If mitigation measures, monitoring, or other conditions are adopted as part of a DOE decision, they will be summarized in the ROD(s), if applicable, and a mitigation action plan will be prepared. The ROD(s) and mitigation action plan, if needed, will be placed in the DOE Reading Room in Washington, D.C., and in the DOE Public Reading Room at Washington State University, Tri-Cities Campus. They will also be available to interested parties upon request.

1.7 Scope of the Revised Draft HSW EIS

This revised draft HSW EIS addresses proposed actions and alternatives for managing four major waste types: LLW, MLLW, TRU waste, and ILAW. It updates previous Hanford NEPA reviews to incorporate alternatives developed after those reviews were completed, and evaluates or updates evaluations of site-specific impacts associated with the WM PEIS (DOE 1997c). Hanford waste management operations include the three major functions of storage, treatment, and disposal. Alternatives evaluated in this EIS address continued operation and expansion of ongoing waste management operations to accommodate future waste receipts. A range of waste volumes is evaluated for each alternative in order to encompass the quantities of waste that might be received at Hanford for management in the future.

1.7.1 Waste Types Evaluated in the Revised Draft HSW EIS

The types of waste evaluated in the revised draft HSW EIS are described in the following sections. Descriptions of the specific waste streams within each waste type and their management alternatives at Hanford are presented in Section 2 and Section 3, respectively.

1.7.1.1 Low-Level Waste

LLW is waste that contains radioactive material and that does not fall under any other DOE classification of radioactive waste. DOE manages LLW and other radioactive waste under the authority of the Atomic Energy Act (AEA) of 1954 (42 USC 2011). At Hanford, LLW may be further divided into Category 1 (Cat 1), Category 3 (Cat 3), or greater than Category 3 (GTC3) LLW, depending on the specific characteristics and quantities of radioactive material that it contains, as defined in the *Hanford Site Solid Waste Acceptance Criteria* (HSSWAC) (FH 2002). LLW streams managed at Hanford are described in Section 2.1.1.

Contact-Handled (CH) and Remote-Handled (RH) Waste

Contact-handled waste containers produce radiation dose rates less than or equal to 200 millirem/hour at the container surface. RH waste containers produce dose rates greater than 200 millirem/hour. CH containers can be safely handled by direct contact using appropriate health and safety measures. RH containers require special handling or shielding during waste management operations. These designations can apply to LLW, MLLW, TRU waste, and ILAW.

LLW and other radioactive wastes are also classified as either contact-handled (CH) or remote-handled (RH), depending on radiation dose rates as measured in contact with the container surface.

1.7.1.2 Mixed Low-Level Waste

MLLW is LLW that also contains hazardous components as defined by the Resource Conservation and Recovery Act (RCRA) of 1976 (42 USC 6901) and applicable State regulations. Hazardous waste requirements became applicable to DOE waste in 1987. The hazardous components of MLLW are regulated under applicable RCRA or State regulations (40 CFR 260-280; WAC 173-303). The radioactive components of MLLW are regulated by DOE under the AEA (42 USC 2011). MLLW streams managed at Hanford are described in Section 2.1.2. Additional discussion of regulations for managing radioactive and hazardous wastes at Hanford is provided in Section 6.

1.7.1.3 Transuranic Waste

TRU waste contains greater than specified quantities of TRU radionuclides as defined in Section 2.1.3. TRU waste can also contain hazardous waste components. The radioactive components of all TRU waste are regulated under the AEA (42 USC 2011). The hazardous components of TRU waste are regulated under applicable RCRA or State regulations (40 CFR 260-280; WAC 173-303). TRU waste must be characterized, packaged, and certified as meeting the WIPP waste acceptance criteria before it can be shipped to that facility for disposal.

TRU waste was not defined as a separate waste type until 1970. From 1970 through 1988, waste suspected of containing TRU radionuclides was retrievably stored in the Hanford LLBGs. This waste is referred to as suspect TRU waste because only part of the stored waste contains TRU radionuclides at concentrations specified in the current definition for TRU waste. Since 1988, TRU waste has generally been stored in surface facilities until it can be processed and certified for disposal at WIPP.

