Idaho National Engineering and Environmental Laboratory

INTEROFFICE MEMORANDUM

HLW-100 1288 LTS

Date: October 23, 2002

To: V. L. Jacobson MS 3679 6-3763

From: M. C. Swenson MS 3211 6-3576

Subject: RESPONSE TO NRC QUESTIONS ON THE RADIOLOGICAL SOURCE TERM FOR I-129 AND TC-99 IN TANK FARM WASTE

References:

1. *Performance Assessment for the Tank Farm Facility at the Idaho National Engineering and Environmental Laboratory*, DOE/ID-10966, December 2001

2. G. J. McManus et. al., *A Model of Iodine-129 process Distributions in a Nuclear Fuel Reprocessing Plant*, ENICO-1108, April 1982

Representatives of the Nuclear Regulatory Commission (NRC) reviewed draft versions of the INTEC Tank Farm Facility (TFF) Residual Waste Incidental to Reprocessing (WIR) Determination Report and the Performance Assessment for the Tank Farm Facility at the Idaho National Engineering and Environmental Laboratory. Their review prompted questions about the radiological source term for the residual waste in the Tank Farm, specifically for I-129 and Tc-99. The NRC noted there was only one I-129 value for the Tank Farm waste. The NRC questioned whether one value could be deemed as representative of the contents of the Tank Farm. The NRC noted that the analytical data for Tc-99 did not correspond with calculated values and therefore questioned the validity of the calculated data.

Attached is a discussion of the radiological source term and the issues associated with I-129 and Tc-99 as well as recommendations relative to the SBW radiological source term to resolve the NRC concerns.

Radionuclide Inventory Determination

Historically, INTEC has analyzed many samples of Tank Farm wastes. Tank Farm waste contains a mixture of fission and activation products from the nuclear fuels processed at INTEC. In order to develop a complete radiological source term for the waste, INTEC uses a combination of both analytical and calculated data. Some radionuclides, such as Cs-137, are present in significant quantities and are easily detected in waste samples. For such nuclides, analytical data are the basis of the radiological source term. Other nuclides are present in such small quantities that they are difficult or impossible to detect in the waste. The Tank Farm radiological source term uses calculated values for such "trace" nuclides. INTEC uses the Cs-137 analytical data to estimate values for radionuclides that are present in very small quantities and have limited or no analytical data. Cs-137 is used as the basis for calculated nuclides because it is present in large quantities, is easily detected, and has reliable analytical results.

INTEC uses the ORIGEN2 model to predict radionuclide inventories in Tank Farm waste based upon the major nuclear-fuel types (aluminum, zirconium, and stainless steel) that were processed at INTEC. Individual radionuclide and Cs-137 values from the ORIGEN2 model are used to calculate a radionuclide-to-Cs-137 ratio for each radionuclide. A complete radiological source term is then

generated for each waste type by multiplying the ORIGEN2-generated radionuclide value by the amount of Cs-137 (analytical value) in each type of waste. INTEC routinely substitutes reliable analytical data for the ORIGEN2-calculated data when analytical data are available.

There is no specific fuel type with which to use the ORIGEN2 model to generate a sodium-bearing waster (SBW) source term. SBW consists primarily of the waste generated by the decontamination of INTEC process equipment. INTEC process equipment is contaminated with waste from the aluminum (Al), Zirconium (Zr), and stainless steel (SS) fuel dissolution processes. Therefore, the SBW source term was derived as a weighted average of the ORIGEN2 model values for the Al, Zr, and SS wastes. This weighted average was adjusted to the measured concentration of Cs-137 and other nuclides obtained from analytical results of samples from several tanks of SBW.

