Naval Reactors Facility

DATA INPUT FOR HISTORICAL DATA TASK FOR RWMC SUBSURFACE DISPOSAL AREA

PART A - GENERAL INFORMATION HDT - 75

1. Preparer: Leonard, Patrick

2. Date prepared: 03/18/94

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

4. Particular facility: 601*
(building number - use code from attached list)

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

6. Waste stream:
Low level compactible and noncompactible waste from operation of the S1W reactor and related activities.

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

8. Actual years disposed of at SDA:
Starting year 1960 Ending year 1983

9. Waste stream volume:
Amount 2942.0000 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):
4. * also includes NRF-613.
8. Material was sent from S1W to the RWMC prior to 1960, but few records have been found for that time period. S1W was built about 1951.

1. General physical form (see attached list)
Combustibles (paper, cloth, wood, etc.).
[X] other (specify)
5.

2. Details on physical form(particularly confinement related)
Most of the activity was probably particulate with the occasional large metal valve or other reactor system component. The majority of this activity is mobile.

3. Chemical form:
Activated corrosion and wear products.

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

5. Waste container type (see attached list)
Cardboard box*.

6. Other characteristics of interest:

7. Comments (specify number of pertinent question):
5. BXW, BLM, "Other", and I.

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	Samp les?	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
Co-60	Particulate.	Oxide.	T 2129.4000000000	CI	1961	1961	N			
Fe-55	Particulate.	Oxide.	T 546.00000000000	CI	1961	1961	N			
Ni-63	Particulate.	Oxide.	T 43.700000000000	CI	1961	1961	N			
Co-60	Particulate.	Oxide.	T 124.80000000000	CI	1962	1983	N			
Fe-55	Particulate.	Oxide.	T 32.000000000000	CI	1962	1983	N			
Ni-63	Particulate.	Oxide.	T 2.5600000000000	CI	1962	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)

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

[ ] RWMIS [ ] other database
[ ] sample analysis data
[ ] operating records [ ] interview
[ ] expert judgment [ ] reports
[X] other
NRFEM-RR-1122.

2. Details concerning source (names, report no., dates, etc.)
Letter NRFEM-RR-1122 "NRF Comments to the Radioactive Waste Management Complex (RWMC) Waste Inventory Report", R.W. Nieslanik, NRF, to T.H. Smith, EG&G, dated March 29,1994.

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:
Radionuclide distribution has been re-evaluated by NRF.

7. Major unknowns in inventories of contaminants:
See continuation.

8. Key assumptions used to deal with the unknowns:
An assumption was that quantities prior to 1960 were small. The 2730 curies in 1961 can be attributed to a single event, not repeated.

Continuation of Part E Column or Question Number or Title 7.

Curie content of these shipments was estimated based on radiation readings with a Geiger-Mueller detector, a method known to have a consistent bias toward higher estimates than really present.

DATA INPUT FOR HISTORICAL DATA TASK FOR RWMC SUBSURFACE DISPOSAL AREA

PART A - GENERAL INFORMATION HDT - 76

1. Preparer: Leonard, Patrick

2. Date prepared: 03/18/94

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

4. Particular facility: 617*
(building number - use code from attached list)

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

6. Waste stream:
Low level compactible and non-compactible waste resulting from operation of the A1W reactors and related activities.

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

8. Actual years disposed of at SDA:
Starting year 1960 Ending year 1983

9. Waste stream volume:
Amount 3092.0000 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):
4. * Also includes NRF-616, NRF-636, NRF-619, NRF-630, and NRF-631.
8. A1W was built about 1957, but few records have been found that detail shipments of waste from A1W to the RWMC prior to 1960.

1. General physical form (see attached list)
Combustibles (paper, cloth, wood, etc.).
[X] other (specify)
5.

2. Details on physical form(particularly confinement related)
Most of the activity was probably particulate, with the occasional large metal valve or other reactor system component. The majority of this activity is mobile.

3. Chemical form:
Activated corrosion and wear products.

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

5. Waste container type (see attached list)
Cardboard box*.

6. Other characteristics of interest:

7. Comments (specify number of pertinent question):
5. BXW, BLM, and "Other".

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
Co-60	Particulate.	Oxide.	T 3641.3000000000	CI	1960	1983	N			
Fe-55	Particulate.	Oxide.	T 1790.0000000000	CI	1960	1983	N			
Ni-63	Particulate.	Oxide.	T 145.00000000000	CI	1960	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)

Approximately 2E+04 curies of the short-lived Zr-95 (half-life 2 months) were omitted from this list. From the year of record (1965) until 1995, there would be a decrease to E-23 curies.