DOE previously decided to characterize the retrievably stored waste and recover the containers that are determined to contain TRU waste for processing and shipment to WIPP (DOE 1987). DOE has begun to characterize the retrievably stored waste to determine which containers should be retrieved and processed as TRU waste. TRU waste managed by the Hanford Solid Waste Program is described in Section 2.1.3.

1.7.1.4 Immobilized Low-Activity Waste and Melters from the Hanford Tank Waste Treatment Plant

For purposes of analysis in this HSW EIS, ILAW and melters from the WTP are assumed to be managed and disposed of as RH MLLW. The first draft HSW EIS evaluated disposal of the WTP melters as part of the pretreated MLLW waste stream, but did not address disposal of ILAW. Under this revised draft, the melters and ILAW are evaluated separately from other MLLW because the physical requirements for onsite transport, handling, and disposal differ from those typically used for most routine operational LLW and MLLW.

Hanford tank waste is presently considered mixed waste from a regulatory perspective. Based on the *Remote-Handled Immobilized Low-Activity Waste Disposal Facility Environmental Permits and Approval Plan* (Deffenbaugh 2000), the recommended approach for ILAW disposal in this document would be to

follow the normal State and RCRA permitting process. However, there are other regulatory processes that could allow DOE to dispose of ILAW consistent with RCRA requirements, including petitioning for variance, rulemaking, and/or delisting.

1.7.2 Waste Volumes Evaluated in the Revised Draft HSW EIS

Unless stated otherwise, environmental consequences in the HSW EIS have been evaluated for three waste volumes: a Hanford Only, a Lower Bound, and an Upper Bound waste volume. Because of uncertainty about future waste receipts, these alternative waste volume scenarios were evaluated to encompass the range of quantities that might be received.

- The **Hanford Only** waste volume consists of 1) the forecast volumes of LLW, MLLW, and TRU waste from Hanford Site generators, 2) the forecast ILAW and melter volumes from treatment of Hanford tank waste, and 3) existing onsite inventories of waste that are already in storage. The analysis also includes waste that has previously been disposed of.

- The **Lower Bound** waste volume consists of 1) the Hanford Only volume, and 2) additional volumes of LLW and MLLW that are currently forecast for shipment to Hanford from offsite facilities. The Lower Bound volume for TRU waste is not substantially greater than the Hanford Only volume, and is not analyzed separately in all cases.

- The **Upper Bound** waste volume consists of 1) the Lower Bound volume, and 2) estimates of additional LLW, MLLW, and TRU waste volumes that may be received from offsite generators as a result of the WM PEIS decisions.

The first draft HSW EIS evaluated consequences for the Lower and Upper Bound waste volumes. The Hanford Only waste volume was added to this revised draft HSW EIS so the incremental impacts of managing all offsite waste can be clearly evaluated. The bases for waste volumes evaluated in the HSW EIS are discussed further in Section 3.3 and Appendix C.

1.7.3 Hanford Waste Management Alternatives Evaluated in the Revised Draft HSW EIS

This revised draft HSW EIS considers a range of reasonable alternatives for management of solid LLW, MLLW, TRU waste, and ILAW at the Hanford Site. The waste management alternatives included within the scope of this revised draft HSW EIS are described briefly in the following sections. Hanford Solid Waste Program activities include storage, treatment, and disposal of LLW and MLLW, as well as storage, processing, and certification of TRU waste for shipment to WIPP. The HSW EIS also evaluates alternatives for onsite disposal of ILAW and melters from the WTP. In its final decision, DOE could choose to implement a combination of actions from any of the alternatives evaluated in this EIS. Existing and proposed waste management facilities considered in the HSW EIS alternatives are described in Section 2.2. The action and no action alternatives for managing these wastes are described further in Section 3.1. In this EIS, the no action alternative consists of continuing ongoing activities, but does not include development of new capabilities to manage wastes that cannot currently be disposed of.