Response to NRC comment II.C.1.a: I-129 in the Tank Farm Liquid

NRC Comment II.C.1.a: Limited sampling, especially for I-129 (which is an important contributor to radiological dose to the public). Only one measurement is available for I-129. Expecting variability in I-129 concentrations, the current value may or may not be a good representation of the true mean. In addition, because the tanks are unstirred, the composition of the tank sludge solids is likely heterogeneous and may therefore vary significantly from the estimated values. The variance could lead to greater than expected residual radioactively in the tanks at closure

I-129 in the Tank Farm Liquid

Over the life of INTEC, there has been a significant amount of sampling and characterization of Tank Farm wastes. There are more data for I-129 than the single analysis the NRC noted in the Tank Farm Performance Assessment (Reference 1). The INEL has analyzed I-129 in both high-level first cycle raffinates and SBW. I-129 is difficult to measure in Tank Farm waste because it is present in very small quantities and it emits very low-energy radiation that is difficult to detect in the presence of Cs-137. Tank Farm waste contains very large concentrations of Cs-137. Because of this, errors are possible when the analyst separates and analyzes the very small quantities of iodine. On the other hand, Cs-137 is easy to measure and has been measured repeatedly with a high degree of reliability. Because I-129 values can vary significantly between samples, it is best to check the validity of I-129 results by comparing them to the theoretical (ORIGEN2) amount of I-129 that should exist.

Standard fission yield data from nuclide and isotope charts shows the fission of one gram-mole of U-235 generates 738 Ci of Cs-137 and 1.71×10^{-4} Ci of I-129. The Cs-137 to I-129 ratio (about 4.3×10^{6}) calculated from this can be used to determine the validity of I-129 analyses of Tank Farm waste. The Cs:I ratio will gradually decrease over time as the Cs-137 decays. However, the decay time in existing waste is relatively short for most waste (approximately one half life) and the Cs:I ratio is a good indicator of validity of the I-129 sample result. For waste that has decayed for 30 years (the average decay time for most SBW), the Cs:I ratio should be about 2.1×10^{6}.

In the late 70's and early 80's an extensive study of the I-129 pathway through the INTEC (ICPP) fuel and waste processing systems was completed (Reference 2). That study included numerous I-129 analyses of a variety of plant wastes. The study concluded that most of the I-129 in the processed fuel

went with the liquid waste into the Tank Farm. The iodine in Tank Farm waste was vented up the stack during the calcination process. The study did not identify and iodine concentration or separation mechanism in the Tank Farm. Therefore, comparing the ORIGEN2 and analytical Cs:I ratios in the Tank Farm waste is a valid method to evaluate I-129 analytical data. When Tank Farm iodine data do not exist, the ORIGEN2 Cs:I ratio can be used to estimate I-129 values based on Cs-137 concentrations.

Table 1 contains historical analytical data for I-129, Cs-137, and the Cs-137:I-129 ratio for various types of Tank Farm (liquid) wastes at various times. Several data points in Table 1 have Cs:I ratios that are near the expected ratio range of 2.1 to 4.3×10^6. However, there are values that are several times below the expected ratio. This could be an error in the analytical results caused by Cs-137 being reported too low or the I-129 being reported too high. The reported Cs-137 numbers are very reliable since Cs-137 is the dominant radionuclide in the waste and is easily detected. There are numerous Cs-137 analyses of Tank Farm waste to confirm its reliability. On the other hand, the reported I-129 values are less reliable and can vary significantly.

Table 1. Historical Cs-137 and I-129 concentrations in INTEC Tank Farm liquids.

