Department of Energy
Office of Civilian Radioactive Waste Management
Office of Repository Development
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QA: N/A
Project No. WM-00011

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OVERNIGHT MAIL

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KEY TECHNICAL ISSUE (KTI) AGREEMENT RESPONSE SCHEDULE

Reference: Ltr, Ziegler to Schlueter, dtd 11/28/03

Enclosed is a revised schedule (enclosure 1) for delivery of the remaining responses to KTI agreements and "Additional Information Needed" (AIN) to the U.S. Nuclear Regulatory Commission (NRC). Enclosure 2 provides a comparison of the revised schedule to the previous schedule forwarded by the referenced letter, and to the NRC risk-significance ranking of the remaining KTI agreements. The U.S. Department of Energy (DOE) will formally address all remaining KTI agreements by the end of August 2004, as further discussed below.

The revised schedule is due to delays in the completion of Analysis and Model Reports, the Total System Performance Assessment, and other documents necessary to complete the KTI agreements and AIN responses. Although delay to the completion of the Total System Performance Assessment will affect some KTI agreements in the Barrier Capability/Total System Performance Assessment and Integration group, we will provide a response by August 2004 to address the status of these KTI agreements, and the plans and schedules for completion of any remaining work.

The enclosed schedule (enclosure 1) represents revised DOE commitment dates for delivery of the responses to the remaining KTI agreements and AINs. The DOE welcomes opportunities to discuss the revised schedule as the NRC considers necessary, and is prepared to support interactions on this topic at the mutual convenience of DOE and NRC.

NMSS07

If you have any questions about this letter or the enclosures, please contact Timothy C. Gunter at (702) 794-1343 or e-mail at timothy_gunter@ymp.gov.

Joseph D. Ziegler, Director
Office of License Application and Strategy

OLA&S:TCG-0978

Enclosures:
1. Changes to KTI Agreement/AIN Response Schedule
2. KTI Agreement Response Schedule Comparison

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Enclosure 1

Changes to KTI Agreement/AIN Response Schedule (sorted by response group and date to NRC)

KTI Agreement/ AIN	Description	Date to NRC	Revised Date to NRC
I. Climate and Infiltration			
TSPAI 3.18.AIN-1	Water-balance plug-flow model and non-linear flow represented by Richards' equation	Apr-04	No Change
TSPAI 3.19.AIN-1	Justify use of the evapotranspiration model and the analog site temperature data	Apr-04	No Change
TSPAI 3.21.AIN-1	Effects of near surface lateral flow on the spatial variability of net infiltration	Apr-04	No Change
USFIC 3.01.AIN-1	Document sources and schedule for the Monte Carlo method for analyzing infiltration	Apr-04	No Change
USFIC 3.02.AIN-1	Infiltration Uncertainty AMR; Alcove 1 and Pagany Wash Tests	Apr-04	No Change
II. Unsaturated Zone Flow			
Group A KTI Agreements/AINs			
RT 1.01	Provide the basis for the proportion of fracture flow through the Calico Hills non-welded vitric	May-04	No Change
RT 3.02	Geochemical data used for support of the flow field below the repository	May-04	No Change
TEF 2.11	Analysis of geochemical and hydrological data used for flow field below repository	May-04	No Change
TEF 2.12	Updated Calibrated Properties Model AMR	May-04	No Change
TEF 2.13.AIN-1	Calibrate UZ flow model using recent data on saturations and water potentials	May-04	No Change
TSPAI 3.22.AIN-1	Uncertainty in calibrating a current climate model and using to forecast future climate flow	May-04	No Change
TSPAI 3.24	UZ flow and transport documentation	May-04	No Change
TSPAI 3.26	Models for UZ Flow and Transport AMR, and Hydrologic Properties Data AMR	May-04	No Change
TSPAI 3.27	Provide an overview of water flow rates used in the UZ model	May-04	No Change
Group B KTI Agreements			
ENFE 2.03	Provide the technical basis for FEP 1.2.06.00 (Hydrothermal Activity)	Jun-04	No Change
USFIC 4.04	Effectiveness of the PTn to dampen episodic flow, including chloride-36 studies	Jun-04	No Change
III. Water Seeping into Drifts			
Group B KTI Agreements/AINs			
ENFE 1.03.AIN-1	Drift-Scale Coupled Processes (DST and THC Seepage) Models AMR, Rev. 01 & 02	Jul-04	No Change
RDTME 3.20	Sensitivity analyses of thermal-mechanical effects on fracture permeability	Jul-04	No Change
RDTME 3.21	Validation analysis of field tests re TM effects on fracture permeability	Jul-04	No Change

