Department of Energy
Carlsbad Field Office
P. O. Box 3090
Carlsbad, New Mexico 88221

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Mr. Steve Zappe, WIPP Project Leader
Hazardous Waste Permits Program
Hazardous and Radioactive Materials Bureau
New Mexico Environment Department
2905 E. Rodeo Park Drive, Bldg. 1
Santa Fe, NM 87505

Subject: Transmittal of Approved Hanford WSPF Number RLMPURX.001, Transuranic Mixed Heterogeneous Debris Waste

Dear Mr. Zappe:

The Department of Energy, Carlsbad Field Office (CBFO) has approved the Hanford Waste Stream Profile Form (WSPF) RLMPURX.001.

Enclosed is a copy of the approved form as required by Section B-4(b)(1) of the WIPP Hazardous Waste Facility Permit No. NM4890139088-TSDF.

If you have any questions on this matter, please contact me at (505) 234-7357 or (505) 706-0066.

Sincerely,

Kerry W. Watson
CBFO Assistant Manager
Office of National TRU Program

Enclosure

cc: w/o enclosure
J. Kieling, NMED
C. Walker, TechLaw
M. Strum, WTS
R. Chavez, WRES
L. Greene, WRES
Operating Record
S. Calvert, CTAC
CBFO M&RC

040206

CBFO:NTP:KWW:VW:04-0274:UFC:5822

Waste Stream Profile Number: RLMPURX.001
Generator Site Name: Hanford Technical Contact: Scott Bisping
Generator Site EPA ID: WA7890008967, Technical Contact phone number: 509-372-0851
Date audit report approved by NMED: June 23, 2000; recertified February 1, 2002; August 8, 2002; February 25, 2003; and December 5, 2003
Title, version number, and date of documents used for WAP certification: HNF-2599, Hanford Site Transuranic Waste Characterization Quality Assurance Project Plan, Rev. 10 (10/08/03); DOE/WIPP-02-3122, CH-TRU Waste Acceptance Criteria, Rev. 0.1, (07/25/02); HNF-2600, Hanford Site Transuranic Certification Plan, Rev. 12 (10/28/03); "Safety Analysis Report for the TRUPACT-II Shipping Package," Docket No. 9218, Rev. 19A (03/02); TRUPACT II – Authorized Methods for Payload Control (TRAMPAC), Rev. 19c (04/03); Waste Analysis Plan (WAP - Attachment B) of the WIPP Final Hazardous Waste Permit, EPA No. NM4890139088, (01/30/03)
Did your facility generate this waste? X Yes __ No If no, provide the name and EPA ID of the original generator:

Waste Stream Information
WIPP ID: RLMPURX.001 Summary Category Group: S5000
Waste Matrix Code Group: Heterogeneous Debris (S5490) Waste Stream Name: MPUREXD
Description from the WTWBIR[1]: This waste stream contains plastic/polyurethane, metal/iron/galvanized/sheet, absorbent/kity ltr/vermiculite, cloth/rags/nylon, paper/cardboard, rubber, glass, and wood/lumber/plywood.
Defense Waste: [X] Yes ☐ No Check one: [X] CH ☐ RH Number of SWBs: N/A Number of Drums: 2885 55-gal drums
Number of Canisters: N/A
Data package numbers supporting this waste stream characterization: See page 13 of 14
List applicable EPA Hazardous Waste Codes[2]: D005, D006, D008, D009, D011
Applicable TRUCON Content Codes: RH125/RH225A, RH125/RH225B, RH125/RH225C, RH125/RH225D, RH125/RH225E, RH125/RH225F, RH125/RH225G, RH125/RH225H, RH125/225I, RH125/225J, RH125/225K, RH125/225L, RH125/225M, RH125/225N, RH125/225P, RH125/225Q, RH125/225R, RH125/225S, RH125/225T, RH125/225U, RH125/225V, RH125/225W, RH125/225X, RH125/225Y, RH125/225Z, RH125/225AA, RH125/225AB, RH125/225AC, RH125/225AD, RH125/225AE, RH125/225AF, RH125/225AG, RH125/225AL, RH125/225AM

Acceptable Knowledge Information

Required Program Information

- Map of site: Reference 1
- Facility mission description: Reference 1
- Description of operations that generate waste: References 1, 2, and 3
- Waste identification/categorization schemes: Reference 1
- Types and quantities of waste generated: References 1, 2, and 3
- Correlation of waste streams generated from the same building and process, as appropriate: Reference 1
- Waste certification procedures: References 1 and 4

Required Waste Stream Information

- Area(s) and building(s) from which the waste stream was generated: References 2 (Figure A-1) and 3
- Waste stream volume and time period of generation: Reference 2
- Waste generating process description for each building: References 2 and 3
- Process flow diagrams References 2 (Figures A-2 and A-3) and 3 (Figures 1 and 2)
- Material inputs or other information identifying chemical/radionuclide content and physical waste form: References 2 and 3
- Which Defense Activity generated the waste: (check one) References 2 and 3

~ Weapons activities including defense inertial confinement fusion
~ Naval reactors development
~ Verification and control technology
~ Defense research and development
X Defense nuclear waste and material by-products management
~ Defense nuclear materials production
~ Defense nuclear waste and materials security and safeguards and security investigations

Supplemental Documentation:

- Process design documents: Note 3
- Standard operating procedures: Note 3
- Safety Analysis Reports: Note 3
- Waste packaging logs Note 3
- Test plans/research project reports: Note 3
- Site data bases: Note 3
- Information from site personnel: Note 3
- Standard industry documents: N/A
- Previous analytical data: Note 3
- Material safety data sheets: Note 3
- Sampling and analysis data from comparable/surrogate waste: N/A
- Laboratory notebooks: N/A

Sampling and Analysis Information

Radiography: Reference 4
Visual Examination: Reference 9
Visual Examination Technique: Not Applicable

Headspace Gas Analysis
VOCs: References 5, 6, 7, and 8
Flammable: References 5 and 6
Other gases (specify): Reference 6

Homogeneous Solids/Soils/Gravel Sample Analysis
Total metals: Not Applicable
PCBs: Not Applicable

VOCs: Not Applicable
Nonhalogenated VOCs: Not Applicable
Semi-VOCs: Not Applicable
Other (specify): Not Applicable

Waste Stream Profile Form Certification:

I have reviewed the information in this Waste Stream Profile Form and have found the information consistent with the information in the analytical batch data reports.

Russell Bisping — Russell Bisping SQAO — 2/3/04
Signature of SQAO — Printed Name and Title — Date

NOTE:
(1) This waste stream is identified in the WTWBIR as RL-W291, 202A Uncat met debris CH RCRA MTRU w/ met; RL-W293, 202A Comb debris CH RCRA MTRU w/ met; RL-W294, 202A Heter debris CH RCRA MTRU w/ met (Hg); RL-W297, 202A Uncat met debris CH St MTRU; RL-W298, 202A Comb debris CH St MTRU; RL-W300, 202AL Comb debris CH RCRA MTRU w/ met; RL-W414, 202A Nonsurplus facility mgmt prg D&D MTRU. The WIPP ID assigned corresponds to the WSPF number.
(2) Radiography, visual examination, headspace gas analysis, and/or homogeneous solids/soils/gravel sample analysis were used to determine EPA Hazardous Waste Codes. The attached signed summary reports document this determination.
(3) See Section 5 of HNF-7355, "Hanford Site Transuranic Waste Management Waste Specific Acceptable Knowledge Documentation for Plutonium Uranium Extraction Plant Mixed Debris," (Rev. 5, June 17, 2002) for a list of supplemental references used to compile AK. This section provides records management system tracking numbers, document titles, revision numbers, dates, authors, and a brief summary for waste stream-specific supplemental AK information documents.

I hereby certify that I have reviewed the information in this Waste Stream Profile Form, and it is complete and accurate to the best of my knowledge. I understand that this information will be made available to regulatory agencies and that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

[signature] — David C. DeRosa — 2/3/04
Signature of Site Project Manager — Printed Name and Title — Date

REFERENCE LIST

1. HNF-3461, "Hanford Site Transuranic Waste Management Program Acceptable Knowledge Document for Retrievably Stored Contact-Handled Waste," Rev. 7, June 17, 2002.
2. HNF-6899, "Hanford Site Transuranic Waste Management Acceptable Knowledge Documentation for the Plutonium-Uranium Extraction Plant," Rev. 3, June 17, 2002.
3. HNF-7355, "Hanford Site Transuranic Waste Management Waste Specific Acceptable Knowledge Documentation for Plutonium Uranium Extraction Plant Mixed Debris," Rev. 5, June 17, 2002.
4. WRP1-OP-0908, "Operation of the Drum Nondestructive Examination System," Rev. G-8, September 19, 2003.
5. DO-080-009, "Obtain Headspace Gas Samples of TRU Waste Containers," Rev. J-0, April 14, 2003.
6. LA-523-410, "Determination of Volatile Organic Compounds in TRU/Mixed Waste Container Headspace," Rev. K-0, April 7, 2003.
7. LO-080-407, "Cleaning Summa Canisters for TRU Headspace Gas Sampling," Rev. G-O, April 08, 2003.
8. LO-090-450, "TRU Project Sample Chain of Custody, Storage, Acceptance, and Disposal," Rev. F-0, April 8, 2003.
9. WRP1-OP-0729, "Visual Examination," Rev. B-5, February 13, 2003.

