Basis: Not corrected — Analyzed: 9322_ELS 08/27/2010 09:30 — Approver: 9858_TES

Analyte Name	Result	+/-	Unit	Qual.	Fn.	LCR	Dilu	HT
Hydrofluoric Acid	12.1		%			0.1		

Inorganic EPA Qualifiers

- B - Analyte result less than PQL and greater than IDL
- U - Below Detection Limit LCR
- * - Duplicate analysis not within control limits
- J - Estimated value
- W - Post-digestion spike recovery out of contol limits
- N - Sample spike recovery not within control limits

Inorganic Footnotes

- B - Backup Pad
- S - NCS Significant
- T - Analyses were performed using SW846-1311 extract.
- W - Cassette Wipe

An asterisk (*) beside a Cust Smpl Id, Test, Analyte ID, Aliquot, or TIC CAS Id indicates a modification after re-open.

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Lab Director: Deborah K. Perez

******* END OF REPORT *******

Sample Chain of Custody Record

~~HF~~ analysis during HFT

Sample ID	HF554082310
Date/Time Sampled	8/23/10
Project ID	HF-X-HFT-02
Station	PORTS
Sample Type:	GRAB
LAB COC NO.	UDS10-014 USEC-PORT
MaterialDesciption:	HF
SampleLocation:	TANK 554

X100824008001

Chain of Custody

Sample Relinquished By	R. Pinkerton	Date/Time 8/23/10 1020
Received By	Debra Hamner	Date/Time 8/23/10 1020
Sample Relinquished By	John R. Hamner	Date/Time 8/23/10 1102
Received By	John R. Hamner	Date/Time 8/23/10 11:02
Sample Relinquished By	John R. Hamner	Date/Time 8/23/10 12:15
Received By	Ed Simpson	Date/Time 8/23/10 12:15
Sample Relinquished By	Tim Shoot	Date/Time 8/27/10 1330
Received By	John R. Hamner	Date/Time 8/27/10 1330
Sample Relinquished By	John R. Hamner	Date/Time 8/27/10
Received By	FedEx Ground Courier	Date/Time 8/27/10 1404
Sample Relinquished By	John Hamner	Date/Time 10/21/10 1204
Received By	Tim Shoot	Date/Time 10/21/10 1204

HF Analysis Matrix: Liquid

Bottle: 1 L Nalgene HDPE wide mouth Pres: None

SOW Numbers: HF-X-HFT

Calculated	pH	
ICP/ICPMS	Arsenic	Barium
Cadmium	Chromium	Copper
Lead	Mercury	Nickel
Selenium	Silver	U
Zinc		
XP4-TS-ST7600	HF Wt%	

Miscellaneous:

Portsmouth Analytical Laboratory
Official Report

Cust. Sample Id:	**HF554082310**	Sample Desc:		Sampled:	08/23/10 00:00
Customer:	Uranium Disposition Services LLC	Matrix:	Liquid	Received:	10/21/10 12:18
Project/Subproj:	UDS_HF - HF-X-SPEC	Location:		Needed:	11/20/10
COC # :				Approved:	10/22/10 11:30
SDG # :				Status:	Released

Sample Level Comments:

Radiological lab tests

Analytical Test/Method: RAD-PREP / Ports-XP4-TS-RL7505 Analytical Run: R10007428 Date Approved: 10/21/10 15:31
Prep Method: - Rpt Basis: Not corrected Analyzed: 60426_JPB 10/21/2010 15:30 Approver: Auto

Analyte Name	Result	+/-	Unit	Qual.	Fn.	TPE	MDA	Dec Lvl
PREPARED	Complete							

Analytical Test/Method: ALPHA-U-AS / Ports-XP4-TS-RL7500 Analytical Run: R10007430 Date Approved: 10/22/10 11:30
Prep Method: Ports-XP4-TS-RL7510 Rpt Basis: Not corrected Analyzed: 7394_SJJ 10/21/2010 15:45 Approver: 60473_CDG

Analyte Name	Result	+/-	Unit	Qual.	Fn.	TPE	MDA	Dec Lvl
Total Uranium	2.039E-03	0	µg/mL	U		2.696E-03	3.311E-03	0

Analytical Test/Method: ALPHA-U-Sep / Ports-XP4-TS-RL7510 Analytical Run: R10007429 Date Approved: 10/21/10 15:33
Prep Method: Ports-XP4-TS-RL7505 Rpt Basis: Not corrected Analyzed: 60426_JPB 10/21/2010 15:32 Approver: Auto

Analyte Name	Result	+/-	Unit	Qual.	Fn.	TPE	MDA	Dec Lvl
U Separation	Complete							

Radiological EPA Qualifiers
- V - Below Decision Level DL
- U - Below Detection Limit MDA
- J - Estimated value
- ! - Insufficient Sample
- T - Test purposes only

Radiological Footnotes
- N - Sample preserved to a pH <2 with Nitric Acid
- S - NCS Significant
- X - Insufficient amount of Uranium present to determine enrichment

An asterisk (*) beside a Cust Smpl Id, Test, Analyte ID, Aliquot, or TIC CAS Id indicates a modification after re-open.

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Lab Director: Deborah K. Perez

******* END OF REPORT *******

Sample Chain of Custody Record

Page 1 of 1

HF analysis during HFT

Sample ID	HF554082310
Date/Time Sampled	
Project ID	HF-X-HFT-02
Station	PORTS
Sample Type:	GRAB
LAB COC NO.	UDS10-014 USEC-PORT
MaterialDesciption:	HF
SampleLocation:	TANK 554

X100824008001

Chain of Custody

Sample Relinquished By	R. Pinkard	Date/Time 8/23/10 1020
Received By	Debra Hamm	Date/Time 8/23/10 1020
Sample Relinquished By	[signature]	Date/Time 8/23/10 1102
Received By	John R. Hamm	Date/Time 8/23/10 11:02
Sample Relinquished By	John R. Hamm	Date/Time 8/23/10 12:15
Received By	Ed Simpson	Date/Time 8/23/10 12:15
Sample Relinquished By	Tim Shoot	Date/Time 11/15/10 1247
Received By	F.R. Blankenship	Date/Time 11/15/10 1248
Sample Relinquished By		Date/Time
Received By		Date/Time
Sample Relinquished By		Date/Time
Received By		Date/Time

HF Analysis Matrix: Liquid

Bottle: 1 L Nalgene HDPE wide mouth Pres: None

SOW Numbers: HF-X-HFT

Calculated	pH	
ICP/ICPMS	Arsenic	Barium
Cadmium	Chromium	Copper
Lead	Mercury	Nickel
Selenium	Silver	U
Zinc		
XP4-TS-ST7600	HF Wt%	

