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REVIEW OF THE APCS APPROACH TO ANALYZING WIPP REPOSITORY PERFORMANCE IN THE CRA-2019 PERFORMANCE ASSESSMENT

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Executive Summary

An unexpected radionuclide release in the WIPP underground repository in February 2014 resulted in a U.S. Department of Energy (DOE) decision to abandon Waste Panel 9 in the south end of the repository waste area and forego installation of closures in the south end waste panel access drifts. These actions were accompanied by a DOE decision to excavate a replacement for Panel 9 at an undetermined location northwest of the existing waste area. In view of the limitations of the existing two-dimensional BRAGFLO performance assessment models to adequately simulate these design changes and the several year lead time required to develop replacement models, the DOE developed the "APCS approach" to modify the existing models for use on an interim basis for their 2019 Compliance Recertification Application performance assessment (the CRA-2019 PA). The acronym "APCS" stands for *Abandonment of Panel Closures in the South*. The primary elements of this approach were to treat the abandoned Panel 9 as a surrogate for its replacement and to treat the now-empty waste panel access drifts as not creep closing but remaining open at relatively high porosities and permeabilities for the 10,000-year U.S. Environmental Protection Agency (EPA) regulatory period. In addition, to help ensure that repository releases would not be underestimated by this approach, the isolation functions of the remaining single panel closures, including the important closures between Panels 9 and 10, were ignored.

Upon review, EPA found that the assumptions in the APCS approach were not physically realistic but did compensate for the uncertainties in treating the abandoned Panel 9 as a surrogate for its replacement. The EPA therefore accepted the DOE's APCS approach to performance assessment (PA) modeling for the CRA-2019 as an interim measure intended to accommodate the immediate need to adapt the existing PA models to the new repository design in time for the 2019 recertification. Coupled with the EPA's acceptance were the DOE's commitments to demonstrate the conservatism of the APCS approach by running a parallel PA model that assumed all panel access drifts without constructed closures would immediately creep close and acquire the porosity and permeability properties of intact halite upon repository closure; to develop a qualified three-dimensional replacement for the two-dimensional BRAGFLO models for future use in PA calculations; and to perform several numerical and laboratory studies of creep closure of empty rooms with and without roof falls for the purpose of informing the CRA-2024 PA. The first of these efforts, development of a qualified, parallel PA model, was completed in 2019 and is further described below. The other two efforts are in progress.

The parallel DOE PA model was called the CRA19_CL model. Treating the empty waste panel access drifts as well as the empty Operational and Experimental Areas of the repository as immediately creep closing resulted in lower repository releases than were calculated by the DOE's CRA-2019 PA model that ignored these closures. Although the results demonstrated that the CRA-2019 PA model using the APCS approach calculated greater releases than the CRA19_CL model, upon review the Agency found that the demonstration was incomplete because the CRA19_CL model did not include rapid consolidation and healing of the disturbed rock zones (DRZs) surrounding these drifts. This finding was based on the recognition that if the drifts healed to approach the properties of intact halite, the surrounding DRZs would also heal in a like manner.

To consider DRZ healing, EPA prepared the CRA19_COMP model. This model was qualified under EPA's quality assurance program. It was the same as the DOE's CRA19_CL model but treated the DRZs as immediately creep closing to the same properties of intact halite as the empty rooms. The results continued to demonstrate that the CRA-2019 PA model using the APCS approach conservatively calculated greater repository releases than if the empty repository rooms and DRZs had been treated as creep closed and healed. Based on this result, the EPA concluded that incorporating the APCS approach in the CRA-2019 PA resulted in conservatively overestimating repository releases as compared with models that included creep closure.

The APCS approach adopted by the DOE for modeling repository design changes that treats empty rooms as not creep closing and uses surrogates for off-axis waste panels is considered by EPA to be a temporary, interim measure that needs to be replaced in future WIPP PA calculations. EPA expects DOE to develop a qualified three-dimensional replacement for the two-dimensional BRAGFLO models for future use in PA calculations and to continue studies of creep closure of empty rooms with and without roof falls for the purpose of informing the CRA-2024 PA as soon as feasible.

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LIST OF ACRONYMS AND ABBREVIATIONS

APCS	Abandonment of Panel Closures in the South
CC	Completeness Comment
CCA	Compliance Certification Application
CFR	*Code of Federal Regulations*
CRA	Compliance Recertification Application
DOE or the Department	U.S. Department of Energy
DPA	Deferred Performance Assessment
DRZ	Disturbed Rock Zone
EPA or the Agency	U.S. Environmental Protection Agency
EXP	Experimental Area
LWA	Land Withdrawal Area
NROR	North Rest-of-Repository
NWP	Nuclear Waste Partners
OPS	Operations Area
PA	Performance Assessment
PAPDB	Performance Assessment Parameter Database
PCS	Panel Closure System
QAP	Quality Assurance Plan
ROM	Run-of-Mine
SNL	Sandia National Laboratories

SROR	South Rest-of-Repository
TRU	Transuranic
TSD	Technical Support Document
WA	Waste Area
WIPP	Waste Isolation Pilot Plant

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1.0 Introduction

The Waste Isolation Pilot Plant (WIPP) repository is being developed by the U.S. Department of Energy (DOE or the Department) for the permanent disposal of transuranic (TRU) waste. The U.S. Environmental Protection Agency (EPA or the Agency) provides regulatory oversight of DOE activities at the WIPP that affect post-closure performance. This Technical Support Document (TSD) describes the Agency's technical review of the APCS approach used by the DOE in its 2019 Compliance Recertification Application (CRA-2019) for analyzing long-term repository performance after waste disposal activities at the WIPP have ceased. An unexpected radionuclide release in the WIPP underground repository in February 2014 resulted in DOE decisions to abandon Waste Panel 9 in the south end of the Waste Area and forego installation of closures in the south end waste panel access drifts. The "APCS approach" is a set of assumptions used by the DOE to modify the CRA-2019 performance assessment (PA) models to accommodate these decisions. The acronym "APCS" stands for *Abandonment of Panel Closures in the South*.

The WIPP repository is located in deeply buried deposits of bedded salt in the Salado Formation within the Delaware Basin in southeastern New Mexico. The EPA regulates post-closure containment of TRU waste at the WIPP in accordance with the radioactive waste disposal standards at Code of Federal Regulations (CFR) Title 40, Parts 191 and 194. The WIPP was first certified by EPA as complying with these standards and approved for TRU waste disposal in 1998. The WIPP Land Withdrawal Act (LWA) is a federal statute requiring the DOE to submit recertification applications at five-year intervals following the first waste shipment in March 1999. The most recent recertification application was submitted in March 2019. The EPA's decision whether to recertify the WIPP is based in part on the results of an assessment of the projected ability of the repository to meet the Agency's numerical waste isolation standards over the 10,000-year post-closure regulatory period.

The ability to meet the Agency's numerical standards is determined by the results of computer modeling conducted for the DOE by Sandia National Laboratories (SNL). That modeling simulates the repository's future performance in a process called Performance Assessment (PA). The most recent assessment was included in DOE's 2019 Compliance Recertification Application (CRA) and is called the CRA-2019 PA (Sosson 2019). The CRA-2019 PA was submitted to the Agency in December 2019. This PA, also called the CRA19 PA or the Deferred PA (DPA), was, by Agency agreement, not submitted at the same time as the recertification application (Veal 2017). The Agency approved this delay to allow the Department to address technical items EPA identified in the 2017 recertification of the WIPP based on the DOE's CRA-2014 submission, and subsequently to update the numerical models used to simulate repository performance. While DOE submitted documentation for the 2019 recertification application in March 2019, the CRA-2019 PA was not yet complete at the time the DOE's 2019 recertification application was submitted and that application referred to the Agency-approved CRA-2014 PA on an interim basis as the current baseline PA. Upon completion, the deferred CRA-2019 PA superseded the CRA-2014 PA and was regarded by the Agency as the DOE's formal, updated demonstration of continuing compliance with EPA's numerical performance requirements.

Background information on events leading up to the need to modify the CRA-2019 performance assessment (PA) models to accommodate abandonment of the southern half of the WIPP waste area is provided in Section 2 of this TSD. Section 3 describes the APCS modifications made by SNL to the PA models for the DOE's CRA-2019 submittal and Section 4 describes the Agency's evaluation of those modifications. The Agency's evaluation included a detailed sensitivity study of the impacts of the DOE's APCS model modifications on calculated repository releases and a determination of whether those modifications resulted in non-conservative overestimates of long-term repository performance. Documentation of the Agency's sensitivity study and the compliance of that study with the requirements of EPA's Quality Assurance Program Plan (QAPP) are presented in Appendix COMP.

2.0 Background

On February 5, 2014, a diesel salt haul truck caught on fire in the WIPP underground and the facility was evacuated due to the resulting smoke (DOE 2014a). Nine days later on February 14 an exothermic reaction occurred in a waste drum that had recently been emplaced in Room 7 of Panel 7 resulting in rapid pressure buildup and a breach of the drum (DOE 2014b). The working status of the WIPP waste panels as of February 2014 is shown in Figure 2.1. Radioactive dust blown from the drum was entrained in the ventilation system air and was dispersed down gradient into the southern half of the repository's Waste Area and back to the exhaust ventilation shaft. Dust particles that settled out in transit contaminated the walls, floors, and roofs of the drifts along this flow path. A map showing access restrictions in the WIPP underground due to radionuclide contamination is presented in Figure 2.2. Fortunately, normal underground operations had not yet resumed following the fire and there were no personnel in the underground at the time of the release (DOE 2014b, Section 2.1).

WIPP resumed waste emplacement operations in January 2017, nearly three years after the underground vehicle fire and radiological release. Routine inspection and ground control maintenance of repository excavations in the contaminated areas were suspended following the release due to worker safety concerns and the rock bolts and wire mesh used to maintain room stability could not be monitored or replaced. As a result, the underground entries became increasingly unstable and rock falls occurred in the roofs of several drifts. Panel 9 provided access to Panels 3, 4, 5, and 6 at the south end of the Waste Area and was planned to be filled with waste after the access drifts to those panels had been sealed. Because of the contamination and increasing instability, the DOE obtained EPA approval to abandon waste Panel 9 and seal the drifts between Panels 9 and 10 with run-of-mine (ROM) crushed salt. No closures would be installed in the access drifts to Panels 3, 4, 5, and 6 but the closures for Panels 1, 2, 7, and 8 to the north would be installed as originally planned. The locations of the waste panels and the remaining ROM salt panel closures are shown in Figure 2.3.

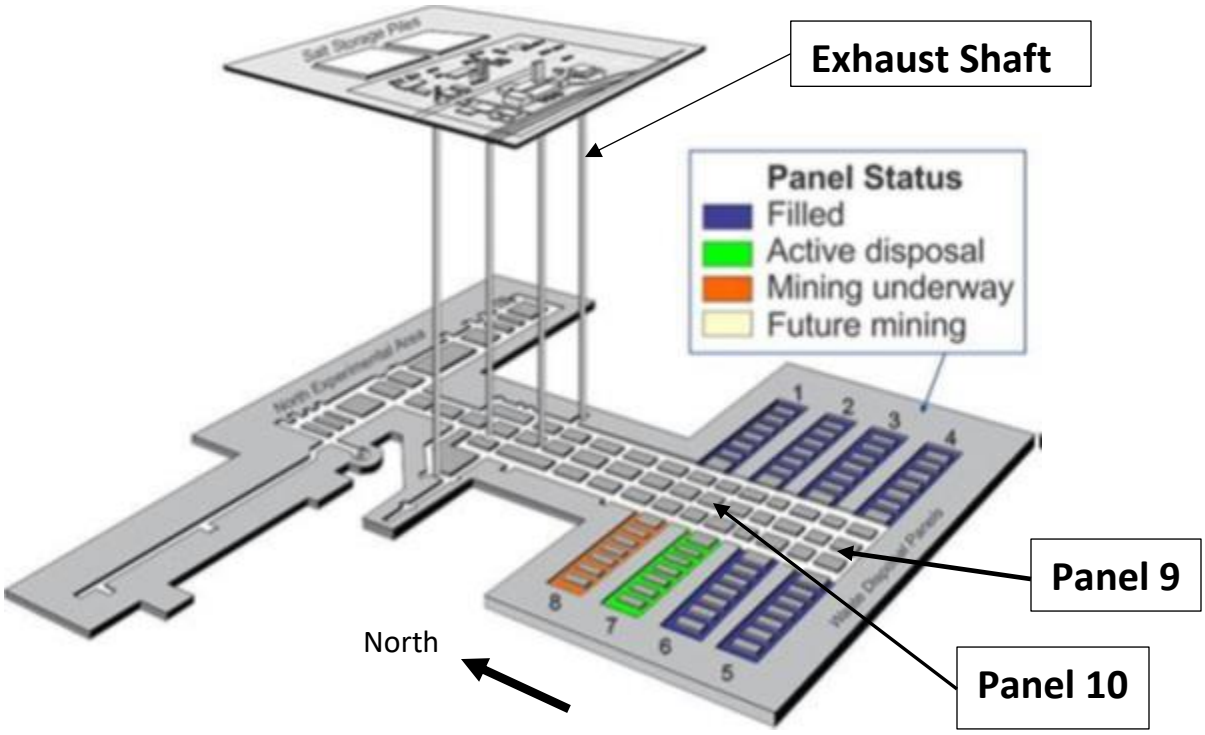

Figure 2.1. Waste panel status as of February 2014. (modified from DOE 2014b, Figure 5)

As shown in Figure 2.3, the only access to Panels 3, 4, 5, and 6 was through Panel 9. These panels had been previously filled with waste and were awaiting final sealing. Prior to the accidental radionuclide release, the DOE had planned to seal the access drifts to these panels with ROM salt and then fill Panel 9 with waste before sealing the drifts between Panels 9 and 10. The DOE proposed to replace the disposal volume lost by the abandonment of Panel 9 by excavating a new waste panel of equivalent volume at an undetermined location to the northwest of the original waste area. This design change raised the immediate need to adapt the existing PA models to the new design in time for the 2019 recertification. This was accomplished by using what the DOE has called the APCS approach.

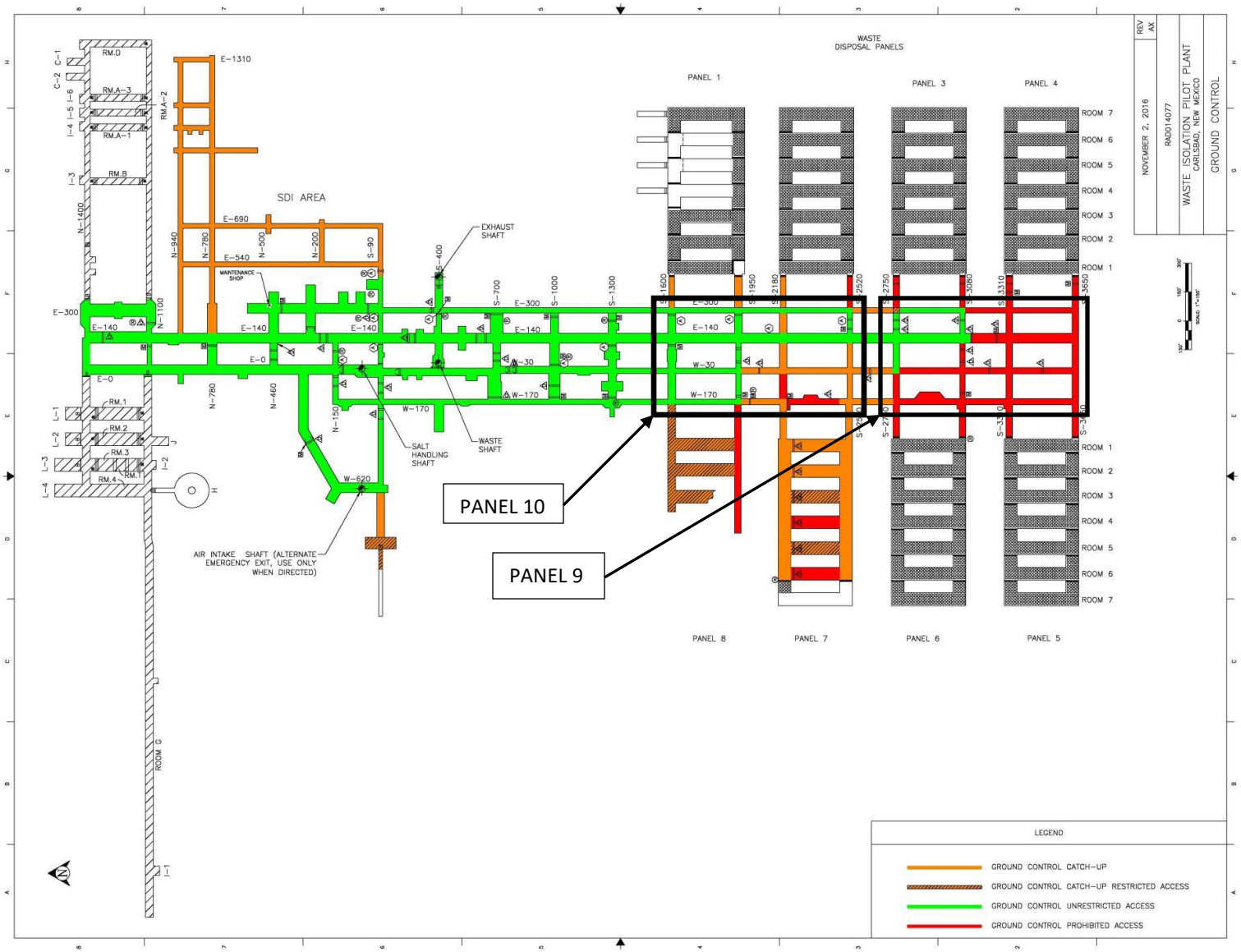

Figure 2.2. Plan view showing access restrictions in the WIPP underground as of November 2016 due to radionuclide contamination. (modified from DOE-NWP 2016, Enclosure 1)

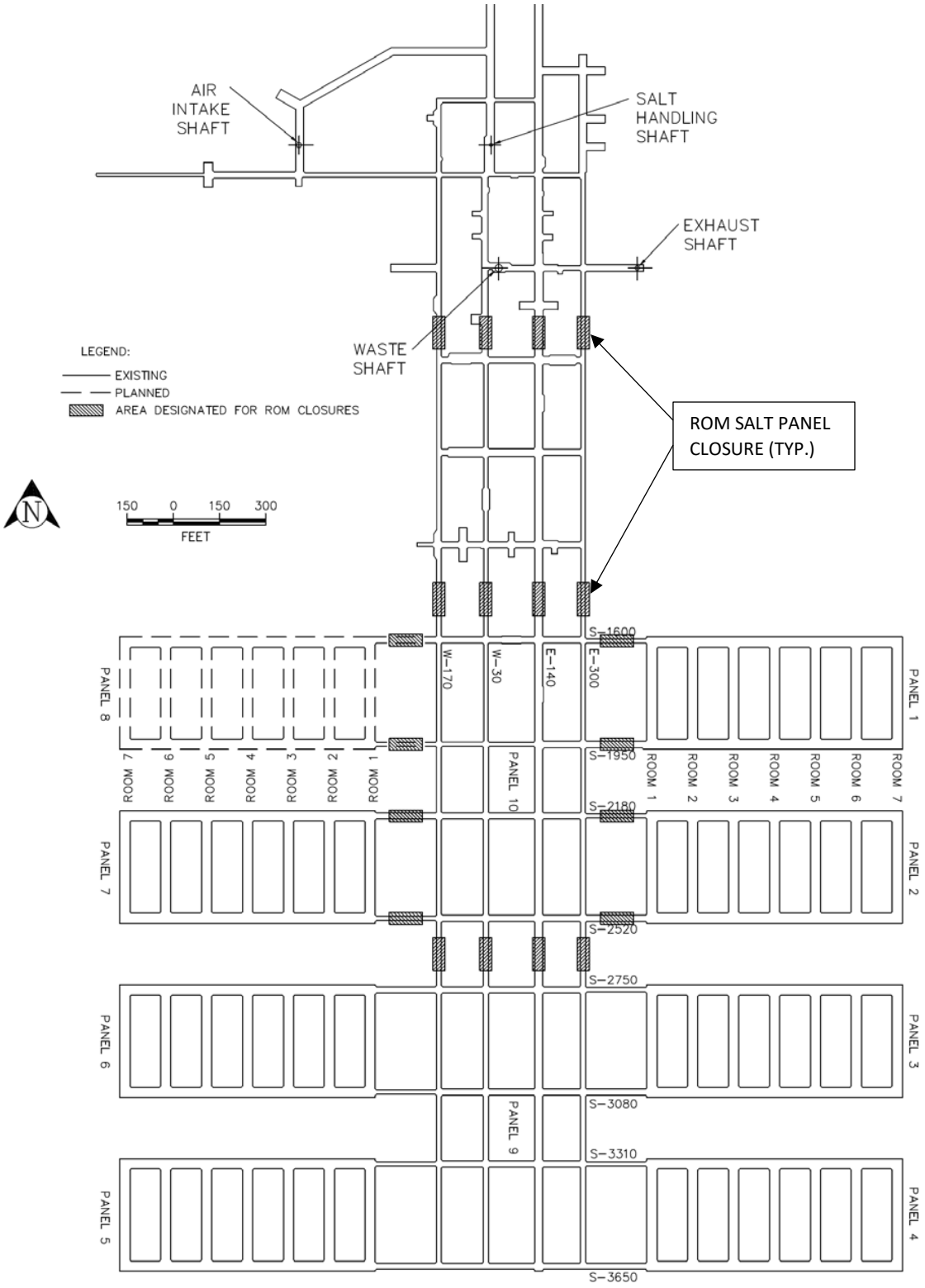

Figure 2.3. Plan view of the WIPP Waste Area showing planned ROM salt panel closure emplacement locations. (modified from DOE 2019, Appendix PA, Figure PA-1)

3.0 The APCS Approach

The following summary of DOE's APCS approach was taken from Zeitler et al. (2017). The repository design changes required determining how the existing PA model structure could be adapted to model the access drifts in waste Panels 3, 4, 5, and 6 without ROM salt closures, and also how to model the old Panel 9 as abandoned and replaced with a new Panel 9 at an undetermined location. In addition to these changes, at the EPA's request, the DOE also incorporated the model changes in an earlier sensitivity study called CRA14_SEN4 that was conducted during the Agency's review of the DOE's CRA-2014 PA (EPA 2017).

3.1 Modeling Waste Panel Access Drifts without ROM Salt Closures

Treatment of Panel Closures in WIPP PA. Panel closures are represented in the computational grids used by the BRAGFLO code. The BRAGFLO Salado Flow computational grid used in the APCS approach is shown in Figure 3.1. BRAGFLO calculates subsurface brine/gas flow in the repository and surrounding area over the 10,000-year regulatory period using a two-dimensional, "flared" vertical cross section representation of the repository and surrounding area. In this grid, Panel 5 is represented by the "Waste Panel" (WP) on the left (south) side of the repository area, Panels 3, 4, 6, and 9 are represented by the "south rest-of-repository" (SROR), and Panels 1, 2, 7, 8, and 10 are represented by the "north rest-of-repository" (NROR). There are also three panel closure areas (PCS): the "southernmost" PCS representation is between the WP and SROR, the "middle" PCS representation is between the SROR and NROR, and the "northernmost" PCS representation is between the NROR and the Operations (OPS) Area. The southernmost panel closure represents a single set of two panel closures (one for each panel access drift) for Panel 5, the middle panel closure represents the four closures in the drifts between Panels 9 and 10, and the northernmost panel closure represents the eight closures in the drifts between Panel 10 and the OPS area.

The closures between the WP and the SROR are the only panel closures explicitly represented in the BRAGFLO Salado Flow grid. Intrusions into the WP are explicitly modeled and used to represent intrusions into other panels. The closure between the WP and the SROR (now removed) is therefore treated in WIPP PA as a proxy for panel closures between any two adjacent panels. Similarly, the combined closures between the SROR and the NROR are treated in WIPP PA as proxies for panel closures between any two non-adjacent panels.

A different grid, called the BRAGFLO_DBR grid, is used for BRAGFLO direct brine release (DBR) calculations. An illustration of this grid is shown in Figure 3.2. The DBR grid represents a two-dimensional plan view of the individual waste panels and panel closures. Repository conditions, such as brine saturation and pressure, at the time of a borehole intrusion are mapped from the BRAGFLO Salado Flow grid to the DBR grid. The DBR grid is then used to calculate the flow of brine between the repository and the ground surface. The individual ROM salt waste panel closures that remain unchanged are shown in grey and those that were removed in the repository redesign are shown in reddish orange in Figure 3.2.

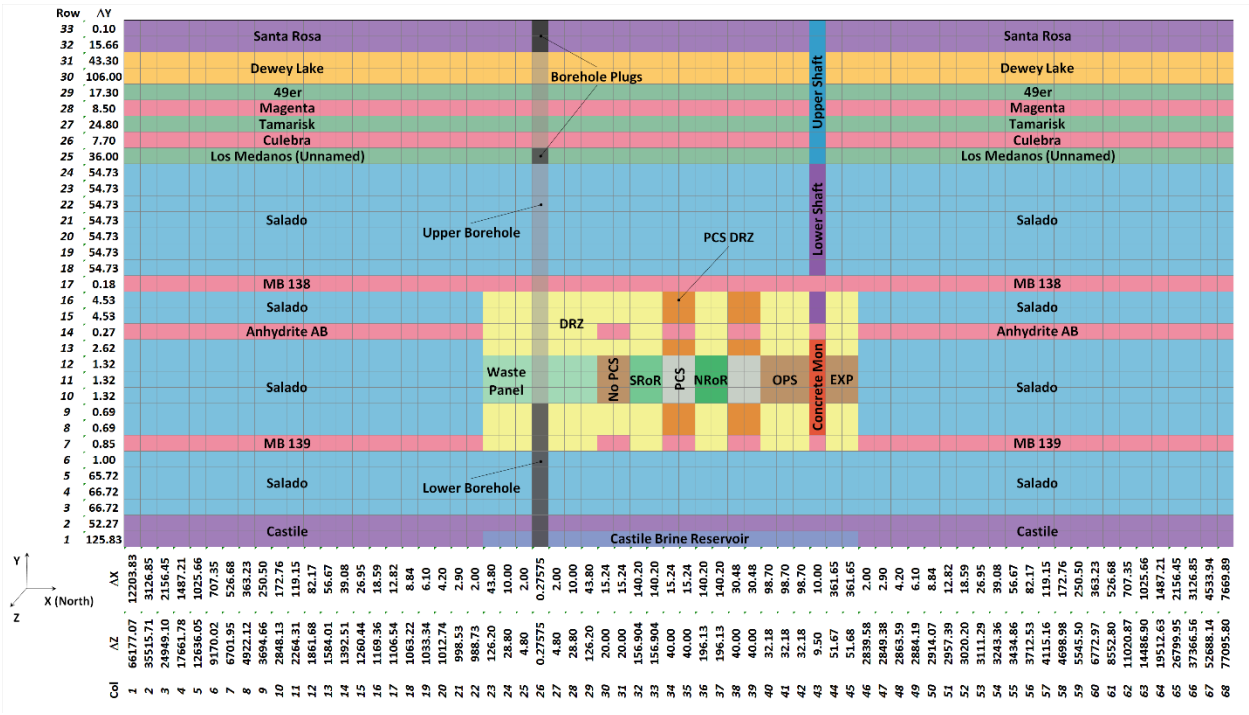

Figure 3.1. BRAGFLO two-dimensional grid used in the APCS approach.
(from Zeitler et al. 2017, Figure 2-1)

Assignment of Physical Properties to Open Waste Panel Closures. Zeitler et al. (2017, Section 2.2.2) identifies ROM salt waste panel closures that have been removed from the model as "open panel closures" and relates them to other "open areas" in the WIPP underground that are not planned to be backfilled with waste or ROM salt. These other open areas include the WIPP Operations (OPS) and Experimental (EXP) Areas. Although these empty rooms are expected to close naturally and approach the very low porosity and permeability of intact Salado halite within a few hundred years by salt creep, in the APCS approach the DOE has chosen to model the open panel closures as having the same constant, relatively high, porosity and permeability over the 10,000-year regulatory period as have previously been assigned to the Operations and Experimental Areas. Although this treatment is not consistent with the actual behavior of deeply buried salt, it was limited to the Operations and Experimental Areas in earlier PAs and was accepted by EPA because it was considered conservative and would ease the computational burden of the PA models. The DOE justified extending this treatment to open panel closures within the WIPP Waste Area in the CRA-2019 PA because "…it is shown to be conservative with respect to releases, and … the properties used for the OPS/EXP areas are the only analogues for open areas used in WIPP PA." (Zeitler et al. 2017, Section 2.2.2). Additionally, in the APCS approach, the DRZs above and below the open panel closures were assumed to have the same properties as the DRZs above and below the Operations and Experimental Areas.

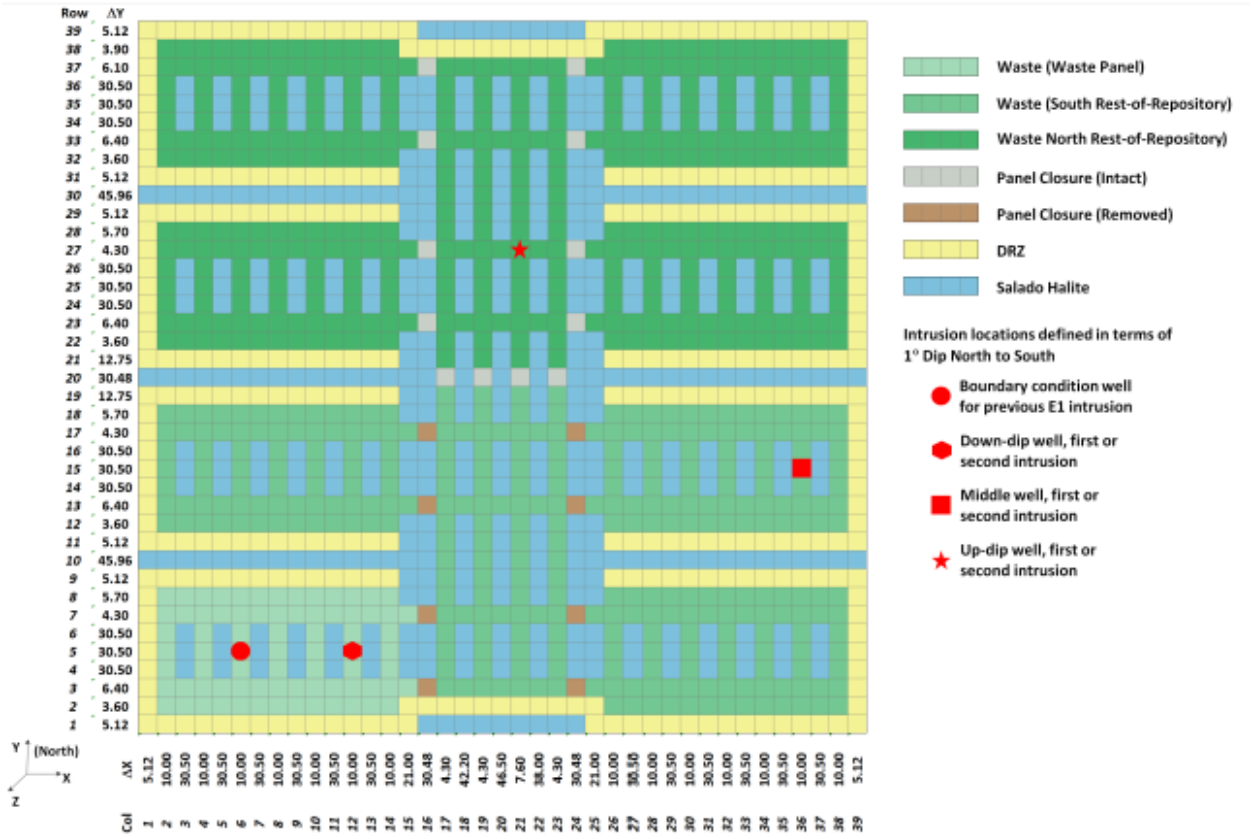

Figure 3.2. BRAGFLO_DBR grid used in the APCS approach.
(from Zeitler et al. 2017, Figure 2-2.)

Removal of panel closures in the repository design coupled with the assumption that the resulting open areas do not creep close eliminates the isolation of waste panels provided by the ROM salt backfill as well as the natural isolation provided by salt creep. As previously noted, the abandoned panel closures were instead simulated in the APCS analysis as filled with a relatively high permeability and porosity material. From a modeling perspective, this simulation allows faster equilibration of pressure between panels and relatively unimpeded flow of the brine that may enter the repository in small amounts over time from the surrounding halite or in relatively large amounts due to inadvertent drilling intrusions of brine reservoirs in the underlying Castile Formation. The faster equilibration of pressure and flow of brine result in conservatively higher calculated releases. In the APCS approach, additional conservatism is provided by the assumption that single ROM salt closures, such as those between Panels 9 and 10 in the BRAGFLO Salado Flow model grid, have no isolation effect.