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

[X] RWMIS [ ] other database
[ ] sample analysis data
[ ] operating records [ ] interview
[ ] expert judgment [ ] reports
[X] other
NRFEM-RR-1122.

2. Details concerning source (names, report no., dates, etc.)
Letter NRFEM-RR-1122 from R.W. Nieslanik, NRF, to T.H. Smith, EG&G, "NRF Comments to the Radioactive Waste Management Complex (RWMC) Waste Inventory Report," March 29, 1994.

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:
Radionuclide distribution has been re-evaluated by NRF.

7. Major unknowns in inventories of contaminants:
See continuation.

8. Key assumptions used to deal with the unknowns:
Quantities prior to 1960 were small. A1W was built in 1957 and would not have generated much radioactive waste for a couple of years after that.

Continuation of Part E Column or Question Number or Title 7.

Curie content of these shipments was estimated, based on radiation readings with a Geiger-Mueller detector, a method known to have a consistent bias toward higher estimates than really present.

DATA INPUT FOR HISTORICAL DATA TASK FOR RWMC SUBSURFACE DISPOSAL AREA

PART A - GENERAL INFORMATION HDT - 243

1. Preparer: Leonard, Patrick

2. Date prepared: 03/10/94

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

4. Particular facility: 617*
(building number - use code from attached list)

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

6. Waste stream:
Lead and asbestos.

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

8. Actual years disposed of at SDA:
Starting year 1955 Ending year 1983

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

10. Comments (specify number of pertinent question):
(*) Also includes NRF-616, NRF-636, NRF-619, NRF-630, NRF-631, and NRF-618.

1. General physical form (see attached list)
Lead.
[X] other (specify)
47.

2. Details on physical form(particularly confinement related)
The lead was radioactively contaminated shielding material in bricks and sheets. The asbestos was loose, friable thermal insulation removed from piping.

3. Chemical form:
Lead, metal, asbestos and unknown.

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

5. Waste container type (see attached list)
Cardboard box.

6. Other characteristics of interest:

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
1332-21-4 Asbestos	Fibers.	Unknown.	Unknown.	GM	1955	1983	N			
7439-92-1 Lead	Solid metal.	Unknown.	Unknown.	GM	1955	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)

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
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)

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

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

2. Details concerning source (names, report no., dates, etc.)

3. Do the estimates of contaminant quantities in Part C and D represent:
[ ] best estimate
[ ] worst case
[X] other
No estimate.

4. If other than best estimate, explain why:
No information has been discovered to allow an estimate of the quantities of either of these two contaminants sent from NRF to the RWMC.

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:
No records have been discovered which would allow an estimate of the inventories.

8. Key assumptions used to deal with the unknowns:

Continuation of Part E Column or Question Number or Title 7.

It is known that both lead shielding and asbestos insulation was shipped from NRF to the RWMC in the past. Radioactive material transfer records show these items occasionally, and past and present employees of NRF remember sending radioactively contaminated lead and asbestos to the RWMC. What is missing is information on the quantity of these contaminants.

DATA INPUT FOR HISTORICAL DATA TASK FOR RWMC SUBSURFACE DISPOSAL AREA

PART A - GENERAL INFORMATION HDT - 78

1. Preparer: Leonard, Patrick

2. Date prepared: 07/09/93

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

4. Particular facility: 618
(building number - use code from attached list)

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

6. Waste stream:
Dissolved PWR fuel rods absorbed in vermiculite.

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

8. Actual years disposed of at SDA:
Starting year 1960 Ending year 1964

9. Waste stream volume:
Amount 5.5000 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):

1. General physical form (see attached list)
Irradiated fuel rods from experiments.
[X] other (specify)
2.

2. Details on physical form(particularly confinement related)
Fuel rods were dissolved and absorbed in vermiculite in polybottles. Nature of solution is unknown, but probably highly reactive acids. The majority of this activity is mobile.

3. Chemical form:
Unknown.

4. Inner packaging: [ ] plastic bag [ ] plastic liner
[ ] metal liner [ ] none [X] other (specify)
Poly bottles. See 7 below.

5. Waste container type (see attached list)
Insert*.

6. Other characteristics of interest:

7. Comments (specify number of pertinent question):
4. "Other" equals poly bottles used to contain the solutions, absorbed in vermiculite.
5. "Other".