RECONCILIATION WITH DATA QUALITY OBJECTIVES

I certify by signature (below) that sufficient data have been collected to determine the following project-required waste parameters for WSPF#: RLMPURX.001

Site Project Office Letter Report #(s): M4T00-TRU-03-571

		Reconciliation Parameter
1	X	Waste Matrix Code as reported in WWIS.
2	X	Waste Material Parameter Weights for individual containers as reported in WWIS.
3	X	The matrix parameter category identified is consistent with the type of sampling and analysis used to characterize the waste.
4	X	Container mass and activities of each radionuclide of concern as reported in WWIS.
5	X	Appropriate packaging configuration and DAC were met and documented in the headspace gas sampling documentation and the drum age was met prior to sampling.
6	X	The TRU activity reported in WWIS demonstrates with a 95% probability that the waste is TRU waste and not low-level radioactive waste.
7	X	Mean concentrations, UCL_{90} for the mean concentrations, standard deviations, and the number of samples collected for each VOC in headspace gas of the waste containers in the waste stream/waste stream lot were assigned as required.
8	X	Identify VOCs and quantify the concentrations of VOC constituents in the total waste inventory to ensure compliance with the environmental performance standards of 20.4.1.500 NMAC (incorporating 40 CFR 11§264.601(c)), and to confirm hazardous waste identification by acceptable knowledge.
9	N/A	Mean concentrations, UCL_{90} for the mean concentrations, standard deviations, number of samples collected for VOCs were calculated and compared with the program required quantitation limits and regulatory threshold limits, as reported in Data Summary Report Table 3, and EPA Hazardous Waste Codes were assigned as required (Matrix Parameter Summary Categories S3000 and S4000).
10	N/A	Mean concentrations, UCL_{90} for the mean concentrations, standard deviations, number of samples collected for SVOCs were calculated and compared with the program required quantitation limits and regulatory threshold limits, as reported in Data Summary Report Table 4, and EPA Hazardous Waste Codes were assigned as required (Matrix Parameter Summary Categories S3000 and S4000).
11	N/A	Mean concentrations, UCL_{90} for the mean concentrations, standard deviations, number of samples collected for metals were calculated and compared with the program required quantitation limits and regulatory threshold limits, as reported in Data Summary Report Table 5, and EPA Hazardous Waste Codes were assigned as required (Matrix Parameter Summary Categories S3000 and S4000).
12	X	Sufficient numbers of samples (as established by completeness rate) were taken to meet statistical sampling requirements, as documented on Summary Data Report Table 1.
13	X	Only validated data were used in the above calculations, as documented through the site data review and validation forms and process.
14	X	Waste containers were selected randomly for sampling, as documented in site procedures.
15	X	The potential flammability of TRU waste headspace gases.
16	X	Whether the waste stream exhibits a toxicity characteristic under 40 CFR Part 261, Subpart C.
17	X	Whether the waste stream can be classified as hazardous or nonhazardous at the 90% confidence level.
18	X	Whether all TICs were appropriately identified and reported in accordance with the requirements of the QAPjP Section B3-1.
19	X	Whether the overall completeness, comparability, and representativeness QAOs were met for each of the analytical and testing procedures as specified in the QAPjP Sections B3-2 through B3-9.
20	X	Whether the PRQLs for all analyses were met.
21	X	Sufficient numbers of waste containers were visually examined to determine with a reasonable level of certainty that the UCL_{90} for the miscertification rate is less than 14 percent.

Check (**X**) indicates that data or acceptable knowledge are sufficient to determine the waste parameters and that the waste parameters have been reported in the listed document or database. N/A indicates parameter does not apply to waste stream.

[signature]
Signature of Site Project Manager

Richard Dunn / DAviD C. DeRosA For RPD
Printed Name

02/03/04
Date

DATA SUMMARY REPORT: HEADSPACE GAS SUMMARY DATA

WSPF #: RLMPURX.001

Site Project Office Letter Report #: M4T00-TRU-03-571

ANALYTE	# Samples with detectable conc.[a]	Transform applied	Normality test (pass/fail)	Mean[b] (ppmv)	SD[c] (ppmv)	UCL_{90}[c] (ppmv)	Transformed PRQL	PRQL (ppmv)	EPA Code[d] (F001-5); (D004-D043[e])
1,1,1-Trichloroethane	0			1.00	0.00	N/A		10	N/A
1,1,2-Trichloro-1,2,2-trifluoroethane	0			1.00	0.00	N/A		10	N/A
Acetone[f]	3	In	Fail	1.86	0.65	2.07	4.61	100	N/A
Benzene[g]	2	None		1.21	0.60	1.66		10	N/A
Butanol	0			5.00	0.00	N/A		100	N/A
Carbon disulfide	0			1.00	0.00	N/A		10	N/A
Carbon tetrachloride	0			1.00	0.00	N/A		10	N/A
Chlorobenzene	0			1.00	0.00	N/A		10	N/A
Chloromethane[f]	7	In	Fail	0.79	0.99	1.11	2.47	10	N/A
Ethyl benzene	0			1.00	0.00	N/A		10	N/A
Ethyl ether	0			1.00	0.00	N/A		10	N/A
m or p-Xylene[h]	0			2.00	0.00	N/A		10	N/A
Methanol[i]	1			6.45	5.99	N/A		100	N/A
Methyl ethyl ketone	0			5.00	0.00	N/A		100	N/A
Methyl isobutyl ketone	0			5.00	0.00	N/A		100	N/A
Methylene chloride	0			1.00	0.00	N/A		10	N/A
o-Xylene	0			1.00	0.00	N/A		10	N/A
Tetrachloroethylene	0			1.00	0.00	N/A		10	N/A
Toluene	0			1.00	0.00	N/A		10	N/A
Trichloroethylene	0			1.00	0.00	N/A		10	N/A
1,1,2,2-Tetrachloroethane	0			1.00	0.00	N/A		10	N/A
1,1-Dichloroethane	0			1.00	0.00	N/A		10	N/A
1,1-Dichloroethylene	0			1.00	0.00	N/A		10	N/A
1,2-Dichloroethane	0			1.00	0.00	N/A		10	N/A
Bromoform	0			1.00	0.00	N/A		10	N/A
Chloroform	0			1.00	0.00	N/A		10	N/A
cis-1,2-Dichloroethylene	0			1.00	0.00	N/A		10	N/A
trans-1,2-Dichloroethylene	0			1.00	0.00	N/A		10	N/A
Cyclohexane[i]	N/A			N/A	N/A	N/A		N/A	N/A
1,2,4-Trimethylbenzene[i]	N/A			N/A	N/A	N/A		N/A	N/A
1,3,5-Trimethylbenzene[i]	N/A			N/A	N/A	N/A		N/A	N/A
Hydrogen[j]	N/A			N/A	N/A	N/A		N/A	N/A

DATA SUMMARY REPORT: HEADSPACE GAS SUMMARY DATA (Concluded)

WSPF #: RLMPURX.001

Site Project Office Letter Report #: M4T00-TRU-03-571

ADDITIONAL TARGET ANALYTE	# Samples[k]	Mean (ppmv)[k]
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A

TENTATIVELY IDENTIFIED COMPOUNDS	Maximum Observed Estimated Concentrations (ppmv)[l]	# Samples Containing TIC[l]
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A

Did the data verify the acceptable knowledge? [√] Yes [] No

If not, describe the basis for assigning the EPA Hazardous Waste Codes:

Signature of WSPF Preparer — S. W. Bisping (Printed Name) — 2/3/04 (Date)

NOTES:

[a]A total of 17 samples were collected.
[b]Mean values were calculated using one-half the method detection limit (MDL) for analytes having no detectable concentrations.
[c]N/A indicates that there were insufficient data for statistical analysis (i.e., because there was no variance in the reported analyte values, there is no standard deviation).
[d]EPA Hazardous Waste Code. No entry indicates no associated EPA Hazardous Waste Code assigned to the waste stream.
[e]Listed and toxic characteristic codes include only those that are listed in the WIPP Hazardous Waste Facility Permit.
[f]UCL_{90} and standard deviation values were calculated using detectable concentrations (J and D Flags) with at least one degree of freedom. For acetone and chloromethane, the Shapiro-Wilk method was used to determine if normality could be obtained using ln and square root transformed data. It could not, and the closest fit to normal was ln, so the UCL_{90} was obtained using ln transformed data and standard statistical techniques. To obtain the closest approximation of normally distributed data, a constant was added to both data and PRQL value before ln transformation and normality testing using the Shapiro-Wilk method and calculation of statistics for chloromethane and acetone. For methanol, statistical analysis requires at least one degree of freedom where degrees of freedom equals the number of positive detects (n) minus one. Because n - 1 = 0, an UCL_{90} could not be calculated.
[g]Data were transformed using ln and square root transforms, but according to the Shapiro-Wilk test for normality, the best fit for normality was with the raw data. Statistics were performed using the untransformed data.
[h]m-Xylene and p-xylene cannot be distinguished as a single analyte in the laboratory and are reported as such.
[i]These compounds are from the TRAMPAC and are flammable VOCs that do not appear in the QAPjP or the WIPP WAP. These are not part of the target analyte list, but samples may be analyzed for these compounds.
[j]Hydrogen will only be sampled as necessary to support aspiration criteria as shown in WMP-400, Section 7.1.7.
[k]N/A indicates no additional target analytes.
[l]No tentatively identified compounds were detected.

WIPP WASTE STREAM PROFILE FORM

DATA SUMMARY REPORT: METALS SUMMARY DATA

WSPF #: RLMPURX.001
Site Project Office Letter Report #(s): M4T00-TRU-03-571

ANALYTE	# Samples[a]	Mean[a] (mg/kg)	SD[a] (mg/kg)	UCL_{90}[a] (mg/kg)	RTL[a] (mg/kg)	EPA Code[b] (D004-11)
Arsenic	N/A	N/A	N/A	N/A	N/A	N/A
Barium	N/A	N/A	N/A	N/A	N/A	N/A
Cadmium	N/A	N/A	N/A	N/A	N/A	N/A
Chromium	N/A	N/A	N/A	N/A	N/A	N/A
Lead	N/A	N/A	N/A	N/A	N/A	N/A
Mercury	N/A	N/A	N/A	N/A	N/A	N/A
Selenium	N/A	N/A	N/A	N/A	N/A	N/A
Silver	N/A	N/A	N/A	N/A	N/A	N/A
Antimony	N/A	N/A	N/A	N/A	N/A	N/A
Beryllium	N/A	N/A	N/A	N/A	N/A	N/A
Nickel	N/A	N/A	N/A	N/A	N/A	N/A
Thallium	N/A	N/A	N/A	N/A	N/A	N/A
Vanadium	N/A	N/A	N/A	N/A	N/A	N/A
Zinc	N/A	N/A	N/A	N/A	N/A	N/A

Did the data verify the acceptable knowledge? □ Yes □ No [√]N/A

If not, describe the basis for assigning the EPA Hazardous Waste Codes.

N/A — Signature of WSPF Preparer

S. W. Bisping — Printed Name

N/A — Date

NOTES:
[a]N/A entries indicate that there is no information available. Because this is a debris waste stream, no solid sampling was performed.

[b]EPA Hazardous Waste Code. No entry indicates no associated EPA Hazardous Waste Code assigned to the waste stream.