1.7.3.1 Storage

Waste is generally stored while awaiting treatment or disposal. The specific storage methods used depend on the chemical and physical characteristics of the waste as well as the type and concentration of radionuclides in the waste.

In most cases, alternatives for storage of LLW, MLLW, and TRU waste consist of using existing or planned capabilities at the Central Waste Complex (CWC), T Plant, the LLBGs, or other onsite facilities. Except for the No Action Alternative, additional storage capacity is not expected to be necessary to accommodate future waste receipts. As waste in storage is treated, processed, or certified for disposal, space would become available for storage of newly received waste. The consequences of operating storage facilities needed to manage Hanford solid waste are included in the HSW EIS to provide a complete assessment and to bound the potential impacts associated with the proposed action. Conservative assumptions are used to provide flexibility in the event of future minor revisions to facility activities.

In the No Action Alternative, treatment and processing capabilities would not be available for all waste types, and any wastes that could not be disposed of would require storage. The analysis in this EIS assumes expansion of the CWC to accommodate most untreated LLW, MLLW, and TRU waste, and treated MLLW that exceeds existing disposal capacity. The No Action Alternative for ILAW includes construction of concrete vaults consistent with the TWRS EIS ROD (62 FR 8693) in the 200 East Area for interim storage.

1.7.3.2 Treatment

Treatment action alternatives examined in this revised draft HSW EIS are shown in Figure 1.5. These alternatives apply two different approaches to processing wastes for disposal.

- **The first approach** would maximize the use of offsite treatment (with full realization that because of its nature some waste would continue to be treated onsite). The alternatives that would maximize use of offsite treatment would include actions DOE previously identified as the preferred alternative for treatment of LLW, MLLW, and TRU waste in the first draft HSW EIS. In general, those actions are expected to minimize environmental impacts by using or modifying existing onsite and offsite facilities for treatment, processing, and certification of waste. Non-conforming LLW would be treated to comply with the HSSWAC at offsite commercial facilities if treatment capacity does not exist at Hanford. DOE would establish additional contracts with a permitted commercial facility (or facilities) to treat most of Hanford's CH MLLW using both thermal and non-thermal processes. For MLLW and TRU waste that cannot be treated at existing facilities, such as RH or non-standard items, DOE would develop new onsite treatment capacity by modifying facilities in the T Plant Complex.

- **The second approach** for acquiring new treatment capacity would maximize the use of onsite treatment capabilities. Under this approach, the alternatives include activities that maximize treatment of MLLW and non-conforming LLW onsite at Hanford. These alternatives are expected to result in the maximum environmental impacts for operations because they include more onsite

activities and construction of a new onsite facility (or facilities) to process some LLW, MLLW and TRU waste. The new waste processing facility would be used to treat non-conforming LLW to comply with the HSSWAC if treatment capacity does not exist at Hanford. Except for the limited quantities treated under existing commercial contracts, most of Hanford's CH MLLW would be treated at a new facility using non-thermal processes (including alternatives to thermal processing for some wastes). The new facility would also be used to process MLLW and TRU waste that cannot be accepted at existing facilities, such as RH or non-standard items.