Enclosure 1

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KTI Agreement/ AIN	Description	Date to NRC	Revised Date to NRC
RT 3.05	Alcove 8/Niche 3 testing and predictive modeling for the UZ	Jul-04	No Change
SDS 3.01 & SDS 3.01.AIN-1	The ECRB and Alcove 8 Niche 3 tests need to be related to observed fracture patterns	Jul-04	No Change
TEF 2.10.AIN-1	Variability/uncertainty in TEF simulations in the abstraction of thermodynamic variables	Jul-04	No Change
TSPAI 3.07	Representation of, or the neglect of, dripping from rockbolts in the ECRB	Jul-04	No Change
TSPAI 3.11	Integration between the 3D UZ flow model, MSTH model, and drift seepage model	Jul-04	No Change
USFIC 6.03	Complete the Alcove 8 testing	Jul-04	No Change
IV. Mechanical Degradation and Seismic Effects			
Group A KTI Agreements			
RDTME 3.05	Technical basis for accounting for the effects of lithophysae	Mar-04	Jul-04
RDTME 3.06	Design sensitivity and uncertainty analyses of the rock support system	Mar-04	Jul-04
RDTME 3.15	Data and analysis of rock bridges between rock joints	Mar-04	Jul-04
RDTME 3.16	Modeling joint planes as circular discs; re small trace length fractures	Mar-04	Jul-04
RDTME 3.17	Technical basis for effective maximum rock size	Mar-04	Jul-04
RDTME 3.19	Determine whether rockfall can be screened out from PA abstractions	Mar-04	Jul-04
Group B KTI Agreements			
RDTME 3.02	Critical combinations of in-situ, thermal, and seismic stresses	Jun-04	Jul-04
RDTME 3.04	Site-specific properties of the host rock	Jun-04	Jul-04
RDTME 3.08	Design sensitivity and uncertainty analyses of fracture patterns	Jun-04	Jul-04
RDTME 3.09	Rock movements in the invert	Jun-04	Jul-04
RDTME 3.10	Two-dimensional modeling for emplacement drifts	Jun-04	Jul-04
RDTME 3.11	Continuum and discontinuum analyses of ground support system performance	Jun-04	Jul-04
RDTME 3.12	Dynamic analyses of ground support system performance	Jun-04	Jul-04
RDTME 3.13	Boundary conditions: continuum/ discontinuum modeling, underground facility design	Jun-04	Jul-04

Enclosure 1

Changes to KTI Agreement/AIN Response Schedule (sorted by response group and date to NRC)

KTI Agreement/ AIN	Description	Date to NRC	Revised Date to NRC
V. In-drift Chemical Environment			
Group B KTI Agreements			
TEF 2.05	Represent the "cold-trap" effect in the Multi-Scale Thermohydrologic Model AMR	Jul-04	Aug-04
TSPAI 3.10	Integrated uncertainty analyses of EBS physical and chemical environment	Jul-04	No Change
VI. Waste Package and Drip Shield Corrosion			
Group B KTI Agreements/AINs			
CLST 1.02	Corrosion: Surface analysis of welded specimens; dissolution, dealloying	May-04	No Change
CLST 1.06.AIN-1	WP - Effects of silica on corrosion	May-04	No Change
CLST 2.02	Documentation for the point loading rockfall analysis	May-04	Jun-04
CLST 2.08	WP - Effects of Phase Instability of Materials and Initial Defects	May-04	Jun-04
CLST 2.09	DS & WP mechanical analysis of seismic excitation and design basis earthquake	May-04	Jun-04
TSPAI 3.01	Propagation of uncertainty of WP & DS Corrosion Rates	May-04	No Change
TSPAI 3.03.AIN-1	WP/DS - Stress corrosion cracking (SCC) (NRC Rejected Bin 3)	May-04	No Change
TSPAI 3.04	Representation of variation of general corrosion rates	May-04	No Change
TSPAI 3.05	Technical basis for uncertainty/variability in general corrosion rates	May-04	No Change
Group C KTI Agreements			
CLST 1.03	WP - Revision to AMR "General and Localized Corrosion of WP Outer Barrier"	Jun-04	No Change
CLST 1.08	WP & DS - AMR ANL-EBS-MD-000003 and 000004	Jun-04	No Change
CLST 1.09	WP & DS - Passive film stability - AMR ANL-EBS-MD-000003 & 000004	Jun-04	No Change
CLST 1.10	Alloy 22 & titanium: Measure corrosion potentials in the LTCTF, etc.	Jun-04	No Change
CLST 1.11	Critical potentials as bounding parameters for localized corrosion	Jun-04	No Change
CLST 6.01	Perform more sensitivity measurements of general corrosion rates, etc	Jun-04	No Change

