VARIANCE / FIELD CHANGE NOTICE (FCN)	V 00-001 3113
WBS NO.: PROJECT/DOCUMENT 98SC000001 WPRAP Sampling and Analysis Plan for Waste Pit Materials, Rev 0	Page 1 of 1
PROJECT TITLE: Waste Pits Remedial Action Project	Date: 4/3/00

VARIANCE / FIELD CHANGE NOTICE (Include justification):

Change: (Table 2.3)

1. Changed Moisture Content parameter container type from glass to plastic.
2. Changed Moisture Content parameter container size from 100g to 4 oz.
3. Changed Proctor Density, etc., parameter(s) container types from glass to plastic.

Justification: (Table 2.3)

1. More economical. Allowed by method.
2. More economical. Allowed by method.
3. More economical. Allowed by method.

REQUESTED BY: Doug Taylor , IT Corp DATE: 4/3/00

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✓	IT QA Manager: 4-300	4-3-00	✓	FDF WPRAP Environmental Compliance:	6-15-0
✓	FDF WPRAP Sampling/ Analysis Coordinator: Devon A. Smith	6/15/00			
✓	FDF WPRAP QA Manager: Michael B Hoze	6.15.00			

VARIANCE/FCN APPROVED [ ]YES [ ]NO

REVISION REQUIRED: [ ]YES [ ]NO

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Table 2.3 Summary of Containers, Preservation Techniques, Sample Volumes and Holding Times -Blended Waste

Location	Parameter	Container Type	Container Size	Minimum Sample Volume or Weight	Preservative	Holding Time
Pit face & Waste Receiving	Moisture Content	G(T)	4 oz	50 g	store in dark 3°- 30°C	Not Applicable
	Radionuclides	Plastic	500 g	400 g	NR	Not Applicable
Railcar storage bin	Proctor Density	Plastic	5 gal	23 kg	NA store in dark 3°- 30°C	Not Applicable
	Paint Filter Test	Plastic	5 gal	12 lbs	NR	Not Applicable
	Moisture Content				store in dark 3°- 30°C	Not Applicable
	TCLP Metals				NR	6 Months (Hg 28 days)
	pH				NR	Not Applicable
	Radionuclides				NR	Not Applicable
	PID	Glass	10 oz	100 g	NR	Not Applicable
Pit Areas (Profile)	Proctor Density	Plastic	5 gal	23 kg	NA store in dark 3°- 30°C	Not Applicable
	Paint Filter Test	G(T)	1 gal	12 lbs	NR	Not Applicable
	Moisture Content				store in dark 3°- 30°C	Not Applicable
	TCLP Metals				NR	6 Months (Hg 28 days)
	pH				NR	Not Applicable
	Radionuclides				NR	Not Applicable
	TCLP SemiVOAs				Cool 4C	14 days
	PCBs				Cool 4C	14 days
	Reactive CN,				Cool 4C	14 days
	Reactive S,				NR	NA
	Redox, Shock Sensitivity,				NR	NA
	Air & Water Reactivity				NR	NA
	PID	Glass	10 oz	100 g	NR	7 Days
	TCLP VOAs	Glass	4 oz	100 g	Cool 4C	7 Days

Before Variance VOO-001.

000002

After variance V00-001.

Table 2.3 Summary of Containers, Preservation Techniques, Sample Volumes and Holding Times -Blended Waste

Location	Parameter	Container Type	Container Size	Minimum Sample Volume or Weight	Preservative[1]	Holding Time
Pit face & Waste Receiving	Moisture Content	Plastic	100 g	50 g	store in dark 3°- 30°C	Not Applicable
	Radionuclides	Plastic	500 g	400 g	NR	Not Applicable
Railcar storage bin	Proctor Density	Plastic	5 gal	23 kg	NA store in dark 3°- 30°C	Not Applicable
	Paint Filter Test	Plastic	5 gal	12 lbs	NR	Not Applicable
	Moisture Content				store in dark 3°- 30°C	Not Applicable
	TCLP Metals				NR	6 Months (Hg 28 days)
	pH				NR	Not Applicable
	Radionuclides				NR	Not Applicable
	PID	Glass	10 oz	100 g	NR	Not Applicable
Pit Areas (Profile)	Proctor Density	Plastic	5 gal	23 kg	NA store in dark 3°- 30°C	Not Applicable
	Paint Filter Test	Plastic	1 gal	12 lbs	NR	Not Applicable
	Moisture Content				store in dark 3°- 30°C	Not Applicable
	TCLP Metals				NR	6 Months (Hg 28 days)
	pH				NR	Not Applicable
	Radionuclides				NR	Not Applicable
	TCLP SemiVOAs				Cool 4C	14 days
	PCBs				Cool 4C	14 days
	Reactive CN,				Cool 4C	14 days
	Reactive S,				NR	NA
	Redox, Shock Sensitivity,				NR	NA
	Air & Water Reactivity				NR	NA
	PID	Glass	10 oz	100 g	NR	7 Days
	TCLP VOAs	Glass	4 oz	100 g	Cool 4C	7 Days

1 Cooling samples to 4°C is a goal that should be diligently pursued by icing or refrigerating the sample from time of collection until time of analysis. It is expected that samples stored overnight before shipment to the laboratory will arrive at the laboratory at a temperature of 4°C. Samples delivered to the laboratory the same day that they are collected may not have had sufficient time to cool down to 4°C. If diligent efforts are made to cool the sample to 4°C and the sample is delivered to the laboratory the same day that it is collected, failure to cool the sample to 4°C shall not be cause for qualifying the resulting analytical data.

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VARIANCE / FIELD CHANGE NOTICE (FCN)	V 00-002
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PROJECT TITLE: Waste Pits Remedial Action Project	Date: 4/3/00

VARIANCE / FIELD CHANGE NOTICE (Include justification):

Change: (Table 2.4)
1. Revised description of radionuclide analytical method.
2. Corrected method numbers of organic and PCB analyses.

Justification: (Table 2.4)
1. Minor word change makes description more meaningful.
2. Fluor non-conformance report (NCR) FY99-1148 pointed out that wrong method numbers had been listed.

