

YMP/92-11, Rev. 0, ICN 1

YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT
WASTE PACKAGE IMPLEMENTATION PLAN
CHANGE HISTORY

<u>REV. NO.</u>	<u>ICN NO.</u>	<u>EFFECTIVE DATE</u>	<u>DESCRIPTION OF CHANGE/ICN</u>
0		02/17/93	Initial Issue
0	1	09/15/93	Addition of missing page 4-26.

YMP/92-11, Rev. 0, ICH 1

YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT
WASTE PACKAGE IMPLEMENTATION PLAN

Edgar A. Simecka, Jr.
William B. Simecka, Director
Engineering & Development Division
Yucca Mountain Site Characterization Project

8/30/92
Date

Richard E. Spence
Richard E. Spence, Director
Yucca Mountain Quality Assurance Division
Yucca Mountain Site Characterization Project

8/31/92
Date

Maxwell Blanchard
Carl P. Oertz, Project Manager
Yucca Mountain Site Characterization Project

8/30/93
Date

YMP/2-11, Rev. 0, ICN 1

The process of PA follows that shown in Figure 1-1. The process is an iterative one with loops through the process until a design is achieved that meets the requirements.

4.4.2 INPUTS

The PA process starts with a set of assumptions regarding the performance of each of the barriers and a tentative allocation of that performance to meeting the requirements. A first cut was provided in the SCP. The next step will be to provide a review of these allocations, based upon the approach provided in Table 4.1-1, with the addition of the performance of other containment barrier materials suggested by the design and materials testing efforts. Models will be developed that describe the degradation of the waste forms and the containment barrier materials. This effort is described in Section 4.4.3. The model development effort is strongly tied to the materials testing and submodel development activities described in Section 4.3. Input will also be provided by long-term performance testing of the containers, as well as in situ testing. These activities are also described in Section 4.3.

The PA effort is also closely linked to the design effort, particularly for the selection of materials, material geometries, and environmental scenarios. The fabrication history of the prototype containers and the various barriers will also be reviewed to confirm that the specifications have been met. Particular attention will be paid to the non destructive and destructive examination of closures for microstructural stability, as described in Section 4.3.2.

Another important input into the PA effort is the set of environmental scenarios to consider over the repository lifetime. As noted in Section 2.6, the repository environment will evolve over time. The likely scenarios will need to be considered and assessed for their impact on the performance of the barriers. The conditions on the surface of the WPs will be dependent upon the environment as altered by the decay heat from the WPs and the design of the ERS.

4.4.3 MODEL DEVELOPMENT

The hierarchical framework for model development was discussed in Section 4.4.1. This framework requires the development of performance parameter submodels, such as WP containment breach (and breach rate) and waste form release. These model hierarchies, which are tied to issue resolution, are shown in Figure 4.4-1 and 4.4-2.

The goal of this effort is the development of detailed mechanistic models that adequately describe each degradation and release mode identified in Figures 4.4-1 and 4.4-2, as well as the other portions of the system that need to be modeled. Using the inputs described above, conceptual models will first be developed. These will be supported by the testing program which includes mechanism characterization, service condition determination, and accelerated tests. The models will be enhanced as results from these test programs become available. Performance predictions can then be made that can be tested using confirmation tests.

The models will, to the extent possible, include the variability of the material being degraded. If complete mechanistic understanding cannot be obtained, then partial understanding will be sought. This follows the approach given in ASTM C 1174-91, described in Section 4.1. Lastly, if neither full nor partial mechanistic understanding is possible, then bounding models will be utilized. Validation will be performed for each