Enclosure 1

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KTI Agreement/ AIN	Description	Date to NRC	Revised Date to NRC
Group D KTI Agreements (Related to Testing)			
CLST 1.04	Documentation for Alloy 22 and titanium	Apr-04	May-04
CLST 2.04	WP - effect of fabrication sequence on phase instability of Alloy 22	Apr-04	Jun-04
CLST 2.05	WP - Provide "Aging and Phase Stability of Waste Package Outer Barrier," AMR	Apr-04	Jun-04
Group E KTI Agreements/AINs (Related to Design)			
CLST 2.03.AIN-1	WP/DS - Material analysis, primarily drip shield	Jul-04	No Change
PRE 7.03	WP - microstructural and compositional variations of alloy 22	Jul-04	No Change
PRE 7.05	WP - waste package closure weld	Jul-04	No Change
VII. In-package Environment, Waste Form Degradation and Solubility			
CLST 3.02.AIN-1	WF in-package chemistry: Radiolysis, water, corrosion, corrosion products, dissolution	Apr-04	Jul-04
CLST 3.03.AIN-1	Provide a more detailed calculation on the in-package chemistry effects of radiolysis	Apr-04	Jul-04
CLST 3.04.AIN-1	Interaction of engineered materials on water chemistry for in-package abstractions	Apr-04	Jul-04
CLST 3.05	Provide the plan for experiments demonstrating in-package chemistry	Apr-04	Jul-04
CLST 3.06.AIN-1	Technical basis for the failure rate and how the rate is affected by localized corrosion	Apr-04	Jul-04
CLST 3.07	Address chloride induced localized corrosion and SCC	Apr-04	Jul-04
CLST 3.08.AIN-1	Distribution for cladding temperature and stress used for hydride embritt	Apr-04	Jul-04
CLST 3.09.AIN-1	Critical stress that is relevant for the environment in which external SCC takes place	Apr-04	Jul-04
ENFE 3.03	Verify that bulk-scale chemical processes dominate the in-package chemical environment	Apr-04	Jul-04
ENFE 3.04	Complete validation of in-package chemistry models	Apr-04	Jul-04
TSPAI 3.08	Abstraction of in-package chemistry and its implementation into the TSPA	Apr-04	Jul-04
TSPAI 3.14	Update in-package chemistry model to account for scenarios and their associated uncertainties	Apr-04	Jul-04
VIII. Colloids			
All Associated Responses Submitted			
IX. Engineered Barrier System Transport			
No Associated KTI Agreements/AINs			