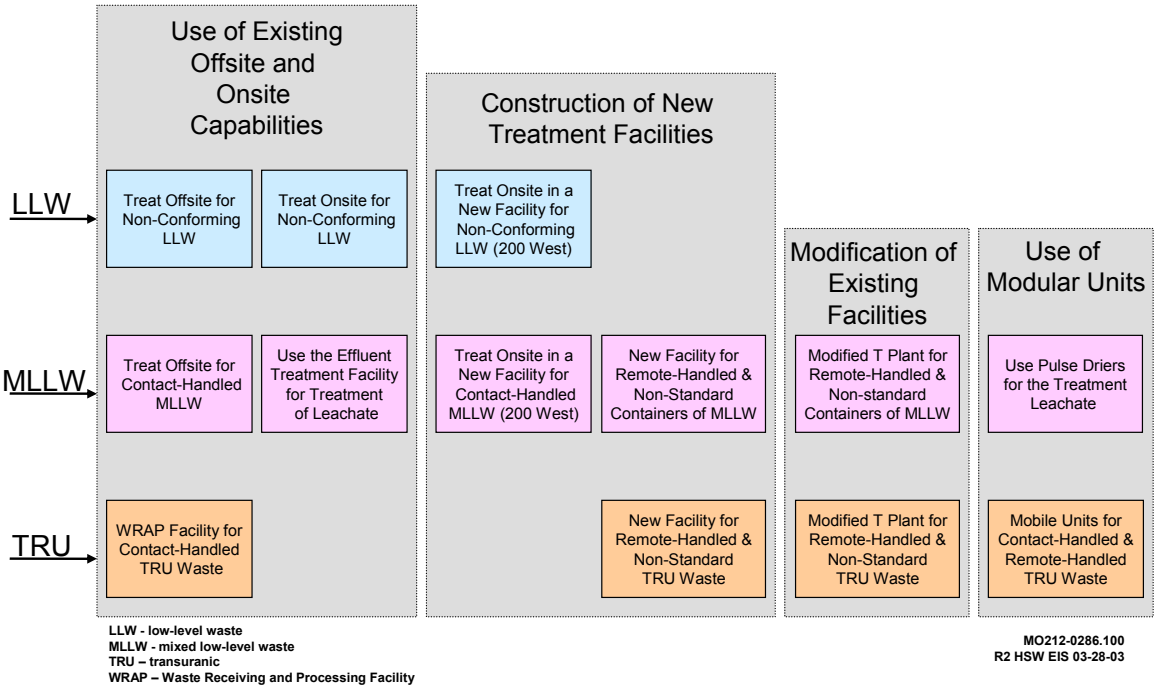

Figure 1.5. Treatment Action Alternatives (ILAW treatment alternatives are evaluated under the TWRS EIS [DOE and Ecology 1996])

In the No Action Alternative, only existing capacity for waste treatment would be used. Some non-conforming LLW, untreated MLLW, and TRU waste that cannot be processed or certified at WRAP would not be suitable for disposal, and those wastes would be stored onsite.

1.7.3.3 Disposal

The final step in the waste management process is disposal. Some types of radioactive and mixed waste can be disposed of safely in existing facilities using conventional methods such as near-surface disposal. Other types of waste require facilities that provide long-term isolation, such as a repository. Disposal facilities at Hanford accept waste suitable for near-surface disposal. Any waste from Hanford or other facilities that requires long-term isolation would ultimately be sent to a repository such as WIPP or Yucca Mountain. This EIS evaluates alternatives or updates previous plans for permanent disposal of LLW, MLLW, ILAW, and WTP melters at Hanford, including expansion, possible reconfiguration, and closure of onsite disposal facilities.

Alternatives for Waste Disposal. Alternatives in this revised draft HSW EIS assume continued use of disposal capabilities that currently exist at Hanford. DOE would construct additional disposal capacity for LLW and MLLW. New disposal facilities would also be constructed to receive ILAW and melters based on the schedule for startup and operation of the WTP. All disposal facilities would meet applicable State and federal requirements. Facilities for disposal of MLLW, ILAW, and melters would be constructed to applicable regulatory standards with double liners and leachate collection systems. LLW disposal in either lined or unlined trenches is evaluated in various alternatives. By the end of operations, all disposal facilities would be closed by applying a regulatory-compliant cap to reduce water infiltration and the potential for intrusion.