Log number	Tank	Waste Type	Cs-137 (d/s/ml)	I-129 (d/s/ml)	Cs-137:I-129 ratio
83-060324	WM-180	Sodium	3.8×10^6	0.761	5.0×10^6
83-06244	WM-181	Sodium	1.1×10^6	0.413	2.7×10^6
83-06066	WM-184	Sodium	7.0×10^5	2.46*	0.28×10^6
83-061218	WM-186	Sodium	1.3×10^6	1.04*	1.2×10^6
90-09053	WM-185	Sodium	4.3×10^6	3.9*	1.1×10^6
93-02066	WM-180	Sodium	none	<0.76	NA
93-020710	WM-180	Sodium	1.2×10^6	<0.52	$>2.3 \times 10^6$
93-02205	WM-181	Sodium	1.1×10^6	<0.28	$>3.9 \times 10^6$
93-022314	WM-181	Sodium	1.1×10^6	<1.18*	$>0.93 \times 10^6$
83-09037	WM-187	First Cycle Zirconium	3.4×10^7	25.6*	1.3×10^6
83-09046	WM-187	First Cycle Zirconium	3.4×10^7	7.49	4.5×10^6
83-09051	WM-187	First Cycle Zirconium	4.3×10^7	8.35	5.2×10^6
96-07039	WM-183	Sodium	8.3×10^6	<2.4	$>3.5 \times 10^6$
00-01175	WM-183	Sodium	5.3×10^6	36*	0.15×10^6

*Analyses with Cs:I ratio $<1.5 \times 10^6$ likely have I-129 values that are too high (used detection limit for those analyses with "less than" values).

During the I-129 analytical process, a chemical separation of iodine must occur to eliminate interference from Cs-137. Trace quantities of Cs-137 remaining after separation will give false (high) values for I-129. The three analyses for WM-187 in Table 1 show significant I-129 variation. The three WM-187 samples were taken on three consecutive days without making any changes to the waste in the tank. The Cs-137 values for the three samples are in good agreement, differing by about 20% between the high and low values. Two of the I-129 values agree, but the third I-129 value (25.6 d/s/ml) is a factor of three

higher than the other two. The sample with the high I-129 value also has an unreasonably low Cs:I ratio. Based upon this, the WM-187 I-129 value of 25.6 d/s/ml is not a valid sample result. Several other I-129 sample results in Table 1 also have unreasonably low Cs:I ratios and are likely not valid. Samples whose I-129 concentration is likely not valid (those with a Cs:I ratio of $<1.5 \times 10^6$) are marked with an asterisk in Table 1.

Table 1 has several "less than" values for I-129 because the small quantities of I-129 quantities are below the analytical method detection value. Some of the "less than" I-129 values in Table 1 have some use because the detection limit is close to the expected value and is low enough to be used as a bounding value. There are numerous additional historical I-129 analyses. However, many historical data have "less than" values with detection limits so high that they are not useful, even for bounding conditions.

Particular attention should be paid to the last two samples in Table 1. The last sample (I-129=36 d/s/ml) is the single sample contained in the Tank Farm Performance Assessment document, referenced in the NRC comment. That sample was obtained in 2000 from the heel solution in tank WM-183 and is not a reasonable value. The history of WM-183 illustrates why the iodine value of 36 d/s/ml is not valid. In 1996 tank WM-183 was full of SBW. The tank was emptied to its heel in December 1996 (processed in the high-level liquid waste evaporator). The second-to-last sample in Table 1 (I-129<2.4 d/s/ml) was taken from WM-183 during the 1996 processing period. After WM-183 was emptied, dilute waste, approximately equal in volume to the tank heel volume, was added to WM-183. The tank was again emptied to its heel volume in December 1999. The last sample in Table 1 (I-129=36 d/s/ml) was obtained in 2000 shortly after the tank was emptied the second time. The second WM-183 sample shows a decrease of Cs-137 of about 40%. This was expected given the approximate 100% dilution of the heel that occurred (some of the added waste contained Cs-137 otherwise it would have been a 50% reduction). The I-129 also should have decreased by about 40%, to a value of <1.5 d/s/ml. However, the 2000 sample data shows the I-129 value increased over an order of magnitude over the 1996 value. The Cs-I ratio of the 2000 WM-183 sample is the lowest of any in Table 1. The 2000 WM-183 I-129 result was included in the Tank Farm Performance Assessment documentation (presumably) because it was the most recent data. However, in this case the most recent data is not the best or most valid data and because of this should not be used.

