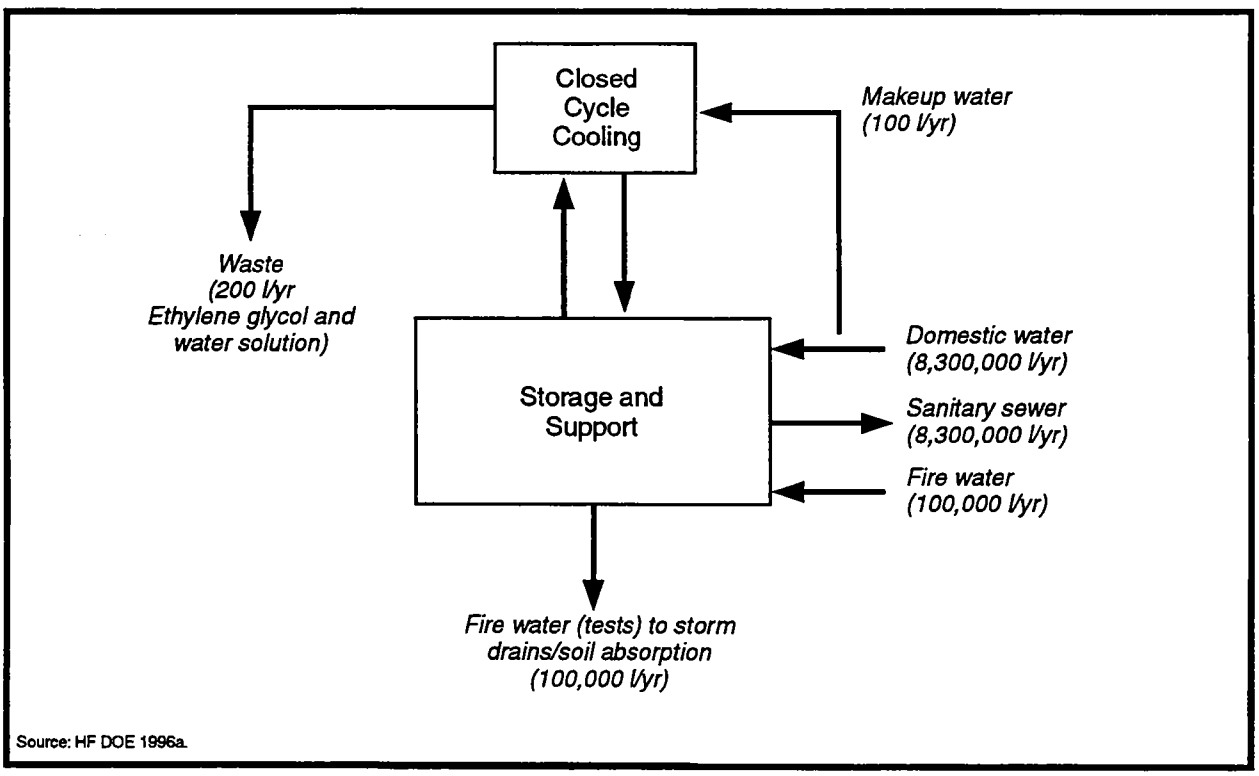
Appendix D
Water Usage

This appendix provides information on overall water usage for the storage and disposition facilities covered by this programmatic environmental impact statement. This information is portrayed in a single water balance diagram for each facility. Gross quantities for intakes to the facility, and effluents from it, are provided. No quantities are estimated internal to the facility, but pathways are shown. Intakes are assumed to be from groundwater, surface water, and rainwater (stormwater).

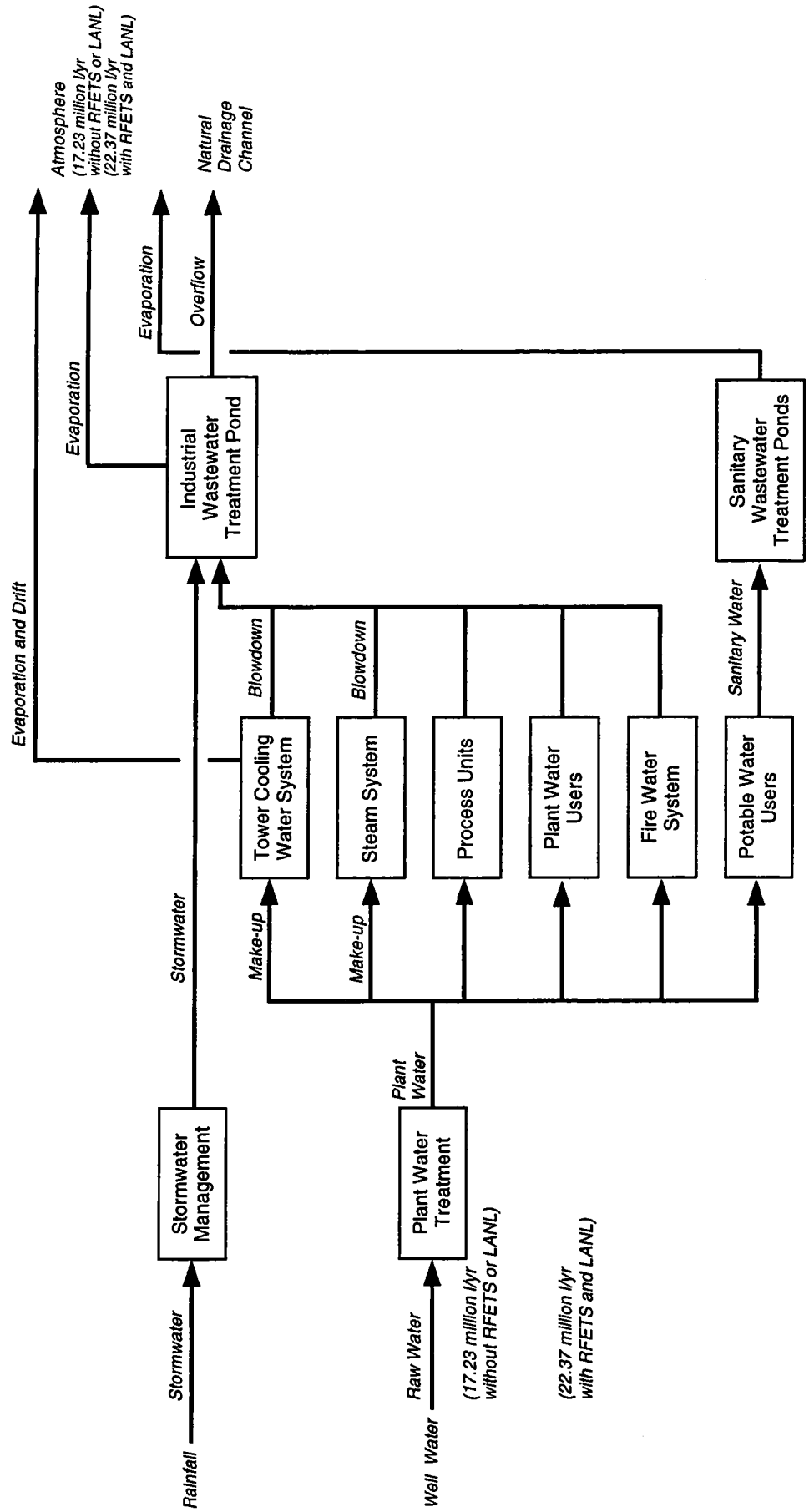
D.1 STORAGE ALTERNATIVES

The water balance diagrams with flow rates in liter/year (l/yr) in Figure D.1–1 to D.1–20 for the plutonium (Pu) and highly enriched uranium (HEU) storage alternatives are organized into three groups: modification of existing and/or construction of new storage facilities, consolidated Pu storage facilities, and collocated Pu and HEU storage facilities. Figures within each group are arranged in the following order: Hanford Site (Hanford), Nevada Test Site (NTS), Idaho National Engineering Laboratory (INEL), the Pantex Plant (Pantex), Oak Ridge Reservation (ORR), and Savannah River Site (SRS). The Preferred Alternative for the long-term storage of surplus Pu involves a combination of upgrade (Pantex, ORR, and SRS), No Action (Hanford, NTS, INEL, and Los Alamos National Laboratory), and phaseout (Rocky Flats Environmental Technology Site).



2464/S&D

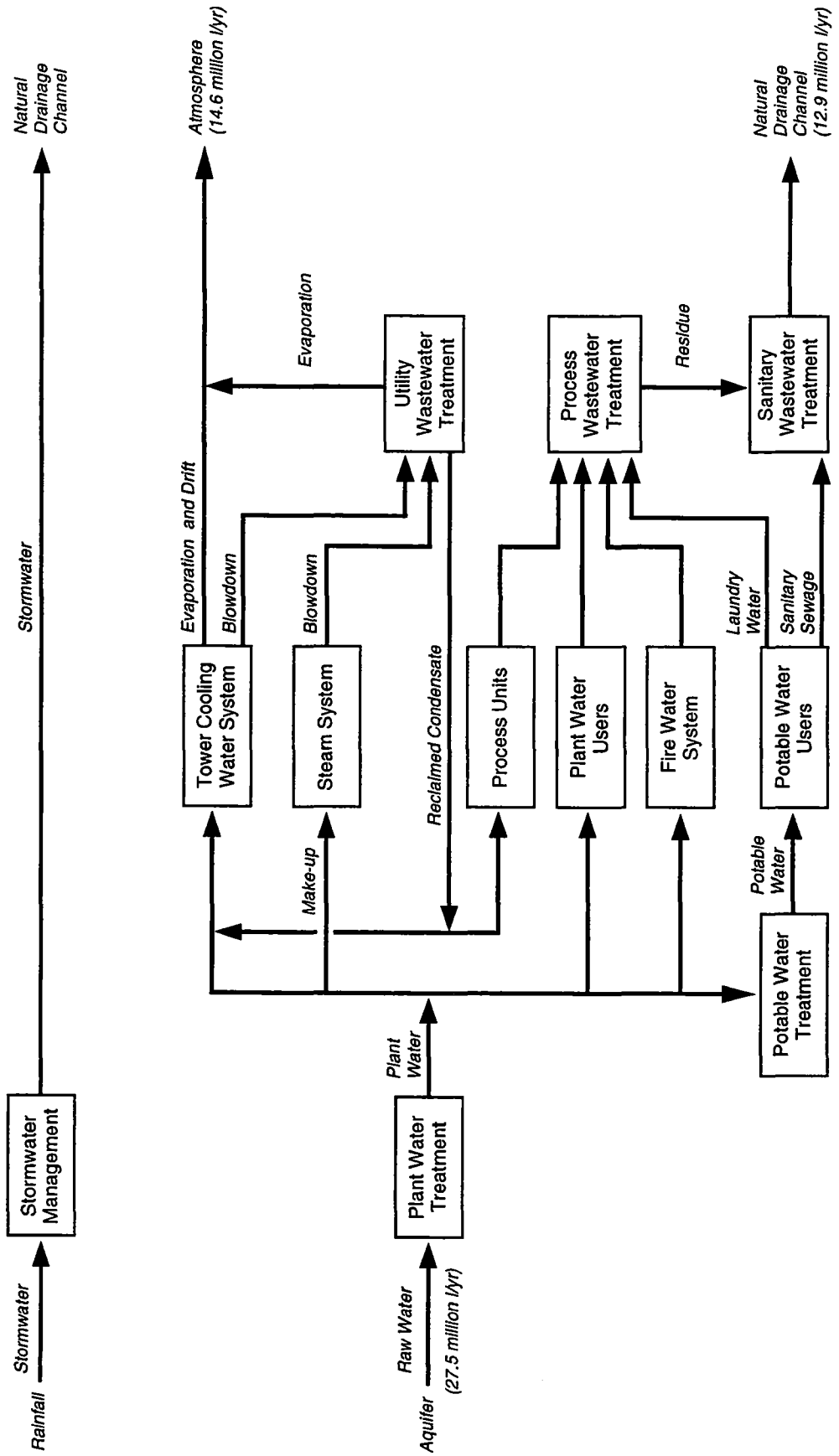
Figure D.1–1. Annual Water Balance for the Upgrade Alternative at Hanford Site.



2523/S&D

Note: Values on this figure may not exactly match raw water requirements and wastewater values in other parts of this PEIS due to rounding. Values in this figure have more significant digits to match the source document's water balance diagram.
Source: IN DOE 1996a.

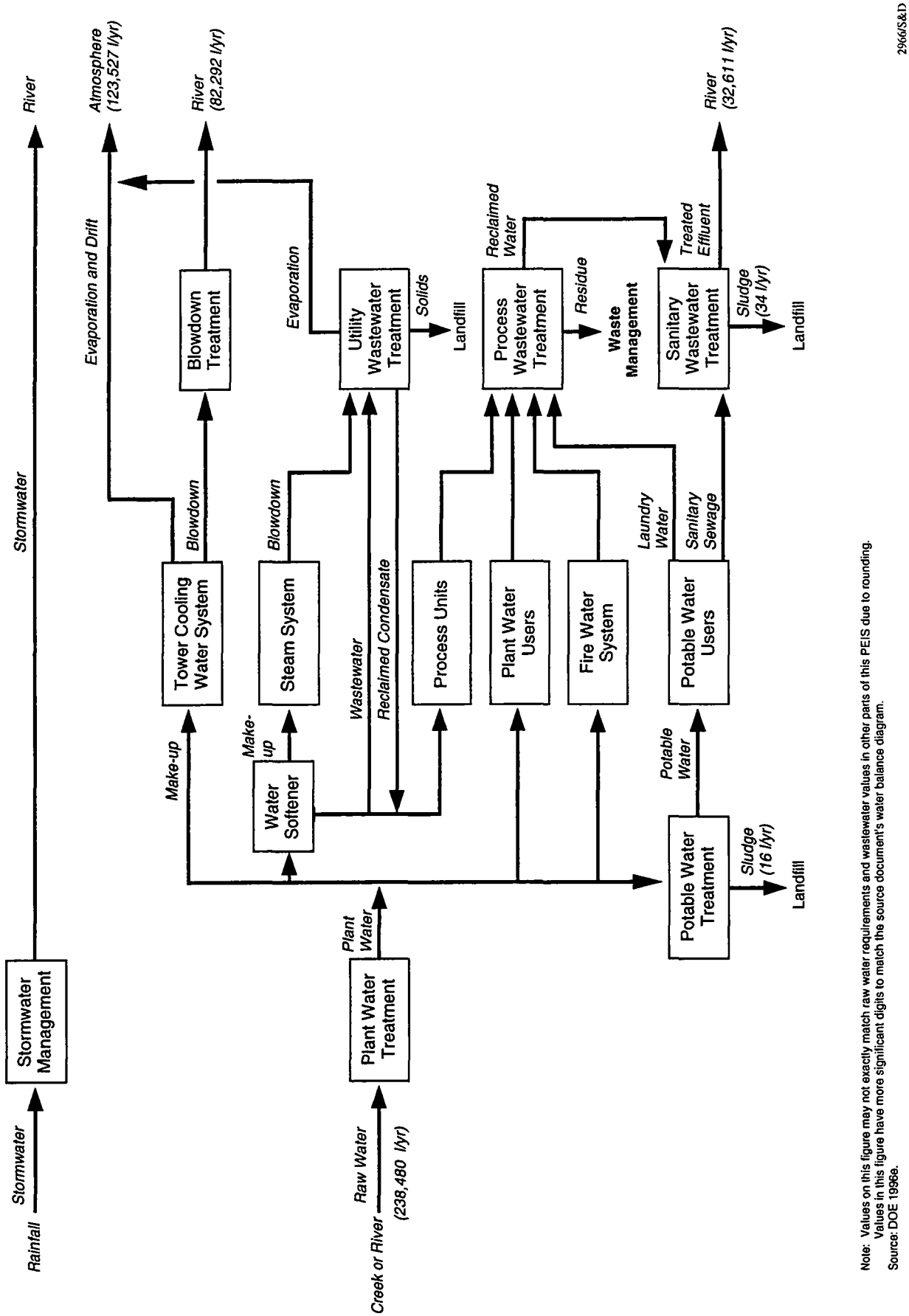
Figure D.1–2. Annual Water Balance for the Upgrade Alternative at Idaho National Engineering Laboratory, Argonne National Laboratory–West.



