3.3.3 Design/Construction

ENHANCED REPOSITORY BLOCK CHARACTERIZATION
DEVELOPMENT SUMMARY DESIGN/CONSTRUCTION WORKING GROUP

CRITERIA	BENEFITS	FOR INVESTIGATIVE CRITERIA PREFERRED SOURCE, ALTERNATIVE SOURCES	FOR CONTROL/REQ'S CRITERIA AFFECTED INVESTIGATIVE CRITERIA	RATIONALE	RISKS
Criteria #1 [D5C] ..fracture variability	Emplacement drift orientation may be driven, at least in part, by the fracture orientation. No information is currently in hand regarding orientation and spacing of dominant fracture sets in the lower sub-units	Preferred Source: TBM excavated cross drift above the repository emplacement drift envelope, parallel to the proposed repository emplacement drift orientation, that penetrates all TSw2 sub-units Alternate Source: TBM excavated cross drift below the repository emplacement drift envelope, oriented in any direction, that penetrates all TSw2 sub-units Boreholes drilled from the surface		The best means of obtaining information on orientation and spacing of dominant fracture sets in the lower Tsw2 sub-units is by actually constructing a TBM-mined drift through these units. By orienting the drift parallel to the proposed repository emplacement drift orientation, confirmatory information on the current repository layout can be obtained.	Fracture orientation and spacing may vary considerably from the north to the south end of the block. This may bring into question data representativeness, particularly when only one cross block drift is driven. A drift driven below the repository emplacement drift envelope would constrain repository design in that the repository exhaust ventilation main would have to be located to either intersect the cross drift or such that an adequate sill pillar is left between the two drifts.

ENHANCED REPOSITORY BLOCK CHARACTERIZATION
DEVELOPMENT SUMMARY DESIGN/CONSTRUCTION WORKING GROUP

CRITERIA	BENEFITS	FOR INVESTIGATIVE CRITERIA PREFERRED SOURCE, ALTERNATIVE SOURCES	FOR CONTROL/REQ'S CRITERIA AFFECTED INVESTIGATIVE CRITERIA	RATIONALE	RISKS
Criteria #2 [D3] .. unexposed faults Criteria #3 [D3, DSB] ...hydrologic properties, fracture properties and geotechnical properties in and near faults	Will reduce uncertainty regarding the overall repository layout. (Current layout assumes no major structure between the Ghost Dance Fault and the Solitario Canyon Fault Location of SCF and its splays currently forms the boundary of the repository block in the NW. More accurate location information at repository depth will reduce uncertainty Examination of splay(s) may result in addition (or reduction) of suitable emplacement area First penetration of Drill Hole Wash structure showed little impact to design. A second penetration could confirm, or alter, this finding	Preferred Source: East-West drift above the repository emplacement drift envelope, that provides a second intercept of the Drill Hole Wash structure and intersects Solitario Canyon Fault in the northwest quadrant of the repository block Alternate Sources: East-West drift below the repository emplacement drift envelope Geophysics or seismic methods		Since major faults in Yucca Mountain tend to be north-south trending features which dip at near vertical angles, an East-West drift is the best means of discovering/locating the faults and providing access to characterize them. A drift located above the repository emplacement drift envelope would have greater utility from a performance confirmation standpoint than a drift driven below the repository emplacement drift envelope	A drift driven below the repository emplacement drift envelope would constrain repository design in that the repository exhaust ventilation main would have to be located to either intersect the cross drift or such that an adequate sill pillar is left between the two drifts. Remote sensing methods such as geophysics or seismic techniques often yield questionable results.

ENHANCED REPOSITORY BLOCK CHARACTERIZATION
DEVELOPMENT SUMMARY DESIGN/CONSTRUCTION WORKING GROUP

CRITERIA	BENEFITS	FOR INVESTIGATIVE CRITERIA PREFERRED SOURCE, ALTERNATIVE SOURCES	FOR CONTROL/REQ'S CRITERIA AFFECTED INVESTIGATIVE CRITERIA	RATIONALE	RISKS
Criteria #18 [D2] ..the distribution and continuity of zeolitization	Provide a better definition of structure and thickness of underlying zeolitized units Zeolite distribution (location, thickness, and depth below repository) can influence repository design (heat distribution and magnitude) Zeolites are a potentially significant natural barrier, and better definition may lead to reduced reliance upon Engineered Barriers	Preferred Source SD-6 and one additional borehole in the north Data should be collected from any/all new boreholes which penetrate the zeolites. Data from existing boreholes should be reviewed/evaluated		Vertical boreholes are the most efficient means of collecting this kind of information.	Boreholes drilled through the repository block necessitate an adjustment to the planned location of emplacement drifts, resulting in a potential loss of emplacement area.

ENHANCED REPOSITORY BLOCK CHARACTERIZATION
DEVELOPMENT SUMMARY DESIGN/CONSTRUCTION WORKING GROUP

CRITERIA	BENEFITS	FOR INVESTIGATIVE CRITERIA PREFERRED SOURCE, ALTERNATIVE SOURCES	FOR CONTROL/REO'S CRITERIA AFFECTED INVESTIGATIVE CRITERIA	RATIONALE	RISKS
Criteria #20 [D5A] ...the location and origin of the large hydraulic gradient north of the repository block	Significant additional emplacement area may be available to the north of the current layout. The presence/nature of the large hydraulic gradient must be investigated to allow this area to be considered as usable emplacement space	Preferred Source: Surface borehole located in the area north of the repository block Alternate Source: Borehole drilled from underground drift, if drift location is appropriate Geophysics or seismic methods		Boreholes are the most efficient means of collecting this kind of information	Boreholes drilled through the repository block necessitate an adjustment to the planned location of emplacement drifts, resulting in a potential loss of emplacement area.

ENHANCED REPOSITORY BLOCK CHARACTERIZATION
DEVELOPMENT SUMMARY DESIGN/CONSTRUCTION WORKING GROUP

CRITERIA	BENEFITS	FOR INVESTIGATIVE CRITERIA PREFERRED SOURCE, ALTERNATIVE SOURCES	FOR CONTROL/REQ'S CRITERIA AFFECTED INVESTIGATIVE CRITERIA	RATIONALE	RISKS
Criteria #23 [D4] ...the spatial distribution of thermal and geomechanical properties of the repository horizon	Only the top of the TSw2 has been seen in the ESF. Cross-block information would yield design information on the construct ability of the lower sub-units. Design parameters regarding the behavior of the rock mass in the lower sub-units will reduce uncertainty in the design	Preferred Source: TBM excavated cross drift above the repository emplacement drift envelope, oriented parallel to the proposed repository emplacement drift orientation, that penetrates all TSw2 sub-units Alternate Source: TBM excavated cross drift below the repository emplacement drift envelope, oriented in any direction, that penetrates all TSw2 sub-units		The best means of obtaining information on constructability and rock mass properties in the lower Tsw2 sub-units is by actually constructing a TBM-mined drift through these units. By orienting the drift parallel to the proposed repository emplacement drift orientation, confirmatory information on the current repository layout can be obtained. A drift located above the repository emplacement drift envelope would have greater utility from a performance confirmation standpoint than a drift driven below the repository emplacement drift envelope	A drift driven below the repository emplacement drift envelope would constrain repository design in that the repository exhaust ventilation main would have to be located to either intersect the cross drift or such that an adequate sill pillar is left between the two drifts.

ENHANCED REPOSITORY BLOCK CHARACTERIZATION
DEVELOPMENT SUMMARY DESIGN/CONSTRUCTION WORKING GROUP

CRITERIA	BENEFITS	FOR INVESTIGATIVE CRITERIA PREFERRED SOURCE, ALTERNATIVE SOURCES	FOR CONTROL/REQ'S CRITERIA AFFECTED INVESTIGATIVE CRITERIA	RATIONALE	RISKS
Criteria #23, #24 [D1] ...the spatial distribution of thermal and geomechanical properties of the repository horizon ...the location and continuity of stratigraphic contacts in the expanded repository block	Provide a better definition of TSw3 location and character, particularly in the southwest quadrant of the repository block. TSw3 bounds the repository layout in the southwest. Better definition would help reduce uncertainty as to actual amount of usable area. Could provide additional information on the presence / amount of Erionite in lower reaches of TSw2	Preferred Source: Vertical boreholes drilled from the surface in the southwest quadrant of the repository block, e.g. SD-6 and one additional borehole on Yucca Mountain crest south of UZ-6 Alternate Source: Vertical boreholes drilled from a cross drift (underground) could also provide the information, if the drift is located in the southwest portion of the block.		Vertical boreholes are the most efficient means of collecting this kind of information.	Boreholes drilled through the repository block necessitate an adjustment to the planned location of emplacement drifts, resulting in a potential loss of emplacement area.

ENHANCED REPOSITORY BLOCK CHARACTERIZATION
DEVELOPMENT SUMMARY DEIGN/CONSTRUCTION WORKING GROUP

CRITERIA	BENEFITS	FOR INVESTIGATIVE CRITERIA PREFERRED SOURCE, ALTERNATIVE SOURCES	FOR CONTROL/REO'S CRITERIA AFFECTED INVESTIGATIVE CRITERIA	RATIONALE	RISKS
Criteria #34 [D6] ...maintaining emplacement drift orientation flexibility	Maintenance of repository flexibility regarding emplacement drift orientation is critical until data are available on which to base a decision on orientation. A cross drift would contribute significantly to the required data base, but could itself destroy flexibility if placed within the repository emplacement drift envelope. Primary benefit is the continued ability to utilize all potentially available emplacement area, without characterization-induced area losses	Preferred Source: All drifting, regardless of location or orientation, should stay out of the repository emplacement drift envelope.		Drifting in the repository emplacement drift envelope could significantly limit repository design layout flexibility. All Tsw2 sub-units can be penetrated by a cross drift above or below the plane(s) of the emplacement drifts, therefore representative data can be obtained without drifting within the repository emplacement drift envelope.	An E-W cross drift located within the repository emplacement drift envelope, that ultimately turns out to be misaligned with the final emplacement drift azimuth, could result in significant emplacement area losses. For misalignments of 5 to 25 degrees, potential emplacement area losses could range from approximately 35 to 170 acres, respectively, or 5 to 23 % of the area required to emplace 70,000 MTU at 85 MTU per acre.