Another item to note is the first four I-129 values in Table 1. As noted earlier, valid analytical sample data are used in place of ORIGEN2-calculated data in the waste source terms. The first four I-129 values (for tanks WM-180, -181, -184, and –186) are used in the SBW source term in place of the ORIGEN2-calculated values. The analytical values are higher than those calculated by ORIGEN2. In reviewing the first four analyses on Table 1, the I-129 value reported for the WM-184 sample is too high as indicated by the extremely low Cs:I ratio. Also, though not as severe, the I-129 sample result for WM-186 is probably too high. Using both of these values in the I-129 analytical basis in place of the calculated ORIGEN-2 values results in a conservatively high value of I-129 in the SBW. Since those first four samples were obtained, much of the SBW has been concentrated in the high-level-liquid-waste evaporator where much of the I-129 goes with the overhead condensate to eventually be vented up the stack. This would reduce the I-129 concentration in the SBW. However, this reduction in I-129 is not reflected in the current SBW source term.

The current SBW radiological source term uses historical analytical data for I-129 in place of the ORIGEN2 calculated values. The analytical data are higher than those predicted by ORIGEN2. Performance assessment calculations based upon these I-129 values are conservative. The I-129 sample result in the Tank Farm Performance Assessment document was not a reliable value. The following reasons support these conclusions:

- No mechanism has been identified that would concentrate I-129 in relation to Cs-137 in the INEEL SBW. To the contrary, when SBW is evaporated for volume reduction some iodine is volatilized and vented up the stack.
- Based upon reasonable I-129 values in Table 1 and upon I-129 values predicted from U-235 fission product yield data, a value of 5-10 d/s/ml was a realistic value for I-129 in first cycle raffinate (which no longer exists in the Tank Farm). Additionally by the same rationale, a value of 1 d/s/ml is a conservatively high value for I-129 in the SBW remaining in the Tank Farm.
- The I-129 values predicted by the ORIGEN2 model were replaced by actual I-129 analytical results in the SBW source term. The analytical I-129 values from the SBW samples are conservative (high) because some of the I-129 values are high when compared to the fission product yield data.

I-129 in the Tank Heel Solids

There are less analytical data for the undissolved solids (UDS) in the tank heels than for the liquids. There are recent I-129 analyses from the solids from three different tanks, WM-182, -183, and –188. Historically, the three tanks have contained all of the major types of waste ever stored in the Tank Farm, including raffinates from Al, Zr, and SS -clad fuel, and SBW. The solids from the tanks have been analyzed for both Cs-137 and I-129 and the results are presented in Table 2.

Table 2. Cs-137 and I-129 content of INTEC Tank Farm solids.

Log number	Tank	Historical Waste Types Stored in Tank	Cs-137 (d/s/ml)	I-129 (d/s/ml)	Cs-137:I-129 ratio
99-1206-2	WM-182	Aluminum, Zirconium	1.6×10^7	<8.2	$>1.8 \times 10^6$
00-0228-1	WM-183	Aluminum, Stainless Steel, Sodium	3.3×10^7	<3.3	$>10 \times 10^6$
99-0210-4 Sample 1	WM-188	Aluminum, Zirconium	9.9×10^7	$<5.7 \times 10^4$	NA (I-129 detection limit too high)
99-0210-4 Sample 2	WM-188	Aluminum, Zirconium	8.0×10^7	$<3.9 \times 10^4$	NA (I-129 detection limit too high)
99-0210-4 Sample 3	WM-188	Aluminum, Zirconium	1.4×10^8	$<9.8 \times 10^4$	NA (I-129 detection limit too high)

Table 2 shows much higher Cs-137 values for the solids than for most liquid values in Table 1. Using the Cs:I ratio of 2.1×10^6 to predict I-129 would yield a value of about 16 d/s/ml for the WM-183 sample. The sample result is much lower (at least a factor of 5) than the calculated value. The Tank Farm

Performance Assessment (Reference 1, Section 7) indicates the Cs:I ratio in the tank solids should be higher than in the liquid because the solids sorption coefficient for cesium is higher than for iodine. Even though they are not precise numbers and the data are very limited, the "less than" values for WM-182 and WM-183 in Table 2 are valuable because the detection limit is close to the expected value and low enough to be bounding. The Cs:I ratio of $>10 \times 10^6$ in the WM-183 solids sample supports the assertion that the Cs:I ratio should be higher in the solids.