2965/S&D

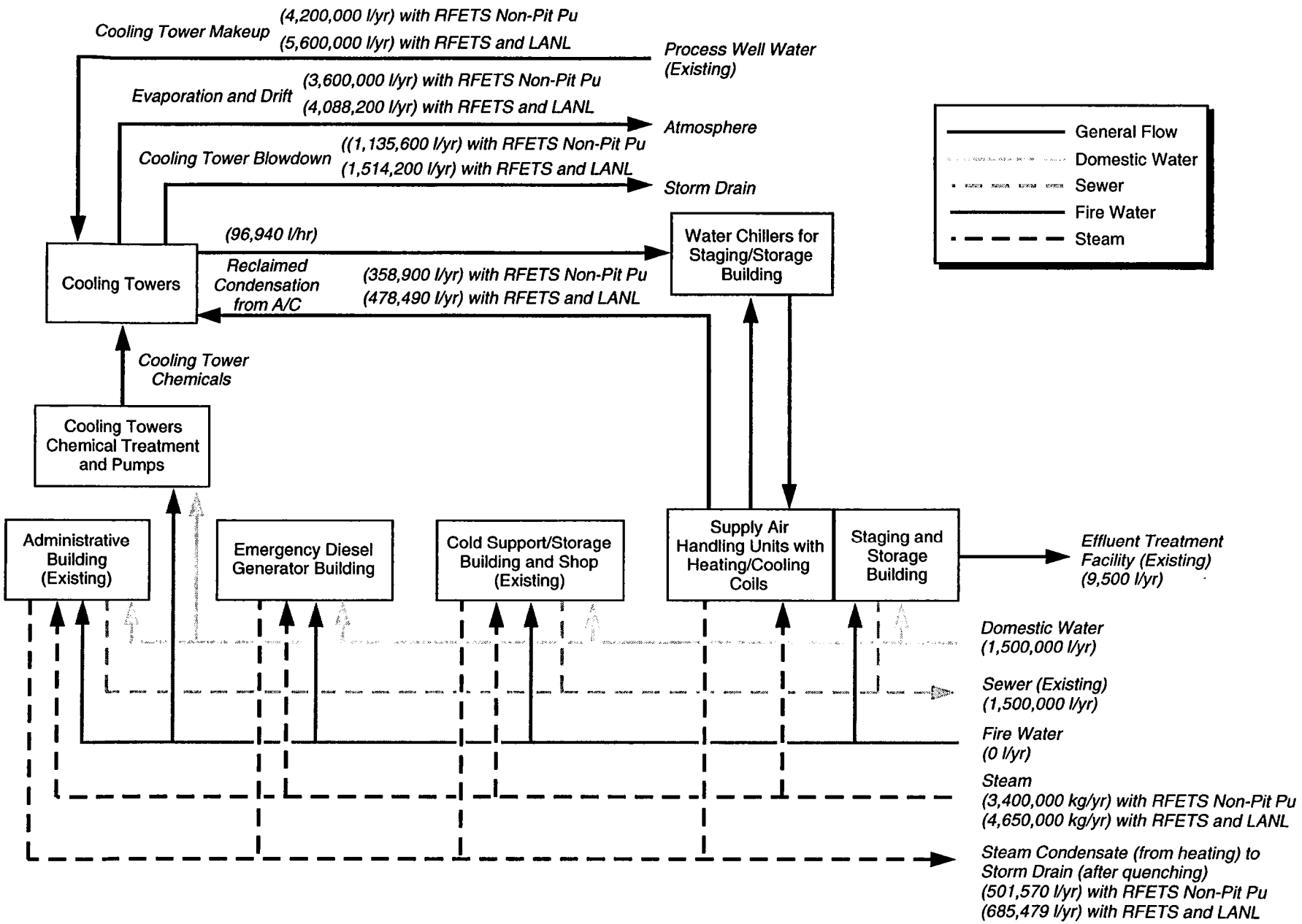
Note: Values on this figure may not exactly match raw water requirements and wastewater values in other parts of this PEIS due to rounding. Values in this figure have more significant digits to match the source document's water balance diagram.
Source: PX MH 1994a.

Figure D.1–3. Annual Water Balance for the Upgrade Alternative at Pantex Plant.



Note: Values on this figure may not exactly match raw water requirements and wastewater values in other parts of this PEIS due to rounding. Values in this figure have more significant digits to match the source document's water balance diagram.
Source: DOE 1996a.

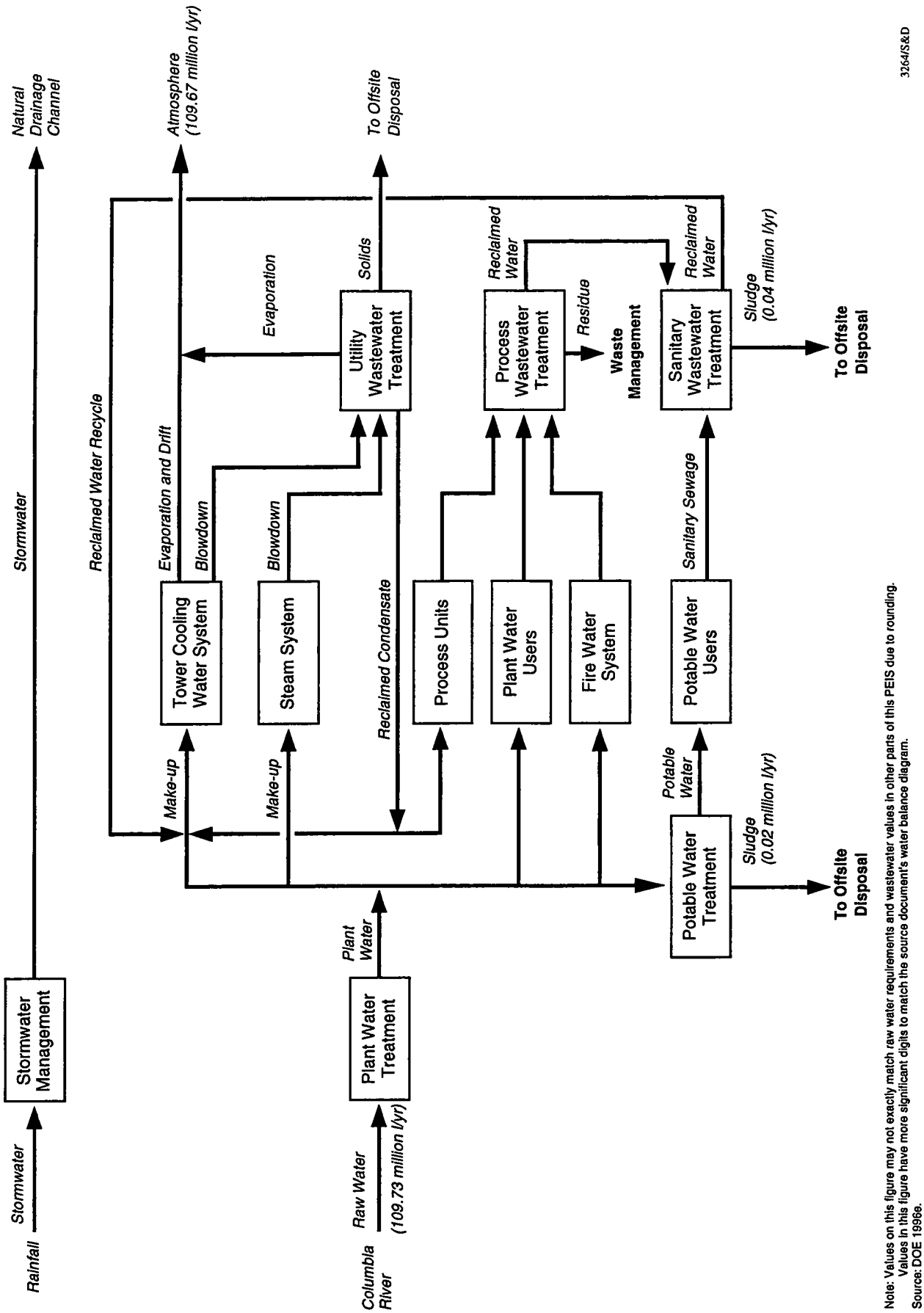
Figure D.1–4. Annual Water Balance for the Upgrade Alternative at Oak Ridge Reservation, Y–12 Plant.



Note: All values are with RFETS Pu and LANL Pu; values on this figure may not exactly match raw water requirements and wastewater values in other parts of this PEIS due to rounding. Values in this figure have more significant digits to match the source document's water balance diagram.
Source: SR DOE 1994e; SRS 1996a:4; WSRC 1995e.

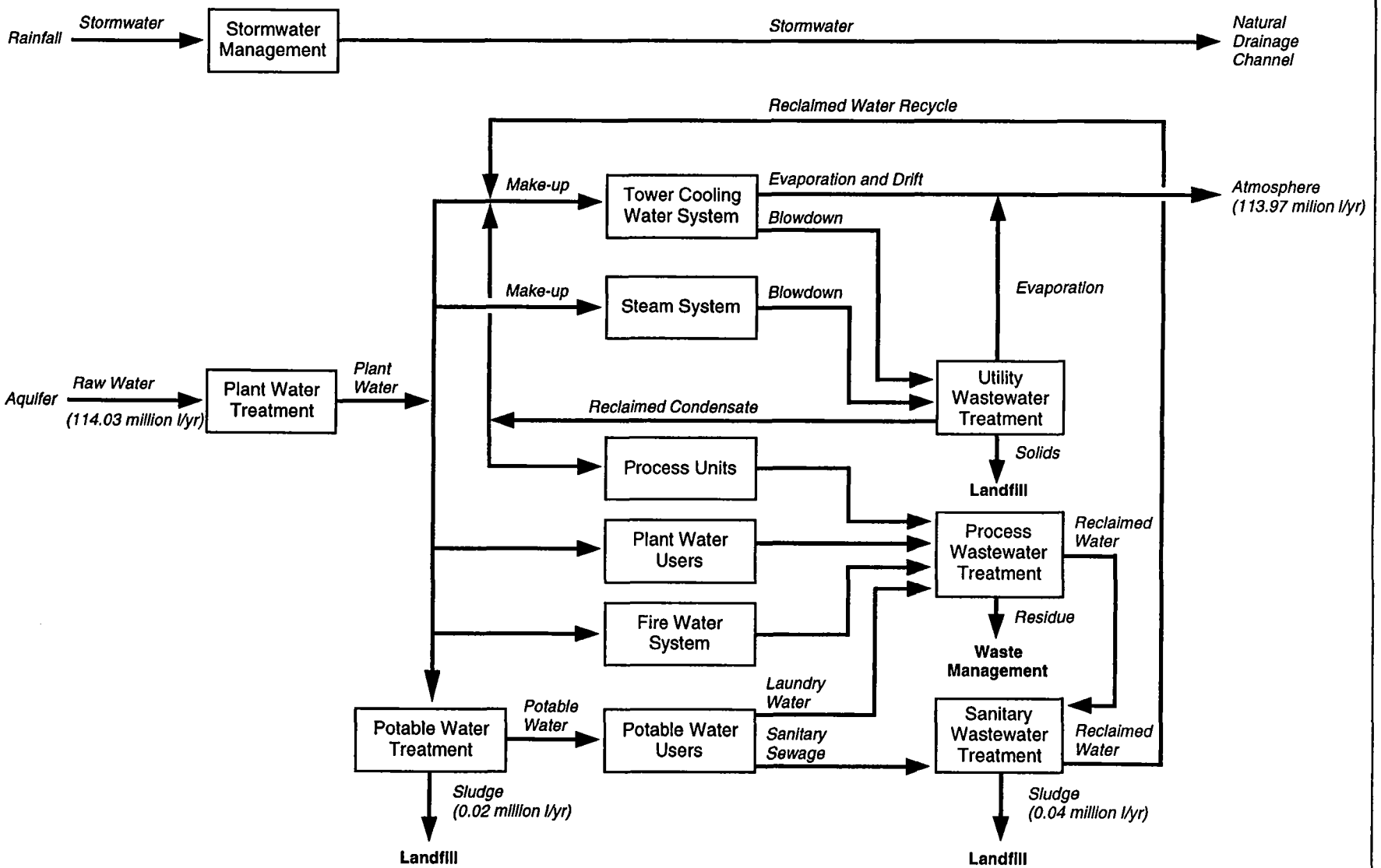
2471/S&D

Figure D.1–5. Annual Water Balance for the Upgrade Alternatives at Savannah River Site.



Note: Values on this figure may not exactly match raw water requirements and wastewater values in other parts of this PEIS due to rounding. Values in this figure have more significant digits to match the source document's water balance diagram.
Source: DOE 1996a.