Source: QAPjP, Table B3-8

WIPP WASTE STREAM PROFILE FORM

DATA SUMMARY REPORT: TOTAL VOC SUMMARY DATA

WSPF #: RLMPURX.001
Site Project Office Letter Report #(s): M4T00-TRU-03-571

ANALYTE	# Samples[a]	Mean[a] (mg/kg)	SD[a] (mg/kg)	UCL_{90}[a] (mg/kg)	RTL[a] (mg/kg)	EPA Code[b] (D018-40,43)
1,1-Dichloroethylene	N/A	N/A	N/A	N/A	N/A	N/A
Trans-1,2-dichloroethylene	N/A	N/A	N/A	N/A	N/A	N/A
1,2-Dichloroethane	N/A	N/A	N/A	N/A	N/A	N/A
1,4-Dichlorobenzene	N/A	N/A	N/A	N/A	N/A	N/A
Benzene	N/A	N/A	N/A	N/A	N/A	N/A
Carbon tetrachloride	N/A	N/A	N/A	N/A	N/A	N/A
Chloroform	N/A	N/A	N/A	N/A	N/A	N/A
Chlorobenzene	N/A	N/A	N/A	N/A	N/A	N/A
Methyl ethyl ketone	N/A	N/A	N/A	N/A	N/A	N/A
Pyridine	N/A	N/A	N/A	N/A	N/A	N/A
Tetrachloroethylene	N/A	N/A	N/A	N/A	N/A	N/A
Trichloroethylene	N/A	N/A	N/A	N/A	N/A	N/A
Vinyl chloride	N/A	N/A	N/A	N/A	N/A	N/A

Source: QAPjP, Table B3-4

DATA SUMMARY REPORT: TOTAL VOC SUMMARY DATA

WSPF #: RLMPURX.001
Site Project Office Letter Report #(s): M4T00-TRU-03-571

ANALYTE	# Samples[a]	Mean[a] (mg/kg)	SD[a] (mg/kg)	UCL_{90}[a] (mg/kg)	PRQL[a] (mg/kg)	EPA Code[b] (F001-5)
1,1,1-Trichloroethane	N/A	N/A	N/A	N/A	N/A	N/A
1,1,2-Trichloro-1,2,2-Trifluoroethane	N/A	N/A	N/A	N/A	N/A	N/A
1,1,2-Trichloroethane	N/A	N/A	N/A	N/A	N/A	N/A
Acetone	N/A	N/A	N/A	N/A	N/A	N/A
Benzene	N/A	N/A	N/A	N/A	N/A	N/A
Butanol	N/A	N/A	N/A	N/A	N/A	N/A
Carbon disulfide	N/A	N/A	N/A	N/A	N/A	N/A
Carbon tetrachloride	N/A	N/A	N/A	N/A	N/A	N/A
Chlorobenzene	N/A	N/A	N/A	N/A	N/A	N/A
Ethyl benzene	N/A	N/A	N/A	N/A	N/A	N/A
Ethyl ether	N/A	N/A	N/A	N/A	N/A	N/A
m-Xylene	N/A	N/A	N/A	N/A	N/A	N/A
Methanol	N/A	N/A	N/A	N/A	N/A	N/A
Methyl ethyl ketone	N/A	N/A	N/A	N/A	N/A	N/A
Methylene chloride	N/A	N/A	N/A	N/A	N/A	N/A
o-Xylene	N/A	N/A	N/A	N/A	N/A	N/A
ortho-Dichlorobenzene	N/A	N/A	N/A	N/A	N/A	N/A
p-Xylene	N/A	N/A	N/A	N/A	N/A	N/A
Pyridine	N/A	N/A	N/A	N/A	N/A	N/A
Tetrachloroethylene	N/A	N/A	N/A	N/A	N/A	N/A
Toluene	N/A	N/A	N/A	N/A	N/A	N/A
Trichloroethylene	N/A	N/A	N/A	N/A	N/A	N/A
Trichlorofluoromethane	N/A	N/A	N/A	N/A	N/A	N/A

ADDITIONAL TARGET ANALYTE	# Samples[c]	Mean (ppmv)[c]
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A

DATA SUMMARY REPORT: TOTAL VOC SUMMARY DATA

WSPF #: RLMPURX.001
Site Project Office Letter Report #(s): M4T00-TRU-03-571

TENTATIVELY IDENTIFIED COMPOUNDS	Maximum Observed Estimated Concentrations (ppmv)[d]	# Samples Containing TIC[d]
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A

Did the data verify acceptable knowledge? ☐ Yes ☐ No [√] N/A

If no, describe the basis for assigning EPA Hazardous Waste Codes.

N/A — Signature of WSPF Preparer
S. W. Bisping — Printed Name
N/A — Date

NOTES:
[a]N/A entries indicate that there is no information available. Because this is a debris waste stream, no solid sampling was performed.

[b]EPA Hazardous Waste Code. N/A indicates no associated EPA Hazardous Waste Code assigned to the waste stream.

[c]N/A indicates no additional target analytes.

[d]No tentatively identified compounds were detected.

DATA SUMMARY REPORT: TOTAL SVOC SUMMARY DATA

WSPF #: RLMPURX.001
Site Project Office Letter Report #(s): M4T00-TRU-03-571

ANALYTE	# Samples[a]	Mean[a] (mg/kg)	SD[a] (mg/kg)	UCL_{90}[a] (mg/kg)	RTL[a] (mg/kg)	EPA Codes[b] (D027-38)
1,4-Dichlorobenzene	N/A	N/A	N/A	N/A	N/A	N/A
2,4-Dinitrotoluene	N/A	N/A	N/A	N/A	N/A	N/A
Cresols	N/A	N/A	N/A	N/A	N/A	N/A
Hexachlorobenzene	N/A	N/A	N/A	N/A	N/A	N/A
Hexachloroethane	N/A	N/A	N/A	N/A	N/A	N/A
Nitrobenzene	N/A	N/A	N/A	N/A	N/A	N/A
Pentachlorophenol	N/A	N/A	N/A	N/A	N/A	N/A
Pyridine	N/A	N/A	N/A	N/A	N/A	N/A
2,4-Dinitrophenol[c]	N/A	N/A	N/A	N/A	N/A	N/A
Aroclor 1016[c]	N/A	N/A	N/A	N/A	N/A	N/A
Aroclor 1221[c]	N/A	N/A	N/A	N/A	N/A	N/A
Aroclor 1232[c]	N/A	N/A	N/A	N/A	N/A	N/A
Aroclor 1242[c]	N/A	N/A	N/A	N/A	N/A	N/A
Aroclor 1248[c]	N/A	N/A	N/A	N/A	N/A	N/A
Aroclor 1254[c]	N/A	N/A	N/A	N/A	N/A	N/A
Aroclor 1260[c]	N/A	N/A	N/A	N/A	N/A	N/A
ortho-Dichlorobenzene	N/A	N/A	N/A	N/A	N/A	N/A
Cresols	N/A	N/A	N/A	N/A	N/A	N/A
Nitrobenzene	N/A	N/A	N/A	N/A	N/A	N/A

TARGET ANALYTE	# Samples[d]	Mean (ppmv)[d]
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A

Source: QAPjP, Table B3-6

DATA SUMMARY REPORT: TOTAL SVOC SUMMARY DATA

WSPF #: RLMPURX.001
Site Project Office Letter Report #(s): M4T00-TRU-03-571

TENTATIVELY IDENTIFIED COMPOUNDS	Maximum Observed Estimated Concentrations (ppmv)[e]	# Samples Containing TIC[e]
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A

Did the data verify acceptable knowledge? ☐ Yes ☐ No [√] N/A

If no, describe the basis for assigning EPA Hazardous Waste Codes.

N/A — Signature of WSPF Preparer

S. W. Bisping — Printed Name

N/A — Date

NOTES:

[a]N/A entries indicate that there is no information available. Because this is a debris waste stream, no solid sampling was performed.

[b]EPA Hazardous Waste Code. N/A indicates no associated EPA Hazardous Waste Code assigned to the waste stream.

[c]Transformer oils containing PCBs have been identified in a limited number of waste streams included in the organic sludges waste matrix code (S3200). Therefore, only waste streams included in the solidified organics final waste form or other waste forms where AK indicates the PCB potential shall be analyzed for PCBs.

[d]N/A indicates no additional target analytes.

[e]N/A indicates no tentatively identified compounds were detected.

RLMPURX.001 CONTAINER IDENTIFICATION NUMBER (CIN)/BATCH DATA REPORT CORRELATION

WSPF #: RLMPURX.001
Site Project Office Letter Report #(s): M4T00-TRU-03-571

CIN	Repackaged CIN	NDE Batch Data Report No.	NDA Batch Data Report No.	Headspace Gas Batch Data Report No.
9400066	N/A	WR-TB-2001-30	WR-TB-2001-38	WSCF-031006BR0
9601845	N/A	WR-TB-2001-83	WR-TB-2001-85	WSCF-031006BR0
9700394	N/A	WR-TB-2001-83	WR-TB-2001-85	WSCF-031006BR0
RH-A-87-058	0002431	WR-TB-2001-73	WR-TB-2003-76	WSCF-031006BR0
RH-A-88-022	0002482	WR-TB-2001-75	WR-TB-2001-79	WSCF-031006BR0
RH-A-89-106	N/A	WR-TB-2001-81	WR-TB-2001-84	WSCF-031006BR0
RH-A-90-004	N/A	WR-TB-2001-81	WR-TB-2001-84	WSCF-031006BR0
RH-A-90-019	N/A	WR-TB-2001-57	WR-TB-2001-62	WSCF-031006BR0
RH-A-90-022	N/A	WR-TB-2001-81	WR-TB-2001-84	WSCF-031006BR0
RH-A-90-102	N/A	WR-TB-2001-83	WR-TB-2001-85	WSCF-031006BR0
RH-A-90-104	N/A	WR-TB-2001-57	WR-TB-2001-62	WSCF-031006BR0
RH-A-90-108	N/A	WR-TB-2001-57	WR-TB-2001-62	WSCF-031006BR0
RH-A-91-004	N/A	WR-TB-2001-81	WR-TB-2001-84	WSCF-031006BR0
RH-A-91-008	N/A	WR-TB-2001-81	WR-TB-2001-84	WSCF-031006BR0
RH-A-92-002	N/A	WR-TB-2001-83	WR-TB-2001-85	WSCF-031006BR0
RH-A-92-005	N/A	WR-TB-2001-83	WR-TB-2001-85	WSCF-031006BR0
RH-A-92-101	N/A	WR-TB-2001-83	WR-TB-2001-85	WSCF-031006BR0

WIPP WASTE STREAM PROFILE FORM

ACCEPTABLE KNOWLEDGE WASTE STREAM SUMMARY

WSPF #: RLMPURX.001

M4T00-TRU-03-574, Acceptable Knowledge Waste Stream Summary Form for WSPF# RLMPURX.001 (attached).