Sample released 11/15/10 [signature]

Miscellaneous: _____

Original COC filed under X101021022002

Sample Chain of Custody Record

~~HF~~ analysis during HFT

Sample ID	HF554082310
Date/Time Sampled	8/23/10
Project ID	HF-X-HFT-02
Station	PORTS
Sample Type:	GRAB
LAB COC NO.	UDS10-014 USEC-PORT
MaterialDesciption:	HF
SampleLocation:	TANK 554

X100824008001

Chain of Custody

Sample Relinquished By	R. Pinkard	Date/Time 8/23/10 1020
Received By	Debra Hamner	Date/Time 8/23/10 1020
Sample Relinquished By	[illegible]	Date/Time 8/23/10 1102
Received By	John R. Hamner	Date/Time 8/23/10 11:02
Sample Relinquished By	John R. Hamner	Date/Time 8/23/10 12:15
Received By	Ed Simpson	Date/Time 8/23/10 12:15
Sample Relinquished By	Tim Shoot	Date/Time 8/27/10 1330
Received By	John R Hamner	Date/Time 8/27/10 1330
Sample Relinquished By	John R. Hamner	Date/Time 8/27/10
Received By	T.R. Blankenship	Date/Time 8/27/10 1404
Sample Relinquished By	[illegible]	Date/Time 10/21/10 1204
Received By	Tim Shoot	Date/Time 10/21/10 1204

HF Analysis Matrix: Liquid

Bottle: 1 L Nalgene HDPE wide mouth Pres: None

SOW Numbers: HF-X-HFT

Calculated	pH	
ICP/ICPMS	Arsenic	Barium
Cadmium	Chromium	Copper
Lead	Mercury	Nickel
Selenium	Silver	U
Zinc		
XP4-TS-ST7600	HF Wt%	

Miscellaneous:

Portsmouth Analytical Laboratory
Official Report

X100824008001
HF554082310

Cust. Sample Id:	**HF554082310**	Sample Desc:		Sampled:	08/23/10 00:00
Customer:	Uranium Disposition Services LLC	Matrix:	Liquid	Received:	08/23/10 12:15
Project/Subproj:	UDS-HF - HF-X-HFT-01	Location:		Needed:	08/24/10
COC # :				Approved:	08/25/10 12:55
SDG # :				Status:	Released

Sample Level Comments:

Inorganic lab tests

Analytical Test/Method: Hg7470A / SW846-7470A — Analytical Run: R10005813 — Date Approved: 08/25/10 12:55
Prep Method: - — Rpt Basis: Not corrected — Analyzed: 60563_KAD 08/24/2010 — Approver: 9858_TES

Analyte Name	Result	+/-	Unit	Qual.	Fn.	LCR	Dilu	HT
Mercury	50.0		ug/L	U		50	1	

Analytical Test/Method: METALS-No-Prep / SW846-6010B — Analytical Run: R10005757 — Date Approved: 08/25/10 12:29
Prep Method: - — Rpt Basis: Not corrected — Analyzed: 9322_ELS 08/24/2010 14:10 — Approver: 9858_TES

Analyte Name	Result	+/-	Unit	Qual.	Fn.	LCR	Dilu	HT
Arsenic	100	0	ug/L	U		100	10	
Barium	12.0	0	ug/L	B		4.11	10	
Cadmium	12.0	0	ug/L	B		2.98	10	
Chromium	116	0	ug/L			9.72	10	
Copper	8500	0	ug/L			10.4	10	
Lead	43.5	0	ug/L	U		43.5	10	
Nickel	4990	0	ug/L			72.7	10	
Selenium	237	0	ug/L	U		237	10	
Silver	29.8	0	ug/L	U		29.8	10	
Uranium	1600		ug/L	U			10	
Zinc	1720	0	ug/L			76	10	

Lab Test Comments: %hf = 9.35
PH =2.0

Analytical Test/Method: HF7600 / PORTS-XP4-TS-ST7600 — Analytical Run: R10005819 — Date Approved: 08/25/10 12:35
Prep Method: - — Rpt Basis: Not corrected — Analyzed: 9322_ELS 08/24/2010 13:00 — Approver: 9858_TES

Analyte Name	Result	+/-	Unit	Qual.	Fn.	LCR	Dilu	HT
Hydrofluoric Acid	9.35		%					

Inorganic EPA Qualifiers

- B - Analyte result less than PQL and greater than IDL
- U - Below Detection Limit LCR
- * - Duplicate analysis not within control limits
- J - Estimated value
- W - Post-digestion spike recovery out of contol limits
- N - Sample spike recovery not within control limits

Inorganic Footnotes

- B - Backup Pad
- S - NCS Significant
- T - Analyses were performed using SW846-1311 extract.
- W - Cassette Wipe

An asterisk (*) beside a Cust Smpl Id, Test, Analyte ID, Aliquot, or TIC CAS Id indicates a modification after re-open.

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Lab Director: Deborah K. Perez

******* END OF REPORT *******

Sample Chain of Custody Record

HF analysis during HFT

Sample ID	HF-X-554-080310
Date/Time Sampled	8-3-10 1410 hrs.
Project ID	HF-X-HFT-01
Station	HF Tank 554
Sample Type:	GRAB
LAB COC NO.	UDS10-011 USEC-PORT
MaterialDesciption:	HF
SampleLocation:	HF Loadout

X100804010 001

Chain of Custody

Sample Relinquished By	Andrast	Date/Time 8/3/10 1705
Received By	Debra Hannah	Date/Time 8/3/10 1706
Sample Relinquished By	Debra Hannah	Date/Time 8/4/10 8:15
Received By	Tim Shoot	Date/Time 8/4/10 8:15
Sample Relinquished By	Tim Shoot	Date/Time 11/15/10 1247
Received By	F.R. Blankenship	Date/Time 11/15/10 1248
Sample Relinquished By		Date/Time
Received By		Date/Time
Sample Relinquished By		Date/Time
Received By		Date/Time
Sample Relinquished By		Date/Time
Received By		Date/Time

HF Analysis Matrix: Liquid

Bottle: 250 ml Nalgene HDPE wide mouth Pres: None

SOW Numbers: HF-X-HFT

9045	pH	
ASTM E271	HF Wt%	
ICP/ICPMS	Arsenic	Barium
Cadmium	Chromium	Copper
Lead	Mercury	Nickel
Selenium	Silver	U
Zinc		

Sample returned 11/15/10 dr

Miscellaneous: _____

Original COC filed under Stubin # X101021022-001

Sample Chain of Custody Record

Page ____ of ____

HF analysis during HFT

Sample ID	HF-X-554-080310
Date/Time Sampled	8-3-10 1410 hrs.
Project ID	HF-X-HFT-01
Station	HF Tank 554
Sample Type:	GRAB
LAB COC NO.	UDS10-011 USEC-PORT
MaterialDesciption:	HF
SampleLocation:	HF Loadout