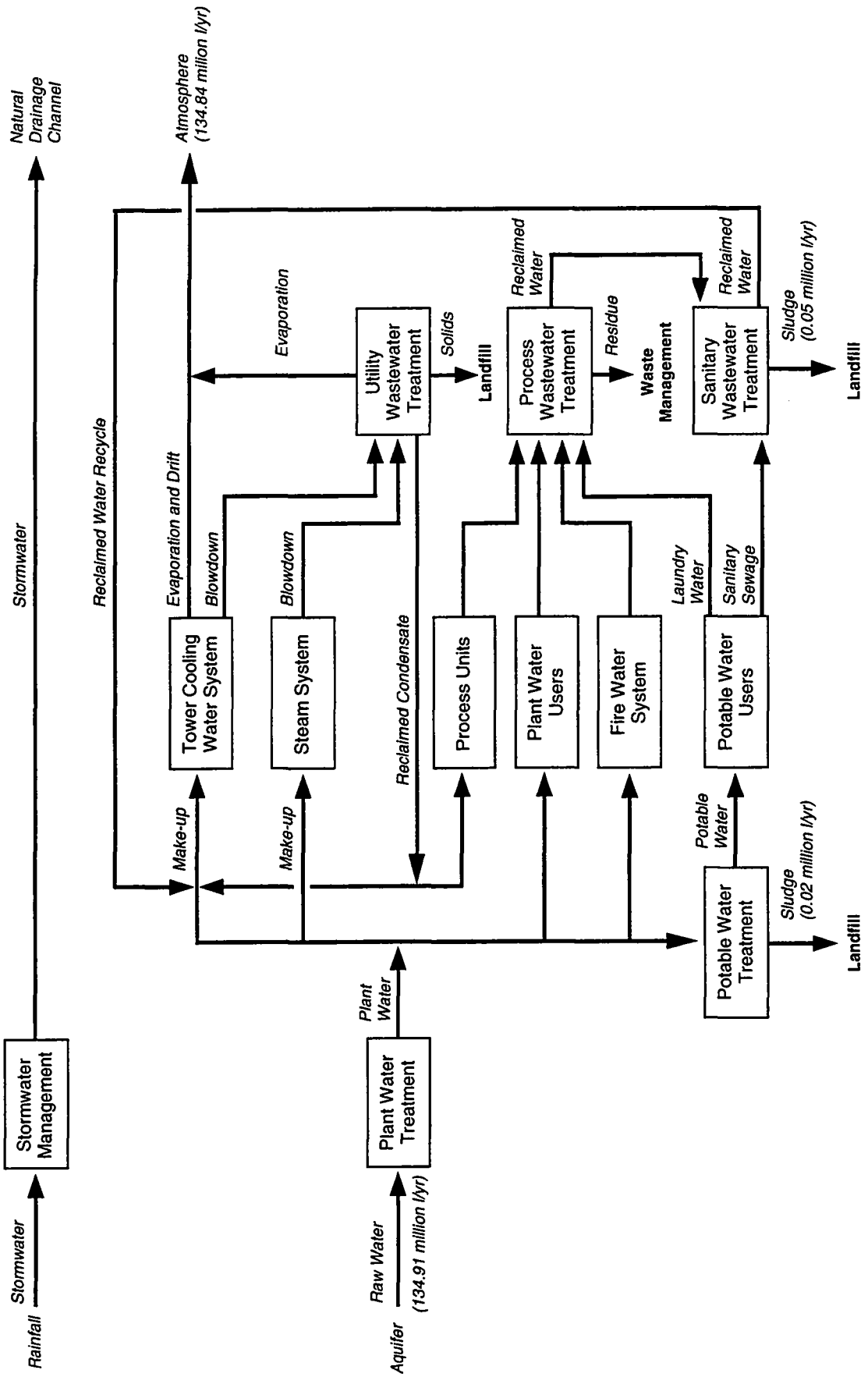
Figure D.1–6. Annual Water Balance for the Consolidation Alternative at Hanford Site.



Note: Values on this figure may not exactly match raw water requirements and wastewater values in other parts of this PEIS due to rounding.
Values in this figure have more significant digits to match the source document's water balance diagram.
Source: DOE 1996e.

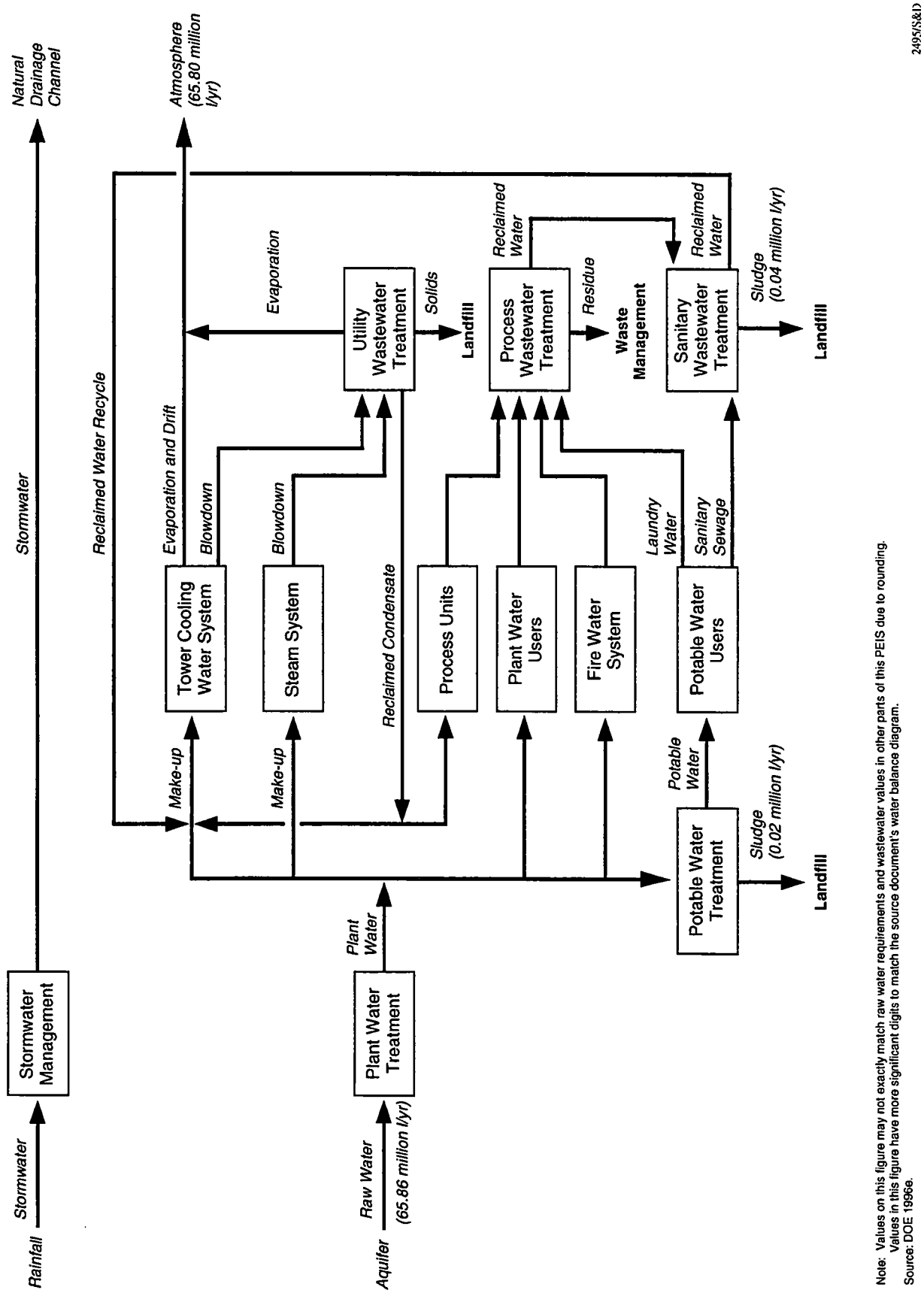
2496/S&D

Figure D.1–7. Annual Water Balance for the Consolidation Alternative Constructing a New Facility at Nevada Test Site.



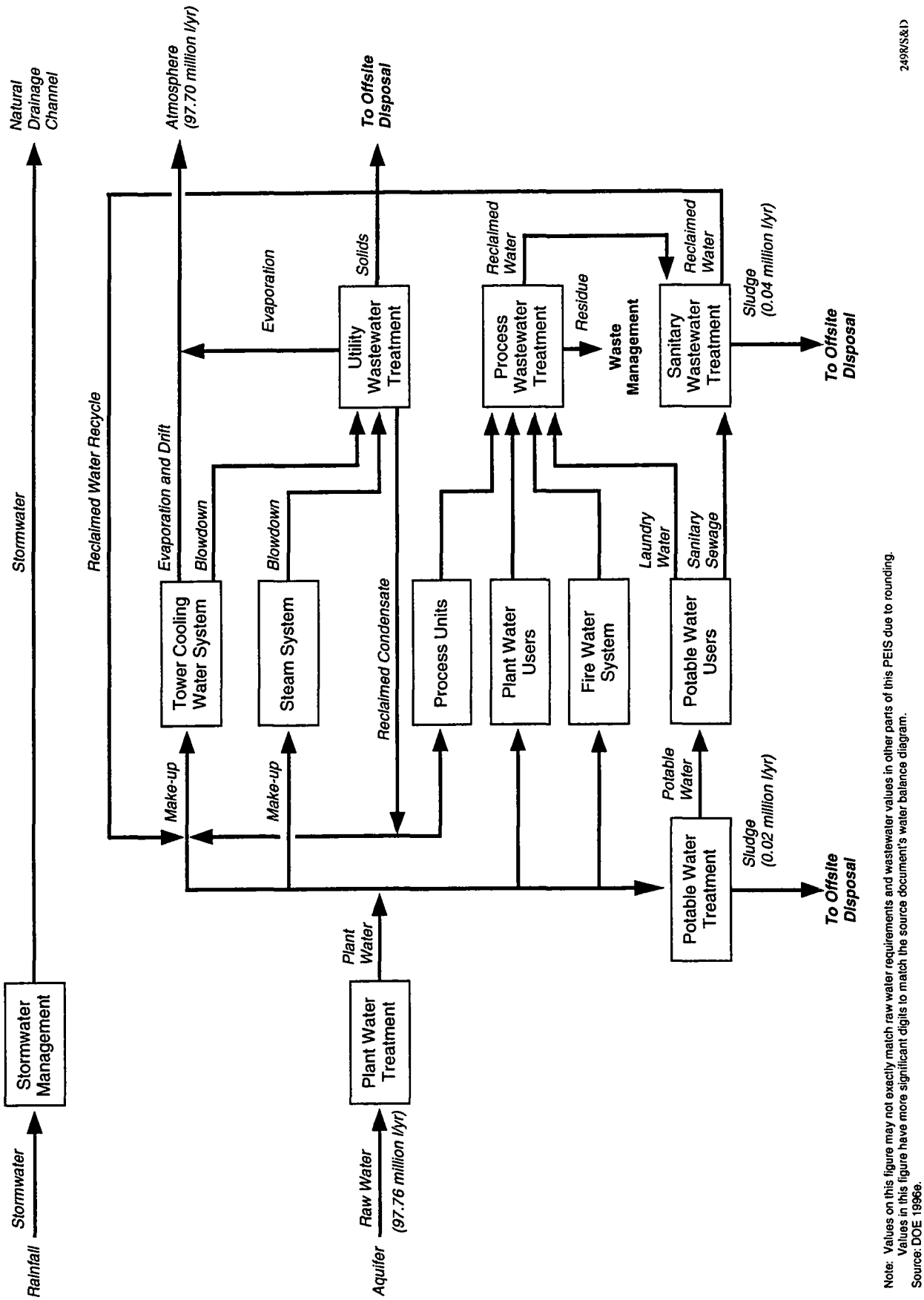
Note: Values on this figure may not exactly match raw water requirements and wastewater values in other parts of this PEIS due to rounding. Values in this figure have more significant digits to match the source document's water balance diagram.
Source: NT DOE 1996a.

Figure D.1–8. Annual Water Balance for the Consolidation Alternative Modifying P-Tunnel at Nevada Test Site.



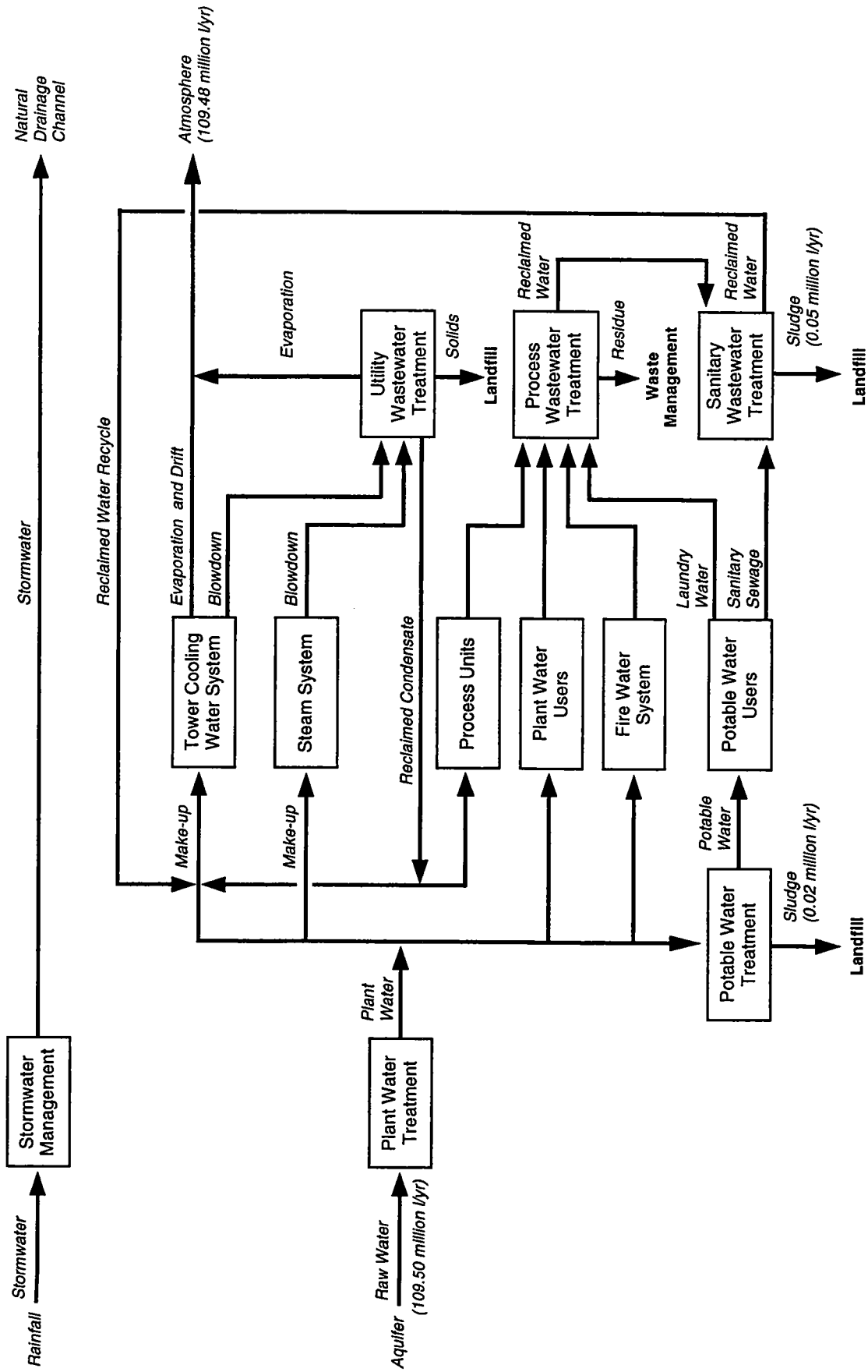
Note: Values on this figure may not exactly match raw water requirements and wastewater values in other parts of this PEIS due to rounding. Values in this figure have more significant digits to match the source document's water balance diagram.
Source: DOE 1996e.

Figure D.1–9. Annual Water Balance for the Consolidation Alternative at Idaho National Engineering Laboratory.