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
7664393 Hydrofluoric Acid	Liquid absorbed in vermiculite.	Unknown.	Unknown.	GM	1960	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)

An assumption has been made that the PWR fuel rods were probably dissolved in HF. The resulting solution may have been made safer for handling by the addition of some complexing agent, but no information is available on this matter.

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	Solution.		T 762.00000000000	CI	1960	1964	N			
Cs-137	Solution.		T 762.00000000000	CI	1960	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)

No specific mix of radionuclides was given consistently in the records. The majority of the activity would have been due to fission products. The assumption was made for the purpose of this study that the responsible radionuclides were 50% Sr-90 and 50% Cs-137. Based on NRF data, the scaling factor uncertainty for Sr-90 in this stream was taken to be the same as that for Cs-137.

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

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

2. Details concerning source (names, report no., dates, etc.)

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:
No quantities for the chemicals, nor even their identification, are listed in the records. Gram quantities were sometimes given for Pu and U. Most of the activity would have been due to fission products.

8. Key assumptions used to deal with the unknowns:

DATA INPUT FOR HISTORICAL DATA TASK FOR RWMC SUBSURFACE DISPOSAL AREA

PART A - GENERAL INFORMATION HDT - 79

1. Preparer: Leonard, Patrick

2. Date prepared: 07/13/93

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

4. Particular facility: 618
(building number - use code from attached list)

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

6. Waste stream:
Structural components from Navy core fuel bundles.
End boxes and other components (1955-1975).

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

8. Actual years disposed of at SDA:
Starting year 1955 Ending year 1975

9. Waste stream volume:
Amount 427.3000 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):

1. General physical form (see attached list)
Irradiated end boxes.
[X] other (specify)
5.

2. Details on physical form(particularly confinement related)
Solid metal parts activated by neutrons in the core environment. The majority of the activity would be immobile.

3. Chemical form:
Metal alloys.

4. Inner packaging: [ ] plastic bag [ ] plastic liner
[X] metal liner [ ] none [X] other (specify)
See 7 below.

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

6. Other characteristics of interest:

7. Comments (specify number of pertinent question):
4. This material, scrap metal cut from Navy fuel bundles, was loaded into a shipping cask insert in the ECF water pits. The insert was then loaded into the shipping cask for transport to the RWMC where the insert was removed from the shipping cask and buried.

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
Co-60	Solid metal.	Unknown.	T 907500.00000000	CI	1955	1975	N	-30%	+10%	
Ni-63	Solid metal.	Unknown.	T 166600.00000000	CI	1955	1975	N	-30%	+10%	
Fe-55	Solid metal.	Unknown.	T 872700.00000000	CI	1955	1975	N	-30%	+10%	
Sb-125	Solid metal.	Unknown.	T 48000.000000000	CI	1955	1975	N	-30%	+10%	
Sn-119m	Solid metal.	Unknown.	T 7200.0000000000	CI	1955	1975	N	-30%	+10%	

* 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)
Radionuclide distributions were based on an evaluation of the various cores being processed during this time period. The evaluation considered the metal composition of the structural material, its location in the core, neutron flux, and power history.

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

[ ] RWMIS [ ] other database
[ ] sample analysis data
[ ] operating records [ ] interview
[ ] expert judgment [ ] reports
[X] other
NRFEM-RR-1122.

2. Details concerning source (names, report no., dates, etc.)
Letter NRFEM-RR-1122 from R.W. Nieslanik, NRF, to T.H. Smith, EG&G, "NRF Comments to the Radioactive Waste Management Complex (RWMC) Waste Inventory Report", March 29, 1994.

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:
Radionuclide distribution and curie total have been re-evaluated by NRF.

7. Major unknowns in inventories of contaminants:

8. Key assumptions used to deal with the unknowns:

DATA INPUT FOR HISTORICAL DATA TASK FOR RWMC SUBSURFACE DISPOSAL AREA

PART A - GENERAL INFORMATION HDT - 80

1. Preparer: Leonard, Patrick

2. Date prepared: 03/09/94

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

4. Particular facility: 618
(building number - use code from attached list)

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

6. Waste stream:
Structural components from Navy core fuel bundles.
End boxes and other components (1976-1980).

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

8. Actual years disposed of at SDA:
Starting year 1976 Ending year 1980

9. Waste stream volume:
Amount 98.7700 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):

1. General physical form (see attached list)
Irradiated end boxes.
[X] other (specify)
5.

2. Details on physical form(particularly confinement related)
Solid metal activated by exposure to neutrons in the core environment. The majority of the activity would be immobile.