X100804010 001

Chain of Custody

Sample Relinquished By	[illegible]	Date/Time 8/3/10 1705
Received By	Debra Hannah	Date/Time 8/3/10 1706
Sample Relinquished By	Debra Hannah	Date/Time 8/4/10 8:15
Received By	Tim Shoot	Date/Time 8/4/10 8:15
Sample Relinquished By	Tim Shoot	Date/Time 8/27/10 1330
Received By	John R Hamer	Date/Time 8/27/10 1330
Sample Relinquished By	John R Hamer	Date/Time 8/27/10
Received By	P.R. Blankenship	Date/Time 8/27/10 1403
Sample Relinquished By	[illegible]	Date/Time 10/20/10 1204
Received By	Tim Shoot	Date/Time 10/21/10 1204
Sample Relinquished By		Date/Time
Received By		Date/Time

HF Analysis Matrix: Liquid

Bottle: 250 ml Nalgene HDPE wide mouth Pres: None

SOW Numbers: HF-X-HFT

9045	pH	
ASTM E271	HF Wt%	
ICP/ICPMS	Arsenic	Barium
Cadmium	Chromium	Copper
Lead	Mercury	Nickel
Selenium	Silver	U
Zinc		

Miscellaneous: _____

Portsmouth Analytical Laboratory
Official Report

Cust. Sample Id:	**HF-X-554-080310**	Sample Desc:		Sampled:	08/03/10 14:10
Customer:	Uranium Disposition Services LLC	Matrix:	Liquid	Received:	10/21/10 12:18
Project/Subproj:	UDS_HF - HF-X-SPEC	Location:		Needed:	11/20/10
COC # :				Approved:	10/22/10 11:30
SDG # :				Status:	Released

Sample Level Comments:

Radiological lab tests

Analytical Test/Method: RAD-PREP / Ports-XP4-TS-RL7505 Analytical Run: R10007428 Date Approved: 10/21/10 15:31
Prep Method: - Rpt Basis: Not corrected Analyzed: 60426_JPB 10/21/2010 15:30 Approver: Auto

Analyte Name	Result	+/-	Unit	Qual.	Fn.	TPE	MDA	Dec Lvl
PREPARED	Complete							

Analytical Test/Method: ALPHA-U-AS / Ports-XP4-TS-RL7500 Analytical Run: R10007430 Date Approved: 10/22/10 11:30
Prep Method: Ports-XP4-TS-RL7510 Rpt Basis: Not corrected Analyzed: 7394_SJJ 10/21/2010 15:49 Approver: 60473_CDG

Analyte Name	Result	+/-	Unit	Qual.	Fn.	TPE	MDA	Dec Lvl
Total Uranium	4.268E-03	0	µg/mL	U		4.393E-03	3.565E-03	0

Analytical Test/Method: ALPHA-U-Sep / Ports-XP4-TS-RL7510 Analytical Run: R10007429 Date Approved: 10/21/10 15:33
Prep Method: Ports-XP4-TS-RL7505 Rpt Basis: Not corrected Analyzed: 60426_JPB 10/21/2010 15:32 Approver: Auto

Analyte Name	Result	+/-	Unit	Qual.	Fn.	TPE	MDA	Dec Lvl
U Separation	Complete							

Radiological EPA Qualifiers

- V - Below Decision Level DL
- U - Below Detection Limit MDA
- J - Estimated value
- ! - Insufficient Sample
- T - Test purposes only

Radiological Footnotes

- N - Sample preserved to a pH <2 with Nitric Acid
- S - NCS Significant
- X - Insufficient amount of Uranium present to determine enrichment

An asterisk (*) beside a Cust Smpl Id, Test, Analyte ID, Aliquot, or TIC CAS Id indicates a modification after re-open.

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Lab Director: Deborah K. Perez

******* END OF REPORT *******

Sample Chain of Custody Record

Page ____ of ____

HF analysis during HFT

Sample ID	HF-X-554-080310
Date/Time Sampled	8-3-10 1410 hrs.
Project ID	HF-X-HFT-01
Station	HF Tank 554
Sample Type:	GRAB
LAB COC NO.	UDS10-011 USEC-PORT
MaterialDesciption:	HF
SampleLocation:	HF Loadout

X100804010 001

Chain of Custody

Sample Relinquished By	Richard	Date/Time 8/3/10 1705
Received By	Debra Hannah	Date/Time 8/3/10 1706
Sample Relinquished By	Debra Hannah	Date/Time 8/4/10 8:15
Received By	Tim Shook	Date/Time 8/4/10 8:15
Sample Relinquished By	Tim Shook	Date/Time 8/27/10 1330
Received By	John R Hamer	Date/Time 8/27/10 1330
Sample Relinquished By	John R Hamer	Date/Time 8/27/10
Received By	H.R. Shankenship	Date/Time 8/27/10 1403
Sample Relinquished By		Date/Time 10/21/10 1204
Received By	Tim Shook	Date/Time 10/21/10 1204
Sample Relinquished By		Date/Time
Received By		Date/Time

HF Analysis Matrix: Liquid

Bottle: 250 ml Nalgene HDPE wide mouth Pres: None

SOW Numbers: HF-X-HFT

9045	pH	
ASTM E271	HF Wt%	
ICP/ICPMS	Arsenic	Barium
Cadmium	Chromium	Copper
Lead	Mercury	Nickel
Selenium	Silver	U
Zinc		

Miscellaneous: _____

Portsmouth Analytical Laboratory
Official Report

Cust. Sample Id:	**HF-X-554-080310**	Sample Desc:		Sampled:	08/03/10 14:10
Customer:	Uranium Disposition Services LLC	Matrix:	Liquid	Received:	08/04/10 08:15
Project/Subproj:	UDS - HF-X-HFT-01	Location:		Needed:	08/05/10
COC # :				Approved:	08/04/10 15:41
SDG # :	HF-X-HFT-080410			Status:	Released

Sample Level Comments:

Inorganic lab tests

Analytical Test/Method: Hg7470A / SW846-7470A — Analytical Run: R10005234 — Date Approved: 08/04/10 14:23
Prep Method: - — Rpt Basis: Not corrected — Analyzed: 9858_TES 08/04/2010 — Approver: 60563_KAD

Analyte Name	Result	+/-	Unit	Qual.	Fn.	LCR	Dilu	HT
Mercury	50.0		ug/L	U		50.0	1	

Analytical Test/Method: METALS-No-Prep / SW846-6010B — Analytical Run: R10005227 — Date Approved: 08/04/10 14:53
Prep Method: - — Rpt Basis: Not corrected — Analyzed: 60563_KAD 08/04/2010 10:35 — Approver: 9858_TES

