1. Type of source of information:
(check box)

[X] RWMIS [ ] other database
[ ] sample analysis data
[ ] operating records [ ] interview
[ ] expert judgment [X] reports
[X] other
Shipping manifests.

2. Details concerning source (names, report no., dates, etc.)
L.E. Plansky and S.A. Hoiland, "Analysis of the Low-Level Waste Radionuclide Inventory for the Radioactive Waste Management Complex Performance Assessment", EGG-WM-9857, June 1992, Revision 1, pp. 126-134.

3. Do the estimates of contaminant quantities in Part C and D represent:
[X] best estimate
[ ] worst case
[ ] other

4. If other than best estimate, explain why:
N/A.

5. Do the data conflict with RWMIS?
(Historical or Present Data Only)
[X] no
[ ] yes

6. If yes, explain why:

7. Major unknowns in inventories of contaminants:
Unidentified beta and MFP.

8. Key assumptions used to deal with the unknowns:
See isotopic interpretation basis in Part D.

DATA INPUT FOR HISTORICAL DATA TASK FOR RWMC SUBSURFACE DISPOSAL AREA

PART A - GENERAL INFORMATION HDT - 169

1. Preparer: Henry Peterson

2. Date prepared: 08/10/93

3. Generator: TAN
(area or contractor - use code from attached list)

4. Particular facility: 629
(building number - use code from attached list)

5. Number of waste stream from this facility:
1H

6. Waste stream:
Minor radioactive wastes from airplane hanger building during the LOFT and LOFT-cleanup eras.

7. Type of radioactive waste (check box):
[ ] TRU or suspect TRU
[X] LLW
[ ] non-radioactive

8. Actual years disposed of at SDA:
Starting year 1972 Ending year 1982

9. Waste stream volume:
Amount 22.4000 Units Cubic meters.
Check box: [ ] annual or [X] total over all years
Check box: [X] container volume or [ ] waste volume

10. Comments (specify number of pertinent question):
4. Facility is the Warehouse Receiving Building, located in the LOFT area of TAN.

1. General physical form (see attached list)
Other scrap metals.
[X] other (specify)
21.

2. Details on physical form(particularly confinement related)
Unknown.

3. Chemical form:
Metal.

4. Inner packaging: [ ] plastic bag [X] plastic liner
[ ] metal liner [ ] none [ ] other (specify)

5. Waste container type (see attached list)
Other.

6. Other characteristics of interest:
None.

7. Comments (specify number of pertinent question):
4. Virtually all TAN waste shipments featured one or more plastic barriers.
5. "Other" is according to RWMIS. Additional description of "Other" may be present in shipping manifests.

For each contaminant, complete at least one line on the following table. If any entries for that contaminant vary by year, fill out additional lines as needed to cover the varying entries for different years. For example, if the annual quantity disposed was x kg for 1952-56 and y kg for 1956-84, use two lines to handle this situation.

Contaminant & CAS Registry Number	Physical Form	Chemical Form	(A)nnual/(T)otal Quantity	Unit	Begin Year	End Year	Samples?	Minimum Value/#Samp	Maximum Value/STD	Basis for Uncertainty
None.										

* If sample data are available, mark Y in the column titled "Samples?" and provide number of samples in the next column and standard deviation in the next column.
If not, mark N and give the minimum value and maximum value.
Additional information or explanations (indicate pertinent contaminant)

For each contaminant, complete at least one line on the following table. If any entries for that contaminant vary by year, fill out additional lines as needed to cover the varying entries for different years. For example, if the annual quantity disposed was x kg for 1952-56 and y kg for 1956-84, use two lines to handle this situation.

Radionuclide	Physical Form	Chemical Form	(A)nnual/(T)otal Quantity	Unit	Begin Year	End Year	Samples?	Minimum Value/#Samp	Maximum Value/STD	Basis for Uncertainty
Cs-137	Unknown.	Unknown.	T .00036000000000	CI	1972	1972	N			
H-3	Unknown.	Unknown.	T .00048000000000	CI	1972	1972	N			
Sr-90	Unknown.	Unknown.	T .00016000000000	CI	1972	1972	N			
Tc-99	Unknown.	Unknown.	T .00000000003000	CI	1972	1972	N			
Co-58	Unknown.	Unknown.	T .03150000000000	CI	1982	1982	N			
Co-60	Unknown.	Unknown.	T .10000000000000	CI	1982	1982	N			

* If sample data are available, mark Y in the column titled "Samples?" and provide number of samples in the next column and standard deviation in the next column. If not, mark N and give the minimum value and maximum value.

Additional information or explanations (indicate pertinent contaminant)

Curies of unidentified beta and gamma as well as MAP and MFP were interpreted into isotopic proportions in the following manner: base proportions were taken as those from a TAN questionnaire plus current INEL practices; proportions for additive nuclides were taken for Class C candidate nuclides; except those which could be discounted on a scientific basis, according to 5 year averages of TRA/NRF waste shipments to RWMC.

1. Type of source of information:
(check box)

[X] RWMIS [ ] other database
[ ] sample analysis data
[ ] operating records [ ] interview
[ ] expert judgment [X] reports
[X] other
Shipping manifests.

2. Details concerning source (names, report no., dates, etc.)
L.E. Plansky and S.A. Hoiland, "Analysis of the Low-Level Waste Radionuclide Inventory for the Radioactive Waste Management Complex Performance Assessment", EGG-WM-9857, June 1992, Revision 1, pp. 126-134.

3. Do the estimates of contaminant quantities in Part C and D represent:
[X] best estimate
[ ] worst case
[ ] other

4. If other than best estimate, explain why:
N/A.

5. Do the data conflict with RWMIS?
(Historical or Present Data Only)
[X] no
[ ] yes

6. If yes, explain why:
N/A.

7. Major unknowns in inventories of contaminants:
Includes ambiguous MFP.

8. Key assumptions used to deal with the unknowns:
Explained in Part D for MFP interpretation.

DATA INPUT FOR HISTORICAL DATA TASK FOR RWMC SUBSURFACE DISPOSAL AREA

PART A - GENERAL INFORMATION HDT - 170

1. Preparer: Henry Peterson

2. Date prepared: 08/11/93

3. Generator: TAN
(area or contractor - use code from attached list)

4. Particular facility: 630
(building number - use code from attached list)

5. Number of waste stream from this facility:
1H

6. Waste stream:
Minor unidentified LOFT-area wastes from TAN 630.

7. Type of radioactive waste (check box):
[ ] TRU or suspect TRU
[X] LLW
[ ] non-radioactive

8. Actual years disposed of at SDA:
Starting year 1979 Ending year 1983

9. Waste stream volume:
Amount 17.3000 Units Cubic meters.
Check box: [ ] annual or [X] total over all years
Check box: [X] container volume or [ ] waste volume

10. Comments (specify number of pertinent question):
4. Facility is the Control and Equipment Building, located in the LOFT area of TAN.

1. General physical form (see attached list)
Combustibles (paper, cloth, wood, etc.).
[X] other (specify)
44.

2. Details on physical form(particularly confinement related)
Paper, rags, and plastic.

3. Chemical form:
Unknown.

4. Inner packaging: [ ] plastic bag [X] plastic liner
[ ] metal liner [ ] none [ ] other (specify)

5. Waste container type (see attached list)
Bale.

6. Other characteristics of interest:
None.

7. Comments (specify number of pertinent question):
4. Virtually all TAN waste shipments featured one or more plastic barriers.

For each contaminant, complete at least one line on the following table. If any entries for that contaminant vary by year, fill out additional lines as needed to cover the varying entries for different years. For example, if the annual quantity disposed was x kg for 1952-56 and y kg for 1956-84, use two lines to handle this situation.

Contaminant & CAS Registry Number	Physical Form	Chemical Form	(A)nnual/(T)otal Quantity	Unit	Begin Year	End Year	Samples?	Minimum Value/#Samp	Maximum Value/STD	Basis for Uncertainty
None.										

* If sample data are available, mark Y in the column titled "Samples?" and provide number of samples in the next column and standard deviation in the next column.
If not, mark N and give the minimum value and maximum value.
Additional information or explanations (indicate pertinent contaminant)

For each contaminant, complete at least one line on the following table. If any entries for that contaminant vary by year, fill out additional lines as needed to cover the varying entries for different years. For example, if the annual quantity disposed was x kg for 1952-56 and y kg for 1956-84, use two lines to handle this situation.