REQUESTED BY: Doug Taylor , IT Corp DATE: 4/3/00

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✓	IT Lab Manager	2K0403	✓	FDF RDQ	6/6/00
✓	IT QA Manager 4-3-00	4-3-00	✓	FDF WPRAP Environmental Compliance	6-15-0
✓	FDF WPRAP Sampling/ Analysis Coordinator 6/15/00				
✓	FDF WPRAP QA Manager 6.15.00				
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000004

Table 2.4 Summary of Methods, Turnaround Times, and Laboratories Used - Blended Waste

Before Variance V00-002.

ANALYTICAL PARAMETER	MATRIX	ANALYTICAL METHOD	Turnaround	Laboratory
Radionuclides	S	Canberra IT Gamma	3 days	On-site
Moisture content	S	Modified ASTM D 2216-92	1 day	On-site
Proctor Density	S	Modified ASTM D 698-91	1 day	On-site
Paint Filter Test	S	SW-846 9095A	3 hours	On-site
PID	S	Envirocare Method	1 hour	On-site
pH	S	9045C	3 days	On-site
TCLP Metals & Zn	S	SW-846 6010B SW-846 7470A	3 days	Off-site
Pyrophoricity	S	Envirocare Method	3 days	On-site
TCLP Organics	S	SW-846 8260 SW-846 8270 SW-846 8082 SW-846 8150	10 days	Off-site
PCBs	S	SW-846 8081	10 days	Off-site

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Table 2.4 Summary of Methods, Turnaround Times, and Laboratories Used - Blended Waste

After Variance V00-002.

ANALYTICAL PARAMETER	MATRIX	ANALYTICAL METHOD	Turnaround	Laboratory
Radionuclides	S	Gamma Spectroscopy	3 days	On-site
Moisture content	S	Modified ASTM D 2216-92	1 day	On-site
Proctor Density	S	Modified ASTM D 698-91	1 day	On-site
Paint Filter Test	S	SW-846 9095A	3 hours	On-site
PID	S	Envirocare Method	1 hour	On-site
pH	S	9045C	3 days	On-site
TCLP Metals & Zn	S	SW-846 6010B SW-846 7470A (Hg)	3 days	Off-site
Pyrophoricity	S	Envirocare Method	3 days	On-site
TCLP Organics	S	SW-846 8260B (VOC) SW-846 8270C (SVOC) SW-846 8081A (pesticides) SW-846 8151A (herbicides)	10 days	Off-site
PCBs	S	SW-846 8082	10 days	Off-site

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VARIANCE / FIELD CHANGE NOTICE (FCN)	V 00-003 - 3113
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PROJECT TITLE: Waste Pits Remedial Action Project	Date: 4/3/00

VARIANCE / FIELD CHANGE NOTICE (Include justification):

INFORMATION ONLY

Change: (Table 2.5)
Added footnote 14.

Justification: (Table 2.5)
Information approved by variance V99-006 to be added to footnote 5 was added to the table as footnote 14 instead. Since footnote 5 originally applied to U-234, U-235, U-238, Th-230, Th-232 and Ra-226, V99-006 should have been a new footnote because it only applied to Ra-226.

Footnote 14 contains a new method of determining Ra-226 activity that is different from that of V99-006. The relatively large uncertainties associated with determining Ra-226 from the 186 kev photopeak caused manifested values for Ra-226 to be grossly over-estimated.

The new method is based upon assuming that all Pb-210 in the waste pits was produced from the decay of Ra-226 and that the Ra-226 placed in the pits had been separated from its daughters. A conservative measurement of the Ra-226 activity is calculated by multiplying the Pb-210 activity by a factor of two.

The factor of two was derived considering the buildup and decay of Pb-210 during the time since the pits were closed. The effective elapsed time used in the end-growth estimate was determined as a weighted average of all pits considering the amount of material in each pit and the closure date of each pit. The reasonableness of this approach was corroborated by comparison with actual analytical data.

REQUESTED BY: Doug Taylor , IT Corp DATE: 4/3/00

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✓	IT QA Manager	5-25-00	✓	FDF WPRAP Environmental Compliance	6-15-00
✓	FDF WPRAP Sampling/ Analysis Coordinator	6/15/00			
✓	FDF WPRAP QA Manager	6.15.00			
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Table 2.5 Radiochemical Method Performance - Blended Waste

Before variance V00-003,

ANALYZE	ASL[1]	HAMDC[2]	PRECISION[3]	ACCURACY[4]	MAX BLANK ACTIVITY	REFERENCES
U234[5] U235[5, 6] U238[5]	E E E	2700 pCi/g 70 pCi/g 2800 pCi/g	+/- 15%	+/- 15%	<HAMDC	EMSL-LV 0539-17[7,8]
Th230[5] Th232[5,10]	E E	500 pCi/g 68 pCi/g	+/- 15%	+/- 15%	<HAMDC	EMSL-LV 0539-17[7,8]
Ra226[5]	E	200 pCi/g	+/- 15%	+/- 15%	<HAMDC	EMSL-LV 0539-17[7,8]
Ra228[10]	E	67 pCi/g	+/- 15%	+/- 15%	<HAMDC	EMSL-LV 0539-17[7,8]
Cs137	E	56 pCi/g	+/- 15%	+/- 15%	<HAMDC	EMSL-LV 0539-17[7,8]

1 Analytical Support Level -- See SCQ

2 Highest Allowable Minimum Detectable Concentrations (or Activities)

3 Precision established by replicate analyses of soils of known activity (LCS or SRM)

4 Accuracy established by replicate analyses of soils of known activity (LCS or SRM)-- May be from data, manufacturers specification, or actual analytical comparison

5 Standard methods have been modified for high level waste and updated technology. Rapid turnaround (<2 hours), low waste methods are preferred over conventional wet chemistry.

6 ~~U236 (HAMDC = 3600 pCi/g) not analyzed separately~~

7 Radiochemical Analytical Procedures for Analysis of Environmental Samples, U.S. EPA, March 1979, Memorandum of Understanding with U.S. Department of Energy No. EY-76-A-08-0539

8 Method is modified for proprietary Canberra/IT Automatic Density and Z-Factor Correction Process

9 XRF may be used for checks for internal use

10 Assumed to be in equilibrium with Ac228

Table 2.5 Radiochemical Method Performance - Blended Waste

3113

After Variance V00-003.