Analyte Name	Result	+/-	Unit	Qual.	Fn.	LCR	Dilu	HT
Arsenic	20.0	0	ug/L	U		20	2	
Barium	12.2	0	ug/L			0.822	2	
Cadmium	0.596	0	ug/L	U		0.596	2	
Chromium	17.0	0	ug/L	B		1.94	2	
Copper	8950	0	ug/L			2.08	2	
Lead	26.0	0	ug/L	B		8.7	2	
Nickel	560	0	ug/L			14.5	2	
Selenium	47.4	0	ug/L	U		47.4	2	
Silver	5.96	0	ug/L	U		5.96	2	
Uranium	162	0	ug/L	U		162	2	
Zinc	451	0	ug/L			15.2	2	

Analytical Test/Method: HF7600 / PORTS-XP4-TS-ST7600 — Analytical Run: R10005236 — Date Approved: 08/04/10 14:48
Prep Method: - — Rpt Basis: Not corrected — Analyzed: 9858_TES 08/04/2010 — Approver: 60563_KAD

Analyte Name	Result	+/-	Unit	Qual.	Fn	LCR	Dilu	HT
Hydrofluoric Acid	0.200		%	U		0.20	1	

Lab Test Comments: Laboratory Control Sample results were 47.3% HF for both laboratory controls. Acceptable control limit for the laboratory control sample is 46.1 - 52.0 % HF. The Reagent Blank result was 0.20 U %HF.

The pH of the sample was found to be 2.71 using method SW846-9040b.

Inorganic EPA Qualifiers
- B - Analyte result less than PQL and greater than IDL
- U - Below Detection Limit LCR
- * - Duplicate analysis not within control limits
- J - Estimated value
- W - Post-digestion spike recovery out of contol limits
- N - Sample spike recovery not within control limits

Inorganic Footnotes
- B - Backup Pad
- S - NCS Significant
- T - Analyses were performed using SW846-1311 extract.
- W - Cassette Wipe

An asterisk (*) beside a Cust Smpl Id, Test, Analyte ID, Aliquot, or TIC CAS Id indicates a modification after re-open.

USEC PORTS Analytical Lab
P.O. Box 628, Piketon, OH 45661 740-897-5702
Lab Director: Deborah K. Perez

***** END OF REPORT *****

Sample Chain of Custody Record

HF analysis during HFT

Sample ID	HF554092810
Date/Time Sampled	9/28/10 1445
Project ID	HF-X-HFT-02
Station	PORTS
Sample Type:	GRAB
LAB COC NO.	UDS10-031 USEC-PORT
MaterialDesciption:	HF
SampleLocation:	TANK 554

X100929006001

Chain of Custody

Sample Relinquished By	R. Rineberger	Date/Time 9/28/10 1452
Received By	Dale Hamm	Date/Time 9/28/10 1452
Sample Relinquished By	Dale Hamm	Date/Time 9/29/10 0808
Received By	Tim Scott	Date/Time 9-29-10 0808
Sample Relinquished By	Tim Scott	Date/Time 11/15/10 1247
Received By	F.B. Blankenship	Date/Time 11/15/10 1248
Sample Relinquished By		Date/Time
Received By		Date/Time
Sample Relinquished By		Date/Time
Received By		Date/Time
Sample Relinquished By		Date/Time
Received By		Date/Time

HF Analysis Matrix: LIQUID

Bottle: 1 L Nalgene HDPE wide mouth Pres: None

SOW Numbers: HF-X-HFT

Calculated	pH	
ICP/ICPMS	Arsenic	Barium
Cadmium	Chromium	Copper
Lead	~~Mercury~~ dw 9/27/10	Nickel
Selenium	Silver	U
Zinc		
XP4-TS-ST7600	HF Wt%	

Sample returned 11/15/11 dw

Miscellaneous:

Portsmouth Analytical Laboratory
Official Report

Cust. Sample Id:	**HF554092810**	Sample Desc:		Sampled:	09/28/10 14:45
Customer:	Uranium Disposition Services LLC	Matrix:	Liquid	Received:	09/29/10 08:08
Project/Subproj:	UDS-HF - HF-X-HFT-01	Location:		Needed:	09/30/10
COC # :				Approved:	09/29/10 15:29
SDG # :				Status:	Released

Sample Level Comments:

Inorganic lab tests

Analytical Test/Method: METALS-No-Prep / SW846-6010B — Analytical Run: R10006829 — Date Approved: 09/29/10 14:49
Prep Method: - — Rpt Basis: Not corrected — Analyzed: 60563_KAD 09/29/2010 11:00 — Approver: 9858_TES

Analyte Name	Result	+/-	Unit	Qual.	Fn.	LCR	Dilu	HT
Arsenic	500	0	ug/L	U		500	10	
Barium	50.0	0	ug/L	U		50	10	
Cadmium	50.0	0	ug/L	U		50	10	
Chromium	89.0	0	ug/L			50	10	
Copper	7260	0	ug/L			50	10	
Lead	146	0	ug/L			100	10	
Nickel	5120	0	ug/L			50	10	
Selenium	500	0	ug/L	U		500	10	
Silver	55.0	0	ug/L			50	10	
Uranium	21800	0	ug/L			810	10	
Zinc	524	0	ug/L			100	10	

Lab Test Comments: The pH of the sample was found to be 1.08 using method SW846-9040b

Analytical Test/Method: HF7600 / PORTS-XP4-TS-ST7600 — Analytical Run: R10006834 — Date Approved: 09/29/10 15:29
Prep Method: - — Rpt Basis: Not corrected — Analyzed: 9858_TES 09/29/2010 — Approver: 60563_KAD

Analyte Name	Result	+/-	Unit	Qual.	Fn.	LCR	Dilu	HT
Hydrofluoric Acid	12.9		%			0.1		

Lab Test Comments: The pH of the sample was found to be 1.08 using method SW846-9040B.

Inorganic EPA Qualifiers

- B - Analyte result less than PQL and greater than IDL
- U - Below Detection Limit LCR
- * - Duplicate analysis not within control limits
- J - Estimated value
- W - Post-digestion spike recovery out of contol limits
- N - Sample spike recovery not within control limits

Inorganic Footnotes

- B - Backup Pad
- S - NCS Significant
- T - Analyses were performed using SW846-1311 extract.
- W - Cassette Wipe

An asterisk (*) beside a Cust Smpl Id, Test, Analyte ID, Aliquot, or TIC CAS Id indicates a modification after re-open.