Radionuclide	Physical Form	Chemical Form	(A)nnual/(T)otal Quantity	Unit	Begin Year	End Year	Samples?	Minimum Value/#Samp	Maximum Value/STD	Basis for Uncertainty
C-14	Surface contamination.	Unknown.	T .00000000039000	CI	1979	1979	N			
Co-60	Surface contamination.	Unknown.	T .00176000000000	CI	1979	1979	N			
Ni-59	Surface contamination.	Unknown.	T .00000704000000	CI	1979	1979	N			
Cs-137	Surface contamination.	Unknown.	T .00063400000000	CI	1979	1979	N			
H-3	Surface contamination.	Unknown.	T .00084500000000	CI	1979	1979	N			
Sr-90	Surface contamination.	Unknown.	T .00028200000000	CI	1979	1979	N			
Tc-99	Surface contamination.	Unknown.	T .00000000004000	CI	1979	1979	N			
C-14	Surface contamination.	Unknown.	T .00000000020000	CI	1980	1980	N			
Co-60	Surface contamination.	Unknown.	T .00092100000000	CI	1980	1980	N			

* If sample data are available, mark Y in the column titled "Samples?" and provide number of samples in the next column and standard deviation in the next column. If not, mark N and give the minimum value and maximum value.

Additional information or explanations (indicate pertinent contaminant)

Curies of unidentified beta and gamma as well as MAP and MFP were interpreted into isotopic proportions in the following manner: base proportions were taken as those from a TAN questionnaire plus current INEL practices; proportions for additive nuclides were taken for Class C candidate nuclides, except those which could be discounted on a scientific basis, according to 5 year averages of TRA/NRF waste shipments to RWMC.

For each contaminant, complete at least one line on the following table. If any entries for that contaminant vary by year, fill out additional lines as needed to cover the varying entries for different years. For example, if the annual quantity disposed was x kg for 1952-56 and y kg for 1956-84, use two lines to handle this situation.

Radionuclide	Physical Form	Chemical Form	(A)nnual/(T)otal Quantity	Unit	Begin Year	End Year	Samples?	Minimum Value/#Samp	Maximum Value/STD	Basis for Uncertainty
Ni-59	Surface contamination.	Unknown.	T .00000368000000	CI	1980	1980	N			
C-14	Surface contamination.	Unknown.	T .00000000326000	CI	1981	1981	N			
Co-60	Surface contamination.	Unknown.	T .01480000000000	CI	1981	1981	N			
Ni-59	Surface contamination.	Unknown.	T .00005920000000	CI	1981	1981	N			
Cs-137	Surface contamination.	Unknown.	T .00000013500000	CI	1981	1981	N			
H-3	Surface contamination.	Unknown.	T .00000018000000	CI	1981	1981	N			
Sr-90	Surface contamination.	Unknown.	T .00000006000000	CI	1981	1981	N			
C-14	Surface contamination.	Unknown.	T .00000000167000	CI	1982	1982	N			
Co-60	Surface contamination.	Unknown.	T .00758000000000	CI	1982	1982	N			

* If sample data are available, mark Y in the column titled "Samples?" and provide number of samples in the next column and standard deviation in the next column. If not, mark N and give the minimum value and maximum value.

Additional information or explanations (indicate pertinent contaminant)

Curies of unidentified beta and gamma as well as MAP and MFP were interpreted into isotopic proportions in the following manner: base proportions were taken as those from a TAN questionnaire plus current INEL practices; proportions for additive nuclides were taken for Class C candidate nuclides, except those which could be discounted on a scientific basis, according to 5 year averages of TRA/NRF waste shipments to RWMC.

For each contaminant, complete at least one line on the following table. If any entries for that contaminant vary by year, fill out additional lines as needed to cover the varying entries for different years. For example, if the annual quantity disposed was x kg for 1952-56 and y kg for 1956-84, use two lines to handle this situation.

Radionuclide	Physical Form	Chemical Form	(A)nnual/(T)otal Quantity	Unit	Begin Year	End Year	Samples?	Minimum Value/#Samp	Maximum Value/STD	Basis for Uncertainty
Ni-59	Surface contamination.	Unknown.	T .00003030000000	CI	1982	1982	N			
Cs-137	Surface contamination.	Unknown.	T .00085000000000	CI	1982	1982	N			
H-3	Surface contamination.	Unknown.	T .00113000000000	CI	1982	1982	N			
Sr-90	Surface contamination.	Unknown.	T .00037800000000	CI	1982	1982	N			
Tc-99	Surface contamination.	Unknown.	T .00000000006000	CI	1982	1982	N			
Co-58	Surface contamination.	Unknown.	T .00100000000000	CI	1983	1983	N			
Co-60	Surface contamination.	Unknown.	T .00100000000000	CI	1983	1983	N			

* If sample data are available, mark Y in the column titled "Samples?" and provide number of samples in the next column and standard deviation in the next column. If not, mark N and give the minimum value and maximum value.

Additional information or explanations (indicate pertinent contaminant)

Curies of unidentified beta and gamma as well as MAP and MFP were interpreted into isotopic proportions in the following manner: base proportions were taken as those from a TAN questionnaire plus current INEL practices; proportions for additive nuclides were taken for Class C candidate nuclides, except those which could be discounted on a scientific basis, according to 5 year averages of TRA/NRF waste shipments to RWMC.

1. Type of source of information:
(check box)

[X] RWMIS [ ] other database
[ ] sample analysis data
[ ] operating records [ ] interview
[ ] expert judgment [X] reports
[X] other
Shipping manifests.

2. Details concerning source (names, report no., dates, etc.)
L.E. Plansky and S.A. Hoiland, "Analysis of the Low-Level Waste Radionuclide Inventory for the Radioactive Waste Management Complex Performance Assessment", EG&G-WM-9857. June 1992, Revision 1, pp. 126-134.

3. Do the estimates of contaminant quantities in Part C and D represent:
[X] best estimate
[ ] worst case
[ ] other

4. If other than best estimate, explain why:
N/A.

5. Do the data conflict with RWMIS?
(Historical or Present Data Only)
[ ] no
[X] yes

6. If yes, explain why:
RWMIS data for TAN agrees with Plansky and Hoiland data for TAN, except in 1982, where Plansky and Hoiland added MFP waste. RWMIS does not include Plansky and Hoiland 1981-1983 data for LOFT.

7. Major unknowns in inventories of contaminants:
Wastes given as MAP and MFP.

8. Key assumptions used to deal with the unknowns:
Interpretation of MAP and MFP described in Part D.

DATA INPUT FOR HISTORICAL DATA TASK FOR RWMC SUBSURFACE DISPOSAL AREA

PART A - GENERAL INFORMATION HDT - 237

1. Preparer: Henry Peterson

2. Date prepared: 01/27/94

3. Generator: TAN
(area or contractor - use code from attached list)

4. Particular facility: 633
(building number - use code from attached list)

5. Number of waste stream from this facility:
1H

6. Waste stream:
Radiation Measurement Lab (RML)/Hot Cell
Samples/Specimens of fuel assemblies from HTRE No. 1
IET #3, #4, and #6 tests.

7. Type of radioactive waste (check box):
[ ] TRU or suspect TRU
[X] LLW
[ ] non-radioactive

8. Actual years disposed of at SDA:
Starting year 1956 Ending year 1956

9. Waste stream volume:
Amount _____ Units Cubic meters.
Check box: [ ] annual or [ ] total over all years
Check box: [ ] container volume or [ ] waste volume

10. Comments (specify number of pertinent question):
6. This waste stream is hypothesized based on reports and interviews with personnel employed with the GE-ANP Program. Half of the yearly curie waste value is ascribed to this facility, and half is ascribed to the TAN Hot Shop (TAN-607).

1. General physical form (see attached list)

[X] other (specify)
2, 5, 21.

2. Details on physical form(particularly confinement related)
Pieces of slag formed by high temperature melting of VO2 and nichrome clad combining. (May have been contained within a welded SS can that was then placed in fiber or steel drum.)

3. Chemical form:
Oxides and eutectic slag.

4. Inner packaging: [ ] plastic bag [ ] plastic liner
[X] metal liner [ ] none [ ] other (specify)

5. Waste container type (see attached list)
Unknown.

6. Other characteristics of interest:

7. Comments (specify number of pertinent question):
2,4, and 5. Interviews with some of the personnel that worked in the Hot Shop and RML (Harold Rau, R.G. Mitchell, R.R. Jones, R. Drexler, E.C. Adamson, and T.L. Murphy) indicated that smaller aluminum or stainless steel containers were used to put RML or Hot Cell samples into, before they were put into the fiber or steel drums that would be the disposal container. One individual indicated that the inner containers may have been welded shut, and yet another individual indicated that the inner containers had a screw type lid.

For each contaminant, complete at least one line on the following table. If any entries for that contaminant vary by year, fill out additional lines as needed to cover the varying entries for different years. For example, if the annual quantity disposed was x kg for 1952-56 and y kg for 1956-84, use two lines to handle this situation.

Contaminant & CAS Registry Number	Physical Form	Chemical Form	(A)nnual/(T)otal Quantity	Unit	Begin Year	End Year	Samples?	Minimum Value/#Samp	Maximum Value/STD	Basis for Uncertainty
7440-02-0 Nickel	Solid.	Metal.	T 1095.0000000000	GM	1956	1956	N			
7440-47-3 Chromium	Solid.	Metal.	T 275.00000000000	GM	1956	1956	N			

* If sample data are available, mark Y in the column titled "Samples?" and provide number of samples in the next column and standard deviation in the next column.
If not, mark N and give the minimum value and maximum value.
Additional information or explanations (indicate pertinent contaminant)

For each contaminant, complete at least one line on the following table. If any entries for that contaminant vary by year, fill out additional lines as needed to cover the varying entries for different years. For example, if the annual quantity disposed was x kg for 1952-56 and y kg for 1956-84, use two lines to handle this situation.

