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BSC	**Model Administrative Change Notice** *Complete only applicable items.*	QA: QA Page 1 of 1

1. Document Number:	ANL-EBS-MD-000004	**2. Revision:**	02	**3. ACN:**	01
4. Title:	General Corrosion and Localized Corrosion of the Drip Shield				
5. No. of Pages Attached	1 + 3 [initials] 4/26/06				

6. Approvals:

	Print name and sign	Date
Preparer:	Fred Hua [signature]	04/26/06
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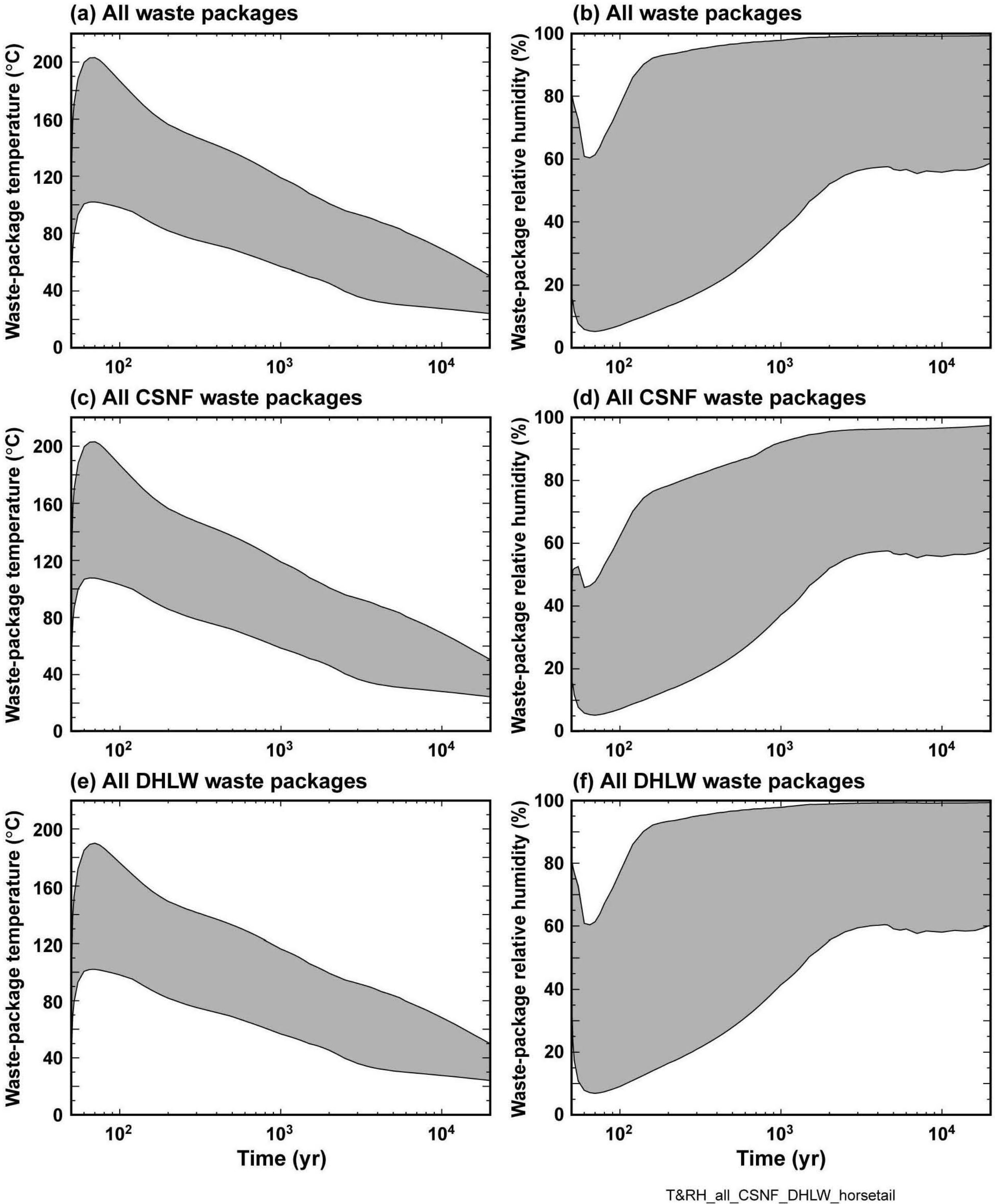
7. Affected Pages	8. Description of Change:
6-4	Replace Figure 4. Waste Package Temperature and Relative Humidity Ranges with correct figure (BSC 2004 [DIRS 169565], Figure 6.3-53). Change due to CR 7272 and TBV-5983
6-36 and 6-39	Additional text added to clarify the use of DTN LL990610605924.079. This does not affect the input values or results. Change due to CR 6664, Action 6664-004



Source: BSC 2004 [DIRS 169565], Figure 6.3-53.

NOTE: The ranges include the lower-bound, mean, and upper-bound infiltration flux cases and use of the mean thermal-conductivity values for all unsaturated zone layer units, including the host-rock units.