Enclosure 1

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KTI Agreement/ AIN	Description	Date to NRC	Revised Date to NRC
X. Unsaturated Zone Transport			
RT 1.02	Provide analog radionuclide data from tracer tests for Calico Hills at Busted Butte & from test blocks at Busted Butte	Apr-04	May-04
RT 3.01	Importance of transport through fault zones below the repository	Apr-04	May-04
RT 3.04	Relative Importance of hydrogeological units beneath the repository for transport	Apr-04	May-04
RT 3.10	Provide analog radionuclide data from tracer tests for Calico Hills at Busted Butte & from test blocks at Busted Butte	Apr-04	May-04
TSPAI 3.28	Confidence in the active-fracture continuum concept in the transport model	Apr-04	May-04
TSPAI 3.29	Integration of the active fracture model with matrix diffusion in the transport model.	Apr-04	May-04
XI. Saturated Zone Flow and Transport			
All Associated Responses Submitted			
XII. Biosphere Transport			
All Associated Responses Submitted			
XIII. Volcanic Events			
IA 2.17	Effects on dose of eolian and fluvial remobilization	Aug-04	Jul-04
XIV. Low Probability Seismic Events			
CLST 3.10	Rockfall and vibratory loading effects on the mechanical failure of cladding	Mar-04	Jun-04
RDTME 2.01	Provide Topical Report 3, Preclosure Seismic Design Inputs for a Geologic Repository	Mar-04	Jun-04
RDTME 2.02	Provide draft final seismic design inputs for LA and Seismic Topical Report 3	Mar-04	Jun-04
RDTME 3.03	Provide the Seismic Design Inputs AMR and the Preclosure Seismic Design Inputs	Mar-04	Jun-04
SDS 2.01.AIN-1	Provide clear documentation of the expert elicitation process	Mar-04	Jun-04
SDS 2.02	Update FEPs; Disruptive Events AMR, Seismic Design Inputs, Seismic Topical Report	Mar-04	Jun-04
SDS 2.04.AIN-1	Document seismic fragility curves and seismic risk analysis	Mar-04	Jun-04
TSPAI 3.06	Methodology used to implement the effects of seismic effects on cladding	Mar-04	Jun-04
Barrier Capability / Total System Performance Assessment and Integration			
TSPAI 1.02	Documentation of barrier capabilities and the corresponding technical bases	Aug-04	No Change[1]
TSPAI 3.37	Justify sampling and correlation methods	Aug-04	No Change[1]

Enclosure 1

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KTI Agreement/ AIN	Description	Date to NRC	Revised Date to NRC
TSPAI 3.38.AIN-1	Develop guidance in the model abstraction process	Aug-04	No Change[1]
TSPAI 3.39.AIN-1	Document the simplifications used for abstractions	Aug-04	No Change[1]
TSPAI 3.41.AIN-1	Support for mathematical representation of data uncertainty in the TSPA	Aug-04	No Change[1]
TSPAI 4.01.AIN-1	Document methodology used to incorporate alternate conceptual models into TSPA	Aug-04	No Change[1]
TSPAI 4.03 & TSPAI 4.03.AIN-1	Demonstrate that the overall results of the TSPA are stable	Aug-04	No Change[1]
TSPAI 4.04	Demonstrate that TSPA results are stable with respect to spatial and temporal discretization	Aug-04	No Change[1]
TSPAI 4.06	Demonstrate compliance with model confidence criteria	Aug-04	No Change[1]
Criticality			
PRE 7.01	Update the Pre-Closure Criticality Analysis Process Report	Mar-04	May-04
CLST 5.03	Technical basis for screening criticality from the post-closure performance assessment	Jun-04	Aug-04
CLST.5.04	Provide the list of (geochemistry) validation reports and their schedules	NA[2]	Aug-04
CLST 5.05.AIN-1	Consequences of increased radiolysis due to criticality events.	Jun-04	Aug-04
ENFE.5.03	Provide list of (geochemistry) validation reports and schedules for external criticality; provide validation approach (geochemistry) and justification that validation independent of models/calibration.	NA[2]	Aug-04
RT.4.03	Provide list of (geochemistry) validation reports and their schedules for external criticality	NA[2]	Aug-04
Features, Events and Processes			
TSPAI 2.01	Provide clarification of the screening arguments	Jun-04	No Change
TSPAI 2.02	Provide the technical basis for the screening arguments	Jun-04	No Change
TSPAI 2.03	Add the FEPs highlighted in Attachment 2	Jun-04	No Change
TSPAI 2.04	Provide a clarification of the description of the primary FEPs	Jun-04	No Change
TSPAI 2.07	Provide results of the implementation of the Enhanced FEP Plan.	Jun-04	Aug-04
Ungrouped			
RDTME 3.14	Provide the results of the ventilation modeling (Multi-Flux code) and technical bases	Jan-04	Apr-04
TEF 2.07	Provide the Ventilation Model AMR and Pre-Test Predictions for Ventilation Test Calculation	Jan-04	Apr-04
TSPAI 4.07.AIN-1	Verification and validation procedure for legacy codes & documentation of compliance with the procedure	Jan-04	Mar-04