Radionuclide	Physical Form	Chemical Form	(A)nnual/(T)otal Quantity	Unit	Begin Year	End Year	Samples?	Minimum Value/#Samp	Maximum Value/STD	Basis for Uncertainty
Cr-51	Particulate.	Oxide.	T 950.00000000000	CI	1956	1956	N			
Ni-63	Particulate.	Oxide.	T 3.5000000000000	CI	1956	1956	N			
Sr-89	Particulate.	Oxide.	T 60.000000000000	CI	1956	1956	N			
Y-91	Particulate.	Oxide.	T 68.000000000000	CI	1956	1956	N			
Zr-95	Particulate.	Oxide.	T 70.000000000000	CI	1956	1956	N			
Nb-95	Particulate.	Oxide.	T 40.000000000000	CI	1956	1956	N			
Ru-103	Particulate.	Oxide.	T 44.000000000000	CI	1956	1956	N			
Ru-106	Particulate.	Oxide.	T 1.0000000000000	CI	1956	1956	N			
Cs-137	Particulate.	Oxide.	T .50000000000000	CI	1956	1956	N			

* If sample data are available, mark Y in the column titled "Samples?" and provide number of samples in the next column and standard deviation in the next column. If not, mark N and give the minimum value and maximum value.

Additional information or explanations (indicate pertinent contaminant)

The HTRE-1 testing of IET #3, #4, and #6 was completed by the end of February 1957. Of the three tests, IET #3 and #4, which were completed during 1956, sustained most damage to the fuel, releasing 99.3% of the 704 gram total release of uranium assumed for the three tests. Since the fuel was nichrome (80% nickel and 20% chromium) clad, the ratio of grams of clad to the grams of fuel was calculated and activated for the length of time used to generate the fission product inventory, calculated by the RSAC-5 computer code, as programmed for the IET #4 operational history. The calculation resulted in 2738 grams of clad associated with 704 grams of fuel. Activation of the nichrome clad resulted in 17,307 curies of Cr-51, 0.257 curies of Ni-59, 30.3 curies of Ni-63 and 64,520 curies of Ni-65. The fission product inventory was calculated assuming the reactor operated at 10.64 MW for 194 hours. All activity values were decayed for 30 days to account for the time for decontamination of the contaminated parts of the reactor and packaging of the waste for shipment to the RWMC. From the 30-day decay list of radionuclides, the radionuclides chosen for listing above were 13 nuclides with the highest curie values. The curie content of uranium nuclides 234, 235, and 238 were calculated by the methodology as outlined in "Health Physics Manual of Good Practices for Uranium Facilities", Rich et al., 1988. (The complete analysis is documented in Peterson, 1994.)

For each contaminant, complete at least one line on the following table. If any entries for that contaminant vary by year, fill out additional lines as needed to cover the varying entries for different years. For example, if the annual quantity disposed was x kg for 1952-56 and y kg for 1956-84, use two lines to handle this situation.

Radionuclide	Physical Form	Chemical Form	(A)nnual/(T)otal Quantity	Unit	Begin Year	End Year	Samples?	Minimum Value/#Samp	Maximum Value/STD	Basis for Uncertainty
Ba-140	Particulate.	Oxide.	T 78.000000000000	CI	1956	1956	N			
La-140	Particulate.	Oxide.	T 90.000000000000	CI	1956	1956	N			
Ce-141	Particulate.	Oxide.	T 88.000000000000	CI	1956	1956	N			
Ce-144	Particulate.	Oxide.	T 18.000000000000	CI	1956	1956	N			
U-235	Particulate.	Oxide.	T .00071000000000	CI	1956	1956	N			
U-234	Particulate.	Oxide.	T .02240000000000	CI	1956	1956	N			
U-238	Particulate.	Oxide.	T .00000660000000	CI	1956	1956	N			

* If sample data are available, mark Y in the column titled "Samples?" and provide number of samples in the next column and standard deviation in the next column.
If not, mark N and give the minimum value and maximum value.
Additional information or explanations (indicate pertinent contaminant)
The HTRE-1 testing of IET #3, #4, and #6 was completed by the end of February 1957. Of the three tests, IET #3 and #4, which were completed during 1956, sustained most damage to the fuel, releasing 99.3% of the 704 gram total release of uranium assumed for the three tests. Since the fuel was nichrome (80% nickel and 20% chromium) clad, the ratio of grams of clad to the grams of fuel was calculated and activated for the length of time used to generate the fission product inventory, calculated by the RSAC-5 computer code, as programmed for the IET #4 operational history. The calculation resulted in 2738 grams of clad associated with 704 grams of fuel. Activation of the nichrome clad resulted in 17,307 curies of Cr-51, 0.257 curies of Ni-59, 30.3 curies of Ni-63 and 64,520 curies of Ni-65. The fission product inventory was calculated assuming the reactor operated at 10.64 MW for 194 hours. All activity values were decayed for 30 days to account for the time for decontamination of the contaminated parts of the reactor and packaging of the waste for shipment to the RWMC. From the 30-day decay list of radionuclides, the radionuclides chosen for listing above were 13 nuclides with the highest curie values. The curie content of uranium nuclides 234, 235, and 238 were calculated by the methodology as outlined in "Health Physics Manual of Good Practices for Uranium Facilities", Rich et al., 1988. (The complete analysis is documented in Peterson, 1994.)

1. Type of source of information:
(check box)

[ ] RWMIS [ ] other database
[ ] sample analysis data
[ ] operating records [X] interview
[ ] expert judgment [X] reports
[ ] other

2. Details concerning source (names, report no., dates, etc.)
Interviews with J.D. Burtenshaw and G.J. Briscoe provided information concerning methods of decontamination of the jet engine, reactor exhaust plenum, a 76-inch exhaust duct, and the types of materials that would have been used, and the types of waste that would have been generated.

3. Do the estimates of contaminant quantities in Part C and D represent:
[X] best estimate
[ ] worst case
[ ] other

4. If other than best estimate, explain why:

5. Do the data conflict with RWMIS?
(Historical or Present Data Only)
[ ] no
[X] yes

6. If yes, explain why:
RWMIS contained no INEL data prior to 1960.

7. Major unknowns in inventories of contaminants:

8. Key assumptions used to deal with the unknowns:
The curie amount for this waste stream is estimated to be on the order of 1500 curies for the year of 1956 (1/2 of the total assumed for the TAN area) and is assumed to be associated with a maximum of 1/2 of the 704 grams of U-235 that was assumed to be released for the three IET tests performed in HTRE-1. The fuel releases were deduced from "Heat Transfer Reactor Experiment No. 1", by G. Thornton, et al., General Electric, Direct-Air-Cycle Aircraft Nuclear Propulsion Program, APEX-904, February 28, 1962. The fission product inventory was based on the modeled HTRE-1, IET #4, reactor operation as described in "Idaho National Engineering Laboratory Historical Dose Evaluation", DOE/ID-12119, August 1991, and was calculated with the RSAC-5 computer code described by "The Radiological Safety Analysis Computer Program (RSAC-5) User's Manual", by D.R. Wenzel, WINCO-1123, October, 1993.

DATA INPUT FOR HISTORICAL DATA TASK FOR RWMC SUBSURFACE DISPOSAL AREA

PART A - GENERAL INFORMATION HDT - 238

1. Preparer: Henry Peterson

2. Date prepared: 01/27/94

3. Generator: TAN
(area or contractor - use code from attached list)

4. Particular facility: 633
(building number - use code from attached list)

5. Number of waste stream from this facility:
2H

6. Waste stream:
Metallurgical samples/specimens from HTRE-2 insert tests.

7. Type of radioactive waste (check box):
[ ] TRU or suspect TRU
[X] LLW
[ ] non-radioactive

8. Actual years disposed of at SDA:
Starting year 1957 Ending year 1961

9. Waste stream volume:
Amount _____ Units Cubic meters.
Check box: [ ] annual or [ ] total over all years
Check box: [ ] container volume or [ ] waste volume

10. Comments (specify number of pertinent question):
6. Since there are no waste manifests available for review for the period prior to 1960, this waste stream is hypothesized based on reports and interviews with personnel employed with the GE-ANP Program. Ninety percent of the yearly curie waste values are ascribed to the TAN Radiation Measurements Laboratory (RML)/Hot Cells (TAN-633) and 10% is ascribed to the TAN Hot Shop (TAN-607) in waste stream TAN-607-2.

1. General physical form (see attached list)

[X] other (specify)
2, 5, 10.

2. Details on physical form(particularly confinement related)
Metallurgical samples/specimens resulting from RML/Hot Cell examinations. May have been replaced in aluminum or stainless steel cans, before being placed in drums for disposal.

3. Chemical form:
Metal, irradiated BeO-VO2 ceramic tubes or parts of tubes.

4. Inner packaging: [ ] plastic bag [ ] plastic liner
[X] metal liner [ ] none [ ] other (specify)

5. Waste container type (see attached list)
Unknown.

6. Other characteristics of interest:

7. Comments (specify number of pertinent question):
2,4, and 5. Interviews with some of the personnel that worked in the Hot Shop and RML (Harold Rau, R.G. Mitchell, R.R. Jones, R. Drexler, E.C. Adamson, and T.L. Murphy) indicated that smaller aluminum or stainless steel containers were used to put RML or Hot Cell samples into, before they were put into fiber or steel drums that would be the disposal container. One individual indicated that the inner containers may have been welded shut, and yet another individual indicated that the inner containers had a screw type lid.

For each contaminant, complete at least one line on the following table. If any entries for that contaminant vary by year, fill out additional lines as needed to cover the varying entries for different years. For example, if the annual quantity disposed was x kg for 1952-56 and y kg for 1956-84, use two lines to handle this situation.

Contaminant & CAS Registry Number	Physical Form	Chemical Form	(A)nnual/(T)otal Quantity	Unit	Begin Year	End Year	Samples?	Minimum Value/#Samp	Maximum Value/STD	Basis for Uncertainty
7440-41-7 Beryllium	Solid.	Oxide.	Unknown.	GM	1957	1961	N			

* If sample data are available, mark Y in the column titled "Samples?" and provide number of samples in the next column and standard deviation in the next column.
If not, mark N and give the minimum value and maximum value.
Additional information or explanations (indicate pertinent contaminant)

For each contaminant, complete at least one line on the following table. If any entries for that contaminant vary by year, fill out additional lines as needed to cover the varying entries for different years. For example, if the annual quantity disposed was x kg for 1952-56 and y kg for 1956-84, use two lines to handle this situation.

Radionuclide	Physical Form	Chemical Form	(A)nnual/(T)otal Quantity	Unit	Begin Year	End Year	Samples?	Minimum Value/#Samp	Maximum Value/STD	Basis for Uncertainty
U-234	Particulate.	Oxide.	T .00300000000000	CI	1957	1957	N			
U-238	Particulate.	Oxide.	T .00000089000000	CI	1957	1957	N			
Sr-90	Particulate.	Oxide.	T 1.4000000000000	CI	1958	1958	N			
Zr-95	Particulate.	Oxide.	T 180.00000000000	CI	1958	1958	N			
Ru-103	Particulate.	Oxide.	T 117.00000000000	CI	1958	1958	N			
Cs-136	Particulate.	Oxide.	T .27000000000000	CI	1958	1958	N			
Ba-140	Particulate.	Oxide.	T 216.00000000000	CI	1958	1958	N			
Ce-141	Particulate.	Oxide.	T 230.00000000000	CI	1958	1958	N			
Ce-144	Particulate.	Oxide.	T 45.000000000000	CI	1958	1958	N			

* If sample data are available, mark Y in the column titled "Samples?" and provide number of samples in the next column and standard deviation in the next column.
If not, mark N and give the minimum value and maximum value.
Additional information or explanations (indicate pertinent contaminant)
See last page of Part D.

For each contaminant, complete at least one line on the following table. If any entries for that contaminant vary by year, fill out additional lines as needed to cover the varying entries for different years. For example, if the annual quantity disposed was x kg for 1952-56 and y kg for 1956-84, use two lines to handle this situation.

Radionuclide	Physical Form	Chemical Form	(A)nnual/(T)otal Quantity	Unit	Begin Year	End Year	Samples?	Minimum Value/#Samp	Maximum Value/STD	Basis for Uncertainty
U-235	Particulate.	Oxide.	T .00009600000000	CI	1958	1958	N			
Sr-89	Particulate.	Oxide.	T 144.00000000000	CI	1959	1959	N			
Y-91	Particulate.	Oxide.	T 162.00000000000	CI	1959	1959	N			
Nb-95	Particulate.	Oxide.	T 95.000000000000	CI	1959	1959	N			
Rh-103m	Particulate.	Oxide.	T 95.000000000000	CI	1959	1959	N			
U-235	Particulate.	Oxide.	T .00009600000000	CI	1957	1957	N			
Sr-89	Particulate.	Oxide.	T 153.00000000000	CI	1958	1958	N			
Y-91	Particulate.	Oxide.	T 171.00000000000	CI	1958	1958	N			
Nb-95	Particulate.	Oxide.	T 99.000000000000	CI	1958	1958	N			

* If sample data are available, mark Y in the column titled "Samples?" and provide number of samples in the next column and standard deviation in the next column. If not, mark N and give the minimum value and maximum value.

Additional information or explanations (indicate pertinent contaminant)

See last page of Part D.

For each contaminant, complete at least one line on the following table. If any entries for that contaminant vary by year, fill out additional lines as needed to cover the varying entries for different years. For example, if the annual quantity disposed was x kg for 1952-56 and y kg for 1956-84, use two lines to handle this situation.

Radionuclide	Physical Form	Chemical Form	(A)nnual/(T)otal Quantity	Unit	Begin Year	End Year	Samples?	Minimum Value/#Samp	Maximum Value/STD	Basis for Uncertainty
Rh-103m	Particulate.	Oxide.	T 99.000000000000	CI	1958	1958	N			
Cs-137	Particulate.	Oxide.	T 1.5000000000000	CI	1958	1958	N			
La-140	Particulate.	Oxide.	T 252.00000000000	CI	1958	1958	N			
Pr-143	Particulate.	Oxide.	T 230.00000000000	CI	1958	1958	N			
U-234	Particulate.	Oxide.	T .00300000000000	CI	1958	1958	N			
U-238	Particulate.	Oxide.	T .00000089000000	CI	1958	1958	N			
Sr-90	Particulate.	Oxide.	T 1.3000000000000	CI	1959	1959	N			
Zr-95	Particulate.	Oxide.	T 171.00000000000	CI	1959	1959	N			
Ru-103	Particulate.	Oxide.	T 113.00000000000	CI	1959	1959	N			

* If sample data are available, mark Y in the column titled "Samples?" and provide number of samples in the next column and standard deviation in the next column.
If not, mark N and give the minimum value and maximum value.
Additional information or explanations (indicate pertinent contaminant)
See last page of Part D.

For each contaminant, complete at least one line on the following table. If any entries for that contaminant vary by year, fill out additional lines as needed to cover the varying entries for different years. For example, if the annual quantity disposed was x kg for 1952-56 and y kg for 1956-84, use two lines to handle this situation.

Radionuclide	Physical Form	Chemical Form	(A)nnual/(T)otal Quantity	Unit	Begin Year	End Year	Samples?	Minimum Value/#Samp	Maximum Value/STD	Basis for Uncertainty
Cs-136	Particulate.	Oxide.	T .30000000000000	CI	1959	1959	N			
Cs-137	Particulate.	Oxide.	T 1.4000000000000	CI	1959	1959	N			
Ba-140	Particulate.	Oxide.	T 207.00000000000	CI	1959	1959	N			
La-140	Particulate.	Oxide.	T 243.00000000000	CI	1959	1959	N			
Ce-141	Particulate.	Oxide.	T 221.00000000000	CI	1959	1959	N			
Pr-143	Particulate.	Oxide.	T 225.00000000000	CI	1959	1959	N			
Ce-144	Particulate.	Oxide.	T 45.000000000000	CI	1959	1959	N			
U-234	Particulate.	Oxide.	T .00300000000000	CI	1959	1959	N			
U-235	Particulate.	Oxide.	T .00009600000000	CI	1959	1959	N			

* If sample data are available, mark Y in the column titled "Samples?" and provide number of samples in the next column and standard deviation in the next column.
If not, mark N and give the minimum value and maximum value.
Additional information or explanations (indicate pertinent contaminant)
See last page of Part D.

For each contaminant, complete at least one line on the following table. If any entries for that contaminant vary by year, fill out additional lines as needed to cover the varying entries for different years. For example, if the annual quantity disposed was x kg for 1952-56 and y kg for 1956-84, use two lines to handle this situation.

Radionuclide	Physical Form	Chemical Form	(A)nnual/(T)otal Quantity	Unit	Begin Year	End Year	Samples?	Minimum Value/#Samp	Maximum Value/STD	Basis for Uncertainty
U-238	Particulate.	Oxide.	T .00000089000000	CI	1959	1959	N			
Sr-89	Particulate.	Oxide.	T 131.00000000000	CI	1960	1960	N			
Sr-90	Particulate.	Oxide.	T 1.2000000000000	CI	1960	1960	N			
Y-91	Particulate.	Oxide.	T 144.00000000000	CI	1960	1960	N			
Zr-95	Particulate.	Oxide.	T 153.00000000000	CI	1960	1960	N			
Nb-95	Particulate.	Oxide.	T 86.000000000000	CI	1960	1960	N			
Ru-103	Particulate.	Oxide.	T 99.000000000000	CI	1960	1960	N			
Rh-103m	Particulate.	Oxide.	T 86.000000000000	CI	1960	1960	N			
Cs-136	Particulate.	Oxide.	T .23000000000000	CI	1960	1960	N			

* If sample data are available, mark Y in the column titled "Samples?" and provide number of samples in the next column and standard deviation in the next column. If not, mark N and give the minimum value and maximum value.