ANALYTE	ASL[1]	HAMDC [2,13]	PRECISION [3,11]	ACCURACY [4]	MAX BLANK ACTIVITY	REFERENCE
U234[5,12] U235[5,6] U238[5]	E E E	2700 pCi/g 70 pCi/g 2800 pCi/g	RER < 2.0	+/- 20%	<HAMDC	EMSL-LV 0539-17[7,8]
Th230[5] Th232[5,10]	E E	500 pCi/g 68 pCi/g	RER < 2.0	+/- 20%	<HAMDC	EMSL-LV 0539-17[7,8]
Ra226[5,14]	E	200 pCi/g	RER < 2.0	+/- 20%	<HAMDC	EMSL-LV 0539-17[7,8]
Ra228[10]	E	67 pCi/g	RER < 2.0	+/- 20%	<HAMDC	EMSL-LV 0539-17[7,8]
Cs137	E	56 pCi/g	RER < 2.0	+/- 20%	<HAMDC	EMSL-LV 0539-17[7,8]

1 Analytical Support Level -- See SCQ

2 Highest Allowable Minimum Detectable Concentrations (or Activities)

3 Precision established by replicate analyses of soils of known activity (LCS or SRM)

4 Accuracy established by replicate analyses of soils of known activity (LCS or SRM)-- May be from data, manufacturers specification, or actual analytical comparison

5 Standard methods have been modified for high level waste and updated technology. Rapid turnaround (<2 hours), low waste methods are preferred over conventional wet chemistry.

6 U236 (HAMDC = 3600 pCi/g) not analyzed separately

7 Radiochemical Analytical Procedures for Analysis of Environmental Samples, U.S. EPA, March 1979, Memorandum of Understanding with U.S. Department of Energy No. EY-76-A-08-0539

8 Method is modified for proprietary Canberra/IT Automatic Density and Z-Factor Correction Process

9 XRF may be used for checks for internal use

10 Assumed to be in equilibrium with Ac228

After variance V00-003.

11 Precision requirement for duplicate samples is based on Relative Error Ratio (RER) < 2.0. For quantitative analyses with data qualification as suspect (code J) a duplicate RER must be > 2 and ≤ 3.
(1) If the RER is > 3, AND both the sample and the duplicate are ≤ HAMDC, then no further analysis is required.
(2) If the RER is > 3, AND either the sample or duplicate is > HAMDC, AND the original sample activity concentration plus 2σ TPU ≤ 50% of the action level AND the duplicate activity concentration plus 2σ TPU ≤ 50% of the action level, the analyst will evaluate duplicate results to determine if re-analysis is necessary.
(3) If the RER is > 3, AND either the sample or duplicate activity concentration > HAMDC, AND either the sample or duplicate activity concentration plus 2σ TPU is > 50% of the action level, then the data will be disqualified and the following corrective actions taken in sequence:
(a) Prepare another sample, recount twice, then calculate a new RER, and/or
(b) Service the instrument and repeat the count.

12 If the mass ratio of U-235 to U-238 ≤ 0.86, the U-234 concentration will be assigned the U-238 concentration. If the U-235 to U-238 mass ratio exceeds 0.86, the U-234 value will be determined by ICP-MS, alpha spectroscopy or other appropriate quantification method.

13 The concentration of radioisotopes in LCS samples for this measurement may be <HAMDC.

14 The reported Ra-226 concentration is determined by assigning it a value equal to twice the Pb-210 concentration, assuming that the Pb-210 concentration is determined from the 46 kev photopeak. If the reported Ra-226 concentration plus the quantity, 1.96 X TPU, is greater than 5000 pCi/g (0.5 Ra-226 WAC value), AND the activity is less than twice its TPU, an alternate method will be used to determine the Ra-226 concentration. In some cases, IT may elect to determine the Ra-226 concentration by an alternate approved method other than gamma spectroscopy.

VARIANCE / FIELD CHANGE NOTICE (FCN)	V 00-004
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PROJECT TITLE: Waste Pits Remedial Action Project	Date: 4/3/00

VARIANCE / FIELD CHANGE NOTICE (Include justification):

Change: (Table 2.6)

1. Changed LCS acceptance from 85%-115% to 80%-120%.
2. Changed DUP acceptance from 85%-115% to RER < 2.0.
3. Changed "isotopes of interest" in comments block of LCS row to "selected isotopes".

Justification: (Table 2.6)

1. Affected by variance V99-004, and probably intended, but wasn't specifically included in the variance.
2. Affected by variance V99-007, and probably intended, but wasn't specifically included in the variance.
3. Wording change allows more flexibility in choice of isotopes.

REQUESTED BY: Doug Taylor , IT Corp DATE: 4/3/00

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✓	IT QA Manager	4-3-00	✓	FDF WPRAP Environmental Compliance	6-15-0
✓	FDF WPRAP Sampling/ Analysis Coordinator	6/15/00			
✓	FDF WPRAP QA Manager	6.15.00			
VARIANCE/FCN APPROVED [ ]YES [ ]NO			REVISION REQUIRED: [ ]YES [ ]NO		

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Table 2.6 Radiochemical Method QC Requirements
Blended Waste

Before variance V00-004.

REQUIREMENT	FREQUENCY	ACCEPTANCE LEVELS	CORRECTIVE ACTION	COMMENTS
ECV[1]	Daily	+/- 1KeV	Re-calibrate	Use a minimum of four certified peak energies 36 to 1836 KeV
ICV[2]	Start of Batch	90-110%	Re-calibrate	Use a minimum of four certified peaks from 36 to 1836 KeV -- Different Source from ECV
MB	Daily	< HAMDC	Check for Contamination	"Background Check"
LCS	Each Batch	85-115% (Railcar Bins)	Check for Contamination and Re-analyze	Synthetic material with certified activities for isotopes of interest ~ 5X HAMDC Can be used to concurrently perform ICV or ECV
DUP	Each Batch	85-115% (Railcar Bins)	Check Homogeneity and Re-analyze Batch	
FCV[3]	End of Batch	90-110%	Re-calibrate	Use a minimum of four certified peaks from 36 to 1836 KeV -- Different Source from ECV

1 ECV = Energy Calibration Verification
2 ICV = Initial Calibration Verification
3 FCV = Final Calibration Verification (Same material as ICV)

Table 2.6 Radiochemical Method QC Requirements
Blended Waste

After Variance V00-004.