3. Chemical form:
Metal alloys.

4. Inner packaging: [ ] plastic bag [ ] plastic liner
[X] metal liner [ ] none [X] other (specify)
See 7 below.

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

6. Other characteristics of interest:

7. Comments (specify number of pertinent question):
4. This material, scrap metal cut from Navy fuel bundles, was loaded into a shipping cask insert in the ECF water pits. The insert was then loaded into a shielded shipping cask for transport to the RWMC where the liner was removed from the shipping cask and buried.

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
Fe-55	Solid metal.	Unknown.	T 140500.00000000	CI	1976	1980	N	-30%	+10%	
Co-60	Solid metal.	Unknown.	T 116400.00000000	CI	1976	1980	N	-30%	+10%	
Sb-125	Solid metal.	Unknown.	T 76290.000000000	CI	1976	1980	N	-30%	+10%	
Sn-119m	Solid metal.	Unknown.	T 20080.000000000	CI	1976	1980	N	-30%	+10%	
Ni-63	Solid metal.	Unknown.	T 8031.0000000000	CI	1976	1980	N	-30%	+10%	

* 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)

Radionuclide distribution in accordance with Bartolomucci letter (see E-2).

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

[ ] RWMIS [ ] other database
[ ] sample analysis data
[ ] operating records [ ] interview
[ ] expert judgment [ ] reports
[X] other
Bartolomucci letter (see E-2).

2. Details concerning source (names, report no., dates, etc.)
Letter NRFE-E-1448, from J.A. Bartolomucci to J.N. Davis, "Curie Content Estimates for ECF Scrap Casks", dated February 27, 1989.

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:

8. Key assumptions used to deal with the unknowns:

DATA INPUT FOR HISTORICAL DATA TASK FOR RWMC SUBSURFACE DISPOSAL AREA

PART A - GENERAL INFORMATION HDT - 81

1. Preparer: Leonard, Patrick

2. Date prepared: 03/10/94

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

4. Particular facility: 618
(building number - use code from attached list)

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

6. Waste stream:
Structural components from Navy core fuel bundles.
End boxes and other components (1981-1983).

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

8. Actual years disposed of at SDA:
Starting year 1981 Ending year 1983

9. Waste stream volume:
Amount 56.6000 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):

1. General physical form (see attached list)
Irradiated end boxes.
[X] other (specify)
5.

2. Details on physical form(particularly confinement related)
Solid metal activated by exposure to neutrons in the core environment. The majority of the activity would be immobile.

3. Chemical form:
Metal alloy.

4. Inner packaging: [ ] plastic bag [ ] plastic liner
[X] metal liner [ ] none [X] other (specify)
See 7 below.

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

6. Other characteristics of interest:

7. Comments (specify number of pertinent question):
4. This material, scrap metal cut from Navy fuel bundles, was loaded into a shipping cask insert in the ECF water pits. The insert was then loaded into a shielded shipping cask for transport to the RWMC where the liner was removed from the shipping cask and buried.

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
Ni-63	Solid metal.	Unknown.	T 32960.000000000	CI	1981	1983	N	-30%	+10%	
Co-60	Solid metal.	Unknown.	T 21520.000000000	CI	1981	1983	N	-30%	+10%	
Fe-55	Solid metal.	Unknown.	T 10760.000000000	CI	1981	1983	N	-30%	+10%	
Co-58	Solid metal.	Unknown.	T 2018.0000000000	CI	1981	1983	N	-30%	+10%	

* 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)

Radionuclide distribution in accordance with Bartolomucci letter (see E-2).

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

[X] RWMIS [ ] other database
[ ] sample analysis data
[ ] operating records [ ] interview
[ ] expert judgment [ ] reports
[X] other
See E.2.

2. Details concerning source (names, report no., dates, etc.)
Letter NRFE-E-1448 from J.A. Bartolomucci of NRF to J.N. Davis of EG&G, "Curie Content Estimate for ECF Scrap Casks", dated February 27, 1989.

