



*A U.S. Department of Energy
Site-Specific Advisory Board*

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August 29, 2023

Mr. Michael Mikolanis, Manager
Environmental Management Los Alamos Field Office
1200 Trinity Drive, Suite 400
Los Alamos, NM 87544

Dear Mr. Mikolanis,

I am pleased to enclose Recommendation 2023-04 "Materials Disposal Area H Recommended Measures in Lieu of a Final Remedy," which was approved by the Northern New Mexico Citizens' Advisory Board during its meeting on August 23, 2023.

Please contact me if you have questions regarding this recommendation. We look forward to the response from the Department of Energy.

Sincerely,

Elena Fernandez
Interim Chair, NNMCAB

Enclosure: a/s

Cc w/encl:

U. S. Senator Ben R. Lujan

U. S. Senator Martin Heinrich

U. S. Congresswoman Teresa Leger Fernandez

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NORTHERN NEW MEXICO CITIZENS' ADVISORY BOARD
Recommendation to the Department of Energy
No. 2023-04

Title: Materials Disposal Area H Recommended Measures in Lieu of a Final Remedy

Compiled and Drafted by: Elena Fernandez

Background

Material Disposal Area H (MDA H) exists within Technical Area 54 of Los Alamos National Laboratory (LANL), west of the community of White Rock, on Mesita del Buey that is a volcanically formed plateau between Pajarito Road (a main road at LANL) and Mesita Del Buey Road (a service road to Area G) upwind from Area G¹ (Diehl, 2023a, p. 20; N3B, n.d.a), several New Mexico-Located Sovereign Nations,² Northern New Mexico Communities,³ and especially those communities nearest to LANL including: the Community of White Rock, the Town and County of Los Alamos, Jemez Springs, Jemez Pueblo, San Ildefonso Pueblo, Santa Clara Pueblo, and many active and revered cultural and historical sites including Bandelier National Monument.⁴ The site for MDA H and MDAs were ostensibly chosen for buried radioactive trash due to the area's naturally occurring protective attributes where conditions there create an "improbability of future leaching of long-lived activities into possible drinking or irrigation water sources," and in consultation with the US Geological Survey that determined the suitability of those areas (Kennedy, 1970, p. 1), and is in a low and weak seismic zone with little to no concerning seismic activity (French, et al, 2008). The area was used from 1960–August 1986 as a designated disposal area restricted to materials that "were determined to be both classified and no longer required for their intended use" that were of solid-form waste only (liquids were prohibited), the inventory of which was recorded (Diehl, 2023a, p 21). Material Disposal Area H is considered by the Department of Energy Office of Environmental Management Los Alamos (DOE/EM-LA) and by extension it's contractor Newport News Nuclear BWXT-Los Alamos, LLC (N3B) as a *Solid Waste Management Unit* and an *Area of Concern*, and is currently fenced off, placarded, and inaccessible to the public (Diehl, 2023a, pp. 3–10).

MDA H is a 0.3-acre site composed of nine inactive subsurface shafts used for the disposal of lithium hydride, high-explosives, metals, radionuclides, classified materials and volatile organic compounds. The waste, which was disposed of over a 26-year period, may be sensitive to sparks, friction, heat, physical impact, pinching, air and/or moisture. (N3B, n.d.b)

MDA H is:

- inspected monthly to verify that no damage has occurred to the existing covers by animals, erosion, vegetation. etc.,
- repaired when needed,
- cleared and grubbed as vegetation develops that could come in contact with the solid waste via root systems (Diehl, 2023a).

¹ Area G is where above-ground low-level waste is stored, and where characterization, remediation and processing of transuranic (TRU) contaminated legacy waste is actively prepared for packaging and shipment to the Waste Isolation Pilot Plant (WIPP) (N3B, n.d.c)]

² Pojoaque Pueblo and Nambe Pueblo

³ The Community of El Rancho, Rio Arriba County, and Santa Fe County, and all downwind communities of LANL beyond the 50 Mile radius.

⁴ Tsankawi, The Jemez National Historic Landmark, and the Valles Caldera National Preserve, and the Puye Cliff Dwellings.

- 41 • experiencing a slow rate of erosion from the sides of Mesita del Buey canyon walls (Levitt,
42 2023).
- 43 • approximately 879 feet above the water table with “very low deep [moisture]
44 infiltration/recharge rates on the mesa top” (Levitt, 2023).
- 45 • under the 2016 Compliance Order on Consent (Consent Order) oversight due to its hazardous
46 constituents.

47

48 [MDA H] contains energetic and pyrophoric materials, Lithium, Depleted Uranium and
49 classified materials. Posing a unique combination of fire, explosion, frag, hazmat and security
50 hazards. Even a minor event could trigger a cascading release resulting in a catastrophic event of
51 national significance extending onto Pueblo Lands, Los Alamos and Santa Fe counties (M.
52 L’Esperance, personal communication, July 2, 2023).

