Cover Sheet to Accompany the Campaign Risk Matrix

Key Points Regarding the Risk Matrix

The accompanying Campaign Risk Matrix is intended by the NNMCAB Risk and Consent Order Committees as a tool and as a vehicle to enhance NNMCAB Members' awareness and understanding of Risk aspects as they apply to setting priorities and driving cleanup decisions across the Los Alamos Legacy Cleanup Program. See the document in your meeting packet titled "Regarding Recommendation to DOE EM-LA on Consent Order Priorities", submitted by the Consent Order Committee.

The Matrix displays information on Human Health Risk and Ecological Risk. These are arguably the most important risks that drive Environmental Remediation priorities and specific cleanup decisions – but they are not the *only* important ones. See the attached one-pager on "What Is Risk?"

Relative risk values in the Matrix were assigned by N3B Subject Matter Experts based on –

- Quantitative risk assessments or risk evaluations where they are available, and
- Professional judgment where no risk calculations have yet been made.

It is important to note that this Matrix condenses a vast amount of information, and because of that many generalizations had to be made (for example, within Aggregate Areas). More than 1,500 Risk Assessment documents relate to the campaigns listed on the Matrix.

Consequently, some individual SWMUs or AOCs within a campaign may have higher risk values than others and the resulting campaign-averaged risk value disguises the importance of these. At the same time, the higher-risk SWMUs and AOCs increase the importance of associated lower-risk SWMUs or AOCs simply by generalizing.

Again, the Campaign Risk Matrix is a tool, created by and for the NNMCAB, and will be subject to further revision and updating to increase its usefulness.

Background

The NNMCAB Risk and Consent Order Committees came up with the idea to prepare a Qualitative Risk Matrix that would give NNMCAB members a general sense of the relative risks among the various Campaigns in the Consent Order.

The NNMCAB Risk Committee prepared a "strawman" qualitative risk matrix that could be populated by Subject Matter Experts from DOE/N3B who would assign relative risk values to the Campaigns.

Kent Rich of N3B populated the Matrix with support from other N3B SMEs, DOE reviewed and approved its release, and then Kent made a presentation of it to the NNMCAB Risk Committee on June 29. Kent thereafter modified the Matrix to clarify or address some of the comments made by Risk Committee Members.

Roadmap for the Campaign Risk Matrix

1. The Matrix rows are organized in the same order as Appendix C of the Consent Order.
2. The campaigns fall into six general categories:
    a. Contamination-specific campaigns (such as hexavalent chromium and RDX)
    b. Aggregate Areas (sites with soil or other surface contamination)
    c. Material Disposal Areas
    d. Reports
    e. TA-21 D&D and Cleanup
    f. Known Cleanup Sites
3. The second column identifies the listed campaigns as either a current Milestone (fiscal year 2020) or a Target (2021-2022) under the November 2019 version of Appendix B of the Consent Order.
4. All risk assignments are made based on the concept that "no remediation takes place" even where some is in progress. This is so that, if for any reason remediation were to stop, then we would have an indication of risk as-is. It is assumed that if remediation does continue, the resulting risks would be lower.
5. The columns for environmental standards are based upon the Consent Order standards with the exception of the reference to DOE Order 458.1, which deals with radiation protection (i.e., not covered by the Consent Order).
6. The intent of the "Potential for Off-Site Effects" (again if no remediation were to take place) is to get a sense if the campaign has a potential to affect the public off site now or later, and if the potential increases with time.

What is 'Risk'? How is it used in making decisions for ER?

The word 'risk' can mean different things in relation to an Environmental Remediation program, depending on the context of its use.

- **Human Health and Ecological Risk [Assessments]**

Calculations based on EPA algorithms to assess risk to Receptors at a specific cleanup site (*each* SWMU and AOC) based on sampling and characterization data for contamination present at that site. Required under the Consent Order. There are 2,100+ such sites at LANL. Calculated results that fall below the threshold of acceptable risk for each category (Human Health and Ecological) qualify the site as 'done' with cleanup, or no action required; this is the basis for a Certificate of Completion (CoC). In some cases remediation is performed even if risk thresholds are already met. For Human Health Risk the calculations are based on certain future use scenarios for human activity at the site. For us the Risk Assessments are typically contained in the Investigation Report, which for an Aggregate Area (AA) covers multiple SWMUs/AOCs with a Risk Assessment for each.

- **Political/Perception Risk**

Risk of failure to adequately embrace the intangibles that matter to stakeholders. For example:

Potential for imminent movement of groundwater contamination off DOE property. Response strategy: Make such a groundwater plume the #1 cleanup priority, and implement an Interim Measure to arrest the plume's advance and to reduce contamination in the aquifer.

Perception as having insufficient sensitivity to Community values and relationships in the selection of what to work on first. Response strategy A: Tackle first those cleanups closest to the public or to Laboratory boundaries. Response strategy B: Knock down buildings to visibly change the skyline.