USEC PORTS Analytical Lab
P.O. Box 628, Piketon, OH 45661 740-897-5702
Lab Director: Deborah K. Perez

******* END OF REPORT *******

Sample Chain of Custody Record

U Analysis of DECON

Sample ID	HF554100510B	
Date/Time Sampled	10/5/2010 15:20	
Project ID	X-DECON	
Station	PORTS	
Sample Type:	GRAB	
LAB COC NO.	UDS10-034	USEC-PORT
MaterialDesciption:	HF	
SampleLocation:	PORTS	

101066005102

Chain of Custody

Sample Relinquished By	Greg Maynard	Date/Time 10/5/10 1328
Received By	[illegible]	Date/Time 10/5/10 1328
Sample Relinquished By	[illegible]	Date/Time 10-06-10 0817
Received By	John R. Hamer	Date/Time 10-06-10 0817
Sample Relinquished By	John R Hamer	Date/Time 10-06-10 0856
Received By	Tim Shoot	Date/Time 10-06-10 0856
Sample Relinquished By	John R Hamer	Date/Time 10-21-10 0806
Received By	[illegible]	Date/Time 10-21-10 0900
Sample Relinquished By		Date/Time
Received By		Date/Time
Sample Relinquished By		Date/Time
Received By		Date/Time

HF Analysis Matrix: LIQUID

Bottle: 1 L Nalgene HDPE wide mouth Pres: None

SOW Numbers: X-DECON-1

ALPHASPEC	U and Assay

Miscellaneous: This sample was pulled first

10/21: Noted that sample was not relinquished from lab to John Hamer

Sample returned 10/21/10 JH

Portsmouth Analytical Laboratory
Official Report

Cust. Sample Id:	**HF554100510B**	Sample Desc:		Sampled:	10/05/10 15:20
Customer:	Uranium Disposition Services LLC	Matrix:	Liquid	Received:	10/06/10 08:56
Project/Subproj:	UDS-X-DECON - LIQUID	Location:		Needed:	10/07/10
COC # :				Approved:	10/07/10 09:03
SDG # :				Status:	Released

Sample Level Comments:

Radiological lab tests

Analytical Test/Method: RAD-PREP / Ports-XP4-TS-RL7505 — Analytical Run: R10007047 — Date Approved: 10/07/10 08:08
Prep Method: - — Rpt Basis: Not corrected — Analyzed: 60426_JPB 10/06/2010 13:00 — Approver: Auto

Analyte Name	Result	+/-	Unit	Qual.	Fn.	TPE	MDA	Dec Lvl
PREPARED	Complete							

Analytical Test/Method: ALPHA-U-AS / Ports-XP4-TS-RL7500 — Analytical Run: R10007049 — Date Approved: 10/07/10 09:03
Prep Method: Ports-XP4-TS-RL7510 — Rpt Basis: Not corrected — Analyzed: 7394_SJJ 10/06/2010 16:00 — Approver: 60426_JPB

Analyte Name	Result	+/-	Unit	Qual.	Fn.	TPE	MDA	Dec Lvl
Assay	3.188E-01	0	Wt%			1.213E-01	0	0
Total Uranium	3.183E+01	0	µg/mL			4.592E+00	4.547E-02	0

Analytical Test/Method: ALPHA-U-Sep / Ports-XP4-TS-RL7510 — Analytical Run: R10007048 — Date Approved: 10/07/10 08:12
Prep Method: Ports-XP4-TS-RL7505 — Rpt Basis: Not corrected — Analyzed: 60426_JPB 10/06/2010 16:00 — Approver: Auto

Analyte Name	Result	+/-	Unit	Qual.	Fn.	TPE	MDA	Dec Lvl
U Separation	Complete							

Radiological EPA Qualifiers

- V - Below Decision Level DL
- U - Below Detection Limit MDA
- J - Estimated value
- ! - Insufficient Sample
- T - Test purposes only

Radiological Footnotes

- N - Sample preserved to a pH <2 with Nitric Acid
- S - NCS Significant
- X - Insufficient amount of Uranium present to determine enrichment

An asterisk (*) beside a Cust Smpl Id, Test, Analyte ID, Aliquot, or TIC CAS Id indicates a modification after re-open.

USEC PORTS Analytical Lab
P.O. Box 628, Piketon, OH 45661 740-897-5702
Lab Director: Deborah K. Perez

******* END OF REPORT *******

Tab 5

STATE OF TEXAS EXEMPTION APPROVAL LETTER

(This documents the State of Texas' evaluation and exemption approval for treatment and disposal of the proposed waste stream)

Texas Commission on Environmental Quality
Protecting Texas by Reducing and Preventing Pollution

August 29, 2011

SCOTT KIRK
WASTE CONTROL SPECIALISTS LLC
P.O. BOX 1129
ANDREW, TX 79714

Re: Exemption Concurrence
Log No. 2011-08-0004

Dear Mr. Kirk:

Please be advised that the Texas Commission on Environmental Quality has determined that Waste Profile Number WP-019660, contaminated hydrofluoric acid, generated by B&W Conversion Services in Piketon, Ohio, described in your letter of August 26, 2011, is exempt under the provisions of Section (§) 336.5(c) of Title 30 Texas Administrative Code (TAC) and §289.251(d)(1).

Please let me know if I may answer any questions regarding this determination. I can be reached by telephone at 512-239-6465 or by e-mail at Hans.Weger@tceq.texas.gov.

Sincerely,

Hans Weger

Hans Weger, Ph.D.
Waste License Reviewer
Radioactive Material Division

cc: Lynn Bell, TCEQ

Tab 6

WCS TREATMENT AND DISPOSAL PROPOSAL

(This documents WCS' evaluation and acceptance of the proposed waste stream for treatment and disposal)

EM Environmental Management

safety ❖ performance ❖ cleanup ❖ closure

May 24, 2011

WCS 10-KG-05

Ben Cooper
Procurement Representative
B&W Conversion Services, LLC
1020 Monarch St., Suite 300
Lexington, KY 40513
(740) 289-5445

Dear Mr. Cooper:

As requested from Mr. Ken Collier and Ms. Cindy King; Waste Control Specialists, LLC (WCS) is pleased to offer you this quotation for the service(s) described below . This pricing is valid for 45 days from the date of this quotation and is contingent upon the execution of a mutually agreeable contract and approval of an approval of a WCS Waste Profile.