The INTEC waste source term model estimates I-129 in the bounding tank inventory based upon the highest measured Cs-137 concentration from the latest tank heel samples (WM-188 was highest for both liquids and solids). Based upon the above discussion, since the SBW source term model uses the lower (liquid value) of the Cs:I ratio, it would overestimate the amount of I-129 in the solids. The total inventory of I-129 in the tank solids is overstated in the INTEC SBW source.

Response to II.C.1.b, Utilization of Cs-137 as a predictor for other radionuclides

NRC Comment II.C.1.b: Utilization of Cs-137 as a predictor for other radionuclides. The information provided in the request for additional information for the WIR determination of sodium-bearing waste shows that the predicted concentrations for many radionuclides can vary significantly from measured values. While underpredictions and overpredictions may cancel out in the WIR determination for sodium-bearing waste, if the concentrations of key radionuclides are significantly underpredicted in tank solids there would be a direct influence on the calculated risk from tank closure. For example, using the data provided in Tables A-1 through A-6 of DOE/ID=10966 one can demonstrate that the approach outlined (utilizing the highest measured tank concentrations and the concentration ratios of CS-137 from tank to tank) would result in an underprediction of greater than 70 percent for Tc-99 in the tank WM-182 solid (compared to the measured values).

Historically, there has been a significant amount of sampling and characterization of Tank Farm wastes. However, there have been very few Tc-99 analyses included in the past characterizations. The amount of Tc-99 in Tank Farm waste is difficult to measure. It emits very low-energy radiation that is difficult to detect in the presence of all the other fission products (primarily Cs-137 which is present in very large concentrations). The analysis of Tc-99 requires a difficult chemical separation to remove Tc-99 from the rest of the radionuclides. The few Tc-99 analyses that have been made often vary significantly on the same waste. Experience with Tc-99 on Tank Farm undissolved solid (UDS) samples has shown more variability than the liquid samples. This is because the solids have to undergo all of the steps (chemical extraction) required of the liquid sample, and an additional step to turn the solids into a liquid form that can be analyzed. The additional step provides additional potential sources of error.

Using standard fission yield data from nuclide and isotope charts, the fission of one gram-mole of U235 generates 738 Ci of Cs-137 and 0.102 Ci of Tc-99. This results in a Cs-137 to Tc-99 ratio of about 7210 before radioactive decay. Assuming a decay of one Cs-137 half-life (about 30 years), this ratio drops to about 3605, the approximate ratio for Tank Farm SBW. In reviewing the available INTEC Tc-99 data, there are several samples of both liquid waste and calcine in which the Cs:Tc ratio is in the expected range. However, some ratios are much lower, indicating there is either more than the expected amount of Tc-99 or less than the expected amount of Cs-137. There is an abundance of analytical data to show the Cs-137 analyses are very reliable. Therefore it is the Tc-99 analyses that are suspect. Usually the

invalid samples show too much Tc-99 as a result of a poor chemical separation in the lab and contamination from other radionuclides (Cs-137).

Table 3 illustrates the variability in the Tc-99 results from samples of the same waste. Table 3 has six analyses of the waste in Tank WM-188. The first two analyses were from samples obtained in 1998; the next four were from samples taken in 1999. Virtually no liquid was added to the waste storage tank between the two sampling periods (a small amount of water, 3% by volume, was added to the tank in the course of leak testing Tank Farm valves). Table 1 shows the consistency of the Cs-137 values from sample to sample. However, the Tc-99 values fluctuate from about 2,000 to over 9,000 d/s/ml, a factor of 4.5. Likewise the ratio of Cs:Tc fluctuates. Based on the expected ratios, the third, fifth, and sixth WM-188 Tc-99 samples are likely invalid.