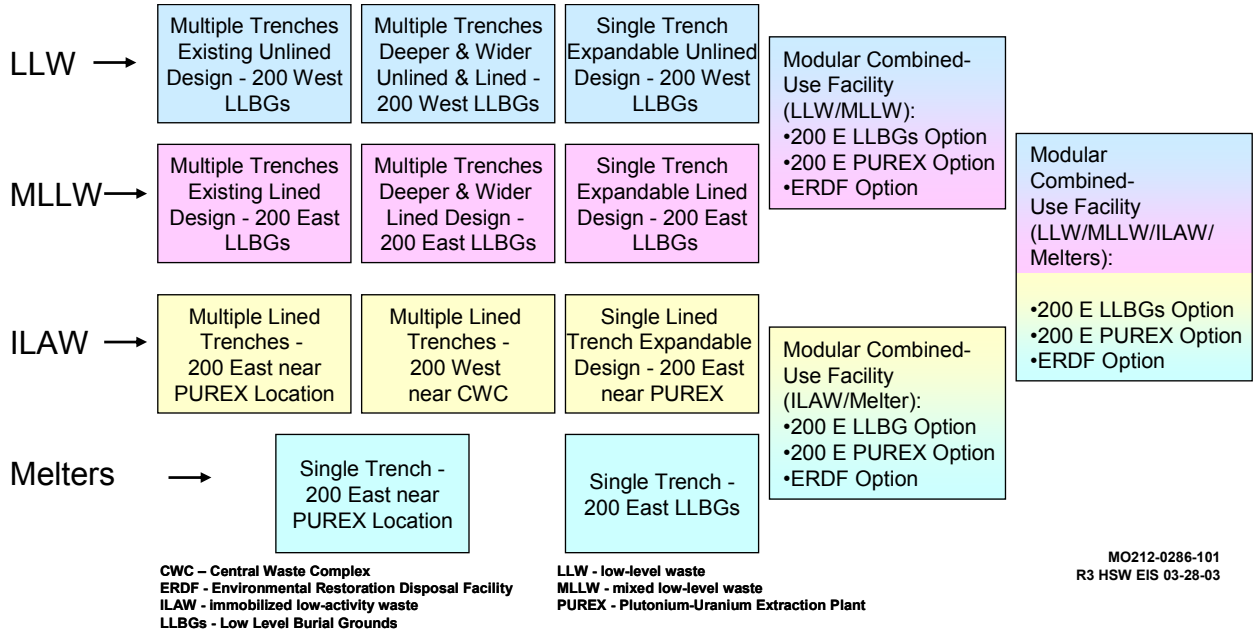

Figure 1.6. Disposal Action Alternatives

Several different configurations and locations are evaluated for new disposal facilities needed to manage each waste type. The disposal action alternatives are shown in Figure 1.6. Section 3 contains a description of these disposal alternatives as evaluated in the HSW EIS. An overview of the configuration and location alternatives is as follows:

- **Disposal Configuration Alternatives**: Alternatives for disposal configuration include various options for the number and size of trenches, including facilities dedicated to a single type of waste and options for combined disposal of two or more waste types. Alternatives for segregated disposal of LLW or MLLW consist of multiple trenches similar to those currently employed for each waste type, multiple trenches of a deeper and wider configuration, or a single expandable trench for each waste type. Similarly, ILAW disposal is evaluated using multiple trenches or a single expandable trench. The independent disposal alternative for WTP melters considers a single dedicated trench because of their relatively small overall volume, and because of constraints imposed by the size and weight of individual waste packages.

Alternatives for combined disposal of two or more waste types are also evaluated. The HSW EIS considers alternatives that include two combined-use disposal facilities: one for combined disposal of LLW and MLLW, and one for combined disposal of ILAW and melters. In addition, disposal of all waste types in a single combined-use facility is evaluated.

- **Disposal Location Alternatives**: The HSW EIS disposal alternatives consider several different locations for new or expanded disposal facilities, including use of LLBGs in the 200 West and 200 East Areas. New disposal sites in the 200 West Area near the CWC and in the 200 East Area near the PUREX Facility are also evaluated. Some alternatives involving combined-use disposal facilities evaluated the use of ERDF. However, such an arrangement would require modifications to the ERDF waste acceptance criteria, as well as to conditions specified in the TPA. A revision to the CERCLA ROD for ERDF might also be necessary.

In the No Action Alternative, LLW would continue to be disposed of in LLBG trenches of a design currently employed. The trenches would be backfilled but would not be capped. The two existing MLLW trenches would be filled to capacity and capped in accordance with applicable regulations. MLLW that exceeds the trench capacity, including WTP melters, would be stored onsite. ILAW would be placed in concrete vaults in the 200 East Area (62 FR 8693).