Failure to prioritize work supporting Federal Government commitments for land transfer to local jurisdictions. Response strategy: Make visible progress at TA-21 to enable timely land transfer.

- **Programmatic Risk**

Unknowns that cause uncertainties in total program size and cost
Example: When one has a good understanding, or at least preliminary quantification, of contamination at some sites (and hence a reasonable expectation of cleanup costs), but hardly any such information for certain other sites, one may choose to move the latter sites up in priority for *investigation* to address that uncertainty risk.

- **Safety and Health Risks That Attach to Any Particular Remediation Approach**

Worker safety in tasks such as excavation, construction, heavy equipment operation, materials handling, exposure to hazardous or radioactive waste

Transportation safety in the hauling of large quantities of material to and/or from the Site (and empty trucks making the return trip)

Public safety in potential airborne release of contamination during excavation of waste or soil

- **Project Risk**

The possibility of an unplanned event or unanticipated condition that, if realized, causes a quantitative cost or schedule impact to a project
Examples: A downhole drilling obstruction. Greater volume of contaminated soil or higher level of radiological contamination than planned for based on previous information

		Potential to Exceed Standards - If no remediation were to take place (NA, Never, VL, L, M, H, VH, or Unknown)							**Potential for Off-Site Effects - If no remediation were to take place** (Never, VL, L, M, H, VH, or Unknown)				**Basis for Risk Assessment**			
2016 Consent Order Appendix C Campaigns (updated November 2019)	**Identify Which Are: CO Milestone FY2020, CO Target FY2021, CO Target FY2022** [2016 CO Appendix B Milestones and Targets (updated November 2019)]	NMED Ground Water Quality Bureau - **Groundwater** Quality Standards	NMED Surface Water Quality Bureau - **Surface Water** Quality Standards	Federal or NM State - **Air** Quality Standards	NMED or EPA **Tap Water** Screening Levels (as applicable)	CO NMED Residential **Soil** Screening Levels	CO NMED **Ecological** Screening Levels	Limits in: DOE Order 458.1 Radiation Protection of the Public and the Environment	Now	Within Next 10 yrs.	Within Next 20 yrs.	Later than 20 yrs.	Has a LANL quantitative risk assessment been permformed? (Y/N)	Quantitative risk summary (E, S,F,NE)	LANL quantitative risk assessment included in what document(s)?	If no quantitative risk assessment, qualitative risk based upon SME best estimate
A. Chromium Interim Measures and Characterization	M 2020, T 2021, T 2022	VH	NA	NA	NA	NA	NA	NA	VH	VH	VH	VH	N	-	-	VH
B. Historical Properties Completion																
Upper Los Alamos Canyon Aggregate Area		NA	NA	NA	NA	VL	VL	VL	VL	VL	VL	VL	Y	S	IR	-
Middle Los Alamos Canyon Aggregate Area		NA	NA	NA	NA	VL	VL	VL	VL	VL	VL	VL	Y	E	IR	-
C. Royal Demolition Explosives (RDX) Characterization	M 2020, T 2021	NA	NA	NA	VH	NA	NA	NA	VL	L	L	L	Y	NE	RAS	-
D. Supplemental Investigation Reports	M 2020	NA	NA	NA	NA	VL	VL	VL	VL	VL	VL	VL	Y	E	SIRs	-
E. TA-21 D&D and Cleanup	M 2020, T 2021, T 2022	NA	NA	NA	NA	M	M	H	M	M	M	M	N	-	-	M
F. RDX Remedy	T 2022	NA	NA	NA	VH	NA	NA	NA	VL	L	L	L	Y	NE	RAS	-
G. Known Cleanup Sites (Above SSLs)		NA	NA	NA	NA	NA	NA	NA	VL	VL	VL	VL	Y	F	IR	-
H. Material Disposal Areas A and T Remedy	T 2021, T 2022	L	L	VL	VL	M	VL	H	L	L	L	L	N	-	-	M
I. Chromium Final Remedy		VH	NA	NA	NA	NA	NA	NA	VH	VH	VH	VH	N	-	-	VH
J. Southern External Boundary																
Chaquehui Canyon Aggregate Area	M 2020	NA	NA	NA	NA	M	L	M	L	L	L	L	N	-	-	L
South Ancho Canyon Aggregatre Area	M 2020, T 2021	NA	NA	NA	NA	M	L	M	L	L	L	L	N	-	-	L
Lower Water Canyon Aggregate Area	M 2020, T 2021	NA	NA	NA	NA	M	L	M	L	L	L	L	N	-	-	L
North Ancho Canyon Aggregate Area	T 2022	NA	NA	NA	NA	VL	VL	VL	VL	VL	VL	VL	Y	S	IR	-
Potrillo/Fence Canyon Aggregate Area	T 2021, T 2022	NA	NA	NA	NA	VL	VL	VL	VL	VL	VL	VL	Y	F	SIR	-
K. Material Disposal Area C Remedy	T 2022	L	VL	L	VL	VL	VL	M	L	L	L	L	Y	F	IRs	-
L. Sandia Canyon Watershed																
Upper Sandia Canyon Aggregate Area		NA	NA	NA	NA	VL	VL	VL	VL	VL	VL	VL	Y	S	SIR	-
Lower Sandia Canyon Aggregate Area		NA	NA	NA	NA	VL	VL	VL	VL	VL	VL	VL	Y	E	SIR	-
Upper Mortandad Canyon Aggregate Area		NA	NA	NA	NA	VL	VL	VL	VL	VL	VL	VL	Y	E	SIR	-
Upper Canada del Buey Aggregate Area		NA	NA	NA	NA	VL	VL	VL	VL	VL	VL	VL	Y	E	SIR	-
M. Pajarito Watershed																
Starmer/Upper Pajarito Canyon Aggregate Area	T 2021, T 2022	NA	NA	NA	NA	M	L	M	L	L	L	L	N	-	-	M
Twomile Canyon Aggregate Area	T 2021, T 2022	NA	NA	NA	NA	M	L	M	L	L	L	L	N	-	-	M
Threemile Canyon Aggregate Area	T 2021, T 2022	NA	NA	NA	NA	VL	VL	VL	VL	VL	VL	VL	Y	E	SIR	-
Lower Pajarito Canyon Aggregate Area	T 2022	NA	NA	NA	NA	M	L	M	L	L	L	L	N	-	-	M
N. Upper Water Watershed																