ENHANCED REPOSITORY BLOCK CHARACTERIZATION
DEVELOPMENT SUMMARY DESIGN/CONSTRUCTION WORKING GROUP

CRITERIA	BENEFITS	FOR INVESTIGATIVE CRITERIA PREFERRED SOURCE, ALTERNATIVE SOURCES	FOR CONTROL/REQ'S CRITERIA AFFECTED INVESTIGATIVE CRITERIA	RATIONALE	RISKS
Criteria #35 [D7] confirming a preferred emplacement drift orientation	Observation of dominant fracture spacings and orientations will allow a more solid basis for drift orientation decisions Fracture data in lower sub-units will confirm, or provide a basis to change, the current drift orientation. Current data are limited to upper-most repository sub-unit Drift orientation decision could impact repository costs related to TBM productivity	Preferred Source: TBM excavated cross drift above the repository emplacement drift envelope, parallel to the proposed repository emplacement drift orientation, that penetrates all TSw2 sub-units Alternate Source: TBM excavated cross drift below the repository emplacement drift envelope, oriented in any direction, that penetrates all TSw2 sub-units Boreholes drilled from the surface		The best means of obtaining information on orientation and spacing of dominant fracture sets in the lower Tsw2 sub-units, is by actually constructing a TBM-mined drift through these units. By orienting the drift parallel to the proposed repository emplacement drift orientation, confirmatory information on the current repository layout can be obtained.	Fracture orientation and spacing may vary considerably from the north to the south end of the block. This may bring into question data representativeness, particularly when only one cross block drift is driven. A drift driven below the repository emplacement drift envelope would constrain repository design in that the repository exhaust ventilation main would have to be located to either intersect the cross drift or such that an adequate sill pillar is left between the two drifts.

ENHANCED REPOSITORY BLOCK CHARACTERIZATION
DEVELOPMENT SUMMARY DESIGN/CONSTRUCTION WORKING GROUP

CRITERIA	BENEFITS	FOR INVESTIGATIVE CRITERIA PREFERRED SOURCE, ALTERNATIVE SOURCES	FOR CONTROL/REQ'S CRITERIA AFFECTED INVESTIGATIVE CRITERIA	RATIONALE	RISKS
Criteria #36 [C1] ...demonstrating a cost effective construction approach	Will provide experience base for alternative approaches Can maintain ECRB schedule for VA support Will improve "fidelity" of some attributes of the TSLCC for repository Should result in lower unit excavation costs with attendant political benefits	Preferred Source: TBM excavation performed under a cost effective contracting arrangement using performance based design specifications, an integrated safety and health approach, and improved management and QA approaches		Demonstration/testing of an alternative contracting and management approach which could provide an enhanced basis for repository planning is not sensitive to drift configuration, but can best be accomplished using the same excavation methods planned for repository construction	Schedule imposed on the ECRB may not allow implementation of the most cost effective contracting arrangement Application of excessive DE controls will inhibit implementation of the most cost effective construction approach

ENHANCED REPOSITORY BLOCK CHARACTERIZATION
DEVELOPMENT SUMMARY DESIGN/CONSTRUCTION WORKING GROUP

CRITERIA	BENEFITS	FOR INVESTIGATIVE CRITERIA PREFERRED SOURCE, ALTERNATIVE SOURCES	FOR CONTROL/REO'S CRITERIA AFFECTED INVESTIGATIVE CRITERIA	RATIONALE	RISKS
Criteria #37 (C2) ...demonstrating effective ventilation and hazardous minerals/dust control	May show that effective dust mitigation measures obviate need for respirators ~~Provide confidence that repository can be constructed within compliance limits~~ Effective dust control will be strongly tied to overall cost-effectiveness of the operation Provides opportunity to try alternative dust control methodologies	Preferred Source Mechanical (TBM and roadheader) excavation with machines equipped with effective dust control features These features should include engineered systems for dust control, such as water sprays and on-board scrubbers.		Demonstration of effective ventilation/dust control can best be accomplished using excavation equipment planned for repository construction	Overly conservative water minimization controls may inhibit ability to test the most effective dust control measures Machine configuration may not be optimal with respect to dust control due to ECRB schedule constraints

ENHANCED REPOSITORY BLOCK CHARACTERIZATION
DEVELOPMENT SUMMARY DESIGN/CONSTRUCTION WORKING GROUP

CRITERIA	BENEFITS	FOR INVESTIGATIVE CRITERIA PREFERRED SOURCE, ALTERNATIVE SOURCES	FOR CONTROL/REO'S CRITERIA AFFECTED INVESTIGATIVE CRITERIA	RATIONALE	RISKS
Criteria #38 [C3] ...demonstrating an integrated environment, safety and health approach	An integrated ES&H approach will lead to a safer workplace and a more cost-effective operation Increased confidence & "baseline" information will be obtained regarding the development of a repository approach to ES&H.	Preferred Source: TBM excavation utilizing an integrated approach to ES&H, which clarifies responsibility and authority and reduces unnecessary duplication of activities such as inspection		Demonstration of an integrated approach to ES&H is not sensitive to drift configuration, but can best be accomplished using the same excavation methods planned for repository construction	

ENHANCED REPOSITORY BLOCK CHARACTERIZATION
DEVELOPMENT SUMMARY DESIGN/CONSTRUCTION WORKING GROUP

CRITERIA	BENEFITS	FOR INVESTIGATIVE CRITERIA PREFERRED SOURCE, ALTERNATIVE SOURCES	FOR CONTROL/REO'S CRITERIA AFFECTED INVESTIGATIVE CRITERIA	RATIONALE	RISKS
Criteria #39 [C4] ...implementing a performance based approach to design and construction, including a construction based TBM configuration	Provides an additional advance rate data ~~projection~~ for the future repository TBM excavation work that is more aggressive (thus, less expensive) than what will be assumed based on the 5-mile loop excavation experience. Dust control requirements/concerns fully addressed prior to any repository construction. Increased confidence in the repository TSLCC. Opportunity available for a more effective, construction-based Hazards Analysis	Preferred Source: -TBM Excavation in repository block (not required to be in emplacement horizon) with TBM configured to YMP needs. Alternative Sources: -Use data from 5-mile loop excavation experience. -Use data from other similar excavation on other tunnel projects.		Excavated ground should be as close as possible to the ground expected in the repository excavation. This will assure that the machine configuration that would maximize the advance rate for the repository excavation is clearly defined. Also, the dust control features would similarly be optimized.	Schedule imposed on the enhanced repository block characterization will require that the TBM acquisition, upgrading, and mobilization be done in approximately 7 months. This will likely preclude a contractor from acquiring a new machine built specifically to our requirements. Rather, a used machine probably currently under the control of the contractor will be modified as much as practical to meet our requirements. The risk is that the machine may not totally meet all our requirements. However, it is more likely that the modified machine will be close enough to get the vast majority of confirmatory information needed.

ENHANCED REPOSITORY BLOCK CHARACTERIZATION
DEVELOPMENT SUMMARY DESIGN/CONSTRUCTION WORKING GROUP

CRITERIA	BENEFITS	FOR INVESTIGATIVE CRITERIA PREFERRED SOURCE, ALTERNATIVE SOURCES	FOR CONTROL/REQ'S CRITERIA AFFECTED INVESTIGATIVE CRITERIA	RATIONALE	RISKS
Criteria #40 [C5] ...testing "state of the art" mechanical excavators	May increase confidence in the applicability of various non-TBM mechanical excavation processes in TSw2. Current repository concept involves some amount of non-TBM mechanical excavation. Could provide a better basis for estimating costs for repository development	Preferred Source: Alcove excavation in repository block (not required to be in emplacement horizon) with mechanical mining equipment configured to YMP needs		Excavated ground should be as close as possible to the ground expected in the repository excavation. This will assure that the machine configuration that is best suited for repository excavation is better defined. Also, the dust control features may similarly be optimized.	A machine suitable for repository construction needs may not currently exist. Determining the best configuration for a mechanical miner for YMP is likely to be a developmental program.

ENHANCED REPOSITORY BLOCK CHARACTERIZATION
DEVELOPMENT SUMMARY DESIGN/CONSTRUCTION WORKING GROUP

CRITERIA	BENEFITS	FOR INVESTIGATIVE CRITERIA PREFERRED SOURCE, ALTERNATIVE SOURCES	FOR CONTROL/REO'S CRITERIA AFFECTED INVESTIGATIVE CRITERIA	RATIONALE	RISKS
Criteria #47 [D8] ...ensuring that additional drifts or excavations do not violate the 200 meter overburden disqualifying condition of 10 CFR Part 960 [960.4-2-5(d)]	Project position on the applicability of the 200 meter cover criterion to non-emplacement areas is needed to allow siting of the cross drift.			Project position supported by waste isolation evaluation with consideration of current situation (e.g. with north and south ramps) will provide a solid basis for siting the cross drift	Options for the starting point of the East-West drift will be limited if all portions of the drift must meet the 200 m cover criterion.

3.3.4 Licensing/Regulatory

Enhanced Repository Block Characterization Development Summary for Licensing Items				
Criteria	Potential Benefits/ Constraints	Preferred Source/ Alternative Source	Rationale	Risks
31: Collecting further data to enhance the ability to demonstrate compliance with 10 CFR 60.122 which requires demonstrations that potentially adverse conditions that are present have been adequately investigated and adequately evaluated.	• Increase confidence in representativeness of site characterization data • Provide additional data to characterize the site features and processes • Corroborate site characterization data • Collect data that was excluded by focused program. • Characterize pathways away from repository. CONSTRAINTS: • All data collected may not be evaluated. This could provide the basis for intervenors to question the adequacy of evaluations of existing PACs (10 CFR 60.122(c)). • Contradictory or inconsistent data may be collected. Such data would have to be explained or a basis provided for excluding it from further consideration. • Contradictory or inconsistent data would complicate demonstrations of representativeness of all data.	Drift and drilling	Drilling and drifting are complementary; drilling provides broader areal coverage, and drifting provides details on in-drift conditions	• All data collected may not be evaluated. This could provide the basis for intervenors to question the adequacy of evaluations of existing PACs (10 CFR 60.122(c)). • Contradictory or inconsistent data may be collected. Such data would have to be explained or a basis provided for excluding it from further consideration. • Contradictory or inconsistent data would complicate demonstrations of representativeness of all data.
32: Projected environmental impacts in the affected area that can be mitigated to an acceptable degree, taking into account programmatic, technical, social, economic, and environmental factors [960.5-2-2(a) & (d)].	None. Further characterization can only increase, not decrease impacts. However, impacts appear to be negligible. CONSTRAINTS: If impacts occur and cannot be mitigated, NEPA process could be compromised Programmatic risk if site is compromised because no alternative site exists.	No preference	Choice of source/alternative has no impact on criterion.	