Additional information or explanations (indicate pertinent contaminant)

See last page of Part D.

For each contaminant, complete at least one line on the following table. If any entries for that contaminant vary by year, fill out additional lines as needed to cover the varying entries for different years. For example, if the annual quantity disposed was x kg for 1952-56 and y kg for 1956-84, use two lines to handle this situation.

Radionuclide	Physical Form	Chemical Form	(A)nnual/(T)otal Quantity	Unit	Begin Year	End Year	Samples?	Minimum Value/#Samp	Maximum Value/STD	Basis for Uncertainty
Cs-137	Particulate.	Oxide.	T 1.3000000000000	CI	1960	1960	N			
Ba-140	Particulate.	Oxide.	T 185.00000000000	CI	1960	1960	N			
La-140	Particulate.	Oxide.	T 216.00000000000	CI	1960	1960	N			
Ce-141	Particulate.	Oxide.	T 198.00000000000	CI	1960	1960	N			
Pr-143	Particulate.	Oxide.	T 198.00000000000	CI	1960	1960	N			
Ce-144	Particulate.	Oxide.	T 36.000000000000	CI	1960	1960	N			
U-234	Particulate.	Oxide.	T .00300000000000	CI	1960	1960	N			
U-235	Particulate.	Oxide.	T .00009600000000	CI	1960	1960	N			
U-238	Particulate.	Oxide.	T .00000089000000	CI	1960	1960	N			

* If sample data are available, mark Y in the column titled "Samples?" and provide number of samples in the next column and standard deviation in the next column.
If not, mark N and give the minimum value and maximum value.
Additional information or explanations (indicate pertinent contaminant)
See last page of Part D.

For each contaminant, complete at least one line on the following table. If any entries for that contaminant vary by year, fill out additional lines as needed to cover the varying entries for different years. For example, if the annual quantity disposed was x kg for 1952-56 and y kg for 1956-84, use two lines to handle this situation.

Radionuclide	Physical Form	Chemical Form	(A)nnual/(T)otal Quantity	Unit	Begin Year	End Year	Samples?	Minimum Value/#Samp	Maximum Value/STD	Basis for Uncertainty
Sr-89	Particulate.	Oxide.	T 165.00000000000	CI	1961	1961	N			
Sr-90	Particulate.	Oxide.	T 1.3000000000000	CI	1961	1961	N			
Y-91	Particulate.	Oxide.	T 182.00000000000	CI	1961	1961	N			
Zr-95	Particulate.	Oxide.	T 198.00000000000	CI	1961	1961	N			
Nb-95	Particulate.	Oxide.	T 104.00000000000	CI	1961	1961	N			
Ru-103	Particulate.	Oxide.	T 119.00000000000	CI	1961	1961	N			
Rh-103m	Particulate.	Oxide.	T 104.00000000000	CI	1961	1961	N			
Cs-136	Particulate.	Oxide.	T .33000000000000	CI	1961	1961	N			
Cs-137	Particulate.	Oxide.	T 1.5000000000000	CI	1961	1961	N			

* If sample data are available, mark Y in the column titled "Samples?" and provide number of samples in the next column and standard deviation in the next column.
If not, mark N and give the minimum value and maximum value.
Additional information or explanations (indicate pertinent contaminant)
See last page of Part D.

For each contaminant, complete at least one line on the following table. If any entries for that contaminant vary by year, fill out additional lines as needed to cover the varying entries for different years. For example, if the annual quantity disposed was x kg for 1952-56 and y kg for 1956-84, use two lines to handle this situation.

Radionuclide	Physical Form	Chemical Form	(A)nnual/(T)otal Quantity	Unit	Begin Year	End Year	Samples?	Minimum Value/#Samp	Maximum Value/STD	Basis for Uncertainty
Ba-140	Particulate.	Oxide.	T 231.00000000000	CI	1961	1961	N			
La-140	Particulate.	Oxide.	T 264.00000000000	CI	1961	1961	N			
Ce-141	Particulate.	Oxide.	T 240.00000000000	CI	1961	1961	N			
Pr-143	Particulate.	Oxide.	T 240.00000000000	CI	1961	1961	N			
Ce-144	Particulate.	Oxide.	T 50.000000000000	CI	1961	1961	N			
U-234	Particulate.	Oxide.	T .00300000000000	CI	1961	1961	N			
U-235	Particulate.	Oxide.	T .00009600000000	CI	1961	1961	N			
U-238	Particulate.	Oxide.	T .00000089000000	CI	1961	1961	N			
Sr-89	Particulate.	Oxide.	T 153.00000000000	CI	1957	1957	N			

* If sample data are available, mark Y in the column titled "Samples?" and provide number of samples in the next column and standard deviation in the next column.
If not, mark N and give the minimum value and maximum value.
Additional information or explanations (indicate pertinent contaminant)
See last page of Part D.

For each contaminant, complete at least one line on the following table. If any entries for that contaminant vary by year, fill out additional lines as needed to cover the varying entries for different years. For example, if the annual quantity disposed was x kg for 1952-56 and y kg for 1956-84, use two lines to handle this situation.

Radionuclide	Physical Form	Chemical Form	(A)nnual/(T)otal Quantity	Unit	Begin Year	End Year	Samples?	Minimum Value/#Samp	Maximum Value/STD	Basis for Uncertainty
Sr-90	Particulate.	Oxide.	T 1.4000000000000	CI	1957	1957	N			
Y-91	Particulate.	Oxide.	T 171.00000000000	CI	1957	1957	N			
Zr-95	Particulate.	Oxide.	T 180.00000000000	CI	1957	1957	N			
Nb-95	Particulate.	Oxide.	T 99.000000000000	CI	1957	1957	N			
Ru-103	Particulate.	Oxide.	T 117.00000000000	CI	1957	1957	N			
Rh-103m	Particulate.	Oxide.	T 99.000000000000	CI	1957	1957	N			
Cs-136	Particulate.	Oxide.	T .27000000000000	CI	1957	1957	N			
Cs-137	Particulate.	Oxide.	T 1.5000000000000	CI	1957	1957	N			
Ba-140	Particulate.	Oxide.	T 216.00000000000	CI	1957	1957	N			

* If sample data are available, mark Y in the column titled "Samples?" and provide number of samples in the next column and standard deviation in the next column.
If not, mark N and give the minimum value and maximum value.
Additional information or explanations (indicate pertinent contaminant)
See last page of Part D.

For each contaminant, complete at least one line on the following table. If any entries for that contaminant vary by year, fill out additional lines as needed to cover the varying entries for different years. For example, if the annual quantity disposed was x kg for 1952-56 and y kg for 1956-84, use two lines to handle this situation.

Radionuclide	Physical Form	Chemical Form	(A)nnual/(T)otal Quantity	Unit	Begin Year	End Year	Samples?	Minimum Value/#Samp	Maximum Value/STD	Basis for Uncertainty
La-140	Particulate.	Oxide.	T 252.00000000000	CI	1957	1957	N			
Ce-141	Particulate.	Oxide.	T 230.00000000000	CI	1957	1957	N			
Pr-143	Particulate.	Oxide.	T 230.00000000000	CI	1957	1957	N			
Ce-144	Particulate.	Oxide.	T 45.000000000000	CI	1957	1957	N			

* If sample data are available, mark Y in the column titled "Samples?" and provide number of samples in the next column and standard deviation in the next column.
If not, mark N and give the minimum value and maximum value.
Additional information or explanations (indicate pertinent contaminant)
See last page of Part D.

Additional information or explanations (indicate pertinent contaminant)

The HTRE-2 testing of the IET inserts was completed by the end of February 1961. During the tests of these inserts, the high temperatures experienced in the insert ceramic fuels caused fission products, UO_2, and BeO to migrate and boil off the fuel tubes. This material contaminated parts of the reactor, the jet engines, and the 76-inch duct. Before further testing could continue, these materials had to be removed from these components and discarded. Based on the summary of the tests, documented in "Idaho National Engineering Laboratory Historical Dose Evaluation", DOE/ID-12119, August 1991, about 260 grams of 93.4% enriched U-235 was released during this test period, or about 52 grams per year during the five-year period. The fission product inventory was calculated using the RSAC-5 computer program, described by "The Radiological Safety Analysis Computer Program (RSAC-5) User's Manual", by D.R. Wenzel, WINCO-1123, October, 1993, assuming that the insert generated 7.4% of the reactor power of 14 MW for a period of 100 hours. All activity values were decayed for 30 days, to account for the time for decontamination of the contaminated parts of the reactor and packaging of the waste for shipment to the RWMC. From the 30-day decay list of radionuclides, the radionuclides chosen for the listing above were the 13 nuclides with the highest curie values, with the sum total normalized to the total yearly curie total for this waste stream. The curie content of uranium nuclides 234, 235, and 238 were calculated by the methodology as outlined in "Health Physics Manual of Good Practices for Uranium Facilities", Rich et al., 1988. (The complete analysis is documented in Peterson, 1994.)