Treatment and/or Disposal Service Needed:	Generator Information:
Receipt, treatment and disposal of 17 275-gallon poly totes containing 13% HF solution w/ incidental DU contamination	B&W Conversion Services Portsmouth, Ohio

Background on WWCS Facilities, Permits, and Licenses

Facilities

WCS' state-of-the-art facility, located in Andrews County, Texas currently has the requisite authorizations and permits which provide broad range of radioactive and mixed waste treatment and disposal capabilities. WCS currently operates a Treatment Storage and Disposal Facility (TSDF) that posses all the necessary RCRA permits, Radioactive Materials Licenses, and TSCA Authorizations to treat and store low-level and mixed low-level wastes at its 1,338-acre site near the Texas-New Mexico border. A 14,385-acre tract owned by WCS surrounds the permitted site. WCS planned, designed, and built its facility to comply with all applicable Texas and Federal regulations. This facility also has the ability to treat, store, and dispose hazardous waste, NORM, and TSCA (PCB) waste without radiological contamination and includes a Subtitle C landfill that currently has 11 million cubic yards of permitted disposal capacity.

WCS' processing capabilities include a negative pressure Mixed Waste Treatment Facility (MWTF) dedicated to the treatment of radioactive and mixed waste. This processing facility includes over 20,000 ft^2 of treatment and staging area with an 80 yd^3 capacity mixing pan. A "Permacon" structure can be erected within this building to provide

9998 Hwy 176 West
Andrews Texas 79714

phone (888) 789-2783
fax: (575) 394-3708

double containment as necessary for highly dispersal waste (e.g. waste with alpha or tritium contamination). A Stabilization Building, adjacent to the MWTF, has two additional 80 yd^3 mix pans for hazardous waste only. Covered storage is available in the Container Storage Area with 37,500 ft^3 (275,000 gallon equivalent) of waste storage capacity and the Bin Storage Area with 58,000 ft^3 of storage capacity (liquid or solid). In addition, 1.5 million ft^3 of uncovered storage capacity is available for "Low Specific Activity" radioactive waste.

These facilities in conjunction with the authorizations discussed below allow WCS to treatment, store, and dispose (subject to Land Disposal Restrictions) of over 2,000 RCRA waste codes, and TSCA (PCB) waste.

Hazardous/Toxic Waste Permits

WCS holds a Resource Conservation Recovery Act (RCRA) Part B permit to receive ignitable, corrosive, toxic, (selected) reactive and non-hazardous wastes. Liquids, sludges, solids, lab packs in approved containers, and liquids in bulk tankers, are also accepted. WCS is licensed to receive radioactive waste in any form (solid or liquid). The site is permitted to receive Polychlorinated Biphenyl (PCB) and PCB-contaminated wastes including PCB-contaminated debris, spill solids, transformer (drained and flushed) carcasses and other PCB-contaminated materials. PCB liquids are acceptable for bulking and off-site treatment. The site is also approved under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), granted March 27, 1997.

A listing of the current WCS Permits is provided below:

- Permit for Industrial Solid Waste Management Site (Resource Conservation and Recovery Act Wastes) Permit 50358 – October 5, 2005 (Updated) by the Texas Commission on Environmental Quality. [A copy of this Permit is provided in **Attachment A**]

- Toxic Substances Control Act Land Disposal Authorization EPA ID # TXD988088464 by the U.S. Environmental Protection Agency PCB storage, processing and disposal.
  [A copy of this Permit is provided in **Attachment B**]

- Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) by the United States Environmental Protection Agency, Region 6.
  [A copy of this Permit is provided in **Attachment C**]

WCS Management Approach for Treatment and Disposal

WCS has evaluated this opportunity and determine that best value to B&W Conversion Services is to treat the material and dispose of it in the WCS RCRA cell as non-regulated waste.

WCS will utilize written and approved procedures to conduct work activities in a safe, compliant, and efficient manner. All work is performed under Process Work Orders (PWOs). A PWO is the administrative control instrument which integrates input from all key groups at the site, including Operations, Health and Safety, Radiation Protection, and Quality Assurance. The Integrated Services Department manages development of PWOs and ensures that all work is planned in accordance with the contract requirements.

WCS will receive and treat seventeen 275-gallon poly totes containing 13% HF solution w/ incidental DU contamination to meet LDR requirements, and provide disposal into the WCS RCRA cell pending proper approvals and protocols to dispose of non-regulated materials in the facility. This option requires concurrence from the State of Texas that the HF waste meets Texas exempt waste limits, but WCS is confident that Texas will concur.

Assumptions:

- Untreated waste will meet TX exempt waste limits.
- Assume totes will be crushed and land filled at WCS.
- There is no dose associated with this waste
- Waste will be profiled as non waste water
- Waste will be treated to non waste water standards

Lump sum cost to perform: $45,595.00

Project Schedule and Summary:

Project total estimated:	Seventeen 275 gallon Totes
Waste description:	13% HF solution w/ incidental DU contamination
Conveyance/package description:	Received by van or flatbed trucks; WCS can not receive waste on Saturday or Sunday.
Plan to trucks	Early estimate June1; late estimate June 30th
Estimated incoming shipments:	2 or 3 truck shipments
Estimated outgoing truck shipments (option one only):	4 – 6 truck shipments
Estimated project time from receipt to disposal	6 weeks

WCS does have the capability to provide treatment for the HF solution for disposition to the Energy Solutions Clive, UT facility; if B&W Conversation Services does not feel that the WCS proposal presented meets the disposition needs; we can provide pricing for treatment and disposition to Clive, UT if needed.

9998 Hwy 176 West
Andrews Texas 79714

phone: (888) 789-2783
fax: (575) 394-3708

We thank you for the opportunity to provide you with quality waste management services. If you have any questions related to this proposal or to other services we can provide, please contact Ken Grumski at (724) 591-8770 or Matt LaBarge (270) 554-7043.

Sincerely,

Kenneth M Grumski

Kenneth M Grumski
Vice President - Federal Programs

Cc:
Ken Collier
Matt LaBarge

Attachments

Tab 7

STATE OF TEXAS REGULATORY AUTHORITY

(This documents the State of Texas' regulatory authority granted from the AEA and NRC)

AGREEMENT
BETWEEN THE
UNITED STATES ATOMIC ENERGY COMMISSION
AND THE
STATE OF TEXAS
FOR
DISCONTINUANCE OF CERTAIN COMMISSION REGULATORY AUTHORITY AND RESPONSIBILITY WITHIN THE STATE PURSUANT TO SECTION 274 OF THE ATOMIC ENERGY ACT OF 1954, AS AMENDED

WHEREAS, The United States Atomic Energy Commission (hereinafter referred to as the Commission) is authorized under Section 274 of the Atomic Energy Act of 1954, as amended, (hereinafter referred to as the Act) to enter into agreements with the Governor of any State providing for discontinuance of the regulatory authority of the Commission within the State under Chapters 6, 7, and 8, and Section 161 of the Act with respect to byproduct materials, source materials, and special nuclear materials in quantities not sufficient to form a critical mass; and

WHEREAS, The Governor of the State of Texas is authorized under Article 4590f of the Texas Revised Civil Statutes to enter into this Agreement with the Commission; and