Enclosure 1

Changes to KTI Agreement/AIN Response Schedule (sorted by response group and date to NRC)

KTI Agreement/ AIN	*Description*	*Date to NRC*	*Revised Date to NRC*
IA 2.18[3]	Effects of engineered repository structures on magma flow processes	Mar-04	May-04
PRE 3.01	Changes to Aircraft Hazard Analysis and additional Technical Exchange	Apr-04	Jun-04
CLST 2.01	Drip shield - rockfall analysis (AMR ANL-XCS-ME-000001)	May-04	No Change
ENFE 1.07.AIN-1	Model of matrix fracture interaction precipitation effects (e.g., coring)	May-04	No Change
ENFE 4.02	Drift-Scale Coupled Processes (DST and THC Seepage) Models AMR, Rev. 01 & 02	May-04	No Change
PRE 6.01.AIN-1	QA Procedures - update procedure AP-2.22Q.	May-04	No Change
ENFE 2.18	Provide 18 AMRs according to schedule	Jun-04	No Change
ENFE 2.07.AIN-1	Role of chemical reactions in DS and WP corrosion; technical basis for establishing of 11 bins	Jun-04	Jul-04
TSPAI 3.16	Evaluate effect of localized flow pathways on water and gas chemistry in the EBS	Jun-04	Jul-04
GEN 1.01	General Agreement	Aug-04	No Change
ENFE 1.04[4]	The effects of cementitious materials on hydrologic properties	Jul-04	No Change
RDTME 3.07	Effect of sustained loading on intact rock strength	Jul-04	No Change
PRE 7.04.AIN-1	Non-destructive evaluation of testing methods & ID of min flaw size affecting mechanical performance of WP	To be further addressed in the LA	NA
USFIC 5.02[5]	Groundwater specific discharge; Flow fields for future climate states	NA	Apr-04

[1] Although delay to the completion of the Total System Performance Assessment will affect some KTI agreements in the Barrier Capability/Total System Performance Assessment and Integration group, we will provide a response by August 2004 to address the status of these KTI agreements, and the plans and schedules for completion of any remaining work.

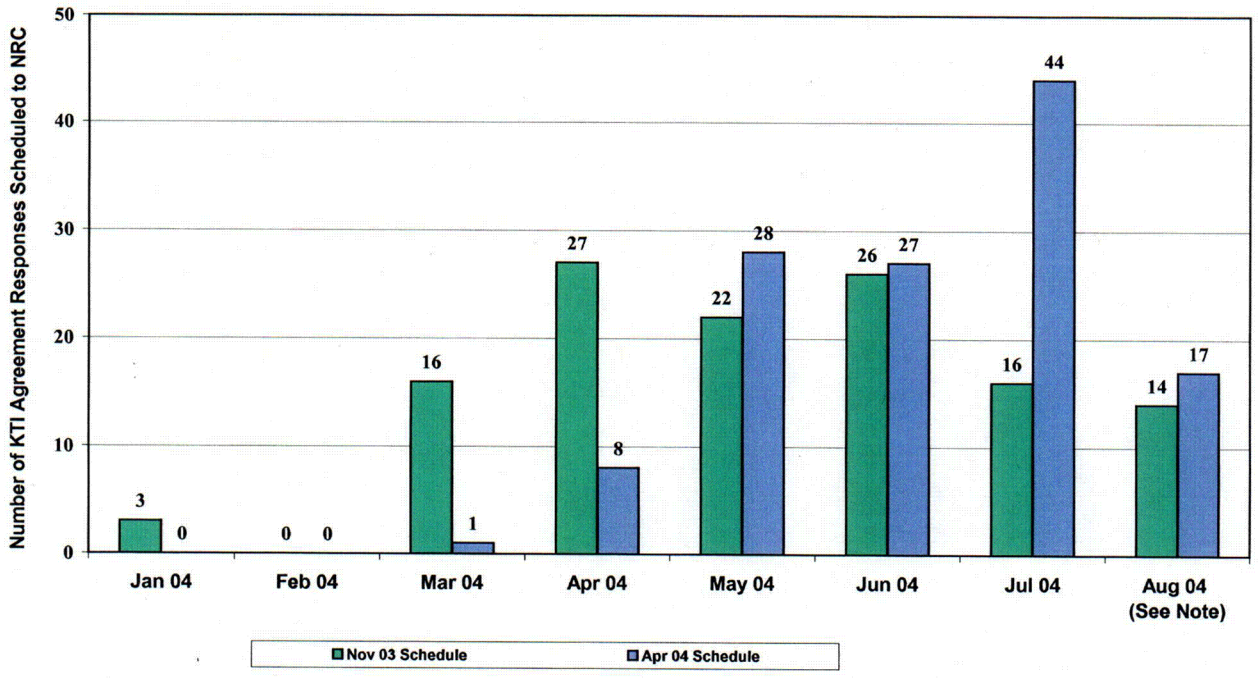
[2] Not included in 11/28/03 ltr to NRC; response came back from NRC as partly received.