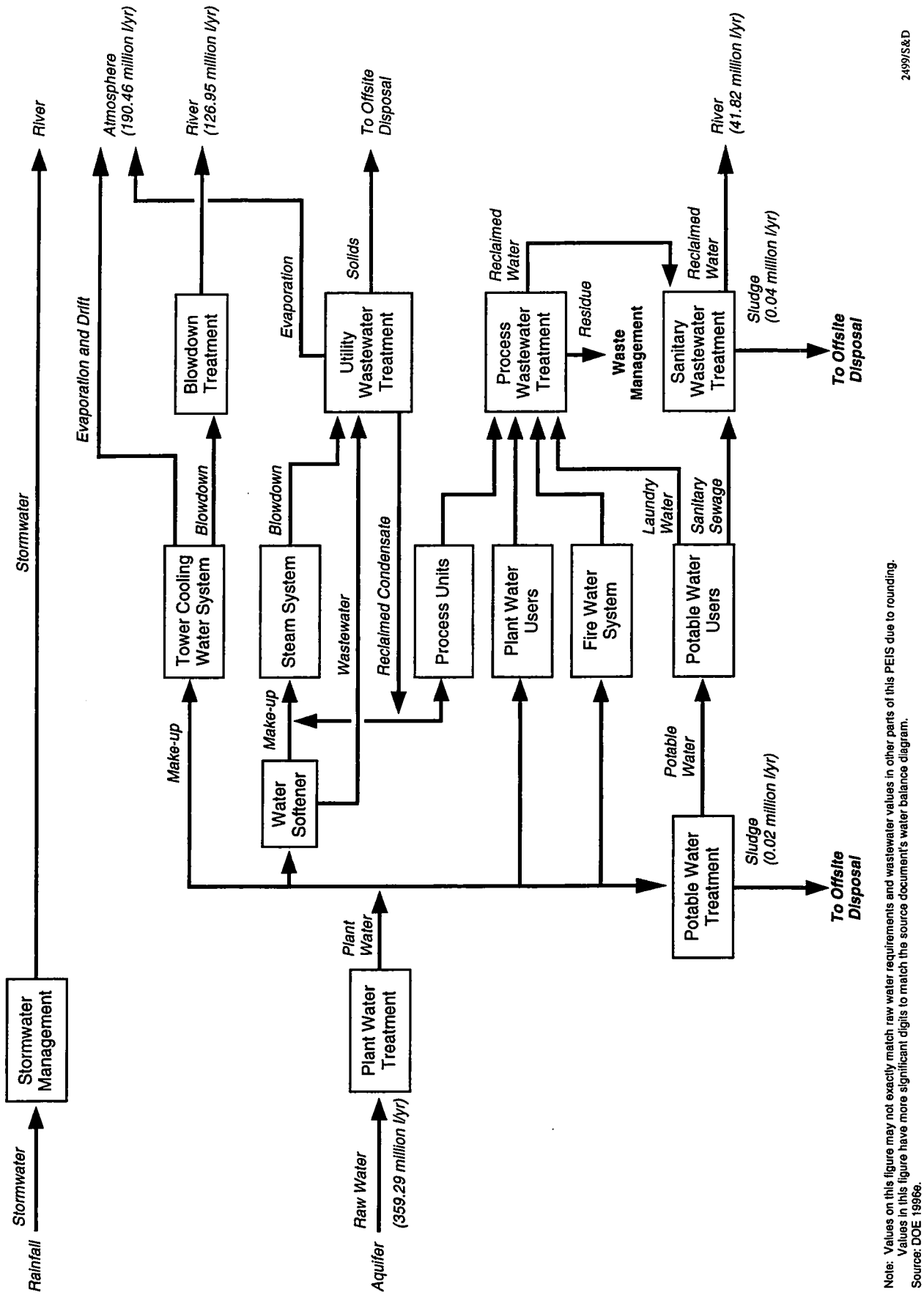
Note: Values on this figure may not exactly match raw water requirements and wastewater values in other parts of this PEIS due to rounding. Values in this figure have more significant digits to match the source document's water balance diagram.
Source: DOE 1996a.

Figure D.1–10. Annual Water Balance for the Consolidation Alternative Constructing a New Facility at Pantex Plant.



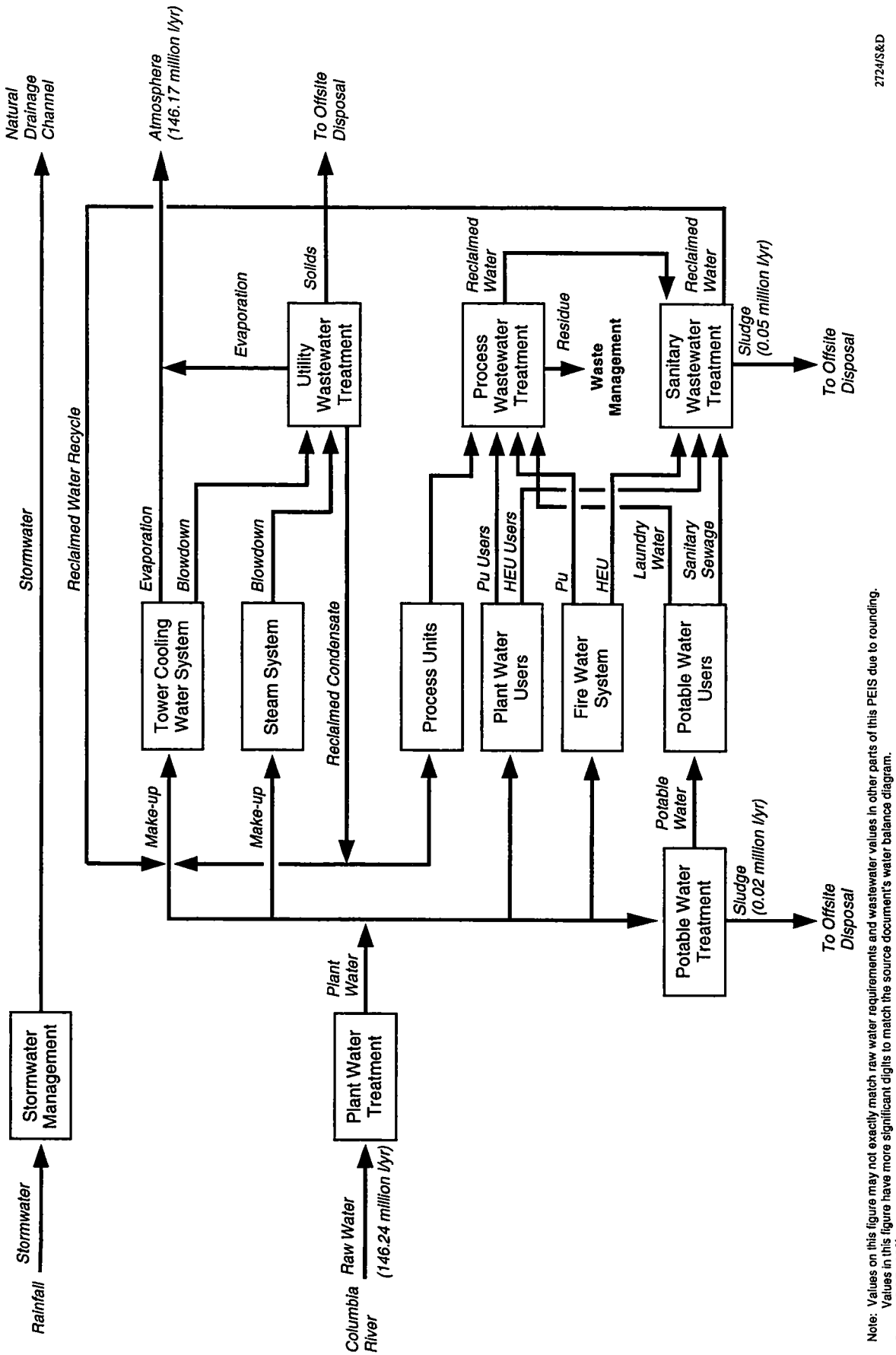
Note: Values on this figure may not exactly match raw water requirements and wastewater values in other parts of this PEIS due to rounding. Values in this figure have more significant digits to match the source document's water balance diagram.
Source: PX DOE 1998a.

Figure D.1–11. Annual Water Balance for the Consolidation Alternative Modifying Zone 12 South at Pantex Plant.



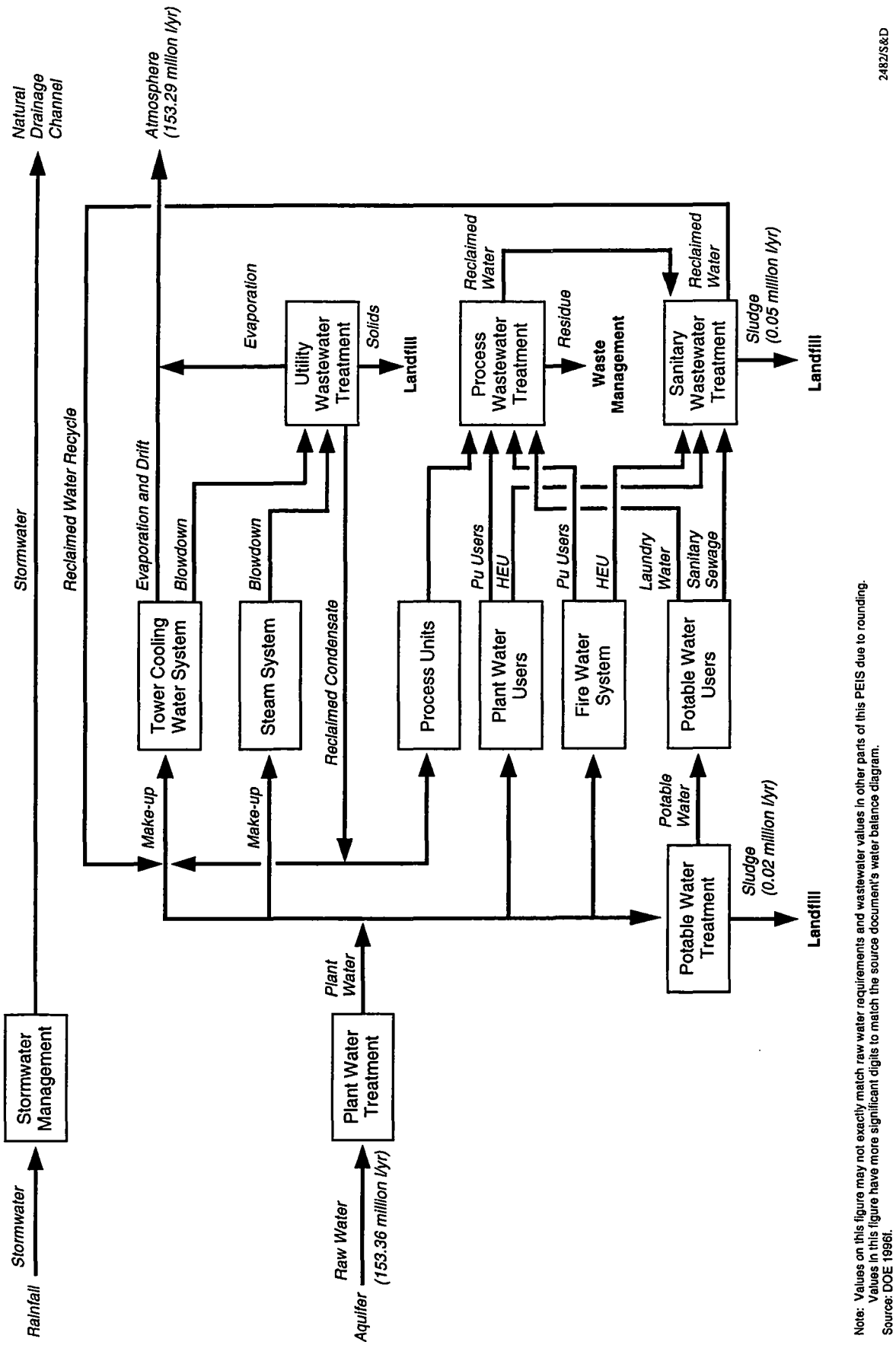
Note: Values on this figure may not exactly match raw water requirements and wastewater values in other parts of this PEIS due to rounding. Values in this figure have more significant digits to match the source document's water balance diagram.
Source: DOE 1996e.

Figure D.1–12. Annual Water Balance for the Consolidation Alternative at Savannah River Site.



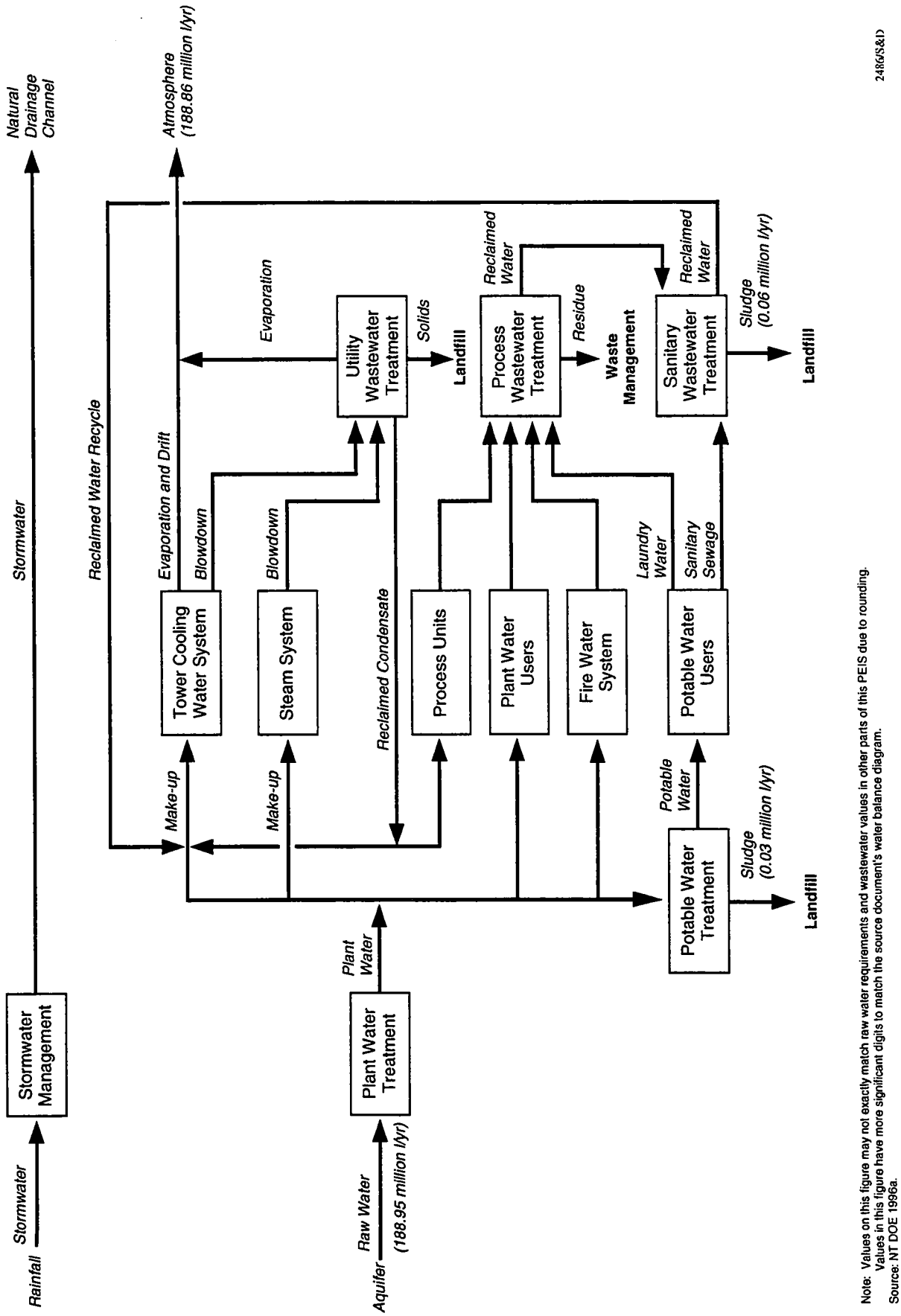
Note: Values on this figure may not exactly match raw water requirements and wastewater values in other parts of this PEIS due to rounding. Values in this figure have more significant digits to match the source document's water balance diagram.
Source: DOE 1996l.