Treatment of Waste Panel Neighbor Relationships. It can be seen from the foregoing discussion that waste panels classified as “adjacent” are treated differently in WIPP PA from panels classified as “non-adjacent.” In classifying individual panels, the DOE identifies adjacent panels as “neighbors” and non-adjacent panels as “non-neighbors.” Neighboring and non-neighboring panels can be identified arbitrarily and are not necessarily tied to the physical locations of panels or the presence of panel closures in the repository design.

Neighbor relationships among waste panels are defined in the CCDFGF code rather than in the BRAGFLO codes. These relationships as defined for the APCS approach are described in Zeitler et al. (2017, Section 2.2.4 and Table 2-5). The effect of the assigned relationships is to treat closures for Panels 3, 4, 5, and 6 as not existing in conformance with the removal of closures for these panels in the revised repository design. However, the assignments also consider all panels separated by only single sets of panel closures as neighbors, such as Panels 9 and 10, thereby treating those ROM salt closures as having no isolation effect even though they are present in the revised design. The DOE explains that single sets of ROM salt panel closures were assumed to have no effect in order to increase calculated repository releases and thereby increase the conservatism of the APCS approach. As will be seen in the following discussion, this increased conservatism is intended by DOE to compensate for non-conservative aspects of the treatment of abandoning Panel 9.

3.2 Modeling Abandonment of Waste Panel 9

The DOE has concluded that the current repository conceptual model and the two-dimensional BRAGFLO PA code were incapable of directly handling the complexity introduced by removing waste from Panel 9 and relocating the waste to a new panel in the northwest (Zeitler et al. 2017, Section 2.3). This conclusion was reached in large part because the new Panel 9 would be located well outside the two-dimensional plane of the BRAGFLO Salado Flow model as well as outside the domain of the BRAGFLO_DBR model. Instead, the DOE proposed as part of the APCS approach to continue to model waste within the existing Panel 9 in lieu of adding a new waste panel to the northwest and to demonstrate that such an approach conservatively overestimates repository releases.

Conservative and non-conservative aspects of treating the waste as remaining in the abandoned Panel 9 were discussed by Zeitler et al (2017, Section 2.3). A conservative aspect is the increased brine accumulation and gas generation due to gravity drainage from the 1-degree southerly dip in the Salado Formation that would occur in the abandoned Panel 9 but would not occur in the replacement Panel 9. However, a non-conservative aspect is that recovery of the lost disposal capacity in a replacement panel would increase calculated repository releases from borehole penetrations due to an approximately 10% increase in the probability that a borehole would randomly intersect a waste panel (Zeitler et al. 2017, Section 2.3). This increase is due to an approximately 10% increase in waste footprint area and would result in increased calculated releases because contaminated brine would still be present in the abandoned Panel 9 due to radionuclide migration from the four surrounding waste panels with open panel closures.

Zeitler et al (2017, Section 2.3) concluded that the overall conservatism in the APCS approach from ignoring creep closure of open panel closures and ignoring the isolation effects of existing panel closures through the definition of “neighbors” would more than compensate for the non-conservatism in the APCS approach of ignoring the existence of a replacement Panel 9. The DOE’s expectation that this approach would result in a conservatively high estimate of radionuclide releases was confirmed by the results of a performance analysis documented in Zeitler et al. (2017, Section 5 and Appendix A).

3.3 Additional Analyses

In addition to proposing to implement the APCS methodology in the CRA-2019 PA, the DOE proposed to demonstrate the conservatism of the APCS approach by running a parallel PA model that treated all panel access drifts without constructed closures as immediately creep closing and assuming the porosity and permeability properties of intact halite upon repository closure; to develop a qualified three-dimensional replacement for the two-dimensional BRAGFLO models for future use in PA calculations; and to perform numerical and laboratory studies of creep closure of empty rooms with and without roof falls for the purpose of informing the CRA-2024 PA. The first of these activities was accomplished in 2019 with development of DOE's CRA19_CL model and is further described below. The second activity is to be accomplished by developing a fully qualified, three-dimensional model of the redesigned repository based on the PFLOTRAN code. A summary description of that code is presented in Attachment PFLOTRAN. The third activity includes updating the WIPP constitutive model for intact salt, reviewing the mechanical behavior of bedding plane interfaces, and microstructural investigations of natural and laboratory-tested salt. These activities are currently in progress.

3.4 DOE Summary Conclusions

In summary, the DOE concluded that the APCS approach allowed the WIPP repository design changes prompted by the accidental radionuclide contamination and the subsequent inability to maintain normal ground control to be adequately addressed within the currently approved PA modeling framework. Although the application of this approach resulted in increases in the calculated total releases from the repository, those releases remained below regulatory limits.

4.0 EPA Evaluation of the APCS Approach

The methodology and scope of the APCS approach were first presented to EPA in an EPA/DOE Technical Exchange Meeting in December 2017. Discussions of the implications of the approach as implemented in a WIPP PA continued in subsequent meetings and focused on the inherent assumptions and consideration of those assumptions as providing a potentially bounding analysis. Consideration of bounding analyses is important to EPA because the calculated releases must be less than the regulatory release limits and there must be a high degree of assurance that actual releases are unlikely to be greater than the calculated releases. Discussions with the DOE focused on a demonstration that the assumptions in the APCS approach, although not physically realistic, would indeed result in calculated releases that were conservatively greater than if creep closure of the open areas was modeled. Also of Agency concern were the need to develop a replacement for the BRAGFLO Salado Flow model that was capable of directly modeling a replacement for the abandoned Panel 9 and the need to develop a viable approach for treating repository open areas as progressively creep closing. Additional information was requested by the Agency in the form of Completeness Comments to the DOE during the CRA-2019 review to better understand the APCS approach. These comments are documented in Appendix CC to this TSD, along with the DOE's responses and the Agency's evaluations of those responses.

In order to demonstrate the conservatism of the APCS approach, the DOE prepared the separate CRA19_CL analysis showing that repository releases calculated using the APCS use of constant,

relatively high porosity and permeability for open panel closures was conservatively greater than releases that would be calculated if creep closure of those drifts were modeled. This analysis was documented in Zeitler et al. (2019, Appendix A). The CRA19_CL was a separate, qualified analysis where the only differences from the CRA-2019 PA analysis (abbreviated as the CRA19 analysis) were that the open areas in the CRA-2019 PA analysis (the Operations, Experimental, and open panel closure areas) were treated as immediately creep closed at the time of repository closure and panel neighbor relationships were changed to reflect creep closure. Creep closure was approximated by assigning the very low porosity and permeability properties of intact Salado halite to these open areas for the entire 10,000-year simulation time. A complete and fully qualified PA was run by DOE for the CRA19_CL analysis.

Average total repository releases for the CRA19_CL analysis are compared with those for the CRA19 and CRA14 PA analyses in Figure 4.1. The figure shows a significant decrease in total releases between the CRA19 and the CRA19_CL analyses. Table 4.1 provides a comparison of average total releases at the two EPA compliance points. The assumption that all waste panels are isolated by intact halite closures for the entire 10,000-year regulatory period resulted in a 17% decrease in calculated releases at the upper compliance point and a 47% decrease at the lower compliance point. Although these results support a conclusion that ignoring creep closure of open areas in the APCS approach conservatively leads to increases in calculated repository releases, the EPA observed that the CRA19_CL analysis did not simultaneously decrease the porosity and permeability of the disturbed rock zones (DRZs) surrounding those open areas.

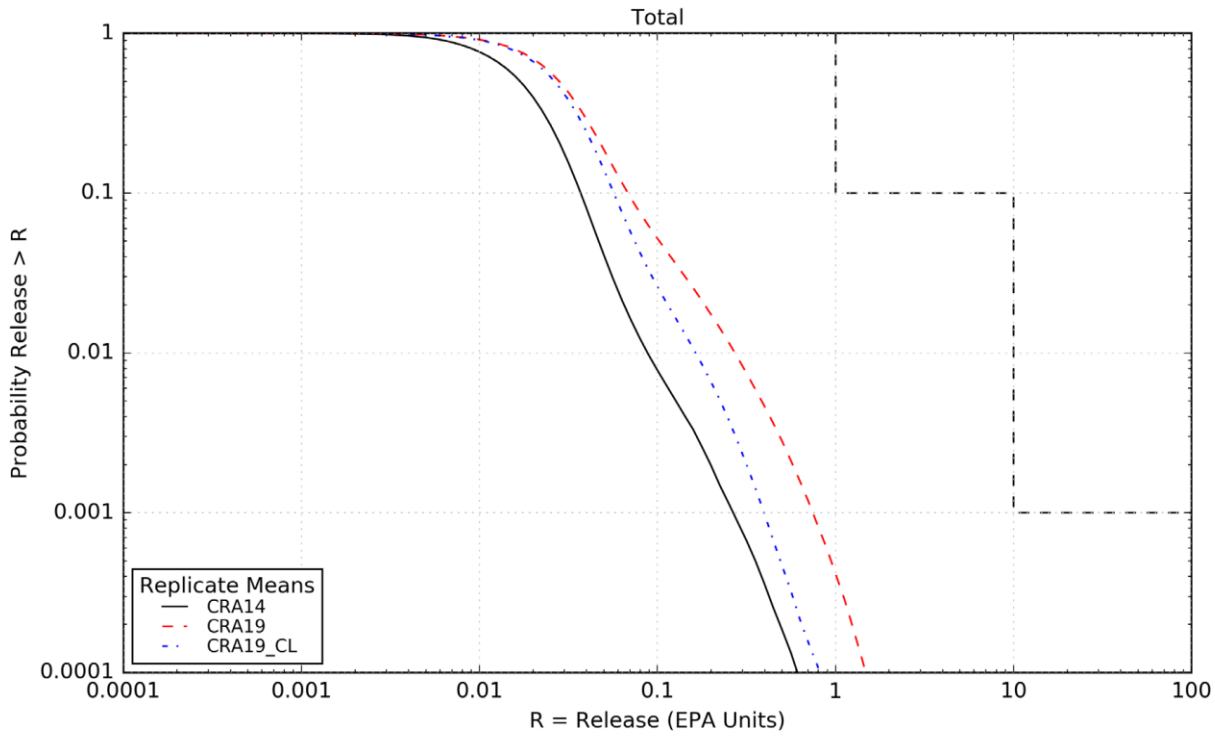

Figure 4.1. Mean total releases for the DOE CRA14, CRA19, and CRA19_CL analyses. (from Zeitler et al. 2019, Figure 83)

Table 4.1. Comparison of Mean Total Releases at EPA Compliance Points for the CRA14, CRA19, and CRA19_CL Analyses

Probability	Mean Total Release (EPA Units)			Decrease in Mean Total Release from CRA19 to CRA19_CL	EPA Release Limit (EPA Units)
	CRA14	CRA19	CRA19_CL		
0.1	0.03725	0.06853	0.05696	17%	1.0
0.001	0.2677	0.7505	0.3974	47%	10.0

The presence of a higher porosity and permeability zone of disturbed Salado halite around the excavated repository drifts has always been incorporated in WIPP performance modeling. The disturbed rock is expected to consolidate and approach the properties of intact halite as the repository drifts creep close over a time period of a few hundred years. Because this additional source of waste panel isolation was not included in the DOE's CRA19_CL analysis, the EPA prepared a supplemental analysis that augmented the CRA19_CL analysis by including the creep closure of the surrounding DRZs. The EPA's supplemental analysis is called the CRA19_COMP analysis.

The CRA19_COMP analysis was prepared by modifying the DOE's CRA19_CL analysis to assign the properties of intact Salado halite to the DRZs surrounding the Operations, Experimental, and open panel closure areas for the entire 10,000-year simulation time. The reassigned panel neighbor relationships in the CRA19_CL analysis remained appropriate for the CRA19_COMP analysis and were left unchanged. A complete PA consisting of 3 replicates of 100 vectors each was again run. The CRA19_COMP analysis was fully qualified under the Agency's QAPP, allowing the results to be used in supporting regulatory decisions. A detailed description of the EPA's CRA19_COMP analysis and documentation of compliance with the requirements of EPA's QAPP are provided in Appendix COMP in this TSD. A copy of the EPA's QAPP is archived in Docket EPA-HQ-OAR-2019-0534.

The mean total releases from the Agency's CRA19_COMP analysis are compared with those of the CRA19 and CRA19_CL analyses in Figure 4.2 and Table 4.2. The figure shows a relatively small incremental decrease in total releases between the CRA19_CL and the CRA19_COMP analyses. Table 4.2 provides a comparison of average total releases at the two EPA compliance points for the CRA19, the CRA19_CL, and the CRA19_COMP analyses. As compared with the CRA19 PA, including the healing of the DRZ in the analysis resulted in a 20% reduction in average total releases at the upper compliance point and a 53% reduction at the lower compliance point. These reductions are significant. They adequately compensate for an approximately 10% increase in repository footprint due to the replacement Panel 9 and at the same time confirm that the APCS treatment of open areas leads to conservative overestimates of repository releases.

Although cuttings and cavings, spallings, and releases from the Culebra were either unaffected or only slightly affected by the creep closure and healing of the open waste panel closures and surrounding DRZs, the DBRs decreased by over an order of magnitude as compared with the

CRA19 and CRA19_CL analysis results. As shown in Figure 4.3, spallings replaced DBRs as the dominant pathway for lower probability but higher consequence releases in the CRA19_COMP results, followed by cuttings and cavings and releases from the Culebra. Due to the increased isolation of the waste panels, the DBR pathway that was once the most significant contributor to lower probability releases became the least significant pathway in the CRA19_COMP analysis. Although the magnitude of the impact on the DBR pathway would be reduced by modeling progressive rather than instantaneous creep closure, these results illustrate the effect of different representations of physical processes in WIPP PA.

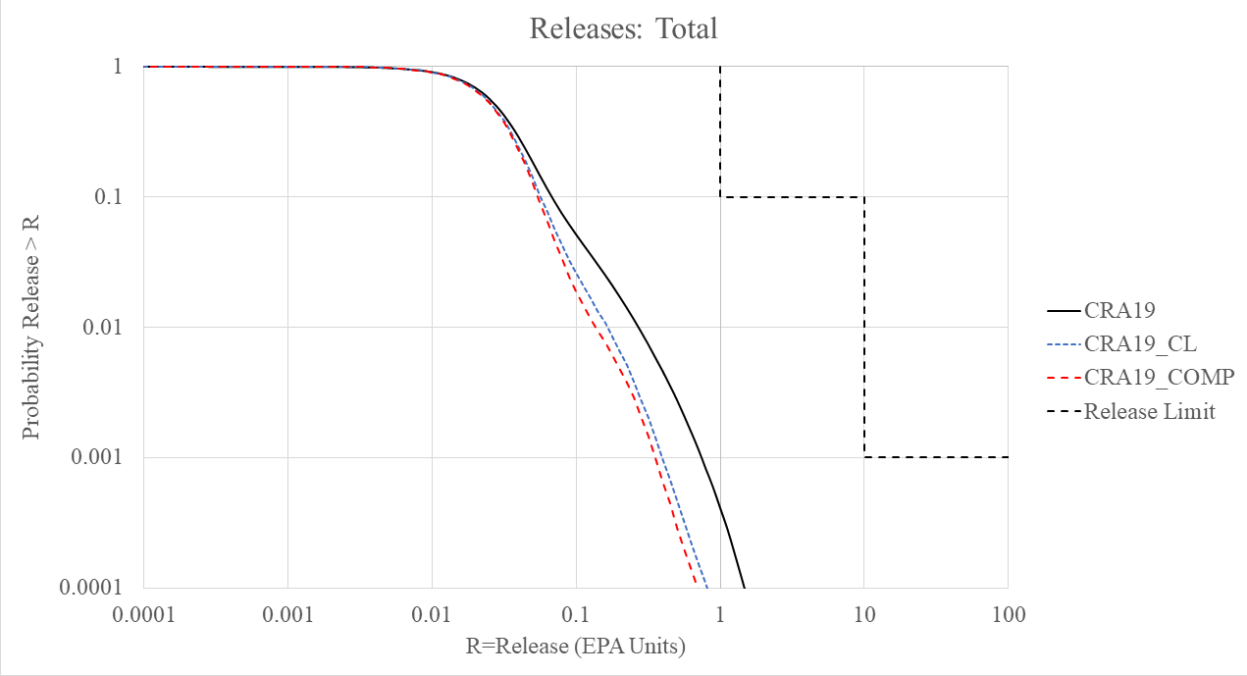

Figure 4.2. Mean total releases for the CRA19, CRA19_CL, and CRA19_COMP analyses.

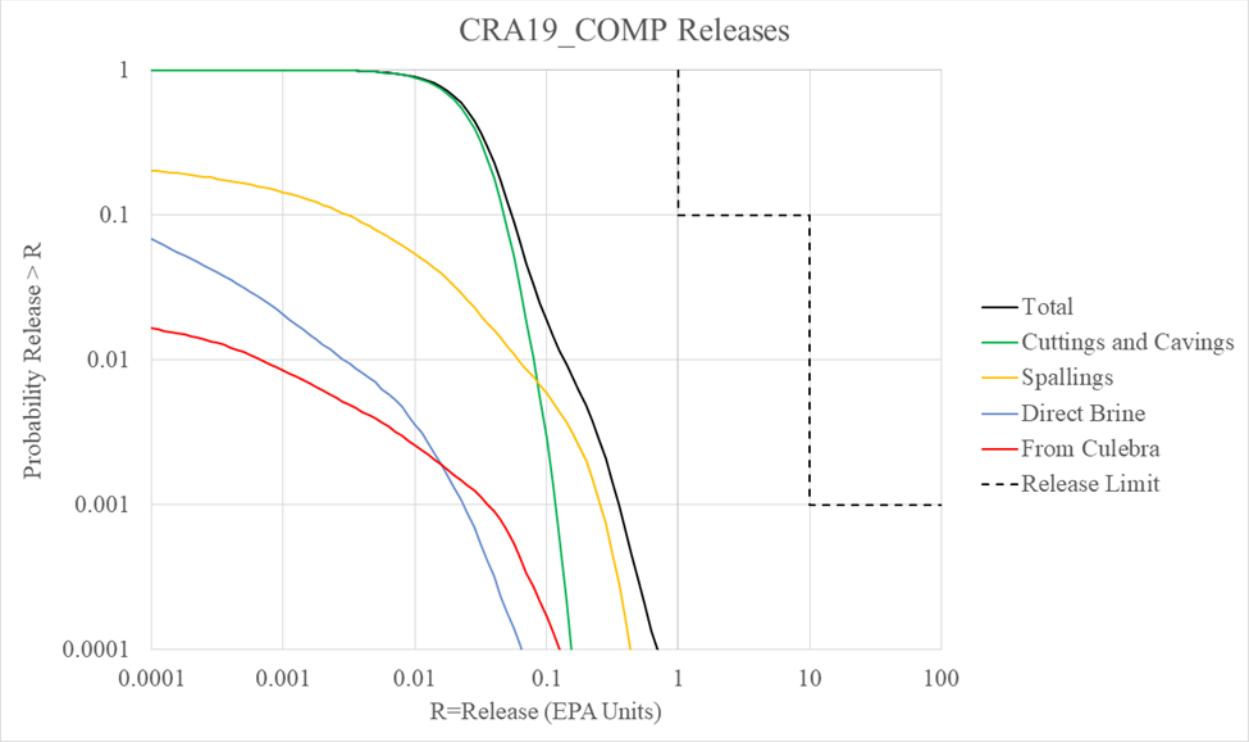

Figure 4.3. Mean component and total releases for the CRA19_COMP analysis.

Table 4.2. Comparison of Mean Total Releases at EPA Compliance Points for the CRA19, CRA19_CL, and CRA19_COMP Analyses

Probability	Mean Total Release (EPA Units)			Decrease in Mean Total Release from CRA19 to CRA19_COMP	EPA Release Limit (EPA Units)
	CRA19	CRA19_CL	CRA19_COMP		
0.1	0.06853	0.05696	0.05470	20%	1.0
0.001	0.7505	0.3974	0.3536	53%	10.0

WIPP excavations do not creep close immediately after ground control maintenance ends. Although initial closure may occur within a few decades, final healing to approach the properties of intact halite may take several hundred years. WIPP ground control maintenance ends when waste panels are filled and in open areas that are abandoned. WIPP PA assumes that future exploratory drilling at the WIPP site will only begin after a 100-year period of institutional control following repository closure, so parts of the facility that are already filled or abandoned will have been creep closing for more than 100 years before borehole intrusions begin. However, effective isolation for other parts of the facility that are not yet filled or abandoned may not be complete at the time borehole drilling is assumed to begin. The Agency expects that if the uncertainty related to the extent of creep closure is taken into account, the calculated releases would be higher than those estimated in the CRA19_COMP analysis but they would be lower than those estimated in the CRA19 analysis. The EPA, therefore, concludes that the results of the CRA19_COMP analysis continue to support the conclusion that ignoring creep closure of open areas in the APCS approach leads to conservatively overestimating calculated repository releases as compared with models that include creep closure.

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Appendix CC

EPA Completeness Comments, DOE Responses, and EPA Evaluations of Responses Related to Use of the APCS Approach in WIPP Performance Assessment

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Table 1. Summary Table of Completeness Comments and DOE Responses in this TSD related to the APCS Approach in WIPP PA

Question	Topic	DOE Response Set	Evaluation/Resolution	Documentation/ Discussion in TSD
Section 34: Results of Performance Assessments Completeness Comments				
CC1-34-6	rock mechanics studies update	#1 (6/10/20)	satisfactory; DOE committed to future technical exchange	Sec 3.4; Appendix CC
CC2-34-10	Clarification of "Neighbor" Relationships in the CRA19_CL Analysis	#3 (8/13/20)	satisfactory	Sec 3.1 & 2; Appendix CC
CC2-34-11	Results of Granular Salt Reconsolidation Study	#4 (9/15/20)	satisfactory; DOE committed to future technical exchange	Sec 3.4; Appendix CC
Other completeness comments				
CC3-GEN-3	CRA-2019 (Deferred) PA a Bounding Analysis	#6 (10/26/20)	satisfactory, DOE provided explanation	Appendix CC

CC1-34-6: Results of Salt Rock Mechanics Studies Updates

40 CFR §194.34 Results of Performance Assessments

EPA Question (from EPA Completeness Comment Package 1)

Please provide updates describing the current status of the following studies, their findings and conclusions to date, and a schedule of their completion with special emphasis on the mechanics of creep closure of open areas accompanied by roof falls:

Update of the WIPP Constitutive Model for Intact Salt (AP-179)

Reconsideration of the WIPP Geomechanical Model for Room Closure (AP-178)

Mechanical Behavior of Bedding Plane Interfaces (TP 17-03)

Experimental Investigation of Small Scale Openings in WIPP Salt (TP 17-02)

DOE's justification of the use of "open area" parameters when modeling the Waste Area in the APCS analysis was based in part on the conclusion that an understanding of the mechanics of open area creep closure accompanied by roof falls is limited and could not be adequately supported for use in PA. To remedy this, the DOE proposed to conduct the above analytical and laboratory studies of the creep closure process.

DOE Response (from DOE Response Package 1 (DOE RP1 2020))

This completeness question requests an update for ongoing technical research. Past Compliance Recertification Applications (CRAs) generally do not report the status of ongoing research because partial results may be premature or misleading. The Department of Energy (DOE) recommends that this update not be considered as part of CRA-2019 completeness. DOE is willing to discuss research progress during a videoconference or webex meeting, at a future date.

EPA Evaluation of Response

The DOE response was satisfactory. The EPA acknowledges that this question was forward-looking and that the results of DOE's investigations will not be needed until submittal of the CRA-2024. DOE's request to respond in a technical discussion was accepted. However, the DOE subsequently provided a written overview of the status of these investigations by the principal investigators, which is reproduced below. In addition to summarizing current status, the letter emphasizes the complexity of modeling roof collapse, reconsolidation, and porosity-permeability relationships. The EPA is aware of this complexity and believes the DOE has misunderstood the Agency's intent. Many important but complex processes have been successfully addressed in WIPP PA by making simplifying assumptions and incorporating stochastic uncertainty to help assure that predicted repository releases are not underestimated and the EPA is expecting this same type of approach to be applied to roof falls.

It is known that roof falls occur and the key questions are: how likely are they to occur; to what degree can consolidation and healing be expected in empty rooms with roof falls at the time postclosure borehole drilling begins; and what porosity and permeability characteristics can be

expected in such rooms during the period of active drilling. We do not expect forward modeling of a roof collapse nor do we expect rigorous correlation of porosity and permeability. We do expect the DOE to conservatively model creep closure of empty rooms with and without roof falls in the CRA-2024 PA, particularly empty rooms within the repository Waste Area. Alternative conceptual approaches to addressing the different aspects of roof falls are documented in the TSD to which this Completeness Comment is appended and in the Agency's 2017 TSD *Technical Review of Salt Aggregate, Disturbed Rock Zone, and Open Drift Healing Characteristics* (EPA-HQ-OAR-2014-0609-053). The DOE is urged to take full advantage of existing channels of communication with the Agency to help avoid misunderstanding and assure that mutual objectives are met.

SAND2020-5269 CTF

Sandia National Laboratories

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subject: Status of Waste Isolation Pilot Plant Rock Mechanics Research

The Environmental Protection Agency (EPA) recently inquired about the status of several ongoing Waste Isolation Pilot Plant (WIPP) rock mechanics research projects at Sandia National Laboratories. In particular, the EPA requested updates on the constitutive model for intact salt, the behavior of bedding plane interfaces, room collapse and reconsolidation, and microstructural investigations of granular salt. We have prepared the following short summary as a response.

The updates to the intact salt constitutive model were broken into two stages in Reedlunn (2017). The first stage was prompted by a 3.5X under-prediction of Room D's vertical closure rate at 7.8 years using a laboratory-based Munson-Dawson (M-D) model calibration (Reedlunn (2016) and Reedlunn (2018a)). In response, Reedlunn (2018b) enhanced the M-D model with a new equivalent stress measure, a more robust numerical implementation, and added the recently established creep behavior at low stresses (<8 MPa). The enhanced M-D model substantially reduced the Room D vertical closure rate under-prediction to 1.3X at 7.8 years (Reedlunn (2018a)). Simulations of Rooms G and Q closure produced similar degrees of agreement. The second stage aims to add damage and healing to the salt constitutive model. Our German collaborators recently characterized WIPP salt's damage and damage-free behavior over a range of temperatures, strain rates, and confining pressures using constant strain rate tests. The M-D model, however, is unable to capture the damage-free behavior during these constant strain rate tests without violating the prior calibration against constant stress (creep) tests on the same WIPP salt. We are, therefore, considering alternative model formulations that are better suited to capturing damage-free constant strain rate and constant stress tests with a single model calibration. We hope to have such a model developed by the end of Fiscal Year 2020 (FY20). Once the damage-free responses are reasonably modeled, we can incorporate damage and healing during FY21.

One of the larger unknowns in the Room D simulations, and in all room closure simulations, is the behavior of the bedding plane interfaces (Sobolik (2017)), which have not been experimentally characterized until recently. As discussed in Sobolik (2019), the first bedding

plane interface cores were extracted from a salt-potash mine near the WIPP facility, prepared into specimens, and tested under direct shear by RESPEC. The interfaces were salt/polyhalite, salt/anhydrite, salt/clay/salt (clay seams), and pure salt. Regardless of the interface type, the specimens broke like solid rock and reasonably conformed to Mohr-Coulomb behavior. Although the clay seams were expected to be the weakest interfaces, based on in-situ observations at the WIPP, the clay seam residual shear stresses were similar to the pure salt. Numerous salt crystals were found spanning the clay seams rather than a solid layer of clay. Mixed zones of salt and clay are representative of some clay "seams" at the WIPP, such as Clay F, but not of well-defined clay seams, such as Clay G. While Sandia is attempting to obtain Clay G core for further testing, RESPEC is establishing trends on laboratory fabricated clay seams. A report on the artificial clay seam testing is expected at the end of FY20. Sandia is also considering measuring the tensile strength of clay seams, because, when roof falls occur, they frequently detach at the first clay seam above a room.

Roof falls in the underground cause rubble piles to form on floors of empty rooms. The surrounding rock formation will gradually compact these rubble piles until they eventually become solid salt, but the length of time for a rubble pile to reach a certain porosity and permeability is unknown (Kicker et al. (2017)) and appropriate predictive tools are not currently available. Chapter 1 of Reedlunn et al. (2019) discusses the relevant physical processes and presents a general research plan to eventually predict the porosity and permeability evolution of empty rooms. These predictions will be a challenging endeavor for several reasons, yet we have made progress in selecting a numerical method appropriate for the investigation.

Conventional geomechanical numerical methods would struggle to model room collapse and reconsolidation, so two different meshless methods, the Immersed Isogeometric Analysis Meshfree and the Reproducing Kernel Particle Method (RKPM), were assessed in Reedlunn et al. (2019) and Reedlunn et al. (2020). First, the meshless methods and the finite element method each simulated gradual room closure, without discrete room collapses. All three methods produced equivalent room closure predictions with comparable computational speed. Second, the Immersed Isogeometric Analysis Meshfree method and RKPM simulated two-dimensional empty room collapse and rubble pile consolidation, using a simplified salt constitutive model. Both methods successfully simulated large viscoplastic deformations, fracture, and rubble pile rearrangement to produce qualitatively realistic results. Neither method displayed a distinct advantage, so Sandia is currently implementing a variant of RKPM, the Conformal Reproducing Kernel (CRK) method, into Sierra/Solid Mechanics. A functional version of CRK is expected at the end of FY20.

A credible empty room collapse model will require model validation. Comparisons against in-situ observations at the WIPP and elsewhere can be made, but Herrick et al. (2017) also proposed a series of laboratory scale room collapse experiments. The ongoing test samples consist of right cylindrical specimens of WIPP salt that are eight inches long and four inches in diameter. Either a 0.625-inch square, representing a drift, or a 0.625 x 1.25-inch rectangle, representing a room, is sawed into the cylindrical sample. The axis of the opening is oriented perpendicular to the cylindrical specimen axis. In some cases, a clay seam above the opening is added. The samples are initially loaded isostatically, such that the internal pressure is equal to the external pressure, until a preselected stress is reached. A reconsolidation period ensues to heal potential microcracks due to sample preparation. After reconsolidation, the internal pressure of the drift or room is reduced to atmospheric, roughly simulating the

excavation of an opening. The deformations inside the small-scale openings are measured by a deformation gauge and fluid volume changes, while Schuler gauges and LVDTs measure deformations outside the specimen. In addition, an acoustic emission monitoring system detects fracturing. Tests are being conducted using both our conventional rock mechanics and our creep laboratory loading systems. We expect to begin publishing results at the end of 2020.

Validation of rubble pile reconsolidation will also be needed. We may be able to validate against in-situ observations of empty drift reconsolidation at old salt mines (see Section 6.3 of Reedlunn et al. (2019) for a potential candidate). In addition, if we assume the physical processes are scale independent and scale the model of the rubble pile down to the size of a laboratory sized granular salt sample, then we may be able to validate against polydispersed granular salt tests at elevated temperatures and stresses. Sandia's involvement in the KOMPASS project (Kuhlman et al. 2019) could prove useful here. Attempts to validate the rubble reconsolidation model will likely begin in the latter half of FY21.

One facet of Sandia's contribution[1] to the KOMPASS project (focused on the development of methods and prerequisites for reconsolidating granular salt) is the analysis of grain structure and deformation mechanisms associated with reconsolidation. In an effort to identify pre-compaction techniques that quickly produce samples with low porosity and minimal cataclastic deformation, the microstructures of three different pre-consolidated German granular salt samples were evaluated and analyzed. One sample was compressed at room temperature for five days, a second at 98°C for one day, and a third at 98°C for five days. The samples were compacted stepwise in a quasi-oedometer cell to a maximum axial load of 20 MPa and consisted of a certain mixture of domal salt with grain sizes no more than 5 mm. The initial half-cylinder dimensions were 100 mm in diameter and approximately 100 mm tall. Due to friction effects at the wall of the cell, the compaction varied from 10 % to 20 % porosity along the sample axis. Results indicate increased temperature enhances pre-compaction and grains experience less cataclastic deformation, which agrees with past reconsolidation experiments, and may produce granular microstructures closer to in-situ compacted granular microstructures. Investigations of an additional sample compacted isostatically in a larger oedometer cell for 28 days, with pressures reaching up to 20 MPa and porosities of 12 to 15%, is also underway. Future experiments will explore various moisture and temperature conditions to reduce uncertainties and enhance model development for prediction of granular salt reconsolidation. The initial phase of KOMPASS will be documented by August 2020, and work could continue beyond that date if funding is allocated.