ACCEPTABLE KNOWLEDGE WASTE STREAM SUMMARY FORM

Site: Hanford

Waste Stream Profile #: RLMPURX.001

Waste Stream Name/Waste Stream Lot Number: MPUREXD

Waste Stream/Waste Stream Lot Number: MPUREXD

Generator Site: 200 West Area, Plutonium Uranium Extraction Plant (PUREX)

Waste Stream Generation Building(s): 202-A and 202-AL Buildings

Waste Stream Volume: 600 m^3 (approximately 2885 55-gal. drums)

Waste Stream Generation Time Period: 1970 - Present

TRUCON Codes: RH125/RH225A, RH125/RH225B, RH125/RH225C, RH125/RH225D, RH125/RH225E, RH125/RH225F, RH125/RH225G, RH125/RH225H, RH125/225I, RH125/225J, RH125/225K, RH125/225L, RH125/225M, RH125/225N, RH125/225P, RH125/225Q, RH125/225R, RH125/225S, RH125/225T, RH125/225U, RH125/225V, RH125/225W, RH125/225X, RH125/225Y, RH125/225Z, RH125/225AA, RH125/225AB, RH125/225AC, RH125/225AD, RH125/225AE, RH125/225AF, RH125/225AG, RH125/225AL, RH125/225AM

WIPP Identification Number(s): RLMPURX.001

Summary Category Group: S5000

Waste Matrix Code Group: Heterogeneous Debris Waste

Waste Matrix Code: Heterogeneous Debris (S5490)

Waste Description:

This mixed transuranic (TRU) debris waste was generated from areas within the Plutonium Uranium Extraction Plant (PUREX) facility (i.e., A Plant, 202-A Building) during housekeeping, cleanout, and maintenance in support of plutonium-based process operations, stabilization, decontamination, and deactivation. The debris wastes were generated from the product loadout areas (e.g., N and Q cells, Product Removal Room), processing areas, (i.e., L cell, M cell), hot shop area, and analytical laboratory (202-AL) area within the PUREX facility. The wastes consist of general trash such as spent equipment, tools, glass bottles and other glassware, waste rags, paper, cardboard, rubber gloves, cartons, beakers, vials, polyjars, and bags. Waste containers were not packaged with the intent to segregate specific waste materials (i.e., containers with 100% plastic, paper, or metal). TRU mixed wastes from these activities were

combined into a single waste stream because the maintenance and operations activities that generated the waste were identical for all the areas in the PUREX facility.

All waste containers in this waste stream were generated from similar activities within the PUREX facility. Waste in these containers is similar in material, physical form, and hazardous constituents and is therefore considered a single waste stream.

TRU Waste Management

Transuranic (TRU) waste management at the PUREX included activities such as segregation (e.g., mixed versus non-mixed), packaging and handling, characterization, and storage. The wastes were generated primarily in the 202-A Building (Canyon Building). In the glove boxes, operations personnel sorted the waste, making certain that prohibited items were segregated from the waste. Also, personnel used procedures to segregate non-mixed TRU waste from mixed TRU waste. Once the determination was made, an operator placed the like (e.g., all non-mixed or all mixed) waste materials into plastic seal out bags [HNF-7355].

Segregation of waste into mixed and non-mixed waste streams at Hanford began on October 31, 1985. Although packaging procedures prior to that date were reviewed to document the segregation of wastes during packaging, the October 31, 1985 date will be used to establish the start date for non-mixed waste generation. Accordingly, any debris waste generated subsequent to that date was segregated into mixed or non-mixed debris waste at the point of generation using facility-specific procedures. All PUREX debris wastes packaged prior to the October 31, 1985 date will be designated as mixed waste due to the hazardous materials used during processing. The process has not changed during the time of waste generation.

PUREX personnel used administrative and operating procedures to ensure minimum amounts of waste material became transuranic mixed waste. Procedures also gave direction to personnel to perform activities that reduced the likelihood of waste becoming mixed waste. Techniques used by PUREX personnel to minimize wastes generated and to prevent mixing of waste included the following [HNF-7355]:

- Waste items containing residual free liquids were drained to remove as much liquid as possible (liquids were recycled to the PUREX process stream). A quantity of absorbent material (e.g., diatomaceous earth, kitty litter, universal polypropylene absorbent), sufficient to absorb at least twice the potential volume of residual liquid present, was added to the packaging. Liquids in sample bottles and other laboratory equipment were removed by vacuum slurping in accordance with operating procedures. The plutonium concentration in removed liquids was determined, and if found to be below the economic discard limit (EDL) the liquid was transferred to tank storage. If found to be above the EDL, the liquids were returned to the process for recovery of the plutonium. This practice was used for both mixed and non-mixed wastes.

- All plutonium and neptunium contaminated vials, bottles, plastic, paper or other waste were separated from fission product contaminated waste.

- Waste that contacted hazardous materials or process solutions (i.e., nitric acid) was segregated and designated as radioactive mixed waste. In case of a spill, the chemicals

were cleaned up with water-soaked rags and absorbents. The contaminated area would then be cleaned. The rags and absorbents were managed as mixed waste (TRU or low-level).

- In the Analytical Laboratory, materials that were used to prepare samples (e.g., pipettes) were disposed of as mixed waste. Empty sample containers were rinsed once with nitric acid and twice with water. Absorbent material was added to empty sample containers to absorb residual liquids and the containers managed as mixed waste. In the event of a chemical spill, acid soaked rags were rinsed thoroughly with water and wrung out per operating procedures prior to disposal and managed as mixed waste.

- All sampling and laboratory equipment decontamination work was performed in the hood located in Room 52 of the PUREX Laboratory. All alpha contaminated equipment was washed separately from beta and gamma contaminated equipment.

- In waste packaging, limitations were applied to the contents of the waste container. Corrosive, ignitable, reactive, explosive, pyrophoric, and oxidizing wastes were prohibited. Free liquids, un-vented gas cylinders, and acid or caustic soaked rags were also prohibited. No free liquids or absorbed organics were placed in the drum. If any free liquid was suspected, it was absorbed with sufficient approved absorbent (e.g., diatomaceous earth, kitty litter, universal polypropylene absorbent) to absorb twice the volume of possible liquid. An absorbent/caustic package (consisting of 50 grams of sodium hydroxide and 950 grams of diatomaceous earth) was added during packaging to neutralize and absorb any remaining liquid.

- Failed equipment to be discarded was thoroughly flushed to remove fissile material. Items with contamination that could easily become airborne were contained within a package before being placed in a waste container.

- Process equipment, piping, fittings and the tools used to maintain the equipment were designated as mixed waste when contaminated with nitric acid solution. The process equipment in this waste either contains hazardous elements or came into contact with process chemicals and was thus designated as mixed waste.

- Personal protective equipment (PPE) such as surgeon's gloves, coveralls, booties, and cloth tape were used for glove box work or in the event of a spill cleanup. Personnel manipulated equipment with the use of glove box gloves, so the PPE was not normally exposed to chemical or the radionuclide contamination. If PPE was chemically contaminated, the PPE was segregated and designated as radioactive mixed waste.

Most of the waste consists of materials (e.g., plastic bags and paper "ice cream" cartons) used to place tools and equipment into the glove boxes for process activities, contamination control, routine activities, housekeeping, maintenance, and deactivation. Materials used in contamination control (for example, dry and water-soaked rags) and during routine and non-routine activities were placed into waste containers after use. Analytical tools, equipment and materials such as paper cartons and plastic bags were left in the glove boxes until housekeeping was performed.

Acid-soaked or oxidizer-soaked materials or equipment were thoroughly rinsed with water at least three times, dried, and separately bagged [HNF-7355].

The PUREX Analytical Laboratory performed analyses primarily of liquid samples for plutonium content, fission product content, impurity determinations, chemical makeup, visual appearance, and various product control parameters, such as acidity, nitrite, and fluoride content. Laboratory sink drainage was collected in one of two 8,000 gal. stainless steel tanks, sampled, made alkaline, and jetted to underground storage for eventual evaporation in the 242-A Waste Concentrator. Radioactive liquid wastes that accumulated in the decontamination room receiving and slurping hoods were routed to the acid waste accumulation tank in the back-cycle waste system. These liquid wastes are not part of this waste stream [HNF-6899].

Chemicals used in the plutonium recovery process were recycled back into the dissolution and extraction process. For some chemicals, such as nitric acid and tributyl phosphate, this was due to the high cost of the chemicals in the amounts used. Other chemicals were analyzed for plutonium content and, if determined to be above the economic discard limit (EDL), were recycled back through the process. Chemicals that analyzed below the EDL were sent to the tank farms for storage and eventual disposal.

Transuranic Waste Baseline Inventory Report

In accordance with the description listed in the Transuranic Waste Baseline Inventory Report (TWBIR), the stream contains plastic/polyurethane, metal/iron/galvanized/sheet, rubber, stainless steel, cloth/rags/nylon, lead, glass, wood/lumber/plywood, paper/cardboard, and hazardous constituents [HNF-7355]. The applicable WIPP TWBIR numbers are RL-W291, RL-W293, RL-W294, RL-W297, RL-W298, RL-W300, and RL-W414. This includes waste currently in retrievable storage. The waste was generated from facility and equipment operation, D&D, analytical laboratory operations, remediation, and maintenance activities. Based on recent operational experience and current hazardous waste designation policy for retrieved debris wastes at Hanford, it is anticipated that a portion of the waste stream currently identified in the TWBIR as non-mixed PUREX debris will be re-designated as mixed debris; therefore, a projected volume of approximately 600 m^3 is anticipated for this waste stream. A corresponding reduction in the TWBIR non-mixed PUREX debris waste stream can be expected.

Waste Matrix Codes

In accordance with the "DOE Waste Treatability Group Guidance" [DOE/LLW-217], this waste stream is defined as a Summary Category Group S5000 Debris Waste. The Waste Matrix Code Group is Heterogeneous Debris Waste, and the Waste Matrix Code that best fits the description of the waste stream is Heterogeneous Debris (S5490) [HNF-7355]. This definition is in accordance with the Waste Analysis Plan (WAP - Attachment B) of the Waste Isolation Pilot Plant (WIPP) Final Hazardous Waste Permit, EPA No. NM4890139088. In accordance with the WIPP WAP, debris is defined as solid material exceeding 2.36 inches (60 millimeters) particle size that is intended for disposal and that is:

- a manufactured object, or
- plant or animal matter, or
- natural geologic material.

Particles smaller than 2.36 inches in size may be considered debris if the debris is a manufactured object and if it is not a homogeneous solids (S3000) or soils/gravel material (S4000). If at least 50% of a waste stream is debris, then the entire waste stream can be classified as debris waste (S5000).