WHEREAS, The Governor of the State of Texas certified on November 5, 1962, that the State of Texas (hereinafter referred to as the State) has a program for the control of radiation hazards adequate to protect the public health and safety with respect to the materials within the State covered by this Agreement, and that the State desires to assume regulatory responsibility for such materials; and

WHEREAS, The Commission found on December 19, 1962, that the program of the State for the regulation of the materials covered by this Agreement is

compatible with the Commission's program for the regulation of such materials and is adequate to protect the public health and safety; and

WHEREAS, The State recognizes the desirability and importance of maintaining continuing compatibility between its program and the program of the Commission for the control of radiation hazards in the interest of public health and safety; and

WHEREAS, The Commission and the State recognize the desirability of reciprocal recognition of licenses and exemption from licensing of those materials subject to this Agreement; and

WHEREAS, This Agreement is entered into pursuant to the provisions of the Atomic Energy Act of 1954, as amended;

NOW, THEREFORE, It is hereby agreed between the Commission and Governor of the State, acting in behalf of the State, as follows:

ARTICLE I

Subject to the exceptions provided in Articles II, III, and IV, the Commission shall discontinue, as of the effective date of this Agreement, the regulatory authority of the Commission in the State under Chapters 6, 7, and 8, and Section 161 of the Act with respect to the following materials:

A. Byproduct materials;

B. Source materials; and

C. Special nuclear materials in quantities not sufficient to form a critical mass.

ARTICLE II

This Agreement does not provide for discontinuance of any authority and the Commission shall retain authority and responsibility with respect to regulation of:

A. The construction and operation of any production or utilization facility;

B. The export from or import into the United States of byproduct, source, or special nuclear material, of any production or utilization facility;

C. The disposal into the ocean or sea of byproduct, source, or special nuclear waste materials as defined in regulations or orders of the Commission;

D. The disposal of such other byproduct, source, or special nuclear material as the Commission from time to time determines by regulation or order should, because of the hazards or potential hazards thereof, not be so disposed of without a license from the Commission.

ARTICLE III

Notwithstanding this Agreement, the Commission may from time to time by rule, regulation, or order, require that the manufacturer, processor, or producer of any equipment, device, commodity, or other product containing source, byproduct, or special nuclear material shall not transfer possession or control of such product except pursuant to a license or an exemption from licensing issued by the Commission.

ARTICLE IV

This Agreement shall not affect the authority of the Commission under subsection 161 b. or i. of the Act to issue rules, regulations, or orders to protect the

common defense and security, to protect restricted data or to guard against the loss or diversion of special nuclear material.

ARTICLE V

The Commission will use its best efforts to cooperate with the State and other agreement States in the formulation of standards and regulatory programs of the State and the Commission for protection against hazards of radiation and to assure that State and Commission programs for protection against hazards of radiation will be coordinated and compatible. The State will use its best efforts to cooperate with the Commission and other agreement States in the formulation of standards and regulatory program of the State and the Commission for protection against hazards of radiation and to assure that the State's program will continue to be compatible with the program of the Commission for the regulation of like materials. The State and the Commission will use their best efforts to keep each other informed of proposed changes in their respective rules and regulations and licensing, inspection and enforcement policies and criteria, and to obtain the comments and assistance of the other party thereon.

ARTICLE VI

The Commission and the State agree that it is desirable to provide for reciprocal recognition of licenses for the materials listed in Article I licensed by the other party or by any agreement State. Accordingly, the Commission and the State agree to use their best effort to develop appropriate rules, regulations, and procedures by which such reciprocity will be accorded.

ARTICLE VII

The Commission, upon its own initiative after reasonable notice and opportunity for hearing to the State, or upon request of the Governor of the State, may terminate or suspend this Agreement and reassert the licensing and regulatory authority vested in it under the Act if the Commission finds that such termination or suspension is required to protect the public health and safety.

ARTICLE VIII

This Agreement shall become effective on March 1, 1963, and shall remain in effect unless, and until such time as it is terminated pursuant to Article VII.

Done at Austin, State of Texas, in triplicate, this 10th day of January 1963.

FOR THE UNITED STATES ATOMIC ENERGY COMMISSION

_____

Glenn T. Seaborg, Chairman

FOR THE STATE OF TEXAS

_____

Price Daniel, Governor

Texas Commission on Environmental Quality
Protecting Texas by Reducing and Preventing Pollution

August 29, 2011

SCOTT KIRK
WASTE CONTROL SPECIALISTS LLC
P.O. BOX 1129
ANDREW, TX 79714

Re: Exemption Concurrence
Log No. 2011-08-0004

Dear Mr. Kirk:

Please be advised that the Texas Commission on Environmental Quality has determined that Waste Profile Number WP-019660, contaminated hydrofluoric acid, generated by B&W Conversion Services in Piketon, Ohio, described in your letter of August 26, 2011, is exempt under the provisions of Section (§) 336.5(c) of Title 30 Texas Administrative Code (TAC) and §289.251(d)(1).

Please let me know if I may answer any questions regarding this determination. I can be reached by telephone at 512-239-6465 or by e-mail at Hans.Weger@tceq.texas.gov.

Sincerely,

Hans Weger

Hans Weger, Ph.D.
Waste License Reviewer
Radioactive Material Division

cc: Lynn Bell, TCEQ

NUCLEAR REGULATORY COMMISSION

State of Texas: Discontinuance of Certain Regulatory Authority and Responsibility Within the State

AGENCY: U.S. Nuclear Regulatory Commission.

ACTION: Notice of amended agreement with the State of Texas.

SUMMARY: Notice is hereby given that on March 12, 1982, the Honorable Nunzio J. Palladino, Chairman of the Nuclear Regulatory Commission, and that on March 24,1982, the Honorable William P. Clements, Jr., Governor of the State of Texas, signed an Amendment to the existing section 274b. Agreement between NRC and the State of Texas pursuant to Section 274 of the Atomic Energy Act of 1954, as amended. The amendment permits the State to continue to regulate byproduct material as defined in section 11e.(2) of the Act (uranium mill tailings) in conformance with the requirements of section 274o. of the Act.

The proposed Amendment to the existing section 274b. Agreement was published in the **Federal Register** for public comment for four consecutive weeks beginning December 8, 1981 (46 FR 60075-60079). A minor change to the introductory text was made to conform the Amendment to the requirements of the "Stratton-Schmitt" amendment (Pub. L. 97-88). The amended agreement was modified to delete the following paragraph:

Whereas, it is necessary to enter into this amendment in order to implement new requirements of Section 274 of the Act which become fully effective on November 8, 1981: and.