A geomechanical model, partially validated against in-situ observations and crushed salt measurements, may be able to reasonably predict a rubble pile's porosity evolution, but the relationship between porosity and permeability is not trivial for polydispersed rubble piles. As such, Chapter 7 of Reedlunn et al. (2019) and Matteo et al. (2020) discuss efforts to characterize rubble fragments using X-ray micro Computed Tomography (micro CT), create multiple roof-fall rubble realizations using depositional software tools, and use computational fluid dynamics (CFD) to predict fluid flow through the rubble pile realizations. The broad size distributions and irregular shapes of the fragments that break out of ceilings during roof falls are likely to produce

[1] Note that Sandia is currently participating the KOMPASS project using Department of Energy-Nuclear Energy funding, not Department of Energy-Environmental Management funding.

highly complex and inhomogeneous packing arrangements on room floors. This complexity, in turn, may result in widely varying geomechanical and fluid-flow properties for these debris deposits, both in their initial state and as they undergo rearrangement during room closure. By running multiple realizations of rubble pile packing configurations and varying the polydispersity, we are exploring how porosity-permeability functions may vary as a function of rubble pile fragment size distribution. Additional processes, such as viscoplasticity, grain breakage, further grain rearrangement, and pressure-solution at grain boundaries, may add additional complexity to permeability-porosity evolution during open room closure. We plan to document our progress in early FY21. Future work, commencing in FY21, will include validating the CFD models against large-scale (roughly $1/10^{th}$ the size of a WIPP room) permeameter measurements conducted in collaboration with the University of New Mexico.

One other topic the EPA has asked about in the past is the constitutive model for the standard 55-gallon waste containers. In an effort to improve this constitutive model, a series of laboratory experiments were performed on surrogate waste materials which represent both the non-degraded and fully degraded WIPP waste states to furnish us with data so we can develop a more appropriate model of how WIPP waste behaves (Broome and Costin (2010)). The proportions of the surrogate waste materials (metals, cellulosics, rubbers and plastics, sorbents and sludges) were based on typical inventory weight percent and density estimates. For non-degraded wastes, sawcut pieces of material were packed in full-sized 55-gal drums or in ¼-scale drums represented by #12 food cans. The degraded surrogate waste material was similar to a soil and was treated as such. The tests to characterize the surrogate wastes' mechanical behavior consisted of hydrostatic, uniaxial, and triaxial compression. The final report for the fully degraded waste tests was written by Broome et al. (2014) and the final report for the non-degraded waste tests will be published by the end of FY20. An appropriate constitutive model to capture the mechanical behaviors measured in these tests is presently being investigated. We hope to have a preliminary model by the end of FY20.

In summary, we have been making steady progress toward the goals laid out in Reedlunn (2017), Sobolik (2017), Kicker et al. (2017), Herrick et al. (2017), Mills (2017), and Broome and Costin (2010). Although some of the remaining goals are ambitious, completion of these projects will improve our fundamental and practical understanding of WIPP rock mechanics.

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CC2-34-10 Clarification of "Neighbor" Relationships in the CRA19_CL Analysis

40 CFR §194.34 Results of Performance Assessments

EPA Question (from EPA Completeness Comment Package 2)

Please provide 1) the criteria used to establish the "neighbor" relationships used in the CRA19_CL analysis, and 2) a table similar to Table 2-5 in ERMS 568459, listing the same, adjacent, and non-adjacent waste panel "neighbors" used in that analysis.

> In the Analysis Plan for the 2019 CRA PA (p. 29; ERMS 571150), the DOE stated that the assignment of panel neighbor relationships was changed in the CRA19_CL analysis to be consistent with the isolation of panels in the south end of the repository. However, no further information on how those relationships were changed was found.

DOE Response (from DOE Response Package 3 (DOE RP3 2020))

To investigate the effects of modeling "open" areas of the repository in the CRA19 analysis of the CRA-2019 performance assessment (PA), the CRA19_CL analysis was performed and documented in Zeitler et al. (2019). The CRA19 and CRA19_CL analyses used an identical criterion for defining panel neighbor relationships, as described in the CRA-2019 PA analysis plan (Zeitler 2019); i.e., "…panels having one or fewer panel closures between them are considered neighbors." The CRA19 analysis treated the panel closure areas for Panels 3, 4, 5, and 6 as "open," meaning that no panel closures inhibited communication between each of those panels and Panel 9. The CRA19_CL analysis, by considering immediate closure of the open areas, treated the panel closure areas for those panels as "closed" or effectively intact for the purposes of defining neighbor relationships. As a result, the CRA19_CL analysis had a different set of neighbor relationships from the CRA19 analysis. The panel neighbor relationships used in the CRA19 and CRA19_CL analyses are detailed in Table 1.

Table 9 - Panel Neighbor Relationships as Defined for the CRA19 and CRA19_CL Analyses

Panel	CRA19	CRA19_CL
1	10	10
2	10	10
3	4, 5, 6, 9, 10	9
4	3, 5, 6, 9, 10	9
5	3, 4, 6, 9, 10	9
6	3, 4, 5, 9, 10	9
7	10	10
8	10	10
9	3, 4, 5, 6, 10	3, 4, 5, 6, 10
10	1, 2, 3, 4, 5, 6, 7, 8, 9	1, 2, 7, 8, 9

DOE References:

Zeitler, T.R. 2019. Analysis Plan for the 2019 WIPP Compliance Recertification Application Performance Assessment. Sandia National Laboratories, Carlsbad, NM. ERMS 571150.

Zeitler, T.R., J. Bethune, S. Brunell, B. Day, D. Kicker, J. Long, and R. Sarathi. 2019. Summary Report for the 2019 Compliance Recertification Application Performance Assessment (CRA-2019 PA). Sandia National Laboratories, Carlsbad, NM. ERMS 571376.

EPA Evaluation of Response

The DOE response was satisfactory. The information was provided as requested.

CC2-34-11 Results of Granular Salt Reconsolidation Study

40 CFR §194.34 Results of Performance Assessments

EPA Question (from EPA Completeness Comment Package 2)

Please provide an update describing the current status of Experimental Investigation TP-17-04: Microstructural Investigations on Natural and Laboratory Tested Salt, the study findings and conclusions to date, and a schedule of its completion. Please provide special emphasis on what has been learned about the extent and timing of salt reconsolidation to native salt porosity and permeability from the microstructural investigations and the study of natural and anthropogenic analogues.

Uncertainties in the end state porosity and permeability of reconsolidated crushed salt under WIPP conditions have been addressed by the DOE in PA modeling and by the EPA in its 2017 TSD Technical Review of Salt Aggregate, Disturbed Rock Zone, and Open Drift Healing Characteristics. In an effort to reduce these uncertainties, the DOE initiated Experimental Investigation TP-17-04 with the goal of investigating salt reconsolidation using microstructural analysis and invoking analogue examples to provide an independent line of reasoning. EPA believes the results of this investigation have the potential to strengthen safety case performance determinations for the WIPP.

DOE Response (from DOE Response Package 4 (DOE RP4 2020))

This completeness question requests an update for ongoing technical research. Past Compliance Recertification Applications (CRAs) generally do not report the status of ongoing research because partial results may be premature or misleading. The Department of Energy (DOE) recommends that this update not be considered as part of CRA-2019 completeness. DOE is willing to discuss research progress during a videoconference or WebEx meeting, at a future date.

EPA Evaluation of Response

The DOE response was satisfactory. The EPA acknowledges that this question was forward-looking and that the results of DOE's investigations will not be needed until submittal of the CRA-2024. Similar to EPA's evaluation of related comment CC1-34-6 in this appendix, an update on this investigations via videoconference or online meeting is desired, and EPA will work with DOE to schedule it in conjunction with updates on the other activities.

CC3-GEN-3 CRA-2019 (Deferred) PA as a Bounding Analysis

40 CFR §194.34 Results of Performance Assessments

EPA Question (from EPA Completeness Comment Package 3)

Please explain whether and why the DOE considers the CRA-2019 (deferred) PA to be a bounding analysis.

> When the APCS methodology for performance assessment was first presented to EPA in a technical exchange meeting in December 2017, it was discussed as a "bounding approach" for modeling repository design changes that included abandonment of ROM salt panel seals and abandonment of Panel 9 in the south end of the waste area. A bounding approach employs an analysis that is structured to produce extreme results that are highly unlikely to be exceeded. An example of a bounding analysis is provided in Appendix IGP-2019 of the CRA-2019. When approving use of the APCS methodology in the CRA-2019 PA, EPA accepted the interim use of parameter values for open rooms and panel "neighbor" relationships to support calculation of bounding repository releases that were highly unlikely to be exceeded. However, although the APCS methodology was used in the CRA- 2019 PA, the results are described in Appendix PA-2019 and in other application documents as being conservative rather than bounding.
>
> It is EPA's understanding that the CRA19_CL analysis was undertaken by DOE to determine the impact on calculated releases of treating open repository excavations as rapidly healing to intact halite properties. As stated in Section A.7 of the Summary Report for the CRA-2019 PA (Zeitler et al. 2019), the DOE concluded that the "… CRA19_CL in comparison to CRA19, produce net repository conditions that are not bounding for any individual release mechanism and for total releases. This supplemental evaluation definitively demonstrates that treatment of abandoned panel closure and non-waste bearing excavations within the repository as "open" is an appropriately conservative representation of these areas to support performance assessments of the repository in its currently planned final closure configuration." Based on this comparison, the DOE apparently concludes that the CRA19_CL results are not bounding and the CRA-2019 PA results (called the CRA19 results in the foregoing quotation) are "conservative." A similar question was asked in the first round of completeness questions (CC1-MASS-1). However, there is no statement of "bounding" for any individual release mechanism or for total releases of the CRA-2019 (deferred) PA.

DOE Response (from DOE Response Package 6 (DOE RP6 2020))

In this comment, the U.S. Environmental Protection Agency (EPA) has defined the term "bounding approach" with the statement: "*A bounding approach employs an analysis that is structured to produce extreme results that are highly unlikely to be exceeded*." There is no precedent or regulatory basis for using this definition with regard to the results from a performance assessment (PA). Consider the following:

• The disposal regulations do not require the PA to be "bounding," but rather for there to be a "reasonable expectation, based upon performance assessments, that the cumulative releases of radionuclides to the accessible environment" will satisfy the containment requirements (40 CFR §191.13(a)).

• This philosophy is also reflected in the certification criteria, such as in the requirement for the mean Complementary Cumulative Distribution Function (CCDF) for total normalized release to comply with the containment requirement at the 95% confidence level (40 CFR §194.34(f)), rather than requiring that all the individual CCDFs comply with the release limits.

• If unrealistically conservative assumptions were used in the PA, then the results of the PA may not be a reasonable measure of the Waste Isolation Pilot Plant's (WIPP's) capability to contain waste.

The U.S. Department of Energy (DOE) has not previously used the EPA's definition of "bounding" to describe the results from the APCS (Abandonment of Panel Closures in the South) or CRA19 analyses to evaluate the operational changes associated with abandonment of the south end of the repository. The DOE considers the APCS/CRA19 PA approach to addressing the operational changes associated with abandonment of the south end of the repository to be conservative with respect to releases compared to the alternative approaches assessed in Zeitler et al. (2017) and Zeitler et al. (2019). In other words, the releases calculated using the APCS approach are expected to exceed those of a more-detailed model and are consistent with a probabilistic approach to PA.

The APCS analysis was performed and a summary report was issued in August, 2017 (Zeitler et al. 2017). Subsequently, the APCS approach was later presented to the EPA in December, 2017 (Day 2017). Neither Zeitler et al. (2017) nor Day (2017) describe the APCS approach using the term "bounding," although it is possible that the issue of a bounding analysis was discussed at the December, 2017 meeting. This discussion may have proceeded using a different definition of the term.

The APCS approach was developed for use in WIPP PA to address the operational changes of abandoning panel closures in Panels 3, 4, 5, and 6 and no emplacement of waste in Panel 9 (Zeitler et al. 2017). Two of the primary components of the APCS approach to address these issues were: 1) selection of appropriate representations of the panel closure areas associated with Panels 3, 4, 5, and 6, which had previously been represented as having intact panel closures; and 2) the decision as to whether to model waste in Panel 9.

Current WIPP PA modeling limitations, the existing parameterizations of material properties, and inter-panel communication (i.e., panel neighboring) were all considered in selecting the appropriate representation of the panel closure areas in Panels 3, 4, 5, and 6. One modeling limitation was the need to avoid instantaneous material changes in regions where capillary action was active (to avoid model instability caused by unrealistic and artificial parametric changes), such as the panel closure regions. Two options were available for representing the panel closure areas in question, but each option had to be applied over the entire 10,000 year modeling period: 1) "open" (i.e., relatively high permeability and porosity, leading to a relatively higher degree of inter-panel communication); or 2) "closed" (i.e., relatively low permeability and porosity, leading to a relatively lower degree of inter-panel communication). In the final APCS approach, it was determined that treating abandoned panel closure areas to be "open" would lead to higher releases than if they were treated as "closed."

Without modeling limitations, a more detailed treatment of the abandoned panel closure areas may have led to a representation that changed over time from more open to more closed and this treatment would presumably lead to releases intermediate to those from the binary cases of the "open" and "closed" treatments. Thus, the "open" treatment approach was considered to be conservative with respect to releases as compared to a hypothetical, more-detailed model. In that sense, the "open" treatment approach may be considered "conservative" in that the results of that treatment are expected to exceed both the "closed" treatment results, as well as the expected results from a more detailed model.

The treatment of waste in Panel 9 was approached as an issue with only two options: 1) waste in Panel 9 or 2) no waste in Panel 9. To assess these two options, an analysis was performed for the case where the waste that would have been in Panel 9 would now occupy a hypothetical 11th panel (Zeitler et al. 2017). It was determined that treating Panel 9 as having waste would lead to higher releases than if that waste were instead in a hypothetical 11th panel. Thus, the "waste in Panel 9" approach was considered to be conservative with respect to the "no waste in Panel 9" approach.

In Zeitler et al. (2019), an alternative approach is implemented in the supplemental CRA19_CL analysis and the conclusion is reached that, when compared to the CRA19 results, "CRA19_CL results are not bounding"; the intent of this statement (and the use of the term "bounding") is simply that the CRA19_CL results, on average, do not exceed the CRA19 results.

The disposal regulations do not require the PA to be "bounding," but rather for there to be a reasonable expectation that cumulative releases will satisfy the containment requirements. This philosophy is reflected elsewhere in the certification criteria, such as in the requirement for the mean CCDF to comply with the containment requirement, rather than for every CCDF to comply. If unrealistically conservative assumptions were used in the PA, then results of the PA would not be a reasonable measure of the WIPP's capability to contain waste.

In summary, the DOE does not use the term "bounding approach", as defined by the EPA in this comment, to describe the CRA-2019 PA analysis. However, the DOE considers the CRA-2019 PA approach to addressing the operational changes associated with abandonment of the south end of the repository to be conservative with respect to releases compared to the reasonable

alternative approaches assessed in Zeitler et al. (2017) and Zeitler et al. (2019) because the releases calculated using the CRA-2019 PA approach are expected to exceed those of a more-detailed model. In other words, the releases calculated using the APCS/CRA19 approach are expected to exceed those of a more-detailed model and are consistent with a probabilistic approach to PA.

DOE References

References with hyperlinks were provided in prior CRAs. The remainder of the reference documents will be provided in Enclosure 4 or as otherwise noted.

Day, B. 2017. Abandoned Panel Closures in South. DOE EPA Technical Exchange on WIPP Recertification. Presented December 6, 2017. Sandia National Laboratories, Carlsbad, NM. SAND 2017-13109PE.

Zeitler, T., B. Day, J. Bethune, R. Sarathi, J. Long. 2017. Assessment of Abandoned Panel Closures in South End of Repository and Lack of Waste Emplacement in Panel 9. Sandia National Laboratories, Carlsbad, NM. ERMS 568459.

EPA Evaluation of Response

The DOE response was satisfactory. The EPA accepts that the CRA-2019 PA is intended by DOE to be conservative rather than bounding.

Source Citations for DOE Completeness Question Response Packages

DOE RP1 (U.S. Department of Energy) 2020. *Response 1 to U.S. Environmental Protection Agency's 2019 Compliance Recertification Application Completeness Comments Letter dated March 23, 2020 from Tom Peake to Mike Brown.* Letter from Gregory Sosson (DOE) to Lee Veal (EPA). CBFO:OEP:MRB:MC:20:0237:UFC 5486.00. Carlsbad, New Mexico. June 10, 2020. (First Response Package).

DOE RP2 (U.S. Department of Energy) 2020. *Response 2 to U.S. Environmental Protection Agency's 2019 Compliance Recertification Application Completeness Comments Letter dated March 23, 2020 from Tom Peake to Mike Brown.* Letter from Gregory Sosson (DOE) to Lee Veal (EPA). CBFO:OEP:MRB:MC:20-0248:UFC 5486.00. Carlsbad, New Mexico. July 9, 2020. (Second Response Package).

DOE RP3 (U.S. Department of Energy) 2020. *Response 3 to U.S. Environmental Protection Agency's 2019 Compliance Recertification Application Completeness Comments Letters dated March 23, 2020 and May 6, 2020 from Tom Peake to Mike Brown.* Letter from Reinhard Knerr (DOE) to Lee Veal (EPA). CBFO:OEP:MRB:MC:20-0513:UFC 5486.00. Carlsbad, New Mexico. August 13, 2020. (Third Response Package).

DOE RP4 (U.S. Department of Energy) 2020. *Response 4 to U.S. Environmental Protection Agency's 2019 Compliance Recertification Application Completeness Comments Letter dated May 6, 2020 from Tom Peake to Mike Brown.* Letter from Reinhard Knerr (DOE) to Lee Veal (EPA). CBFO:OEP:MRB:MC:20-0268:UFC 5486.00. Carlsbad, New Mexico. September 15, 2020. (Fourth Response Package).

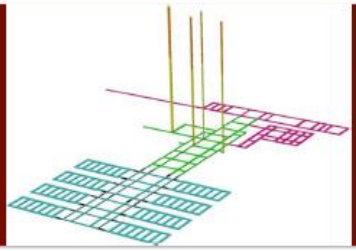
DOE RP6 (U.S. Department of Energy) 2020. *Response 6 to U.S. Environmental Protection Agency's 2019 Compliance Recertification Application Completeness Comments Letters dated March 23, 2020, May 6, 2020, June 12, 2020, and July 17, 2020 from Tom Peake to Mike Brown.* Letter from Reinhard Knerr (DOE) to Lee Veal (EPA). CBFO:OEP:MRB:MC:20-0277:UFC 5486.00. Carlsbad, New Mexico. October 26, 2020. (Sixth Response Package).

Appendix PFLOTRAN

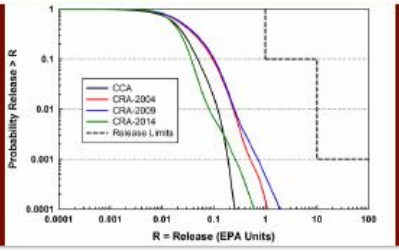
A DOE Presentation to EPA Describing the Need for and Development of the PFLOTRAN Code as a Replacement for the BRAGFLO Code in WIPP Performance Assessment

Exceptional service in the national interest

Sandia National Laboratories







PFLOTRAN Code Development for Waste Isolation Pilot Plant Performance Assessment

Todd R. Zeitler, Glenn Hammond, and James Bethune

DOE-EPA Videoteleconference 2018

U.S. DEPARTMENT OF ENERGY | NNSA

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Outline

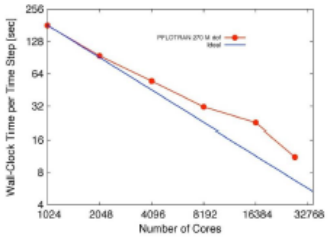
Sandia National Laboratories

- PFLOTRAN—What is it?
- Motivation for Considering a New PA Code
  - Current Representation of WIPP Repository in WIPP PA
  - Challenges of potential repository layout changes
- PFLOTRAN Development for WIPP PA
  - Long-term integration plan
  - Code replacements
  - Code testing
  - Current status and schedule
- Summary

PFLOTRAN

Sandia National Laboratories

- Petascale reactive multiphase flow and transport code
- Open source license (GNU LGPL 2.0)
- Object-oriented Fortran 2003/2008
  - Pointers to procedures
  - Classes (extendable derived types with member procedures)

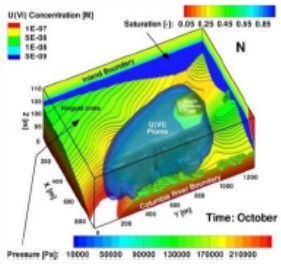


- Founded upon well-known (supported) open source libraries
  - MPI, PETSc, HDF5, METIS/ParMETIS/CMAKE
- Demonstrated performance
  - Maximum # processes: 262,144 (Jaguar supercomputer)
  - Maximum problem size: 3.34 billion degrees of freedom
  - Scales well to over 10K cores

Application of PFLOTRAN

Sandia National Laboratories

- Nuclear waste disposal
  - Waste Isolation Pilot Plant (WIPP) in Carlsbad, NM
  - US DOE NE Spent Fuel and Waste Science and Technology (SFWST)
  - SKB Forsmark Spent Fuel Nuclear Waste Repository (Sweden, Amphos[21])
- Climate: coupled overland/groundwater flow; CLM
  - Next Generation Ecosystem Experiments (NGEE) Arctic
  - DOE Earth System Modeling (ESM) Program
- Biogeochemical transport modeling
  - U(VI) fate and transport at Hanford 300 Area
  - Hyporheic zone biogeochemical cycling
    - Columbia River, WA, USA
    - East River, CO, USA
- Oil & Gas (OpenGoSim.com)
- CO_2 sequestration
- Enhanced geothermal energy
- Radioisotope tracers



Hammond and Lichtner, WRR, 2010

Discretization and Numerical Methods

Sandia National Laboratories

- Spatial discretization
  - Finite volume (2-point flux default)
  - Structured and unstructured grids
- Time discretization: fully-implicit backward Euler
- Nonlinear solver
  - Newton-Raphson
  - Line search/damping with custom convergence criteria
- Linear solver: direct (LU) or iterative (BiCGStab)
- Multi-physics coupling
  - Flow and transport/reaction: sequential
  - Transport and reaction: global implicit
  - Geomechanics and flow/transport: sequential
  - Geophysics and flow/transport: sequential

Deep Borehole Waste Disposal



Emily Stein, SNL, 2015

PFLOTRAN Unstructured Grid

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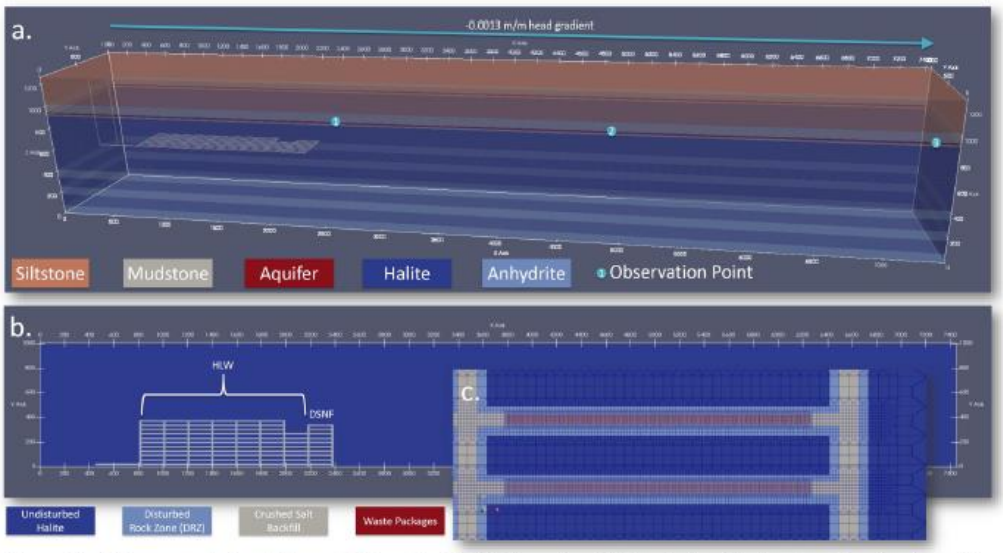

Figure 3. a.) Transparent view of the model domain. b.) *X-Y* slice of model domain (a reflection boundary lies at $y = 0$), and c.) close-up of two DSNF disposal rooms showing details of the discretization. Smallest cells are 5/9 m on a side; largest (at far right) transition to 15 m on a side.

Stein, E.R., S.D. Sevougian, G.E. Hammond, J.M. Frederick and P.E. Mariner, (2016) *Performance Assessment of a Generic Repository in Bedded Salt, AGU Fall Meeting, San Francisco CA*

PFLOTRAN Unstructured Grid

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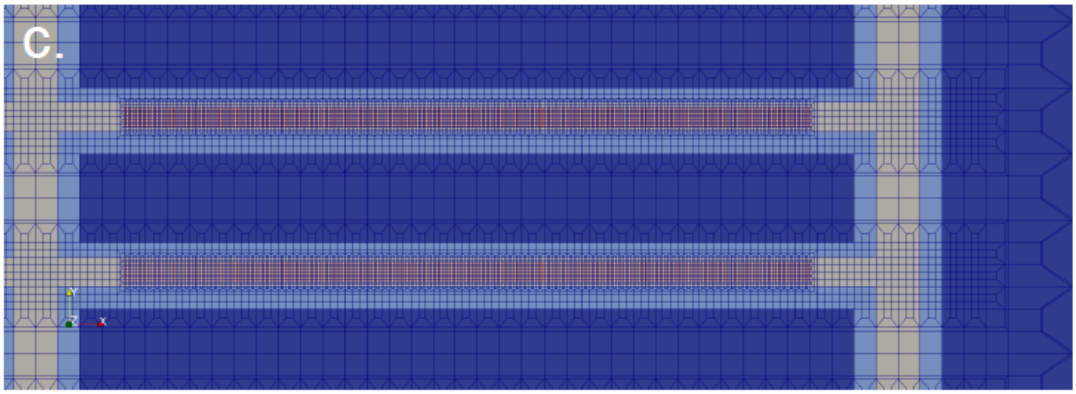
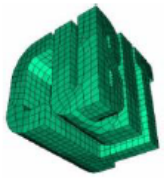




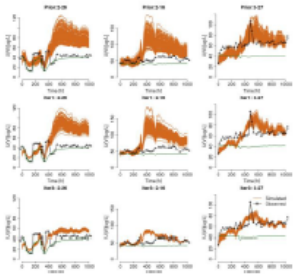
Stein, E.R., S.D. Sevougian, G.E. Hammond, J.M. Frederick and P.E. Mariner, (2016) *Performance Assessment of a Generic Repository in Bedded Salt, AGU Fall Meeting, San Francisco CA*

PFLOTRAN Computing Capability

Sandia National Laboratories

- High-Performance Computing (HPC)
  - Increasingly mechanistic process models
  - Highly-refined 3D discretizations
  - Massive probabilistic runs
- Open Source Collaboration
  - Leverages a diverse scientific community
  - Sharing among subject matter experts and stakeholders from labs/universities
- Modern Fortran (2003/2008)
  - Domain scientists remain engaged
  - Modular framework for customization
- Leverages Existing Capabilities
  - Meshing, visualization, HPC solvers, etc.
  - Configuration management, testing, and QA

Data Assimilation



Xingyuan Chen, PNNL, 2011

Benefits of Massively Parallel HPC

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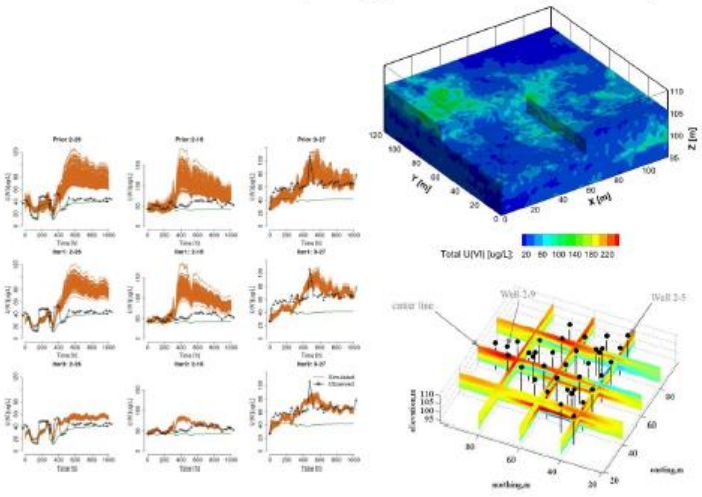
Data Assimilation at the Hanford 300 Area (Xingyuan Chen, 2011)

- Problem domain:
  - 120×120×15m
  - Δx,Δy,Δz = 1,1,0.5 m
  - 432K grid cells
  - 15 chemical species
  - 6.48M dofs total
- 1-2 month simulation:
  - Δt = 1 hour
- Computing, e.g.
  - 128 cores (single realization)
  - 64,000 cores (500 realizations)
  - 1 hour wallclock runtime
  - ~7 cpu years





Approach to Parallelization

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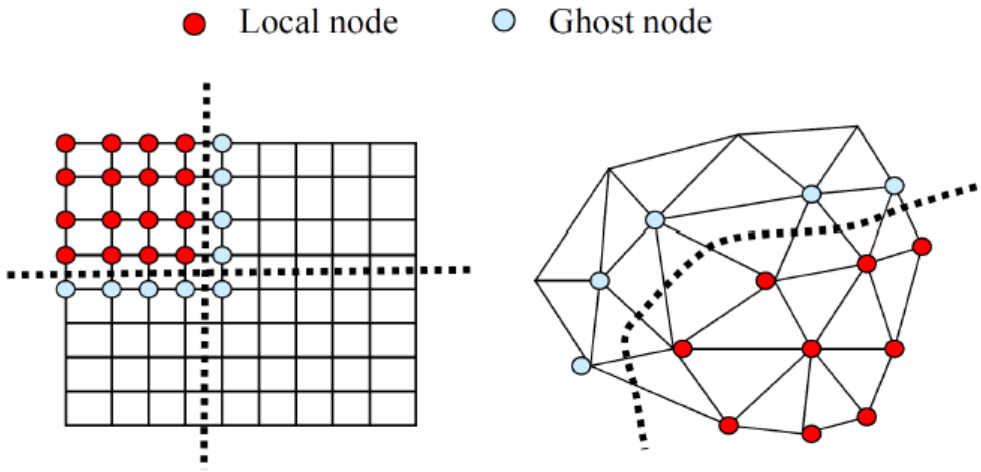
Domain Decomposition



Ghost node information used only in flux calculations.

PFLOTRAN Support Infrastructure



- www.pflotran.org: documentation and overview
- Git: distributed source control management tool
- Bitbucket: online PFLOTRAN repository
  - git clone https://bitbucket.org/pflotran/pflotran
  - Source tree
  - Commit logs
  - Pull requests
  - Issue tracker
  - Wiki
    - Link to documentation.pflotran.org
      - Developer/Theory/User guides
      - FAQ (entries motivated by questions on mailing list)
- Travis CI: automated building and testing (regression and unit)
- Google Groups: pflotran-users and pflotran-dev mailing lists
- Google Analytics: tracks behavior on Bitbucket









Why Object-Oriented Fortran 2003/2008?