Figure D.1–13. Annual Water Balance for the Collocation Alternative at Hanford Site.



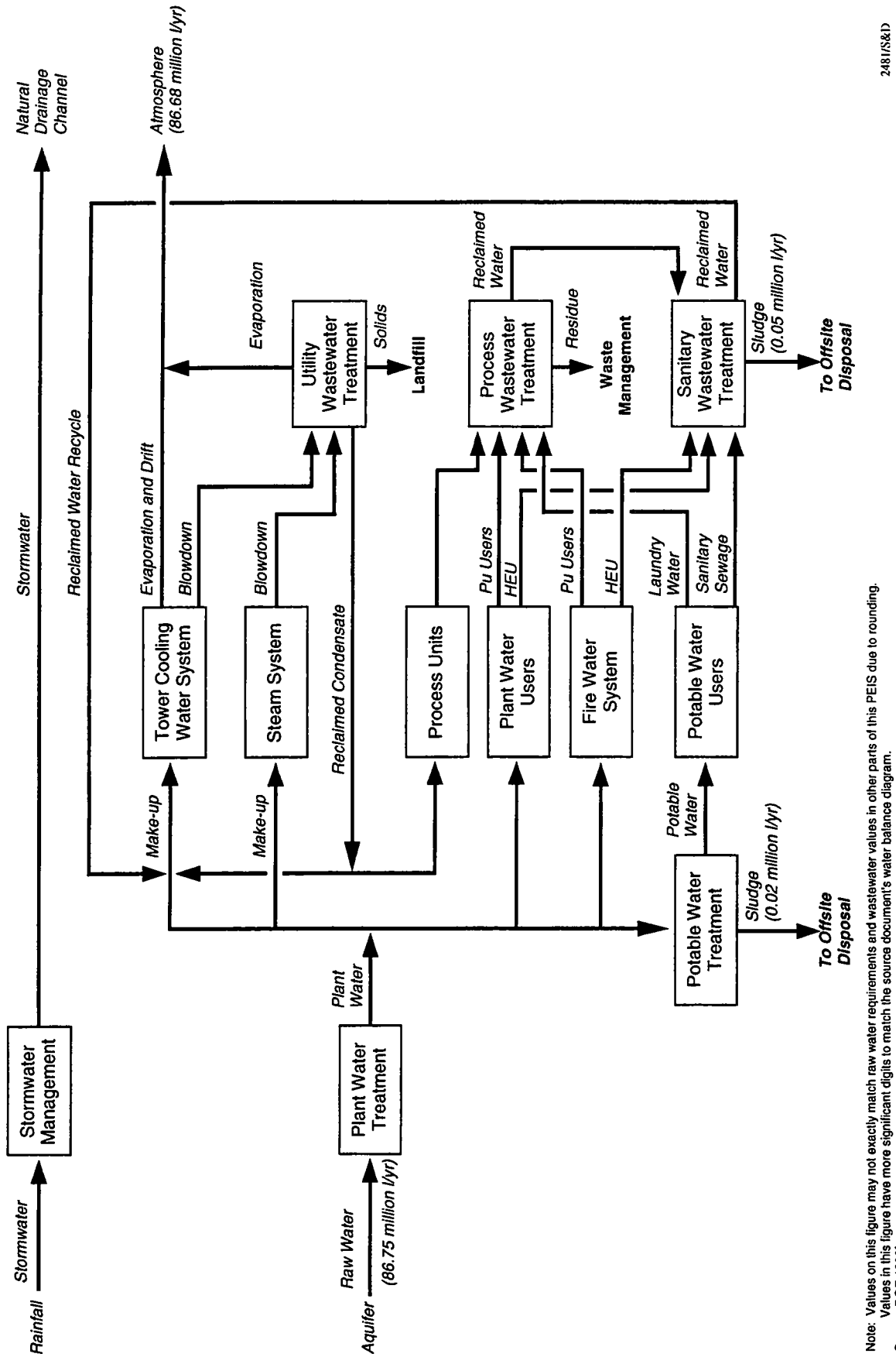
Note: Values on this figure may not exactly match raw water requirements and wastewater values in other parts of this PEIS due to rounding. Values in this figure have more significant digits to match the source document's water balance diagram.
Source: DOE 1996l.

Figure D.1–14. Annual Water Balance for the Collocation Alternative Constructing a New Facility at Nevada Test Site.



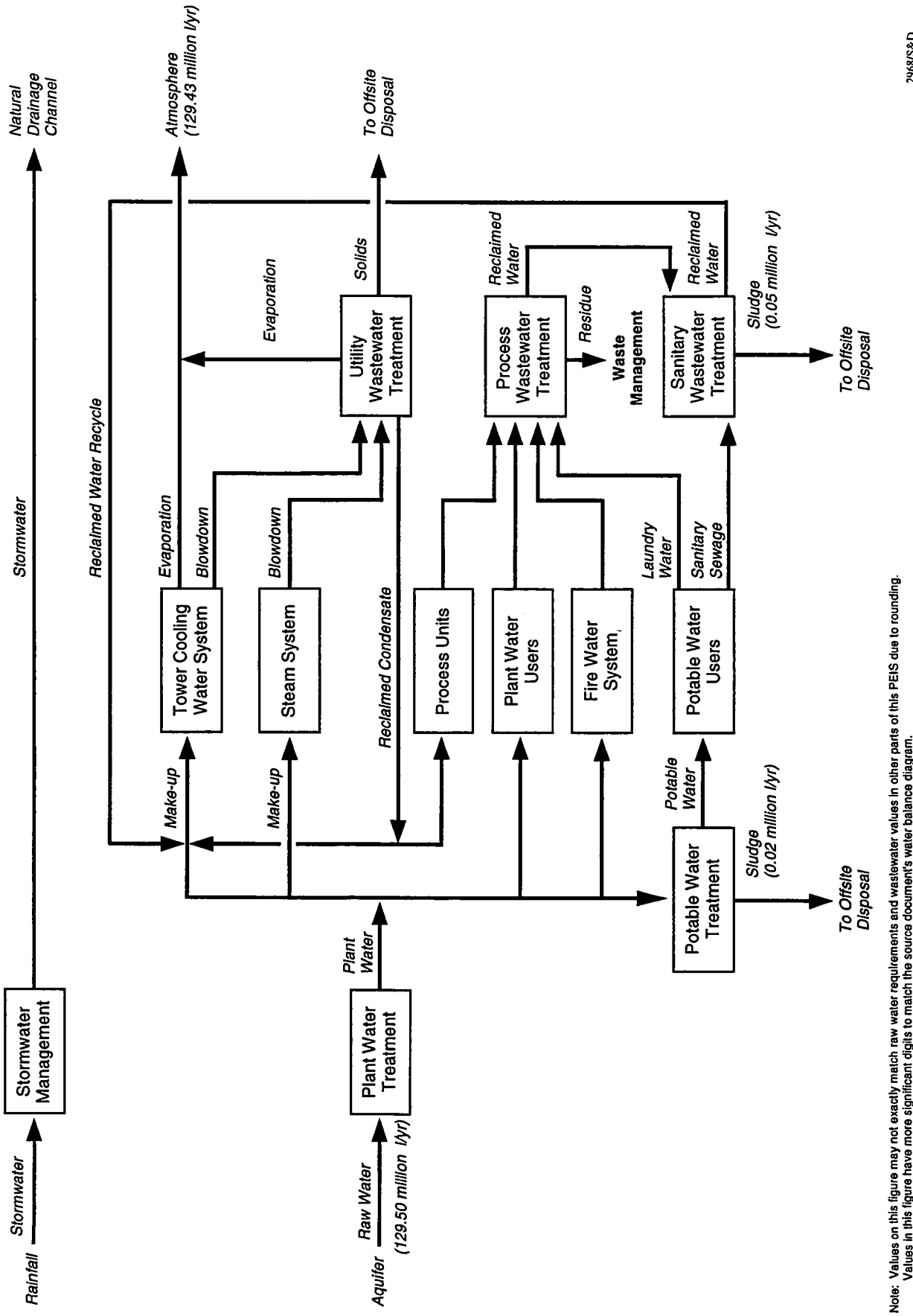
Note: Values on this figure may not exactly match raw water requirements and wastewater values in other parts of this PEIS due to rounding. Values in this figure have more significant digits to match the source document's water balance diagram.
Source: NT DOE 1996a.

Figure D.1–15. Annual Water Balance for the Collocation Alternative Modifying P-Tunnel at Nevada Test Site.



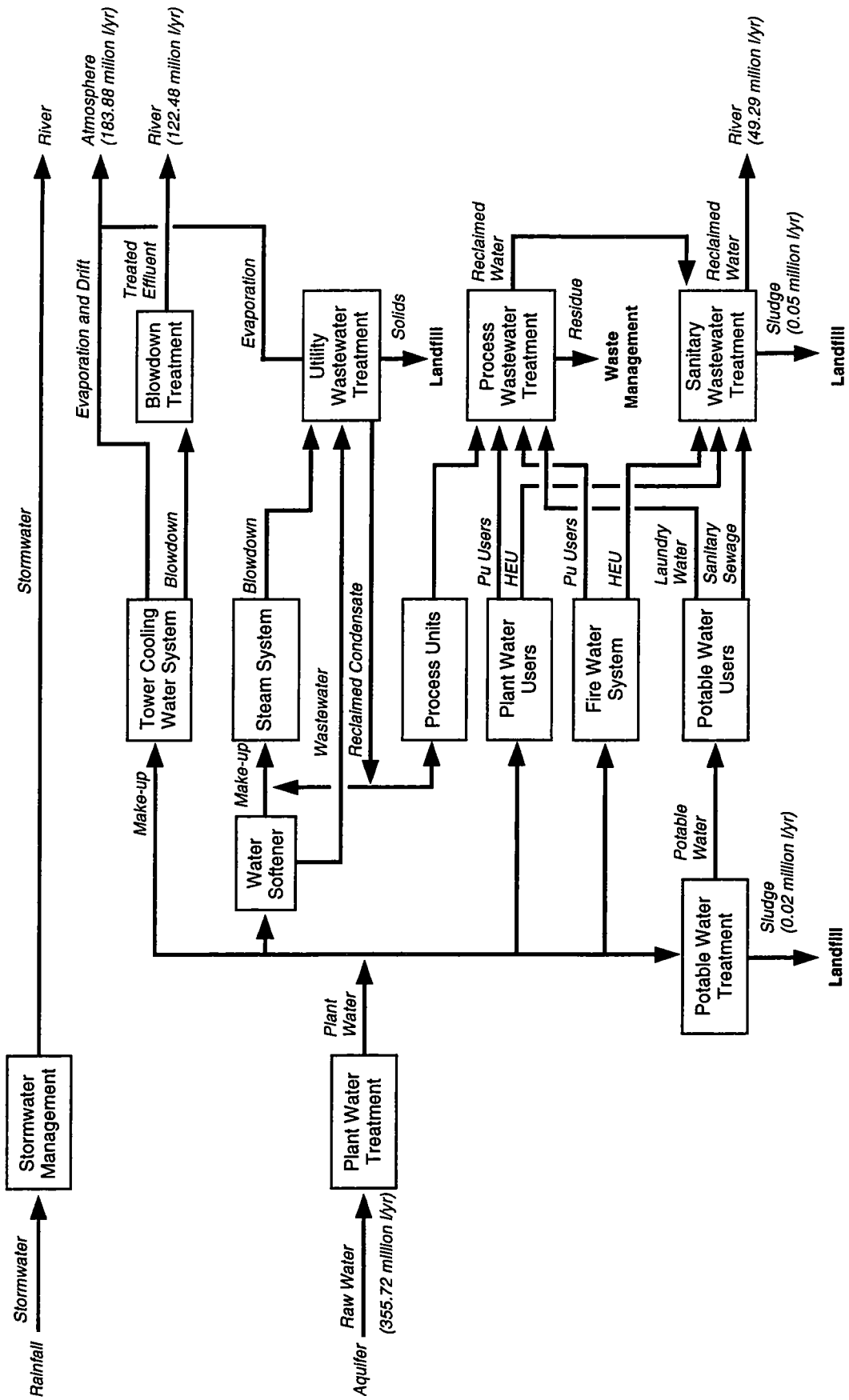
Note: Values on this figure may not exactly match raw water requirements and wastewater values in other parts of this PEIS due to rounding. Values in this figure have more significant digits to match the source document's water balance diagram.
Source: DOE 1996f.

Figure D.1–16. Annual Water Balance for the Collocation Alternative at Idaho National Engineering Laboratory.



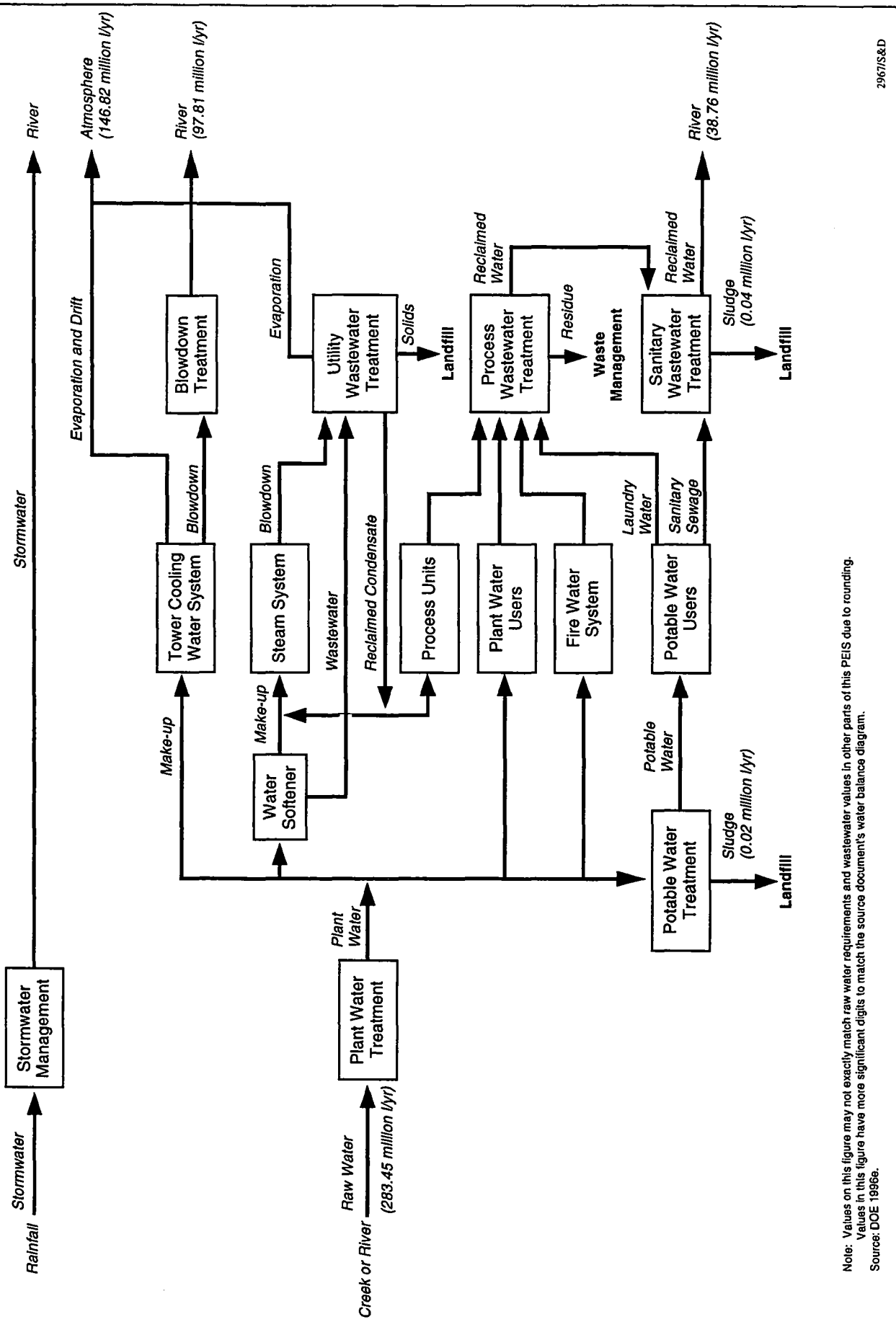
Note: Values on this figure may not exactly match raw water requirements and wastewater values in other parts of this PEIS due to rounding. Values in this figure have more significant digits to match the source document's water balance diagram.
Source: DOE 1996f.