REQUIREMENT	FREQUENCY	ACCEPTANCE LEVELS	CORRECTIVE ACTION	COMMENTS
ECV[1]	Daily	+/- 1KeV	Re-calibrate	Use a minimum of four certified peak energies 36 to 1836 KeV
ICV[2]	Start of Batch	90-110%	Re-calibrate	Use a minimum of four certified peaks from 36 to 1836 KeV -- Different Source from ECV
MB	Daily	< HAMDC	Check for Contamination	"Background Check"
LCS	Each Batch	80-120% (Railcar Bins)	Check for Contamination and Re-analyze	Synthetic material with certified activities for selected isotopes - 5X HAMDC. Can be used to concurrently perform ICV or ECV.
DUP	Each Batch	RER < 2.0	Check Homogeneity and Re-analyze Batch	
FCV[3]	End of Batch	90-110%	Re-calibrate	Use a minimum of four certified peaks from 36 to 1836 KeV -- Different Source from ECV

1 ECV = Energy Calibration Verification
2 ICV = Initial Calibration Verification
3 FCV = Final Calibration Verification (Same material as ICV)

VARIANCE / FIELD CHANGE NOTICE (FCN)	V 00-006
WBS NO.: PROJECT/DOCUMENT 98SC000001 WPRAP Sampling and Analysis Plan for Waste Pit Materials, Rev 0	Page 1 of 1
PROJECT TITLE: Waste Pits Remedial Action Project	Date: 4/3/00

VARIANCE / FIELD CHANGE NOTICE (Include justification):

Change: (Table 2.9)

1. Changed method number in title of table from 6010A to 6010B.
2. Re-wrote entire table adding significantly more detail overall and making changes to detection limits, MS frequency, LCS frequency and DUP frequency in response to specific problems identified in Fluor non-conformance report (NCR) FY99-1148.

Justification: (Table 2.9)

1. Fluor NCR FY99-1148 pointed out that table title listed wrong method number.
2. Changes made to resolve problems identified in Fluor NCR FY99-1148.

REQUESTED BY: Doug Taylor, IT Corp DATE: 4/3/00

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✓	Lead Manager	2K0403	✓	FDF RDQ	6/15/00
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✓	FDF WPRAP Sampling/ Analysis Coordinator	6/15/00			
✓	FDF WPRAP QA Manager	6.15.00			
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Before variance V00-006.

Table 2.7 QC Checks and Method Performance Criteria for Paint Filter Test (9095A) – Blended Waste ASL: B

REQUIREMENT	FREQUENCY	ACCEPTANCE LEVELS	CORRECTIVE ACTION	COMMENTS
Duplicate	1/20	Results must agree	Qualify Data	

Table 2.8 QC Checks and Method Performance Criteria for pH (9045C & 9045B) -- Blended Waste ASL: B

REQUIREMENT	FREQUENCY	ACCEPTANCE LEVELS	CORRECTIVE ACTION	COMMENTS
DUP	1/sample	± 0.1 pH units	Qualify Data	

Table 2.9 QC Checks and Method Performance Criteria for ICP-AES (6010A) -- Blended Waste ASL: B

REQUIREMENT	FREQUENCY	ACCEPTANCE LEVELS	CORRECTIVE ACTION	COMMENTS
ICVS	Begin	90-110%	Re-calibrate	
CCVS	Every 10 and at end	90-110%	Re-calibrate	
MB	Each Batch	<5xIDL	Re-digest Batch	
ICB/CCB	With ICVS/CCVS	+/- CRDL	Re-calibrate/ Re-analyze last 10	
ICS	Begin & end or every 8 hrs.	80-120%	Re-examine background/ Re-analyze	
LCS	1/20 or 1/batch	80-120%	Re-digest Batch	
MS	Each matrix	75-125%	Re-digest or Post Digestion Spike or MSA	
DUP	1/20 samples	RPD <20% for samples 5 X CRDL	DQO driven	
Detection Limit	NA	NA	NA	Per method 6010 Table 1

000015

Table 2.9 QC Checks and Method Performance Criteria for ICP-AES (6010B) -- Blended Waste ASL: B

After variance V00-006

REQUIREMENT	FREQUENCY	ACCEPTANCE LEVELS	CORRECTIVE ACTION	COMMENTS
ICB/CCB	After each ICVS/CCVS & before calibration	< RL	Clean sample transfer mechanism/tubing	
Calibration Curve	Beginning of use & when ICVS/CCVS indicates re-calibration	N/A	N/A	Either CCB & one standard or CCB & three standards. Defines ICP working range.
ICVS (separate source)	Beginning of day/sequence	90%-110% of true values	Re-analyze with fresh ICVS. Re-calibrate if still out.	Analysis cannot proceed unless ICVS is acceptable for all project target analytes.
CCVS	Every ten samples & at conclusion of day.	90%-110%	Re-analyze. Re-calibrate if still out.	Analysis cannot proceed without passing CCVS for all project target analytes.
Interference Check	Beginning & end of sequence or every 8 hours.	80%-120%	Re-anlyze. Re-evaluate interference corrections.	IC should be analyzed following each ICVS/CCVS.
MB	1/20 or 1/batch, whichever is more frequent.	<CRDL (10% of 40CFR261.24 limit)	Clean glassware, etc., & re-digest.	Evaluate batch results for bias effects before resorting to re-digest (IT decision).
LCS	1/20 or one per digestion batch, whichever is more frequent.	80%-120%	Re-digest batch	
MS	One per week for same matrix (≈every 10 samples). All samples of same matrix analyzed within week will be associated with this "Matrix QC".	75%-125% for samples with spike analyte native concentrations of < 4x spike level.	Re-analyze. Perform post-digest spike (85-115%). Perform MSA on all samples. If problem not solved, re-digest entire batch.	MB & LCS must be digested & analyzed with each sample set. MS is performed at twice the frequency required by SW-846.
DUP	Same as above (MS).	RPD <20% for samples > 5x CRDL.	DQO driven.	Same as above (MS).
Reporting Limit (RL)	N/A	N/A	N/A	10% of LDR levels (table 1 of 40CFR261.24).

VARIANCE / FIELD CHANGE NOTICE (FCN)	V 00-007 3113
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VARIANCE / FIELD CHANGE NOTICE (Include justification):

Change: (Table 2.10)

1. Re-wrote entire table adding significantly more detail overall and making changes to detection limits, QC frequencies and acceptance criteria in response to specific problems identified in Fluor non-conformance report (NCR) FY99-1148.