1.7.3.4 Grouping of Alternatives

In developing the alternatives for this HSW EIS there are a large number of combinations of the various waste streams, their potential waste volumes, and individual options for their storage, treatment, and disposal. To facilitate the analysis and presentation of impacts, these alternatives and options were combined into five primary alternative groups. Alternatives for the treatment, storage, and disposal for the different waste types were included in each alternative group, in addition to a range of potential waste volumes. The alternative groups have been identified as A, B, C, D, and E. A No Action Alternative was also evaluated as required under NEPA. For Alternative Groups D and E, several different potential locations were evaluated for the disposal facility(s) within the 200 East and 200 West Areas. With the exception of the No Action Alternative, each alternative is consistent with WM PEIS RODs. For LLW, MLLW, and TRU wastes, Alternative Group A, Alternative Group B, and the No Action Alternative are fundamentally the same as Alternative 1, Alternative 2, and the No Action Alternative, described in the first draft of this HSW EIS (DOE 2002b). Alternative Groups C, D, and E (and their options) are new and are supported by new analysis. Figure 1.7 illustrates the alternatives included in each of these alternative groups.

No Action Alternative: The No Action Alternative consists of continuing current solid waste management practices, including indefinite storage of radioactive wastes that cannot be processed for disposal. As part of the No Action Alternative, RODs and other NEPA decisions for existing facilities and operations would be implemented and ongoing activities would continue, consistent with the Council on Environmental Quality guidelines. This is the “no action” alternative for an ongoing activity, where the EIS assumes there is no change from existing operations. For example, Hanford would continue to