Enhanced Repository Block Characterization Development Summary for Licensing Items				
33: The performance confirmation requirements in 10 CFR Part 60 to show that conditions have not varied beyond the limits assumed for design and to show that conditions are within the limits assumed for design.	• Compliance with requirements. • Increased data for performance confirmation baseline. Potentially easier to show that conditions are within limits assumed for design. Contradictory or inconsistent data could be used to advantage because it would be identified, described, and evaluated prior to performance confirmation. • Increased confidence in performance confirmation program and demonstrations. • The applicability of this item is questionable since the data from the enhanced program would likely be limited to development of the performance confirmation baseline. **CONSTRAINTS:** • Delays establishing performance confirmation baseline. • Data may not be completely evaluated thereby providing the basis for intervenors or regulators to question the adequacy of the evaluation of PACs in the LA. • Contradictory or inconsistent data that would cause revisions of the descriptions and models of site features and processes.	Drifting augmented by some drilling or horizontal drilling in the repository horizon.	More drifting would provide additional information for baseline on in-drift conditions; drilling would provide enhanced baseline on thermal, mechanical, and hydrologic conditions in and around the potential repository.	• Delays establishing performance confirmation baseline. • Data may not be completely evaluated thereby providing the basis for intervenors or regulators to question the adequacy of the evaluation of PACs in the LA. • Contradictory or inconsistent data that would cause revisions of the descriptions and models of site features and processes.

Enhanced Repository Block Characterization Development Summary for Licensing Items				
44: Limiting impacts to major natural features that may be important to site performance	None. Further excavation or drilling can only increase impacts, however small they may be. **CONSTRAINTS:** • If surface-based drilling is pursued, the potential for creating preferential water pathways must be evaluated and defended; decisions to drill must be based on an assessment that the value of the information from drilling is greater than the cost of potential impacts to the site. Such an assessment is not easy to perform and may be challenged. • Additional data could compromise demonstrations required by 10 CFR 60.122(a)(2). • Programmatic risk because no alternative site exists if the site is compromised by additional testing. • Risk of non-compliance with requirement to conduct operations in such a manner as to limit adverse effects on the long-term performance (10 CFR 60.15(c)(1)), requirements to limit the number of exploratory boreholes and shafts (10 CFR 60.15(c)(2), and the requirements for locations of exploratory boreholes and shafts in the GROA to areas where no excavations are planned (10 CFR 60.15(c)(3)).	Drifting only.	Drifting is slightly preferred to surface-based drilling for this criterion because of perceived potential for surface boreholes to create fast pathways for water flow.	• If surface-based drilling is pursued, the potential for creating preferential water pathways must be evaluated and defended; decisions to drill must be based on an assessment that the value of the information from drilling is greater than the cost of potential impacts to the site. Such an assessment is not easy to perform and may be challenged. • Additional data could compromise demonstrations required by 10 CFR 60.122(a)(2).
45:limiting impacts to availability of alternatives to design features to waste isolation and promote ultimate compliance with the 10 CFR 60.21(c)(1)(ii)(D) requirements to pra comparison of these alternatives				

Enhanced Repository Block Characterization Development Summary for Licensing Items				
46: Limiting, during site characterization, impacts to waste isolation, construction-to-test and test-to-test interference, and other requirements derived from 10 CFR 60.15(c)	None. Further excavation or drilling can only increase impacts, however small they may be. CONSTRAINTS: • The risk of a challenge based on 10 CFR 60.15(c) is minimal as long as due care is taken to coordinate drift and borehole locations with the current conceptual design. However, the design is subject to change, and flexibility to make changes in repository layout will become increasingly limited as additional drifting and drilling are performed.	Drifting is slightly preferred to drilling for impacts on waste isolation; no preference for other criteria.	Drifting is slightly preferred to surface-based drilling for this criterion because of perceived potential for surface boreholes to create fast pathways for water flow.	• The risk of a challenge based on 10 CFR 60.15(c) is minimal as long as due care is taken to coordinate drift and borehole locations with the current conceptual design. However, the design is subject to change, and flexibility to make changes in repository layout will become increasingly limited as additional drifting and drilling are performed.
47: Ensuring that additional drifts or excavations do not violate the 200 m overburden disqualifying condition of 10 CFR 960.4-2-5(d).	None. CONSTRAINTS: • Potential to disqualify site. • Potential to compromise repository system performance. •Programmatic risk because an alternative site is not available.	No preference.	Choice of source will have no impact on whether waste is emplaced 200 m or more below the ground surface.	
48: The requirements for Underground records in 10 CFR 60.72 such that construction of another drift during site characterization could fulfill level of detail requirements needed to satisfy some of the construction records requirements.	None. Regulatory requirement applies to construction phase not site characterization phase. However, if this item is used in the repository or planned to be used as part of the repository, adequate construction records must be preserved. CONSTRAINTS: • Potential to compromise repository system performance. • Conflicting or inconsistent data could provide the basis for intervenors or regulators to question the adequacy of evaluations of PACs that are determined to be present (10 CFR 60.122(a) and (c)).	No preference	Choice of source has no impact on criterion.	

Enhanced Repository Block Characterization Development Summary for Licensing Items				
49: Beginning construction of the geologic repository operations without a construction authorization as required in 10 CFR 60.3(b)	None. CONSTRAINTS: • Inappropriate or careless description of the enhanced characterization could compromise compliance with 10 CFR 60.3(b). • Intervenors could bring legal actions, but based on brief conversations with counsel, it is unlikely that this is a real problem.	Slight preference for drilling.	Drilling is less likely than drifting to be perceived to constitute unauthorized repository construction.	• Inappropriate or careless description of the enhanced characterization could compromise compliance with 10 CFR 60.3(b). • Intervenors could bring legal actions, but based on brief conversations with counsel, it is unlikely that this is a real problem.
50: Minimizing any significant adverse environmental impacts identified in comments on the Site Characterization Plan or in the Environmental Assessment [NWPA Sec. 113(a)].	None. CONSTRAINTS: Further excavation or drilling can only increase environmental impacts.	No preference.	Neither drilling or drifting will have significant environmental impacts.	• Minimal.

3.3.5 Design, Construction & Testing Controls and Requirements

ENHANCED REPOSITORY BLOCK CHARACTERIZATION
DEVELOPMENT SUMMARY CONTROLS/REQUIREMENTS WORKING GROUP

CRITERIA	BENEFITS/CONSTRAINTS	FOR INVESTIGATIVE CRITERIA PREFERRED SOURCE, ALTERNATIVE SOURCES	FOR CONTROLS/REQ'S CRITERIA AFFECTED INVESTIGATIVE CRITERIA	RATIONALE	RISKS
29) the geochemical environment in the drifts (including the interaction with cement) to better define conditions affecting radionuclide solubilities and waste package corrosion?	No benefit identified by CRWG			*Subsequent discussion withink working group indicated we are not likely to get <u>new</u> data in this regard that will be useful to anticipation of repository controls, and that more benefit might be derived from enhancing our ability to <u>model</u> cement in the repository.*	

ENHANCED REPOSITORY BLOCK CHARACTERIZATION
DEVELOPMENT SUMMARY CONTROLS/REQUIREMENTS WORKING GROUP

CRITERIA	BENEFITS/CONSTRAINTS	FOR INVESTIGATIVE CRITERIA. PREFERRED SOURCE, ALTERNATIVE SOURCES	FOR CONTROLS/REQ'S CRITERIA AFFECTED INVESTIGATIVE CRITERIA	RATIONALE	RISKS
32) projected environmental impacts in the affected area that can be mitigated to an acceptable degree, taking into account programmatic, technical, social, economic, and environmental factors? [960.5-2-5(a) and (d)]	CONSTRAINT: In comparing possible design configurations, are there options which limit projected environmental impacts in the context of 10CFR960?			*Subsequent discusion within the working group indicated we are not likely to use the opportunity afforded by additional excavation to develop or test new methods in this regard, so there's no inherent benefit; however there is a comparitive benefit/ constraint, as indicated.*	

ENHANCED REPOSITORY BLOCK CHARACTERIZATION
DEVELOPMENT SUMMARY CONTROLS/REQUIREMENTS WORKING GROUP

CRITERIA	BENEFITS/CONSTRAINTS	FOR INVESTIGATIVE CRITERIA PREFERRED SOURCE, ALTERNATIVE SOURCES	FOR CONTROLS/REQ'S CRITERIA AFFECTED INVESTIGATIVE CRITERIA	RATIONALE	RISKS
33) the performance confirmation requirements in 10 CFR Part 60 to show that conditions have not varied beyond the limits assumed for design and to show that conditions are within the limits assumed for design?	CONSTRAINT: In comparing possible design configurations, are there options which will result in excavation useful as a future repository performance confirmation drift?			*Subsequent discussion withing working group discounted this as an inherent benefit from a CRWG perspective; this will be useful primarily as a comparitive benefit.*	

ENHANCED REPOSITORY BLOCK CHARACTERIZATION
DEVELOPMENT SUMMARY CONTROLS/REQUIREMENTS WORKING GROUP

CRITERIA	BENEFITS/CONSTRAINTS	FOR INVESTIGATIVE CRITERIA PREFERRED SOURCE, ALTERNATIVE SOURCES	FOR CONTROLS/REQ'S CRITERIA AFFECTED INVESTIGATIVE CRITERIA	RATIONALE	RISKS
34) maintaining emplacement drift orientation flexibility?	CONSTRAINT: In comparing possible design configurations, are there options which will preserve emplacement drift orientation flexibility (e.g., by not entering the block at the emplacement level); such a configuration would enhance the number of design options available to repository designers, and help ensure that the total maximum volume available for waste emplacement is not reduced.				

CRITERIA	BENEFITS/CONSTRAINTS	FOR INVESTIGATIVE CRITERIA PREFERRED SOURCE, ALTERNATIVE SOURCES	FOR CONTROLS/REQ'S CRITERIA AFFECTED INVESTIGATIVE CRITERIA	RATIONALE	RISKS
36) demonstrating a cost effective construction approach?	The costs to develop and implement controls and requirements (or for other "support" functions) for repository excavation will be prominent components of the overall per-foot excavation cost of the repository. Additional ECRB excavation experience would thus provide an opportunity to examine these activities, evaluate alternative concepts, and potentially reduce the associated costs.			*Additional discussion within the working group indicated that, while this could be an important (if not primary) benefit, it will only be realized as a benefit if we plan to take advantage of it by building in ongoing evaluations (e.g., "lessons-learned" exercises). It was also noted that this benefit is less applicable to boreholes or other non-excavation efforts.*	

ENHANCED REPOSITORY BLOCK CHARACTERIZATION
DEVELOPMENT SUMMARY CONTROLS/REQUIREMENTS WORKING GROUP

CRITERIA	BENEFITS/CONSTRAINTS	FOR INVESTIGATIVE CRITERIA PREFERRED SOURCE, ALTERNATIVE SOURCES	FOR CONTROLS/REQ'S CRITERIA AFFECTED INVESTIGATIVE CRITERIA	RATIONALE	RISKS
37) demonstrating effective ventilation and hazardous minerals/dust control?	There is significant benefit in demonstrating effective ventilation and hazardous minerals/dust control, using minimal amounts of water, prior to full-scale repository excavation efforts. Successes in this regard could both reduce worker health concerns and significantly reduce the overall per-foot excavation cost of the repository (i.e., cost reduction as compared with conducting the same evaluation later, at a time when there is more potential to impact larger-scale repository development). One significant consideration in this regard is the avoidance during excavation of volumes of rock containing erionite. *Note that this benefit is applicable almost exclusively to additional underground excavation options.*				

ENHANCED REPOSITORY BLOCK CHARACTERIZATION
DEVELOPMENT SUMMARY CONTROLS/REQUIREMENTS WORKING GROUP

CRITERIA	BENEFITS/CONSTRAINTS	FOR INVESTIGATIVE CRITERIA PREFERRED SOURCE, ALTERNATIVE SOURCES	FOR CONTROLS/REQ'S CRITERIA AFFECTED INVESTIGATIVE CRITERIA	RATIONALE	RISKS
38) demonstrating an integrated environment, safety (including fire safety and evacuation preparedness) and health approach?	*This can be a two-part benefit/ constraint.* As indicated in CRWG comments under criterion 32, if we are likely to use the opportunity afforded by additional excavation to develop or test new methods in this regard, there may be some benefits associated with this criterion related to those for Criteria 36 and 37 above. That is, any successes in enhancing the integration of environment, safety and health programs could translate into a reduction in the overall per-foot excavation cost of the repository, and reduce potential worker health and safety concerns *Absent such effort, a constraint still exists:* CONSTRAINT: In comparing possible design configurations, are there options which will lend themselves to less costly near-term requirements from an ES&H perspective?				