Justification: (Table 2.10)

1. Changes made to resolve problems identified in Fluor NCR FY99-1148.

REQUESTED BY: Doug Taylor , IT Corp DATE: 4/3/00

CHECK IF REQD	VARIANCE/ FCN APPROVAL	DATE	CHECK IF REQD	VARIANCE/ FCN APPROVAL	DATE
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✓	IT QA Manager	4-3-00	✓	FDF WPRAP Environmental Compliance	6-15-00
✓	FDF WPRAP Sampling/ Analysis Coordinator Devon A. Smith	6/15/00			
✓	FDF WPRAP QA Manager	6.15.00			
VARIANCE/FCN APPROVED [ ]YES [ ]NO			REVISION REQUIRED: [ ]YES [ ]NO		

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000017

Table 2.10 QC Checks and Method Performance Criteria for Mercury by Cold Vapor AAS -- Blended Waste (7470A) ASL: B

REQUIREMENT	FREQUENCY	ACCEPTANCE LEVELS	CORRECTIVE ACTION	COMMENTS
ICVS	Begin	90-110%	Re-calibrate	
CCVS	Every 10 and at end	90-110%	Re-calibrate	
MB	Each Batch	<5 X IDL	Re-digest Batch	
ICB/CCB	With ICVS/CCVS	+/- CRDL	Re-calibrate/ Re-analyze last 10	
ICS	Begin & end or every 8 hrs.	80-120%	Re-examine background/ Re-analyze	
LCS	1/20 or 1/batch	80-120%	Re-digest Batch	
MS/MSD	1/10 or Each matrix	75-125% (MS)	Re-digest or MSA	
DUP	1/20 samples	RPD <20% for samples 5 X CRDL	DQO driven	
Detection Limit	NA	NA	NA	0.0002 mg/l
Standard Concentrations	NA	NA	NA	Per method

Before Variance V00-007.

Table 2.10 QC Checks and Method Performance Criteria for Mercury by Cold Vapor AAS -- Blended Waste (7470A) ASL: B

After Variance V00-007

REQUIREMENT	FREQUENCY	ACCEPTANCE LEVELS	CORRECTIVE ACTION	COMMENTS
ICB/CCB	After each ICVS/CCVS & before calibration	< RL	Clean sample transfer mechanism/tubing	
Calibration Curve	Beginning of use & when ICVS/CCVS indicates re-calibration	N/A	N/A	CCB & three standards. Defines working range.
ICVS (separate source)	Beginning of day/sequence	90%-110% of true values	Re-analyze with fresh ICVS. Re-calibrate if still out.	Analysis cannot proceed unless ICVS is acceptable.
CCVS	Every ten samples & at conclusion of day/sequence.	80%-120%	Re-analyze. Re-calibrate if still out, then re-analyze previous ten samples.	Analysis cannot proceed without passing CCVS.
MB	Each batch.	<RL	Clean glassware, etc., & re-digest.	Evaluate batch results for bias effects before resorting to re-digest (IT decision).
LCS	1/20 or one per batch, whichever is more frequent.	85%-115%	Re-digest batch	
MS	One per week for same matrix (≈every 10 samples). All samples of same matrix analyzed within week will be associated with this "Matrix QC".	75%-125% for samples with spike analyte native concentrations of < 4x spike level.	Re-analyze. Perform post-digest spike (85-115%). Perform MSA on all samples. If problem not solved, re-digest entire batch.	MB & LCS must be digested & analyzed with each sample set. MS is performed at twice the frequency required by SW-846. Stated frequency is 10% & SW-846 requires 5%.
DUP	Same as above (MS).	RPD <20% for samples > 5x CRDL.	DQO driven.	Same as above (MS).
Reporting Limit (RL)	N/A	N/A	N/A	0.02mg/l Defined by low standard in curve.

000019

VARIANCE / FIELD CHANGE NOTICE (FCN)	V 00-008
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PROJECT TITLE: Waste Pits Remedial Action Project	Date: 4/3/00

VARIANCE / FIELD CHANGE NOTICE (Include justification):

Change: (Table 2.11)

1. Re-wrote entire table adding significantly more detail overall. Acceptance criteria defined instead of stating "per method".

Justification: (Table 2.11)

1. Changes made to resolve problems identified in Fluor non-conformance report (NCR) FY99-1148.

REQUESTED BY: Doug Taylor , IT Corp DATE: 4/3/00

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✓	IT QA Manager	4-3-00	✓	FDF WPRAP Environmental Compliance	6-15-0
✓	FDF WPRAP Sampling/ Analysis Coordinator	6/15/00			
✓	FDF WPRAP QA Manager	6.15.00			
VARIANCE/FCN APPROVED [ ]YES [ ]NO			REVISION REQUIRED: [ ]YES [ ]NO		

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Table 2.11 QC Checks and Method Performance Criteria for GC/MS for Volatile Organics (8260B) -- Blended Waste ASL: B

Before variance V00-008

REQUIREMENT	FREQUENCY	ACCEPTANCE LEVELS	CORRECTIVE ACTION	COMMENTS
IAP	Start each 12 hr. period	Per method	Re-tune	
IC	Begin, following tune	Per method	Re-calibrate	
CCV	Every 12 hours following tune	Per method	Re-calibrate	
LCS	1/20 or 1/batch	Per method	Re-analyze	
MB	Each Batch	<PQL	Re-analyze	
MS/MSD	1/20 or Each matrix	Per method	Advisory	
Surrogates	All samples	Per method	Re-extract and Re-analyze	
IS	All samples	Per method	Re-analyze	
Detection Limits	NA	NA	NA	Per method
Standard Concentrations IAP IS MS Surrogate	NA	NA	NA	Per method
Calibration points & ranges ICV CCV	NA	NA	NA	Per method

Table 2.11 QC Checks and Method Performance Criteria for GC/MS for Volatile Organics (8260B) -- Blended Waste ASL: B