Table 3. Cs-137 and Tc-99 results from selected Tank Farm liquid and calcine samples.

Log number/report	Tank	Waste Type	Cs-137 (d/s/ml)	Tc-99 (d/s/ml)	Cs-137:Tc-99 ratio
98-0120-4 Sample 1	WM-188	Dilute First Cycle Zirconium	1.21×10^7	2.07×10^3	5860
98-0120-4 Sample 2	WM-188	Dilute First Cycle Zirconium	1.27×10^7	2.08×10^3	6115
99-0210-4 Sample 1	WM-188	Dilute First Cycle Zirconium	1.22×10^7	6.59×10^3	1851
99-0210-4 Sample 2	WM-188	Dilute First Cycle Zirconium	1.28×10^7	4.12×10^3	3107
99-0210-4 Sample 3	WM-188	Dilute First Cycle Zirconium	1.22×10^7	6.22×10^3	1961
99-0301-6	WM-188	Dilute First Cycle Zirconium	1.29×10^7	9.22×10^3	1399
INEL-94/0028	NCC-105 (Calciner)	Calcine	2.4×10^3 microCi/g	0.43 microCi/g	5581

Table 3 also contains the sample results of calcine produced in the early 90's. The calcine Cs:Tc ratio is within the expected ratio based on the fission yield of U-235. This shows the Tc follows the Cs through the fuel dissolution process, into the waste storage tanks, and into the calcine and there is no apparent mechanism for separation or concentration of Tc in the Tank Farm.

Table 4 shows Cs-137 and Tc-99 data from the solids samples taken from the heels of WM-182 and WM-183 by the LDUA. In general, the radionuclide content of the solids from the two tanks was very similar, as evidenced by the Cs-137 values in Table 4. The one exception to the radionuclide similarity was Tc-99. Table 4 shows the Cs-137 in the two tanks differed by a factor of 2, while the Tc-99 differed by 2 orders of magnitude. Based on the Cs:Tc ratio, neither of the Tc-99 values in Table 4 appears to be valid. One is approximately an order of magnitude too high and the other is an order of magnitude too low. The WM-182 sample has too much Tc-99 reported in it and it is the sample referenced in the NRC comment.

Table 4. Cs-137 and Tc-99 data in the WM-182 and WM-183 solids

Log number/report	Tank	Waste Type	Cs-137 (mCi/g)	Tc-99 (mCi/g)	Cs-137:Tc-99 ratio
99-1206-2	WM-182	Tank Heel Solids	0.429	2.63×10^{-3}	163
00-0228-1	WM-183	Tank Heel Solids	0.888	3.29×10^{-5}	27,000

Because of the variability in the analytical results for Tc-99, the Cs:Tc ratio calculated by the ORIGEN-2 model is deemed a more valid method to determine Tank Farm Tc-99 values and should be used in place of the highly variable analytical sample data.

MCS:rrh

cc: W. B. McNaught, MS 3670
J. I. Pruitt, MS 3211
M. D. Staiger, MS 3211
HLW CFL, MS 3211
M. C. Swenson Letter File (MCS-05-02)

Uniform File Code: 6150
Disposition Authority: ENV1-j-1
Retention Schedule: Cutoff at the end of the program. Destroy 75 years after cutoff.

NOTE: Original disposition authority, retention schedule, and Uniform Filing Code applied by the sender may not be appropriate for all recipients. Make adjustments as needed.

435.55
01/16/2003
Rev. 01

HLW PROGRAM RECORDS INPUT FORM

1288

Instructions: Fill in **bolded fields** or use N/A when applicable.
See page two for instructions.