Figure D.1–17. Annual Water Balance for the Collocation Alternative at Pantex Plant.



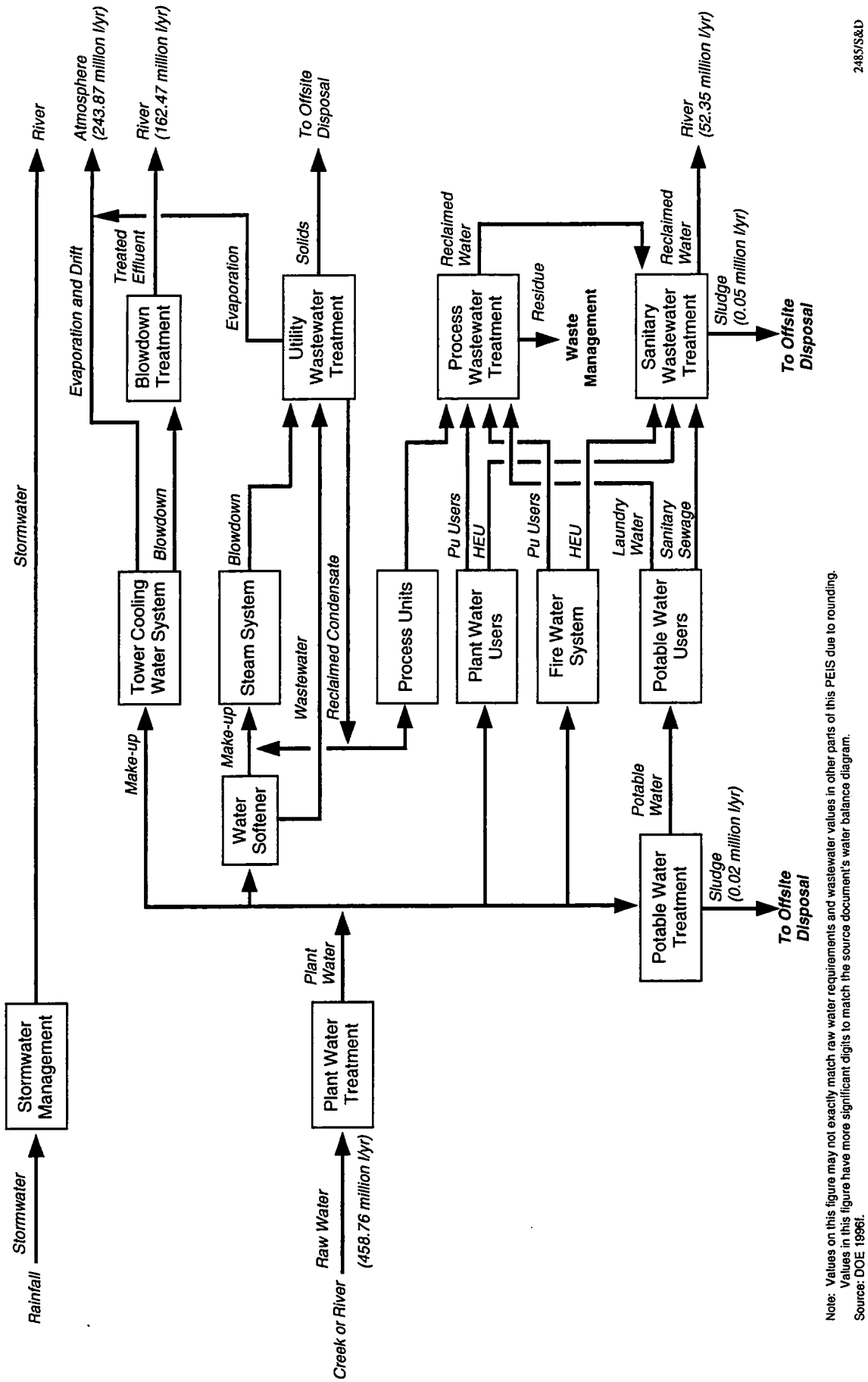
Note: Values on this figure may not exactly match raw water requirements and wastewater values in other parts of this PEIS due to rounding. Values in this figure have more significant digits to match the source document's water balance diagram.
Source: DOE 1996l.

Figure D.1–18. Annual Water Balance for the Collocation Alternative Constructing a New Facility at Oak Ridge Reservation.



Note: Values on this figure may not exactly match raw water requirements and wastewater values in other parts of this PEIS due to rounding. Values in this figure have more significant digits to match the source document's water balance diagram.
Source: DOE 1996e.

Figure D.1–19. Annual Water Balance for the Collocation Alternative Constructing a New Plutonium Storage Facility at Oak Ridge Reservation; Maintain Existing Highly Enriched Uranium Storage Facilities at Y–12 Plant.



Note: Values on this figure may not exactly match raw water requirements and wastewater values in other parts of this PEIS due to rounding. Values in this figure have more significant digits to match the source document's water balance diagram.
Source: DOE 1996f.

Figure D.1–20. Annual Water Balance for the Collocation Alternative at Savannah River Site.

D.2 FACILITIES COMMON TO MULTIPLE PLUTONIUM DISPOSITION ALTERNATIVES

The typical water balance diagrams for facilities that perform precursor activities on Pu materials before certain Pu disposition alternatives are provided in Figures D.2–1, D.2–2, and D.2–3. Under the Preferred Alternative for surplus Pu disposition, the pit disassembly/conversion facility and the mixed oxide fuel fabrication facility could each be located at either Hanford, INEL, Pantex, or SRS, and the Pu conversion facility could be located at Hanford or SRS. The facility water usage for these alternatives could be reduced by using existing facilities for portions of the operations. The next tier of *National Environmental Policy Act* (NEPA) review will examine locations for the selected alternatives including the use of existing facilities.

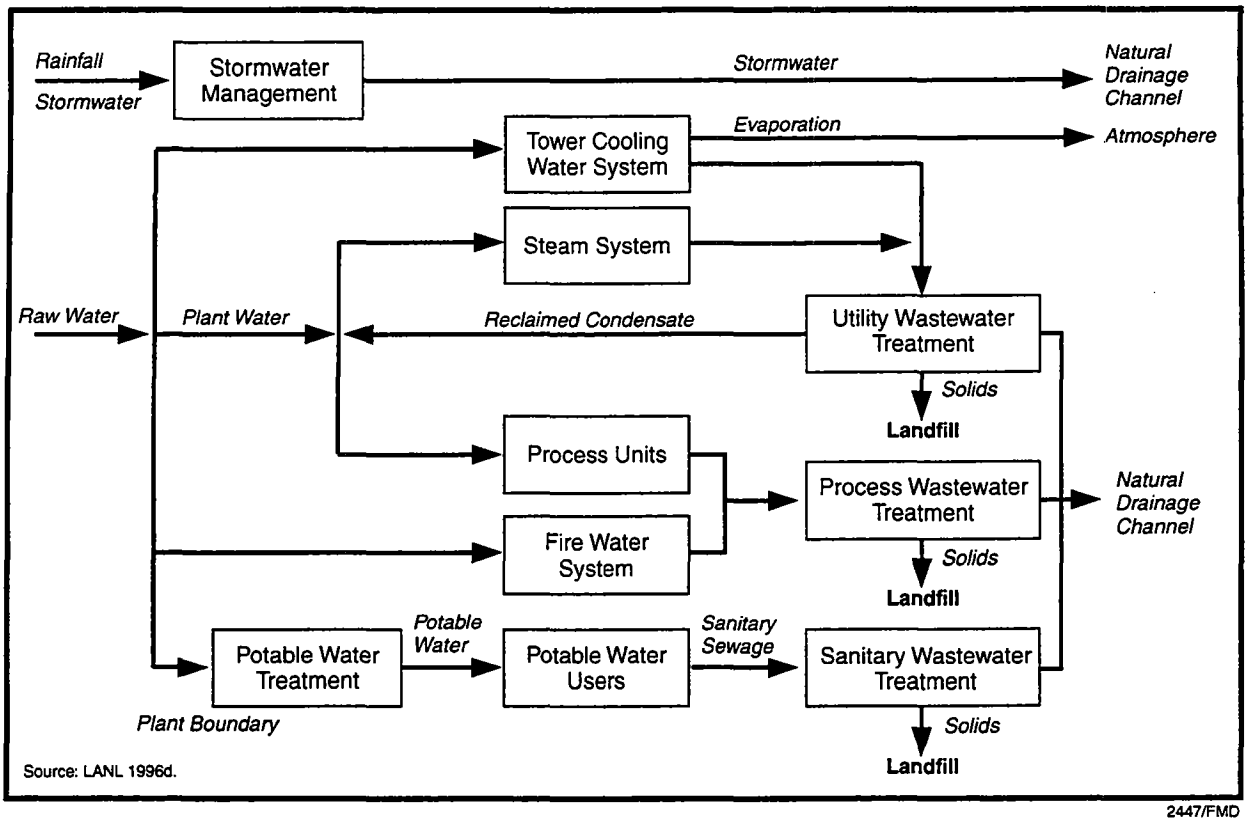


Figure D.2–1. Typical Water Balance for the Pit Disassembly/Conversion Facility.

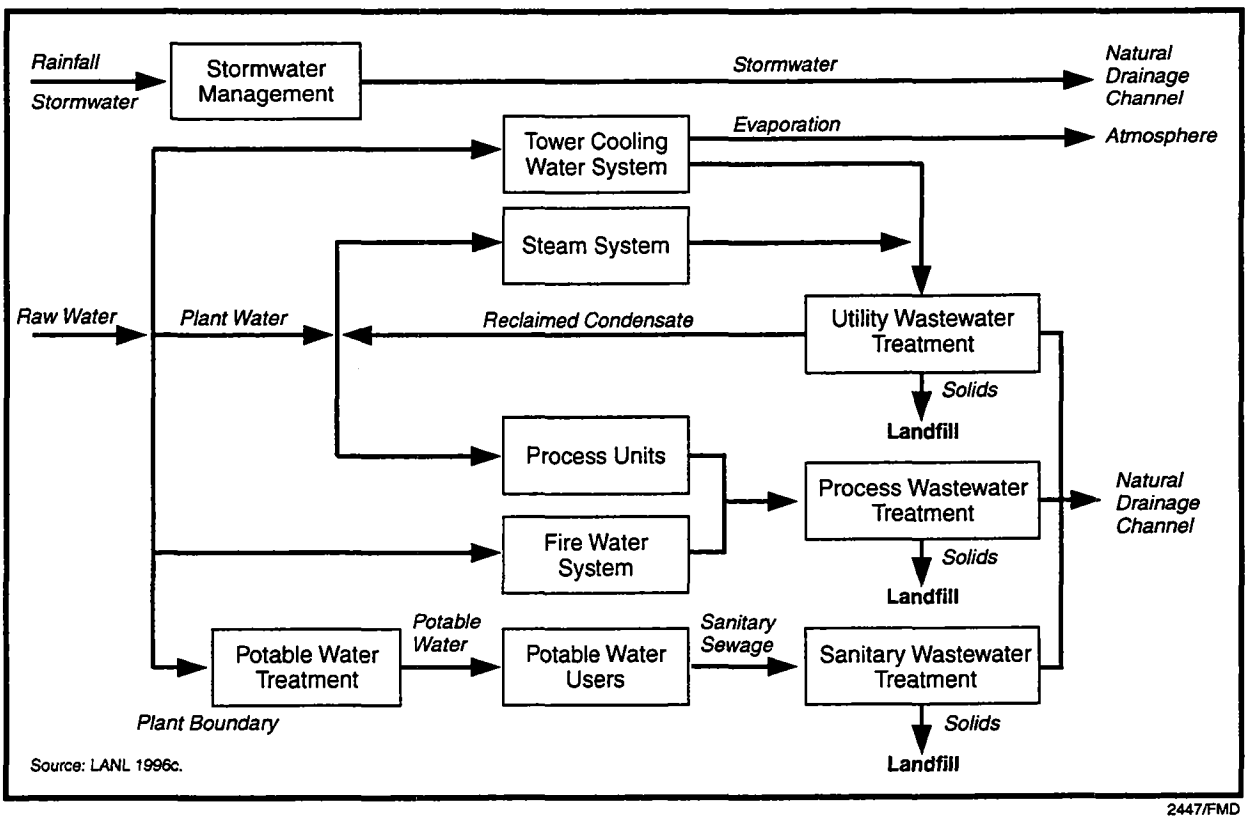
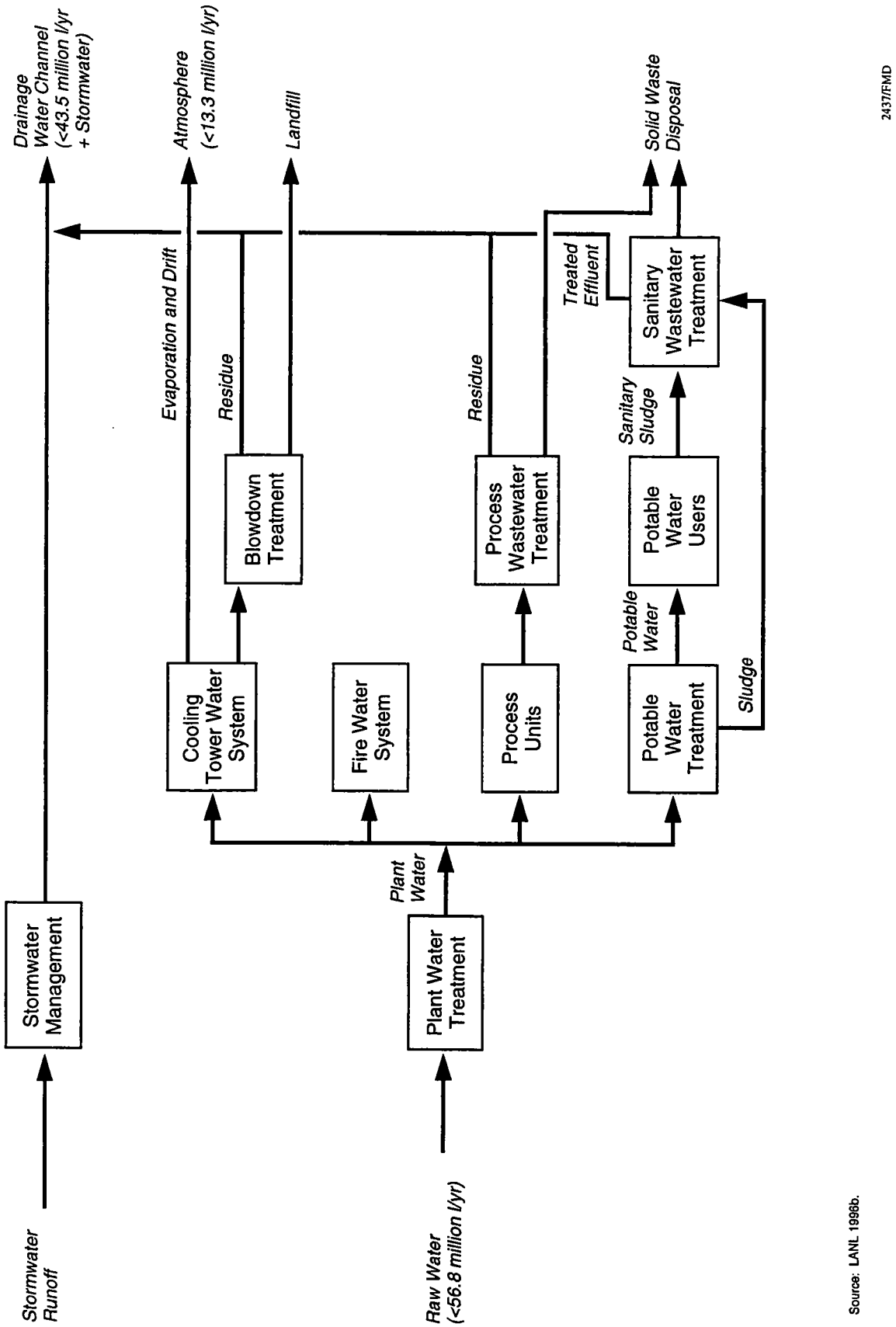