The S5000 Debris Waste classification is appropriate for MPUREXD waste based on the following [M4T00-TRU-03-571]:

- The waste consists of general trash such as unusable equipment, tools, glass bottles, rags, gloves, and used material handling items such as cartons, beakers, vials, plastic jars and bags. These items are manufactured objects.

- The majority of waste items exceed 2.36 inches in size.

- Some individual waste items contained in some of the waste containers may meet the definition of either homogeneous waste and/or soil/gravel. However, the drums containing such items primarily contain debris waste materials and the designation as debris waste is appropriate.

Waste Material Parameters

Based on a review of Solid Waste Storage/Disposal Records, PUREX waste management practices, operating procedures, and nondestructive examination results, the following waste material parameters are expected in this waste stream [HNF-7355]:

- Ferrous Metals: tools and scraps remaining after maintenance activities, spent equipment (e.g., ball valves, brackets, pumps, nuts & bolts, pipes), wide variety of stainless steel items including tools and process filters.

- Non-ferrous Metals/Alloys: lead lined gloves, platinum tip tweezers, fluorescent light tubes (cadmium, barium, mercury, silver).

- Other Inorganic Materials:
  - Glass: fluorescent light tubes, light bulbs, laboratory equipment (e.g., beaker, bottles, pipettes)
  - Pyrex: dish, pipe
  - Diatomaceous earth (used in the waste packaging of all drums).

- Cellulosics:
  - Paper: hoods, cardboard and "ice cream" cartons to place tools in the glove boxes at the glove box seal out and hood areas
  - Cloth: rags, massillons, laundry bag, towels, tape
  - Wood: hand tool handles, stick rulers, HEPA filter frames
  - Filter media: HEPA filters, rock stoppers (glass-wool roughing filters used in front of all HEPA filters).

- Rubber: washers, O-rings, glovebox gloves (leaded and hypalon), boots.

- Plastics (waste material and packaging materials): used to bag out glove box waste, load equipment and tools into glove boxes, for contamination control during and after bagging out waste, empty bags, poly jars, and bottles, and anti-corrosive rad pad (polypropylene) used in the waste packaging of all waste drums.

Waste Packaging

PUREX debris waste was sealed out, handled, and packaged in accordance with the procedure "Handle Transuranic (TRU) and Transuranic Mixed (TRU-MW)" (PO-100-100). Revisions of this procedure were retrieved and evaluated to determine criteria changes. In each revision of the seal out procedure, the TRU waste packaging criteria required the absence of free liquids, pyrophoric materials, and pressurized containers. In each of the revisions of the packaging and handling procedures, the criteria were virtually the same. There were no significant differences among the revisions of any of the procedures that would affect the compliance of the waste for the Waste Receiving and Packaging Facility (WRAP) or WIPP acceptance requirements [HNF-7355].

Operating procedures controlled the preparation, seal-out, and placement of glove box waste into 55-gallon drums. TRU glove box waste objects were packaged by first padding sharp corners and edges with excess plastic and tape and enclosing each item a minimum of 4 mil of plastic. Equipment to be discarded that had contact with nitric acid solution was treated as TRU waste. All vials or containers associated with L9, L11, or M-Cell samples after slurping (i.e., vacuum removal of contents) were also considered TRU mixed waste. Water dampened rags and towels were placed on drying bars and were not packaged until dry [HNF-7355].

The waste was packaged in Contact Handled Waste Acceptance Criteria compliant waste drums. The drums meet U.S. Department of Transportation specification 17C or UN1A2. Drums were prepared by first placing an anti-corrosive rad pad in the bottom of the drum. Then a 10-mil nylon reinforced plastic liner was placed in the drum. Next, a minimum of 3 liters of diatomaceous earth or universal absorbent was added to the bottom of the liner. Individual items for disposal were placed into seal out bags, operators then horsetailed (tightly twisted) the seal out bags, placed tape on the neck between the glove boxes and the bags, and severed the necks of the bags to remove the wastes from the glove boxes. The sealed package was then placed into a second clean plastic bag and sealed by horsetailing. The seal out bags were then assayed for plutonium content and placed in 55-gal drums. When filled to within 8-in. of the top, the drum liner was carefully horsetailed with duct tape [HNF-7355].

The PUREX during the early 1990s started recording the layers of confinement on contents inventory sheets. The contents inventory sheets for this waste stream have been reviewed. The number of layers of confinement that appears the most is 3. However, it is unclear as to whether the definition of a layer of confinement was the same during that time period as it is today. This uncertainty is the result of a discovery during the visual examination of 3 drums with one package in each that had 5 layers of confinement. To be conservative, all of the containers for this waste stream have been identified as having 5 layers of confinement.

The plutonium content, Pu-239 fissile gram equivalent content, Pu-239 equivalent curies, TRU activity, and total alpha curie loading of all CH-TRU waste generated was determined by Non-Destructive Assay (NDA). Waste items placed in drums were individually assayed using the Segmented Gamma Scan Assay System [HNF-7355].

Exclusion of Prohibited Items

All containers in this waste stream certified under waste stream profile RLMPURX.001 are packaged in accordance with facility-specific procedure PO-100-100. Radiography has been performed to confirm that this waste stream does not contain any of the following prohibited items:

- Liquids
- Corrosives
- Reactives
- Ignitables
- Pyrophorics
- Compressed gases
- Sealed containers > 4 L
- Pressurized containers
- Non-mixed hazardous wastes
- Incompatible wastes

Visual examination has been performed on a statistically selected population of S5000 waste as a quality control check of radiography.

Waste Generating Process

The PUREX facility is located in the southeast corner of the 200 East Area in the center of the 560-square-mile Hanford Site in southeastern Washington State. The PUREX facility is a complex of several buildings and support facilities. A detailed map of the facility is given in Figure A-1.

The PUREX facility was constructed in 1954 and 1955 and began operations in early 1956 to process irradiated fuel elements for separation and recovery of uranium, plutonium, and neptunium [HNF-6899]. Major facilities in 200 East Area include: the PUREX facility; the Waste Fractionization and Encapsulation Plant (221-B and 225-B Buildings), where strontium and cesium were separated from processing wastes and encapsulated; and the Waste Evaporator-Crystallizer (242-A-Building), used for dehydration of liquid radioactive waste [HNF-6899].

TRU debris waste was produced in the product loadout areas including the PR room and Q and N cells. Debris waste was also generated in the hot shop (i.e., support and maintenance activities), L cell, and M cell. Debris waste was also generated by the Analytical Laboratory in the form of contaminated equipment, glassware, waste rags, paper, cardboard, and rubber gloves [HNF-6899].

This section presents a general description of the buildings and other facilities constituting the PUREX facility with emphasis on architecture, general equipment layout, and utility services. The discussion is limited to those facilities and/or rooms in which TRU wastes were generated.

202-A Building

The 202-A Building, in which the fuels were reprocessed, is a reinforced concrete structure 1,005 feet long, 119 feet wide at its maximum, and 100 feet high, with about 40 feet of this height below grade. It consists of three main structural components: (a) a thick-walled, concrete canyon in which the equipment for radioactive processing is contained in cells below grade; (b) a pipe sample and storage gallery section; and (c) a steel and transite annex that houses offices, process control rooms, laboratories, and the building services. The basic features and arrangement are shown by vertical cross section and plan views in Figures A-2 and A-3, respectively. A cutaway view of the 202-A building is presented in Figure A-4 [HNF-6899].

The portion of the canyon below grade is subdivided into a row of process equipment cells paralleled by a ventilation air tunnel and pipe tunnel through which intercell solution transfers were made. The air tunnel exhausts the ventilation air from the cells to the main ventilation filters and stack. The canyon contains a single row of 12 process cells, 813 feet long overall. The cells run east and west with each cell 14 feet wide and 39.5 feet deep; lengths of the cells vary depending on function. The functions of the individual cells included [HNF-6899]:

- Cells A, B, and C (the first three cells from east to west): chemical decladding and dissolution of fuels
- Cells D and E: preparation of the metal solution feed for the solvent extraction columns
- F Cell: recovery of nitric acid used in the process
- G Cell: washing and preparation for use of the spent process organic solvent
- H, J, K, and L Cells: solvent extraction processing steps using non-paraffin hydrocarbon (a nonhalogenated organic compound)
- M Cell: contaminated equipment storage and decontamination.

At the east end of the canyon is the basin where irradiated fuel was stored either dry or under water. Casks containing the fuel were brought into the canyon through a railroad tunnel running north and south on the west side of the storage basin. The tunnel, which was also the route for removing and delivering process equipment, connects to a railroad spur outside the 202-A Building [HNF-6899].

Product Removal Room

The Product Removal (PR) Room was used for filling shipping containers with plutonium nitrate solution and is located at the west end of the storage gallery adjacent to L Cell. This room is 41-feet long and 19.5-feet wide, and contains two plutonium sampler tanks and a receiver tank shielded from the working area by concrete walls. The receiver tank (TH-11) was used to collect various plutonium solutions for rework [HNF-6899].

The container loading facilities and decontamination equipment are located inside enclosures made of stainless steel panels containing glass windows. The equipment within the enclosures was operated from outside by extension handles on the valves. An overhead electric-powered hoist was used for handling the product containers and for weighing and placing them in jackets before shipment and storage [HNF-6899].

N Cell

The Plutonium Oxide Production Facility, better know as N Cell, was designed to convert plutonium nitrate solution to plutonium dioxide (PuO_2). The facility also had the capability to blend and package the oxide in sealed cans for onsite shipment to the Plutonium Finishing Plant (PFP). The process for conversion of the plutonium nitrate to PuO_2 and the packaging of the powder was conducted in several separate gloveboxes [HNF-6899].

The plutonium nitrate entered the plutonium conversion facility from the M Cell vault storage tanks through Glovebox N7 where the pumps, samplers, and valves for the storage tanks are located. The solution from the M Cell feed tanks was batch transferred to a feed tank in glovebox N2C. The feed solution was transferred from the feed tank to gloveboxes N1A and N2A where pre-reduction and feed preparations were performed. The feed was then transferred to the N3 glovebox where it was mixed with oxalic acid to form plutonium oxalate precipitate. The wet plutonium oxalate crystals were filtered out and then thermally decomposed to plutonium dioxide in the first stage calciner. The filtrate was routed back to the N1A and N2A gloveboxes for oxalate destruction. The second stage calciner, located below the first stage calciner, completed the conversion of the plutonium nitrate to plutonium oxide [HNF-6899].

