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BLM Gas Migration Study
Risk Assessment
Geomechanical Parameter List

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Geomechanical Parameter	Expected data source	Geomechanical Parameter	Expected data source
Cement strength (tension, shear, etc.)	Industry standards	Failure bending stress of welded coupling of K55 steel casing (function of diameter)	SNL lab data, API standards
Number of known well leakage events in greater Delaware Basin region, including locations with respect to WIPP, potash mine	NMOCD records, oil/gas stakeholders	Failure shear stress of K55 steel casing (function of diameter)	SNL lab data, API standards
Deviation of well string after subsidence (Unless in region of significant subsidence, operational deviation not expected)	Oil/gas stakeholders	Failure shear stress of threaded coupling of K55 steel casing (function of diameter)	SNL lab data, API standards
Deviation of well string during/after installation (typical, extremes)	Oil/gas stakeholders	Failure shear stress of welded coupling of K55 steel casing (function of diameter)	SNL lab data, API standards
Frequency of threaded vs. welded casing connections	Oil/gas stakeholders	Failure threshold, longitudinal strain in casings	SNL lab data, API standards
Hydrofracture pressure of rock in marker beds	Oil/gas stakeholders	FEPs - specific events to be considered in RA model	SNL, Oil/gas, Potash
Identify old oil bearing zones in relation to wells, mines; determine potential effect on gas migration pathways	Oil/gas stakeholders	FEPs - WIPP FEPs to use as framework for developing gas migration FEPs	WIPP records
Water pressure used for injection wells	Oil/gas stakeholders	Friction coefficient (effective) along marker beds	WIPP records
Well abandonment method (Plugged at top, filled in borehole, presence of open space or annuli)	Oil/gas stakeholders	Geologic abnormalities (damaged regions, reef, etc.)	WIPP records
Well casing design, current typical (diameters, depths, length of cement installation in each annulus, etc.)	Oil/gas stakeholders	Marker bed composition, for material mechanical properties (each one)	WIPP records
Well pressure (FTP) histories (operation histories; typical, extreme) (telemetry data of well pressure?)	Oil/gas stakeholders	Marker bed permeability, including fractures (each one)	WIPP records
Gas level in mine, threshold for safe operations	Potash stakeholders	Marker bed porosity (each one)	WIPP records
Mining excavation rate	Potash stakeholders	Marker bed thickness (each one)	WIPP records
Mining methods (long wall v. room-pillar)	Potash stakeholders	Pore pressure of geologic layers	WIPP records
Elastic collapse pressure of steel casing (function of diameter)	SNL lab data, API standards	Porosity of geologic layers	WIPP records
Failure bending stress of K55 steel casing (function of diameter)	SNL lab data, API standards	Potash creep properties (use salt properties)	WIPP records
Failure bending stress of threaded coupling of K55 steel casing (function of diameter)	SNL lab data, API standards	Potash mech. properties (E, ν, strength) (use salt properties)	WIPP records

Geomechanical Parameter	Expected data source	Geomechanical Parameter	Expected data source
Potash permeability (use salt properties)	WIPP records	Well drilling data in WIPP footprint	WIPP records (Dave Hughes, DOE-Carlsbad)
Potash porosity (use salt properties)	WIPP records	Slip displacement data along marker beds (use to validate model asumptions)	WIPP records, field data
Salt creep properties	WIPP records	Relationship, dilatant stress to porosity/perm changes, salt and potash	WIPP records, geomech literature
Salt mechanical properties (E, ν, strength)	WIPP records	Relationship, stress change to porosity/perm change, clay and anhydrite in marker beds	WIPP records, geomech literature
Salt permeability	WIPP records	Surface subsidence data in vicinity of mine	WIPP records, potash stakeholders
Salt porosity	WIPP records		