Figure D.2–2. Typical Water Balance for the Plutonium Conversion Facility.

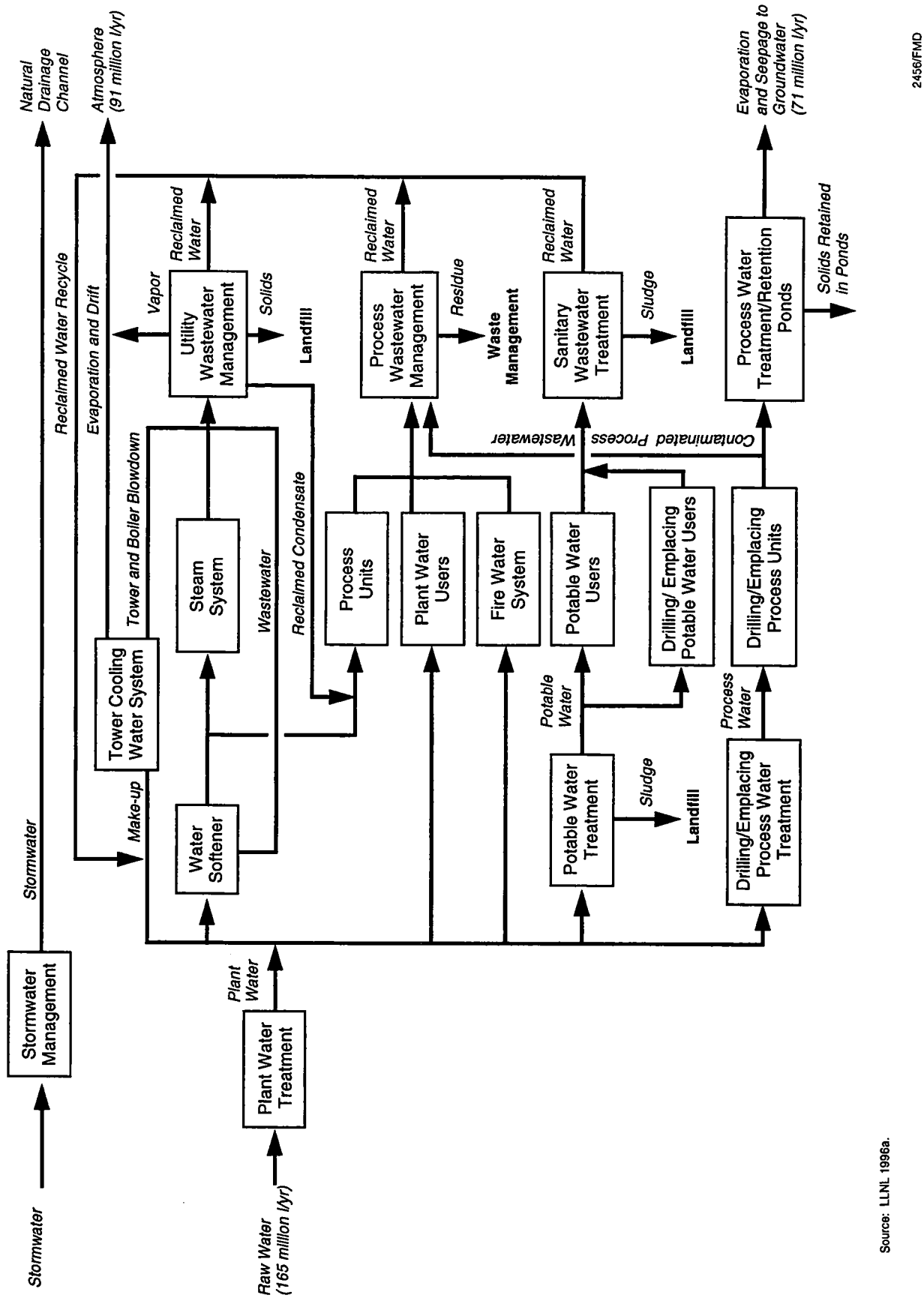


Source: LANL 1996b.

Figure D.2–3. Typical Water Balance for the Mixed Oxide Fuel Fabrication Facility.

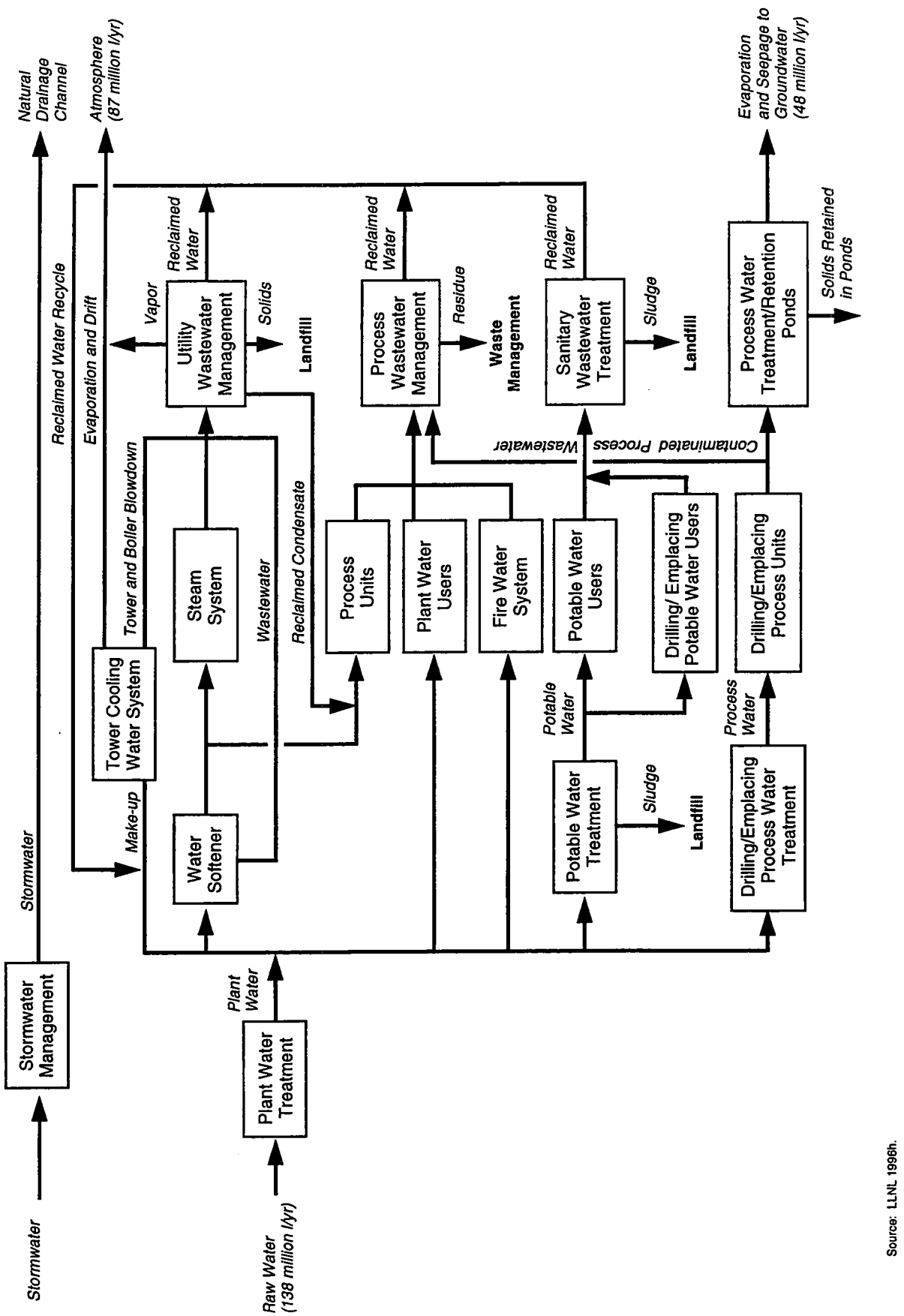
D.3 DISPOSITION ALTERNATIVES

The typical water balance diagrams for each of the various Pu disposition alternatives are provided in Figures D.3–1 through D.3–7. The figures are in the same order as their description appears in Chapter 2. Under the Preferred Alternative for surplus Pu disposition, the ceramic immobilization facility or the vitrification facility could be located at Hanford or SRS. The facility water usage for these alternatives could be reduced by using existing facilities for portions of the operations. The next tier of NEPA review will examine locations for the selected alternatives including the use of existing facilities.



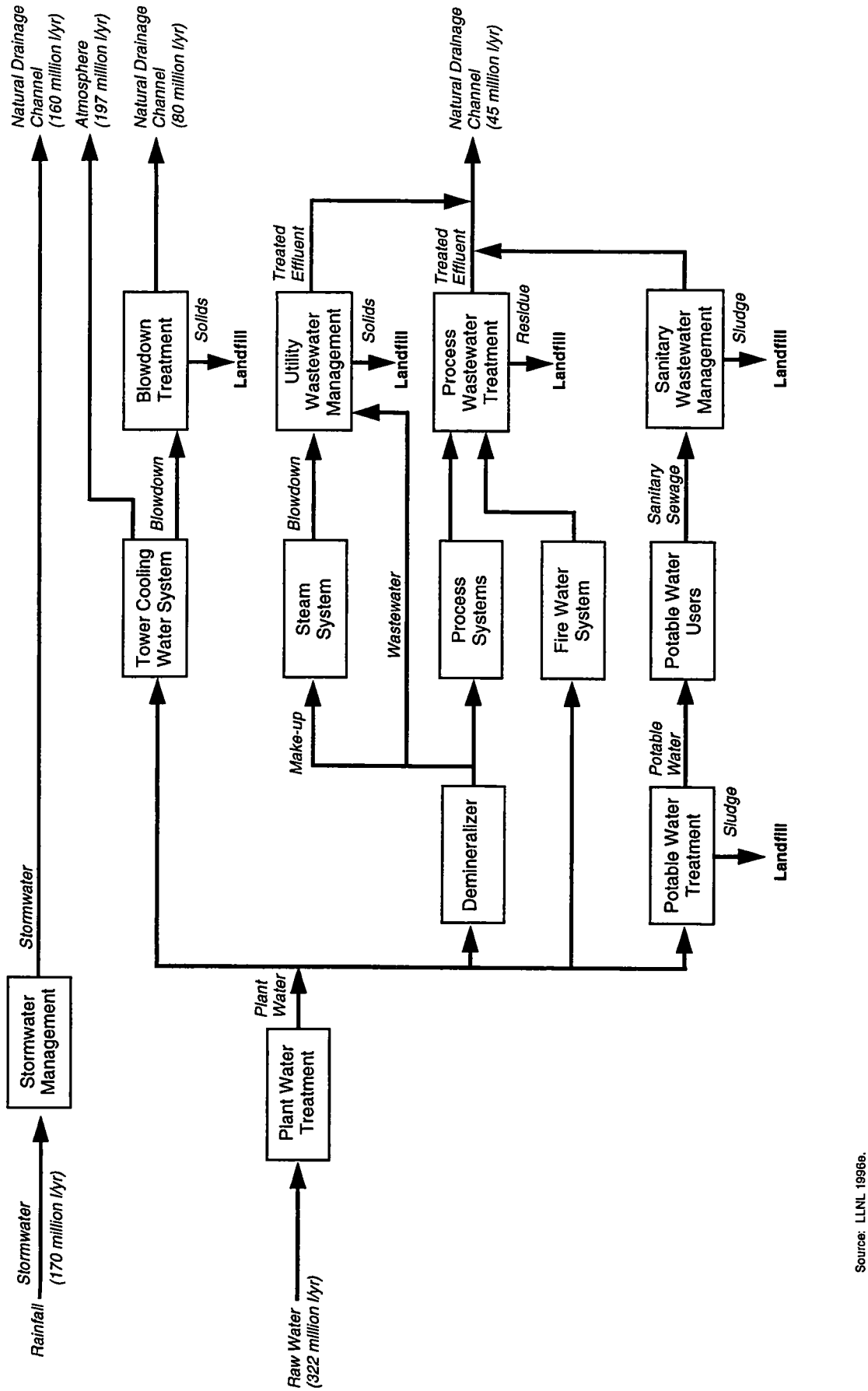
Source: LLNL 1996a.

Figure D.3–1. Typical Water Balance for the Deep Borehole Complex—Direct Disposition Alternative.