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:

8. Key assumptions used to deal with the unknowns:

DATA INPUT FOR HISTORICAL DATA TASK FOR RWMC SUBSURFACE DISPOSAL AREA

PART A - GENERAL INFORMATION HDT - 82

1. Preparer: Leonard, Patrick

2. Date prepared: 07/13/93

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

4. Particular facility: 618
(building number - use code from attached list)

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

6. Waste stream:
Zirconium alloy (zircaloy) cladding from Navy cores.

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

8. Actual years disposed of at SDA:
Starting year 1955 Ending year 1975

9. Waste stream volume:
Amount 11.7000 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):

1. General physical form (see attached list)
Zirconium.
[ ] other (specify)

2. Details on physical form(particularly confinement related)
Solid scrap, chips from machining operations, and saw fines. The majority of this material would be immobile.

3. Chemical form:
Zirconium (zircaloy) alloy.

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

5. Waste container type (see attached list)
Insert*.

6. Other characteristics of interest:

7. Comments (specify number of pertinent question):
4. The zirconium alloy scrap resulting from water pit operations on Navy cores would be cleaned from the bottom of the pits, placed in 5-gallon cans (round or square), and the cans loaded into a scrap cask insert. The insert would then be loaded into a shielded shipping cask for transport to the RWMC. At the RWMC, the insert would be removed and buried. Before use of a specially built scrap cask became common, the zirconium would be transported to the RWMC in a shielded 32-gallon galvanized trash can ("trash cask").
5. "Other."

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-XZA. Zirconium Alloys	Solid, chips and fines.	Metal alloy.	T 13000.000000000	LB	1955	1975	N	-80%	+100%	

* 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
Zr-95	Solid.	Alloy.	T 72850.000000000	CI	1955	1975	N	-30%	+10%	

* 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)

Given the short half-life (67 days) for Zr-95, the activity buried in the 1960's would have long since decayed.

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

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

2. Details concerning source (names, report no., dates, etc.)

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:
Weights of the zirconium alloy shipments were estimated at the time of shipment when any data were given at all. From 1960 through 1964, weights were frequently not given.

8. Key assumptions used to deal with the unknowns:
The assumption was made that shipments for which weights were not given were the same weight as the average weight for later shipments for which weights were listed.

Continuation of Part E Column or Question Number or Title E-8 and E-7.

The preparer estimates that approximately 13,000 pounds of mixed zirconium alloy solid pieces, chips, and saw fines were buried at the RWMC over the period from 1960 through 1967. This represents a significant fire hazard for anyone attempting to recover buried waste at the RWMC, since zirconium and zirconium alloys are pyrophoric.

DATA INPUT FOR HISTORICAL DATA TASK FOR RWMC SUBSURFACE DISPOSAL AREA

PART A - GENERAL INFORMATION HDT - 83

1. Preparer: Leonard, Patrick

2. Date prepared: 07/14/93

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

4. Particular facility: 618*
(building number - use code from attached list)

5. Number of waste stream from this facility:
6H

6. Waste stream:
Solidified sludge, resin, waste liquids in vermiculite.

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

8. Actual years disposed of at SDA:
Starting year 1955 Ending year 1983

9. Waste stream volume:
Amount 624.0000 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):
4. (*)Also includes NRF-601, NRF-617, and NRF-633.

1. General physical form (see attached list)
Sludge.
[X] other (specify)
12, 13, 14.

2. Details on physical form(particularly confinement related)
Most of these sludges and resins were contained in metal tanks and drums. Also, in many cases, there is specific mention of the liquid being absorbed in some sorbent (mainly vermiculite) or being solidified.

3. Chemical form:
Unknown.

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

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

6. Other characteristics of interest:

7. Comments (specify number of pertinent question):
5. "Other" and BLF.

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
Co-60	Sludge and resin.	Unknown.	T 472.80000000000	CI	1955	1983	N			
Cs-137	Sludge and resin.	Unknown.	T 269500.00000000	CI	1955	1983	N			
Sr-90	Sludge and resin.	Unknown.	T 269500.00000000	CI	1955	1983	N			
Fe-55	Sludge and resin.	Unknown.	T 236.40000000000	CI	1955	1983	N			
Ni-63	Sludge and resin.	Unknown.	T 78.800000000000	CI	1955	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)

MFP were treated as being 50% Sr-90 and 50% Cs-137. Based on NRF data, the scaling factor uncertainty for Sr-90 in this stream was taken to be the same as that for Cs-137.

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

[X] RWMIS [ ] other database
[ ] sample analysis data
[X] operating records [X] interview
[X] expert judgment [ ] reports
[X] other
NRFEM-RR-1122.