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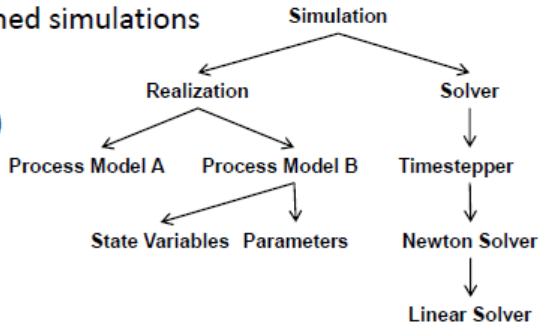
- Why Fortran?
  - Experienced domain scientists remain engaged
  - Commonality among all domain scientists
- Why object-oriented?
  - Modular data structures
    - Eases code development and debugging – data locality
    - Nesting of processes and data
  - Tree structure enables self-contained simulations
- Why Fortran 2003/2008?
  - Classes (extendable derived types)
    - Member functions
    - Inheritance
  - Pointers to procedures
    - E.g. swapping equations of state



PFLOTRAN Flow Modes

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- RICHARDS: variably-saturated water
- TH: variably-saturated water-energy
- GENERAL: multiphase air-water-energy
- WIPP_FLOW: immiscible air-water
- MPHASE: supercritical CO2-water-energy
- FLASH2: supercritical CO2-water-energy (experimental)
- IMMIS: air-water (experimental)
- MISCIBLE: X-water-energy (experimental)
- TOIL_IMS: oil-water-energy (experimental)

Governing Equations

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GENERAL Mode (miscible air-water-energy)

Water Mass
$$\frac{\partial \phi (s_l \rho_l X_w^l + s_g \rho_g X_w^g)}{\partial t} = -\nabla \cdot \left(\rho_l X_w^l \boldsymbol{q}_l + \rho_g X_w^g \boldsymbol{q}_g + \boldsymbol{J}_w^l + \boldsymbol{J}_w^g \right) + q_w$$

Air Mass
$$\frac{\partial \phi (s_l \rho_l X_a^l + s_g \rho_g X_a^g)}{\partial t} = -\nabla \cdot \left(\rho_l X_a^l \boldsymbol{q}_l + \rho_g X_a^g \boldsymbol{q}_g + \boldsymbol{J}_a^l + \boldsymbol{J}_a^g \right) + q_a$$

Energy
$$\frac{\partial \phi \left(s_l \rho_l U_l + s_g \rho_g U_g \right) + (1-\phi) C_p^{\text{rock}} \rho_{\text{rock}} T}{\partial t} = -\nabla \cdot \left(\rho_l H_l \boldsymbol{q}_l + \rho_g H_g \boldsymbol{q}_g - \kappa_{\text{eff}} \nabla T \right) + q_e$$

WIPP_FLOW Mode (immiscible air-water)

Water Mass
$$\frac{\partial \phi (s_l \rho_l)}{\partial t} = -\nabla \cdot (\rho_l \boldsymbol{q}_l) + q_w^G$$

Air Mass
$$\frac{\partial \phi (s_g \rho_g)}{\partial t} = -\nabla \cdot \left(\rho_g \boldsymbol{q}_g \right) + q_a^G$$

$$\boldsymbol{q}_\alpha = -\frac{k k_\alpha}{\mu_\alpha} \nabla (p_\alpha - \gamma_\alpha g z), \quad (\alpha = l,\ g)$$

$$\boldsymbol{J}_a^l = -\tau \phi s_l D_l \rho_l \nabla X_a^l$$

$$\boldsymbol{J}_a^g = -\tau \phi s_g D_g^0 \left(\frac{T}{T_K} \right)^\theta \frac{p_0}{p_g} \rho_g \nabla X_a^g$$

PFLOTRAN Reactive Transport

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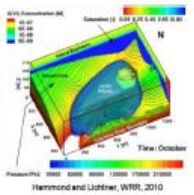
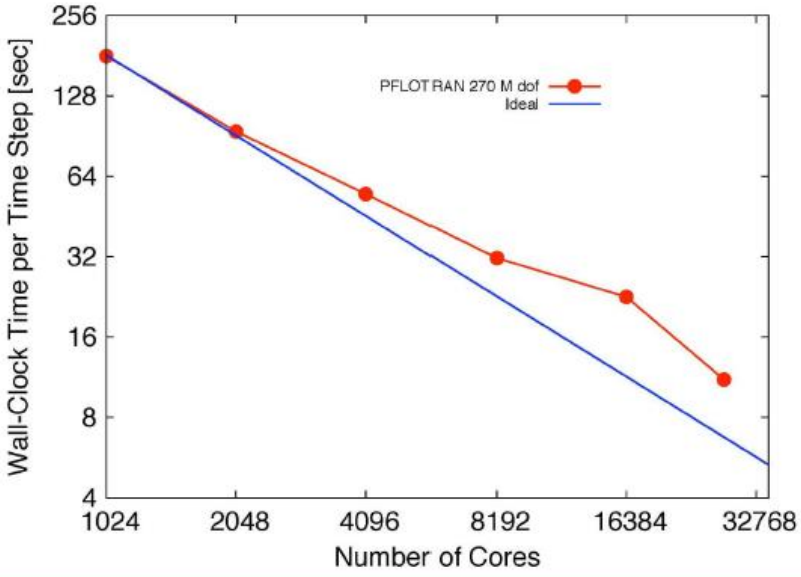
- Transport
  - Multicomponent
  - Mobile/immobile primary species
  - Advection (upwinding)
  - Hydrodynamic dispersion
- Reaction
  - Aqueous speciation
    - Ion activity models
  - General (A + B ↔ C)
    - N^{th} order kinetics
    - Reversible
  - Mineral precipitation-dissolution
    - Prefactors
  - Microbiological
    - Michaelis–Menten kinetics
    - Biomass
    - Inhibition
  - Radioactive decay with daughter products
  - Sorption
    - Isotherm-based: linear, Langmuir, Freundlich
    - Ion exchange
    - Surface complexation
      - Equilibrium
      - Kinetic / multirate kinetic
  - Reaction Sandbox

PFLOTRAN Parallel Performance

Sandia National Laboratories



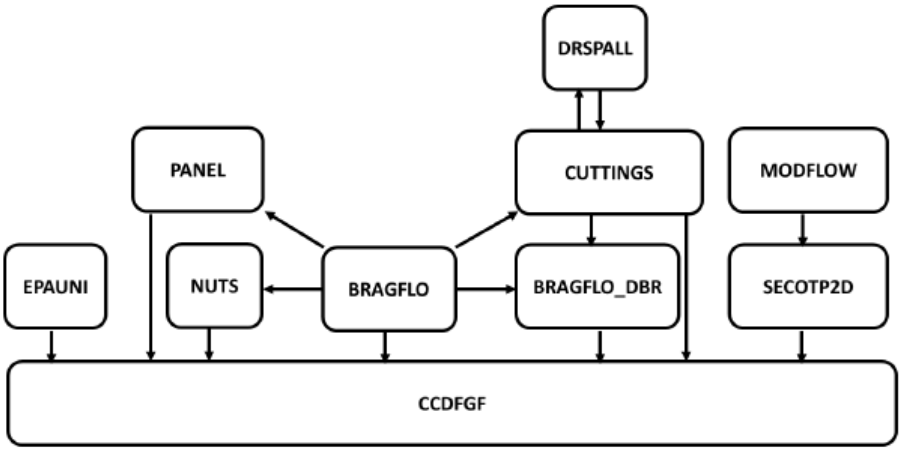
Hanford 300 Area



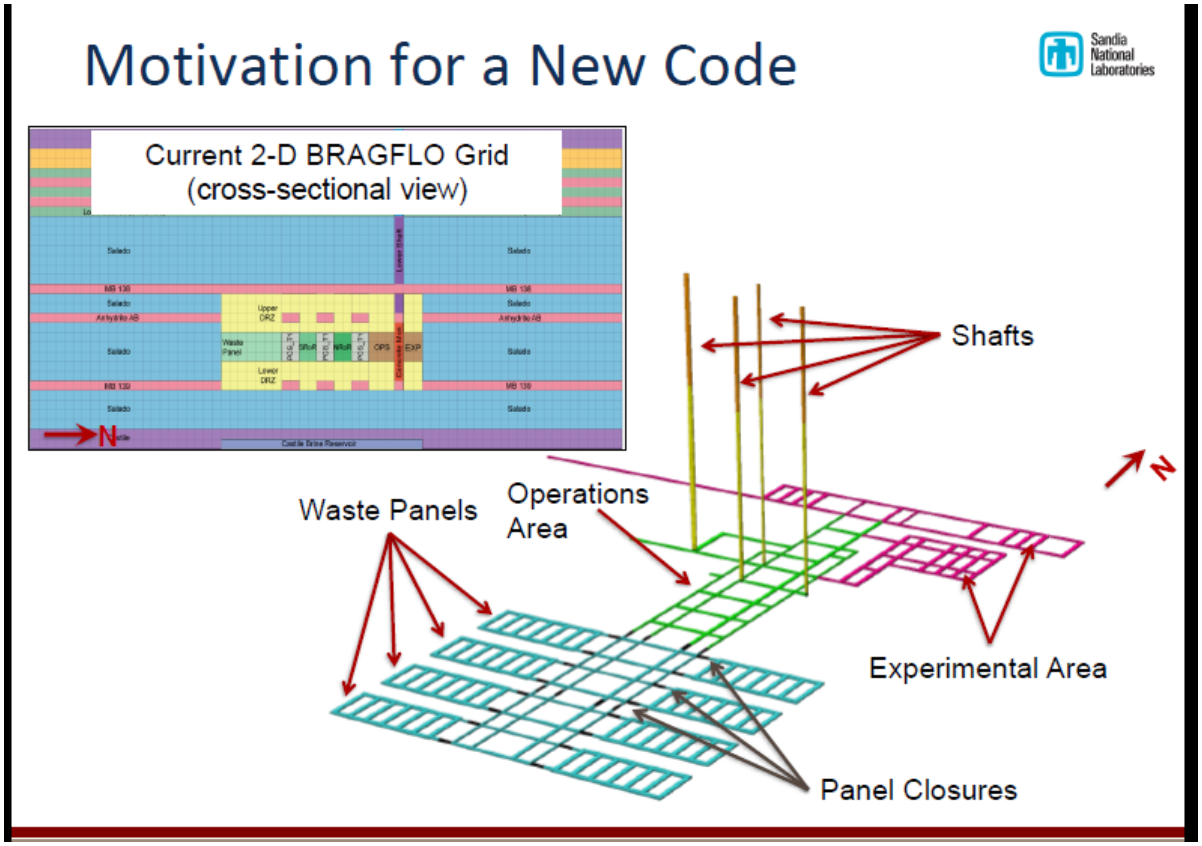
WIPP Performance Assessment

Sandia National Laboratories

- PA considers 245 Features, Events, and Processes
- PA calculations cover 24 peer-reviewed conceptual models
- PA codes include 10 principal codes and many utility codes



Current generalized code map and run control configuration

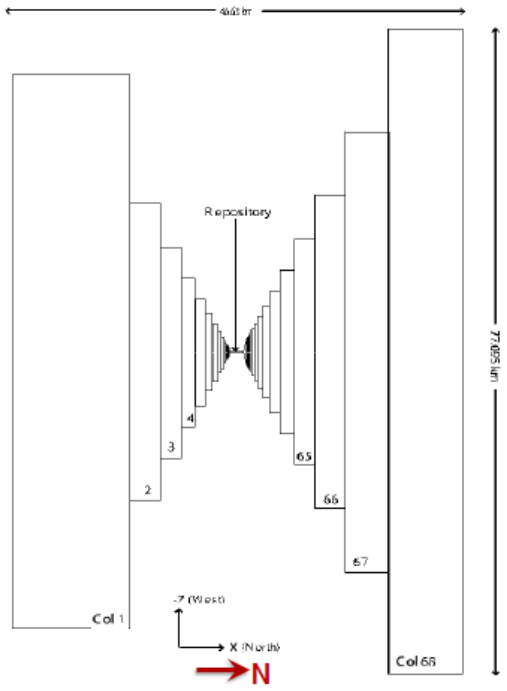

Motivation for a New Code
Sandia National Laboratories
Current 2-D BRAGFLO Grid
(cross-sectional view)
Shafts
Waste Panels
Operations Area
Experimental Area
Panel Closures
N

Motivation for a New Code

Sandia National Laboratories

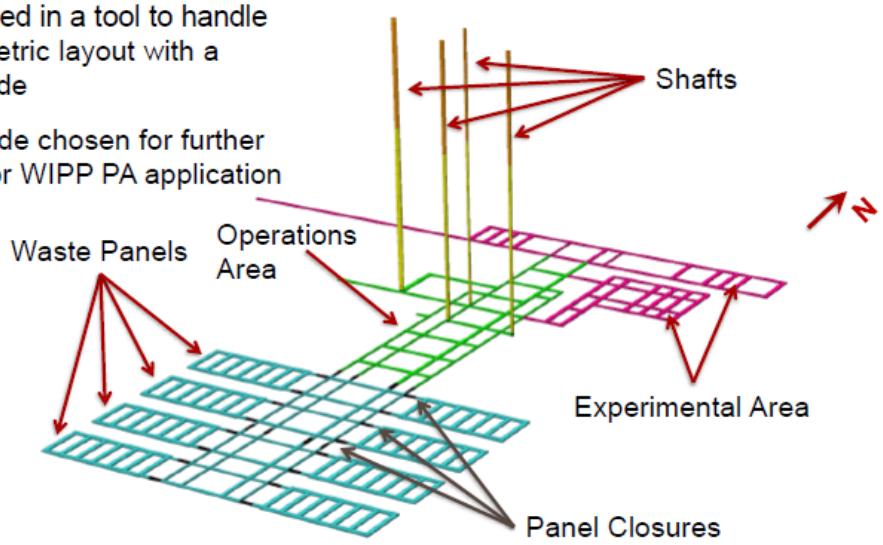
Current 2-D "Flared" Grid (plan view)

- One cell in width
- Width of each cell varies
- Approved for use in Compliance Certification Application (CCA)
- Shown to give similar results to a 3-D representation using BRAGFLO
- Radial concentric flow
  - No lateral flow
- Relies on (approximately) symmetric repository layout



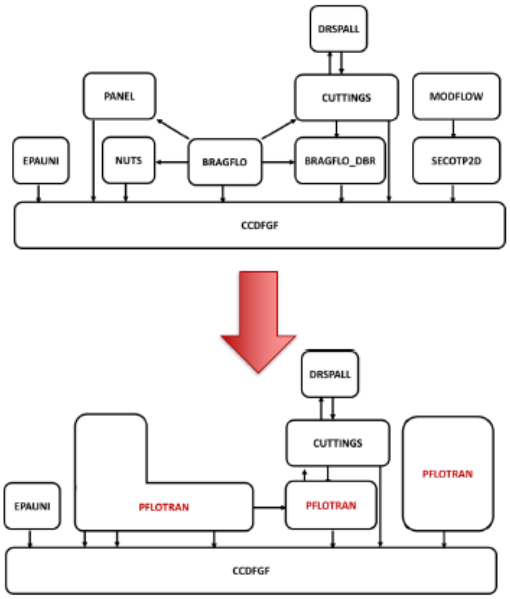
Motivation for a New Code

- Potential for additional waste panels challenges the radial concentric flow assumption
- DOE is interested in a tool to handle a more asymmetric layout with a modern 3-D code
- PFLOTRAN code chosen for further development for WIPP PA application



Long-term Approach to Integration

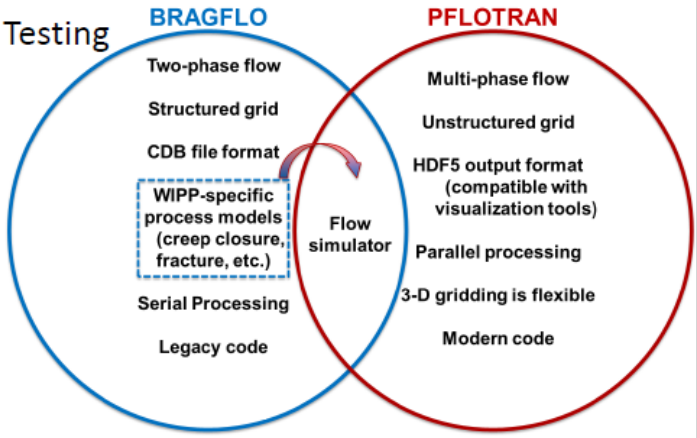
- Process model implementation
- Comparison of PFLOTRAN against BRAGFLO/NUTS for 2-D flared grid
  - Validates flow and transport
- Comparison of PFLOTRAN w/3-D representation against 2-D flared grid
  - Quantifies impact of 2-D→3-D
- Development of 3-D conceptualization
  - Grid resolution
  - Run-time
- Hardware purchase and migration
- Formal reviews



Generalized code map and run control configuration

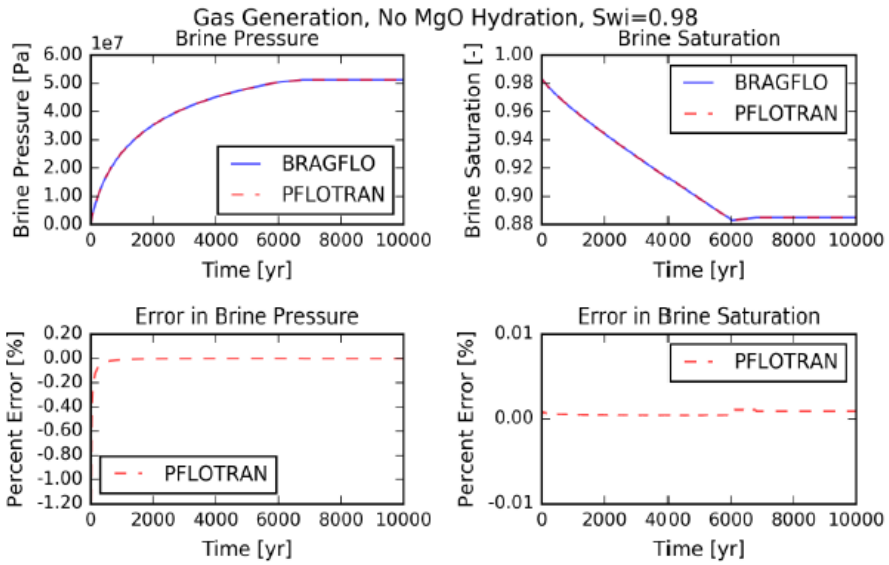
Process Model Implementation

- Code development
  - Transport appears straight-forward
  - Flow has required more work
  - Transition to 3-D is still largely unknown
- Validation/Verification Testing
  - Against BRAGFLO, NUTS, analytical solutions
  - Single-cell
  - Multi-cell
  - 2-D flared grid



Process Model Implementation

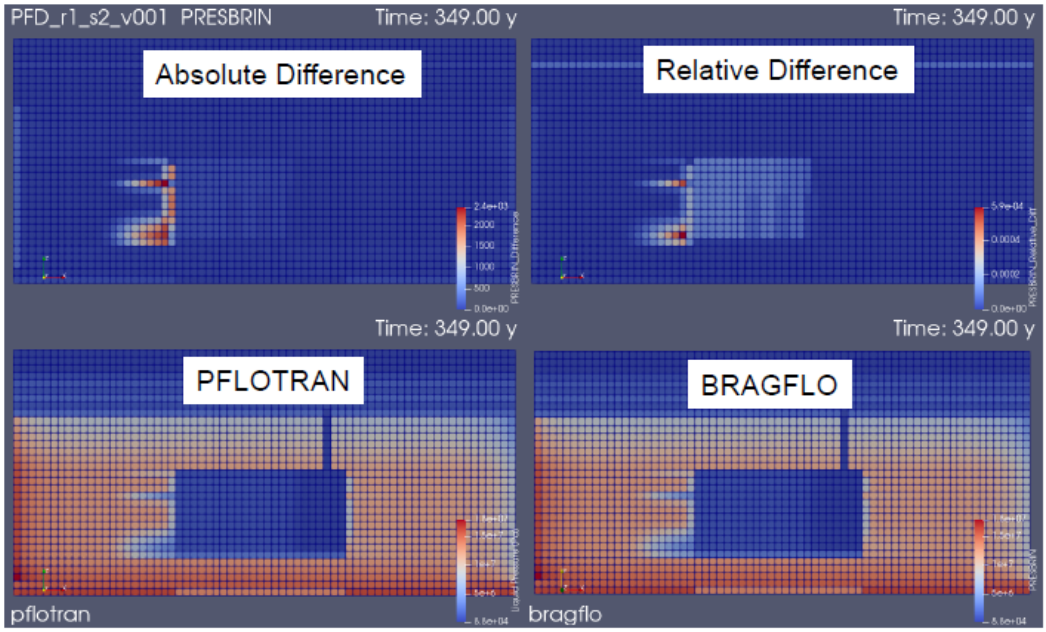
- Example test for gas generation



2-D Flared Grid Comparison

Sandia National Laboratories

- Replicate 1, Scenario 2, vector 1

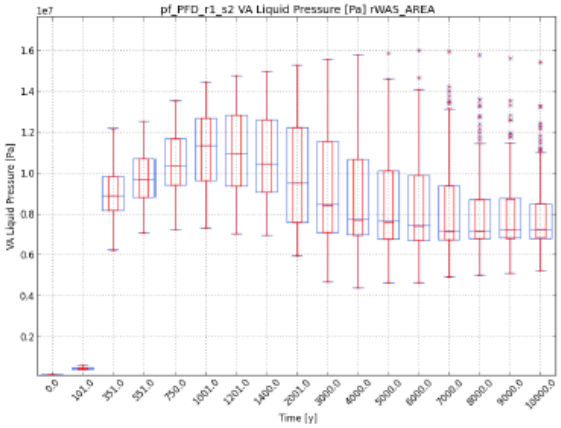


2-D Flared Grid Comparison

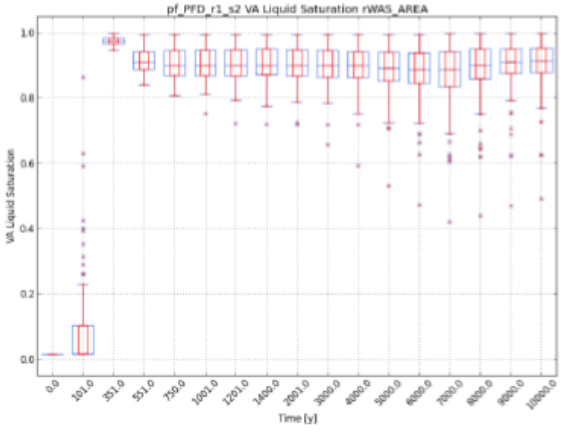
Sandia National Laboratories

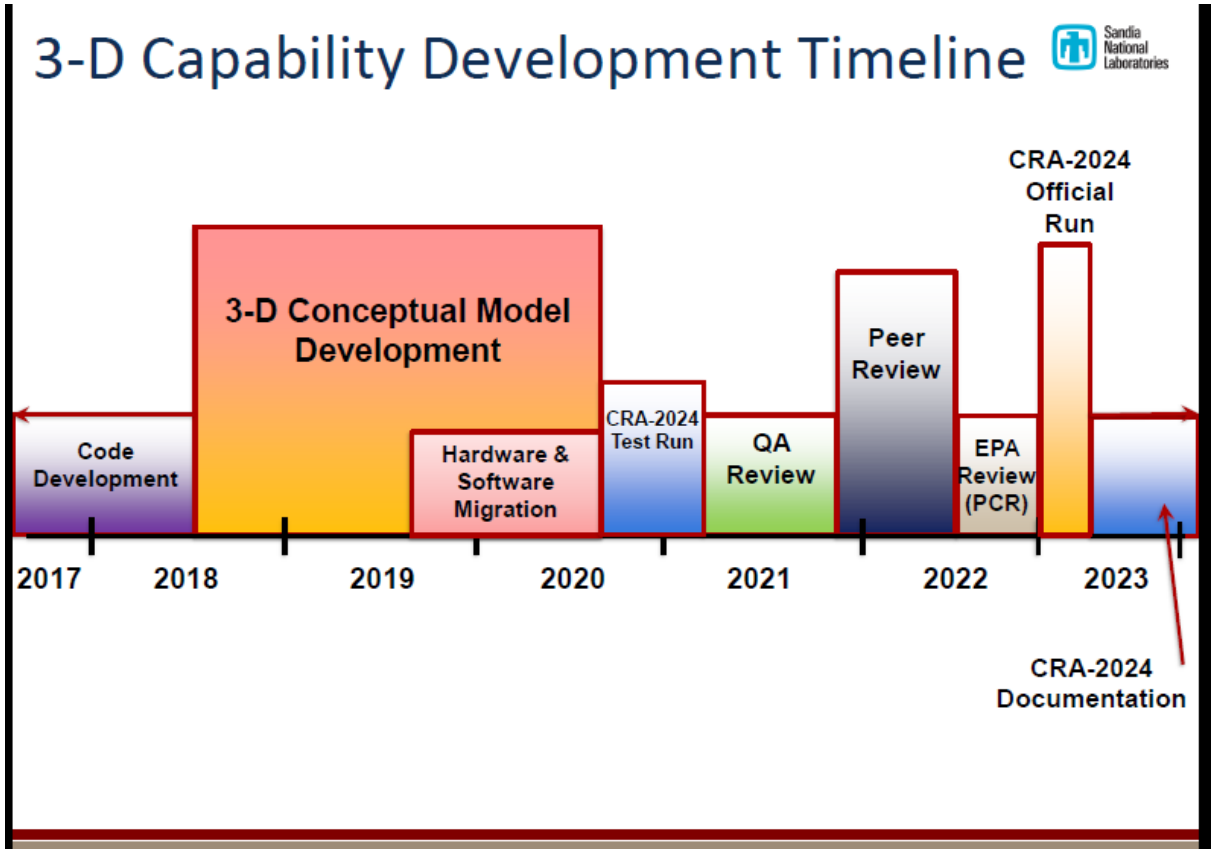
- Replicate 1, Scenario 2, all vectors, Waste Area

Liquid Pressure (Pa)



Liquid Saturation (--)




3-D Capability Development Timeline
Sandia National Laboratories
CRA-2024 Official Run
3-D Conceptual Model Development
Peer Review
Code Development
Hardware & Software Migration
CRA-2024 Test Run
QA Review
EPA Review (PCR)
2017
2018
2019
2020
2021
2022
2023
CRA-2024 Documentation

Summary

Sandia National Laboratories

- SNL is further developing the existing PFLOTRAN code for application to WIPP PA
  - Potential repository layout changes require 3-D representation
- PFLOTRAN comes with "upgraded" features
  - Enhanced 3-D capability
  - Integrated with existing postprocessing tools
  - Implementation of WIPP-specific capabilities required
- Large-scale testing of PFLOTRAN vs. current WIPP PA codes
  - Aid in validation during review process
- PFLOTRAN to be integrated into WIPP PA for CRA-2024

Appendix COMP

Development and Qualification of the CRA19_COMP Computer Code and Analysis

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Attachment C to Appendix COMP. quality Control Checks of Restoring Undisturbed Properties of Anhydrite Interbeds within DRZs Above and Below Open Areas

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COMP.1. CRA19_COMP MODEL DEVELOPMENT

COMP.1.1 Introduction

The CRA19_COMP model was developed by the EPA to evaluate the effect on repository releases of creep closure and healing of parts of the WIPP repository that are not planned to be filled with waste or other materials. These are called "open areas." For purposes of the DOE's 2019 Compliance Recertification Application Performance Assessment (CRA-2019 PA), these open areas consist of the repository's Operations Area, Experimental Area, and waste panel access drifts that have been abandoned and were not filled with run-of-mine (ROM) salt panel closures. The DOE refers to the abandoned access drifts as abandoned panel closures. As described in this TSD, the abandoned original Waste Panel 9 became another open area, but this panel was not treated as an open area in the CRA-2019 PA. Instead, the original Waste Panel 9 was treated as a surrogate for its replacement, which is planned to be at an unspecified location northwest of the present repository waste area. The DOE's CRA-2019 PA, also called the CRA19 PA, did not simulate salt creep in these open areas but instead modeled them as retaining relatively high porosities and permeabilities throughout EPA's 10,000-year postclosure regulatory period. However, salt creep is a physical process that will actually occur, and the effects of creep closure were therefore not fully captured in the CRA19 PA.

To evaluate the effects that creep closure may have on repository performance, Sandia National Laboratories (SNL), in its capacity as the DOE's science advisor, revised the BRAGFLO Salado Flow model properties used in the CRA19 PA to simulate complete creep closure and healing of the open areas immediately upon repository closure. This was accomplished by assigning the properties of intact Salado halite to these open areas in what SNL called the CRA19_CL model. An exception to this assignment was that the capillary flow characteristics of Salado halite were not modeled in these open areas. The revised model was then used in the DOE's CRA19_CL analysis (Zeitler et al 2019).

Upon review, the Agency determined that although the properties of the model cells representing the open areas were appropriately changed by SNL to those of intact halite in the CRA19_CL model, the disturbed rock zones (DRZs) surrounding those areas were not changed and retained higher porosities and permeabilities that did not reflect salt creep and healing. To correct this, the EPA further revised the BRAGFLO Salado Flow model used in the CRA19_CL analysis by assigning the same properties of intact halite to the DRZs surrounding these open areas. The EPA called this revised model the CRA19_COMP model and used it in the Agency's CRA19_COMP analysis.

The changes that were made to the BRAGFLO Salado Flow model grid in these analyses are illustrated in Figures COMP.1-1 through COMP.1-3. Figure COMP.1-1 shows the Salado Flow model grid used by the DOE in the CRA19 PA. The open Operations Area, Experimental Area, abandoned panel closures, and surrounding DRZs are identified in the figure. Figure COMP.1-2 shows the grid as modified by SNL for the CRA19_CL analysis. Here the cells representing the Operations Area, Experimental Area, and abandoned panel closures are assigned the properties of intact halite as described above but, as previously noted, the properties of the surrounding DRZs are unchanged. As shown in the figure, the properties of the DRZs in the CRA19_CL

model are the same throughout the repository except around the active ROM salt panel closures, the shaft, and the intrusion borehole. Figure COMP.1-3 shows the BRAGFLO grid as further modified by EPA for the CRA19_COMP model. Here the properties of the cells representing the Operations Area, Experimental Area, and abandoned panel closures are the same as in SNL's CRA19_CL model but the properties of the DRZs surrounding those areas are assigned the same properties of intact halite as the open areas themselves. Another change made by the Agency was to assume the integrity of anhydrite Marker Bed 139 and anhydrite layers A and B would be preserved around the healed open areas consistent with SNL's assumption that they would be preserved around the healed ROM salt panel closures.

COMP.1.2 Revisions to Material Blocks

The first step in developing the CRA19_COMP model was to identify the material blocks associated with model cells whose properties would need to be changed. Each cell in the BRAGFLO Salado Flow model represents a specific material, such as intact Salado halite. Each material is assigned a specific set of physical characteristics such as porosity as well as functional flags that identify applicable submodels. These are called the properties of the material. Each set of properties is called a block and each block is assigned a number and a material name for use in the model. The material blocks relevant to CRA19_COMP model development, the associated material names used in the Salado Flow model, and physical descriptions of the materials are presented in Table COMP.1-1. In addition, the properties of a particular material can change over time due, for example, to salt creep and healing. The combination of a BRAGFLO material name and a property, for example, *DRZ_OE_1:PORE_DIS*, is called a model parameter.

Material maps for the BRAGFLO Salado Flow model showing block number assignments in the CRA19 PA have been published by SNL (Day 2019). Examples of material maps relevant to developing the CRA19_COMP model are shown in Figures COMP.1-4 and COMP.1-5. Figure COMP.1-4 shows material block assignments for periods of -5 to zero years. This is the initialization period for the model and is the same for all three versions of the BRAGFLO Salado Flow model discussed here. In the model, time zero is the date that repository operations cease and EPA's postclosure regulatory period begins.

Nine additional material maps with varying block number assignments were prepared by SNL to represent property changes over time resulting, for example, from salt creep and borehole intrusions (Day 2019, Figures 4 through 12). However, the block number assignments and the related material properties of the cells representing the DRZs around the open areas relevant to developing the CRA19_COMP model do not change in the CRA19 PA model. Figure COMP.1-5 is a copy of one such figure showing that the DRZs associated with the Operations Area (identified as Block 15) and the Experimental Area (identified as Block 16) in the CRA19 PA were represented by the properties of Block 37 and the DRZs associated with the abandoned panel closures (identified as Block 41) were represented by the properties of Block 22. Also relevant to developing the CRA19_COMP model was the need to extend undisturbed anhydrite Marker Bed 139 (Block 3) and anhydrite layers A and B (Block 4) into the aforementioned DRZs.

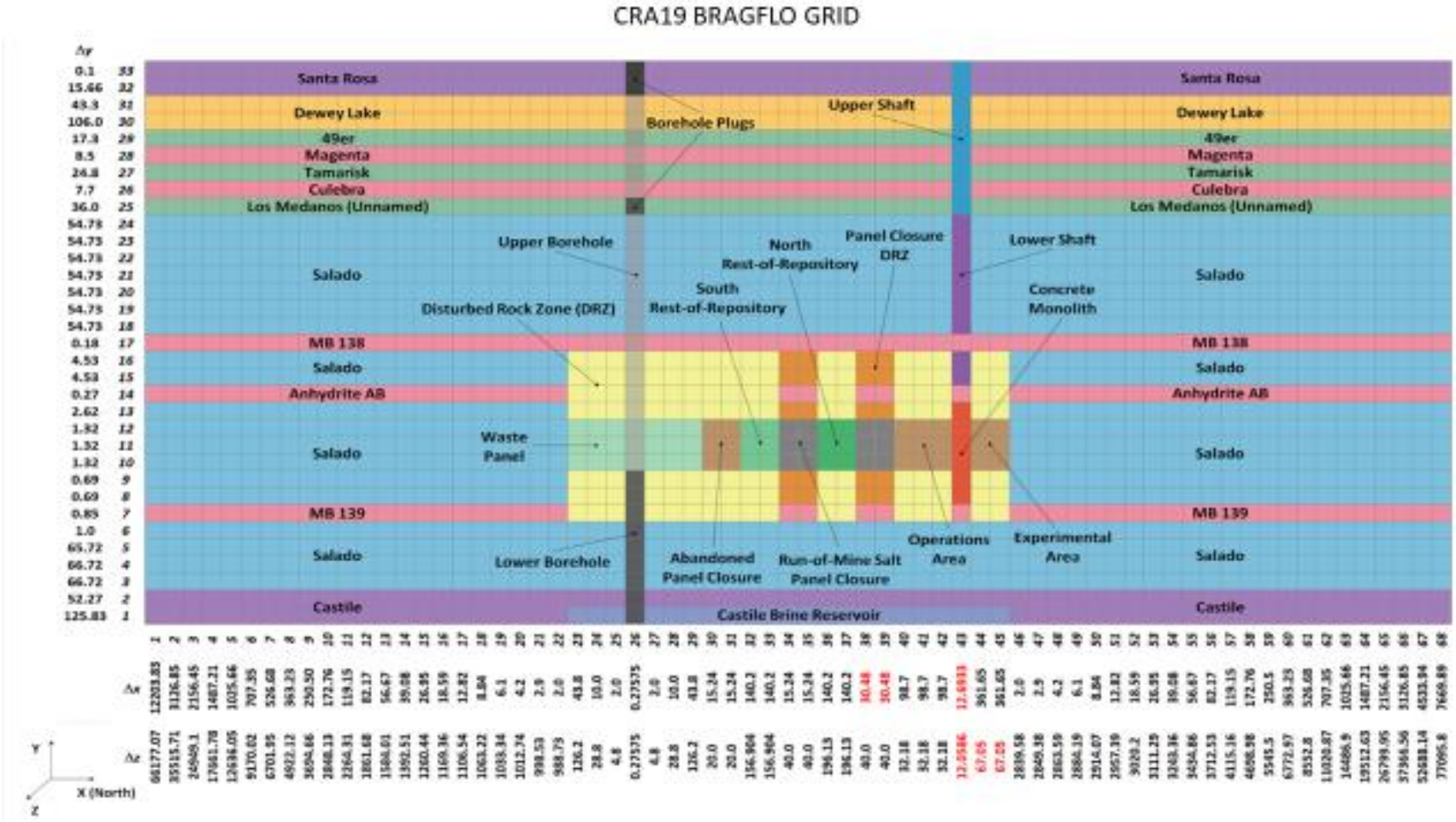

Figure COMP.1-1. BRAGFLO Salado Flow model grid used in the CRA19 PA analysis (from Zeitler et al. 2019, Figure 9; grid dimensions in meters).