1. Type of source of information:
(check box)

[ ] RWMIS [ ] other database
[ ] sample analysis data
[ ] operating records [X] interview
[ ] expert judgment [ ] reports
[X] other
Waste manifests.

2. Details concerning source (names, report no., dates, etc.)
Interviews with some of the personnel that worked in the Hot Shop and RML (Harold Rau, R.G. Mitchell, R.R. Jones, R. Drexler, E.C. Adamson, and T.L. Murphy) and personnel that were responsible for waste disposal (G.J. Briscoe, J.H. Lofthouse, and R.B. O'Brien) were consulted. The reports used were: a) "Heat Transfer Reactor Experiment No. 2", by P.N. Flagella, May 25, 1962, APEX-905, and b) "Idaho National Engineering Laboratory Historical Dose Evaluation", DOE/ID-12119, August 1991.

3. Do the estimates of contaminant quantities in Part C and D represent:
[X] best estimate
[ ] worst case
[ ] other

4. If other than best estimate, explain why:

5. Do the data conflict with RWMIS?
(Historical or Present Data Only)
[ ] no
[X] yes

6. If yes, explain why:
RWMIS contains no data prior to 1960.

7. Major unknowns in inventories of contaminants:

8. Key assumptions used to deal with the unknowns:
There are no TAN waste manifests available for review and no data in the RWMIS for 1957-1959. The major TAN waste stream curie disposal values were estimated based on work completed during this time frame, and compared against similar work performed in 1960 and 1961. Therefore, 2000 curies was estimated for each year for 1957 and 1958. In 1959, 1915 curies was reported as waste to the RWMC (USAEC, 1960); in 1960, 1710 curies was reported for TAN (USAEC, 1961), and the total curie value summed from the waste shipping manifests for 1961 was 2110 curies. Testing of the HTRE-2 IET tests was responsible for the release of a maximum of 265 grams of U-235, which was assumed to be disposed of at the rate of 52 grams per year over the five year period. Of the total curie and U-235 values, 90% was ascribed to the RML/Hot Cells TAN-633-2 waste stream and 10% was ascribed to the Hot Shop operation waste stream TAN-607-2.

DATA INPUT FOR HISTORICAL DATA TASK FOR RWMC SUBSURFACE DISPOSAL AREA

PART A - GENERAL INFORMATION HDT - 239

1. Preparer: Henry Peterson

2. Date prepared: 02/07/94

3. Generator: TAN
(area or contractor - use code from attached list)

4. Particular facility: 633
(building number - use code from attached list)

5. Number of waste stream from this facility:
3H

6. Waste stream:
Metallurgical samples/specimens examined and discarded from RML/Hot Cells resulting from SL-1 accident of Jan. 3, 1961.

7. Type of radioactive waste (check box):
[ ] TRU or suspect TRU
[X] LLW
[ ] non-radioactive

8. Actual years disposed of at SDA:
Starting year 1963 Ending year 1963

9. Waste stream volume:
Amount 85.0000 Units Cubic meters.
Check box: [X] annual or [ ] total over all years
Check box: [X] container volume or [ ] waste volume

10. Comments (specify number of pertinent question):

1. General physical form (see attached list)

[X] other (specify)
2, 4, 5, 10.

2. Details on physical form(particularly confinement related)
Samples/specimens examined in the RML/Hot Cell were placed in a screw-top or seal welded aluminum or stainless steel can, before being placed in fiber or steel drum for disposal.

3. Chemical form:
Metal.

4. Inner packaging: [ ] plastic bag [ ] plastic liner
[X] metal liner [ ] none [ ] other (specify)

5. Waste container type (see attached list)
Metal barrel*.

6. Other characteristics of interest:
None.

7. Comments (specify number of pertinent question):

For each contaminant, complete at least one line on the following table. If any entries for that contaminant vary by year, fill out additional lines as needed to cover the varying entries for different years. For example, if the annual quantity disposed was x kg for 1952-56 and y kg for 1956-84, use two lines to handle this situation.

Contaminant & CAS Registry Number	Physical Form	Chemical Form	(A)nnual/(T)otal Quantity	Unit	Begin Year	End Year	Samples?	Minimum Value/#Samp	Maximum Value/STD	Basis for Uncertainty
None.										

* If sample data are available, mark Y in the column titled "Samples?" and provide number of samples in the next column and standard deviation in the next column.
If not, mark N and give the minimum value and maximum value.
Additional information or explanations (indicate pertinent contaminant)

For each contaminant, complete at least one line on the following table. If any entries for that contaminant vary by year, fill out additional lines as needed to cover the varying entries for different years. For example, if the annual quantity disposed was x kg for 1952-56 and y kg for 1956-84, use two lines to handle this situation.

Radionuclide	Physical Form	Chemical Form	(A)nnual/(T)otal Quantity	Unit	Begin Year	End Year	Samples?	Minimum Value/#Samp	Maximum Value/STD	Basis for Uncertainty
Cr-51	Solid.	Metal.	T 50.000000000000	CI	1963	1963	N			
Mn-54	Solid.	Metal.	T 230.00000000000	CI	1963	1963	N			
Fe-55	Solid.	Metal.	T 2040.0000000000	CI	1963	1963	N			
Fe-59	Solid.	Metal.	T 6.0000000000000	CI	1963	1963	N			
Co-58	Solid.	Metal.	T 50.000000000000	CI	1963	1963	N			
Co-60	Solid.	Metal.	T 600.00000000000	CI	1963	1963	N			
Ni-63	Solid.	Metal.	T 52.000000000000	CI	1963	1963	N			
Nb-94	Solid.	Metal.	T .00100000000000	CI	1963	1963	N			
Nb-95	Solid.	Metal.	T .00600000000000	CI	1963	1963	N			

* If sample data are available, mark Y in the column titled "Samples?" and provide number of samples in the next column and standard deviation in the next column.
If not, mark N and give the minimum value and maximum value.
Additional information or explanations (indicate pertinent contaminant)
In the process of creating metallurgical samples, loose contamination is routinely removed. Therefore, this waste stream is characterized nearly exclusively by the activation products that are created in the structural materials, by the neutron flux to which they were subjected, and contains insignificant amounts of fission products that are included in the companion waste stream, TAN-607-3.

1. Type of source of information:
(check box)

[ ] RWMIS [ ] other database
[ ] sample analysis data
[ ] operating records [X] interview
[ ] expert judgment [X] reports
[X] other
Radioactive waste shipping manifests.

2. Details concerning source (names, report no., dates, etc.)
Interviews with Dr. J.F. Kunze, R.B. O'Brien, and G.J. Briscoe provided information on the extensive number of samples that were examined in the RML/Hot Cells and how they were disposed. "The Final Report of SL-1 Recovery Operation", May 1961 through July 1962, General Electric, July 27, 1962, IDO-19311, also provides information concerning the types of metallurgical samples that were examined.

3. Do the estimates of contaminant quantities in Part C and D represent:
[X] best estimate
[ ] worst case
[ ] other

4. If other than best estimate, explain why:

5. Do the data conflict with RWMIS?
(Historical or Present Data Only)
[X] no
[ ] yes

6. If yes, explain why:

7. Major unknowns in inventories of contaminants:
Type of stainless steel or metal irradiated and the time of irradiation.

8. Key assumptions used to deal with the unknowns:
Stainless steel type 304 was assumed for activation.

DATA INPUT FOR HISTORICAL DATA TASK FOR RWMC SUBSURFACE DISPOSAL AREA

PART A - GENERAL INFORMATION HDT - 240

1. Preparer: Henry Peterson

2. Date prepared: 02/07/94

3. Generator: TAN
(area or contractor - use code from attached list)

4. Particular facility: 633
(building number - use code from attached list)

5. Number of waste stream from this facility:
4H

6. Waste stream:
Metallurgical samples/specimens from examination of the Ml-1, PM-2A, and the 2 SNAPTRAN systems.

7. Type of radioactive waste (check box):
[ ] TRU or suspect TRU
[X] LLW
[ ] non-radioactive

8. Actual years disposed of at SDA:
Starting year 1964 Ending year 1966

9. Waste stream volume:
Amount 162.0000 Units Cubic meters.
Check box: [ ] annual or [X] total over all years
Check box: [X] container volume or [ ] waste volume

10. Comments (specify number of pertinent question):
6. This waste stream originated at the TAN-RML/Hot Cells (TAN-633) and covers a period of three years: 1964, 1965, and 1966. Originally, this waste stream was to be subdivided into several smaller units, but the documentation is not specific enough to allow this subdivision. Therefore, this waste stream covers two minor projects, and two major projects, that were accomplished at the TAN facilities: the two minor projects involved the two SNAPTRAN tests that were conducted in April 1964 and January 1966. The two major projects involved the ML-1 and PM-2A reactor vessel examinations. The final report for the ML-1 examination was published in June 1966, and the report for the PM-2A examination was published in March 1967. Since these projects cannot presently be divided, they are all included in the same waste stream. A review of the waste shipping manifests provides data to illustrate the magnitude of this stream compared to the other major waste for TAN.