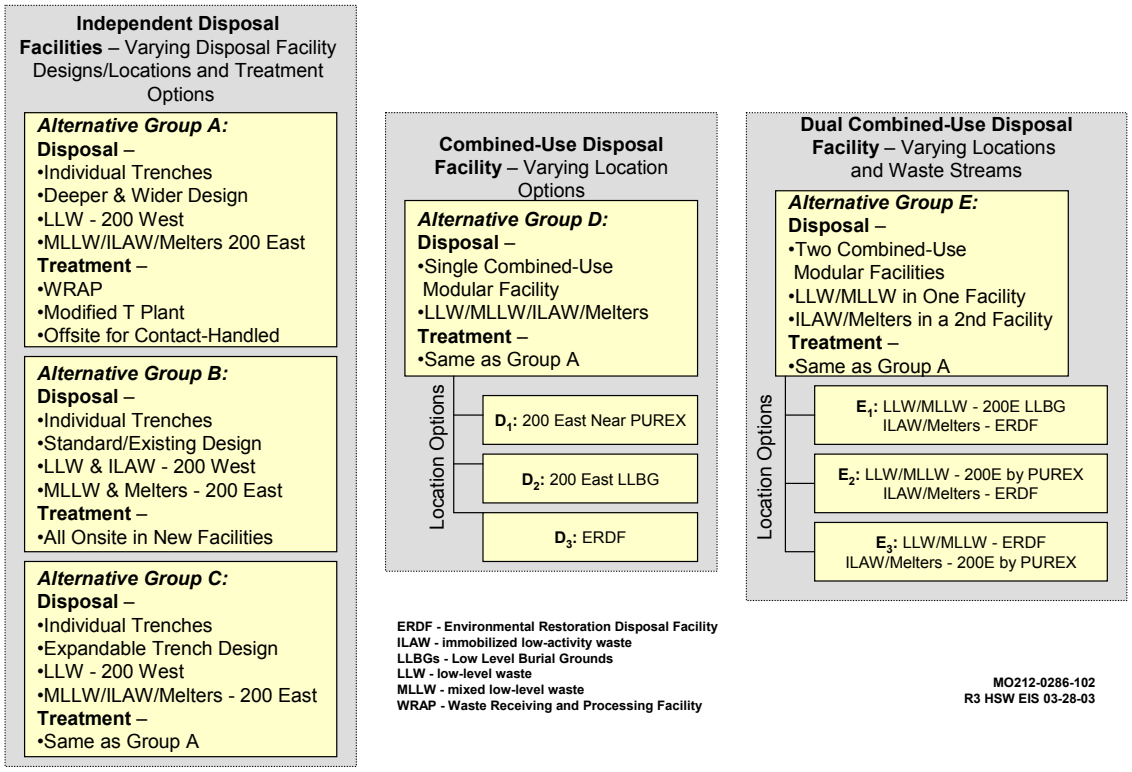

Figure 1.7. Development of Alternative Groups

dispose of LLW and MLLW within the Low Level Burial Grounds, and to certify and ship TRU waste to WIPP. A "Stop Action" scenario is also described, in which ongoing waste management operations would cease.

Alternative Group A – ***Disposal by Waste Type in Larger Disposal Facilities – Onsite and Offsite Treatment***: New LLW and MLLW disposal trenches would be deeper and wider than those currently in use. New LLW disposal capacity would be located in the 200 West Area and new MLLW, ILAW, and melter disposal facilities would be located in the 200 East Area. T Plant would be modified to provide treatment capabilities for remote-handled TRU waste, remote-handled MLLW, and waste in non-standard containers. Treatment of contact-handled MLLW would be provided at offsite facilities.

Alternative Group B – ***Disposal by Waste Type in Existing Design Disposal Trenches – Onsite Treatment***: Disposal trenches for LLW and MLLW would be of the same design as those currently in use. New LLW and ILAW trenches would be located in the 200 West Area and new MLLW and melter trenches would be located in the 200 East Area. A new facility would be built to provide treatment capabilities for remote-handled TRU waste, remote-handled and contact-handled MLLW, and waste in non-standard containers. Modular facilities (accelerated process lines, or APLs) would also be used for processing and certification of TRU waste to accelerate preparation of the waste for disposal at WIPP.

Alternative Group C – *Disposal by Waste Type in Expandable Design Facility – Onsite and Offsite Treatment*: A single, expandable disposal facility (similar to the Environmental Restoration Disposal Facility) would be used for each waste type. New LLW facilities would be located in the 200 West Area and new MLLW, ILAW, and melter facilities would be located in the 200 East Area. Treatment alternatives would be the same as those described for Alternative Group A.

Alternative Group D – *Single Combined-Use Disposal Facility – Onsite and Offsite Treatment*: LLW, MLLW, ILAW, and melters would be disposed of in a single facility. Disposal would occur either near the PUREX Plant (D_1), in the 200 East Area Low Level Burial Grounds (D_2), or at the Environmental Restoration Disposal Facility (D_3). Treatment alternatives would be the same as those described for Alternative Group A.

Alternative Group E – *Dual Combined-Use Disposal Facilities – Onsite and Offsite Treatment*: LLW and MLLW would be disposed of in a single facility; ILAW and melters would be disposed of in another single facility. Disposal would occur in some combination of locations as shown in Figure 1.7. Treatment alternatives would be the same as those described for Alternative Group A.

1.7.4 Environmental Impact Analyses in the Revised Draft HSW EIS

Analyses of environmental consequences from waste management operations in the HSW EIS includes assessment of impacts in the following areas as required by NEPA:

- land use
- air quality
- water quality
- geologic resources
- ecological resources
- socioeconomics
- cultural resources
- transportation
- noise
- health and safety
- aesthetic and scenic resources
- environmental justice
- cumulative impacts
- irreversible and irretrievable commitments of resources
- unavoidable adverse impacts
- potential mitigation measures.

Analyses were expanded to include additional alternatives and the impacts from the Hanford Only waste volume. Major changes to the environmental consequences analysis in this revised draft HSW EIS include an expanded presentation of the impacts on groundwater quality and a summary of the offsite transportation consequences based on previous analyses in the WM PEIS and WIPP SEIS2. The cumulative impacts analysis is also more comprehensive.