Figure 4. Waste Package Temperature and Relative Humidity Ranges

data upon which the cumulative distribution functions are based. This includes the effect of uncertainties involved with $CaCl_2$ and fluoride. However, this uncertainty is small. This was discussed in the modeling analysis in Section 6.5.4.2. In particular it was demonstrated that even under extremely aggressive chemical exposure conditions (brines containing 35,000 mg/L of Mg^{2+} at 250°C) relatively low rates (~ 400 nm/yr) were obtained for Ti Grade 7 (Molecke et al. 1982 [DIRS 161678]) and these rates were attributed to the high temperature and shorter exposure period (i.e., higher than the rates based on the long-term parabolic or logarithmic kinetics). Because these measured rates are near the upper bound levels of the cumulative distribution functions, the uncertainties in the corrosion rates due to unanticipated but possible aggressive chemical exposure conditions are included within the cumulative distribution function distributions.

6.5.5 Composite Model for the General Corrosion Rates for Drip Shield

A simple and defensible representation of the observed general corrosion rates is recommended. The primary difference between the exposure environments on the inner and the outer surfaces of the drip shield is that the drip shield outer surface may be exposed to a more complicated chemistry and geometry because dust or mineral films (from evaporation of dripping water), or both, may form crevices on the drip shield outer surfaces. In contrast, the inner surfaces of the drip shield will not be exposed to dripping water or significant dust film formation. Therefore, the general corrosion of the inner surface and the outer surface of the drip shield are modeled by using different sets of corrosion data. This approach is schematically illustrated in Figure 3. General corrosion of the inner surface of the drip shield is represented by a cumulative distribution function generated from the LTCTF weight-loss samples only (Figure 10). The negative weight-loss general corrosion rates were conservatively removed from the distribution. The numerical values for this distribution are shown in Table 16 and the cumulative distribution function is plotted in Figure 12. The general corrosion rates of the outer surface of the drip shield are represented by a cumulative distribution function generated from combining both the LTCTF weight-loss samples (Figure 10) and the crevice samples (Figure 11). The negative weight-loss general corrosion rates were conservatively removed from the distribution. The numerical values for this distribution are shown in Table 17 and the cumulative distribution function is plotted in Figure 13. Although DTN: LL990610605924.079 [DIRS 104994], S99359_035 (crevice) and S99359_036 (weight loss) files contain 6-month and 1-year data, Table 17 presents only the 1-year data (approximately 8,760 hours). DTN: LL990610605924.079 [DIRS 104994] S99359_035 contains only crevice data, even though its "SCENARIO" column does not indicate the 1-year data as such. This is evident as S99359_035 is entitled, "Corrosion Rate and Chloride Abundance data of crevice from datafile: pmr99gc1tigr16crev, of Titanium Grade 16, 02/15/1999 to 05/26/1999."

Table 17. Cumulative Distribution Function for General Corrosion Rates of Ti Grade 16: LTCTF 1-Year Weight-Loss and Crevice Samples (No Negative Rates)

Sample	Rate (mm/yr)	Cumulative Distribution Function
1	0.00000000E+00	0.00000000E+00
2	4.18430800E-06	1.42857143E-01
3	7.90540100E-06	1.78571429E-01
4	7.90899600E-06	2.14285714E-01
5	7.91733600E-06	2.50000000E-01
6	7.99205500E-06	2.85714286E-01
7	1.59679640E-05	3.21428571E-01
8	1.60740360E-05	3.57142857E-01
9	1.65389750E-05	3.92857143E-01
10	2.10450870E-05	4.28571429E-01
11	2.35658240E-05	4.64285714E-01
12	2.37302160E-05	5.00000000E-01
13	2.40329080E-05	5.35714286E-01
14	2.52784890E-05	5.71428571E-01
15	3.99976910E-05	6.07142857E-01
16	4.26207080E-05	6.42857143E-01
17	4.28647310E-05	6.78571429E-01
18	5.15303020E-05	7.14285714E-01
19	6.33683700E-05	7.50000000E-01
20	6.49668830E-05	7.85714286E-01
21	7.14961090E-05	8.21428571E-01
22	7.91641200E-05	8.57142857E-01
23	8.22028960E-05	8.92857143E-01
24	1.11563286E-04	9.28571429E-01
25	1.12788228E-04	9.64285714E-01
26	3.19409704E-04	1.00000000E+00

Source: DTN: LL990610605924.079 [DIRS 104994] S99359_035 and S99359_036. Data in S99359_035 are for crevice specimens only and data in S99359_036 are for weight loss specimens only.

Output DTN: MO0408MWDGLCDS.002.

6.5.6 Alternative Conceptual Models for the Representation of Drip Shield General Corrosion Rates

The composite general corrosion model uses cumulative distribution functions to select values for the general corrosion rate. The cumulative distribution functions were obtained from the titanium corrosion testing at the LTCTF. The testing performed to support this model involved exposure of titanium alloy coupons for up to five years. The distribution of these rates is then considered in the model to be maintained over the regulatory period. In this way, the general corrosion model is based on the conservative assumption (Assumptions 5.3 and 5.4) that the corrosion rates will not decrease with time.