ENHANCED REPOSITORY BLOCK CHARACTERIZATION
DEVELOPMENT SUMMARY CONTROLS/REQUIREMENTS WORKING GROUP

CRITERIA	BENEFITS/CONSTRAINTS	FOR INVESTIGATIVE CRITERIA PREFERRED SOURCE, ALTERNATIVE SOURCES	FOR CONTROLS/REQ'S CRITERIA AFFECTED INVESTIGATIVE CRITERIA	RATIONALE	RISKS
39) implementing a performance based approach to design and construction, including a construction based TBM configuration? Full consideration is to be given to constructability, operability, and maintainability issues associated with a potential storage facility.	The principal benefit to be derived from establishing a performance based approach to design and construction (from the perspective of controls and requirements implementation) would come from identifying the critical performance parameters to be included in the contract such that the implementation of applicable controls and requirements (e.g., controls associated with water use minimization) are appropriately addressed and incentivized.				

ENHANCED REPOSITORY BLOCK CHARACTERIZATION
DEVELOPMENT SUMMARY CONTROLS/REQUIREMENTS WORKING GROUP

CRITERIA	BENEFITS/CONSTRAINTS	FOR INVESTIGATIVE CRITERIA PREFERRED SOURCE, ALTERNATIVE SOURCES	FOR CONTROLS/REQ'S CRITERIA AFFECTED INVESTIGATIVE CRITERIA	RATIONALE	RISKS
40) testing "state of the art" mechanical excavators?	The benefits to be derived from testing "state of the art" mechanical excavators would be (1) the potential identification of more effective ways to control dust while simultaneously minimizing water use, and (2) the potential demonstration of better line and grade performance.				

ENHANCED REPOSITORY BLOCK CHARACTERIZATION
DEVELOPMENT SUMMARY CONTROLS/REQUIREMENTS WORKING GROUP

CRITERIA	BENEFITS/CONSTRAINTS	FOR INVESTIGATIVE CRITERIA PREFERRED SOURCE, ALTERNATIVE SOURCES	FOR CONTROLS/REQ'S CRITERIA AFFECTED INVESTIGATIVE CRITERIA	RATIONALE	RISKS
41) traffic problems that could occur with other operational drifts?	CONSTRAINT: In comparing possible design configurations, are there options which limit projected impacts from an ES&H perspective in terms of personnel safety as a result of traffic problems or other similar operational issues? *This constraint is primarily limited to underground excavation efforts.*			*Additional discussion identified this as a constraint, which could be captured as a subset of other ES&H criteria.*	

ENHANCED REPOSITORY BLOCK CHARACTERIZATION
DEVELOPMENT SUMMARY CONTROLS/REQUIREMENTS WORKING GROUP

CRITERIA	BENEFITS/CONSTRAINTS	FOR INVESTIGATIVE CRITERIA PREFERRED SOURCE, ALTERNATIVE SOURCES	FOR CONTROLS/REQ'S CRITERIA AFFECTED INVESTIGATIVE CRITERIA	RATIONALE	RISKS
42) muck handling, including direct connection to current system?	CONSTRAINT: In comparing possible design configurations, are there options which lend themselves to easier methods of muck handling? *This constraint is primarily limited to underground excavation efforts.*			*Additional discussion identified this as a constraint, which could be captured as a subset of other construction methods criteria.*	

ENHANCED REPOSITORY BLOCK CHARACTERIZATION
DEVELOPMENT SUMMARY CONTROLS/REQUIREMENTS WORKING GROUP

CRITERIA	BENEFITS/CONSTRAINTS	FOR INVESTIGATIVE CRITERIA PREFERRED SOURCE, ALTERNATIVE SOURCES	FOR CONTROLS/REO'S CRITERIA AFFECTED INVESTIGATIVE CRITERIA	RATIONALE	RISKS
43) storage location and reclamation of the mine muck removed from the drifts?	CONSTRAINT: In comparing possible design configurations, are there options which are lend themselves to easier methods of muck handling, storage, and possible reclamation? There are requirements for muck storage that restrict the maximum height of muck piles, restrict the areas on the surface where muck piles can be located (based on state land-use permits), require muck from different geologic units to be segregated in some cases (Calico Hills only), and require muck piles containing hazardous materials (*e.g.*, erionite) to be treated as hazardous waste. While this constraint is limited to underground excavation efforts, understanding the different potential approaches to muck storage in multiple-drift scenarios could enhance the development of such requirements when required later for full-scale repository excavation. .				

ENHANCED REPOSITORY BLOCK CHARACTERIZATION
DEVELOPMENT SUMMARY CONTROLS/REQUIREMENTS WORKING GROUP

CRITERIA	BENEFITS/CONSTRAINTS	FOR INVESTIGATIVE CRITERIA PREFERRED SOURCE, ALTERNATIVE SOURCES	FOR CONTROLS/REQ'S CRITERIA AFFECTED INVESTIGATIVE CRITERIA	RATIONALE	RISKS
44) Limiting impacts to major natural features that may be important to site performance?	CONSTRAINT: In comparing possible design configurations, are there options which will result in less impact to major natural features important to site performance?			*Subsequent discussion within working group identified this as a comparitive benefit/constraint. Note that this item as a constraint is predicated on the assumption that previous analyses have discussed ESF drifts (or boreholes) as not having impacted site performance by their mere existence. If such analyses exist, it will be important to demonstrate similarly that additional excavation or boreholes will not impact performance. For this reason, as a comparitive benefit, it may be more beneficial to choose an excavation that has a high likelihood of becoming a repository drift of some kind.*	

ENHANCED REPOSITORY BLOCK CHARACTERIZATION
DEVELOPMENT SUMMARY CONTROLS/REQUIREMENTS WORKING GROUP

CRITERIA	BENEFITS/CONSTRAINTS	FOR INVESTIGATIVE CRITERIA PREFERRED SOURCE, ALTERNATIVE SOURCES	FOR CONTROLS/REQ'S CRITERIA AFFECTED INVESTIGATIVE CRITERIA	RATIONALE	RISKS
45) limiting impacts to availability of alternatives to design features to waste isolation, and promote ultimate compliance with the 10CFR60.21(c)(1)(ii)(D) requirement to provide a comparison of these alternatives?	CONSTRAINT: In comparing possible design configurations, are there options which will result in less impact to the ability to demonstrate compliance with requirements to provide a comparison of alternatives to design features important to waste isolation? The benefit of not precluding potential waste isolation alternatives is that enhanced flexibility is afforded to repository designers			*As in CRWG comments associated criterion #44, this issue should be evaluated in the context of previous related efforts (e.g., the ESF Alternatives Study).*	

ENHANCED REPOSITORY BLOCK CHARACTERIZATION
DEVELOPMENT SUMMARY CONTROLS/REQUIREMENTS WORKING GROUP

CRITERIA	BENEFITS/CONSTRAINTS	FOR INVESTIGATIVE CRITERIA PREFERRED SOURCE, ALTERNATIVE SOURCES	FOR CONTROLS/REQ'S CRITERIA AFFECTED INVESTIGATIVE CRITERIA	RATIONALE	RISKS
46) limiting, during site characterization, impacts to waste isolation, construction-to-test and test-to-test interference, and other requirements derived from 10CFR60.15(c)?	CONSTRAINT In comparing possible design configurations, are there options which will result in less impacts to waste isolation, test interference, etc ? (See also benefits associated with Criterion 44 above.)				

ENHANCED REPOSITORY BLOCK CHARACTERIZATION
DEVELOPMENT SUMMARY CONTROLS/REQUIREMENTS WORKING GROUP

CRITERIA	BENEFITS/CONSTRAINTS	FOR INVESTIGATIVE CRITERIA PREFERRED SOURCE, ALTERNATIVE SOURCES	FOR CONTROLS/REQ'S CRITERIA AFFECTED INVESTIGATIVE CRITERIA	RATIONALE	RISKS
47) ensuring that additional drifts or excavations do not violate the 200 meter overburden disqualifying condition of 10 CFR Part 960? [960.4-2-5(d)]?	CONSTRAINT: In comparing possible design configurations, are there options which will result in less of a challenge to the regulatory requirement to preserve a 200-m overburden over the GROA? Preserving the 200-meter overburden requirement would enhance the number of design options available to repository designers, and help ensure that the total maximum volume available for waste emplacement is not reduced.				

ENHANCED REPOSITORY BLOCK CHARACTERIZATION
DEVELOPMENT SUMMARY CONTROLS/REQUIREMENTS WORKING GROUP

CRITERIA	BENEFITS/CONSTRAINTS	FOR INVESTIGATIVE CRITERIA PREFERRED SOURCE, ALTERNATIVE SOURCES	FOR CONTROLS/REQ'S CRITERIA AFFECTED INVESTIGATIVE CRITERIA	RATIONALE	RISKS
48) the requirements for underground records in 10 CFR 60.72 such that construction of another drift during site characterization could fulfill level of detail requirements needed to satisfy some of the construction records requirements?	*This can be a two-part benefit/ constraint.* As indicated in CRWG comments under criterion 32, if we are likely to use the opportunity afforded by additional excavation to develop or test new methods in this regard, there may be some benefit associated with this criterion. The QA Program implements requirements for records retention. Conformance with these requirements will be a component of the per-foot cost to excavate the repository. Additional ECRB excavation could provide an opportunity to evaluate ways to reduce these costs; e.g., through process streamlining or automation initiatives. ***Absent such effort, a constraint still exists:*** CONSTRAINT: In comparing possible design configurations, are there options which will lend themselves to less costly near-term requirements from a records perspective?				