53

54 Both NMED and EM-LA have regulatory oversight over all MDA’s existing at LANL including MDA
55 H (Diehl, 2023a, p. 3) As of now MDA H has been added to the DOE/EM-LA and N3B Closure
56 Program (Diehl, 2023a, p. 3) as work and/or DOE/EM-LA and N3B oversight progresses through the
57 Consent Order process (NMED & DOE, 2017; Hoffman, 2018; Diehl, 2023a). The Consent Order does
58 not seem to allow for an Interim Measure (IM) on MDA H at this juncture only a *Final Remedy*. As
59 such, DOE/EM-LA and N3B have proposed four alternative remedies for consideration as a Final
60 Remedy.

61

62 ***DOE/EM-LA and N3B Proposed Four Remedies:***

- 63 • Alternative 1: No Action
- 64 • Alternative 2A: Multilayer Resource Conservation and Recovery Act (RCRA) Cover
- 65 • Alternative 2B: Evapotranspiration (ET) Cover
- 66 • Alternative 3: Excavation and Full Removal (Diehl, 2023a, pp. 11–17)
- 67

68 There is a high degree of certainty that materials within the shafts have degraded over time and are no
69 longer in a state equal to that which existed when they were deposited. The shafts in which the materials
70 have been placed may not be exposed to: oxygen, moisture, or vibrations for probable certainty that any
71 one of those factors may trigger a catastrophic event resulting in atmospheric releases, detonation and
72 destruction of the area, and with materials that may travel to multiple and far downwind communities
73 beyond Los Alamos County (Diehl, 2023a; Diehl, 2023b; Reid, 2023). The NNMCAB has listened to
74 community members, stakeholder groups, New Mexico Regulatory Agencies, and DOE and its
75 contractors’ concerns, and weighed the risks based on that received input. Material Disposal Area H
76 would benefit in the short-term from adaptive site management (Price, et al., 2017) of Alternative 2B:
77 Evapotranspiration (ET) Cover (as that cover would protect from moisture infiltration and draw any
78 moisture content out of the soils) and concurrent enhanced monitoring as an *enhanced measure* rather
79 than a *Final Remedy*.⁵ The concern of the public, the NNMCAB, NMED, and DOE/EM-LA & N3B, is
80 that as materials continue to degrade, degenerate and decompose, there is danger of *in situ* chemical and
81 material catalysts that could create or exacerbate conditions of catastrophic failure. However, the risks of
82 excavation and removal at this point outweigh the risks of an enhanced measure with an ET cover being
83 the most protective and proactive.

⁵ With full understanding and knowledge any measures recommended can only be called “Final Remedy” as per the Consent Order.

84
85 The NNCMAB is reluctant to and disagrees to call/name the enhanced measure a Final Remedy;
86 however, the Consent Order, as written, does not have a mechanism for this categorization or
87 distinction, and leaves NMED, DOE/EM-LA and the public with little choice but to call it a Final
88 Remedy (Consent Order, 2017), nor does the Consent Order provide a mechanism for external peer
89 review (outside of the regulatory purview) to aid DOE/EM-LA and N3B in more robust consideration of
90 Alternative 3—and in those ways the Consent Order is adverse to DOE/EM-LA’s efforts—and thus
91 proceeding as scheduled with the MDAs Closure Program as consistent with the Consent Order (Diehl,
92 2023a, p. 3). The NNM CAB does not believe a Final Remedy can be achieved until full excavation and
93 removal can be achieved- yet the circumstances and science and technology that exist today do not lend
94 themselves to Alternative 3 in a way that is safe, non-destructive, or that mitigates a catastrophic failure
95 for all communities and the environment. The NNM CAB recommends more frequent monitoring as
96 reasonable, the maintenance and enhancement of institutional controls as reasonable and keeping the
97 possibility open to future removal: cap and cover should not—and in this recommendation—does not
98 mean abandonment.
99

100 The Risk Evaluation and Management (REM) Subcommittee, to whom the NNM CAB has entrusted
101 writing this recommendation does so with the utmost care, and thoughtful deliberation with the choices
102 provided to us, and in consideration of the best available science and technology available to the
103 contractors and the existing limitations those tools and skills have to provide. The area is stable for the
104 moment, and we do not want to be the generation that says “leave it”; however, the risk assessment as
105 voiced by the community, and in consideration of the community, leaves us with fewer options. The
106 REM Subcommittee must consider those available procedures and their associated risks that are the
107 most proactive while being the most protective as new technologies are being developed. It is our intent
108 to minimize potential damage while at the same time understanding that some measure of expediency
109 must be balanced, and we do not see MDA H as a problem that can nor should be ignored, nor does this
110 Subcommittee agree that MDA H is ready for a Final Remedy, only that an enhanced measure can be
111 considered until that time comes (see footnote 5).
112

113 **Comments and Observations**

114
115 Since its inception in 1994, the NNM CAB has been given the opportunity, on a 28 yearly basis, to
116 participate in the development of top clean-up priorities for Environmental Management of Legacy
117 Waste at Los Alamos National Laboratory, the clean-up program of which is under the purview of
118 DOE/EM-LA and performed by its remediation subcontractor N3B. This recommendation is consistent
119 with that opportunity and responsibility, and the NNM CAB is morally accountable to the public of New
120 Mexico while also ethically accountable based on the information available to us.
121

122 The NNM CAB applauds N3B and DOE/EM-LA’s efforts to understand and reasonably know the
123 contents of the shafts within MDA H from the archival documents available to them, to characterize
124 those contents within reasonable available knowledge and best available science and technology, and the
125 safety and care taken to protect workers, the local communities, and environment from catastrophic
126 failure. The NNM CAB also applauds and supports the regulatory oversight that provides
127 environmentally and technically-defensible protection for a possibly-eventual excavation and removal
128 process (NMAC Title-19, 2023; NMAC Title-20, 2023; NMAC Title-21, 2023), the ongoing protections
129 of the integrity of the area and affected communities, and the integrity of the area that is detrimental to

130 the public welfare. The NNM CAB acknowledges the time and effort put into the research, study, and
131 ongoing protection of MDA H, and the input from stakeholders’, land-based communities’, and New
132 Mexico Tribal Sovereign Nations’ concerns and suggestions for remediation and simultaneous
133 protection of the livelihood, safety, security, and environmental integrity.

134
135 The NNM CAB has reviewed the clean-up and proposed remedy alternatives, issues, possible final
136 remedy, supporting and enabling documents, and related presentations regarding MDA H presented and
137 submitted to the NNM CAB Calendar Years (CYs) 2018–2023 and publications made publicly available
138 throughout CY’s 1970–2023:

139
140 ***CY 2023 Public Presentations***

- 141 • March 8, 2023, Los Alamos National Laboratory Legacy Waste Cleanup Technical Working
142 Group (TWG), Material Disposal Areas Overview and the Revised MDA H CME (Diehl,
143 2023a).
- 144 • May 11, 2023 NNM CAB Full Meeting (NNM CAB, 2023).
- 145 • April 11, 2023, TWG, Continued from March 8, 2023 (Diehl, 2023a).
- 146 • May 3, 2023 Los Alamos Legacy Cleanup Contract (LLCC) Base Period Accomplishments and
147 Option Period 1 (OP1) Work Scope for Environmental Remediation. (Thompson, 2023, p. 8)
- 148 • June 23, 2023 Combined Committee Meeting of the NNM CAB.
- 149 • July 19, 2023 NNM CAB Full Meeting (NNM CAB, 2023)
- 150 • August 2, 2023, TWG, Material Disposal Area (MDA) G Background and Disposal History
151 Performance Assessment (PA) and Composite Analysis (CA) Part 1 (Levitt, 2023).

152
153 ***Documents***

- 154 • August 1970 *Los Alamos Environmental Monitoring Program Report* (LA-3639-MS) (Kennedy,
155 1970)
- 156 • NMED and DOE. *2016 Compliance Order on Consent* (NMED & DOE, 2017).

157
158 The NNM CAB understands that regardless of our recommendation, NMED and DOE have regulatory
159 oversight over MDA H (Diehl, 2023a, p 3), and at the time of this writing, a corrective evaluations
160 measure (CME) has not been submitted to the NMED.⁶ As per the Consent Order. *after* the Investigation
161 Work Plan implementation and submittal of the Investigation Report is complete, then will a CME be
162 submitted to the NMED for a statement of basis and selection of a Final Remedy by DOE/EM-LA
163 (Diehl, 2023a, p. 6) whereby a Corrective Measures Implementation (CMI) plan of the selected remedy
164 and CMI report is submitted. The certificate of completion is submitted *only after NMED approves that*
165 *CMI report.*

166
167 Given the nature of MDA H and the potential for harm to the community—whether the materials are left
168 *in situ* or excavated—the REM Subcommittee, other NNM CAB members, and members of N3B and
169 NMED have expressed their opinions as being both proactive and protective of the site area as any
170 decision directly affects the local area and LANL’s downwind communities (NNM CAB, 2023). Given
171 the volatility of MDA H both in physical and conceptual realms, the REM Subcommittee believes it

⁶ A previous CME was submitted my DOE/EM-LA to NMED in 2011 and was rejected (O’Neill, 2023).

172 necessary to share those conversations in this recommendation to elucidate the level of attention and
173 thought-provoking comments that weighed within our risk assessment and decision making:

174

175 ***July 19, 2023 Northern New Mexico Citizen’s Advisory Board***

- 176 • New tools may have to be engineered that: “[Are] fit for purpose... Nothing that will cause
177 sparking,” (Smith, 2023).
- 178 • “[Need] something to make it [the materials and area] inert”, (Life, 2023).

179

180 **On Safety and Security**

- 181 • “Each piece of waste reacts differently to different types of waste and that [scenario] increases
182 the complexity,” (Reid, 2023).
- 183 • “Build a dome with an inner atmosphere... the area is not in a seismic zone- low risk [from
184 seismic activity] ...the technology needs to keep growing... [EM-LA & N3B] could not find a
185 location [within MDA H] that does not have reactive materials,” (Diehl, 2023a).
- 186 • “[MDA H] is a classified and disposal area...[ensure] that it is not visible from aerial view,”
187 (Reid, 2023).
- 188 • “If it is unsafe today, then it is unsafe in the future...create an inert environment and [erect] a
189 tent to protect the area from [aerial view] ...NMED [asserts that the] area is not safe,” (Dhawan,
190 2023).

191

192 ***REM Subcommittee Comments***

- 193 • “I am in support of installing an evapotranspiration cover as part of the cap and cover existing
194 interim measure- as that seems to be the least intrusive, and the most protective enhanced remedy
195 to the: local environment, wildlife, and community; as well as the most protective remedy for all
196 downwind communities and the broader environment. Even though proposed Final Remedy 3
197 would be performed to standards, the volatility of the encapsulated contents within the
198 shafts...does not lend itself to a great enough margin of safety from catastrophic failure, and also
199 given that volatility, I for one, would not want to see any disturbance that would put the
200 community or environment at such potentially harmful and destructive risk,” (E. Fernandez,
201 personal communication, June 29, 2023).
- 202 • “I have concerns with the RCRA cover that may deteriorate over time and could introduce new
203 chemicals to the air and soils with the potential of increasing the likelihood of detonation of
204 existing materials,” (E. Fernandez, personal communication, July 2, 2023).
- 205 • “The contractor N3B has stated the site MDA-H is stable and they are not able to safely and
206 without incident mitigate the site. They have recommended a cap and cover option and I agree
207 with that assessment... I believe that the material contained in MDA-H be confirmed to be stable
208 and the option implemented to allow it to remain so. I believe the site should be monitored and
209 remediation options reevaluated at reasonable periods (25 Years) until such time as it can be
210 remediated safely,” (M. L’Esperance, personal communication, July 2, 2023).
- 211 • “I support [the] strategy as described,” (S. Grogan, personal communication, July 3, 2023), i.e.
212 an ET cap and cover as an enhanced measure and not a final remedy.

- 213 • “[Cap and ET cover] ought not be labeled as the "final remedy" as there is no real final remedy
214 for this area. ... the best science and technology available may not and is not necessarily the best
215 existing science and technology.” (E. Fernandez, personal communication, July 3, 2023).
216
- 217 • “My view is to agree with the science and data we have seen regarding MDA-H. As Manny
218 says, the potential for a disastrous outcome if this site is disturbed is too great. The “cap and
219 cover” remedy is my recommendation,” (M. Hewlett, personal communication, July 2, 2023).
- 220 • “[T]he land is not suitable for residential or recreational development...I also agree that a cap
221 should not be considered as the final remedy in case future alternatives for remediation become
222 viable,” (B. Martin, personal communication, July 3, 2023).
- 223 • “Regardless of any multilayer (RCRA) Cover and or Evapotranspiration (ET) Cover are installed
224 and approved, it is a “man-made product” that will not permanently protect the environment at
225 all magnitudes... The **Alternative 3: Excavation and Full Removal** option needs to be
226 designated as a **Permanent Remedy**... Frankly, my indigenous community is located downwind
227 from LANL (i.e., plume of radioactive particles downwind direction and time factors plays a
228 strong role in terms of emergency evacuation procedures) and within 15 minutes of driving time
229 to LANL. If a [catastrophic] event of this man-made error would occur at this site, now, I would
230 identify this scenario as intrusive and a threat of life, liberty, and justice for my family, my
231 indigenous community, and overall environment, period!” (J. Villegas, personal communication,
232 July 4, 2023).
- 233 • “I would be for cap and cover with extensive monitoring of area H. I regret to think of this being
234 a waste site that is not dealt with immediately, however the results of an unexpected event is not
235 a good thing to deal with, as so much other cleanup is in progress,” (R. Life, personal
236 communication, July 6, 2023).
- 237 • “I’m not sure I see how much more can be developed about this option [Option 3: excavation
238 and full removal], especially after the detailed [stratigraphic] description we received of the
239 contents of each shaft. However, if it is included for completeness of all options, I do get
240 that. It’s just that at this point, I don’t see it as realistic” (M. Hewlett, personal communication,
241 July 15, 2023).
- 242 • “When we make a recommendation or a remedy bringing in more technical people and
243 information would help with determination with a remedy,” (R. Life, personal communication,
244 August 1, 2023).

245 ***Other NNMCAB Member Comments***

246 “In my opinion and experience as a resident of Los Alamos... it is important to understand we
247 are generally not talking about the clean-up of UXO [unexploded ordnance] munitions being the
248 concern except in Rendija Canyon, ... [At MDA H] munition chemicals are mixed in with all the
249 other hazardous materials the Lab utilized... What I have learned in my career here in Los
250 Alamos, is that keeping a dialog going with the Lab, long term, about what is important to us
251 does mean something because their work and processes take time... [the topography] has been a
252 hinderance to EMs clean-up efforts compared to other DOE communities with legacy waste
253 issues. Furthermore, please keep in mind the people working on these issues were not part of
254 creating the legacy waste... I believe, as a CAB, we can assist and weigh into EMs assessment of

255 these factors. Yes, the timing can be frustrating, but it is real and not going to go away....” (A.
256 Laurent, personal communication, July 3, 2023).

257 Based on the data and information available, and in the interest of the safety, wellbeing of the regional
258 environment (and in consideration of migration across all other downwind communities) and
259 environmental justice of workers, land-based communities and New Mexico based Tribal Sovereign
260 Nations, the NNM CAB is providing the following as our input for MDA H as a top area of concern and
261 proactive and protective measure for FY 2023 and beyond until a such time as a feasible, Final Remedy
262 can be implemented, and for concurrent implementations and activities until said Final Remedy is
263 approved, installed, and functional by the regulator in agreement with DOE/EM-LA, NMED, and
264 especially the public of New Mexico. Public health and safety and environmental and social justice are
265 some of our highest priorities; therefore, we are hopeful that existing DOE Office of Environmental
266 Management legacy cleanup funding and future monies be made available and that Congress
267 appropriates full base-line funding necessary for this comprehensive clean-up effort including the
268 enhanced measure as an IM and with thought toward a Final Remedy. Furthermore, it is our
269 recommendation the following should be reasonably implemented and completed *concurrently*.

270
271 **Recommendation**

- 272
- 273 1. The NNM CAB supports an *enhanced measure* of simultaneous evapotranspiration (ET)
274 cover (Alternative 2b), with continued maintenance and ongoing and more frequent
275 monitoring and reporting of MDA H, as enhanced institutional controls (see footnote 5).
 - 276 2. The NNM CAB recommends DOE/EM-LA install an enhanced monitoring network and
277 enhanced institutional controls as necessary and feasible within reasonably safe parameters
278 as close to MDA H, for better and more complete data-gathering of the site for: stability,
279 emissions, or other environmental and *in situ* factors that could affect the integrity of the
280 MDA H shafts and/or cause potential harm to the surrounding areas and downwind
281 communities.
 - 282 3. The NNM CAB recommends DOE/EM-LA seek a panel of external subject matter experts
283 to explore the issues and possible engineered opportunities in consideration of Alternative
284 3 (see footnote 5).
 - 285 4. The NNM CAB recommends DOE/EM-LA begin preparation toward implementation of the
286 Enhanced Measure in calendar year 2023.
 - 287 5. The NNM CAB recommends that DOE/EM-LA report and respond in a reasonably and
288 timely manner to their regulators and stakeholders: progress, any concerns, accidents, or
289 delays that may arise with the concurrent ET installation and monitoring.
 - 290 6. The NNM CAB recommends that DOE/EM-LA reasonably and timely reports on the Final
291 Remedy in the interest of environmental and community safety and under the scope of
292 environmental justice.

293
294 **Intent**

295
296 It is the intent of this recommendation to voice the NNM CAB’s comments, concerns, and support of an
297 enhanced measure, that we understand may likely not be termed an *IM* (see footnote 5) until the Final
298 Remedy of excavation and removal can become a realistic and solution, and to have input into providing

299 guidance to DOE/EM-LA based on the best science available and in the best interest of the health and
300 wellbeing with the participation and attention of land-based communities and New Mexico Tribal
301 Sovereign Nations. It is also the intent of this recommendation for the NNMCAB to be an ally of and
302 proponent for advancing environmental justice within those affected communities and the citizens of
303 New Mexico. It is also the intent of this recommendation to voice concerns and offer guidance on best
304 management and precautionary practices in the interest of the health and wellbeing of the local
305 environment and ecology, protecting those natural resources that may be directly affected and those
306 areas that are secondarily affected by fate-and-transport of contaminants through the air, soil, and water
307 cycle, as well as biological uptake. It is also the intent of this recommendation to support compliance
308 with federal and local regulations to the greatest extent possible for effective and safe remediation based
309 on the best available science and data possible that are all technically and regulatorily defensible.

310
311 To be clear, the NNMCAB makes this recommendation based on and in relation to the alternatives and
312 existing evidence, and science and technology available of which does not yet safely exist in regards to
313 Alternative 3. The most protective and proactive alternative available to us with the highest amount of
314 relational positive control is Alternative 2b; to reach this determination, the REM Subcommittee
315 considered the task demands, work environment, critical steps, error-likely situations and potential
316 consequences that included the risk and protective factors.

317
318 ***Decision Tree***

319
320 Alternative 1: No Action

- 321 • Consideration: leaves the materials as-is with no additional protective controls for
- 322 moisture, air, or other types of infiltration.
- 323 • Risk Factor: May have a shorter time frame from creating more risk due to exposure.
- 324 • Protective Factor: Protective of life, community, and environment in the short-term.

325
326 Alternative 2A: Multilayer (RCRA) Cover

- 327 • Consideration: Depending on the type of RCRA cover chosen, some RCRA covers
- 328 contain polymers (petroleum products) that could introduce new materials to the local
- 329 environment (FRTR, n.d.).
- 330 • Risk Factor: Introduction of new materials and chemicals in and of itself, and over time
- 331 could become an additional hazard or catalyst.
- 332 • Protective Factor: Protective of life, community, and environment in the short-term, may
- 333 be less protective as it creates a new infiltration scenario over time.

334
335 Alternative 2B: Evapotranspiration (ET) Cover

- 336 • Consideration: deemed most protective and proactive relative to Alternatives 1 & 2, and
- 337 given the requirements and limitations of existing science and technology relative to
- 338 Alternative 3.
- 339 • Protective Factor:
 - 340 ■ “The top layer of the proposed evapotranspiration cover at MDA H would be a
 - 341 mixture of a sandy loam soil and ~3.4in rock. With 75% soil and 25% rock. The

342 rock/soil mix at the surface is designed to provide erosion resistance. With the
343 soil, it allows for a rooting medium for native vegetation to allow for evaporation
344 and transpiration of infiltrated water,” (K. Reid, personal communication, August
345 3, 2023).

- 346 ▪ “Like other caps, ET covers do not destroy or remove contaminants. Instead, they
347 isolate them and keep them in place to prevent the spread of contamination and
348 protect people and wildlife from the contaminated material,” (French, et al, 2008).
- 349 ▪ “They differ from other types of caps...in the way they prevent water from
350 seeping into the waste,” (USEPA, 2015).

- 351 • Risk Factor:

- 352 ▪ Part of the maintenance is to “make sure no woody plants establish on the cover.
353 Keep it to grasses and shallow roots,” (K. Reid, personal communication, August
354 3, 2023).

356 Alternative 3: Excavation and Full Removal

- 357 • Consideration: This alternative requires extensive protection and careful handling to
358 prevent a catastrophic event.
- 359 • Risk Factor: High level of risk with high level of uncertainty:
 - 360 ▪ One service road and one main road must be closed to all traffic.
 - 361 ▪ Work must stop in the immediate area.
 - 362 ▪ Remote handling is required.
 - 363 ▪ Blast shielding is required both above and along the sides of the canyon.
 - 364 ▪ Tenting or other covering of the area must be installed to protect classified
365 materials from aerial view.
 - 366 ▪ A dome and controlled atmosphere must be installed to control: shrapnel, large
367 particles from the detonation of the plateau, and a capture and filtration system to
368 mitigate and prevent escaped/released gasses and radioactive materials.
 - 369 ▪ Employees must have the correct level of clearance for the type of classified
370 material within the shafts.
 - 371 ▪ Moisture must not infiltrate the shafts.
 - 372 ▪ Vibration must not disturb the shafts.
 - 373 ▪ Oxygen must not infiltrate the shafts.
 - 374 ▪ The immediate and local area may have to be evacuated for an indeterminate
375 amount of time for safety and due to the length of the project (NNMCAB, 2023).
- 376 • Protective Factor: The level of uncertainty is too high to consider for the safety and well-
377 being of workers, local communities, downwind communities, and the environment even
378 with institutional controls and performed remotely within regulatory standards.

379
380 There is no such term as an *enhanced measure* in the Consent Order, and while EM-LA is looking
381 toward closure of MDA H and a Final Remedy, the NNMCAB seeks to keep the area open-ended and
382 does not recommend a Final Remedy at this point- rather the NNMCAB recommends an enhanced
383 measure of installing an ET with the added measure of enhanced institutional controls of more frequent

384 monitoring to include: air, soils, moisture, dosimetry, and seismic and all other monitoring that has been
385 agreed to with NMED and those monitoring efforts within the original suite as agreed to with NMED
386 and DOE/EM-LA, and as prescribed by the United States Environmental Protection Agency and under
387 RCRA (USEPA, 2022). A third-party panel independent SME review could aid DOE/EM-LA and N3B
388 for future engineering possibilities in consideration of Alternative 3.
389

390 The REM Subcommittee has made the choice it deems best available based on the options provided and
391 with the added measure of enhanced and more frequent monitoring. The alternatives with the existing
392 tools on-hand could potentially lead to catastrophic failure, and it is our intent to mitigate harm when
393 possible and feasible if the alternative is more harmful *even though* it would fulfill a task and the desire
394 of some community members. The uncertainty of the state of disposed materials has a level of certainty
395 that could have a higher risk of catastrophic failure, endangerment to lives, and the ecosystem, that harm
396 may harm the local area and also those communities and ecosystems beyond the radius of MDA H and
397 Los Alamos County. The NNM CAB disagrees with the notion of calling the alternatives presented for
398 this recommendation a Final Remedy and does not absolve any one from a duty to continuously think
399 and act toward ways that could render a final solution when one is scientifically and technologically
400 feasible and that is protective of the community and environment with the least amount of damage
401 possible (NNMCAB, 2023).
402

403 Our intent is to operate within the transparency, integrity, and morality with the choices given us. The
404 NNM CAB's actions are consequential and we will strive to *not commit the Four Mitigating Factors*
405 (Klaas, 2023):

- 406 • The Problem of Dirty Hands – where decision makers or in our case community risk managers
407 face awful choices, i.e. “hands” will get dirty no matter what and that is why we act deliberate
408 and act with the best intention and morality based on the information we have available.
- 409 • The Idea of Learning – where some have to learn to be good at being bad. We take this as
410 learning to be good within the morality we have within us as New Mexicans and as a community
411 who cares and wants to do what is right and correct within an innate moral code borne with a
412 deep sense of understanding of the position we are in, and the information we have available
413 under our own subject matter expertise.
- 414 • Idea of Opportunity – where “decision makers have more chances to harm other people”. We
415 seek to mitigate harm if possible and seek out alternatives or the best alternative that is the least
416 harmful even if opportunity arises for what is expedient or easy over thought and substance.
- 417 • Concept of Scrutiny – acting out of haste or performance while under the microscope. We
418 attempt to work within the timeframe allotted to us and what is best for the public. If a
419 recommendation must take more time even under scrutiny, then that time will be taken for the
420 best possible or most reasonable outcome.

421
422 As now for the NNM CAB, MDA H is a matter of being caught between ethics and morals. The ethical
423 thing to do is to excavate and remove, the moral thing is to be as proactive yet as protective as possible
424 due to the high probability of a catastrophic event. While MDA H offers difficult choices, at this stage
425 and in consideration of the presented alternatives with the best tools available- the recommendation we
426 present is not an impossible one if only a temporary one. The REM Subcommittee of the NNM CAB has
427 not rushed to a recommendation just to present one, we do so with deliberation and gravitas. The
428 NNM CAB respects and knows full-well that this recommendation could be judged based on the

429 alternative choices that were provided, yet we want the public to know that we have acted with careful
430 consideration and deliberation, and it is our hope and want that the site can be fully excavated with the
431 materials removed when the time and ability comes available.

432 **References**

- 433 Dhawan, N. (2023, July 19). July 19th, 2023 Northern New Mexico Citizens’ Advisory Board Meeting
434 [Video]. YouTube. <https://www.youtube.com/@NNMCAB>
- 435 Diehl, PE., D. (2023a, March 8, 2023). *Material Disposal Areas Overview and the Revised MDA H*
436 *CME* [PDF Document].
- 437 Diehl, PE., D. (2023b, July 19). July 19th, 2023 Northern New Mexico Citizens’ Advisory Board
438 Meeting [Video]. YouTube. <https://www.youtube.com/@NNMCAB>
- 439 Federal Remediation Technologies Roundtable (FRTR). (n.d.). *Landfill and Soil Capping* (last retrieved
440 August 6, 2023). Retrieved from <https://www.frtr.gov/matrix/Landfill-and-Soil-Capping/>
- 441 French, et al. (2008). *Performance Assessment and Composite Analysis for Los Alamos National*
442 *Laboratory Technical Area 54, Area G. Revision 4*. LA-UR-0806764, ERID-106890. Retrieved
443 from https://www.energy.gov/sites/prod/files/2015/10/f27/PACA_2008.pdf
- 444 Hoffman, S. (2018). Environmental Management Los Alamos Field Office Program Overview and
445 Update. Retrieved from [https://www.energy.gov/sites/default/files/2019/04/f61/NNMCAB_EM-](https://www.energy.gov/sites/default/files/2019/04/f61/NNMCAB_EM-LA%20Program%20Overview%20and%20Update_November%202018.pdf)
446 [LA%20Program%20Overview%20and%20Update_November%202018.pdf](https://www.energy.gov/sites/default/files/2019/04/f61/NNMCAB_EM-LA%20Program%20Overview%20and%20Update_November%202018.pdf)
- 447 Kennedy, W. R. (1970). *Los Alamos Environmental Monitoring Program by Environmental Services*
448 *Group*. Los Alamos Scientific Laboratory of the University of California. Retrieved from
449 https://cdn.lanl.gov/files/document-1_15c07.pdf
- 450 Klaas, PhD., B. (2023, June 23). *The World’s Biggest Problem? Power Psychopaths*. [Video]. Big
451 Think. YouTube. <https://www.youtube.com/watch?v=dxqz0QpjyCU>
- 452 Levitt, D. (2023, August 2). *Material Disposal Area (MDA) G Background and Disposal History*
453 *Performance Assessment (PA) and Composite Analysis (CA) Part 1* [PDF Document].
- 454 Life, R. (2023, July 19). July 19th, 2023 Northern New Mexico Citizens’ Advisory Board Meeting
455 [Video]. YouTube. <https://www.youtube.com/@NNMCAB>
- 456 Newport News Nuclear BWXT-Los Alamos, LLC (N3B). (n.d.a). *Map of Materials Disposal Areas* (last
457 retrieved July 28, 2023). Retrieved from [https://n3b-la.b-cdn.net/wp-](https://n3b-la.b-cdn.net/wp-content/uploads/2021/01/rzaa-MDAs.jpg)
458 [content/uploads/2021/01/rzaa-MDAs.jpg](https://n3b-la.b-cdn.net/wp-content/uploads/2021/01/rzaa-MDAs.jpg)
- 459 N3B. (n.d.b). *Material Disposal Area*. Retrieved from (last retrieved July 29, 2023). Retrieved from
460 <https://n3b-la.com/mda/>
- 461 N3B. (n.d.c). *TRU Waste Management at Area G*. Retrieved from (last retrieved July 29, 2023).
462 Retrieved from <https://n3b-la.com/area-g-tru/>
- 463 New Mexico Administrative Code (NMAC) Title-19 – Natural Resources and Wildlife.
464 (Last retrieved January 3, 2023). Retrieved from [https://www.srca.nm.gov/nmac-home/nmac-](https://www.srca.nm.gov/nmac-home/nmac-titles/title-19-natural-resources-and-wildlife/)
465 [titles/title-19-natural-resources-and-wildlife/](https://www.srca.nm.gov/nmac-home/nmac-titles/title-19-natural-resources-and-wildlife/)
- 466 NMAC Title-20 – Environmental Protection (NMAC 20.6.2). New Mexico Water Quality Control
467 Commission Ground and Surface Water Protection and Regulations (Effective December
468 21,2018). (Last retrieved January 3, 2023). Retrieved from [https://www.srca.nm.gov/nmac-](https://www.srca.nm.gov/nmac-home/nmac-titles/title-20-environmental-protection/)
469 [home/nmac-titles/title-20-environmental-protection/](https://www.srca.nm.gov/nmac-home/nmac-titles/title-20-environmental-protection/)
- 470 NMAC Title-21 – Agriculture and Ranching. (Last retrieved January 3, 2023). Retrieved

- 471 from <https://www.srca.nm.gov/nmac-home/nmac-titles/title-21-agriculture-and-ranching/>
- 472 NMED Hazardous Waste Bureau. (2018, December 1). Hazardous Waste Management Regulations,
473 (20.4.1 NMAC). Retrieved from [https://www.env.nm.gov/wp-](https://www.env.nm.gov/wp-content/uploads/sites/12/2016/11/20.004.0001.pdf)
474 [content/uploads/sites/12/2016/11/20.004.0001.pdf](https://www.env.nm.gov/wp-content/uploads/sites/12/2016/11/20.004.0001.pdf)
- 475 NMED and DOE. (2017, February 17). *2016 Compliance Order on Consent*. Retrieved from
476 [https://www.energy.gov/sites/prod/files/2020/01/f70/2016%20Consent%20Order_February%20](https://www.energy.gov/sites/prod/files/2020/01/f70/2016%20Consent%20Order_February%202017.pdf)
477 [017.pdf](https://www.energy.gov/sites/prod/files/2020/01/f70/2016%20Consent%20Order_February%202017.pdf)
- 478 NNMCAB. (2023, July 19). July 19th, 2023 Northern New Mexico Citizens' Advisory Board Meeting
479 [Video]. YouTube. <https://www.youtube.com/@NNMCAB>
- 480 O'Neill, M. (2023, August 9). DOE EM-LA Engages with the public on what to do with Material
481 Disposal Area H at Los Alamos National Laboratory. *The Los Alamos Reporter*. Retrieved from
482 [https://losalamosreporter.com/2023/08/08/doe-em-la-engages-with-public-on-what-to-do-with-](https://losalamosreporter.com/2023/08/08/doe-em-la-engages-with-public-on-what-to-do-with-material-disposal-area-h-at-los-alamos-national-laboratory/)
483 [material-disposal-area-h-at-los-alamos-national-laboratory/](https://losalamosreporter.com/2023/08/08/doe-em-la-engages-with-public-on-what-to-do-with-material-disposal-area-h-at-los-alamos-national-laboratory/)
- 484 Price, J., Spreng, C., Hawley, E. L., & Deeb, R. (2017). Remediation of complex sites using and
485 adaptive site management approach. *Journal of Environmental Management*, 204 part2(12), pp
486 738-747. <https://doi.org/10.1016/j.jenvman.2017.04.009>
- 487 Reid, K. (2023, July 19). July 19th, 2023 Northern New Mexico Citizens' Advisory Board Meeting
488 [Video]. YouTube. <https://www.youtube.com/@NNMCAB>
- 489 Smith, B. (2023, July 19). July 19th, 2023 Northern New Mexico Citizens' Advisory Board Meeting
490 [Video]. YouTube. <https://www.youtube.com/@NNMCAB>
- 491 Thomson, T. (May 3, 2023) Los Alamos Legacy Cleanup Contract (LLCC) Base Period
492 Accomplishments and Option Period 1 (OP1) Work Scope for Environmental Remediation
493 (4/30/2023–4/29/203).
- 494 United States Environmental Protection Agency (USEPA). (2015). A Citizen's Guide to
495 Evapotranspiration Covers. Retrieved from
496 [https://19january2021snapshot.epa.gov/sites/static/files/2015-](https://19january2021snapshot.epa.gov/sites/static/files/2015-04/documents/a_citizens_guide_to_evapotranspiration_covers.pdf)
497 [04/documents/a_citizens_guide_to_evapotranspiration_covers.pdf](https://19january2021snapshot.epa.gov/sites/static/files/2015-04/documents/a_citizens_guide_to_evapotranspiration_covers.pdf)
- 498 USEPA. (2022, August 16, last updated). *Resource Conservation and Recovery Act (RCRA)*
499 *Regulations*. Retrieved from [https://www.epa.gov/rcra/resource-conservation-and-recovery-act-](https://www.epa.gov/rcra/resource-conservation-and-recovery-act-rcra-regulations#haz)
500 [rcra-regulations#haz](https://www.epa.gov/rcra/resource-conservation-and-recovery-act-rcra-regulations#haz)
501