TAN HOT SHOP AND RML/HOT CELL WASTE FOR 1964,1965, AND 1966
(From review of the shipping manifests)

	Total Tan Area		Hot Shop		RML/Hot Cells	
Year	Curies	Vol.(M3)	Curies	Vol.(M3)	Curies	Vol.(M3)
1964	3624	412	0.86	23.2	1019	28.9
RWMIS	3864	457	----	----	----	----
1965	1454	400	8.27	160.9	1421	43.6
RWMIS	1364	405	----	----	----	----
1966	4852	851	3.62	70.6	4842	89.3
RWMIS	3842	862	----	----	----	----

1. General physical form (see attached list)

[X] other (specify)
2, 3, 4, 5, 10, 17, 15, 21, 22, 23, 51.

2. Details on physical form(particularly confinement related)
See 7 below.

3. Chemical form:
Mostly metal.

4. Inner packaging: [ ] plastic bag [X] plastic liner
[ ] metal liner [ ] none [X] other (specify)
Metal liner.

5. Waste container type (see attached list)
Metal barrel*.

6. Other characteristics of interest:
None.

7. Comments (specify number of pertinent question):
1, 2, and 4. During the three-year period covered by this waste stream, the TAN RML/Hot Cell processed 17 ICPP Waste Calciner Facility (WCF) and Hot Cell filters, which are to be considered to have accumulated radioactive material in a highly dispersible, particulate form. These filters were packaged in a plastic lined plywood box for shipment to the RWMC. The other major physical form included in this waste stream is solid pieces of stainless steel, assumed for purposes of activation to be type 304, the most commonly used type of stainless steel for experiment and structural purposes. If the pieces of stainless steel were small enough to be placed in fiber or steel barrels, that is how they were contained for shipment to the RWMC. If the pieces were too large to fit in these fiber or steel barrels, and were relatively contamination free (of removable contamination), the articles were wrapped in plastic and placed generally in plywood boxes for shipment to the RWMC. Also, during this three-year period, 414.09 grams of U-235 (assumed to be 93% enriched, the enrichment consistent with this period of time), 1 gram of plutonium (assumed to be Pu-239), and 2360 grams of depleted uranium (U-238) were authorized, by the AEC, for disposal in the RWMC. This accountable material was generally canned in stainless or aluminum cans and sealed, before being placed in fiber or steel barrels/drums for disposal.

For each contaminant, complete at least one line on the following table. If any entries for that contaminant vary by year, fill out additional lines as needed to cover the varying entries for different years. For example, if the annual quantity disposed was x kg for 1952-56 and y kg for 1956-84, use two lines to handle this situation.

Contaminant & CAS Registry Number	Physical Form	Chemical Form	(A)nnual/(T)otal Quantity	Unit	Begin Year	End Year	Samples?	Minimum Value/#Samp	Maximum Value/STD	Basis for Uncertainty
11135-81-2 Sodium Potassium	Liquid.	Elemental.	T 360.00000000000	GM	1966	1966	N	180	360	
15625-89-5 Trimethylolpropane-Triester	Liquid.		T 440.00000000000	GL	1966	1966	N	220	440	Drums may not have been full.
7440-47-3 Chromium	Solid.	Metal.	Unknown.	GM	1966	1966	N		*	
7440-02-0 Nickel	Solid.	Metal.	Unknown.	GM	1966	1966	N			

* If sample data are available, mark Y in the column titled "Samples?" and provide number of samples in the next column and standard deviation in the next column. If not, mark N and give the minimum value and maximum value.

Additional information or explanations (indicate pertinent contaminant)

Hazardous material disposed of during this three-year period consisted of a maximum of 360 grams of NaK, 8 55-gallon drums of an organic liquid, trimethylolpropane triester, used in the testing of the PM-2A, and an unknown amount of nichrome (80% nickel and 20% chromium) clad and structural material from the GE-ANP testing of the HTRE reactors. The NaK is reported on the shipping manifest to be sealed within stainless steel tubes. The nichrome has at least a 5 year decay and will consist primarily of Ni-59 and Ni-63, with essentially all of the gamma field being contributed by the Ni-59 and small amounts of impurities in the material. An estimated amount of 3010 curies is attributed to the nichrome components, based on the addition of the curie values ascribed to the HTRE components.

For each contaminant, complete at least one line on the following table. If any entries for that contaminant vary by year, fill out additional lines as needed to cover the varying entries for different years. For example, if the annual quantity disposed was x kg for 1952-56 and y kg for 1956-84, use two lines to handle this situation.

Radionuclide	Physical Form	Chemical Form	(A)nnual/(T)otal Quantity	Unit	Begin Year	End Year	Samples?	Minimum Value/#Samp	Maximum Value/STD	Basis for Uncertainty
Cs-137	Solid particulate.	Unknown.	T 304.00000000000	CI	1964	1964	N			
Sr-90	Solid particulate.	Unknown.	T 304.00000000000	CI	1964	1964	N			
Pu-238	Solid particulate.	Unknown.	T 3.0000000000000	CI	1964	1964	N			
C-14	Solid.	Metal.	T .30000000000000	CI	1964	1964	N			
Cr-51	Solid.	Metal.	T .72000000000000	CI	1964	1964	N			
Mn-54	Solid.	Metal.	T 215.00000000000	CI	1964	1964	N			
Fe-55	Solid.	Metal.	T 2460.0000000000	CI	1964	1964	N			
Fe-59	Solid.	Metal.	T .53000000000000	CI	1964	1964	N			
Co-58	Solid.	Metal.	T 12.000000000000	CI	1964	1964	N			

* If sample data are available, mark Y in the column titled "Samples?" and provide number of samples in the next column and standard deviation in the next column. If not, mark N and give the minimum value and maximum value.

Additional information or explanations (indicate pertinent contaminant)

See last page of Part D.

For each contaminant, complete at least one line on the following table. If any entries for that contaminant vary by year, fill out additional lines as needed to cover the varying entries for different years. For example, if the annual quantity disposed was x kg for 1952-56 and y kg for 1956-84, use two lines to handle this situation.

Radionuclide	Physical Form	Chemical Form	(A)nnual/(T)otal Quantity	Unit	Begin Year	End Year	Samp les?	Minimum Value/#Samp	Maximum Value/STD	Basis for Uncertainty
Co-60	Solid.	Metal.	T 770.00000000000	CI	1964	1964	N			
Ni-59	Solid.	Metal.	T .43000000000000	CI	1964	1964	N			
Ni-63	Solid.	Metal.	T 72.000000000000	CI	1964	1964	N			
Nb-94	Solid.	Metal.	T .00230000000000	CI	1964	1964	N			
Sr-90	Solid particulate.	Unknown.	T 45.000000000000	CI	1965	1965	N			
Cs-137	Solid particulate.	Unknown.	T 45.000000000000	CI	1965	1965	N			
Pu-238	Solid particulate.	Unknown.	T .50000000000000	CI	1965	1965	N			
C-14	Solid.	Metal.	T .12000000000000	CI	1965	1965	N			
Cr-51	Solid.	Metal.	T .28000000000000	CI	1965	1965	N			

* If sample data are available, mark Y in the column titled "Samples?" and provide number of samples in the next column and standard deviation in the next column.
If not, mark N and give the minimum value and maximum value.
Additional information or explanations (indicate pertinent contaminant)
See last page of Part D.

For each contaminant, complete at least one line on the following table. If any entries for that contaminant vary by year, fill out additional lines as needed to cover the varying entries for different years. For example, if the annual quantity disposed was x kg for 1952-56 and y kg for 1956-84, use two lines to handle this situation.

Radionuclide	Physical Form	Chemical Form	(A)nnual/(T)otal Quantity	Unit	Begin Year	End Year	Samples?	Minimum Value/#Samp	Maximum Value/STD	Basis for Uncertainty
Mn-54	Solid.	Metal.	T 83.000000000000	CI	1965	1965	N			
Fe-55	Solid.	Metal.	T 960.00000000000	CI	1965	1965	N			
Fe-59	Solid.	Metal.	T .21000000000000	CI	1965	1965	N			
Co-58	Solid.	Metal.	T 4.5000000000000	CI	1965	1965	N			
Co-60	Solid.	Metal.	T 300.00000000000	CI	1965	1965	N			
Ni-59	Solid.	Metal.	T .17000000000000	CI	1965	1965	N			
Ni-63	Solid.	Metal.	T 28.000000000000	CI	1965	1965	N			
Nb-94	Solid.	Metal.	T .00090000000000	CI	1965	1965	N			
U-234	Solid.	Metal.	T .01600000000000	CI	1965	1965	N			

* If sample data are available, mark Y in the column titled "Samples?" and provide number of samples in the next column and standard deviation in the next column.
If not, mark N and give the minimum value and maximum value.
Additional information or explanations (indicate pertinent contaminant)
See last page of Part D.