ENHANCED REPOSITORY BLOCK CHARACTERIZATION
DEVELOPMENT SUMMARY CONTROLS/REQUIREMENTS WORKING GROUP

CRITERIA	BENEFITS/CONSTRAINTS	FOR INVESTIGATIVE CRITERIA PREFERRED SOURCE, ALTERNATIVE SOURCES	FOR CONTROLS/REQ'S CRITERIA AFFECTED INVESTIGATIVE CRITERIA	RATIONALE	RISKS
49) beginning construction of the geologic repository operations area without a construction authorization as identified in 10 CFR Part 60.3?	CONSTRAINT: In comparing possible design configurations, are there options which will provide less of a challenge with regard to demonstrating compliance with 10CFR60.3(b)?			*As with criteria 44, 45, and 47, this constraint should be applied in the context of previous efforts toward demonsrtating compliance with these criteria.*	

ENHANCED REPOSITORY BLOCK CHARACTERIZATION
DEVELOPMENT SUMMARY CONTROLS/REQUIREMENTS WORKING GROUP

CRITERIA	BENEFITS/CONSTRAINTS	FOR INVESTIGATIVE CRITERIA PREFERRED SOURCE, ALTERNATIVE SOURCES	FOR CONTROLS/REQ'S CRITERIA AFFECTED INVESTIGATIVE CRITERIA	RATIONALE	RISKS
50) minimizing any significant adverse environmental impacts identified in comments on the Site Characterization Plan or in the Environmental Assessment? [NWPA Sec. 113(a)]	CONSTRAINT: In comparing possible design configurations, are there options which limit projected environmental impacts during site characterization?			*Subsequent discusion within the working group indicated we are not likely to use the opportunity afforded by additional excavation to develop or test new methods in this regard, so there's no inherent benefit; however there is a comparitive benefit/ constraint, as indicated.*	

3.4 Optimum Configuration

3.4.1 Initial Compilation of Configuration Elements

The results of the configuration analyses of the Working Groups were compiled and consolidated by the Project Engineering Manager resulting in the following 37 page listing by individual configuration element. Each of the configuration elements was then scored using a simple mathematical method. For each working group criteria that was satisfied by the configuration element, a value of 2 was assigned if it was the preferred source and a value of 1 was assigned if it was an alternate source. The point values were then totaled for each configuration element resulting in the List of Configuration Elements with point totals shown in parentheses.

Example:

Page 1 of 37, E-W cross drift, central block, above the repository block.

This configuration element was listed as the preferred source for 9 criteria @ 2 points/criteria = 18 points.

This configuration element was also listed as the alternate source for 4 criteria @ 1 point/criteria = 4 points.

Total point value = 18 + 4 = 22

Note: Criterion 1(D5C) & 1(TS1) are treated as separate criterion and scored accordingly.

The highest rated configuration elements are shown in bold on the list. This information was provided back to the Working Groups for determining a recommended Optimum Configuration for presentation to the Integrated Planning Committee for validation.

ENHANCED CHARACTERIZATION OF THE REPOSITORY BLOCK
OPTIMIZATION OF CONFIGURATION
INITIAL COMPILATION OF CONFIGURATION ELEMENTS

Configuration Element	Investigative Criteria Satisfied		Applicable Controls/Requirements Criteria WG Development Summary Cross Reference			Rationale Summary
	Preferred Source Available/ Individual WG Development Summary Cross Reference	Alternate Source Available/ Individual WG Development Summary Cross Reference	Criteria Number	Sheet Number	Description	
E-W Cross drift, central block above repository horizon	2(TS2), 36(C1), 37(C2), 38(C3), 39(C4), 8(PA), 1(D5C), 23(D4), 35(D7)	1(TS1), 6(TS6), 25(TS25), 15(PA)				

Configuration Element	Investigative Criteria Satisfied		Applicable Controls/Requirements Criteria WG Development Summary Cross Reference			Rationale Summary
	Preferred Source Available/ Individual WG Development Summary Cross Reference	Alternate Source Available/ Individual WG Development Summary Cross Reference	Criteria Number	Sheet Number	Description	
E-W Cross drift, central block at repository horizon	1(TS1), 2(TS2), 10(TS10), 15(TS15), 23(TS23), 32(TS), 36(C1), 37(C2), 38(C3), 39(C4), 2(PA15), 8(PA)	6(TS6), 25(TS25), 15(PA)	34(D6)			

Configuration Element	Investigative Criteria Satisfied		Applicable Controls/Requirements Criteria WG Development Summary Cross Reference			Rationale Summary
	Preferred Source Available/ Individual WG Development Summary Cross Reference	Alternate Source Available/ Individual WG Development Summary Cross Reference	Criteria Number	Sheet Number	Description	
E-W Cross drift, central block below repository horizon	2(TS2), 36(C1), 37(C2), 38(C3), 39(C4), 8(PA)	1(TS1), 6(TS6), 25(TS25), 2(PA15), 15(PA), 1(D5C), 23(D4), 35(D7)				

Configuration Element	Investigative Criteria Satisfied		Applicable Controls/Requirements Criteria WG Development Summary Cross Reference			Rationale Summary
	Preferred Source Available/ Individual WG Development Summary Cross Reference	Alternate Source Available/ Individual WG Development Summary Cross Reference	Criteria Number	Sheet Number	Description	
E-W Cross drift, northern block above repository horizon	2(TS2), 6(TS6), 23(TS23), 36(C1), 37(C2), 38(C3), 39(C4), 2(D3), 3(D3 & D5B), 23(D4), 1(D5C), 8(PA), 35(D7)	1(TS1), 5(TS5), 25(TS25), 12(PA1), 15(PA)	47(D8)			

Configuration Element	Investigative Criteria Satisfied		Applicable Controls/Requirements Criteria WG Development Summary Cross Reference			Rationale Summary
	Preferred Source Available/ Individual WG Development Summary Cross Reference	Alternate Source Available/ Individual WG Development Summary Cross Reference	Criteria Number	Sheet Number	Description	
E-W Cross drift, northern block at repository horizon	6(TS6), 10(TS10), 23(TS23), 36(C1), 37(C2), 38(C3), 39(C4), 2(PA15), 8(PA)	1(TS1), 5(TS5), 25(TS25), 12(PA1), 15(PA)	34(D6) 47(D8)			

Configuration Element	Investigative Criteria Satisfied		Applicable Controls/Requirements Criteria WG Development Summary Cross Reference			Rationale Summary
	Preferred Source Available/ Individual WG Development Summary Cross Reference	Alternate Source Available/ Individual WG Development Summary Cross Reference	Criteria Number	Sheet Number	Description	
E-W Cross drift, northern block below repository horizon	2(TS2), 6(TS6), 23(TS23), 36(C1), 37(C2), 38(C3), 39(C4), 8(PA)	1(TS1), 5(TS5), 25(TS25), 2(D3), 3(D3 & D5B), 23(D4), 1(D5C), 2(PA15), 12(PA1), 15(PA), 35(D7)	47(D8)			

Configuration Element	Investigative Criteria Satisfied		Applicable Controls/Requirements Criteria WG Development Summary Cross Reference			Rationale Summary
	Preferred Source Available/ Individual WG Development Summary Cross Reference	Alternate Source Available/ Individual WG Development Summary Cross Reference	Criteria Number	Sheet Number	Description	
E-W Cross drift, southern block above repository horizon	2(TS2), 23(TS23), 36(C1), 37(C2), 38(C3), 39(C4), 23(D4), 1(D5C), 8(PA), 35(D7)	1(TS1), 25(TS25), 15(PA)				

Configuration Element	Investigative Criteria Satisfied		Applicable Controls/Requirements Criteria WG Development Summary Cross Reference			Rationale Summary
	Preferred Source Available/ Individual WG Development Summary Cross Reference	Alternate Source Available/ Individual WG Development Summary Cross Reference	Criteria Number	Sheet Number	Description	
E-W Cross drift, southern block at repository horizon	23(TS23), 36(C1), 37(C2), 38(C3), 39(C4), 2(PA15), 8(PA)	1(TS1), 25(TS25), 15(PA)	34(D6)			

Configuration Element	Investigative Criteria Satisfied		Applicable Controls/Requirements Criteria WG Development Summary Cross Reference			Rationale Summary
	Preferred Source Available/ Individual WG Development Summary Cross Reference	Alternate Source Available/ Individual WG Development Summary Cross Reference	Criteria Number	Sheet Number	Description	
E-W Cross drift, southern block below repository horizon	2(TS2), 23(TS23), 36(C1), 37(C2), 38(C3), 39(C4), 8(PA)	1(TS1), 25(TS25), 23(D4), 1(D5C), 2(PA15), 15(PA), 35(D7)				

Configuration Element	Investigative Criteria Satisfied		Applicable Controls/Requirements Criteria WG Development Summary Cross Reference			Rationale Summary
	Preferred Source Available/ Individual WG Development Summary Cross Reference2	Alternate Source Available/ Individual WG Development Summary Cross Reference	Criteria Number	Sheet Number	Description	
E-W Cross drift, central block above repository horizon w/ loop down to Calico Hills	2(TS2),17(TS17), 18(TS18), 19(TS19), 36(C1), 37(C2), 38(C3), 39(C4), 5(PA), 8(PA), 1(D5C), 23(D4), 35(D7)	1(TS1), 6(TS6), 25(TS25), 15(PA), 17(PA10)				

Configuration Element	Investigative Criteria Satisfied		Applicable Controls/Requirements Criteria WG Development Summary Cross Reference			Rationale Summary
	Preferred Source Available/ Individual WG Development Summary Cross Reference2	Alternate Source Available/ Individual WG Development Summary Cross Reference	Criteria Number	Sheet Number	Description	
E-W Cross drift, central block at repository horizon w/ loop down to Calico Hills	1(TS1), 2(TS2), 3(TS3), 7(TS7), 8(TS8), 9(TS9), 10(TS10), 11(TS11), 12(TS12), 15(TS15), 17(TS17), 18(TS18), 19(TS19), 23(TS23), 32(TS), 36(C1), 37(C2), 38(C3), 39(C4), 2(PA15), 5(PA), 8(PA)	6(TS6), 25(TS25), 15(PA), 17(PA10)	34(D6)			