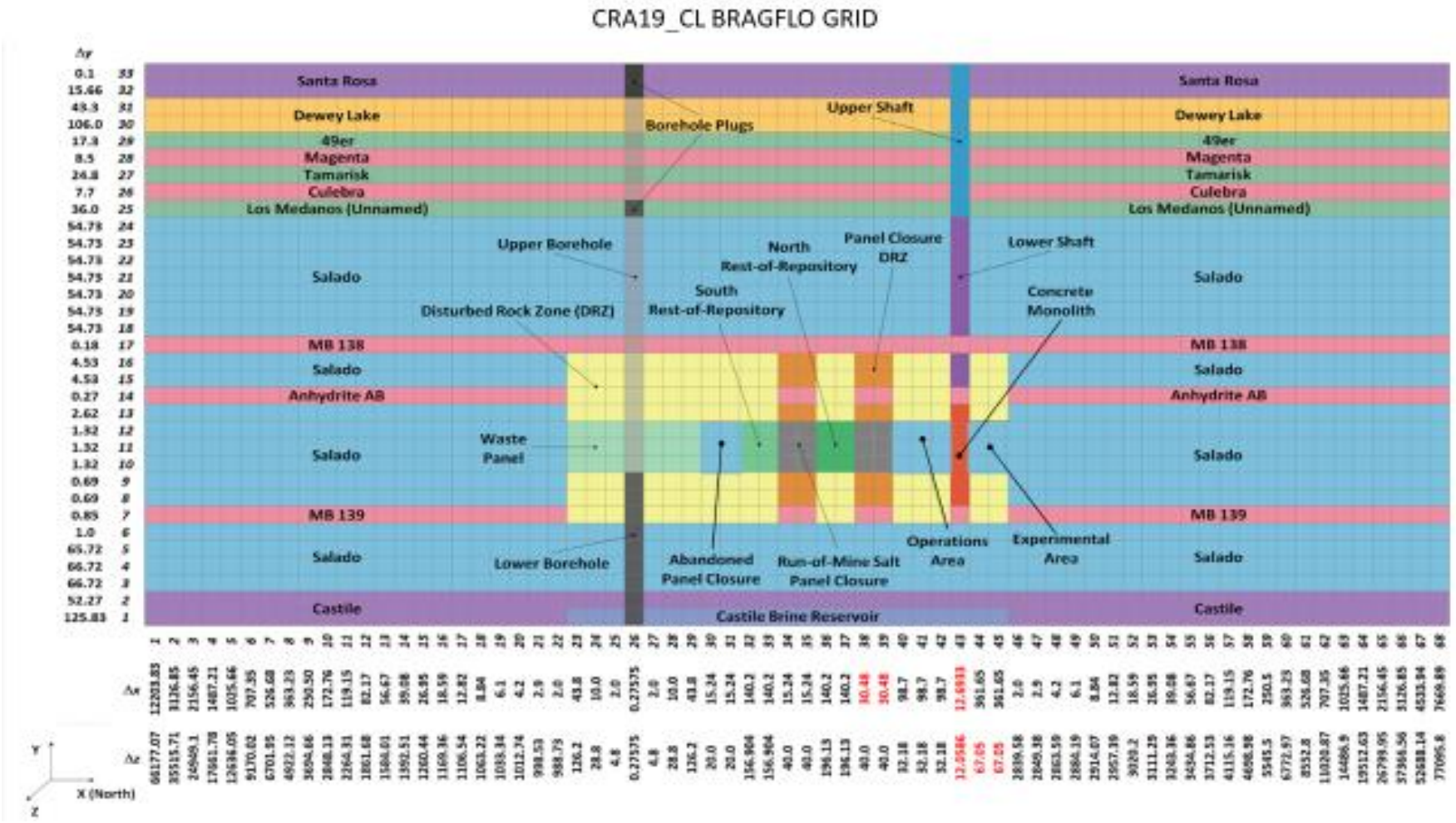

Figure COMP.1-2. BRAGFLO Salado Flow model grid used in the CRA19_CL analysis (modified from Zeitler et al. 2019, Figure 9; grid dimensions in meters).

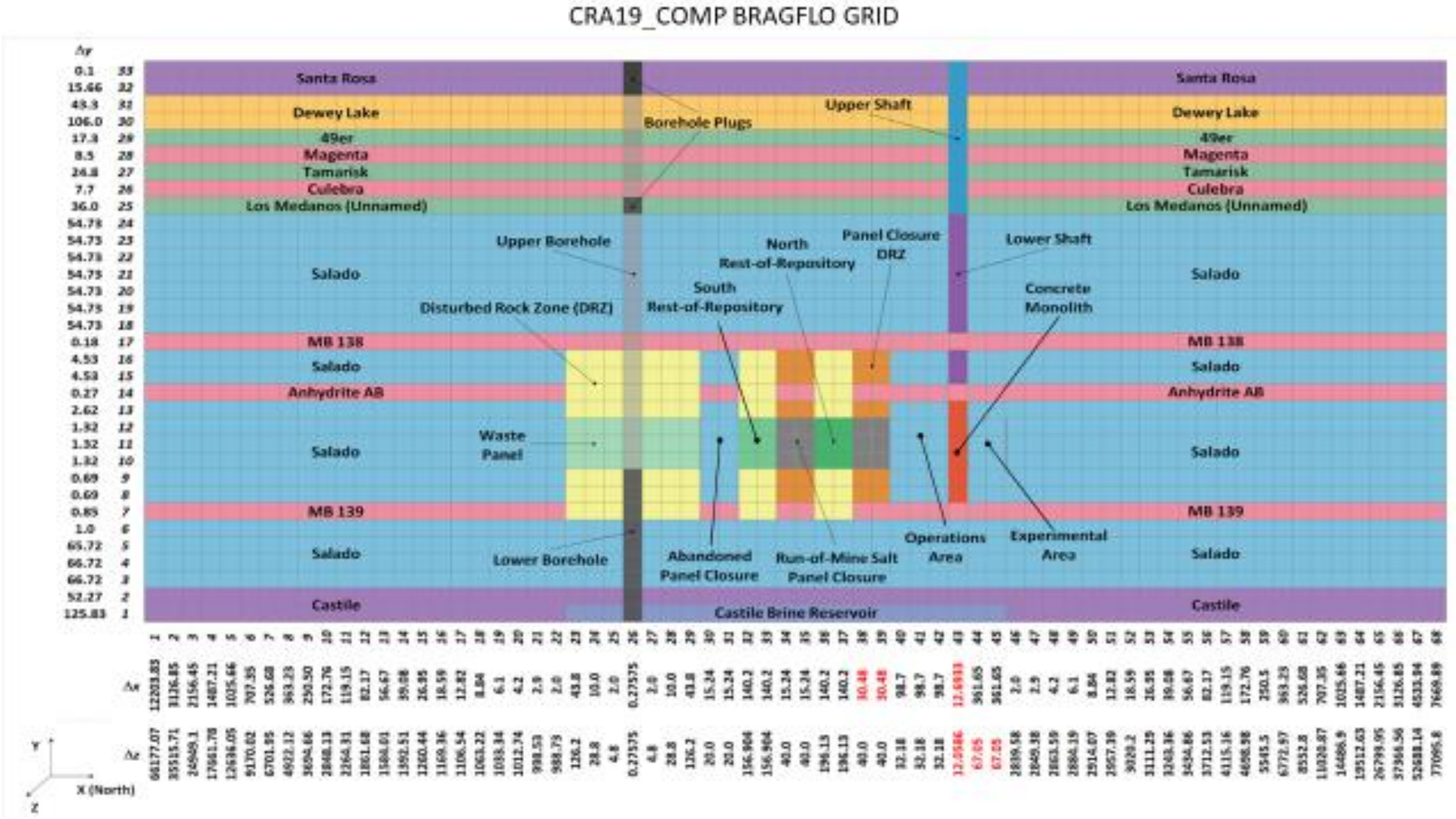

Figure COMP.1-3. BRAGFLO Salado Flow model grid used in the CRA19_COMP analysis (modified from Zeitler et al. 2019, Figure 9; grid dimensions in meters).

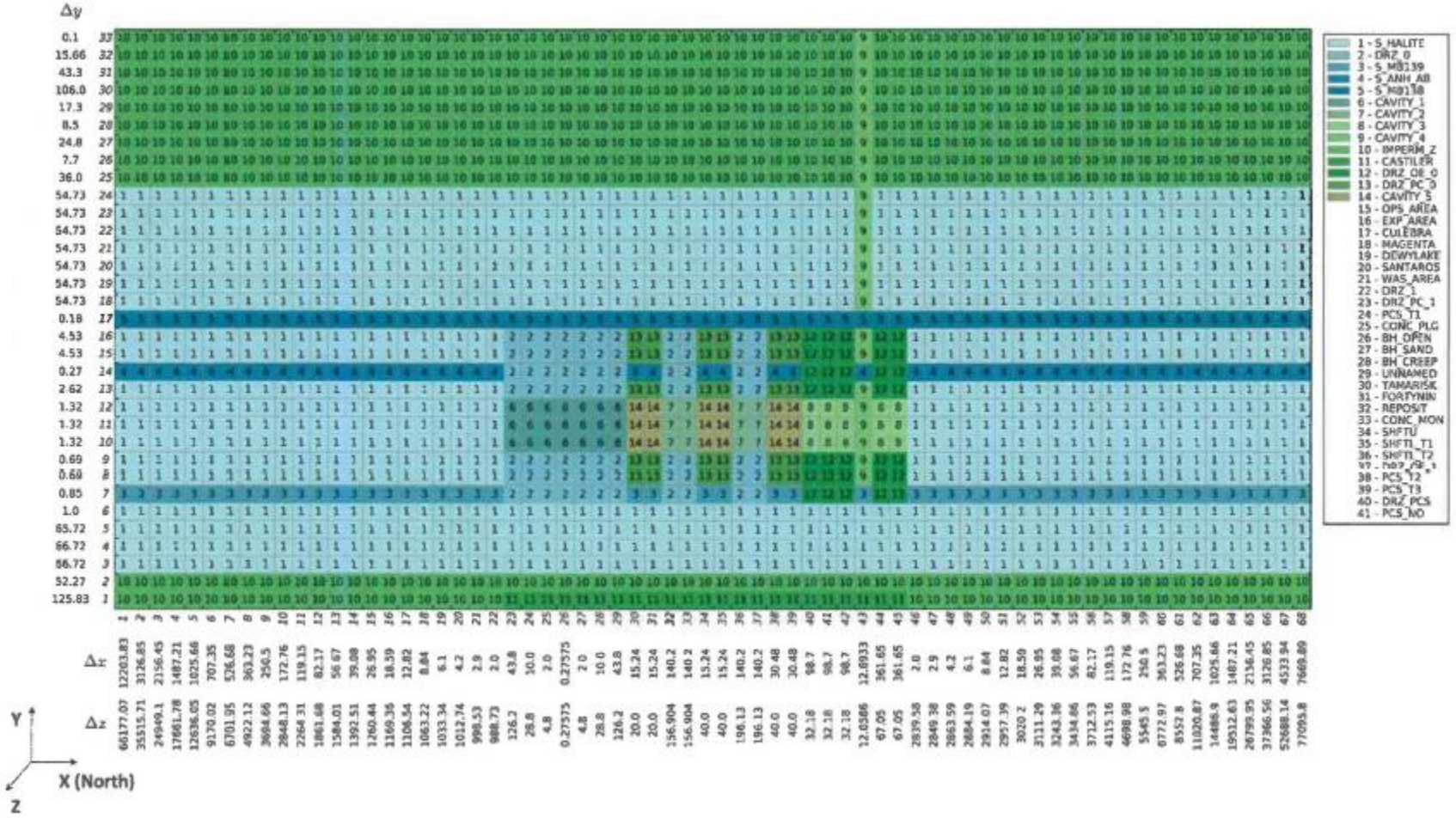

Figure COMP.1-4. BRAGFLO Salado Flow model grid and material map used in the CRA19 PA analysis, years -5 to 0, for all BRAGFLO Scenarios (from Day 2019, Figure 3)

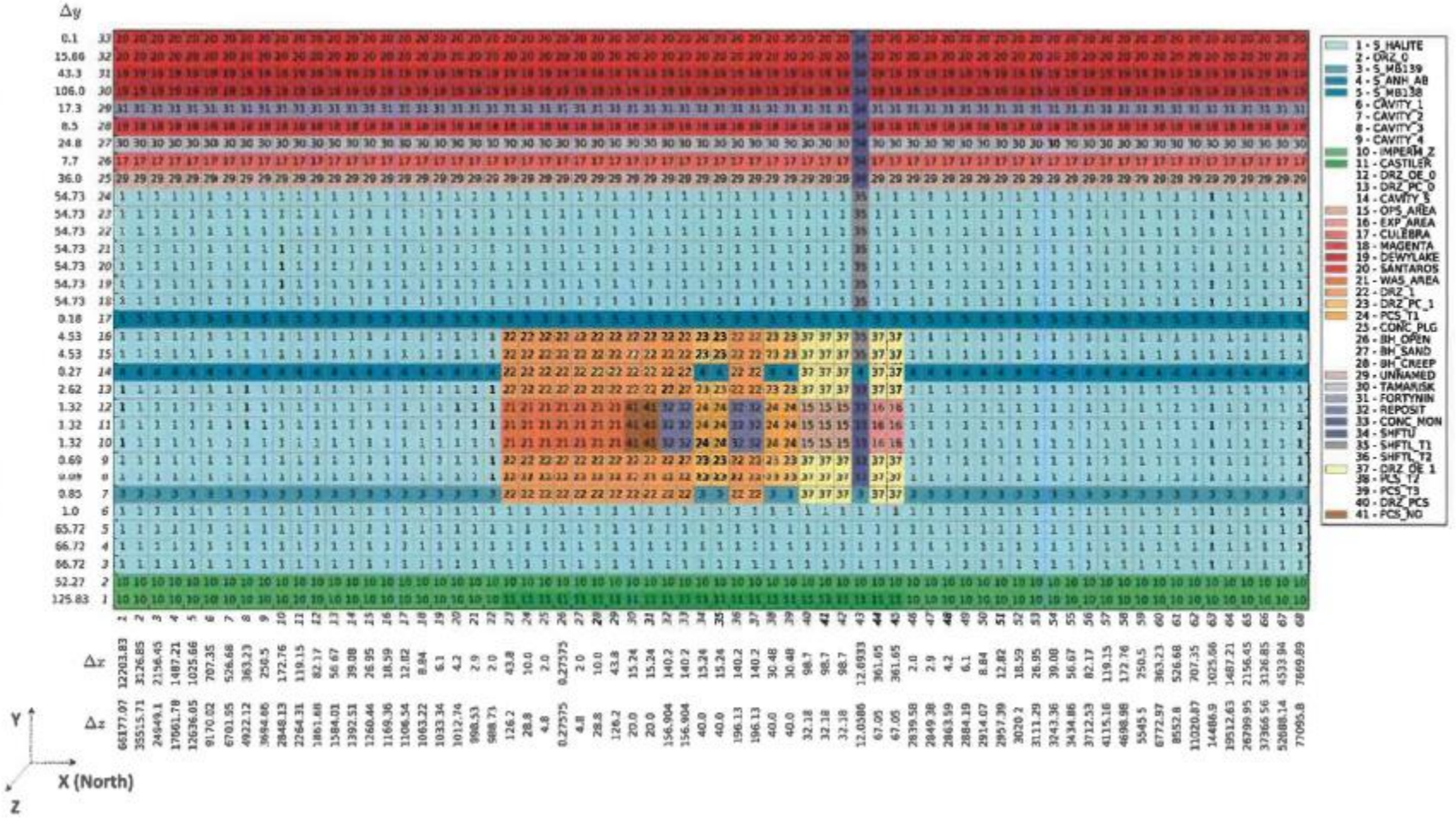

Figure COMP.1-5. BRAGFLO Salado Flow model grid and material map used in the CRA19 PA analysis for the DRZs around the repository open areas relevant to developing the CRA19_COMP model, years 0 to 10.000, representative of all BRAGFLO Scenarios (from Day 2019, Figure 4; see text discussion)

The material properties of the three open areas, represented by Blocks 15, 16, and 41, had already been changed to those of intact halite (Block 1) by SNL in the CRA19_CL model. Thus, the only additional modifications to material properties needed for the CRA19_COMP model were to (1) change the properties of all DRZ cells represented by Block 37 to those of intact halite, (2) change the properties of the DRZ cells represented by Block 22 above and below the abandoned panel closures to those of intact halite, and (3) restore the properties of the cells representing the anhydrite horizons within these DRZs to those representing undisturbed anhydrite. The material properties of the remaining cells representing the DRZs associated with the Waste Area (Block 21), the North and South Rest-of-Repository (Block 24), and the active ROM panel closures (Block 32) in Figure COMP.1-5 were not changed.

In its initial review of SNL's CRA19_CL model input scripts preparatory to making the above modifications, the EPA found that the BRAGFLO Salado Flow model block numbering system presented in the material maps by Day (2019) and described above was not the same as the numbering system actually used in the CRA19 PA or the CRA19_CL models. The EPA did not expect this discrepancy because the source document *Day (2019)* is SNL's Analysis Package for Salado flow modeling in the CRA-2019 PA and is self-described as "documenting" the BRAGFLO Salado Flow model used in the CRA19 PA (Day 2019, p. 12).

Pursuant to a request for clarification, the DOE provided the response presented in Attachment A. This response explained that the material map images in Day's (2019) Analysis Package are produced by a post-processing script that is not connected to the block numbering in the CAMDAT model input files and although each numbering system is internally consistent, they are acknowledged to be different. The DOE further stated that:

> *"The material map image numbering [in Day (2019)] is strictly for visualization and has no meaning beyond connecting the grid cells visualized to a material name in the figure legend."*

However, the EPA did not find this caveat in Day's report. As previously noted, the introduction to Day's Analysis Package states:

> *"This analysis package documents the Salado flow component of the CRA-2019 PA analysis."* (Day 2019, p. 12).

To "document" an analysis implies accuracy, and the EPA expects the documentation of future DOE performance models to be accurate.

The discrepancies in block numbering relating to the repository areas of interest in developing the CRA19_COMP model are shown in Table COMP.1-1 and noted in a footnote to that table. The principal numbering change of interest was the renumbering of Block 37 to Block 45. Block 37 is described in Day (2019) as representing the material properties of the DRZs above and below the Operations and Experimental Areas, but in the model Block 37 has the properties of a sedimentary horizon called the Tamarisk. However, the Agency found the material properties of Block 45 to be the same as originally assigned to Block 37 and the renumbering as Block 45 instead of Block 37 was found to be consistent throughout the model. In recognition of this

change, Block 45 will be cited as representing the material properties of the DRZs above and below the Operations and Experimental Areas in the remainder of this appendix.

The 15 properties assigned to the materials in Table COMP.1-1 relevant to the development of the CRA19_COMP model are listed in Table COMP.1-2. Some materials have additional properties that are not relevant to intact halite and are not included in the table.

Table COMP.1-1. Material Block Names and Physical Descriptions for Repository Areas in the BRAGFLO Salado Flow Model

Block Number	Material Name in BRAGFLO	Physical Description
1	S_HALITE	INTACT SALADO HALITE
2	DRZ_0	DRZ AROUND WASTE FROM -5 YRS TO 0 YRS
3	S_MB139	SALADO MARKER BED 139
4	S_ANH_AB	SALADO ANHYDRITE LAYERS A + B
6	CAVITY_1	OPEN WASTE AREA FROM -5 YRS TO 0 YRS
7	CAVITY_2	OPEN REST OF REPOSITORY FROM -5 YRS TO 0 YRS
8	CAVITY_3	OPS/EXP AREAS FROM -5 YRS TO 0 YRS
12	DRZ_OE_0	DRZ AROUND OPS/EXP AREAS FROM -5 YRS TO 0 YRS
13	DRZ_PC_0	DRZ AROUND ACTIVE AND ABANDONED PCS FROM -5 YRS TO 0 YRS
14	CAVITY_5	ACTIVE AND ABANDONED PCS FROM -5 YRS TO 0 YRS
15	OPS_AREA	OPERATIONS AREA FROM 0 YRS TO 10,000 YRS
16	EXP_AREA	EXPERIMENTAL AREA FROM 0 YRS TO 10,000 YRS
21	WAS_AREA	WASTE AREA FROM 0 YRS TO 10,000 YRS
22	DRZ_1	DRZ AROUND WASTE AND ABANDONED PCS FROM 0 YRS TO 10,000 YRS, AND DRZ AROUND ACTIVE PCS FROM 0 YRS TO 100 YRS
23	DRZ_PC_1	DRZ AROUND ACTIVE PCS FROM 100 YRS TO 200 YRS
24	PCS_T1	ACTIVE PCS FROM 0 YRS TO 100 YRS
32 ➡ 40	REPOSIT	NORTH AND SOUTH REST OF REPOSITORY FROM 0 YRS TO 10,000 YRS
37 ➡ 45	DRZ_OE_1	DRZ AROUND OPS/EXP AREAS FROM 0 YRS TO 10,000 YRS
38 ➡ 46	PCS_T2	ACTIVE PCS FROM 100 YRS TO 200 YRS
39 ➡ 47	PCS_T3	ACTIVE PCS FROM 200 YRS TO 10,000 YRS
40 ➡ 48	DRZ_PCS	DRZ AROUND ACTIVE PCS FROM 200 YRS TO 10,000 YRS
41 ➡ 49	PCS_NO	ABANDONED PANEL CLOSURE FROM 0 YRS TO 10,000 YRS

Note: Data from Day 2019, Figures 3 – 12 (ERMS 571368) documenting the BRAGFLO Salado Flow model used in the CRA19 PA except where superseded by reassigned block numbers identified in the BRAGFLO Salado Flow model input script, as indicated by black arrows.

Table COMP.1-3 presents the original property values assigned to Block 22 (material DRZ-1 in BRAGFLO) above and below the abandoned panel closures and to Block 45 (material DRZ_OE_1 in BRAGFLO), above and below the Operations and Experimental Areas. These values were replaced in the CRA19_COMP model by the corresponding values for intact halite (material S_HALITE; Block 1), also shown in the table. The capillary pressure parameters PCT_A and PCT_EXP for intact halite were treated by SNL as an exception when assigning intact halite properties to open areas in the CRA19_CL model. Both parameters were given values of zero instead of the values shown in the table for intact halite. SNL stated that this change was made primarily for computational efficiency and convenience, and was justified due to the limited impact on brine and gas flows in association with the extremely low intrinsic

permeabilities of intact halite (Zeitler et al 2019, p. 136). This change had the effect of turning off the capillary pressure model. Although SNL did not quantify the impact that ignoring capillary forces would have on model results, this same convention was also used in the CRA19_COMP model for consistency.

Table COMP.1-2. Properties of Materials Relevant to the EPA CRA19_COMP Model

Property Name in BRAGFLO	Property Description	Units
CAP_MOD	Capillary pressure model number	None
COMP_RCK	Bulk compressibility	Pa^{-1}
KPT	Flag for permeability-determined threshold capillary pressure	None
PC_MAX	Maximum allowable capillary pressure	Pa
PCT_A	Threshold capillary pressure equation linear parameter	Pa
PCT_EXP	Threshold capillary pressure equation exponential parameter	None
PO_MIN	Minimum brine pressure for capillary pressure model KPC = 3	Pa
PORE_DIS	Brooks-Corey pore distribution parameter	None
POROSITY	Effective porosity	None
PRMX_LOG	Log of intrinsic permeability, x-direction	Log(m^2)
PRMY_LOG	Log of intrinsic permeability, y-direction	Log(m^2)
PRMZ_LOG	Log of intrinsic permeability, z-direction	Log(m^2)
RELP-MOD	Relative permeability model number	None
SAT_RBRN	Residual brine saturation	None
SAT_RGAS	Residual gas saturation	None

Property values for the undisturbed anhydrite horizons that were extended into the open area DRZs in the CRA19_COMP model are shown in Table COMP.1-3 for comparison with the original DRZ and intact halite properties. The property values for undisturbed anhydrite shown in the table replaced the values for disturbed anhydrite assigned to the relevant cells in the CRA19_CL model. These anhydrite horizons also have other properties for simulating fracturing under elevated gas pressures that are not shown in the table because they have no parallels in intact halite.

Another version of BRAGFLO, called the BRAGFLO_DBR model, is used to simulate direct brine releases (DBRs) from the repository. This model was modified by SNL to separately identify the abandoned panel closures in the CRA19 PA and was again modified by SNL to assign the properties of intact halite to those closures in the CRA19_CL model. A grid map for that model is shown in Figure COMP.1-6. The individual ROM salt waste panel closures that remain unchanged are shown in grey and those that were removed in the repository redesign are shown in reddish-orange in the figure. No additional changes to this model were needed for the CRA19_COMP analysis.

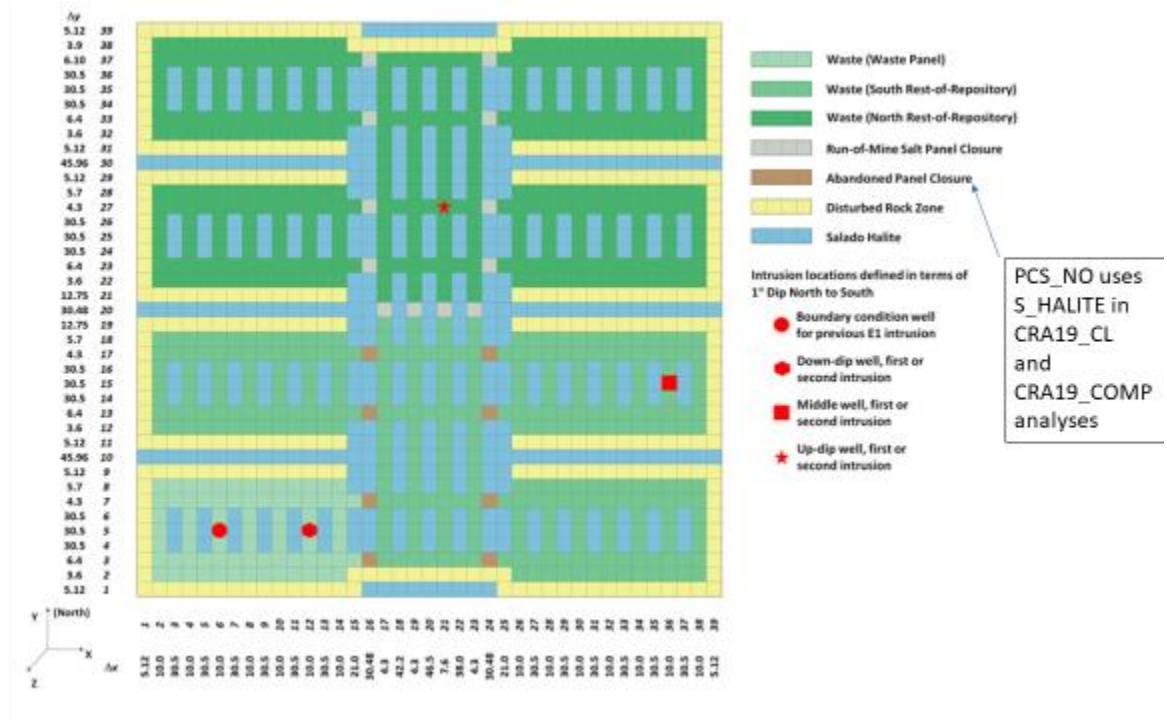

Figure COMP.1-6. BRAGFLO_DBR model grid used in the CRA19_CL and CRA19_COMP analyses (modified from Zeitler et al. 2019, Figure 52; grid dimensions in meters).

Table COMP.1-3. Original Property Values Used in the CRA19 PA and CRA19_CL Models Associated with Changes in the CRA19_COMP Model

Property Name in BRAGFLO	Material DRZ_OE_1 (Block 45)	Material DRZ_1 (Block 22)	Material S_HALITE (Block 1)	Material S_MB139 (Block 3)	Material S_ANH_AB (Block 4)	Units
CAP_MOD	1	1	2	2	2	None
COMP_RCK	7.41E-10	7.41E-10	Uniform Distribution Max 1.92E-10 Mean 0.975 E-10 Min 0.0294E-10	2.23E-11	2.23E-11	Pa^{-1}
KPT	0	0	0	0	0	None
PC_MAX	1E+08	1E+08	1E+08	1E+08	1E+08	Pa
PCT_A	0	0	0.56 (see note below)	0.260	0.260	Pa
PCT_EXP	0	0	-0.346 (see note below)	-0.348	-0.348	None
PO_MIN	101325	101325	101325	101325	101325	Pa
PORE_DIS	0.7	0.7	0.7	Student Distribution Max 0.842 Mean 0.644 Min 0.491	Same as sampled value for S_MB139	None
POROSITY	0.0129	0.0129	Cumulative Distribution Max 0.0519 Median 0.01 Min 0.001 Value 0.01	0.0110	0.0110	None
PRMX_LOG	-17	Uniform Distribution Max -12.5 Mean -16.0 Min -19	Uniform Distribution Max -21 Mean -22.5 Min -24	Student Distribution Max -17.1 Mean -18.9 Min -21.0	Same as sampled value for S_MB139 (see footnote 4)	$Log(m^2)$
PRMY_LOG	-17	Equals PERMX_LOG	Equals PERMX_LOG	Equals PERMX_LOG	Equals PERMX_LOG	$Log(m^2)$
PRMZ_LOG	-17	Equals PERMX_LOG	Equals PERMX_LOG	Equals PERMX_LOG	Equals PERMX_LOG	$Log(m^2)$

Table COMP.1-3. Original Property Values Used in the CRA19 PA and CRA19_CL Models Associated with Changes in CRA19_COMP Model (Continued)

Property Name in BRAGFLO	Material DRZ_OE_1 (Block 45)	Material DRZ_1 (Block 22)	Material S_HALITE (Block 1)	Material S_MB139 (Block 3)	Material S_ANH_AB (Block 4)	Units
RELP-MOD	4	4	4	Delta Distribution Max 4 Median 4 Min 1	Same as sampled value for S_MB139	None
SAT_RBRN	0	0	3.00E-01	Student Distribution Max 1.74E-01 Mean 8.36E-02 Min 7.78E-03	Same as sampled value for S_MB139	None
SAT_RGAS	0	0	2.00E-01	5.50E-02	Same as constant value for S_MB139	None

Footnotes:

1. Property values from Kim and Feng (2019, ERMS 571660). Some properties have assigned distributions that were not used in the CRA19 models. Property values without identified statistical distributions were treated as constants. Property values with identified statistical distributions were treated as uncertain and were sampled.
2. Capillary pressure parameters PCT_A and PCT_EXP were given zero values by SNL when assigning the properties of intact halite to the three repository open areas. See text discussion. This same convention was also used in the CRA19_COMP model for consistency.
3. Property SAT_IBRN, the initial brine saturation, has a value of 1.00 for material DRZ_OR_1 but is undefined for material S_HALITE. The value of 1.00 was retained for this property in the CRA19_COMP model.
4. Parameter S_ANH_AB: PRMX_LOG is identified in Kim and Feng (2019, Table 24, Footnote 3; ERMS 571660) as using the default constant value for all vectors. However, in the CRA19 PA, the value of this parameter is the same as the sampled value for S_MB139. The parameter values used in the CRA19 PA were also used in the CRA19_CL and CRA19_COMP models for consistency.