At the end of the second stage calciner, the product flowed through a scalper, which screened the oxide to remove larger particulates for recycle. The oxide flowed from the scalper into one of the two double cone blenders that were used to ensure batch consistency. The blenders were moved into one of three stations in the glovebox, which were used to either fill the blender with oxide, rotate the blender to mix the material, or unload the blender. At the unloading station, the blender contents were loaded into slip lid cans. The loaded cans were placed into a conveyer and sent into the packaging gloveboxes where the cans were weighed, sealed in plastic, and repackaged into secondary cans. The N1B and N2B gloveboxes were used for the off-gas system equipment and the N6 glovebox was used to rework scrap material. The N3 glovebox is connected directly to glovebox N4. The process gloveboxes include the N4, primary loadout and secondary loadout gloveboxes [HNF-6899].

Q Cell

The neptunium purification facility, known as Q Cell, is located in the west end of the storage gallery adjacent to the east wall of the PR room. Q Cell includes a control room, a shielded hot cell, a maintenance room with shielded access gloveboxes, a product loadout room, and the Aqueous Makeup Unit (AMU) area. The AMU area is on a separate floor above the control room and was used to prepare the process feed chemicals [HNF-6899].

Analytical Laboratory

The PUREX analytical and control laboratory, located in the western end of the east service annex, is 144 feet long and 34 feet high. The first floor, containing the laboratory work area and lunch and change rooms, is on the same level as the pipe and operating gallery. The floor and

walls of the first floor are made of reinforced concrete for radiation shielding. The second floor, which houses the ventilation equipment and service piping, has transite walls [HNF-6899].

During PUREX process operation, the laboratory workload was about 10,000 samples per month. Most process control samples were liquid. The types of analyses performed on liquid samples included plutonium content, fission product content, various impurity determinations, chemical makeup analyses, visual appearance and measurements of various process control parameters such as acidity, nitrite and fluoride. A small number of solid samples were analyzed. Packaged solid waste from the laboratory was stored in a small rectangular vault located at the end of the corridor leading to Loading Dock 5. The vault has eight inch-thick concrete walls, and contains a lead box with 5-inch-thick walls. The highly radioactive solid wastes were stored in the lead box, while the less radioactive wastes were stored outside the box on the floor of the concrete vault [HNF-6899].

RCRA Hazardous Waste

The mixed TRU waste stream described in this document is regulated by both the U.S. Environmental Protection Agency (EPA), under the Resource Conservation and Recovery Act (RCRA), and the state of Washington. The waste exhibits EPA toxic characteristics and is designated as Washington state toxic, solid corrosive, and persistent waste. The following section describes the hazardous waste numbers and codes applied to the PUREX mixed debris waste under these requirements.

No RCRA-listed chemicals were used in the PUREX process; however, equipment and items that contacted process solutions were segregated and disposed of as mixed waste because of the potential presence of RCRA metals contamination. Laboratory equipment used for analyzing samples were triple rinsed, as described in the TRU Waste Management section, and were also disposed of as mixed waste.

Characteristic of Ignitability

Based on process knowledge, TRU waste management history and EPA guidance, the Hanford MPUREXD waste stream does not meet the definition of ignitability as defined in 40 CFR 261.21 [HNF-6900]. The materials are not liquid, as confirmed by radiography. This material will not cause fire through friction, absorption of moisture, or spontaneous chemical changes. This material is not a compressed gas as defined in 49 CFR 173.151. This material is not an oxidizer as defined in 49 CFR 173.300. The materials in this waste stream are therefore not ignitable wastes (D001).

Characteristic of Corrosivity

This mixed debris waste stream does not exhibit the characteristics of corrosivity as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR Part 261.22. Additionally, this waste stream does not present a compatibility problem (HNF-7355). The materials are not liquid and radiography is used to ensure liquids are not present in the containers. The materials in this waste stream are therefore not corrosive wastes (D002).

Characteristic of Reactivity

Based on process knowledge, TRU waste management history and EPA guidance, the Hanford MPUREXD waste stream does not meet the definition of reactivity as defined in 40 CFR 261.23

[HNF-6900]. Based on experience with the materials at Hanford, the materials are stable and will not undergo violent chemical change. The materials will not react violently with water, form potentially explosive mixtures with water, or generate toxic gases, vapors, or fumes when mixed with water. The materials do not contain cyanides or sulfides, and are not capable of detonation or explosive reaction. The materials in this waste stream are therefore not reactive wastes (D003).

Toxicity Characteristic

EPA toxicity characteristic hazardous waste numbers have been applied to this waste stream based on acceptable knowledge (AK). Application of these hazardous waste numbers originates from historical and current waste designations made at Hanford based on the waste items present in the waste. The toxicity characteristic waste numbers applied to this waste stream are listed below with examples of the waste items that have resulted in the waste designations (HNF-7355):

- D005 (barium) - fluorescent light tubes
- D006 (cadmium) - fluorescent light tubes
- D008 (lead) - light bulbs, leaded gloves, leaded cans
- D009 (mercury) - fluorescent light tubes, alkaline batteries, mercury thermometers
- D011 (silver) - alkaline batteries

In certain cases, such as barium and cadmium from fluorescent light tubes and silver in alkaline batteries, the data did not indicate the toxicity characteristic for these constituents. However, Hanford proclaimed these items hazardous as a conservative measure in accordance with waste designation practices at the time of generation.

Listed Waste Codes

The mixed PUREX debris waste stream material is not, or was not mixed with, a waste listed in 40 CFR 261, Subpart D as a hazardous waste from non-specific sources (40 CFR 261.31), as a hazardous waste from specific sources (40 CFR 261.32), or as a discarded commercial chemical product (e.g., U134 hydrofluoric acid), an off-specification species, a container residue, or a spill residue thereof (40 CFR 261.33). Because halogenated solvents were not used during plutonium extraction at PUREX, no halogenated solvents are present in the waste and listed waste codes associated with these solvents are not assigned. Materials used in spill cleanup were allowed to dry and were disposed of as mixed waste, and the appropriate toxicity characteristic codes have been assigned.

Beryllium may be present in the waste matrix in trace amounts (i.e., μg Be/g Pu quantities) that will be less than 0.01 percent by weight. However, the beryllium is not an unused commercial chemical product and is therefore not a P015-listed waste. Therefore, containers from this waste stream are not a listed hazardous waste and the P, U, K, and F codes do not apply.

Washington State Toxic and Dangerous Waste Determination

Under Washington state Administrative Code (WAC) Chapter 173-303, state-only dangerous and toxic waste codes include WSC2 (solid corrosive), WT01 and WT02 (toxic), and WP01 and WP02 (persistent). These Washington state codes are applied to chemicals (e.g., non-regulated

paint) that may not exhibit RCRA waste codes, but have been determined by the state of Washington to present a hazard in concentrations that warrant state regulation.

Washington State Toxic
WAC 173-303-100(5) describes the approach for evaluating toxic constituents to determine whether the code for a Washington state toxic waste should be assigned to the waste. This approach uses a formula that considers the sum of the dose concentrations associated with the various constituents in the waste.

Although concentration information for specific contaminants is not available, waste items in this waste stream include dry cell batteries and fluorescent light tubes. Conservatively, based on the presence of various metals, particularly cadmium, lead, and mercury, in these items, the Washington state codes for WT01 and WT02 are applied to the PUREX mixed TRU debris waste.

Washington State Dangerous
The waste items present in this waste stream include dry cell batteries and sodium hydroxide pellets. The Washington state waste code used to identify solid corrosive waste materials is WSC2. According to the WAC Dangerous Waste Regulations, Chapter 173-303, WSC2 is a solid or semi-solid that when mixed with an equal weight of water results in a solution, the liquid portion of which has a pH less than or equal to 2, or greater than or equal to 12.5. This is different than D002 as defined under RCRA (40 CFR 261.22) as the RCRA definition applies only to liquid corrosive wastes. Because the WSC2 code applies to solid or semi-solid materials, it is applicable to this waste stream.

Historically, the Washington state codes for persistent toxics, WP01 and WP02, have been assigned to this waste stream. Because of this, and because the wastes have been (and continue to be) managed in accordance with this designation, the MPUREXD waste stream will retain this designation.

Toxic Substances Control Act-Regulated Waste

This waste stream does not contain polychlorinated biphenyl (PCB) constituents. PUREX facility personnel identified components and their respective locations that could possibly contain PCB contamination. None of the items listed in that inventory were located in areas where TRU waste was generated. PCB-bearing materials such as transformers and hydraulic fluids are not contained within this waste stream [HNF-7355].

Although it is likely that asbestos is present in the buildings in which this material was processed, there is no indication that asbestos was used in the processing or was added to the material during processing.

Radionuclides

The TRU waste elements in the PUREX process streams included neptunium, plutonium, and americium. Beginning in 1956, the PUREX facility produced weapons grade plutonium with a Pu-240 weight percentage 6% or less. In addition, the PUREX facility processed fuel grade material from the Hanford production reactors (primarily the N Reactor) with varying

concentrations of Pu-240 from 12% to 27% for defense research and development (e.g., breeder reactor research), but most fuel grade plutonium material was 12% [HNF-7355].

Plutonium product specifications allowed for elemental impurity concentrations from between 50 and 500 ppm. These trace elements include americium, calcium, carbon, iron, nickel, neptunium, thorium and uranium. Cesium also could be present as both a trace impurity of the plutonium product or as environmental contamination. Other radionuclides expected in trace quantities in this waste stream are strontium-90 (Sr-90), uranium-233 (U-233), uranium-234 (U-234), uranium-235 (U-235), and uranium-238 (U-238) [HNF-7355].

Additional AK was obtained for strontium-90 and uranium-234 to comply with Contact-Handled Waste Acceptance Criteria requirements. Acceptable knowledge was needed to quantify the amount of Sr-90 and U-234 expected in the waste stream. Scaling factors were determined or developed using historical data [HNF-7355]. The scaling factors for the following activity relationships are as follows [M4T00-PJC-02-076, M4T00-PJC-02-077]:

- U-234/U-235 $\simeq$ 30
- U-234/U-238 $\simeq$ 2
- Cs-137/Sr-90 $\simeq$ 1.1

After packaging and prior to placement in storage, the waste containers were radioassayed. Table 1 shows the approximate isotopic compositions of typical plutonium products from N Reactor [HNF-7355]. The radionuclides associated with this waste are listed in Table 2 [HNF-7355].

Table 1. Approximate Compositions of Typical Plutonium Products from N Reactor.

Isotope	Concentration (wt%)[a]		
	6	9	12
Pu-238	0.01	0.03	0.1
Pu-239	93.2	89.3	85.0
Pu-240	6.0	9.0	12.0
Pu-241[b]	0.76	1.62	2.6
Pu-242	0.03	0.10	0.2
Am-241[c]	0.01	0.02	0.05

Note: totals do not add to 100% due to rounding.
[a] The headings 6, 9, and 12 designate products by nominal Pu-240 concentration.
[b] A beta emitter; all other isotopes are alpha emitters.
[c] Typical values—Am-241 forms from decay of Pu-240; therefore, amount present varies depending upon the age since separation and purification.