Public Law 97-88 makes it clear that such an amended agreement is not "necessary" for the State to continue to regulate uranium mill tailings after November 8, 1981. The following was inserted in its place:

Whereas, the Governor of the State has requested this amendment in accordance with Section 274 of the Act; and,

The Amendment is published in accordance with the requirements of Pub. L. 86-373. A copy of the consolidated version of the Agreement is available at the Office of State Programs.

FOR FURTHER INFORMATION CONTACT:

Craig Z. Gordon, Office of State Programs, U.S. Nuclear Regulatory Commission, Washington. D.C. 20555. Phone: (301) 492-9886.

SUPPLEMENTARY INFORMATION

Amendment To Agreement Between The United States Nuclear Regulatory Commission And The State Of Texas For Discontinuance Of Certain Commission Regulatory Authority And Responsibility Within The State Pursuant To Section 274 Of The Atomic Energy Act Of 1954, As Amended

Whereas, the United States Atomic Energy Commission[1] (hereinafter referred to as the Commission) entered into an Agreement (hereinafter referred to as the Agreement of January 10, 1963) with the State of Texas under section 274 of the Atomic Energy Act of 1954, as amended (hereinafter referred to as the Act), which Agreement became effective on March 1, 1963 and provided for discontinuance of the regulatory authority of the Commission within the State under Chapters 6. 7, and 8, and Section 161 of the Act with respect to byproduct materials as defined in section 11e.(1) of the Act, source materials, and special nuclear materials in quantities not sufficient to form a critical mass; and

Whereas, the Governor of the State has requested this amendment in accordance with section 274 of the Act; and

Whereas, the Commission found on February 26, 1982, that the program of the State for the regulation of materials covered by this amendment is in accordance with the requirements of section 274o. of the Act and in all other respects compatible with the Commission's program for the regulation of such materials and is adequate to protect the public health and safety; and

---

[1]Under the provisions of the Energy Reorganization Act of 1974, the regulatory functions formerly carried out by the Atomic Energy Commission are now carried out by the Nuclear Regulatory Commission as of January 19.1975.

Whereas, this amendment is entered into pursuant to the provisions of the Atomic Energy Act of 1954. as amended;

Now, therefore, it is hereby agreed between the Commission and the Governor of the State, acting on behalf of the State, as follows:

Section 1. Article I of the Agreement of January 10, 1963, is amended by adding "as defined in section 11e.(1) of the Act;" after the words "byproduct materials" in paragraph A, by redesignating paragraphs B. and C. as paragraphs C. and D., and by inserting the following new paragraph immediately after paragraph A.:

"B. Byproduct materials as defined in section 11e.(2) of the Act;".

Section 2. Article III of the Agreement of January 10, 1963, is amended by inserting "A." before the words "This Agreement," by redesignating paragraphs A. through D. as subparagraphs 1. through 4., and by adding the following at the end thereof:

"B. Notwithstanding this Agreement, the Commission retains the following authorities pertaining to byproduct materials as defined in section 11e.(2) of the Act:

"1. Prior to the termination of a State license for such byproduct material, or for any activity that results in the production of such material, the Commission shall have made a determination that all applicable standards and requirements pertaining to such materials have been met.

"2. The Commission reserves the authority to establish minimum standards governing reclamation, long term surveillance or maintenance, and ownership of such byproduct material. Such reserved authority includes:

"a. The authority to establish terms and conditions as the Commission determines necessary to assure that, prior to termination of any license for such byproduct material, or for any activity that results in the production of such material, the licensee shall comply with decontamination, decommissioning, and reclamation standards prescribed by the Commission; and with ownership requirements for such materials and its disposal site:

"b. The authority to require that prior to termination of any license for such byproduct material or for any activity that results in the production of such material, title to such byproduct material and its disposal site be transferred to the United States or the State at the option of the State (provided such option is exercised prior to termination of the license);

"c. The authority to permit use of surface or subsurface estates, or both, of the land transferred to the United States or the State pursuant to subparagraph B.2.b., of this Article;

"d. The authority to require the Secretary of the Department of Energy. other Federal agency, or State, whichever has custody of such byproduct material and its disposal site, to undertake such monitoring. maintenance, and emergency measures as are necessary to protect the public health and safety, and other actions as the Commission deems necessary: and

"e. The authority to enter into the arrangements as may be appropriate to assure Federal long term surveillance or maintenance of such byproduct material and its disposal site on land held in trust by the United States for any Indian tribe or land owned by an Indian tribe and subject to a restriction against alienation imposed by the United States.".

Section 3. Article III of the Agreement of January 10, 1963, is amended by inserting "otherwise licensable by the State under Article I of this Agreement" after the words "special nuclear material."

Section 4. Article VII of the Agreement of January 10, 1963, is amended by inserting "all or part of after the words "terminate or suspend." by inserting "(1)" after the words "finds that," and by adding at the end before the period the following:

", or (2) the State has not complied with one or more of the requirements of section 274 of the Act. The Commission shall periodically review this Agreement and actions taken by the State under this Agreement to ensure compliance with the provisions of section 274 of the Act.".

Section 5. Article VIII of the Agreement of January 10, 1963, is amended by redesignating it Article IX and by inserting a new Article VIII as follows:

"In the licensing and regulation of byproduct material as defined in section lle.(2) of the Act, or of any activity which results in production of such material, the State shall comply with the provisions of section 274o. of the Act. If, in such licensing and regulation, the State requires financial surety arrangements for the reclamation or long term surveillance or maintenance of such material.

"A. The total amount of funds the State collects for such purposes shall be transferred to the United States if custody of such material and its disposal site is transferred to the United States upon termination of the State license for such material or any activity which results in the production of such material. Such funds include, but are not limited to, sums collected for long term surveillance or maintenance. Such funds do not, however, include monies held as surety where no default has occurred and the reclamation or other bonded activity has been performed; and

"B. Such State surety or other financial requirements must be sufficient to ensure compliance with those standards established by the Commission pertaining to bonds, sureties, and financial arrangements to ensure adequate reclamation and long term management of such byproduct material and its disposal site.".

This amendment shall become effective on March 24, 1982.

Done at Austin. State of Texas, in triplicate, this 24th day of March 1982.

For The State of Texas William P. Clements. Jr.,

Governor.

Done at Washington, District of Columbia, in triplicate, the 12th day of March 1982.

For The United States Nuclear Regulatory Commission.

Nuzio J. Palladino,

Chairman.

Dated at Bethesda, Maryland, this 1st day of April, 1982.

For The United States Nuclear Regulatory Commission.

G. Wayne Kerr,

Director, Office of State Programs.

For the United States Nuclear Regulatory Commission.

[FR Doc. 82-9546 Filed 4-7-82; 8:45 am]
BILLING CODE 7590-01-M