COMP.1.3. Modifications to the Baseline CRA19_CL Model

The first set of modifications was to correlate the properties of Block 45 (DRZ_OE_1) with those of Block 1 (S_HALITE, intact halite). Material DRZ_OE_1 is used in the DRZ cells above and below the Abandoned Panel Closure, Operations, and Experimental Areas in the CRA19_COMP analysis. The Algebra 1 step in the BRAGFLO Salado Flow computational loop pre-processes the parameter data from the Performance Assessment Parameter Database (PAPDB) to values that the BRAGFLO simulation needs. This modification is made in the Algebra 1 BRAGFLO input file, named alg1_bf_CRA19_COMP.inp. The differences between alg1_bf_CRA19_COMP.inp (indicated by '<' sign) and alg1_bf_CRA19_CL.inp (indicated by '>' sign) are excerpted below:

```
< !  CALCULATE PERM_X FROM PRMX_LOG AND APPLY TO PERM_Y AND PERM_Z
< !  X_T: TAKE PERMEABILITY FROM HALITE
< PERM_X   = 10**PRMX_LOG[B:1]
< !  X_T: TAKE OTHER PROPERTIES FROM HALITE
< COMP_RCK = COMP_RCK[B:1]
< POROSITY = POROSITY[B:1]
< PRESSURE = PRESSURE[B:1]
< RELP_MOD = RELP_MOD[B:1]
< SAT_RBRN = SAT_RBRN[B:1]
< SAT_RGAS = SAT_RGAS[B:1]
< CAP_MOD = CAP_MOD[B:1]
< !  X_T: TAKE OTHER PROPERTIES FROM HALITE
< COMP_RCK = COMP_RCK[B:1]
< POROSITY = POROSITY[B:1]
< PRESSURE = PRESSURE[B:1]
< RELP_MOD = RELP_MOD[B:1]
< SAT_RBRN = SAT_RBRN[B:1]
< SAT_RGAS = SAT_RGAS[B:1]
< CAP_MOD = CAP_MOD[B:1]
---
> !  CORRELATE PERMEABILITY TO DRZ_1
> PERM_X   = PERM_X[B:22]
> !  CORRELATE POROSITY TO DRZ_0
> POROSITY = POROSITY[B:2]
> !  CORRELATE FRACTURE PARAMETERS TO DRZ_0
> PI_DELTA = PI_DELTA[B:2]
> PF_DELTA = PF_DELTA[B:2]
> IFRX     = IFRX[B:2]
> IFRY     = IFRY[B:2]
> IFRZ     = IFRZ[B:2]
> KMAXLOG  = KMAXLOG[B:2]
> PHIMAX   = PHIMAX[B:2]
> !  CALCULATE POROSITY AT FRACTURE INITIATION PRESSURE
> PORINIT  = POROSITY*(EXP(POR_COMP*(PI_DELTA)))
> !  CALCULATE N EXPONENTIAL FOR FRACTURED PERMEABILITY MODEL
> PERM_EXP = LOG((10**KMAXLOG)/PERM_X)/(LOG(PHIMAX/PORINIT))
```

Thus, the S_HALITE (Block 1) material properties were assigned to DRZ_OE_1 (Block 45). This set of modifications for the DRZ is the same as the DOE's CRA19_CL analysis modifications of the CRA19 analysis for abandoned panel closures.

The second set of modifications (1) assigned the properties of DRZ_OE_1, which now are like those of intact halite, to the DRZ cells above and below the Abandoned Panel Closures, Operations, and Experimental Areas, (2) restored the properties of the cells representing the anhydrite horizons within these DRZs to those representing undisturbed anhydrite (S_MB139

and S_ANH_AB), and (3) adjusted simulation control parameters for BRAGFLO calculation convergence. There are six scenarios simulated in BRAGFLO for all three replicates and 100 vectors per replicate. Each BRAGFLO scenario has its own input file, named as bf1_CRA19_COMP_s(1,2,3,4,5,6).inp. There are two fallback solver input files for each scenario for simulation convergence. For example, the fallback input files for Scenario 1 are named as bf1_CRA19_COMP_s1_mod(1,2).inp. There are total of 18 files in this second set of modifications. As an example, the difference between bf1_CRA19_COMP_s6_mod2.inp (indicated by '<' sign) and bf1_CRA19_CL_s6_mod2.inp (indicated by '>' sign) are excerpted below with explanations:

Assign DRZ_OE_1 to cells in DRZs below Abandoned Panel Closure Area,

```
< MODIFY, MAT=DRZ_OE_1,   TIME_ID=1, IRANGE=30,31, JRANGE=8,9,   KRANGE=1,1
---
> MODIFY, MAT=DRZ_1,   TIME_ID=1, IRANGE=30,31, JRANGE=8,9,   KRANGE=1,1
```

Assign DRZ_OE_1 to cells in DRZs above Abandoned Panel Closure Area,

```
< MODIFY, MAT=DRZ_OE_1,   TIME_ID=1, IRANGE=30,31, JRANGE=13,13,  KRANGE=1,1
< MODIFY, MAT=DRZ_OE_1,   TIME_ID=1, IRANGE=30,31, JRANGE=15,16,  KRANGE=1,1
---
> MODIFY, MAT=DRZ_1,   TIME_ID=1, IRANGE=30,31, JRANGE=13,13,  KRANGE=1,1
> MODIFY, MAT=DRZ_1,   TIME_ID=1, IRANGE=30,31, JRANGE=15,16,  KRANGE=1,1
```

Assign DRZ_OE_1 to cells in DRZs above and below Operations and Experimental Areas,

```
< MODIFY, MAT=DRZ_OE_1, TIME_ID=1, IRANGE=40,42, JRANGE=8,9,   KRANGE=1,1
< MODIFY, MAT=DRZ_OE_1, TIME_ID=1, IRANGE=44,45, JRANGE=8,9,   KRANGE=1,1
< MODIFY, MAT=DRZ_OE_1, TIME_ID=1, IRANGE=40,42, JRANGE=13,13,  KRANGE=1,1
< MODIFY, MAT=DRZ_OE_1, TIME_ID=1, IRANGE=40,42, JRANGE=15,16,  KRANGE=1,1
< MODIFY, MAT=DRZ_OE_1, TIME_ID=1, IRANGE=44,45, JRANGE=13,13,  KRANGE=1,1
< MODIFY, MAT=DRZ_OE_1, TIME_ID=1, IRANGE=44,45, JRANGE=15,16,  KRANGE=1,1
---
> MODIFY, MAT=DRZ_OE_1, TIME_ID=1, IRANGE=40,42, JRANGE=7,9,   KRANGE=1,1
> MODIFY, MAT=DRZ_OE_1, TIME_ID=1, IRANGE=44,45, JRANGE=7,9,   KRANGE=1,1
> MODIFY, MAT=DRZ_OE_1, TIME_ID=1, IRANGE=40,42, JRANGE=13,16,  KRANGE=1,1
> MODIFY, MAT=DRZ_OE_1, TIME_ID=1, IRANGE=44,45, JRANGE=13,16,  KRANGE=1,1
```

Assign undisturbed anhydrite, S_MB139 and S_ANH_AB properties to the cells representing the anhydrite horizons within these DRZs above and below Abandoned Panel Closure, Operations, and Experimental Areas,

```
< MODIFY, MAT=S_MB139,   TIME_ID=1, IRANGE=30,31, JRANGE=7,7,   KRANGE=1,1
< MODIFY, MAT=S_ANH_AB,   TIME_ID=1, IRANGE=30,31, JRANGE=14,14,  KRANGE=1,1
< MODIFY, MAT=S_MB139,   TIME_ID=1, IRANGE=40,42, JRANGE=7,7,   KRANGE=1,1
< MODIFY, MAT=S_ANH_AB,   TIME_ID=1, IRANGE=40,42, JRANGE=14,14,  KRANGE=1,1
< MODIFY, MAT=S_MB139,   TIME_ID=1, IRANGE=44,45, JRANGE=7,7,   KRANGE=1,1
< MODIFY, MAT=S_ANH_AB,   TIME_ID=1, IRANGE=44,45, JRANGE=14,14,  KRANGE=1,1
---
> MODIFY, MAT=DRZ_1,   TIME_ID=1, IRANGE=30,31, JRANGE=7,7,   KRANGE=1,1
> MODIFY, MAT=DRZ_1,   TIME_ID=1, IRANGE=30,31, JRANGE=14,14,  KRANGE=1,1
```

Increase the maximum steps, MAXSTEPS, from 30000 to 90000 for simulation convergence,

```
< DT_INCR=1.25,   DT_REDU=0.5,   AUTODT=YES,  TSWITCH=1.0,&
< MAXSTEPS=90000
---
> DT_INCR=1.25,   DT_REDU= 0.5,   AUTODT=YES,  TSWITCH=1.0,&
> MAXSTEPS=30000
```

Uncomment the fracture properties for DRZ_OE_1, which is now a halite-like material without fracturing,

```
< ! FRACTURE, MAT= DRZ_OE_1, FRAC_PI   = PI_DELTA, FRAC_PF  = PF_DELTA,&
< !                FRAC_PHI  = PHIMAX,   FRAC_EXP = PERM_EXP,&
< !                FRAC_PMX  = IFRX,     FRAC_PMY = IFRY,&
< !                FRAC_PMZ  = IFRZ,     FRAC_PRC = OFF
---
>  FRACTURE, MAT= DRZ_OE_1, FRAC_PI   = PI_DELTA, FRAC_PF  = PF_DELTA,&
>                 FRAC_PHI  = PHIMAX,   FRAC_EXP = PERM_EXP,&
>                 FRAC_PMX  = IFRX,     FRAC_PMY = IFRY,&
>                 FRAC_PMZ  = IFRZ,     FRAC_PRC = OFF
```

After these two sets of modifications, the S_HALITE material sampled parameters for permeability, porosity, rock compressibility, brine far-field pore pressure, and the relative permeability model, along with the constant S_HALITE parameters for residual brine saturation, residual gas saturation, and the capillary pressure limit type model were assigned to DRZ cells above and below the Abandoned Panel Closure, Operations, and Experimental Areas. In addition, S_MB139 and S_ANH_AB material properties were restored for undisturbed anhydrite horizons. Those are the changes for EPA's CRA19_COMP analysis compared to DOE's CRA19_CL analysis.

COMP.1.4. Implementation of the CRA19_COMP Model

The first step to implement the CRA19_COMP analysis is the database setup. The following commands are used to set up the CRA19/CRA19_CL based CRA19_COMP analysis in the PAPDB:

Add CRA19_COMP to the Analysis table with the new Series number, 40, using the SQL command,

```
INSERT INTO Analyses (Analysis, Name, Description, AnalysisRevision, SeriesNumber) VALUES ('CRA19_COMP', 'CRA19/CRA19_CL based Open Area Closure test', 'CRA19/CRA19_CL based analysis with complete closure for open areas and associated DRZs', 0, 40);
```

Copy the CRA19/CRA19_CL entries (1329 parameters) into the AnalysisToVersion table with the new analysis name using the following SQL command,

```
INSERT INTO AnalysisToVersion (Analysis, Material, Property, Version, Code, VersionNumber, AnalysisRevision ) SELECT 'CRA19_COMP', Material, Property, Version, Code, VersionNumber, AnalysisRevision FROM AnalysisToVersion WHERE Analysis = 'CRA19';
```

The second step is the analysis setup. The following commands are used to make a working directory for the CRA19_COMP analysis and pull the CRA19_CL code versions and run control scripts into this working directory.

Make a working directory for the CRA19_COMP analysis,

```
cd Analyses
mkdir CRA19_COMP
cd CRA19_COMP
```

Pull the run control scripts from the CRA19 folder and edit the file to change the analysis name from 'CRA19' to 'CRA19_COMP',

```
cp ../CRA19/run_CRA19.sh run_CRA19_COMP.sh
```

Pull the CRA19_CL code versions into the working directory and rename them to CRA19_COMP,

```
/shared/RC_Scripts/GetCRA19Files.sh CRA19_CL
$CVSLIB/bin/ChangeAllNames.sh CRA19_CL CRA19_COMP
```

Make the modifications to the input files as described in COMP. 2.3.

The last step is to compile and run the new analysis.

The following commands compile the CRA19_COMP analysis with the modifications from the CRA19_CL analysis,

```
$CVSLIB/bin/InstallAnalysisFiles.sh CRA19_COMP
```

Make a new analysis folder and run the CRA19_CL based CRA19_COMP analysis,

```
mkdir Analyses/CRA19_COMP
nohup ./run_CRA19_COMP CRA19_CL CRA19_COMP &
```

No new parameters need to be entered into the database for this CRA19_COMP analysis. Therefore, the implementation step for new parameter values is omitted.

COMP.1.5. CRA19_COMP Analysis Results

The modifications to the material properties of the DRZs above and below the Abandoned Panel Closure, Operations, and Experimental Areas in the BRAGFLO grid changed the waste area pressures and brine saturations. There are direct impacts on some, but not all release mechanisms. In general, increased saturations also lead to increased pressures due to increased gas generation from chemical reactions. Cuttings and cavings releases are independent of waste area pressures and saturations. Spallings releases are directly dependent on waste area pressures but are also indirectly dependent on saturations due to the gas generation model. Direct brine releases are directly impacted by waste area pressures and saturations, as the criteria for a DBR to occur are based on minimum pressure and saturation values. Finally, discharges to the Culebra (which directly impact releases from the Culebra) are driven by brine flow up the borehole, which are impacted by waste area pressures and saturations.

Cuttings and cavings releases are independent of waste area pressure and saturation. Figure COMP.1-7 confirms that the changes made for the CRA19_COMP analysis have no impact on cuttings and cavings releases.

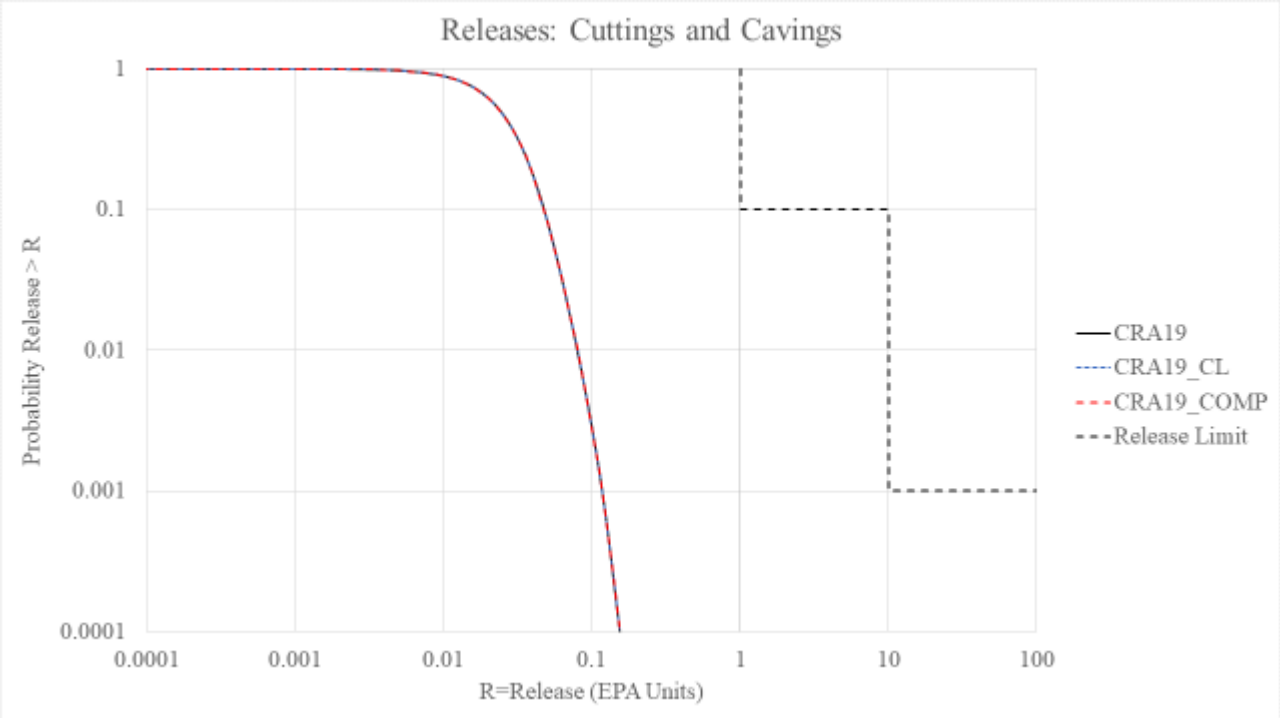

Figure COMP.1-7. Mean cuttings and cavings releases from the CRA19, CRA19_CL, and CRA19-COMP analyses.

Spallings releases are indirectly dependent on saturations due to the gas generation model and directly dependent upon waste area pressures. In general, increased saturations also lead to increased pressures due to increased gas generation from chemical reactions. Figure COMP.1-8 compares spallings releases for the CRA19, CRA19_CL, and CRA19_COMP analyses. CRA19_CL spallings releases are observed to be lower than CRA19 spallings releases. According to Zeitler et al. (2019), the difference in releases is due to the larger overall decreases in pressures for Castile brine-intruded scenarios with only modest increases in waste area pressures for non-Castile brine intruded scenarios in the CRA19_CL analysis in comparison with the CRA19 analysis. Similar to the CRA19_CL analysis, the CRA19_COMP spallings releases are lower than the CRA19 spallings releases. The slight increase in low probability-high consequence spallings releases in CRA19_COMP analysis, in comparison to CRA19_CL analysis, is due to the modifications of the DRZ material properties in the CRA19_COMP analysis. Using halite-like material for the DRZs above and below the Abandoned Panel Closure area leads to higher pressure in the Waste Area compared to the CRA19_CL analysis.

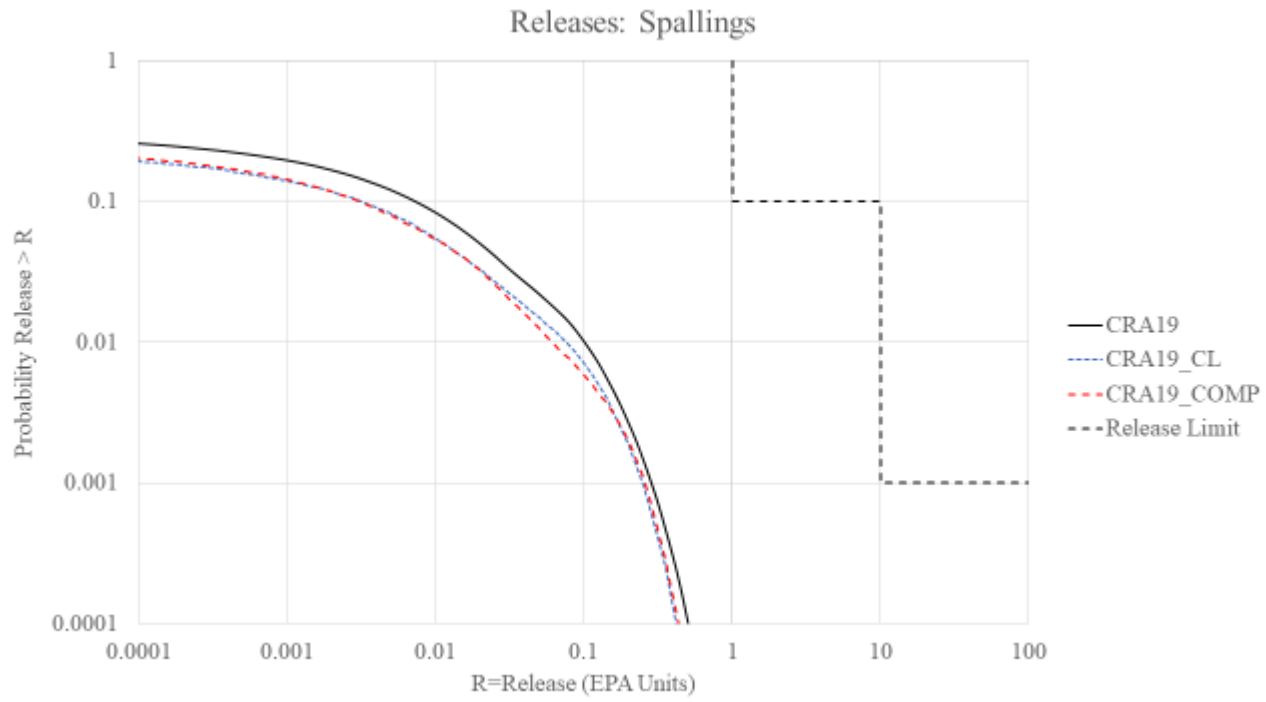

Figure COMP.1-8. Mean spallings releases from the CRA19, CRA19_CL, and CRA19-COMP analyses.

Direct brine releases are directly impacted by waste area pressures and saturations because the criteria for a DBR to occur are based on minimum pressure and saturation values. Figure COMP.1-9 shows comparisons of DBRs for the CRA19, CRA19_CL, and CRA19_COMP analyses and illustrates that DBRs are more than an order of magnitude lower in the CRA19_COMP analysis than in the CRA19 PA. According to Zeitler et al. (2019), the reduction in DBRs for CRA19_CL in comparison to CRA19 is primarily attributed to the substantially lower brine saturations in the south rest-of-repository that result from the "closed" southernmost panel closure treatment in CRA19_CL that limits brine inflow from the Castile. The lower south rest-of-repository pressures and saturations dominate over the slightly elevated pressures within the waste area and the south rest-of-repository for undisturbed and non-Castile intruded scenarios observed for CRA19_CL and result in less favorable conditions for DBRs. The CRA19_COMP DBR releases are observed to be lower than both CRA19 and CRA19_CL DBR releases.

The significant reduction in DBRs shown in Figure COMP.1-9 for CRA19_COMP in comparison to CRA19_CL is due to the elimination of high permeability fractures in the DRZ materials above and below the Abandoned Panel Closure. DBRs are likely to occur when brine saturation and pressure are increased by the release of Castile brine into a waste panel through a first intruding borehole and that same waste panel or an adjacent panel with similar brine saturation and pressure is later randomly intersected by another borehole. Even though the southern waste panel access drifts were assumed to be sealed with intact halite in the CRA19_CL analysis, the high permeability of the surrounding DRZs continued to allow sufficient brine and gas flow among the five southern waste panels that high pressures and saturations from a Castile

brine release into any one of these panels would raise the pressure and saturation in all five panels. Decreasing the permeability of the DRZ in the CRA19_COMP analysis reduced brine and gas flow among these waste panels to the extent that, when coupled with the equally low permeabilities of the abandoned panel closures, the high brine saturation and pressure from a Castile brine release was essentially limited to the first intruded panel and a DRB was only likely to occur when a second borehole intersected that same panel. DBRs therefore became less likely to occur because the probability of a second borehole intersecting the same panel is less than the probability of a second borehole intersecting any one of five panels.

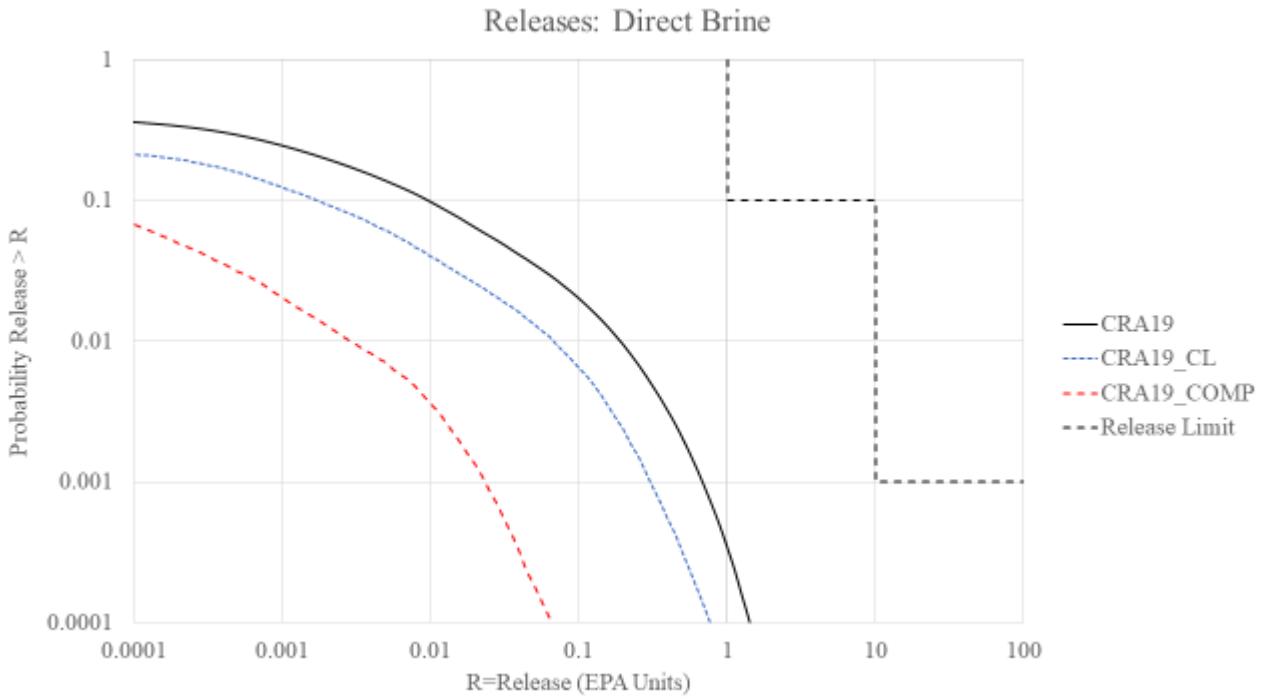

Figure COMP.1-9. Mean direct brine releases from the CRA19, CRA19_CL, and CRA19-COMP analyses.

Finally, discharges to the Culebra (which directly impact releases from the Culebra to the accessible environment) are driven by brine flow up an intruding borehole, which is impacted by the waste area pressures and saturations. Figure COMP.1-10 shows comparisons of discharges to the Culebra for the CRA19, CRA19_CL, and CRA19_COMP analyses and Figure COMP.1-11 shows comparisons of releases from the Culebra for these three analyses. Both discharges to and releases from the Culebra for CRA19_CL are shown to be slightly reduced in comparison to CRA19. According to Zeitler et al. (2019), this reduction is due to the lower brine pressures and saturations under Castile-intruded scenarios and is attributed primarily to the “closed” southernmost panel closure area treatment in CRA19_CL. CRA19_COMP releases are shown to be slightly increased in comparison to CRA19_CL analysis. This is because of the tighter “closed” treatment in CRA19_COMP analysis, which slightly increases the waste area pressure in contrast to CRA19_CL analysis.

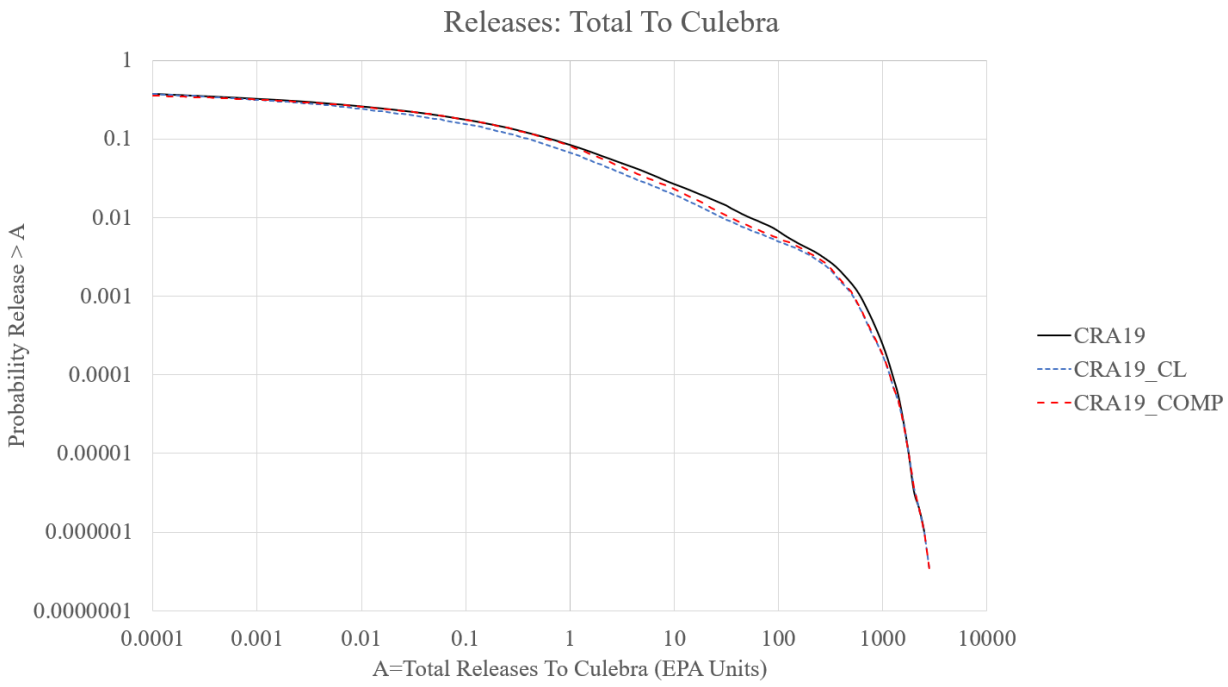

Figure COMP.1-10. Mean discharges to the Culebra from the CRA19, CRA19_CL, and CRA19-COMP analyses.

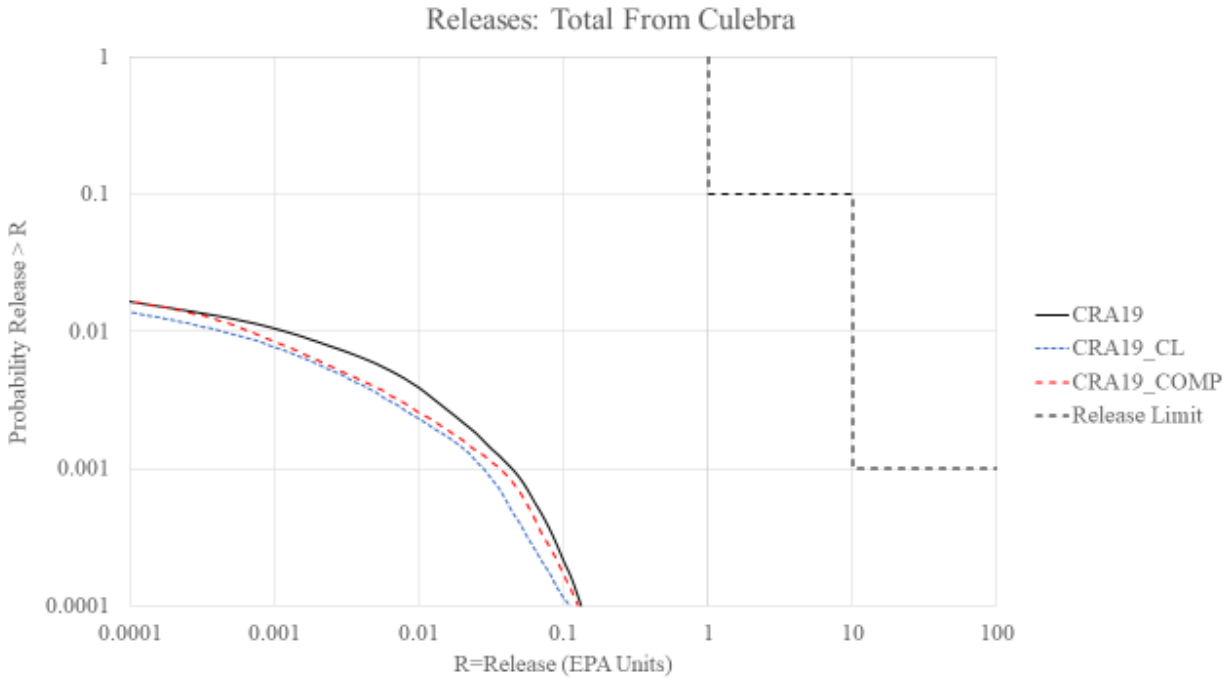

Figure COMP.1-11. Mean releases from the Culebra to the accessible environment from the CRA19, CRA19_CL, and CRA19-COMP analyses.

A comparison of Figures COMP.1-10 and COMP.1-11 shows that discharges *to* the Culebra are several orders of magnitude greater than releases *from* the Culebra to the accessible environment. This means that over the 10,000-year regulatory period, a considerable inventory of radionuclides may become sequestered in the Culebra within the LWA. This inventory could become the source of releases to the accessible environment through, for example, the transport of contaminated cuttings to the ground surface during shallow or deep drilling, or through changes in flow or transport characteristics within the Culebra. These concerns are also discussed in the Agency's Culebra TSD.

Total releases are based on contributions from all release mechanisms. Figure COMP.1-12 shows a comparison of total releases for the CRA19, CRA19_CL, and CRA19_COMP analyses. Table COMP.1-4 shows a comparison of calculated release values at the EPA compliance points for the CRA19, CRA19_CL, and CRA19_COMP analyses. Total releases for CRA19_COMP are observed to be decreased below the CRA19 and CRA19_CL total releases at both compliance points.