REQUIREMENT	FREQUENCY	ACCEPTANCE LEVELS	CORRECTIVE ACTION	COMMENTS
BFB Tune	Each 12 hours of operation.	Meet criteria in Table 4 of method.	Re-tune & re-analyze.	Analysis cannot commence until tune criteria is met.
IB	Prior to calibration, ICV/CCV.	All target analytes <RL. Common solvents < 5X IDL.	Clean system/syringes.	
Calibration Curve (ICAL)	Beginning of use, when new standards are made & when ICV/CCV indicates re-calibration.	SPCC criteria if in std. All target compounds <15% RSD or linear to >0.990 correlation. Section 7.3 of method.	System must be calibrated for all project target analytes and surrogates before analysis can proceed.	Five-point standard curve defining working range of the instrument.
ICV (separate source)	Following initial calibration or re-calibration.	± 20% of true values.	Re-analyze with fresh ICV. If still out, evaluate standards & re-calibrate.	Analysis cannot proceed unless ICV is acceptable for all target analytes.
CCV	Every 12 hours following BFB & IB.	80%-120%	Re-analyze. Re-calibrate if still not in.	Analysis cannot proceed without passing CCV for all target compounds.
MB	Each batch.	<20% RL for target analytes.	Clean glassware, vessel, etc. & re-analyze if contamination affects results.	Evaluate batch results for bias effects before resorting to re-analysis (IT decision). Must be performed with ZHE fluid addition if analyzing ZHEs.
ZHE Blank	One per ten ZHEs. At least one per week that ZHE is performed	<20% RL for target analytes	Review ZHE cleaning procedures. Re-extract if bias affects data.	Samples for which ZHE blank bias affects data decision (determined by IT) should be re-extracted.
LCS	1/20 or 1/batch, whichever is more frequent.	75%-125% for all target analytes.	Re-analyze. Check standards. Check purge system.	Evaluate overall QC performance in data validation process. Must be performed with ZHE fluid addition if analyzing ZHEs.
MS/MSD	One per week for same matrix (≈every 10 samples) All samples of same matrix analyzed within week will be associated with this matrix QC.	Within lab established ranges for samples with spike analyte native concentrations of <4X spike level. RPD < 30%.	Advisory. Re-analyze to confirm any suspected "matrix effects".	± 15% of lab established ranges may be acceptable depending actual results and possible bias. Decision to accept is IT's. Lab must consult with IT if QC matrix fails.
Surrogates	Each sample/QC.	Within laboratory acceptance range.	Re-analyze.	IT may choose to accept results that are ± 10% of ranges. Lab must consult IT.
ISTD	Evaluate for all samples/QC.	-50% to +100% of ICAL average area.	Re-analyze. Dilute if necessary.	Results cannot be accepted with failing ISTD.
Reporting Limit (RL)	N/A	N/A	N/A	10% of LDR levels (40CFR261.24, Table 1) Should be above low standard in curve.

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VARIANCE / FIELD CHANGE NOTICE (Include justification):

Change: (Table 2.12)

1. Re-wrote entire table adding significantly more detail overall. Acceptance criteria and other information previously stated as "per method" expanded upon.

Justification: (Table 2.12)

1. Changes made to resolve problems identified in Fluor non-conformance report (NCR) FY99-1148.

REQUESTED BY: Doug Taylor , IT Corp DATE: 4/3/00

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✓	FDF WPRAP Sampling/ Analysis Coordinator	6/15/00			
✓	FDF WPRAP QA Manager	6/15/00			
VARIANCE/FCN APPROVED [ ]YES [ ]NO			REVISION REQUIRED: [ ]YES [ ]NO		

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TABLE 2.12 QC Checks and Method Performance Criteria for GC/MS for Semivolatile Organics (8270C) -- Blended Waste ASL: B

Before Variance V00-009.

REQUIREMENT	FREQUENCY	ACCEPTANCE LEVELS	CORRECTIVE ACTION	COMMENTS
IAP	Start each 12 hr. period	Per method	Re-tune	
IC	Begin, following tune	Per method	Re-calibrate	
CCV	Every 12 hours following tune	Per method	Re-calibrate	
LCS	1/20 or 1/batch	Per method	Re-analyze	
MB	Each Batch	<PQL	Re-analyze	
MS/MSD	1/20 or Each matrix	Per method	Advisory	
Surrogates	All samples	Per method	Re-analyze	
IS	All samples	Per method	Re-analyze	
Detection Limits	NA	NA	NA	Per method
Analyze Lists	NA	NA	NA	Per method
Standard Concentrations IAP IS MS Surrogate	NA	NA	NA	Per method
Calibration points & ranges ICV CCV	NA	NA	NA	Per method

TABLE 2.12 QC Checks and Method Performance Criteria for GC/MS for Semivolatile Organics (8270C) -- Blended Waste ASL: B

After Variance V00-009.

REQUIREMENT	FREQUENCY	ACCEPTANCE LEVELS	CORRECTIVE ACTION	COMMENTS
DFTPP Tune	Each 12 hours of operation.	Meet criteria in Table 3 of method.	Re-tune & re-analyze.	Analysis cannot commence until tune criteria is met.
System Chromatographic Integrity Test.	Each 12 hours of operation.	Per method	Correct injection liner/front of column. Re-analyze.	
IB	Prior to calibration, ICV/CCV.	All target analytes < RL.	Clean auto-sampler syringe.	
Calibration Curve (ICAL)	Beginning of use, when new standards are made & when ICV/CCV indicates re-calibration.	SPCC criteria if in standard. All target compounds <15% RSD or linear to 0.990 correlation. Section 7.3 of method.	System must be calibrated for all project target analytes and surrogates before analysis can proceed. SPCC criteria must be met if in standard.	Five-point standard curve defining working range of the instrument.
ICV (separate source)	Following initial calibration or re-calibration.	80%-120% of true values for target compounds.	Re-analyze with fresh ICV. If still out, evaluate standards & re-calibrate.	Analysis cannot proceed unless ICV is acceptable for all target analytes.
CCV	Each 12 hours following tune & SCI.	80%-120%	Re-analyze. Re-calibrate if still not in.	Analysis cannot proceed without passing CCV for all target compounds.
MB	Each batch.	<20% of RL for target compounds.	Clean glassware, etc., & re-analyze if contamination affects results.	Evaluate batch results for bias effects before resorting to re-analysis.
MS/MSD	Each matrix/batch. At least one per week (≈10 WPRAP samples)	Within lab established ranges for samples with spike analyte native concentrations of <4X spike level. RPD<30%.	Advisory. Re-analyze to confirm any suspected "matrix effects".	± 15% may be acceptable based upon bias effect. Re-analysis decision rests with IT. If analyzing TCLP, must use lab derived QC ranges for TCLP samples.

After Variance V00-009.