[3] Previously grouped with Volcanic Events.

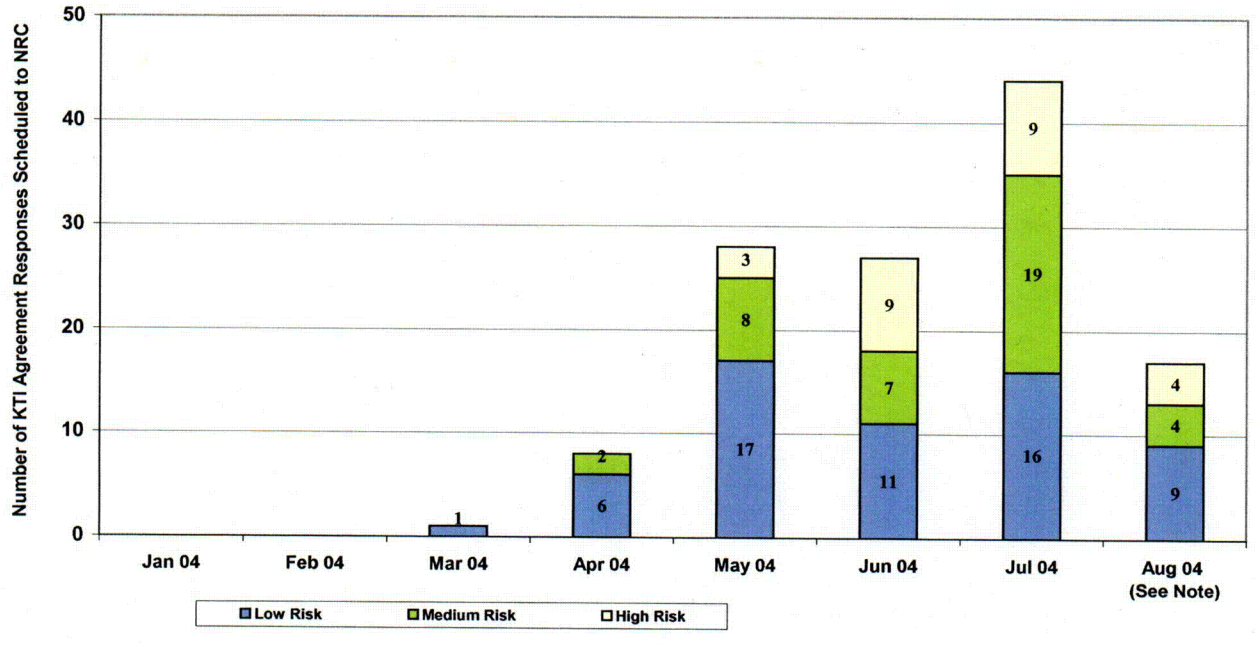
[4] Previously grouped with Water Seeping into Drifts Group B.

[5] Not included in 11/28/03 ltr to NRC; in response to Sept 2002 submittal, NRC identified specific issues yet to be addressed.

KTI Agreements - Nov 03 Schedule and Apr 04 Schedule Comparision



KTI Agreements - NRC Risk Ranking Per Month (Apr 04 Schedule)



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