Table COMP.1-4. Comparison of Total Releases at EPA Compliance Points for the CRA19, CRA19_CL, and CRA19_COMP Analyses

Probability	Analysis	Mean Total Release	Lower 95% Confidence Level	Upper 95% Confidence Level	Release Limit
0.1	CRA19	0.06853	0.06307	0.07453	1
	CRA19_CL	0.05696	0.05394	0.06079	
	CRA19_COMP	0.05470	0.05202	0.05762	
0.001	CRA19	0.7505	0.6301	0.8501	10
	CRA19_CL	0.3974	0.3160	0.4425	
	CRA19_COMP	0.3536	0.1722	0.4179	

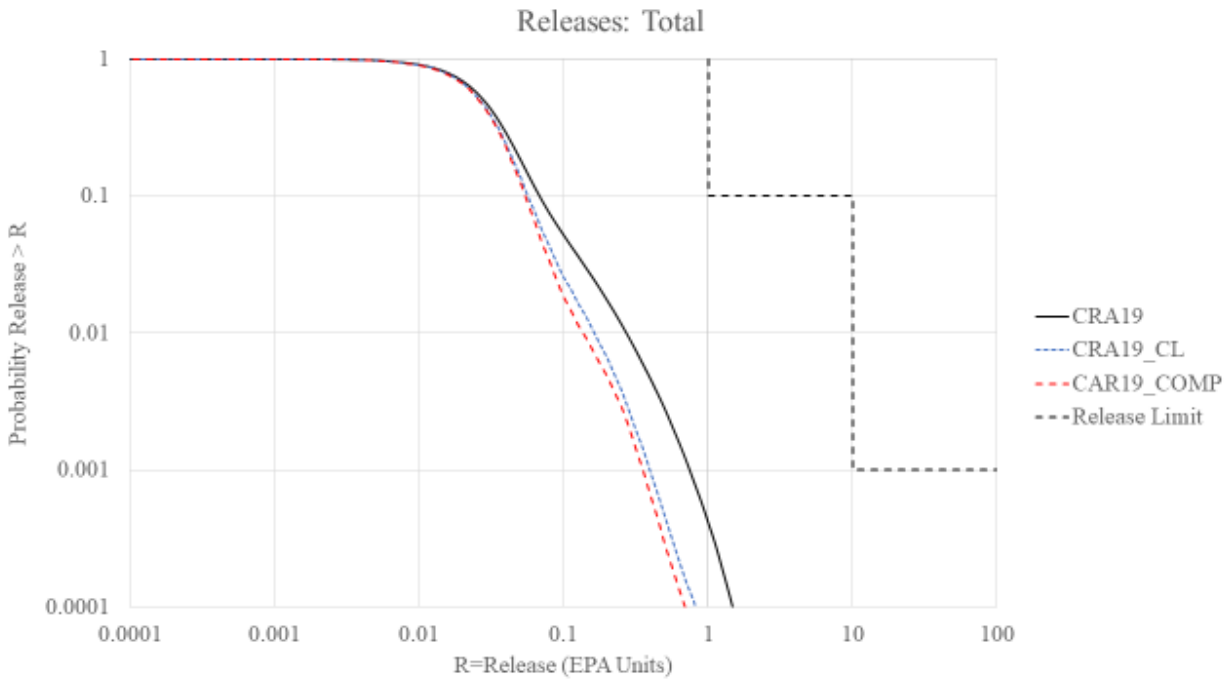

Figure COMP.1-12. Mean total releases to the accessible environment from the CRA19, CRA19_CL, and CRA19-COMP analyses.

The relative contributions of the four major release pathways to total releases in the CRA19_COMP analysis are shown in Figure COMP.1-13. This comparison illustrates some of the consequences of ignoring creep closure. Although cuttings and cavings, spallings, and releases from the Culebra were either unaffected or only slightly affected by the creep closure and healing of the open waste panel closures and surrounding DRZs, the DBRs decreased by over an order of magnitude as compared with the CRA19 and CRA19_CL analysis results. As shown in the figure, spallings replaced DBRs as the dominant pathway for lower probability but higher consequence releases in the CRA19_COMP results, followed by cuttings and cavings and releases from the Culebra. Due to the increased isolation of the waste panels, the DBR pathway that was once the most significant contributor to lower probability releases became the least significant pathway in the CRA19_COMP analysis. Although the magnitude of the impact on the DBR pathway would be reduced by modeling progressive rather than instantaneous creep closure, these results illustrate the importance of accurately representing physical processes in WIPP PA. More accurate representation provides not only a better understanding of future repository performance but also provides better guidance on the best allocation of resources for improving that understanding.

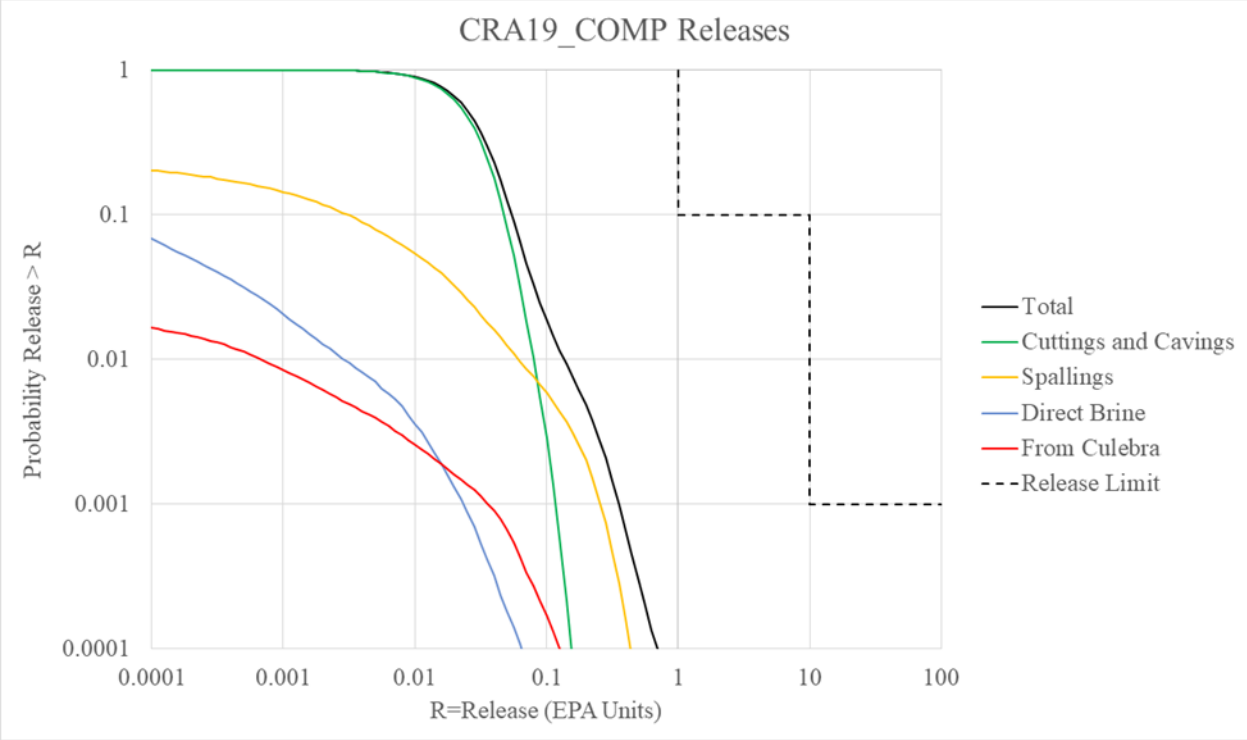

Figure COMP.1-13. Mean component and total releases for the CRA19_COMP analysis.

COMP.2. CRA19_COMP ANALYSIS QUALITY CONTROL REVIEW

COMP.2.1 Data Quality Objectives

The data used in EPA's CRA19_COMP analysis was not developed by the Agency. Rather, it was developed by the DOE consistent with the Quality Assurance requirements of 40 CFR §194.22 as applied by the DOE (DOE 2019, Appendix PA-2019, p. PA-34). The EPA accepted these data as adequately qualified for the purposes of the CRA19_COMP analysis and applied them unaltered when preparing the CRA19_COMP model. In preparing that model, the Agency made the following changes.

- The DOE's data representing the properties of the DRZs around open areas were replaced by the DOE's data representing the material properties of intact halite;
- The DOE's data representing the properties of anhydrite Marker Bed 139 and anhydrite layers A and B were restored to their original, undisturbed values within the DRZs around the open areas; and
- The model cells associated with the foregoing property value changes were identified and the property values of those cells were changed.

Details of the data used and the changes made are described in Section COMP.1 of this appendix. Because no new data were used when developing the CRA19_COMP model, the focus of the Agency's Data Quality Objectives was therefore to assure that the data replacements were made correctly.

COMP.2.1.1 Check Equivalency to Intact Halite

The material property changes to the DRZs around the open areas were checked using logic statements in Excel spreadsheets to assure that (1) the values of uncertain parameters for intact halite had been sampled within their established ranges and (2) that the values assigned to the DRZs around the open areas were the same as the values used for intact halite. These checks were made for each of the 15 individual material properties, for each of the three replicates, and for each of the 100 vectors in each replicate. Copies of the spreadsheets used to check the proper sampling and assignment of intact halite properties are presented in Attachment B to this appendix.

As described in Section COMP.1.3, the reassignment of DRZ properties to those of intact halite was accomplished by first changing the appropriate properties of Block 45 (material DRZ_OE_1) assigned to model cells representing the DRZ around the Operations and Experimental Areas, and then assigning those same properties to the DRZ cells around the abandoned panel closures. The alternative of simply assigning these DRZ cells all the properties of Block 1 (material S_HALITE) was not possible because, as described in Section COMP.1.2, the values of parameters DRZ_OE_1:PCT_A and DRZ_OE_1:PCT_EXP were set to zero rather than to the values assigned to S_HALITE:PCT_A and S_HALITE:PCT_EXP. Also, the checks for permeability were made on the linear rather than the logarithmic values because the linear values are used in the BRAGFLO model. Every value of every intact halite parameter was found to have been appropriately assigned to the DRZs around the open areas in the CRA19_COMP model.

COMP.2.1.2 Check Restoration of Anhydrite Properties

Restoration of the original, undisturbed properties of anhydrite Marker Bed 139 and anhydrite layers A and B within the DRZs around the open areas was checked using an approach similar to that described above for the assignment of intact halite properties to the DRZs. The assignment of anhydrite properties was made by assigning all the material properties for Marker Bed 139 (S_MB139; Block 3) to the model cells representing that marker bed and all the material properties for anhydrite layers A and B (S_ANH_AB; Block 4) to the model cells representing those layers. This approach was possible because no exceptions to the property assignments were needed. This approach also supported a QC process of checking the proper reassignment of randomly selected parameters rather than checking every individual parameter.

EPA selected two properties for each anhydrite material for checking. The first, COMP_RCK, was selected because it has a constant value for the anhydrites rather than a distributed value as is used for the intact halite and that value is the same for each of the two anhydrites. The second property, PRMX_LOG, was selected because it has a distributed value for S_MB139 and the same sampled values were used for S_ANH_AB. The values of these two properties were checked for each of the two anhydrite horizons, for all three replicates, and for all 100 vectors in each replicate.

Copies of the spreadsheets used to make these checks are presented in Attachment C to this appendix. In this case, the values assigned to the anhydrite cells within the DRZs were checked by comparing them with the undisturbed anhydrite parameter values described by Kim and Feng (2019) in the input parameter report for the CRA19 PA. Every value of these parameters was found to have been appropriately assigned.

COMP.2.2 Identification of Model Cells

The EPA checked that the property changes were correctly assigned to the CRA19_COMP model cells by independently identifying each of the model cells that were to be changed and then comparing those cells to the cells identified in the model input files. The individual cells are identified by their X, Y, and Z coordinates shown on the CRA19_COMP model grid in Figure COMP.1-3. These were compared with the I, J, and K coordinates used in the model. The results of this review are presented in Attachment D to this appendix. All relevant cells were found to be appropriately identified.

REFERENCES

Day, B. 2019. Analysis Package for Salado Flow in the 2019 Compliance Recertification Application Performance Assessment (CRA-2019 PA). Sandia National Laboratories, Carlsbad, NM. ERMS 571368.

DOE (U.S. Department of Energy) 2019. Title 40 CFR Part 191 Subparts B and C Compliance Recertification Application 2019 for the Waste Isolation Pilot Plant. Carlsbad Field Office, Carlsbad, New Mexico. DOE/WIPP-19-3609.

Kim, S. and L. Feng. 2019. Input Parameter Report for the 2019 Compliance Recertification Application Performance Assessment (CRA-2019 PA), Rev. 1. Sandia National Laboratories, Carlsbad, NM. ERMS 571660.

Zeitler, T.R., J. Bethune, S. Brunell, B. Day, D. Kicker, J. Long, and R. Sarathi. Summary Report for the 2019 Compliance Recertification Application Performance Assessment (CRA-2019 PA). 2019. Carlsbad, NM: Sandia National Laboratories. ERMS 571376.

Attachment A to Appendix COMP

DOE Response to EPA Question Regarding Reassignment of Block Numbers in the BRAGFLO Salado Flow Model Used in the CRA19 PA

This is a response to the questions raised in an email from Ingrid Rosencrantz to Russ Patterson on Tuesday, December 22, 2020.

EPA Question 1:

1. The materials assigned to some of the block numbers in the document *Analysis Package for Salado Flow in the 2019 Compliance Recertification Application Performance Assessment (CRA-2019 PA) Rev. 0* (ERMS 571368) do not match the numbering in the BRAGFLO Salado Flow model input files. Please provide referenceable documentation describing and explaining these differences as well as any other differences that may exist between the model as described in ERMS 571368 and the actual model used to support the CRA-2019 PA.

   Explanation: The Analysis Package for the CRA-2019 Salado Flow model (ERMS 571368) was presented by DOE as providing an accurate description of the model as used in the CRA-2019 PA. However, the relationships between some block numbers and material properties as presented in ERMS 571368 Figures 4 through 12 were not consistent with those described in the model input files. For example, Block 37 in ERMS 571368 Figure 4 is identified as DRZ_OE_1 while Block 37 in the model input files is identified as the Tamarisk and DRZ_OE_1 is changed to Block 45. The Agency found no explanation for or documentation of these discrepancies and considers this to be an important quality assurance concern that raises questions about the accuracy of the model's documentation.

DOE Response:

There is no connection between the CAMDAT block numbering system in the input files and the numbering in the material map images shown in Day (2019). The material blocks defined in the BRAGFLO Salado Flow input files are defined for all materials used in the systems not just the materials that are assigned to grid cells in the simulation. The material map images are produced by a post-processing script that is not connected to the block numbering in the CAMDAT files. The material map imaging script only numbers materials that are assigned to grid cells within the simulations grid, it does not number the materials that are not assigned to grid cells.

The model described by Day (2019) is the model used to support the CRA-2019 PA. The material map images provided in Day accurately describe how materials are changed through time in the CRA-2019 PA Salado Flow simulations.

The CAMDAT block numbering is not described in Day (2019). The material map image numbering is strictly for visualization and has no meaning beyond connecting the grid cells visualized to a material name in the figure legend. There is no inconsistency between the Salado Flow input files and the model described by Day (2019).

References:
Day, B. 2019. Analysis Package for Salado Flow in the 2019 Compliance Recertification Application Performance Assessment (CRA-2019 PA). Carlsbad, NM: Sandia national Laboratories. ERMS 571368

EPA Question 2:

2. Please provide documentation confirming that the base model being modified in the EPA's CRA19_COMP analysis is identical to the model used in the DOE's CRA19_CL analysis.

   Explanation: The Agency's intent is to base its CRA19_COMP analysis on the fully qualified model used in DOE's CRA19_CL analysis described in ERMS 571376. The discrepancy between the Salado Flow model description in ERMS 571368 and the model input files described in Question 1 led the Agency to question whether the model may have subsequently been changed.

DOE Response:

As explained in the response to question 1, there has been no subsequent changes to the CRA19 or CRA19_CL models. As indicated in Long (2019), the input files are stored in the WIPP PA cluster CVS repository at: /nfs/data/CVSLIB/WIPP _ANALYSES/CRA19_CL. The script "/shared/RC_Scripts/GetCRA19Files.sh" is designed to iterate through each PA code and extracts the input files for an analysis specified as a command line argument. If the EPA started building the CRA19_COMP analysis by running this script with the command line argument of "CRA19_CL", then the base model is identical to the model used in the DOE's CRA19_CL analysis.

References:

Long, J. 2019. Computational Code Execution and File Management for the 2019 Compliance Recertification Application Performance Assessment (CRA-2019 PA). Carlsbad, NM: Sandia national Laboratories. ERMS 571375

Response Transmittal Document

From: Mike Brown <mike.brown@cbfo.doe.gov>
Sent: Monday, January 11, 2021 3:09 PM
To: Rosencrantz, Ingrid <Rosencrantz.Ingrid@epa.gov>; Peake, Tom <Peake.Tom@epa.gov>
Cc: Anderson Ward <Anderson.Ward@cbfo.doe.gov>; 'Kouba, Steve - WRES' <Steve.Kouba@wipp.ws>; Judy McLemore - RES <Judy.McLemore@wipp.ws>; 'vann.bynum@vannbynum.com' <vann.bynum@vannbynum.com>
Subject: FW: Request for References from EPA

Ingrid, and Tom

As requested in the attached e-mail, here is the response to your request. In addition the supplemental QA documentation requested by EPA on December 14, 2020 for the CRA19_CL Analysis is available to EPA in eDocs in the following \Workspace\folder \EPA Document Transfer\CRA-2019 Supplemental QA Documentation Request 12-14-20. Within the folder there is a zip file containing the documents requested. To access the information, download the PDF file, save to your storage folder, use file explorer to change the file extension from .pdf to .zip. Unzip the file and contents will be accessible. Should you have any questions or difficulties accessing the file(s), please let me know.

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Attachment B to Appendix COMP

Quality Control Checks of Replacing Material DRZ_OE_1 with Properties of S_HALITE

The following tables are copies of Excel spreadsheets used to confirm the correct substitution of the properties of material S_HALITE (representing intact halite) for material DRZ_OE_1 (representing the DRZ above and below the Operations and Experimental Areas in the BRAGFLO Salado Flow model). A separate table is provided for each property (such as porosity) assigned to material DRZ_OE_1 in BRAGFLO. Three replicates of 100 vectors each are run for WIPP PA. For properties whose parameter values are randomly sampled because they are uncertain, each vector will have a different value. For properties with constant parameter values, each vector will have the same value. Each replicate has two columns of property values. The right column has the value assigned to the particular vector (such as Replicate 2, Vector 31) for material S_HALITE (Block 1) and the left column has the value reassigned to that vector for material DRZ_OE_1 (Block 45).

For the purposes of the CRA19_COMP analysis, the values in the two columns should be the same. This indicates that the original value for material DRZ_OE_1 has been successfully replaced by the value for material S_HALITE. Successful replacement was checked for each property, each replicate, and each vector using the Excel logic statements shown on the spreadsheets. For sampled parameter values, checks were also conducted to assure that the sampled value was within the minimum and maximum limits of their distributions. Correct replacements were indicated by the response “OK” and incorrect replacements were indicated by the response “PROBLEM”. All parameter values were found to be replaced as intended.

Table COMP.B-1. QC Check for Parameter DRZ_OE_1:CAP_MOD in CRA19_COMP Analysis, BRAGFLO Salado Flow Model

Checks Performed:

Check that material Block 45 has been assigned the same property values as Block 1.

Check that the values of sampled properties lie between the minimum and maximum values of the uncertainty range for intact halite.

Block Identification Key:	**CAP_MOD Target Values:**		**Example logic statements used to perform checks:**		**Check Result Indicators:**	
BLK 45 = DRZ_OE_1	Target Min	Target Max	Check Min Value:	IF(VALUE<E9,S8,T8)	PROBLEM	OK
BLK 1 = S_HALITE	2.00E+00	2.00E+00	Check Max Value:	IF(VALUE>F9,S8,T8)		
			Check Equality:	IF(BLK45 VALUE=BLK1 VALUE,T8,S8)		

BRAGFLO Salado Flow Model Parameter DRZ_OE_1:CAP_MOD							Minimum Checks BLK 1			Maximum Checks BLK 1			Equality Checks		
	Replicate 1		Replicate 2		Replicate 3										
Vector	BLK 45	BLK 1	BLK 45	BLK 1	BLK 45	BLK 1	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3	Rep 1 BK45	Rep 2 BK45	Rep 3 BK45
1	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
2	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
3	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
4	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
5	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
6	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
7	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
8	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
9	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
10	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
11	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
12	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
13	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
14	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
15	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
16	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
17	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
18	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
19	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
20	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
21	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
22	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
23	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
24	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
25	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
26	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
27	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
28	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
29	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
30	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
31	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
32	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
33	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
34	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
35	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
36	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
37	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
38	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
39	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
40	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
41	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
42	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
43	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
44	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
45	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
46	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
47	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
48	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
49	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
50	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
51	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
52	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
53	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
54	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
55	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK

Table COMP.B-1. QC Check for Parameter DRZ_OE_1:CAP_MOD in CRA19_COMP Analysis, BRAGFLO Salado Flow Model (Continued)

BRAGFLO Salado Flow Model Parameter DRZ_OE_1:CAP_MOD																	
	Replicate 1		Replicate 2		Replicate 3		Minimum Checks BLK 1			Maximum Checks BLK 1			Equality Checks		
Vector	BLK 45	BLK 1	BLK 45	BLK 1	BLK 45	BLK 1	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3	Rep 1 BK45	Rep 2 BK45	Rep 3 BK45
56	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
57	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
58	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
59	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
60	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
61	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
62	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
63	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
64	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
65	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
66	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
67	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
68	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
69	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
70	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
71	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
72	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
73	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
74	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
75	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
76	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
77	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
78	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
79	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
80	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
81	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
82	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
83	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
84	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
85	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
86	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
87	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
88	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
89	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
90	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
91	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
92	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
93	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
94	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
95	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
96	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
97	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
98	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
99	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
100	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK

Table COMP.B-2. QC Check for Parameter DRZ_OE_1:COMP_RCK in CRA19_COMP Analysis, BRAGFLO Salado Flow Model

Checks Performed:

Check that material Block 45 has been assigned the same property values as Block 1.

Check that the values of sampled properties lie between the minimum and maximum values of the uncertainty range for intact halite.

Block Identification Key:	**COMP_RCK Target Values:**			**Example logic statements used to perform checks:**		**Check Result Indicators:**	
BLK 45 = DRZ_OE_1	Target Min	Target Max		Check Min Value:	IF(VALUE<E9,S8,T8)	PROBLEM	OK
BLK 1 = S_HALITE	2.94E-12	1.92E-10	Pa^{-1}	Check Max Value:	IF(VALUE>F9,S8,T8)		
				Check Equality:	IF(BLK45 VALUE=BLK1 VALUE,T8,S8)		

BRAGFLO Salado Flow Model Parameter DRZ_OE_1:COMP_RCK																
	Replicate 1		**Replicate 2**		**Replicate 3**		**Minimum Checks BLK 1**			**Maximum Checks BLK 1**			**Equality Checks**		
Vector	**BLK 45**	**BLK 1**	**BLK 45**	**BLK 1**	**BLK 45**	**BLK 1**	**Rep 1**	**Rep 2**	**Rep 3**	**Rep 1**	**Rep 2**	**Rep 3**	**Rep 1 BK45**	**Rep 2 BK45**	**Rep 3 BK45**
1	1.15E-10	1.15E-10	1.10E-11	1.10E-11	1.50E-11	1.50E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
2	9.99E-11	9.99E-11	9.00E-11	9.00E-11	3.30E-11	3.30E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
3	7.86E-11	7.86E-11	3.52E-11	3.52E-11	1.52E-10	1.52E-10	OK	OK	OK	OK	OK	OK	OK	OK	OK
4	5.35E-11	5.35E-11	1.20E-10	1.20E-10	9.70E-11	9.70E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
5	1.88E-11	1.88E-11	3.26E-11	3.26E-11	1.17E-10	1.17E-10	OK	OK	OK	OK	OK	OK	OK	OK	OK
6	1.55E-10	1.55E-10	9.56E-11	9.56E-11	8.96E-11	8.96E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
7	1.26E-10	1.26E-10	2.52E-11	2.52E-11	2.99E-11	2.99E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
8	1.87E-10	1.87E-10	7.30E-12	7.30E-12	7.26E-11	7.26E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
9	2.67E-11	2.67E-11	1.54E-10	1.54E-10	3.50E-11	3.50E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
10	6.02E-11	6.02E-11	1.25E-11	1.25E-11	9.29E-11	9.29E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
11	1.69E-10	1.69E-10	1.88E-11	1.88E-11	1.82E-10	1.82E-10	OK	OK	OK	OK	OK	OK	OK	OK	OK
12	1.86E-10	1.86E-10	8.40E-11	8.40E-11	8.97E-12	8.97E-12	OK	OK	OK	OK	OK	OK	OK	OK	OK
13	8.44E-11	8.44E-11	1.61E-10	1.61E-10	1.13E-10	1.13E-10	OK	OK	OK	OK	OK	OK	OK	OK	OK
14	1.20E-10	1.20E-10	1.51E-10	1.51E-10	1.23E-10	1.23E-10	OK	OK	OK	OK	OK	OK	OK	OK	OK
15	1.80E-10	1.80E-10	1.59E-10	1.59E-10	6.75E-11	6.75E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
16	5.17E-11	5.17E-11	7.21E-11	7.21E-11	7.59E-11	7.59E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
17	2.79E-11	2.79E-11	1.87E-10	1.87E-10	5.44E-11	5.44E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
18	1.50E-11	1.50E-11	1.36E-10	1.36E-10	1.87E-10	1.87E-10	OK	OK	OK	OK	OK	OK	OK	OK	OK
19	6.52E-11	6.52E-11	8.21E-11	8.21E-11	1.27E-10	1.27E-10	OK	OK	OK	OK	OK	OK	OK	OK	OK
20	7.44E-11	7.44E-11	1.72E-10	1.72E-10	1.34E-11	1.34E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
21	1.92E-10	1.92E-10	9.87E-11	9.87E-11	1.74E-10	1.74E-10	OK	OK	OK	OK	OK	OK	OK	OK	OK
22	1.40E-10	1.40E-10	1.32E-10	1.32E-10	4.24E-11	4.24E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
23	1.72E-10	1.72E-10	1.84E-10	1.84E-10	2.90E-11	2.90E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
24	6.64E-11	6.64E-11	1.04E-10	1.04E-10	1.63E-10	1.63E-10	OK	OK	OK	OK	OK	OK	OK	OK	OK
25	1.14E-10	1.14E-10	6.08E-11	6.08E-11	1.41E-10	1.41E-10	OK	OK	OK	OK	OK	OK	OK	OK	OK
26	1.58E-10	1.58E-10	1.64E-10	1.64E-10	9.03E-11	9.03E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
27	1.47E-10	1.47E-10	9.39E-11	9.39E-11	1.19E-10	1.19E-10	OK	OK	OK	OK	OK	OK	OK	OK	OK
28	9.10E-11	9.10E-11	1.44E-10	1.44E-10	1.45E-10	1.45E-10	OK	OK	OK	OK	OK	OK	OK	OK	OK
29	1.16E-11	1.16E-11	5.69E-11	5.69E-11	7.89E-11	7.89E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
30	1.53E-10	1.53E-10	1.76E-10	1.76E-10	1.56E-10	1.56E-10	OK	OK	OK	OK	OK	OK	OK	OK	OK
31	1.67E-10	1.67E-10	8.59E-11	8.59E-11	8.55E-12	8.55E-12	OK	OK	OK	OK	OK	OK	OK	OK	OK
32	1.12E-10	1.12E-10	7.02E-11	7.02E-11	1.60E-10	1.60E-10	OK	OK	OK	OK	OK	OK	OK	OK	OK
33	2.47E-11	2.47E-11	1.90E-10	1.90E-10	5.25E-11	5.25E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
34	3.55E-11	3.55E-11	5.25E-11	5.25E-11	1.84E-10	1.84E-10	OK	OK	OK	OK	OK	OK	OK	OK	OK
35	3.77E-12	3.77E-12	1.42E-10	1.42E-10	1.31E-10	1.31E-10	OK	OK	OK	OK	OK	OK	OK	OK	OK
36	5.71E-11	5.71E-11	4.98E-11	4.98E-11	1.53E-10	1.53E-10	OK	OK	OK	OK	OK	OK	OK	OK	OK
37	1.74E-10	1.74E-10	1.90E-10	1.90E-10	5.80E-11	5.80E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
38	7.22E-11	7.22E-11	1.14E-10	1.14E-10	3.85E-11	3.85E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
39	1.30E-10	1.30E-10	3.01E-11	3.01E-11	1.30E-10	1.30E-10	OK	OK	OK	OK	OK	OK	OK	OK	OK
40	2.17E-11	2.17E-11	7.39E-11	7.39E-11	7.05E-11	7.05E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
41	9.85E-11	9.85E-11	1.50E-11	1.50E-11	8.70E-11	8.70E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
42	1.83E-10	1.83E-10	1.29E-10	1.29E-10	1.85E-10	1.85E-10	OK	OK	OK	OK	OK	OK	OK	OK	OK
43	1.22E-10	1.22E-10	4.00E-11	4.00E-11	1.64E-10	1.64E-10	OK	OK	OK	OK	OK	OK	OK	OK	OK
44	1.62E-10	1.62E-10	6.86E-11	6.86E-11	2.29E-11	2.29E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
45	1.19E-10	1.19E-10	1.67E-10	1.67E-10	1.09E-10	1.09E-10	OK	OK	OK	OK	OK	OK	OK	OK	OK
46	1.58E-10	1.58E-10	4.32E-11	4.32E-11	1.05E-10	1.05E-10	OK	OK	OK	OK	OK	OK	OK	OK	OK
47	1.51E-10	1.51E-10	1.70E-10	1.70E-10	1.04E-10	1.04E-10	OK	OK	OK	OK	OK	OK	OK	OK	OK
48	1.28E-10	1.28E-10	1.00E-10	1.00E-10	9.78E-11	9.78E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
49	1.08E-10	1.08E-10	5.60E-12	5.60E-12	1.16E-10	1.16E-10	OK	OK	OK	OK	OK	OK	OK	OK	OK
50	8.83E-11	8.83E-11	4.52E-11	4.52E-11	3.46E-12	3.46E-12	OK	OK	OK	OK	OK	OK	OK	OK	OK
51	4.99E-11	4.99E-11	1.81E-10	1.81E-10	1.21E-10	1.21E-10	OK	OK	OK	OK	OK	OK	OK	OK	OK
52	1.49E-10	1.49E-10	5.86E-11	5.86E-11	1.49E-10	1.49E-10	OK	OK	OK	OK	OK	OK	OK	OK	OK
53	1.03E-10	1.03E-10	8.98E-11	8.98E-11	3.94E-11	3.94E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
54	5.90E-11	5.90E-11	1.68E-10	1.68E-10	1.70E-10	1.70E-10	OK	OK	OK	OK	OK	OK	OK	OK	OK
55	7.07E-11	7.07E-11	1.47E-10	1.47E-10	5.09E-11	5.09E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK

Table COMP.B-2. QC Check for Parameter DRZ_OE_1:COMP_RCK in CRA19_COMP Analysis, BRAGFLO Salado Flow Model (Continued)

BRAGFLO Salado Flow Model Parameter DRZ_OE_1:COMP_RCK							Minimum Checks BLK 1			Maximum Checks BLK 1			Equality Checks		
	Replicate 1		Replicate 2		Replicate 3										
Vector	BLK 45	BLK 1	BLK 45	BLK 1	BLK 45	BLK 1	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3	Rep 1 BK45	Rep 2 BK45	Rep 3 BK45
56	1.38E-10	1.38E-10	2.67E-11	2.67E-11	1.77E-10	1.77E-10	OK	OK	OK	OK	OK	OK	OK	OK	OK
57	1.89E-10	1.89E-10	2.87E-11	2.87E-11	4.66E-11	4.66E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
58	4.41E-11	4.41E-11	3.78E-11	3.78E-11	1.25E-10	1.25E-10	OK	OK	OK	OK	OK	OK	OK	OK	OK
59	8.12E-11	8.12E-11	9.25E-12	9.25E-12	8.12E-11	8.12E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
60	7.76E-11	7.76E-11	3.35E-11	3.35E-11	4.29E-11	4.29E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
61	1.09E-10	1.09E-10	1.06E-10	1.06E-10	2.18E-11	2.18E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
62	1.64E-10	1.64E-10	6.41E-11	6.41E-11	1.01E-10	1.01E-10	OK	OK	OK	OK	OK	OK	OK	OK	OK
63	6.80E-11	6.80E-11	1.09E-10	1.09E-10	6.39E-11	6.39E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
64	1.41E-10	1.41E-10	1.80E-10	1.80E-10	1.41E-10	1.41E-10	OK	OK	OK	OK	OK	OK	OK	OK	OK
65	7.42E-12	7.42E-12	7.58E-11	7.58E-11	1.72E-10	1.72E-10	OK	OK	OK	OK	OK	OK	OK	OK	OK
66	8.27E-11	8.27E-11	1.78E-10	1.78E-10	5.29E-12	5.29E-12	OK	OK	OK	OK	OK	OK	OK	OK	OK
67	1.35E-10	1.35E-10	6.66E-11	6.66E-11	2.66E-11	2.66E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
68	3.46E-11	3.46E-11	1.02E-10	1.02E-10	1.91E-10	1.91E-10	OK	OK	OK	OK	OK	OK	OK	OK	OK
69	1.36E-10	1.36E-10	1.37E-10	1.37E-10	1.43E-10	1.43E-10	OK	OK	OK	OK	OK	OK	OK	OK	OK
70	1.06E-10	1.06E-10	1.23E-10	1.23E-10	1.75E-10	1.75E-10	OK	OK	OK	OK	OK	OK	OK	OK	OK
71	1.81E-10	1.81E-10	1.26E-10	1.26E-10	1.09E-10	1.09E-10	OK	OK	OK	OK	OK	OK	OK	OK	OK
72	1.46E-10	1.46E-10	4.82E-11	4.82E-11	1.33E-10	1.33E-10	OK	OK	OK	OK	OK	OK	OK	OK	OK
73	1.71E-10	1.71E-10	1.56E-10	1.56E-10	4.56E-11	4.56E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
74	1.18E-10	1.18E-10	1.65E-10	1.65E-10	8.45E-11	8.45E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
75	1.60E-10	1.60E-10	6.19E-11	6.19E-11	5.67E-11	5.67E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
76	1.63E-11	1.63E-11	8.68E-11	8.68E-11	7.78E-11	7.78E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
77	4.14E-11	4.14E-11	1.50E-10	1.50E-10	1.01E-10	1.01E-10	OK	OK	OK	OK	OK	OK	OK	OK	OK
78	6.32E-11	6.32E-11	1.86E-10	1.86E-10	7.33E-11	7.33E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
79	1.78E-10	1.78E-10	4.24E-11	4.24E-11	1.89E-10	1.89E-10	OK	OK	OK	OK	OK	OK	OK	OK	OK
80	1.76E-10	1.76E-10	5.48E-11	5.48E-11	1.38E-10	1.38E-10	OK	OK	OK	OK	OK	OK	OK	OK	OK
81	5.06E-12	5.06E-12	1.18E-10	1.18E-10	1.55E-10	1.55E-10	OK	OK	OK	OK	OK	OK	OK	OK	OK
82	9.29E-11	9.29E-11	1.47E-10	1.47E-10	1.35E-10	1.35E-10	OK	OK	OK	OK	OK	OK	OK	OK	OK
83	1.05E-10	1.05E-10	7.93E-11	7.93E-11	8.28E-11	8.28E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
84	1.32E-10	1.32E-10	2.12E-11	2.12E-11	1.66E-10	1.66E-10	OK	OK	OK	OK	OK	OK	OK	OK	OK
85	3.91E-11	3.91E-11	1.57E-10	1.57E-10	1.68E-10	1.68E-10	OK	OK	OK	OK	OK	OK	OK	OK	OK
86	9.47E-11	9.47E-11	1.21E-10	1.21E-10	1.88E-11	1.88E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
87	8.72E-11	8.72E-11	5.06E-11	5.06E-11	3.62E-11	3.62E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
88	3.31E-11	3.31E-11	1.31E-10	1.31E-10	1.19E-11	1.19E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
89	1.44E-10	1.44E-10	1.77E-11	1.77E-11	1.74E-11	1.74E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
90	1.29E-11	1.29E-11	2.24E-11	2.24E-11	1.60E-10	1.60E-10	OK	OK	OK	OK	OK	OK	OK	OK	OK
91	2.23E-11	2.23E-11	1.35E-10	1.35E-10	6.58E-11	6.58E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
92	7.50E-11	7.50E-11	9.34E-11	9.34E-11	1.80E-10	1.80E-10	OK	OK	OK	OK	OK	OK	OK	OK	OK
93	1.27E-10	1.27E-10	1.13E-10	1.13E-10	2.50E-11	2.50E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
94	4.70E-11	4.70E-11	7.80E-11	7.80E-11	6.14E-11	6.14E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
95	9.68E-11	9.68E-11	1.39E-10	1.39E-10	9.43E-11	9.43E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
96	5.50E-11	5.50E-11	1.74E-10	1.74E-10	1.47E-10	1.47E-10	OK	OK	OK	OK	OK	OK	OK	OK	OK
97	3.87E-11	3.87E-11	3.20E-12	3.20E-12	4.94E-11	4.94E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
98	9.12E-12	9.12E-12	1.09E-10	1.09E-10	1.12E-10	1.12E-10	OK	OK	OK	OK	OK	OK	OK	OK	OK
99	3.12E-11	3.12E-11	1.25E-10	1.25E-10	1.36E-10	1.36E-10	OK	OK	OK	OK	OK	OK	OK	OK	OK
100	4.46E-11	4.46E-11	1.15E-10	1.15E-10	6.33E-11	6.33E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK

Table COMP.B-3. QC Check for Parameter DRZ_OE_1:KPT in CRA19_COMP Analysis, BRAGFLO Salado Flow Model

Checks Performed:

Check that material Block 45 has been assigned the same property values as Block 1.