For each contaminant, complete at least one line on the following table. If any entries for that contaminant vary by year, fill out additional lines as needed to cover the varying entries for different years. For example, if the annual quantity disposed was x kg for 1952-56 and y kg for 1956-84, use two lines to handle this situation.

Radionuclide	Physical Form	Chemical Form	(A)nnual/(T)otal Quantity	Unit	Begin Year	End Year	Samples?	Minimum Value/#Samp	Maximum Value/STD	Basis for Uncertainty
U-235	Solid.	Metal.	T .00052000000000	CI	1965	1965	N			
U-238	Solid.	Metal.	T .00000490000000	CI	1965	1965	N			
Sr-90	Solid particulate.	Unknown.	T 65.000000000000	CI	1966	1966	N			
Cs-137	Solid particulate.	Unknown.	T 65.000000000000	CI	1966	1966	N			
Pu-238	Solid particulate.	Unknown.	T .70000000000000	CI	1966	1966	N			
C-14	Solid.	Metal.	T .15000000000000	CI	1966	1966	N			
Cr-51	Solid.	Metal.	T .36000000000000	CI	1966	1966	N			
Mn-54	Solid.	Metal.	T 110.00000000000	CI	1966	1966	N			
Fe-55	Solid.	Metal.	T 1240.0000000000	CI	1966	1966	N			

* If sample data are available, mark Y in the column titled "Samples?" and provide number of samples in the next column and standard deviation in the next column. If not, mark N and give the minimum value and maximum value.

Additional information or explanations (indicate pertinent contaminant)

See last page of Part D.

For each contaminant, complete at least one line on the following table. If any entries for that contaminant vary by year, fill out additional lines as needed to cover the varying entries for different years. For example, if the annual quantity disposed was x kg for 1952-56 and y kg for 1956-84, use two lines to handle this situation.

Radionuclide	Physical Form	Chemical Form	(A)nnual/(T)otal Quantity	Unit	Begin Year	End Year	Samples?	Minimum Value/#Samp	Maximum Value/STD	Basis for Uncertainty
Fe-59	Solid.	Metal.	T .27000000000000	CI	1966	1966	N			
Co-58	Solid.	Metal.	T 5.8000000000000	CI	1966	1966	N			
Co-60	Solid.	Metal.	T 390.00000000000	CI	1966	1966	N			
Ni-59	Solid.	Metal.	T 3010.0000000000	CI	1966	1966	N			
Ni-63	Solid.	Metal.	T 18.000000000000	CI	1966	1966	N			
Nb-94	Solid.	Metal.	T .00120000000000	CI	1966	1966	N			
U-234	Solid.	Metal.	T .00990000000000	CI	1966	1966	N			
U-235	Solid.	Metal.	T .00031000000000	CI	1966	1966	N			
U-238	Solid.	Metal.	T .00079000000000	CI	1966	1966	N			

* If sample data are available, mark Y in the column titled "Samples?" and provide number of samples in the next column and standard deviation in the next column.
If not, mark N and give the minimum value and maximum value.
Additional information or explanations (indicate pertinent contaminant)
See last page of Part D.

For each contaminant, complete at least one line on the following table. If any entries for that contaminant vary by year, fill out additional lines as needed to cover the varying entries for different years. For example, if the annual quantity disposed was x kg for 1952-56 and y kg for 1956-84, use two lines to handle this situation.

Radionuclide	Physical Form	Chemical Form	(A)nnual/(T)otal Quantity	Unit	Begin Year	End Year	Samples?	Minimum Value/#Samp	Maximum Value/STD	Basis for Uncertainty
Pu-239	Unknown.	Unknown.	T .06000000000000	CI	1966	1966	N			

* If sample data are available, mark Y in the column titled "Samples?" and provide number of samples in the next column and standard deviation in the next column.
If not, mark N and give the minimum value and maximum value.
Additional information or explanations (indicate pertinent contaminant)
See last page of Part D.

Additional information or explanations (indicate pertinent contaminant)

A review of the 1964 radioactive waste shipping manifests shows that 8 ICPP WCF filters and Hot Cell Filters were discarded, and contributed 304 curies to this waste stream for 1964. The remaining 3530 curies was assumed to be activation products associated with 304 stainless steel components. Since irradiation times and decay times are not known, "high burnup" irradiation conditions have been used, and a decay period of 1 year, is assumed for calculation of the radionuclide distribution. The radionuclide distribution in the 304 SS was calculated by the methodology described in "Characteristics of Potential Repository Wastes", U.S. DOE Office of Civilian Radioactive Waste Management, July 1992, DOE/RW-0184-R1. No U-235 was sent to the RWMC during 1964.

A review of the 1965 radioactive waste shipping manifests shows that 2 ICPP WCF filters and 1 Hot Cell Filter were discarded, and contributed 45 curies to this waste stream for 1964. Other waste manifests with significant curie values listed such items being discarded as EBR II control rod pieces, non-accountable trash from the GE experiment, ERT poison sections, and other 304 SS components. Therefore, the remaining irradiation times and decay times are not known, "high burnup" irradiation conditions have been used, and a decay period of 1 year, is assumed for calculation of the radionuclide distribution. The radionuclide distribution in the 304 SS was calculated by the methodology described in "Characteristics of Potential Repository Wastes", U.S. DOE Office of Civilian Radioactive Waste Management, July 1992, DOE/RW-0184-R1. During 1965, 258.6 grams of U-235 was authorized by the AEC for disposal and sent to the RWMC. Since 93% enrichment is typical for this time period, this discarded U-235 was assumed to be 93% enriched, and the associated uranium radionuclides were calculated by the methodology of pages 2-7, "Health Physics Manual of Good Practices for Uranium Facilities", B.L. Rich, Chairman, U.S. Doe, June 1988, EGG-2530.

A review of the 1966 radioactive waste shipping manifests shows that 5 ICPP WCF filters and 1 Hot Cell Filter were discarded, and contributed 65 curies to this waste stream for 1964. Other waste manifests with significant curie values listed such items being discarded as WAPD 49 experiment clad, HTRE control rod tips, and ML-1 components, which were either SS 304 or 321 ("Final Disassembly and examination of the ML-1 Reactor Core", by T.L. Murphy, et al., June 1966, IDO-17190). The ML-1 components alone accounted for 320 curies. There were also many HTRE components (fuel element liners, fuel element nose and tail pieces, a core structure, a core filler piece, and control rods) that accounted for 3010 curies. Irradiation times and a decay period of 1 year is assumed for calculation of the radionuclide distribution. The radionuclide distribution in 304 SS was calculated by the methodology described in "Characteristics of Potential Repository Wastes", U.S. DOE office of Civilian Radioactive Waste Management, July 1992, DOE/RW-0184-R1. During 1966, 155.49 grams of U-235, 2360 grams of depleted uranium (U-238), and 1 gram of plutonium were authorized by the AEC for disposal, and sent to the RWMC. Since 93% enrichment is typical for this time period, this discarded U-235 was assumed to be 93% enriched, and the associated uranium radionuclides were calculated by the methodology of pages 2-7, "Health Physics Manual of Good Practices for Uranium Facilities", B.L. Rich, Chairman, U.S. DOE, June 1988, EGG-2530.

1. Type of source of information:
(check box)

[X] RWMIS [ ] other database
[ ] sample analysis data
[ ] operating records [X] interview
[ ] expert judgment [X] reports
[X] other
Radioactive waste shipping manifests.

2. Details concerning source (names, report no., dates, etc.)
Interviews with G.J. Briscoe, R.B. O'Brien, and D.R. Mousseau provide details on the types of sources and methods of packaging the waste. A.N. Tschaeche provided the radionuclide distribution for the ICPP WCF off-gas filters. The reports "PM-2A Reactor Vessel Test Program Final Report", by D.R. Mousseau and J.C. Purden, March 1967, IN-1061, and "Final Disassembly and Examination of the ML-1 Reactor Core", by T.L. Murphy, et al., June 1966, IDO-17190, gave details on the source terms and the types of operations that were conducted in the TAN Hot Shop and TAN RML/Hot Cells.

3. Do the estimates of contaminant quantities in Part C and D represent:
[X] best estimate
[ ] worst case
[ ] other

4. If other than best estimate, explain why:

5. Do the data conflict with RWMIS?
(Historical or Present Data Only)
[ ] no
[X] yes

6. If yes, explain why:
RWMIS gave a higher curie value for 1964, and lower curie values for 1965 and 1966, than summed from the shipping manifests.

7. Major unknowns in inventories of contaminants:
The composition, irradiation time, and decay time for the stainless steel component activation.

8. Key assumptions used to deal with the unknowns:
Type 304 stainless steel with "high burnup" irradiation and 1 year decay was used for radionuclide distribution.