Surrogates	Each sample/QC.	Withing laboratory acceptance range.	Re-analyze.	± 10% may be acceptable. Lab must consult IT.
LCS	1/20 or 1/batch, whichever is more frequent.	Within laboratory acceptance range.	Re-analyze. Check standards. Check purge system.	Evaluate overall QC performance in data validation process.
ISTD	Evaluate for all samples/QC.	-50% to +100% of ICAL average area.	Re-analyze. Dilute if necessary.	Results cannot be accepted with failing ISTD.
Reporting Limit (RL)	NA	NA	NA	10% of LDR levels (40CFR261.24, Table 1). Should be above low standard in curve.

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VARIANCE / FIELD CHANGE NOTICE (Include justification):

Change: (Table 2.13)

1. Re-wrote entire table adding significantly more detail overall. Acceptance criteria and other information previously stated as "per method" expanded upon.

Justification: (Table 2.13)

1. Changes made to resolve problems identified in Fluor non-conformance report (NCR) FY99-1148.

REQUESTED BY: Doug Taylor , IT Corp DATE: 4/3/00

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✓	IT Lab Manager	2K0403	✓	FDF RDQ	6/15/00
✓	IT QA Manager	4-3-00	✓	FDF WPRAP Environmental Compliance	6-15-00
✓	FDF WPRAP Sampling/ Analysis Coordinator	6/15/00			
✓	FDF WPRAP QA Manager	6.15.00			
VARIANCE/FCN APPROVED [ ]YES [ ]NO			REVISION REQUIRED: [ ]YES [ ]NO		

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TABLE 2.13 QC Checks and Method Performance Criteria for GC for PCBs (8082) -- Blended Waste ASL: B

Before variance V00-010

REQUIREMENT	FREQUENCY	ACCEPTANCE LEVELS	CORRECTIVE ACTION	COMMENTS
Degradation Check	Start each 12 hr. period	Per method	Re-analyze	
IC	Begin	Per method	Re-calibrate	
CCV	Start, 1/10 samples and end	Per method	Re-calibrate	
LCS	1/20 or 1/batch	Per method	Re-calibrate	
MB	Each Batch	<PQL	Re-analyze	
MS/MSD	1/20	Per method	Advisory	
Surrogates	All samples	Per method	Re-analyze	
Detection Limits	NA	NA	NA	Per method
Analyze Lists	NA	NA	NA	Per method
Standard Concentrations MS Surrogate	NA	NA	NA	Per method
Calibration points & ranges ICV CCV	NA	NA	NA	Per method

TABLE 2.13 QC Checks and Method Performance Criteria for GC for PCBs (8082) -- Blended Waste ASL: B

3113

After Variance V00-010.

REQUIREMENT	FREQUENCY	ACCEPTANCE LEVELS	CORRECTIVE ACTION	COMMENTS
IB	Prior to calibration, ICV/CCV.	<RL	Clean system/syringes.	
Calibration Curve (ICAL)	Beginning of use, when new standards are made & when ICV/CCV indicates re-calibration.	< 20% RSD or linear to 0.990 correlation. Peak selection per section 7 of method 8000B.	System must be calibrated for all project target analytes & surrogates before analysis can proceed.	Five-point standard curve defining working range of the instrument for at least two arochlors.
ICV (separate source, two arochlors)	Following initial calibration and/or re-calibration.	80%-120% of true values.	Re-analyze with fresh ICV. If still out, evaluate standards & re-calibrate.	Analysis cannot proceed unless ICV is acceptable for all target analytes.
CCV (two arochlors)	Each ten samples.	85%-115%	Re-analyze. Re-calibrate if still not in.	Analysis cannot proceed without passing CCV for all target compounds.
MB	1/20 or 1/batch, whichever is more frequent.	< 20% of RL for target compounds.	Clean glassware, vessel, etc. & re-analyze if contamination affects results.	Evaluate batch results for bias effects before resorting to re-analysis (IT decision).
LCS	1/20 or 1/batch, whichever is more frequent.	70% - 130%	Re-analyze. Check standards. Re-extract.	Evaluate overall QC performance in data validation process (IT decision).
MS/MSD	Each matrix/batch.	Within established matrix ranges for samples with spike analyte native concentrations of < 4X spike level. RPD < 30%.	Advisory. Re-analyze to confirm any suspected "matrix effects".	± 15% may be acceptable. Lab must consult IT.
Surrogate (decachlorobiphenyl)	Each sample/QC.	Within lab established ranges.	Re-analyze.	± 10% may be acceptable. Lab must consult IT.
Reporting Limit (RL)	NA	NA	NA	0.500 mg/kg Defined above low standard in curve.

VARIANCE / FIELD CHANGE NOTICE (FCN)	V 00-011
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PROJECT TITLE: Waste Pits Remedial Action Project	Date: 4/3/00

VARIANCE / FIELD CHANGE NOTICE (Include justification):

Change: (Table 2.14)

1. Developed new method performance criteria table for pesticide method.

Justification: (Table 2.14)

1. Fluor non-conformance report (NCR) FY99-1148 pointed out that the SAP had no performance criteria information for the pesticide method.

REQUESTED BY: Doug Taylor , IT Corp DATE: 4/3/00

CHECK IF REQD	VARIANCE/ FCN APPROVAL	DATE	CHECK IF REQD	VARIANCE/ FCN APPROVAL	DATE
✓	IT Lab Manager	2K0403	✓	FDF RDQ	6/15/00
✓	IT QA Manager	4-3-00	✓	FDF WPRAP Environmental Compliance	6-15-00
✓	FDF WPRAP Sampling/ Analysis Coordinator	6/15/00			
✓	FDF WPRAP QA Manager	6.15.00			

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TABLE 2.14 QC Checks and Method Performance Criteria for GC Pesticides (8081A) -- Blended Waste ASL: B

3113

REQUIREMENT	FREQUENCY	ACCEPTANCE LEVELS	CORRECTIVE ACTION	COMMENTS
IB	Prior to calibration, ICV/CCC.	<RL	Clean system/syringes.	
DDT/Endrin Breakdown	Start of day's sequence.	Per section 7 of method.	Clean/change liner. Clip column. Re-analyze.	Analysis may not proceed until system passes test.
Calibration Curve (ICAL)	Beginning of use, when new standards are made & when ICV/CCV indicates re-calibration.	< 20% RSD or linear to 0.990 correlation. Method 8000B.	System must be calibrated for all project target analytes & surrogates before analysis can proceed.	Five-point standard curve defining working range of the instrument.
ICV (separate source)	Following initial calibration and/or re-calibration.	80%-120% of true values.	Re-analyze with fresh ICV. If still out, evaluate standards & re-calibrate.	Analysis cannot proceed unless ICV is acceptable for all target analytes.
CCV	Each ten samples.	85%-115%	Re-analyze. Re-calibrate if still not in.	Analysis cannot proceed without passing CCV for all target compounds.
MB	Each batch.	< 20% of RL	Clean glassware, vessel, etc. & re-analyze if contamination affects results.	Evaluate batch results for bias effects before resorting to re-analysis.
LCS	1/20 or 1/batch	70% - 130%	Re-analyze. Check standards. Re-extract.	Evaluate overall QC performance in data validation process.
MS/MSD	Each matrix/batch.	Within established matrix ranges for samples with spike analyte native concentrations of <4X spike level. RPD < 30%.	Advisory. Re-analyze to confirm any suspected "matrix effects".	± 15% may be acceptable. Lab must consult IT.
Surrogate	Each sample/QC.	Within lab established ranges.	Re-analyze.	± 10% may be acceptable. Lab must consult IT.
Reporting Limit (RL)	NA	NA	NA	10% of LDR levels (40CFR261.24, Table 1) Should be above low standard in curve.

VARIANCE / FIELD CHANGE NOTICE (FCN)	V 00-012
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PROJECT TITLE: Waste Pits Remedial Action Project	Date: 4/3/00

VARIANCE / FIELD CHANGE NOTICE (Include justification):

Change: (Table 2.15)

1. Developed new method performance criteria table for herbicide method.

Justification: (Table 2.15)

1. Fluor non-conformance report (NCR) FY99-1148 pointed out that the SAP had no performance criteria information for the herbicide method.

REQUESTED BY: Doug Taylor , IT Corp DATE: 4/3/00

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✓	IT Lab Manager:	2K0403	✓	FDF RDQ	4/15/00
✓	IT QA Manager	4-3-00	✓	FDF WPRAP Environmental Compliance	4-15-00
✓	FDF WPRAP Sampling/ Analysis Coordinator	6/15/00			
✓	FDF WPRAP QA Manager	6/15/00			
VARIANCE/FCN APPROVED [ ]YES [ ]NO			REVISION REQUIRED: [ ]YES [ ]NO		

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8113

TABLE 2.15 QC Checks and Method Performance Criteria for GC Herbicides (8151A) -- Blended Waste ASL: B

REQUIREMENT	FREQUENCY	ACCEPTANCE LEVELS	CORRECTIVE ACTION	COMMENTS
IB	Prior to calibration, ICV/CCV.	<RL	Clean system/syringes.	
Calibration Curve (ICAL)	Beginning of use, when new standards are made & when ICV/CCV indicates re-calibration.	< 20% RSD or linear to 0.990 correlation. Method 8000B.	System must be calibrated for all project target analytes & surrogates before analysis can proceed.	Five-point standard curve defining working range of the instrument.
ICV (separate source)	Following initial calibration and/or re-calibration.	80%-120% of true values.	Re-analyze with fresh ICV. If still out, evaluate standards & re-calibrate.	Analysis cannot proceed unless ICV is acceptable for all target analytes.
CCV	Each ten samples.	85%-115%	Re-analyze. Re-calibrate if still not in.	Analysis cannot proceed without passing CCV for all target compounds.
MB	Each batch.	< 20% of RL	Clean glassware, vessel, etc. & re-analyze if contamination affects results.	Evaluate batch results for bias effects before resorting to re-analysis.
LCS	1/20 or 1/batch	70% - 130%	Re-analyze. Check standards. Check purge system.	Evaluate overall QC performance in data validation process.
MS/MSD	Each matrix/batch.	Within lab established matrix ranges for samples with spike analyte native concentrations of <4X spike level. RPD < 30%.	Advisory. Re-analyze to confirm any suspected "matrix effects".	± 15% may be acceptable. Lab must consult IT.
Surrogate	Each sample/QC.	Within lab established ranges.	Re-analyze. Re-extract.	± 10% may be acceptable. Lab must consult IT.
Reporting Limit (RL)	NA	NA	NA	10% of LDR levels (40CFR261.24, Table 1) Should be above low standard in curve.

FIELD CHANGE NOTICE (FCN)	V 00-013
)JECT/DOCUMENT /PRAP Sampling and Analysis Plan for Waste Pit Materials, Rev 0	Page 1 of 1
.E: Waste Pits Remedial Action Project	Date: 4/3/00

Materials
Rev. 0

LD CHANGE NOTICE (Include Justification):

e: (Table 7.1)
reased "Turn Time" for reports of Waste Receiving/Blending Area samples from two hours to
ht hours.

cation: (Table 7.1)
eparation of sample, analysis of sample and review of data takes longer than two hours. Lab
n communicate preliminary results in less than eight hours, but needs the extra time for hard
py report.

BY: Doug Taylor , IT Corp DATE: 4/3/00

VARIANCE/ FCN APPROVAL	DATE	CHECK IF REQD	VARIANCE/ FCN APPROVAL	DATE
ab Manager	2K0403	✓	FDF RDQ	6/7/00
IA Manager	4-3-00	✓	FDF WPRAP Environmental Compliance	6-15-00
WPRAP Sampling/ Analysis Coordinator	6/15/00			
F WPRAP QA Manager	6.15.00			
N APPROVED [ ]YES [ ]NO		REVISION REQUIRED: [ ]YES [ ]NO		

IT Document Control
IT Project Engineer
IT Lab Manager
IT QA Manager
IT Radiological Manager

FDF Document Control
FDF WPRAP QA Manager
FDF ARWWP Operations Manager
FDF WPRAP Environmental Compliance
FDF WPRAP Sampling/ Analysis Coordinator

FDF RDQ
FDF WAO
FDF Waste Certification

ECDC CONTROLLED
COPY NO. 571

INFORMATION ONLY

[X]A - Conforms to the Subcontract Requirements
[ ]B - Minor Comment - Incorporate and Resubmit
[ ]C - Revise and Resubmit
Sig: _____ Date: 7-5-01

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TABLE 7.1 WPRAP Summary Reports

Location	Matrix	Hard Copy Deliverable	Turn Time Hard Copy	Electronic Deliverable	Turn Time Electronic
Waste Receiving/ Blending Area	Solid	Summary (Internal to IT)	8 hours	NA	NA
Blending Area/Railcar Storage Bins	Solid	Summary	72 hours	Access Diskette	72 hours

After Variance V00-013.