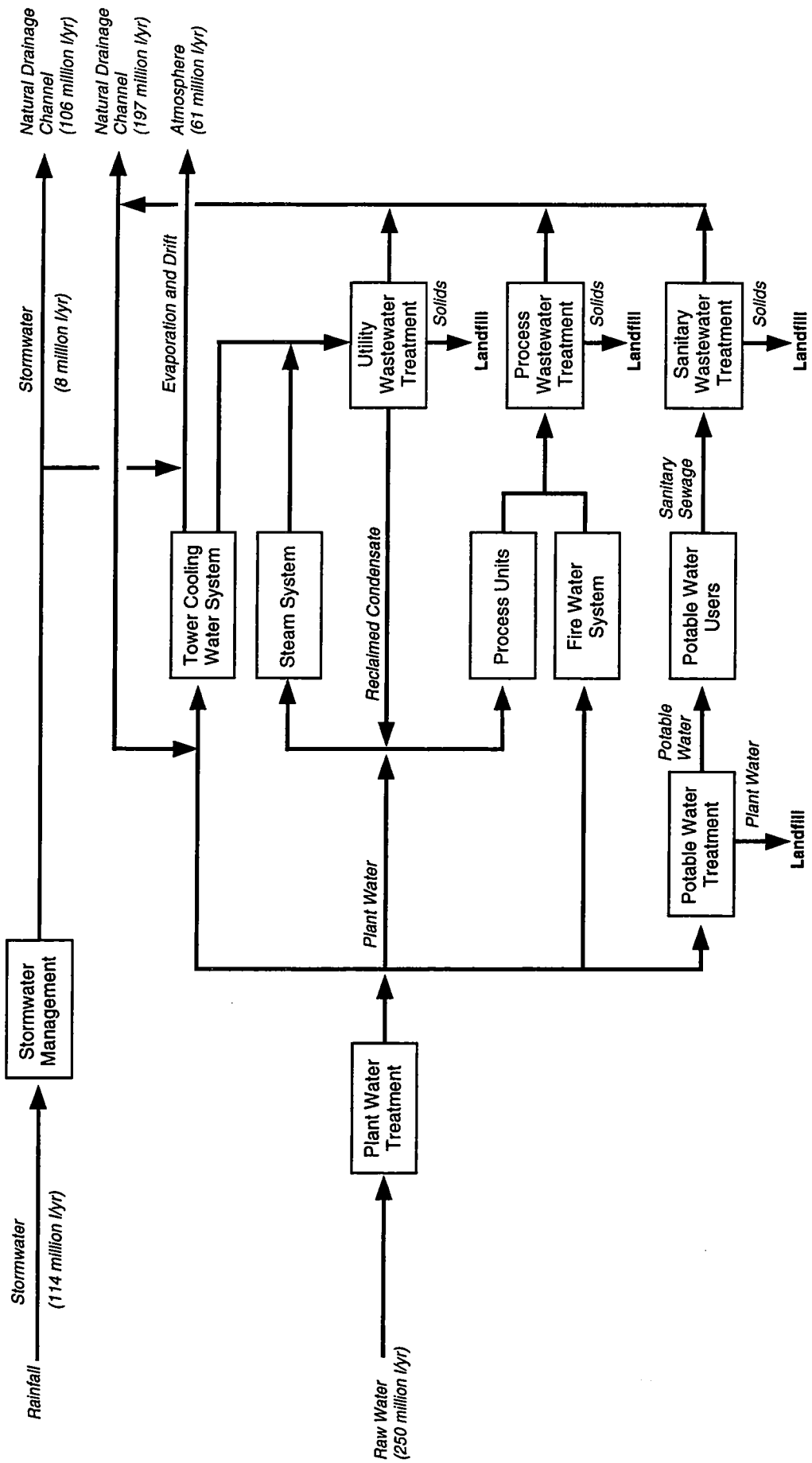
Source: LLNL 1996h.

Figure D.3–2. Typical Water Balance for the Deep Borehole Complex—Immobilized Disposition Alternative.



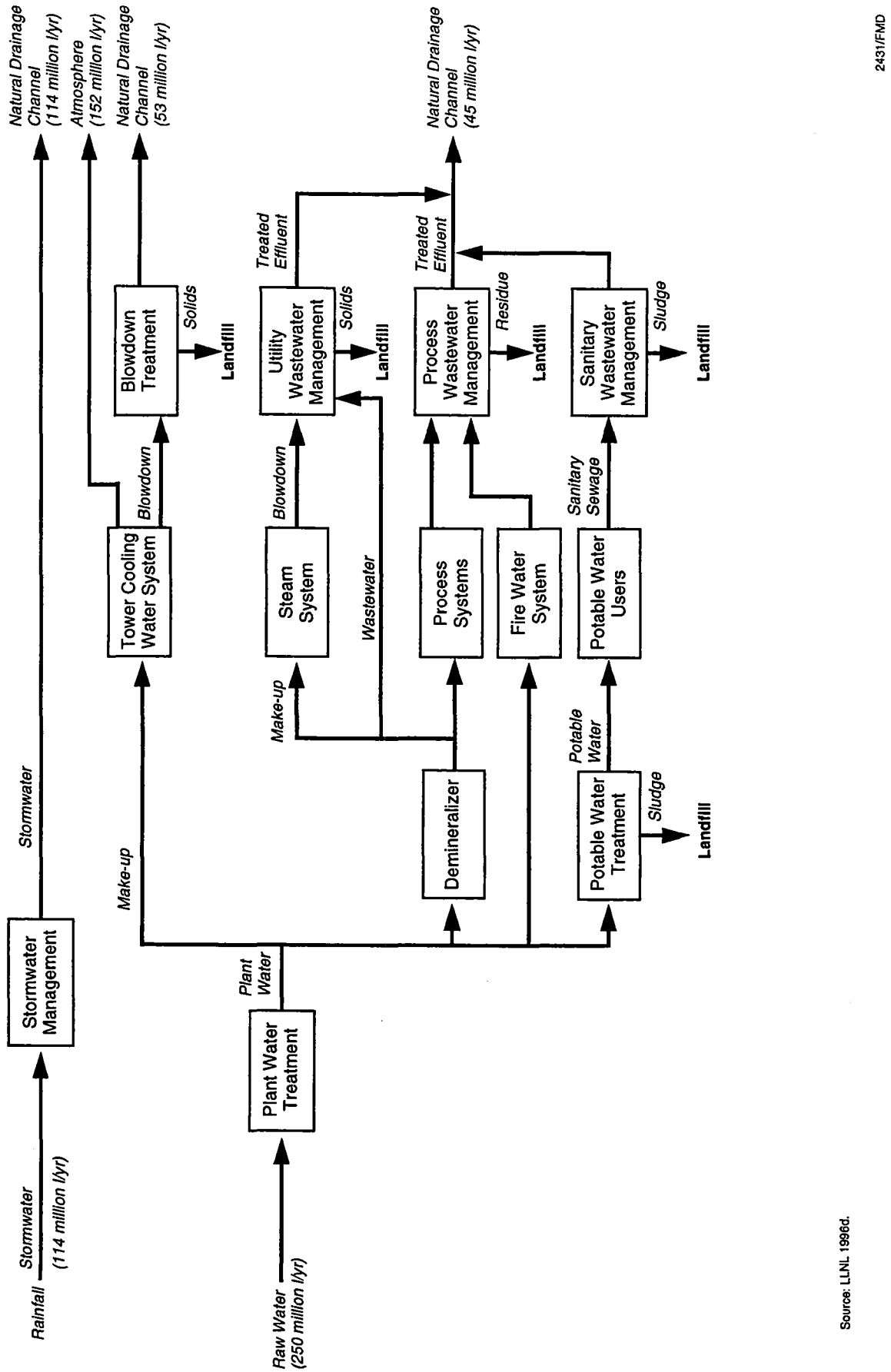
Source: LLNL 1996a.

Figure D.3–3. Typical Water Balance for the Ceramic Immobilization Facility—Immobilized Disposition Alternative.



Source: LLNL 1996c.

Figure D.3–4. Typical Water Balance for the Vitrification Alternative.



Source: LLNL 1996d.

Figure D.3–5. Typical Water Balance for the Ceramic Immobilization Alternative.

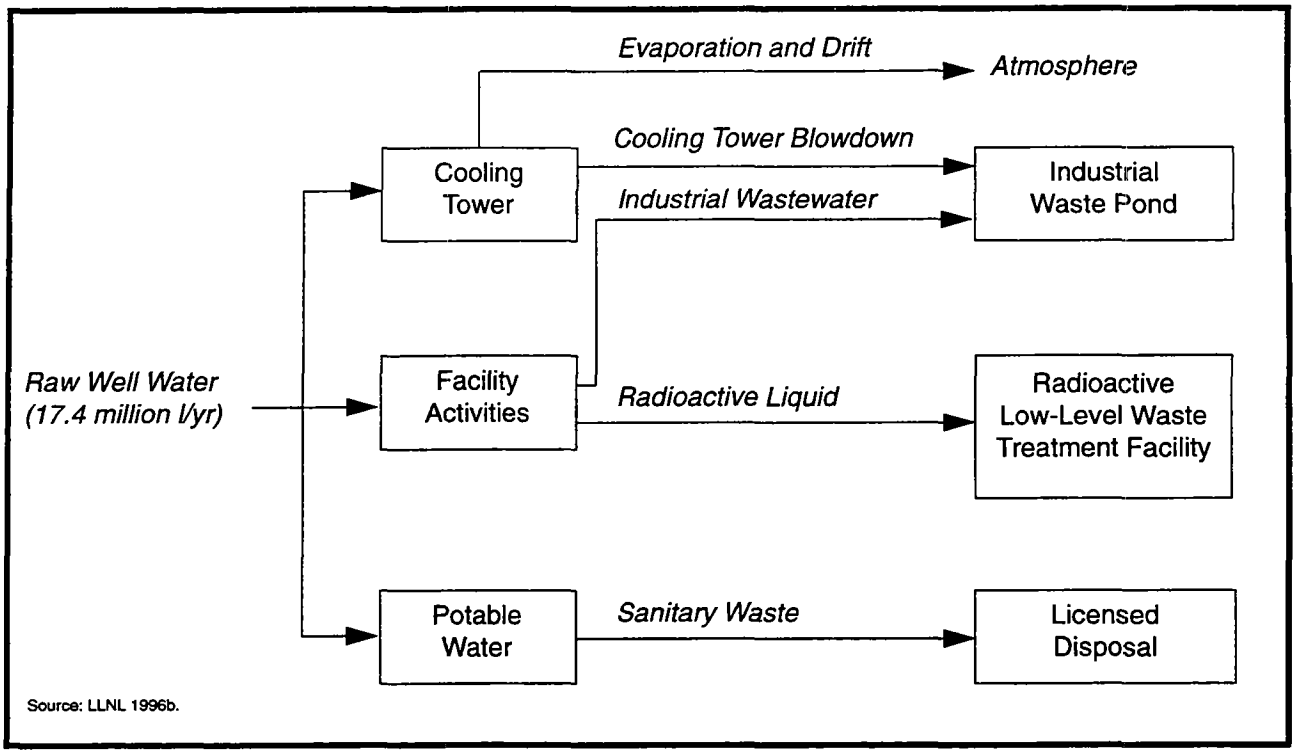
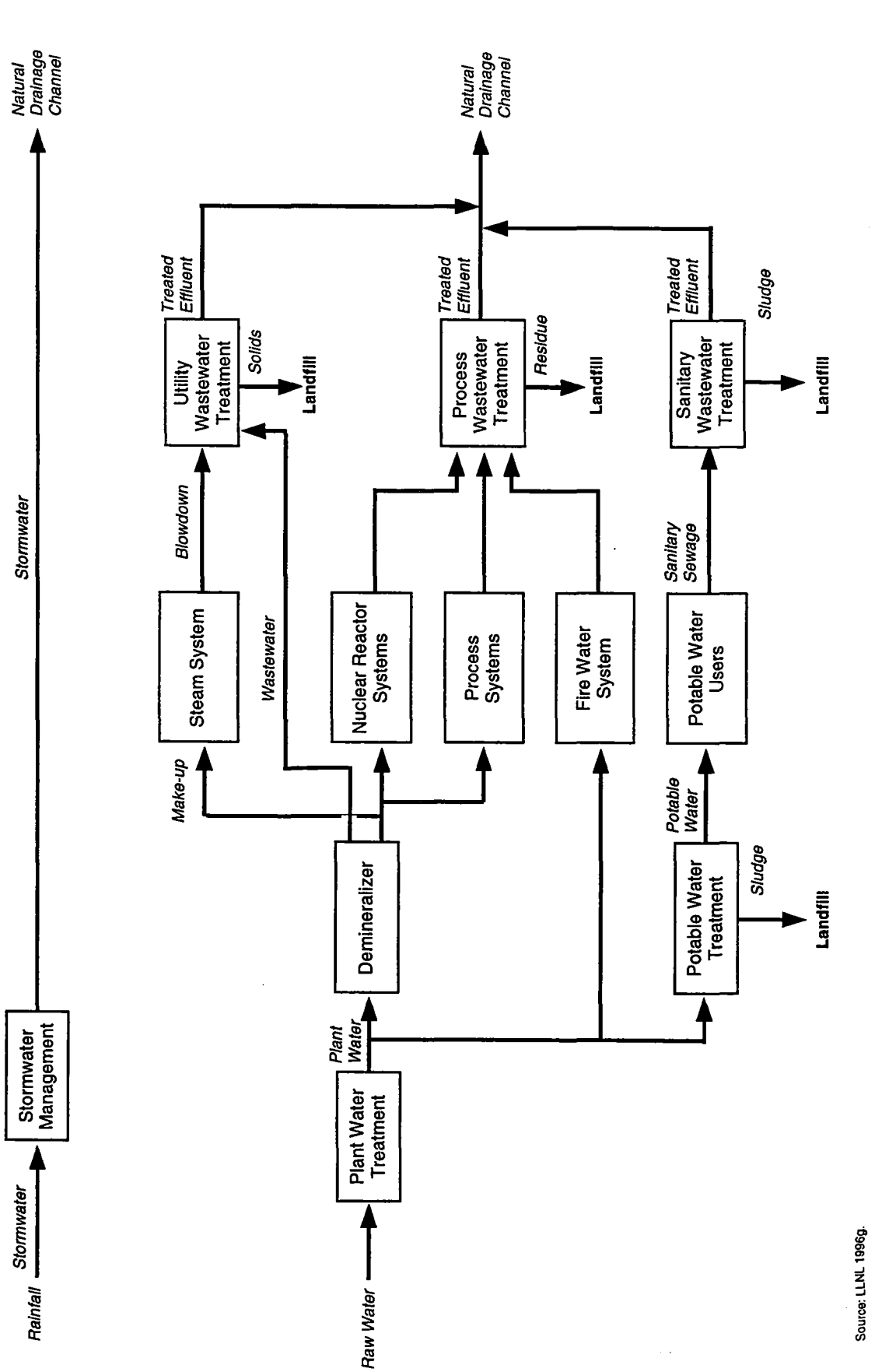


Figure D.3–6. Typical Water Balance for the Electrometallurgical Treatment Alternative (Glass-Bonded Zeolite).



Source: LLNL 1996g.

Figure D.3–7. Typical Water Balance for the Evolutionary Light Water Reactor Alternative.