Configuration Element	Investigative Criteria Satisfied		Applicable Controls/Requirements Criteria WG Development Summary Cross Reference			Rationale Summary
	Preferred Source Available/ Individual WG Development Summary Cross Reference2	Alternate Source Available/ Individual WG Development Summary Cross Reference	Criteria Number	Sheet Number	Description	
E-W Cross drift, central block below repository horizon w/ loop down to Calico Hills	2(TS2),17(TS17), 18(TS18), 19(TS19), 36(C1), 37(C2), 38(C3), 39(C4), 5(PA), 8(PA)	1(TS1), 6(TS6), 25(TS25), 2(PA15), 15(PA), 17(PA10), 1(D5C), 23(D4), 35(D7)				

Configuration Element	Investigative Criteria Satisfied		Applicable Controls/Requirements Criteria WG Development Summary Cross Reference			Rationale Summary
	Preferred Source Available/ Individual WG Development Summary Cross Reference	Alternate Source Available/ Individual WG Development Summary Cross Reference	Criteria Number	Sheet Number	Description	
E-W Cross drift, northern block above repository horizon w/ loop down to Calico Hills	2(TS2), 6(TS6), 23(TS23), 36(C1), 37(C2), 38(C3), 39(C4), 2(D2), 3(D3 & D5B), 23(D4), 1(D5C), 5(PA), 8(PA), 35(D7)	1(TS1), 3(TS3), 5(TS5), 25(TS25), 12(PA1), 15(PA), 17(PA10)	47(D8)			

Configuration Element	Investigative Criteria Satisfied		Applicable Controls/Requirements Criteria WG Development Summary Cross Reference			Rationale Summary
	Preferred Source Available/ Individual WG Development Summary Cross Reference	Alternate Source Available/ Individual WG Development Summary Cross Reference	Criteria Number	Sheet Number	Description	
E-W Cross drift, northern block at repository horizon w/ loop down to Calico Hills	2(TS2), 6(TS6), 7(TS7), 8(TS8), 10(TS10), 11(TS11), 12(TS12), 23(TS23), 36(C1), 37(C2), 38(C3), 39(C4), 2(PA15), 5(PA), 8(PA)	1(TS1), 3(TS3), 5(TS5), 25(TS25), 12(PA1), 15(PA), 17(PA10)	34(D6) 47(D8)			

Configuration Element	Investigative Criteria Satisfied		Applicable Controls/Requirements Criteria WG Development Summary Cross Reference			Rationale Summary
	Preferred Source Available/ Individual WG Development Summary Cross Reference	Alternate Source Available/ Individual WG Development Summary Cross Reference	Criteria Number	Sheet Number	Description	
E-W Cross drift, northern block below repository horizon w/ loop down to Calico Hills	2(TS2), 6(TS6), 23(TS23), 36(C1), 37(C2), 38(C3), 39(C4), 5(PA), 8(PA)	1(TS1), 3(TS3), 5(TS5), 25(TS25), 23(D4), 1(D5C), 2(PA15), 12(PA1), 15(PA), 17(PA10), 2(D3), 3(D3, D5B), 35(D7)	47(D8)			

Configuration Element	Investigative Criteria Satisfied		Applicable Controls/Requirements Criteria · WG Development Summary Cross Reference			Rationale Summary
	Preferred Source Available/ Individual WG Development Summary Cross Reference	Alternate Source Available/ Individual WG Development Summary Cross Reference	Criteria Number	Sheet Number	Description	
E-W Cross drift, southern block above repository horizon w/ loop down to Calico Hills	2(TS2), 23(TS23), 36(C1), 37(C2), 38(C3), 39(C4), 23(D4), 1(D5C), 5(PA), 8(PA), 18(PA12), 35(D7)	1(TS1), 25(TS25), 15(PA), 17(PA10)				

Configuration Element	Investigative Criteria Satisfied		Applicable Controls/Requirements Criteria WG Development Summary Cross Reference			Rationale Summary
	Preferred Source Available/ Individual WG Development Summary Cross Reference	Alternate Source Available/ Individual WG Development Summary Cross Reference	Criteria Number	Sheet Number	Description	
E-W Cross drift, southern block at repository horizon w/ loop down to Calico Hills	2(TS2), 7(TS7), 8(TS8), 23(TS23), 36(C1), 37(C2), 38(C3), 39(C4), 2(PA15), 5(PA), 8(PA), 18(PA12)	1(TS1), 25(TS25), 15(PA), 17(PA10)	34(D6)			

Configuration Element	Investigative Criteria Satisfied		Applicable Controls/Requirements Criteria WG Development Summary Cross Reference			Rationale Summary
	Preferred Source Available/ Individual WG Development Summary Cross Reference	Alternate Source Available/ Individual WG Development Summary Cross Reference	Criteria Number	Sheet Number	Description	
E-W Cross drift, southern block below repository horizon w/ loop down to Calico Hills	2(TS2), 23(TS23), 36(C1), 37(C2), 38(C3), 39(C4), 5(PA), 8(PA), 18(PA12)	1(TS1), 25(TS25), 23(D4), 1(D5C), 2(PA15), 15(PA), 17(PA10), 35(D7)				

Configuration Element	Investigative Criteria Satisfied		Applicable Controls/Requirements Criteria WG Development Summary Cross Reference			Rationale Summary
	Preferred Source Available/ Individual WG Development Summary Cross Reference	Alternate Source Available/ Individual WG Development Summary Cross Reference	Criteria Number	Sheet Number	Description	
Cross drift alcoves and subsurface boreholes, northern	6(TS6), 10(TS10), 11(TS11), 12(TS12), 37(C2), 40(C5), 20(D5A)	4(TS4), 13(TS13), 14(TS14), 24(TS24), 3(PA14), 12(PA1), 15(PA)				

Configuration Element	Investigative Criteria Satisfied		Applicable Controls/Requirements Criteria WG Development Summary Cross Reference			Rationale Summary
	Preferred Source Available/ Individual WG Development Summary Cross Reference	Alternate Source Available/ Individual WG Development Summary Cross Reference	Criteria Number	Sheet Number	Description	
Cross drift alcoves and subsurface boreholes, central	10(TS10), 11(TS11), 12(TS12), 15(TS15), 37(C2), 40(C5)	4(TS4), 6(TS6), 13(TS13), 14(TS14), 24(TS24), 3(PA14), 15(PA)				

Configuration Element	Investigative Criteria Satisfied		Applicable Controls/Requirements Criteria WG Development Summary Cross Reference			Rationale Summary
	Preferred Source Available/ Individual WG Development Summary Cross Reference	Alternate Source Available/ Individual WG Development Summary Cross Reference	Criteria Number	Sheet Number	Description	
Cross drift alcoves and subsurface boreholes, southern	37(C2), 40(C5), 18(PA12)	14(TS14), 24(TS24), 23(D1), 24(D1), 3(PA14), 15(PA)				

Configuration Element	Investigative Criteria Satisfied		Applicable Controls/Requirements Criteria WG Development Summary Cross Reference			Rationale Summary
	Preferred Source Available/ Individual WG Development Summary Cross Reference	Alternate Source Available/ Individual WG Development Summary Cross Reference	Criteria Number	Sheet Number	Description	
Existing Thermal Test Facility	29(PA8)					

Configuration Element	Investigative Criteria Satisfied		Applicable Controls/Requirements Criteria WG Development Summary Cross Reference			Rationale Summary
	Preferred Source Available/ Individual WG Development Summary Cross Reference	Alternate Source Available/ Individual WG Development Summary Cross Reference	Criteria Number	Sheet Number	Description	
Existing Ghost Dance Fault Alcoves	3(PA14), 12(PA1), 15(PA)	27(PA6), 28(PA7)				

Configuration Element	Investigative Criteria Satisfied		Applicable Controls/Requirements Criteria WG Development Summary Cross Reference			Rationale Summary
	Preferred Source Available/ Individual WG Development Summary Cross Reference	Alternate Source Available/ Individual WG Development Summary Cross Reference	Criteria Number	Sheet Number	Description	
3-D Seismic from surface and ESF		2(TS2), 2(D3), 3(D3 & D5B)				

Configuration Element	Investigative Criteria Satisfied		Applicable Controls/Requirements Criteria WG Development Summary Cross Reference			Rationale Summary
	Preferred Source Available/ Individual WG Development Summary Cross Reference	Alternate Source Available/ Individual WG Development Summary Cross Reference	Criteria Number	Sheet Number	Description	
Horizontal borehole from Solitario Canyon	3(TS3), 13(TS13)					

Configuration Element	Investigative Criteria Satisfied		Applicable Controls/Requirements Criteria WG Development Summary Cross Reference			Rationale Summary
	Preferred Source Available/ Individual WG Development Summary Cross Reference	Alternate Source Available/ Individual WG Development Summary Cross Reference	Criteria Number	Sheet Number	Description	
Northern crest borehole to water table	4(TS4), 5(TS5), 13(TS13), 14(TS14), 24(TS24), 25(TS25), 18(D2), 5(PA), 9(PA2), 17(PA10), 19(PA10), 22(PA3)	6(TS6), 18(TS18), 19(TS19), 23(TS23), 21(PA3)				

Configuration Element	Investigative Criteria Satisfied		Applicable Controls/Requirements Criteria WG Development Summary Cross Reference			Rationale Summary
	Preferred Source Available/ Individual WG Development Summary Cross Reference	Alternate Source Available/ Individual WG Development Summary Cross Reference	Criteria Number	Sheet Number	Description	
Southern crest borehole to water table	4(TS4), 14(TS14), 18(TS18), 24(TS24), 25(TS25), 23(D1), 24(D1), 5(PA), 9(PA2), 17(PA10), 19(PA10), 22(PA3)	19(TS19), 23(TS23), 18(PA12), 21(PA3)				

Configuration Element	Investigative Criteria Satisfied		Applicable Controls/Requirements Criteria WG Development Summary Cross Reference			Rationale Summary
	Preferred Source Available/ Individual WG Development Summary Cross Reference	Alternate Source Available/ Individual WG Development Summary Cross Reference	Criteria Number	Sheet Number	Description	
Paired WT holes across middle of Solitario Canyon Fault	16(TS16)	19(TS19)				

Configuration Element	Investigative Criteria Satisfied		Applicable Controls/Requirements Criteria WG Development Summary Cross Reference			Rationale Summary
	Preferred Source Available/ Individual WG Development Summary Cross Reference	Alternate Source Available/ Individual WG Development Summary Cross Reference	Criteria Number	Sheet Number	Description	
Borehole west of Solitario Canyon Fault		15(TS15)				

Configuration Element	Investigative Criteria Satisfied		Applicable Controls/Requirements Criteria WG Development Summary Cross Reference			Rationale Summary
	Preferred Source Available/ Individual WG Development Summary Cross Reference	Alternate Source Available/ Individual WG Development Summary Cross Reference	Criteria Number	Sheet Number	Description	
Borehole near WT-17		16(TS16), 19(TS19)				