2. Details concerning source (names, report no., dates, etc.)
Letter from R.W. Nieslanik (NRF) to T.H. Smith (EG&G) NRFEM-RR-1122, "NRF comments to the Radioactive Waste Management Complex (RWMC) Waste Inventory Report", March 29, 1994.

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:
Curie contents in tanks and barrels were estimated using a Geiger-Mueller detector, a method that generally over-estimated the activity in the shipments.

8. Key assumptions used to deal with the unknowns:

DATA INPUT FOR HISTORICAL DATA TASK FOR RWMC SUBSURFACE DISPOSAL AREA

PART A - GENERAL INFORMATION HDT - 84

1. Preparer: Leonard, Patrick

2. Date prepared: 01/25/94

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

4. Particular facility: 618
(building number - use code from attached list)

5. Number of waste stream from this facility:
7H

6. Waste stream:
Low level compactible and non-compactible waste resulting from work at the ECF water pits and hot cells.

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

8. Actual years disposed of at SDA:
Starting year 1960 Ending year 1983

9. Waste stream volume:
Amount 12460.0000 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):

1. General physical form (see attached list)
Combustibles (paper, cloth, wood, etc.).
[X] other (specify)
10.

2. Details on physical form(particularly confinement related)
This material would likely be in the form of particulate.
The majority would be mobile.

3. Chemical form:
Unknown.

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

5. Waste container type (see attached list)
Cardboard box*.

6. Other characteristics of interest:

7. Comments (specify number of pertinent question):
5. BLM, BXW, and "Other".

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
Fe-55	Particulate.	Oxide.	T 57300.000000000	CI	1960	1983	N			
Co-60	Particulate.	Oxide.	T 115000.00000000	CI	1960	1983	N			
Ni-63	Particulate.	Oxide.	T 19100.000000000	CI	1960	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)

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

[X] RWMIS [ ] other database
[ ] sample analysis data
[ ] operating records [ ] interview
[ ] expert judgment [ ] reports
[X] other
NRFEM-RR-1122.

2. Details concerning source (names, report no., dates, etc.)
Letter NRFEM-RR-1122 from R.W. Nieslanik, NRF, to T.H. Smith, EG&G, "NRF Comments to the Radioactive Waste Management Complex (RWMC) Waste Inventory Report", March 29, 1994.

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:
Curie content of packages were estimated using a Geiger-Mueller detector, a method that generally over-estimated the activity in the shipments.

8. Key assumptions used to deal with the unknowns:

DATA INPUT FOR HISTORICAL DATA TASK FOR RWMC SUBSURFACE DISPOSAL AREA

PART A - GENERAL INFORMATION HDT - 77

1. Preparer: Leonard, Patrick

2. Date prepared: 03/21/94

3. Generator: NRF
(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:
Low level compactible and non-compactible waste, resulting from operation of the S5G reactor.

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

8. Actual years disposed of at SDA:
Starting year 1965 Ending year 1983

9. Waste stream volume:
Amount 610.0000 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):
8. S5G was built in 1965.

1. General physical form (see attached list)
Other core,reactor vessel,loop component
[X] other (specify)
21.

2. Details on physical form(particularly confinement related)
Most of the activity was probably particulate, with the occasional large metal valve or other reactor system component. The majority of this activity is mobile.

3. Chemical form:
Activated corrosion and wear products.
Fission products. Probably oxides.

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

5. Waste container type (see attached list)
Cardboard box*.

6. Other characteristics of interest:

7. Comments (specify number of pertinent question):
5. BXW, BLM, and "Other".

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
Co-60	Particulate.	Oxide.	T 9.4840000000000	CI	1965	1983	N			
Fe-55	Particulate.	Oxide.	T .18400000000000	CI	1965	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)

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

[X] RWMIS [ ] other database
[X] sample analysis data
[ ] operating records [ ] interview
[ ] expert judgment [ ] reports
[X] other
NRFEM-RR-1122.

2. Details concerning source (names, report no., dates, etc.)
Letter NRFEM-RR-1122 from R.W. Nieslanik, NRF to T.H. Smith, EG&G,"NRF Comments to the Radioactive Waste Management Complex (RWMC) Waste Inventory Report", March, 1994.

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:
Radionuclide distribution has been re-evaluated by NRF.

7. Major unknowns in inventories of contaminants:
Curie contents in packages and boxes were estimated using a Geiger-Mueller detector, a method that generally over-estimated the activity in the shipments.

8. Key assumptions used to deal with the unknowns: