

APPENDIX C
ENGINEERED ALTERNATIVES REJECTION LIST WITH JUSTIFICATIONS



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ENGINEERED ALTERNATIVES REJECTION LIST WITH JUSTIFICATIONS

The following is a listing of Engineered Alternatives (EA) that failed the screening process. A brief description of the Engineered Alternatives Screening Working Groups (EASWG) rejection justification is provided.

4 Wet Oxidation

Wet oxidation alone was not considered an EA and was deleted. The EASWG determined that wet oxidation must be followed by a stabilization process to be an EA so #4 (Wet Oxidation) was changed to wet oxidation plus two separate solidifiers, #4a and #4b.

11 Melt Metals

The EASWG decided to delete this EA and separate it into two categories: #11a (melt metals and emplace all at the Waste Isolation Pilot Plant [WIPP]) and #11b (melt metals, partition radionuclides in slag and remove, cast metal and dispose of as low-level waste). The EASWG determined that this separation allows for greater flexibility in the analysis.

13 Add Other Sorbents

The EASWG determined that this EA is a duplicate of #15.

14 Add Gas Suppressant

The EASWG concluded that this EA is a duplicate of #19.

16 Acid Digestion

The EASWG concluded that acid digestion alone was not considered an EA. Acid digestion must be followed by a stabilization process to be an EA so #16, Acid Digestion, was changed to include two separate solidifiers, #16a and #16b.

17 Sterilization

The EASWG determined that the original Engineered Alternatives Task Force (EATF) rejection justification was still valid and that this EA would be rejected. The EATF rejection justification states, "Not feasible to maintain long-term effectiveness."

18 Add Copper Sulfate

The EASWG determined that the original EATF rejection justification was still valid and that this EA would be rejected. The EATF rejection justification states, "Potential for hydrogen generation by galvanic coupling of deposited copper."

20 Add Fillers

The EASWG concluded that this EA was not specific enough to evaluate and is considered by other more specific alternatives (#7, 9, 13, 14, 15, 18, and 19).

21 Segregate Waste Forms

The EASWG concluded that this EA did not meet the definition of an EA and was inherent with most waste processing EAs. This EA was not considered for further evaluation.



- 1 23 Change Waste Generation Process
2 The EASWG could not define this alternative and rejected it from further consideration.
3 The EASWG determined the original EATF rejection justification was still valid. The EATF
4 rejection justification states, "Scope too broad to be evaluated."
5
- 6 24 Add Anti-Bacterial Material
7 The EASWG determined that the original EATF rejection justification was still valid and
8 that this EA would be rejected. Adding mercury was discussed and rejected due to the
9 health hazards. The EASWG stated that adding hazardous materials to increase the
10 safety of the repository was self-defeating. The EATF rejection justification states,
11 "Unable to identify a long-term, anti-bacterial material."
12
- 13 25 Accelerate Waste Digestion Process
14 The EASWG determined that the original EATF rejection justification was still valid and
15 that this EA would be rejected. The EASWG discussed the experimental results for
16 culturing digestive materials. The working group was not convinced that the WIPP
17 environment could be controlled to the extent required by the digestion process. The
18 EATF rejection justification states, "Technology for fast waste digestion not demonstrated."
19
- 20 26 Alter Corrosion Environment
21 The EASWG concluded that this EA was not specific enough to evaluate. The technology
22 was less than bench scale and has not been demonstrated. This concept is considered
23 under other alternatives.
24
- 25 27 Alter Bacterial Environment in WIPP
26 The EASWG concluded that this EA is a duplicate of #24, which was deleted.
27
- 28 28 Transmutation of Radionuclides
29 The EASWG concluded that transmutation technologies are not feasible for transuranic
30 (TRU) wastes and that the process requires the segregation of the pure isotopes from the
31 waste. If waste was placed directly in the reactor, activated (radioactive) materials would
32 be generated. The EATF rejection justification states, "Technology not demonstrated for
33 large amounts."
34
- 35 30 Salt Backfill Only
36 The EASWG concluded that this EA is a duplicate of #12.
37
- 38 31 Salt Backfill Plus Gas Getters
39 The EASWG concluded that this EA is a duplicate of #83.
40
- 41 32 Compact Backfill
42 The EASWG determined that this EA was considered under EA #12 and would not be
43 evaluated further.
44
- 45 34 Preformed Compacted Backfill
46 The EASWG concluded that this alternative is considered under the salt backfill alternative
47 and would not be evaluated further.
48

1 37 Add Gas Suppressant

2 The EASWG concluded that the original EATF rejection justification was still valid. The
3 EATF rejection justification states, "This alternative was considered together with the 'Salt
4 Plus Gas Getters' alternative, and therefore was not subject to separate evaluation."
5

6 39 Segregate Waste in WIPP

7 The EASWG concluded that this EA was part of the baseline repository design. Load
8 management is considered in the compliance documentation. The EASWG concluded
9 that this EA does not meet the definition of an EA.
10

11 40 Decrease Amount of Waste per Room

12 The EASWG concluded that the original EATF rejection justification was still valid. The
13 EATF rejection justification states, "This alternative was considered together with some
14 of the backfill alternatives, and hence not evaluated separately."
15

16 41 Emplace Waste and Backfill Simultaneously

17 The EASWG concluded that this alternative is a subset of other backfill alternatives and
18 was not evaluated separately.
19

20 42 Selected Vegetative Uptake

21 The EASWG determined that the process for vegetative uptake would not allow for proper
22 containment of the alpha emitters. This process would require the waste to be placed in
23 soil with plants. The EASWG determined the original EATF rejection was still valid. The
24 EATF rejection justification states, "Not been laboratory demonstrated for TRU waste."
25

26 43 Brine Isolating Dikes

27 The EASWG determined that the isolation dikes configuration must be maintained to be
28 effective. Room consolidation would alter the configuration, and the EA would not be
29 effective. The EA was not considered further.
30

31 44 Raise Waste Above the Floor

32 The EASWG determined that this is a short-term fix for a long-term problem. The EA
33 would provide no benefit and therefore would not be considered further. The EASWG
34 also concluded that the original EATF rejection justification was still valid.
35

36 45 Brine Sump and Drains

37 The EASWG concluded that this EA is not effective since the required configuration
38 cannot be maintained due to creep closure and rock mechanics of the repository. The
39 EASWG also concluded that the original EATF rejection was still valid. The EATF
40 rejection justification states, "This alternative was deleted because the EAMP (Engineered
41 Alternatives Multidisciplinary Panel) believed that the flow paths leading to the sumps
42 would not remain open long enough to allow substantial amounts of brine to be isolated
43 from the waste."
44

45 46 Gas Expansion Volume

46 The EASWG concluded that this EA was detrimental to repository performance because
47 the extra void volume allows for more stored energy and greater consequences during
48 human intrusion scenarios. The EA was not considered further.
49

- 1 47 Seal Repository Room Walls
2 The EASWG determined that the rock mechanics of the repository precluded sealing. The
3 technology has not been proven. Creep closure and interaction with the waste would be
4 detrimental to the seal. The EASWG determined the original EATF rejection was still
5 valid. The EATF rejection justification states, "The technology has not been
6 demonstrated."
7
- 8 48 Vent Facility
9 The EASWG reviewed past data from the EATF data and the Design Analysis Model and
10 determined that higher peak pressures would result for a vented facility. The EASWG
11 also determined the original EATF rejection justification was still valid. The EATF rejection
12 justification states, "Not regulatory feasible after institutional control" (period).
13
- 14 49 Ventilate Facility
15 The EASWG reviewed data from the EATF and concluded that this alternative was not
16 feasible due to both regulatory and technical concerns. Quoting the original EATF,
17 "...regulatory concerns about maintaining active facility controls for such a long period
18 (100 years), the difficulty of assuring continuous ventilation in all spaces, and the potential
19 for rupturing the waste containers during the ventilation period. The difficulty of safely
20 sealing the rooms and panels of the facility, after so many years of creep closure has
21 taken place, was also considered. Also, ventilation might violate the RCRA 'no migration'
22 variance proposed for the WIPP." The EASWG concluded that this EA would not be
23 evaluated further.
24
- 25 50 Add Floor of Brine Sorbents
26 The EASWG determined that this EA is a duplicate of #44, which was deleted.
27
- 28 52 Change Room Configurations
29 The EASWG determined that this EA did not meet the definition of an EA and may be
30 detrimental to the performance of the repository during a human intrusion scenario.
31
- 32 54 Two-Level Repository
33 The EASWG determined that this EA did not meet the definition of an EA and may be
34 detrimental to the performance of the repository during a human intrusion scenario.
35
- 36 55 Monument Forest Over Repository
37 The EASWG concluded that this EA is a marker and not a barrier and does not meet the
38 definition of an EA because it does not increase the performance or reduce the
39 uncertainty in the performance calculations.
40
- 41 56 Monument Covering the Entire Repository
42 The EASWG concluded that this EA is a marker and not a barrier and does not meet the
43 definition of an EA because it does not increase the performance or reduce the
44 uncertainty in the performance calculations.
45
- 46 57 Buried Steel Plate Over the Repository
47 The EASWG concluded that this EA is a marker and not a barrier and does not meet the
48 definition of an EA because it does not increase the performance or reduce the
49 uncertainty in the performance calculations.

1 58 Artificial Surface Layer Over the Repository

2 The EASWG concluded that this EA is a marker and not a barrier and does not meet the
3 definition of an EA because it does not increase the performance or reduce the
4 uncertainty in the performance calculations.
5

6 59 Add Marker Dye to Strata

7 The EASWG concluded that this EA is a marker and not a barrier and does not meet the
8 definition of an EA because it does not increase the performance or reduce the
9 uncertainty in the performance calculations.
10

11 61 Grout Culebra Foundation

12 The EASWG concluded that grouting the Culebra could be detrimental to the performance
13 of the repository. The technology was not considered feasible in part, because it has not
14 been demonstrated for this application. Verification of the effectiveness is problematic;
15 may create alternative pathways within the Culebra formation, and the long-term
16 effectiveness is unknown.
17

18 62 Increase Land Withdrawal Area

19 The EASWG concluded that increasing the area does not reduce the consequences of
20 releases or increase the performance of the repository. Regulatory restriction on resource
21 recovery within the new area would be problematic (resource lease acquisition).
22

23 65 EATF Baseline—As Received with Salt Backfill

24 The EASWG determined that this EA is a duplicate of #12, "Add Salt Backfill".
25

26 6 80 SPM-Baseline

27 The EASWG determined that the SPM baseline is the current repository baseline. The
28 baseline is not an alternative and is inherent in the analysis.
29

30 81 SPM-A Salt Backfill

31 The EASWG concluded that this EA is a duplicate of #12, "Add Salt Backfill".
32

33 82 SPM-B Salt/Bentonite Backfill 50-50 Mix, 50% Filling Efficiency

34 The EASWG concluded that this EA is a duplicate of #22, "Salt Plus Clay Backfill".
35

36 84 SPM-D Cement Grout Backfill

37 The EASWG concluded that this EA is a duplicate of #35, "Salt Aggregate Grout Backfill".
38

39 85 SPM-E Salt/Grout Backfill

40 The EASWG concluded that this EA is a duplicate of #35, "Salt Aggregate Grout Backfill".
41

42 86 SPM IT-1 Shred and Cement Organics and Inorganics, Salt Backfill

43 The EASWG concluded that this EA is a duplicate of #66, "EATF Alternative 1".
44

45 88 SPM IT-3 Enhanced Cement Sludges, Shred and Cement Organics and Inorganics,
46 Salt Aggregate Grout Backfill.

47 The EASWG concluded that this EA is a duplicate of #68, "EATF Alternative 3".
48



- 1 91 SPM IT-6 Enhanced Cement Sludges, Shred and Compact Organics and Inorganics, Salt
2 Aggregate Grout Backfill, 2,000 drum monolayer, 6x33x300 room.
3 The EASWG concluded that this EA is a duplicate of #77, "EATF Alternative 12".
4
- 5 96 SPM EATF-8 Vitrify Sludges, Shred and Vitrify Organics, Melt Metals with Frit to Partition
6 Actinides (metals are eliminated from the WIPP inventory), Salt Backfill, Change Waste
7 Container Material.
8 The EASWG concluded that this EA is a duplicate of #73, "EATF Alternative 8".
9
- 10 97 SPM EATF-9 Vitrify Sludges, Shred and Vitrify Organics, Melt Metals with Frit to Partition
11 Actinides (metals are eliminated from the WIPP inventory), Salt Aggregate Grout Backfill,
12 Change Waste Container Material.
13 The EASWG concluded that this EA is a duplicate of #74, "EATF Alternative 9".
14
- 15 98 SPM DOE-1 Passive Markers—No Specific Scenario Given to Reduce Human Intrusion
16 Probability Parameters.
17 The EASWG concluded that this EA dos not meet the definition of an alternative. The
18 proposed alternative is a marker and not a barrier. This alternative does not increase the
19 performance nor reduce the uncertainty in performance assessment.
20
- 21 99 SPM DOE-2 Compartmentalization of Waste—Various Unspecified Scenarios.
22 The EASWG determined that this EA is inherent in several EAs and does not require
23 further consideration in the analysis.
24
- 25 100 194—Cementation
26 The EASWG determined that this EA is inherent in several EAs and does not require
27 further consideration in the analysis.
28
- 29 101 194—Shredding
30 The EASWG determined that this EA is inherent in several EAs and does not require
31 further consideration in the analysis.
32
- 33 102 194—Supercompaction
34 The EASWG concluded that this EA is a duplicate of #1, "Compact Waste."
35
- 36 103 194—Incineration
37 The EASWG concluded that this EA is inherent in #2, "Incinerate and Cement," because
38 incineration is not an EA alone. Incineration must be followed by a form of solidification
39 to meet the particulate restriction in the waste acceptance criteria.
40
- 41 104 194—Vitrification
42 The EASWG concluded that this EA is a duplicate of #3, "Shred and Vitrify Waste."
43
- 44 105 194—Improved Waste Containers
45 The EASWG concluded that this EA is a duplicate of #63, "Change Waste Container
46 Shape," and #64, "Change Waste Container Material."
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106 194—Grout and Bentonite Backfill

The EASWG determined that this EA is inherent in other EAs (#33 and #35) and does not require further consideration in the analysis.

107 194—Metal Melting

The EASWG concluded that this EA is a duplicate of #11a and 11b, "Melt Metals."

108 194—Alternative Configuration of Waste Emplacement

The EASWG concluded that this EA is inherent in several other EAs and does not require further consideration in the analysis.

109 194—Alternative Disposal System Dimensions

The EASWG concluded that this EA is inherent to several other EAs and does not require further consideration in the analysis.



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