Configuration Element	Investigative Criteria Satisfied		Applicable Controls/Requirements Criteria WG Development Summary Cross Reference			Rationale Summary
	Preferred Source Available/ Individual WG Development Summary Cross Reference	Alternate Source Available/ Individual WG Development Summary Cross Reference	Criteria Number	Sheet Number	Description	
Additional testing in G2 (existing) and WT-24(planned)	20(TS20), 22(TS22), 20(D5A), 20(PA13)	21(TS21)				

Configuration Element	Investigative Criteria Satisfied		Applicable Controls/Requirements Criteria WG Development Summary Cross Reference			Rationale Summary
	Preferred Source Available/ Individual WG Development Summary Cross Reference	Alternate Source Available/ Individual WG Development Summary Cross Reference	Criteria Number	Sheet Number	Description	
Southern Testing Complex (near WT-17)	21(TS21), 21(PA3), 22(PA3)	16(TS16), 19(TS19), 22(TS22)				

Configuration Element	Investigative Criteria Satisfied		Applicable Controls/Requirements Criteria WG Development Summary Cross Reference			Rationale Summary
	Preferred Source Available/ Individual WG Development Summary Cross Reference	Alternate Source Available/ Individual WG Development Summary Cross Reference	Criteria Number	Sheet Number	Description	
Additional 4 boreholes to carbonate aquifer between repository block and Franklin Lake Playa	21(PA), 22(PA)					

Configuration Element	Investigative Criteria Satisfied		Applicable Controls/Requirements Criteria WG Development Summary Cross Reference			Rationale Summary
	Preferred Source Available/ Individual WG Development Summary Cross Reference	Alternate Source Available/ Individual WG Development Summary Cross Reference	Criteria Number	Sheet Number	Description	
G-hole in Crater Flats		21(TS21)				

Configuration Element	Investigative Criteria Satisfied		Applicable Controls/Requirements Criteria WG Development Summary Cross Reference			Rationale Summary
	Preferred Source Available/ Individual WG Development Summary Cross Reference	Alternate Source Available/ Individual WG Development Summary Cross Reference	Criteria Number	Sheet Number	Description	
WT-23		20(TS20)				

Configuration Element	Investigative Criteria Satisfied		Applicable Controls/Requirements Criteria WG Development Summary Cross Reference			Rationale Summary
	Preferred Source Available/ Individual WG Development Summary Cross Reference	Alternate Source Available/ Individual WG Development Summary Cross Reference	Criteria Number	Sheet Number	Description	
Testing in SD-6	18(D2), 23(D1), 24(D1)	17(PA10), 21(PA3)				

Configuration Element	Investigative Criteria Satisfied		Applicable Controls/Requirements Criteria WG Development Summary Cross Reference			Rationale Summary
	Preferred Source Available/ Individual WG Development Summary Cross Reference	Alternate Source Available/ Individual WG Development Summary Cross Reference	Criteria Number	Sheet Number	Description	
Laboratory testing	27(TS), 29(TS), 30(TS), 26(PA5), 27(PA6), 28(PA7), 30(PA11), 26A(PA)	29(PA8)				

Enhanced Characterization of the Repository Block
Initial List of Configuration Elements

- **East-West Drift (9 variations), includes alcoves (17-31)**
  - Northern Block @ 3 different elevations (at emplacement horizon, above, below)
  - Central Block @ 3 different elevations (at emplacement horizon, above, below)
  - Southern Block @ 3 different elevations (at emplacement horizon, above, below)

- **East-West Drift w/ Calico Hills Loop (9 variations), includes alcoves (26-48)**
  - Same 9 options identified above but with each having a Calico Hills loop

- Existing Thermal Test Facility (2)

- Existing Ghost Dance Fault Alcoves (8)

- Other existing ESF excavations (8)

- 3D Seismic from surface and ESF (3)

- Horizontal Borehole from Solitario Canyon (4)

- **Northern Crest Borehole to WT (29)**

- **Southern Crest Borehole to WT (28)**

- Paired WT holes across middle of Solitario Canyon Fault (3)

- Borehole west of Solitario Canyon Fault (1)

- Borehole near WT-17 (2)

- Additional testing in G-2 and WT-24 (9)

- **Southern Testing Complex (9)**

- Additional 4 boreholes to carbonate aquifer, between repository block & Franklin Lake Playa (4)

- G-hole in Crater Flats (1)

- WT-23 (1)

- Testing in SD-6 (8)

- **Laboratory Testing (17)**

5/20/97

Rank order of configuration elements (with point values)

48	E-W drift, central block, at emplacement horizon, w/ Calico Hills loop
37	E-W drift, northern block, at emplacement horizon, w/ Calico Hills loop
35	E-W drift, northern block, above emplacement horizon, w/ Calico Hills loop
31	E-W drift, northern block, below emplacement horizon, w/ Calico Hills loop
31	E-W drift, central block, above emplacement horizon, w/ Calico Hills loop
31	E-W drift, northern block, above emplacement horizon
29	Northern Crest borehole to water table
29	E-W drift, central block, below emplacement horizon, w/ Calico Hills loop
28	Southern Crest borehole to water table
28	E-W drift, southern block, above emplacement horizon, w/ Calico Hills loop
28	E-W drift, southern block, at emplacement horizon, w/ Calico Hills loop

3.4.2 Evaluation & Development of Optimum Configuration

In implementing the methodology to develop recommended enhancements, Testing, Performance Assessment and Design Working Groups addressed questions about appropriate drifting, test alcoves, and subsurface boreholes, surface boreholes, and other investigations, that could enhance the scientific understanding of the site for specific technical criteria. Licensing/Regulatory, Controls and Requirements and Construction Working Groups addressed questions about specific technical criteria that dealt with regulatory constraints or requirements that could potentially constrain enhancements to the program.

There were two general views on the initially recommended configurations; one from design and one from testing. Site attributes that were of interest to testing included zones of potentially higher infiltration on the western side of the block, including evidence of fast paths. A cross section through the block illustrates that the repository development would be in the middle nonlithophysal, the lower lithophysal, and the lower nonlithophysal zone. An issue for testing is a look at that vertical section with respect to fracture mapping, some geomechanical properties, some hydrologic properties. Repository exposures to the lower nonlithophysal strata generally start in the southern part of the block. The middle nonlithophysal is seen in the east main and the bulk of the repository is in the lower lithophysal. When mapping in the existing construction, a zone of unexpected fracturing was encountered at station 43+00. A testing perspective was that predictive modeling could be done and compared to conditions encountered in this area that could support the Viability Assessment . Also, in the southern part of the block, the Solitario Canyon fault has a reasonable amount of displacement, and the splay on the Solitario Canyon is clearly present. The recommendation from the testing working group was drifting along repository alignment within the repository block near station 43+00.

The design perspective was more focused on the northern part of the block, the preferred zone for potential expansion. Design was concerned about an excavation in the repository horizon, because if the drift orientation is not coincident with the eventual repository alignment, there is a potential to lose repository area. There is also a concern about the 10 CFR 960 Erosion guideline 200 meter disqualifer. The currently planned repository horizon is about as high in the section as it can go. One argument about drifting below the repository horizon was that it could constrain the ability to move the repository horizon downward. If it turns out, for example, that the lower lithophysal is, in fact better rock for the repository horizon, it would be logical to shift the repository down to take advantage of that. The ECRB drift should not constrain that eventuality. Accordingly, design preferred to drift above the repository horizon. The design working group recommended developing a drift that could be used as a performance confirmation drift.

As a result of the scoring effort, the following elements (highest ranking) were accepted by the working groups as part of the optimum configuration:

- East-West cross drift (with or without Calico Hills Access)
- Northern Crest Borehole
- Southern Crest Borehole
- Laboratory Testing (primarily related to waste package/EBS performance)
- Southern Testing Complex

The working groups were in agreement with this list with the only items requiring additional discussion were the configuration of the East-West cross drift and the inclusion/exclusion of the Calico Hills Access.

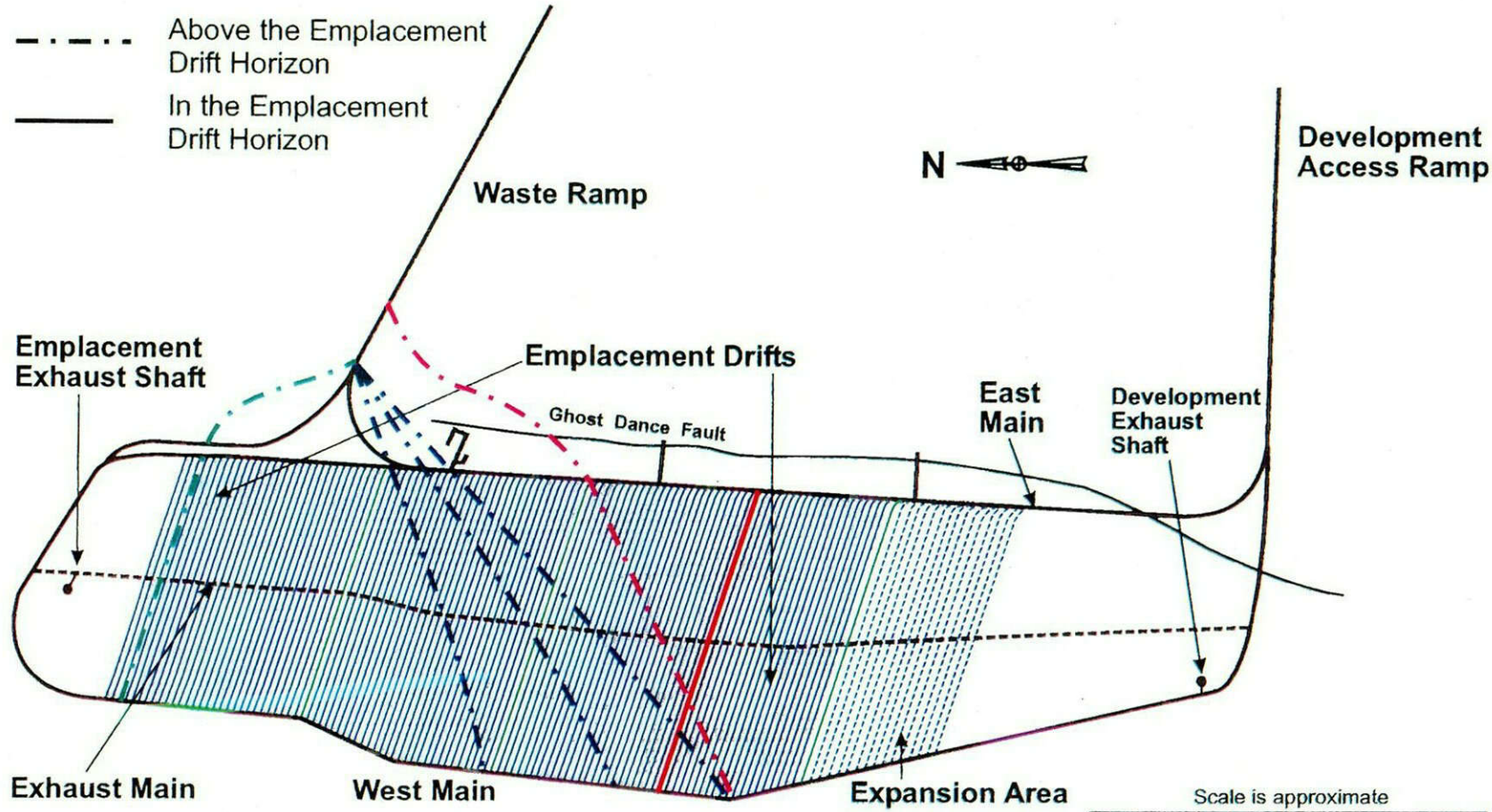
The design and testing groups jointly developed a cross drift configuration to be included as part of the overall optimum configuration. If the drift is to stay above the repository horizon, it is appropriate and faster to start off a ramp rather than to circle around from the east main, which could take more than a month. This recommended configuration has other advantages. First, it has approximately 1,000 feet of drifting in rock that is not potential repository rock, with a wet-head cutter machine (used for dust control and excavation enhancement). That allows time to make measurements, and confirm construction is not impacting waste isolation. It also allows the ability to pass by near an alcove, or even the heated drift test to deliberately look for interactions, perhaps even flooding an area, if it is seen as appropriate. It could be avoided as well if that was the decision. One additional attribute is that it allows a way to get down to the Calico Hills at a later time without going through the TSw3 directly (if in fact the potential presence of erionite remains a major concern).

In summary, a drift located further to the south gives a better look at the northwest trending fracture zones that start at about Station 43+00 in the ESF Main Drift. It hits the Solitario Canyon fault at a location where there is significant displacement, and definitely crosses the splay. The splay could extent to the north, but it would be beneath the Paintbrush. The third attribute favoring the farther south drift is that the drift would actually be in the lower non-lithophysal Topopah Spring unit in the western most region of the drift. The intercept with the Solitario Canyon fault would be below the lower lithophysal/lower non-lithophysal contact; this is potentially the most significant testing consideration. Drifting in the repository horizon potentially constrains the layout flexibility, as does drifting below the horizon. Starting from the north ramp gives the correct elevation to go above the horizon, and allows for potential interactions with the ongoing test program.

3.4.3 Illustration of Drifting Options Considered & Consensus Option

The following illustration shows the initial cross drift configurations preferred by the Testing Working Group and the Design/Construction Working Group. It also shows the other options jointly considered by these two Working Groups and the consensus configuration that resulted from the joint working group discussions.

Enhanced Repository Block Characterization



ECRBLAY.CDR.124/5-7-97

C-01

3.4.4 Concurrence of Integrated Planning Committee

The following write-up provides a brief description of the optimum configuration and the validation of this optimum configuration by the Integrated Planning Committee as shown by the sign off sheet.

ENHANCED CHARACTERIZATION OF THE REPOSITORY BLOCK OPTIMUM CONFIGURATION INTEGRATED PLANNING COMMITTEE CONCURRENCE

During the week of April 28, 1997, the five Working Group Leads, Michael Voegele, and Jim Beyer with support from other Working Group members developed a recommended optimum configuration for the enhanced characterization of the repository block. Six configuration elements were included, in rank order, in this optimum configuration. These elements were an East-West cross drift, a northern borehole, a southern borehole, Calico Hills excavation from the end of the East-West cross drift, performance assessment testing related to waste package, and the Southern Testing Complex.

Significant testing and design aspects were considered in, and incorporated into, arriving at the optimum configuration. These included vertical geologic stratigraphy, fracture mapping, potential repository block flexibility, and future access to the Calico Hills without direct transit through Tsw3. Two additional value added features arise from optimum configuration; (1) greater opportunity to view the northwest trending fracture zones which begin at Station 43+00 and, (2) crossing the Solitario Canyon at an area to observe the significant displacement there where it crosses the splay.

The recommended optimum configuration was presented to the Integrated Planning Committee on May 1, 1997. The list of attendees is included as Attachment 1. The committee was presented with the complete list of configuration elements that were identified by the Working Groups. The methodology for scoring each element was described and the score for each configuration element was presented to the committee. The details and supporting rationale for the recommended optimum configuration were then presented to the committee. Several questions were raised and a considerable amount of discussion occurred concerning the potential impact of the East-West cross drift on waste isolation and potential repository performance. Dennis Williams indicated that the fourth element, Calico Hills excavation, should be recombined with the East-West cross drift consistent with the original Working Group recommendation. The committee agreed with the caveat that the Calico Hills work would not take precedence over the northern and southern boreholes and would not be included in the ECRB Change Request. Final determination regarding access into the Calico Hills will be made in 1998 based upon information gained from the East-West Drift and the Calico Hills scoping studies. Michael Voegele asked the committee members to further examine the recommended optimum configuration and the committee would reconvene on the following day.

The Integrated Planning Committee reconvened on May 2, 1997 to finalize discussion on the optimum configuration. The list of attendees is included as Attachment 2. The discussions from the previous day were concluded with all questions answered to the satisfaction of those present. The committee members present were then polled for final questions and whether they concurred with the scope of the optimum configuration. All members present indicated their concurrence with the scope of the optimum configuration. The optimum configuration is described in Attachment 3.

ENHANCED CHARACTERIZATION OF THE REPOSITORY BLOCK
OPTIMUM CONFIGURATION
INTEGRATED PLANNING COMMITTEE CONCURRENCE

Robert M. Sandifer
M&O SC&O, Chairman

Michael D. Voegele
M&O Deputy AGM

R. Glenn Vawter
M&O PPC

Douglas K. Chandler
M&O Support Ops

Larry R. Hayes
M&O SEP Ops

Richard D. Snell
M&O E&I Ops

Jean L. Younker
M&O Regulatory Ops

Jerri J. Adams
DOE AMAAM

Richard L. Craun
DOE AMVA&SP

Richard E. Spence
DOE OPC

Dennis R. Williams
DOE AML

Mark E. VanDerPuy
DOE AMESH

Marshall Bishop
MTS

Michael K. Cline
MTS

Kenneth L. Ashe
Licencing/Regulatory WG Lead

Ned Z. Elkins
Testing WG Lead

Peter S. Hastings
Control & Requirements WG Lead

James E. Houseworth
Performance Assessment WG Lead

William R. Kennedy
Design/Construction WG Lead

ATTACHMENT 1

ENHANCED CHARACTERIZATION OF THE REPOSITORY BLOCK
INTEGRATED PLANNING COMMITTEE MEETING
MAY 1, 1997 4:00-5:00PM
ROOM 1275

NAME	ORG	PHONE
Jim Beyer	M&O C&O PE	5-5395
Glenn Vawter	M&O	5-5517
Dick Spence	DOE/OPC	4-1346
Michael Voegele	M&O	5-5520
Richard L. Crown	DOE/VA	4-1488
Mark Van Der Puy	AMESH	45563
Dennis R. Williams	DOE/NWML	4-1417
Jim Houseworth	M&O/PA	5-4638
Peter Hastings	M&O/SE	5.3961
Ken Ashe	M&O/Lic	5-5563
DAN McKENEKE	M&O/REPOSITORY	5-4393
Bill Kennedy	M&O MGDS	5 4240
Michael Cline	BAH	45481
Ralph Rogers	M&O/SPO	5-5785
Larry R. Hayes	M&O/SPO	5-5104
Dick Snell	M&O/E&T	5-5601
Mike Lugo	M&O/Reg	5-4761

ATTACHMENT 2

ENHANCED CHARACTERIZATION OF THE REPOSITORY BLOCK
INTEGRATED PLANNING COMMITTEE MEETING
MAY 2, 1997 12:30-1:30PM
ROOM 1257

NAME	ORG	PHONE
Jim Beyer	M&O C&O PE	5-5395
Mark Van De-Puy	DANESH	45563
Dennis R. Williams	DOE/AML	4-1417
Bill Kennedy	M&O/DESIGN A/E	5-4240
Dan McKenzie	M+O/ Repository	5-4393
Dick Snell	M+O/E&I	5-5601
Ralph Rogers	M&O/SPO	55785
Mike Lugo	M&O/Regulatory	
Jim Howenorth	M+O/PA	5-4638
Peter Hastings	M&O/SE	5.3961
Larry R. Hayes	M+O - SPO	5-5604
Ned Z. Elkins	SPO/LANL	5-3403
Ken Ashe	M+O/Lic	5-5563
K. Michael Clinn	BAH/MTS	4 5481
Bob Sandifer	M&O/SC&O	55504
R. Cramer	DOE	4-1000
Dale Foust	M&O	

ATTACHMENT 3

ENHANCED CHARACTERIZATION OF THE REPOSITORY BLOCK

OPTIMUM CONFIGURATION

VALIDATED BY THE INTEGRATED PLANNING COMMITTEE ON MAY 2, 1997
RANK ORDER

1. EAST-WEST CROSS DRIFT COMING OFF THE NORTH RAMP TO THE SOUTHWEST INTERSECTING SOLITARIO CANYON FAULT CENTRAL BLOCK(BETWEEN SECTIONS 2 &3), ABOVE THE REPOSITORY HORIZON, PRESERVE ABILITY TO GO TO CALICO HILLS

   1A. ACCESS TO CALICO HILLS FROM THE WEST END OF THE EAST-WEST CROSS DRIFT. (This element is included as part of the East-West drift but the cost and schedule will not be included in the Change Request)

2. NORTHERN BOREHOLE TO THE WATER TABLE BETWEEN UZ-14 AND G-2 AT THE HEAD OF TEACUP WASH

3. SOUTHERN BOREHOLE TO THE WATER TABLE ALONG THE CREST BETWEEN UZ-6 AND H-3.

4. PERFORMANCE ASSESSMENT RELATED LABORATORY TESTING
   - Cathodic Protection
   - Flow & transport through corrosion pits in waste package
   - Drip shield
   - Cladding
   - Thermomechanical data and dissolution rates under different water composition and heating scenarios

5. SOUTHERN TESTING COMPLEX (3-4 BOREHOLES)

3.5 Scope, Schedule & Cost

3.5.1 Work Scope

The work scope statements for the various pieces of work can be found in the two Change Requests for the ECRB. Copies of these Change Requests are included in Appendix F and Appendix G.

3.5.2 Integrated Schedule

The schedule, including milestones, can be found in the two Change Requests for the ECRB.

3.5.3 Cost

The cost estimates for the ECRB are found in the two Change Requests. The total cost is $1.5M for the Early Start work and $39.1M for the remaining work totaling $40.6M.