Table 2. Radionuclides Present

Radionuclide	Suspected Present? (Y/N)
Sr-90	Y[a]
Cs-137	Y[a]
Np-237[b]	Y
U-233	Y
U-234	Y[a]
U-235	Y[a]
U-238	Y[a]
Pu-238	Y
Pu-239	Y
Pu-240	Y
Pu-241	Y
Pu-242	Y
Am-241	Y
Unexpected Radionuclides	None

[a]Ratios have been determined using historical data.

[b] Np-237 is a decay product of Am-241; therefore, there may be trace quantities in the waste stream.

Defense Waste Determination

The Department of Energy (DOE) and its predecessor agencies were engaged in a broad range of activities that fall under the heading of atomic energy defense activities. These activities include:

- Naval reactors development
- Weapons activities, including defense inertial confinement fusion
- Verification and control technology
- Defense nuclear materials production
- Defense nuclear waste and materials by-product management
- Defense nuclear materials security and safeguards and security investigations
- Defense research and development

A review of acceptable knowledge reference sources [HNF-3461 and HNF-6899] indicates that this waste stream is the result of weapons activities. The PUREX product stream was used to produce plutonium metal and plutonium oxides to support national defense activities. The PUREX received aluminum-clad uranium metal fuel and zirconium alloy clad fuel from Hanford production reactors to reprocess to recover weapons-grade and fuels-grade plutonium. Feed material processed at PUREX during the 1980s consisted primarily of fuel irradiated in the Hanford N Reactor. Plutonium separation and recovery for defense purposes continued until the final stabilization run in 1990, after which the PUREX facility was deactivated. The source of

the PUREX feed from the DOE production reactors, and use of the recovered plutonium for defense purposes, allows the resulting waste stream to be classified as defense waste.

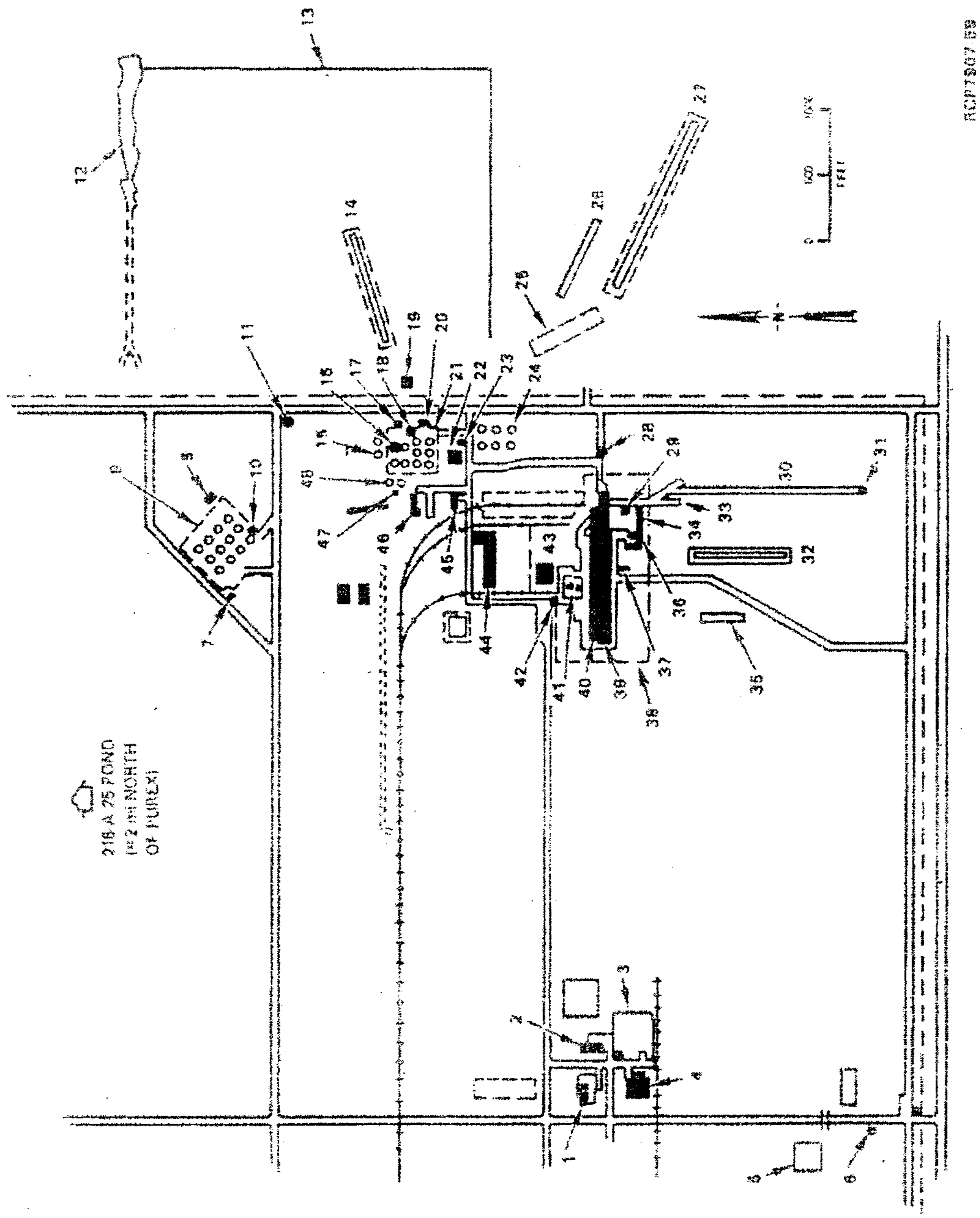
Reference List:

1. HNF-3461, "Hanford Site Transuranic Waste Management Program Acceptable Knowledge Document for Retrievably Stored Contact-Handled Waste," Rev. 7, June 17, 2002.
2. HNF-6899, "Hanford Site Transuranic Waste Management Acceptable Knowledge Documentation for the Plutonium-Uranium Extraction Plant," Rev. 3, June 17, 2002.
3. DOE/WIPP-02-3122, "Contact-Handled Transuranic Waste Acceptance Criteria for the Waste Isolation Pilot Plant," Rev. 0.1, July 25, 2002.
4. HNF-6899, "Hanford Site Transuranic Waste Management Program Acceptable Knowledge Documentation for the Plutonium-Uranium Extraction Plant" Rev. 5, June 17, 2002.
5. HNF-7355, "Hanford Site Transuranic Waste Management Waste Specific Acceptable Knowledge Documentation for Plutonium Uranium Extraction Plant Mixed Debris," Rev. 5, June 17, 2002.
6. M4T00-PJC-02-077, "U-234 to U-235 and U-238 Ratios for Appendix A of the Hanford Site Transuranic Waste Certification Plan for NDA," April 11, 2002.
7. M4T00-PJC-02-076, "Sr-90 to Cs-137 Ratio for Appendix E of the Hanford Site Transuranic Waste Certification Plan for NDA," April 11, 2002.
8. M4T00-TRU-03-571, "Data Quality Objectives Reconciliation, Headspace Gas Analysis Report, and Flammable VOC Report for 17 Containers from Waste Stream MPUREXD," December 17, 2003

APPENDIX A

Figures

Figure A-1

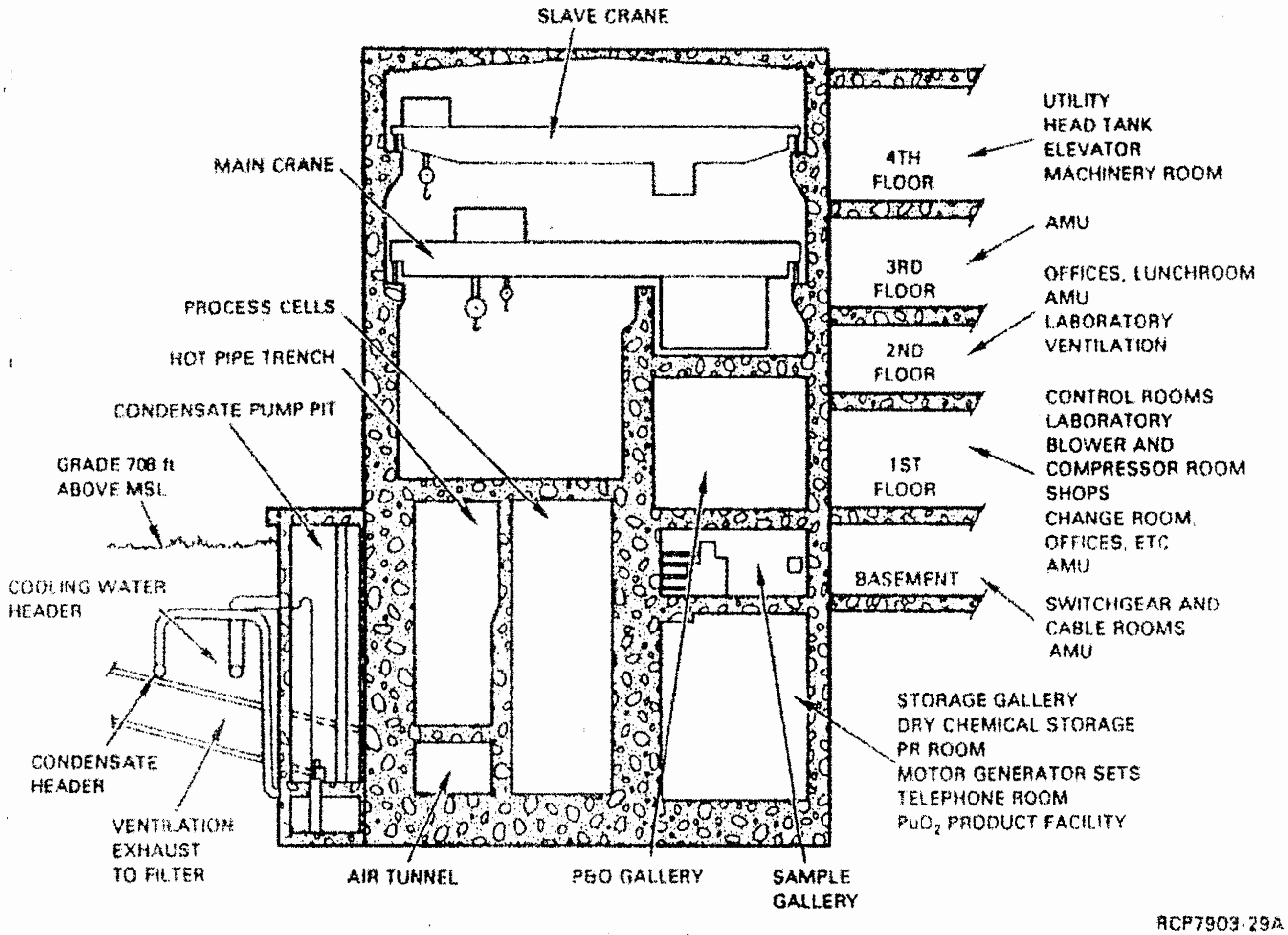


PUREX Plant and Adjacent Facilities.

Legend for Figure A-1 Map of PUREX and Adjacent Facilities

1. Filter plant (283-3)	25. Retention basin (216-A-42)
2. Powerhouse (284-E)	26. Steam condensate crib (216-A-37-1)
3. Coal pile	27. Steam condensate crib (216-A-30)
4. Reservoir (282-E)	28. Cooling water tank (241-A-201)
5. Waste Management Surveillance Building (2750-E)	29. Offgas treatment and acid recycle building (293-A)
6. Office equipment repair (2709-E)	30. Railroad tunnel (218-E-15)
7. Diversion boxes (241-C-151 to –153) 241-CR-151 to –153, 241-C-252)	31. Monitoring station
8. Waste storage tank farm (241-C)	32. Cribs (216-A-2. -4. -21. -36)
9. Cesium loadout (241-C-801)	33. Railroad tunnel 218-E-14)
10. Control house (271-CR)	34. Fanhouse and stack (291-A)
11. Emergency water well	35. Process condensate crib (216-A-10)
12. B Plant pond (216-B-3)	36. Exhaust filters
13. PUREX chemical sewer ditch	37. Storage
14. Contact condenser crib	38. Exclusion-area fence (double)
15. Waste storage tank farm (241-AZ)	39. Separations building (202-A)
16. Transfer box (241-A-153)	40. PUREX building annex
17. Coolant building (241-A-401)	41. Chemical storage (211-A and 2714-A)
18. Change and control building (2707-AX)	42. Gatehouse (2701-A)
19. Cribs (216-A-1 and -7)	43. UNH storage area
20. Diversion box (241-A-302-B)	44. Warehouse (275-E)
21. Waste storage tank farms	45. Waste diverter station (241-AX-151)
22. Evaporator building (242-A)	46. 244-AR vault
23. Retention basins (207-A)	47. Stack (291-AR)
24. Waste storage tank farm (241-AW)	48. Waste storage tank farm (241-AY)

Figure A-2



Cross Section of PUREX Facility.

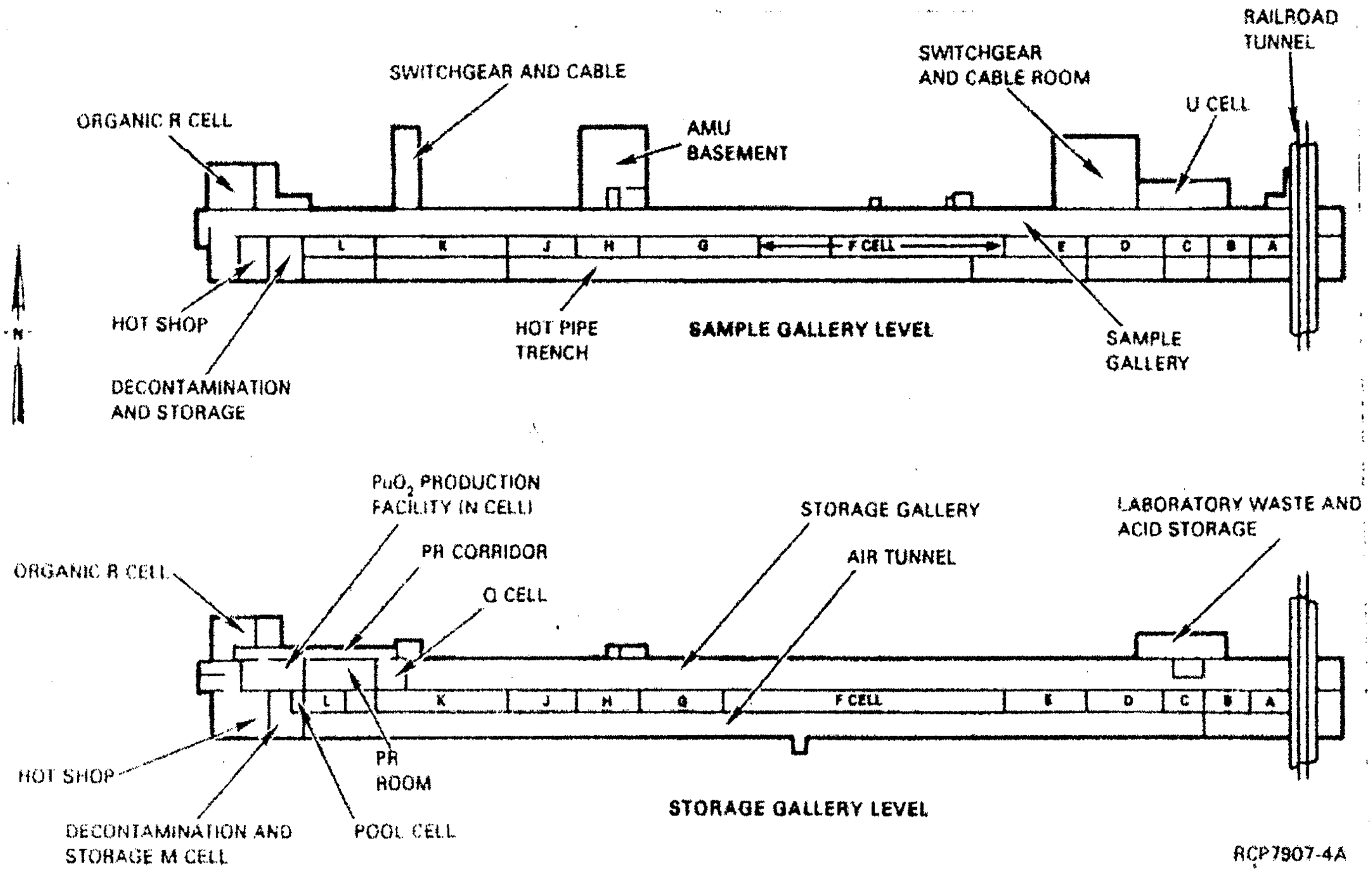


FIGURE 1-5. Plan Views--PUREX 202-A Building. (Sheet 1 of 2)

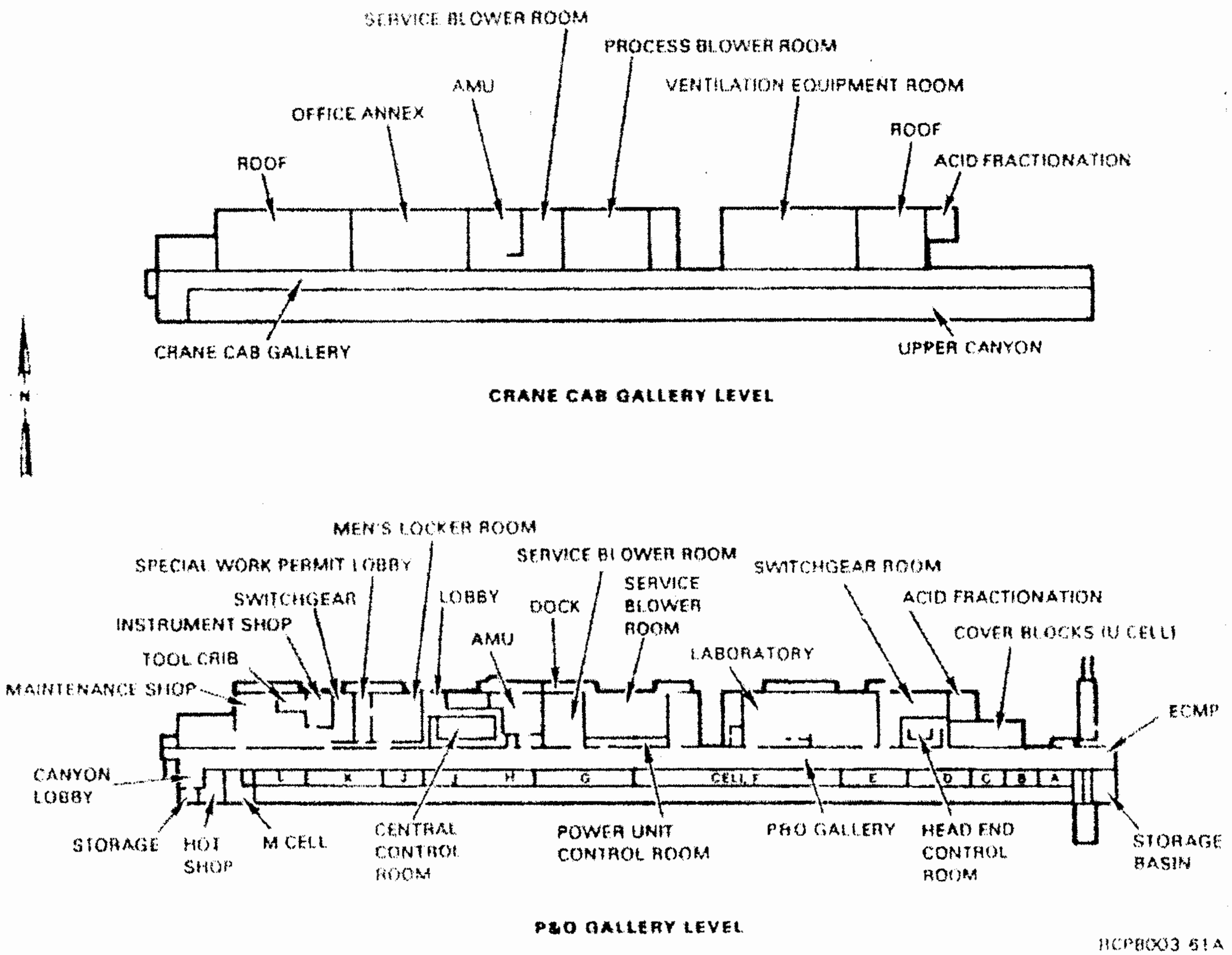


FIGURE 1-5. Plan Views--PUREX 202-A Building. (Sheet 2 of 2)

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Figure A-4