		Potential to Exceed Standards - If no remediation were to take place (NA, Never, VL, L, M, H, VH, or Unknown)							**Potential for Off-Site Effects - If no remediation were to take place** (Never, VL, L, M, H, VH, or Unknown)				**Basis for Risk Assessment**			
2016 Consent Order Appendix C Campaigns (updated November 2019)	**Identify Which Are: CO Milestone FY2020, CO Target FY2021, CO Target FY2022** [2016 CO Appendix B Milestones and Targets (updated November 2019)]	NMED Ground Water Quality Bureau - **Groundwater** Quality Standards	NMED Surface Water Quality Bureau - **Surface Water** Quality Standards	Federal or NM State - **Air** Quality Standards	NMED or EPA **Tap Water** Screening Levels (as applicable)	CO NMED Residential **Soil** Screening Levels	CO NMED **Ecological** Screening Levels	Limits in: DOE Order 458.1 Radiation Protection of the Public and the Environment	Now	Within Next 10 yrs.	Within Next 20 yrs.	Later than 20 yrs.	Has a LANL quantitative risk assessment been permformed? (Y/N)	Quantitative risk summary (E, S,F,NE)	LANL quantitative risk assessment included in what document(s)?	If no quantitative risk assessment, qualitative risk based upon SME best estimate
Canon de Valle Aggregate Area TA-14		NA	NA	NA	NA	VL	VL	VL	VL	VL	VL	VL	Y	E	SIR	-
Canon de Valle Aggregate Area TA-15	T 2022	NA	NA	NA	NA	M	L	M	L	L	L	L	N	-	-	M
Canon de Valle Aggregate Area TA-16	T 2022	NA	NA	NA	NA	M	L	M	L	L	L	L	N	-	-	M
Upper Water Canyon Aggregate Area		NA	NA	NA	NA	M	L	M	L	L	L	L	N	-	-	M
S-Site Aggregate Area		NA	NA	NA	NA	VL	VL	VL	VL	VL	VL	VL	Y	E	SIR	-
O. Material Disposal Area AB Remedy		VL	VL	VL	VL	VL	VL	L	VL	VL	VL	VL	N	-	-	L
P. Material Disposal Areas H Remedy	T 2022	VL	VL	VL	VL	VL	VL	L	L	L	L	L	Y	F	IR	-
Q. Material Disposal Areas G and L Remedy	M 2020	VL	VL	VL	VL	M	L	M	L	L	L	L	Y	F	IRs	-

Definition of abbreviations:

CO = LANL NMED 2016 Compliance Order on Consent
IR = Investigation Report
SIR = Supplemental Investigation Report
RAS = Risk Assessment Report
NA = Not Applicable

VL = Very Low
L = Low
M = Moderate
H = High
VH = Very High

E = > 80% of sites meet residential scenario
S = 50% to 80% of sites meet residential scenario
F = < 50% of sites meet residential scenario
NE = No exposure

NOTE:
These qualitative value terms are relative and do not connote any threshold being exceeded. The SME should recognize these are value judgements based upon their expert opinion.

Shading denotes individual Aggregate Areas