1. **Document ID Number and Rev:**	HLW-100-1288
2. **Document Date:**	10/23/2002
3. **Document Title/Description or Subject:**	RESPONSE TO NRC QUESTIONS ON THE RADIOLOGICAL SOURCE TERM FOR I-129 AND TC-99 IN TANK FARM WASTE
4. **Addressee Name and Organization:**	V.L. JACOBSON
5. **Author Name and Organization:**	M.C. SWENSON
6. **Key Words:**	PROJECT NUMBER 23582
7. **Uniform Filing Code:** 6150	**Disposition Authority:** ☒ ENV1-j-1 ☐ Other:
Retention Schedule:	☐ EPI Cutoff at end of the program. Destroy 75 years after cutoff. LONG TERM STEWARDSHIP ☒ Other: Cutoff at end of the program. Destroy 75 years after cutoff.
8. **Document Type:** (See instruction page.)	CORRESPONDENCE
9. **File Location:** (Indicate only one.)	☒ **WCB** ☐ **EROB** ☐ **CPP-637**
Total Pages of Document: 10	☐ **Satellite:** ☒ **Other:**
10. **If QA Record, Validator Sign and Date:**	Sign: _____ Date: _____
	(Mark box only if applicable) ☐ *QA Document Pages* _____
QA Record Classification:	☐ **Non Permanent** ☐ **Lifetime**
11. **Scan Document:**	☒ **Scan into EDMS** ☐ **No Scan**
	☐ **Unclassified/Business Sensitive**
Medium:	☒ **Hard Copy** ☐ **Disk** ☐ **Other** (Specify)
12. **Receiver/Verifier**	Sign: CATHY GONZALES Date: 02/10/04
13. **Individual Submitting Record** (Please Print)	Name: M. DANIEL STAIGER Date: 02/10/04

Incomplete forms will be returned to Individual Submitting Record.

435.55
01/16/2003
Rev. 01

HLW PROGRAM
RECORDS INPUT FORM

1. If the document to be submitted bears a number (report number, letter number, etc.), enter it, along with the revision status.
2. Enter document date.
3. If the document to be submitted has no title, enter a brief subject description.
4. If the document to be submitted is correspondence, enter the name of the person to whom the correspondence is addressed, and that person's organization. If the correspondence has multiple addressees, enter "Distribution."
5. Enter the name of the person who signed the letter or authored the report; if no approval signature appears on the document, enter N/A.
6. Enter key subject terms that would be useful in retrieving the document. Avoid duplicating information provided in the document title/description or subject field.
7. Identify Uniform File Code (UFC) from HLW Program Records Type List. HLW Program case file records are filed under UFC-6150.

   Mark the appropriate boxes for Disposition Authority and Retention Schedule for the document.

   Disposition Authority:

ENV1-j-1	(HLW Program Case File) Cutoff at end of program. Destroy 75 years after cutoff.
Other	Identify Disposition Authority and retention period as specified on the HLW Program Record Type List.

8. Document Types: (more than one may be applicable)

As-Built Drawings	*Funding/Budget Documentation*	*Procedures*
Assessments, Audits, Appraisals	*Independent Hazard Review*	*Reference Material*
Construction Documents	*Justifications*	*Reports*
Contract or Work Agreements	*Logbooks*	*Reviews*
Correspondence	*Minutes/Agendas*	*Sampling Analysis*
Data Sheets	*Miscellaneous Documents*	*Statements of Work*
Electronic Mail	*Organization Structure*	*Training*
Engineering Design Files	*Permits*	*Waste Characterization Data*
Environmental Monitoring	*Plans*	
Facsimile	*Presentations*	

9. Specify the Central File Location (CFL) or the Satellite CFL where the document will reside. Enter the total page count including two pages for Form 435.55.
10. Quality Assurance Validator signs and dates in space provided. If the document is a QA record, mark the box as indicated and enter total page count including two pages for Form 435.55. Determined by the Quality Assurance Validator.
11. Mark if the document is to be scanned into EDMS HLW Cabinet or if No Scan is required.
    If document should be placed in a restricted folder, mark Unclassified/Business Sensitive to limit viewing access.
12. CFL personnel will receive and verify document.
13. Individual submitting record.