Check that the values of sampled properties lie between the minimum and maximum values of the uncertainty range for intact halite.

Block Identification Key:	**KPT Target Values:**		**Example logic statements used to perform checks:**		**Check Result Indicators:**	
BLK 45 = DRZ_OE_1	Target Min	Target Max	Check Min Value:	IF(VALUE<E9,S8,T8)	PROBLEM	OK
BLK 1 = S_HALITE	0.00E+00	0.00E+00	Check Max Value:	IF(VALUE>F9,S8,T8)		
			Check Equality:	IF(BLK45 VALUE=BLK1 VALUE,T8,S8)		

BRAGFLO Salado Flow Model Parameter DRZ_OE_1:KPT																	
	Replicate 1		**Replicate 2**		**Replicate 3**		**Minimum Checks BLK 1**			**Maximum Checks BLK 1**			**Equality Checks**		
Vector	**BLK 45**	**BLK 1**	**BLK 45**	**BLK 1**	**BLK 45**	**BLK 1**	**Rep 1**	**Rep 2**	**Rep 3**	**Rep 1**	**Rep 2**	**Rep 3**	**Rep 1 BK45**	**Rep 2 BK45**	**Rep 3 BK45**
1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
15	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
17	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
19	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
20	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
21	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
22	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
23	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
24	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
25	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
26	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
27	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
28	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
29	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
30	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
31	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
32	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
33	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
34	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
35	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
36	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
37	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
38	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
39	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
40	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
41	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
43	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
44	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
45	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
46	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
47	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
48	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
49	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
50	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
51	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
52	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
53	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
54	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
55	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK

Table COMP.B-3. QC Check for Parameter DRZ_OE_1:KPT in CRA19_COMP Analysis, BRAGFLO Salado Flow Model (Continued)

BRAGFLO Salado Flow Model Parameter DRZ_OE_1:KPT							Minimum Checks BLK 1			Maximum Checks BLK 1			Equality Checks		
	Replicate 1		Replicate 2		Replicate 3										
Vector	BLK 45	BLK 1	BLK 45	BLK 1	BLK 45	BLK 1	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3	Rep 1 BK45	Rep 2 BK45	Rep 3 BK45
56	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
57	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
58	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
59	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
60	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
61	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
62	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
63	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
64	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
65	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
66	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
67	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
68	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
69	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
70	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
71	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
72	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
73	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
74	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
75	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
76	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
77	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
78	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
79	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
80	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
81	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
82	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
83	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
84	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
85	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
86	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
87	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
88	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
89	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
90	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
91	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
92	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
93	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
94	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
95	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
96	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
97	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
98	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
99	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
100	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK

Table COMP.B-4. QC Check for Parameter DRZ_OE_1:PC_MAX in CRA19_COMP Analysis, BRAGFLO Salado Flow Model

Checks Performed:

Check that material Block 45 has been assigned the same property values as Block 1.

Check that the values of sampled properties lie between the minimum and maximum values of the uncertainty range for intact halite.

Block Identification Key:	**PC_MAX Target Values:**			**Example logic statements used to perform checks:**		**Check Result Indicators:**	
BLK 45 = DRZ_OE_1	Target Min	Target Max		Check Min Value:	IF(VALUE<E9,S8,T8)	PROBLEM	OK
BLK 1 = S_HALITE	1.00E+08	1.00E+08	Pa	Check Max Value:	IF(VALUE>F9,S8,T8)		
				Check Equality:	IF(BLK45 VALUE=BLK1 VALUE,T8,S8)		

BRAGFLO Salado Flow Model Parameter DRZ_OE_1:PC_MAX																	
	Replicate 1		**Replicate 2**		**Replicate 3**		**Minimum Checks BLK 1**			**Maximum Checks BLK 1**			**Equality Checks**		
Vector	**BLK 45**	**BLK 1**	**BLK 45**	**BLK 1**	**BLK 45**	**BLK 1**	**Rep 1**	**Rep 2**	**Rep 3**	**Rep 1**	**Rep 2**	**Rep 3**	**Rep 1 BK45**	**Rep 2 BK45**	**Rep 3 BK45**
1	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
2	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
3	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
4	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
5	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
6	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
7	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
8	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
9	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
10	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
11	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
12	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
13	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
14	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
15	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
16	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
17	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
18	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
19	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
20	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
21	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
22	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
23	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
24	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
25	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
26	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
27	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
28	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
29	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
30	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
31	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
32	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
33	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
34	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
35	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
36	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
37	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
38	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
39	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
40	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
41	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
42	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
43	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
44	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
45	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
46	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
47	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
48	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
49	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
50	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
51	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
52	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
53	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
54	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
55	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK

Table COMP.B-4. QC Check for Parameter DRZ_OE_1:PC_MAX in CRA19_COMP Analysis, BRAGFLO Salado Flow Model (Continued)

BRAGFLO Salado Flow Model Parameter DRZ_OE_1:PC_MAX							Minimum Checks BLK 1			Maximum Checks BLK 1			Equality Checks		
	Replicate 1		Replicate 2		Replicate 3										
Vector	BLK 45	BLK 1	BLK 45	BLK 1	BLK 45	BLK 1	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3	Rep 1 BK45	Rep 2 BK45	Rep 3 BK45
56	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
57	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
58	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
59	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
60	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
61	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
62	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
63	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
64	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
65	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
66	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
67	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
68	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
69	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
70	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
71	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
72	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
73	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
74	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
75	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
76	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
77	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
78	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
79	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
80	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
81	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
82	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
83	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
84	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
85	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
86	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
87	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
88	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
89	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
90	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
91	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
92	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
93	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
94	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
95	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
96	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
97	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
98	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
99	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK
100	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	1.00E+08	OK	OK	OK	OK	OK	OK	OK	OK	OK

Table COMP.B-5. QC Check for Parameter DRZ_OE_1:PCT_A in CRA19_COMP Analysis, BRAGFLO Salado Flow Model

Checks Performed:

Check that material Block 45 is consistent with the target values.

Block Identification Key:	**PCT_A Target Values:**		**Example logic statements used to perform checks:**		**Check Result Indicators:**	
BLK 45 = DRZ_OE_1	Target Min	Target Max	Check Min Value:	IF(VALUE<E9,S8,T8)	PROBLEM	OK
BLK 1 = S_HALITE	0.00E+00	0.00E+00	Check Max Value:	IF(VALUE>F9,S8,T8)		
			Check Equality:	IF(BLK45 VALUE=BLK1 VALUE,T8,S8)		

BRAGFLO Salado Flow Model Parameter DRZ_OE_1:PCT_A																
	Replicate 1		**Replicate 2**		**Replicate 3**		**Minimum Checks BLK 1**			**Maximum Checks BLK 1**			**Equality Checks**		
Vector	**BLK 45**	**BLK 1**	**BLK 45**	**BLK 1**	**BLK 45**	**BLK 1**	**Rep 1**	**Rep 2**	**Rep 3**	**Rep 1**	**Rep 2**	**Rep 3**	**Rep 1 BK45**	**Rep 2 BK45**	**Rep 3 BK45**
1	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
2	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
3	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
4	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
5	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
6	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
7	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
8	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
9	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
10	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
11	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
12	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
13	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
14	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
15	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
16	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
17	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
18	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
19	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
20	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
21	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
22	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
23	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
24	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
25	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
26	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
27	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
28	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
29	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
30	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
31	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
32	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
33	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
34	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
35	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
36	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
37	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
38	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
39	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
40	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
41	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
42	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
43	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
44	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
45	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
46	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
47	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
48	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
49	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
50	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
51	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
52	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
53	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
54	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
55	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK

Table COMP.B-5. QC Check for Parameter DRZ_OE_1:PCT_A in CRA19_COMP Analysis, BRAGFLO Salado Flow Model (Continued)

BRAGFLO Salado Flow Model Parameter DRZ_OE_1:PCT_A							Minimum Checks BLK 1			Maximum Checks BLK 1			Equality Checks		
	Replicate 1		Replicate 2		Replicate 3										
Vector	BLK 45	BLK 1	BLK 45	BLK 1	BLK 45	BLK 1	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3	Rep 1 BK45	Rep 2 BK45	Rep 3 BK45
56	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
57	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
58	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
59	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
60	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
61	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
62	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
63	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
64	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
65	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
66	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
67	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
68	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
69	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
70	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
71	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
72	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
73	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
74	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
75	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
76	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
77	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
78	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
79	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
80	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
81	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
82	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
83	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
84	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
85	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
86	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
87	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
88	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
89	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
90	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
91	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
92	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
93	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
94	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
95	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
96	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
97	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
98	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
99	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
100	0.00E+00	5.60E-01	0.00E+00	5.60E-01	0.00E+00	5.60E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK

Table COMP.B-6. QC Check for Parameter DRZ_OE_1:PCT_EXP in CRA19_COMP Analysis, BRAGFLO Salado Flow Model

Checks Performed:

Check that material Block 45 is consistent with the target values.

Block Identification Key:	**PCT_EXP Target Values:**		**Example logic statements used to perform checks:**		**Check Result Indicators:**	
BLK 45 = DRZ_OE_1	Target Min	Target Max	Check Min Value:	IF(VALUE<E9,S8,T8)	PROBLEM	OK
BLK 1 = S_HALITE	0.00E+00	0.00E+00	Check Max Value:	IF(VALUE>F9,S8,T8)		
			Check Equality:	IF(BLK45 VALUE=BLK1 VALUE,T8,S8)		

BRAGFLO Salado Flow Model Parameter DRZ_OE_1:PCT_EXP																	
	Replicate 1		**Replicate 2**		**Replicate 3**		**Minimum Checks BLK 1**			**Maximum Checks BLK 1**			**Equality Checks**		
Vector	**BLK 45**	**BLK 1**	**BLK 45**	**BLK 1**	**BLK 45**	**BLK 1**	**Rep 1**	**Rep 2**	**Rep 3**	**Rep 1**	**Rep 2**	**Rep 3**	**Rep 1 BK45**	**Rep 2 BK45**	**Rep 3 BK45**
1	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
2	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
3	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
4	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
5	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
6	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
7	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
8	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
9	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
10	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
11	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
12	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
13	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
14	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
15	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
16	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
17	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
18	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
19	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
20	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
21	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
22	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
23	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
24	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
25	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
26	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
27	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
28	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
29	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
30	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
31	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
32	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
33	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
34	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
35	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
36	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
37	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
38	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
39	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
40	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
41	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
42	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
43	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
44	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
45	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
46	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
47	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
48	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
49	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
50	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
51	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
52	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
53	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
54	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
55	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK

Table COMP.B-6. QC Check for Parameter DRZ_OE_1:PCT_EXP in CRA19_COMP Analysis, BRAGFLO Salado Flow Model (Continued)

BRAGFLO Salado Flow Model Parameter DRZ_OE_1:PCT_EXP							Minimum Checks BLK 1			Maximum Checks BLK 1			Equality Checks		
	Replicate 1		Replicate 2		Replicate 3										
Vector	BLK 45	BLK 1	BLK 45	BLK 1	BLK 45	BLK 1	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3	Rep 1 BK45	Rep 2 BK45	Rep 3 BK45
56	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
57	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
58	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
59	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
60	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
61	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
62	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
63	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
64	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
65	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
66	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
67	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
68	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
69	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
70	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
71	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
72	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
73	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
74	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
75	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
76	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
77	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
78	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
79	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
80	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
81	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
82	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
83	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
84	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
85	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
86	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
87	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
88	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
89	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
90	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
91	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
92	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
93	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
94	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
95	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
96	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
97	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
98	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
99	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
100	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	0.00E+00	-3.46E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK

Table COMP.B-7. QC Check for Parameter DRZ_OE_1:PERM_X in CRA19_COMP Analysis, BRAGFLO Salado Flow Model

Checks Performed:

Check that material Block 45 has been assigned the same property values as Block 1.

Check that the values of sampled properties lie between the minimum and maximum values of the uncertainty range for intact halite.

Block Identification Key:	**PERM_X Target Values:**			**Example logic statements used to perform checks:**		**Check Result Indicators:**	
BLK 45 = DRZ_OE_1	Target Min	Target Max		Check Min Value:	IF(VALUE<E9,S8,T8)	PROBLEM	OK
BLK 1 = S_HALITE	1.00E-24	1.00E-21	m^2	Check Max Value:	IF(VALUE>F9,S8,T8)		
				Check Equality:	IF(BLK45 VALUE=BLK1 VALUE,T8,S8)		

BRAGFLO Salado Flow Model Parameter DRZ_OE_1:PERM_X																
	Replicate 1		**Replicate 2**		**Replicate 3**		**Minimum Checks BLK 1**			**Maximum Checks BLK 1**			**Equality Checks**			
Vector	**BLK 45**	**BLK 1**	**BLK 45**	**BLK 1**	**BLK 45**	**BLK 1**	**Rep 1**	**Rep 2**	**Rep 3**	**Rep 1**	**Rep 2**	**Rep 3**	**Rep 1 BK45**	**Rep 2 BK45**	**Rep 3 BK45**	
1	1.80E-23	1.80E-23	7.54E-22	7.54E-22	6.91E-22	6.91E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK	
2	1.15E-23	1.15E-23	4.78E-23	4.78E-23	4.26E-22	4.26E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK	
3	7.67E-23	7.67E-23	2.44E-22	2.44E-22	5.52E-24	5.52E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK	
4	1.28E-22	1.28E-22	1.86E-23	1.86E-23	5.71E-23	5.71E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK	
5	5.89E-22	5.89E-22	3.96E-22	3.96E-22	1.83E-23	1.83E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK	
6	4.10E-24	4.10E-24	2.95E-23	2.95E-23	1.37E-22	1.37E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK	
7	1.55E-23	1.55E-23	5.23E-22	5.23E-22	3.39E-22	3.39E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK	
8	1.21E-24	1.21E-24	8.73E-22	8.73E-22	3.63E-23	3.63E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK	
9	4.37E-22	4.37E-22	5.17E-24	5.17E-24	2.86E-22	2.86E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK	
10	1.88E-22	1.88E-22	6.30E-22	6.30E-22	2.96E-23	2.96E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK	
11	2.21E-24	2.21E-24	4.49E-22	4.49E-22	1.25E-24	1.25E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK	
12	1.30E-24	1.30E-24	6.51E-23	6.51E-23	7.27E-22	7.27E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK	
13	7.20E-23	7.20E-23	2.87E-24	2.87E-24	1.23E-23	1.23E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK	
14	1.07E-23	1.07E-23	2.75E-24	2.75E-24	1.04E-23	1.04E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK	
15	2.50E-24	2.50E-24	2.02E-24	2.02E-24	1.48E-22	1.48E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK	
16	3.53E-22	3.53E-22	7.52E-23	7.52E-23	8.19E-23	8.19E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK	
17	4.21E-22	4.21E-22	1.19E-24	1.19E-24	9.39E-23	9.39E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK	
18	7.21E-22	7.21E-22	4.00E-24	4.00E-24	1.17E-24	1.17E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK	
19	8.12E-23	8.12E-23	4.31E-23	4.31E-23	1.81E-23	1.81E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK	
20	4.27E-23	4.27E-23	4.47E-24	4.47E-24	5.90E-22	5.90E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK	
21	1.06E-24	1.06E-24	3.53E-23	3.53E-23	2.11E-24	2.11E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK	
22	4.96E-24	4.96E-24	8.47E-24	8.47E-24	1.94E-22	1.94E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK	
23	2.11E-24	2.11E-24	1.50E-24	1.50E-24	3.88E-22	3.88E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK	
24	1.06E-22	1.06E-22	2.07E-23	2.07E-23	2.54E-24	2.54E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK	
25	2.71E-23	2.71E-23	1.78E-22	1.78E-22	7.25E-24	7.25E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK	
26	3.31E-24	3.31E-24	2.22E-24	2.22E-24	6.06E-23	6.06E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK	
27	4.82E-24	4.82E-24	4.84E-23	4.84E-23	1.60E-23	1.60E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK	
28	5.50E-23	5.50E-23	5.40E-24	5.40E-24	1.06E-23	1.06E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK	
29	8.62E-22	8.62E-22	1.91E-22	1.91E-22	9.88E-23	9.88E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK	
30	4.46E-24	4.46E-24	1.92E-24	1.92E-24	2.14E-24	2.14E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK	
31	2.31E-24	2.31E-24	5.88E-23	5.88E-23	8.06E-22	8.06E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK	
32	1.88E-23	1.88E-23	7.14E-23	7.14E-23	3.30E-24	3.30E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK	
33	4.86E-22	4.86E-22	1.01E-24	1.01E-24	5.38E-23	5.38E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK	
34	3.79E-22	3.79E-22	1.57E-22	1.57E-22	1.48E-24	1.48E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK	
35	9.75E-22	9.75E-22	6.00E-24	6.00E-24	4.98E-24	4.98E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK	
36	2.68E-22	2.68E-22	1.77E-22	1.77E-22	3.87E-24	3.87E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK	
37	1.41E-24	1.41E-24	1.14E-24	1.14E-24	8.73E-23	8.73E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK	
38	8.84E-23	8.84E-23	1.23E-23	1.23E-23	3.29E-22	3.29E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK	
39	8.40E-24	8.40E-24	4.14E-22	4.14E-22	1.36E-23	1.36E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK	
40	5.34E-22	5.34E-22	8.94E-23	8.94E-23	1.05E-22	1.05E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK	
41	6.75E-23	6.75E-23	7.04E-22	7.04E-22	2.81E-23	2.81E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK	
42	1.59E-24	1.59E-24	9.91E-24	9.91E-24	1.39E-24	1.39E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK	
43	2.80E-23	2.80E-23	2.83E-22	2.83E-22	3.08E-24	3.08E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK	
44	3.65E-24	3.65E-24	1.26E-22	1.26E-22	5.42E-22	5.42E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK	
45	2.41E-23	2.41E-23	2.61E-24	2.61E-24	2.53E-23	2.53E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK	
46	3.00E-24	3.00E-24	1.52E-22	1.52E-22	1.38E-23	1.38E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK	
47	2.80E-24	2.80E-24	3.62E-24	3.62E-24	4.17E-23	4.17E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK	
48	8.89E-24	8.89E-24	1.69E-23	1.69E-23	4.52E-23	4.52E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK	
49	1.99E-23	1.99E-23	8.39E-22	8.39E-22	1.13E-23	1.13E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK	
50	1.42E-23	1.42E-23	2.97E-22	2.97E-22	9.90E-22	9.90E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK	
51	1.71E-22	1.71E-22	1.32E-24	1.32E-24	9.29E-24	9.29E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK	
52	5.90E-24	5.90E-24	1.28E-22	1.28E-22	4.11E-24	4.11E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK	
53	3.04E-23	3.04E-23	3.67E-23	3.67E-23	2.45E-22	2.45E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK	
54	9.23E-23	9.23E-23	2.31E-24	2.31E-24	1.88E-24	1.88E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK	
55	6.04E-23	6.04E-23	7.56E-24	7.56E-24	1.27E-22	1.27E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK	

Table COMP.B-7. QC Check for Parameter DRZ_OE_1:PERM_X in CRA19_COMP Analysis, BRAGFLO Salado Flow Model (Continued)

BRAGFLO Salado Flow Model Parameter DRZ_OE_1:PERM_X							Minimum Checks BLK 1			Maximum Checks BLK 1			Equality Checks		
	Replicate 1		Replicate 2		Replicate 3										
Vector	BLK 45	BLK 1	BLK 45	BLK 1	BLK 45	BLK 1	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3	Rep 1 BK45	Rep 2 BK45	Rep 3 BK45
56	7.36E-24	7.36E-24	3.50E-22	3.50E-22	1.65E-24	1.65E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
57	1.09E-24	1.09E-24	3.59E-22	3.59E-22	2.27E-22	2.27E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
58	2.29E-22	2.29E-22	2.23E-22	2.23E-22	8.00E-24	8.00E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
59	4.99E-23	4.99E-23	7.90E-22	7.90E-22	3.53E-23	3.53E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
60	9.87E-23	9.87E-23	2.52E-22	2.52E-22	2.08E-22	2.08E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
61	2.28E-23	2.28E-23	1.75E-23	1.75E-23	4.50E-22	4.50E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
62	3.19E-24	3.19E-24	1.07E-22	1.07E-22	2.21E-23	2.21E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
63	1.14E-22	1.14E-22	2.49E-23	2.49E-23	2.59E-22	2.59E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
64	6.20E-24	6.20E-24	1.75E-24	1.75E-24	8.97E-24	8.97E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
65	6.65E-22	6.65E-22	9.71E-23	9.71E-23	2.95E-24	2.95E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
66	2.09E-23	2.09E-23	1.55E-24	1.55E-24	9.22E-22	9.22E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
67	7.93E-24	7.93E-24	8.40E-23	8.40E-23	4.75E-22	4.75E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
68	2.43E-22	2.43E-22	2.57E-23	2.57E-23	1.01E-24	1.01E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
69	9.68E-24	9.68E-24	1.35E-23	1.35E-23	1.96E-23	1.96E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
70	3.27E-23	3.27E-23	6.30E-24	6.30E-24	2.64E-24	2.64E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
71	1.69E-24	1.69E-24	1.13E-23	1.13E-23	2.40E-23	2.40E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
72	5.29E-24	5.29E-24	1.42E-22	1.42E-22	5.78E-24	5.78E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
73	1.76E-24	1.76E-24	3.29E-24	3.29E-24	1.81E-22	1.81E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
74	1.34E-23	1.34E-23	3.03E-24	3.03E-24	6.47E-23	6.47E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
75	3.75E-24	3.75E-24	1.11E-22	1.11E-22	1.64E-22	1.64E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
76	5.61E-22	5.61E-22	6.20E-23	6.20E-23	4.06E-23	4.06E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
77	3.22E-22	3.22E-22	4.59E-24	4.59E-24	3.27E-23	3.27E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
78	1.45E-22	1.45E-22	1.30E-24	1.30E-24	6.80E-23	6.80E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
79	1.87E-24	1.87E-24	3.25E-22	3.25E-22	1.10E-24	1.10E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
80	1.41E-24	1.41E-24	8.29E-23	8.29E-23	4.59E-24	4.59E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
81	9.17E-22	9.17E-22	1.51E-23	1.51E-23	7.58E-24	7.58E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
82	3.96E-23	3.96E-23	8.67E-24	8.67E-24	6.67E-24	6.67E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
83	3.43E-23	3.43E-23	4.09E-23	4.09E-23	4.81E-23	4.81E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
84	9.97E-24	9.97E-24	5.48E-22	5.48E-22	2.39E-24	2.39E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
85	2.71E-22	2.71E-22	3.74E-24	3.74E-24	1.86E-24	1.86E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
86	3.82E-23	3.82E-23	1.09E-23	1.09E-23	6.18E-22	6.18E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
87	4.65E-23	4.65E-23	2.07E-22	2.07E-22	2.92E-22	2.92E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
88	3.05E-22	3.05E-22	1.47E-23	1.47E-23	8.17E-22	8.17E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
89	6.71E-24	6.71E-24	5.89E-22	5.89E-22	5.32E-22	5.32E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
90	6.44E-22	6.44E-22	4.79E-22	4.79E-22	4.50E-24	4.50E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
91	2.10E-22	2.10E-22	6.90E-24	6.90E-24	1.18E-22	1.18E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
92	5.22E-23	5.22E-23	2.36E-23	2.36E-23	1.62E-24	1.62E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
93	1.29E-23	1.29E-23	2.16E-23	2.16E-23	3.56E-22	3.56E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
94	1.36E-22	1.36E-22	5.48E-23	5.48E-23	7.73E-23	7.73E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
95	1.60E-23	1.60E-23	7.00E-24	7.00E-24	2.71E-23	2.71E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
96	1.20E-22	1.20E-22	1.71E-24	1.71E-24	3.65E-24	3.65E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
97	1.96E-22	1.96E-22	9.68E-22	9.68E-22	1.68E-22	1.68E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
98	8.06E-22	8.06E-22	3.38E-23	3.38E-23	1.51E-23	1.51E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
99	3.90E-22	3.90E-22	9.48E-24	9.48E-24	6.34E-24	6.34E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
100	1.56E-22	1.56E-22	2.93E-23	2.93E-23	1.11E-22	1.11E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK

Table COMP.B-8. QC Check for Parameter DRZ_OE_1:PERM_Y in CRA19_COMP Analysis, BRAGFLO Salado Flow Model

Checks Performed:

Check that material Block 45 has been assigned the same property values as Block 1.

Check that the values of sampled properties lie between the minimum and maximum values of the uncertainty range for intact halite.

Block Identification Key:	**PERM_Y Target Values:**			**Example logic statements used to perform checks:**		**Check Result Indicators:**	
BLK 45 = DRZ_OE_1	Target Min	Target Max		Check Min Value:	IF(VALUE<E9,S8,T8)	PROBLEM	OK
BLK 1 = S_HALITE	1.00E-24	1.00E-21	m^2	Check Max Value:	IF(VALUE>F9,S8,T8)		
				Check Equality:	IF(BLK45 VALUE=BLK1 VALUE,T8,S8)		

BRAGFLO Salado Flow Model Parameter DRZ_OE_1:PERM_Y																
	Replicate 1		**Replicate 2**		**Replicate 3**		**Minimum Checks BLK 1**			**Maximum Checks BLK 1**			**Equality Checks**		
Vector	**BLK 45**	**BLK 1**	**BLK 45**	**BLK 1**	**BLK 45**	**BLK 1**	**Rep 1**	**Rep 2**	**Rep 3**	**Rep 1**	**Rep 2**	**Rep 3**	**Rep 1 BK45**	**Rep 2 BK45**	**Rep 3 BK45**
1	1.80E-23	1.80E-23	7.54E-22	7.54E-22	6.91E-22	6.91E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
2	1.15E-23	1.15E-23	4.78E-23	4.78E-23	4.26E-22	4.26E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
3	7.67E-23	7.67E-23	2.44E-22	2.44E-22	5.52E-24	5.52E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
4	1.28E-22	1.28E-22	1.86E-23	1.86E-23	5.71E-23	5.71E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
5	5.89E-22	5.89E-22	3.96E-22	3.96E-22	1.83E-23	1.83E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
6	4.10E-24	4.10E-24	2.95E-23	2.95E-23	1.37E-22	1.37E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
7	1.55E-23	1.55E-23	5.23E-22	5.23E-22	3.39E-22	3.39E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
8	1.21E-24	1.21E-24	8.73E-22	8.73E-22	3.63E-23	3.63E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
9	4.37E-22	4.37E-22	5.17E-24	5.17E-24	2.86E-22	2.86E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
10	1.88E-22	1.88E-22	6.30E-22	6.30E-22	2.96E-23	2.96E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
11	2.21E-24	2.21E-24	4.49E-22	4.49E-22	1.25E-24	1.25E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
12	1.30E-24	1.30E-24	6.51E-23	6.51E-23	7.27E-22	7.27E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
13	7.20E-23	7.20E-23	2.87E-24	2.87E-24	1.23E-23	1.23E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
14	1.07E-23	1.07E-23	2.75E-24	2.75E-24	1.04E-23	1.04E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
15	2.50E-24	2.50E-24	2.02E-24	2.02E-24	1.48E-22	1.48E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
16	3.53E-22	3.53E-22	7.52E-23	7.52E-23	8.19E-23	8.19E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
17	4.21E-22	4.21E-22	1.19E-24	1.19E-24	9.39E-23	9.39E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
18	7.21E-22	7.21E-22	4.00E-24	4.00E-24	1.17E-24	1.17E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
19	8.12E-23	8.12E-23	4.31E-23	4.31E-23	1.81E-23	1.81E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
20	4.27E-23	4.27E-23	4.47E-24	4.47E-24	5.90E-22	5.90E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
21	1.06E-24	1.06E-24	3.53E-23	3.53E-23	2.11E-24	2.11E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
22	4.96E-24	4.96E-24	8.47E-24	8.47E-24	1.94E-22	1.94E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
23	2.11E-24	2.11E-24	1.50E-24	1.50E-24	3.88E-22	3.88E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
24	1.06E-22	1.06E-22	2.07E-23	2.07E-23	2.54E-24	2.54E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
25	2.71E-23	2.71E-23	1.78E-22	1.78E-22	7.25E-24	7.25E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
26	3.31E-24	3.31E-24	2.22E-24	2.22E-24	6.06E-23	6.06E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
27	4.82E-24	4.82E-24	4.84E-23	4.84E-23	1.60E-23	1.60E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
28	5.50E-23	5.50E-23	5.40E-24	5.40E-24	1.06E-23	1.06E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
29	8.62E-22	8.62E-22	1.91E-22	1.91E-22	9.88E-23	9.88E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
30	4.46E-24	4.46E-24	1.92E-24	1.92E-24	2.14E-24	2.14E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
31	2.31E-24	2.31E-24	5.88E-23	5.88E-23	8.06E-22	8.06E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
32	1.88E-23	1.88E-23	7.14E-23	7.14E-23	3.30E-24	3.30E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
33	4.86E-22	4.86E-22	1.01E-24	1.01E-24	5.38E-23	5.38E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
34	3.79E-22	3.79E-22	1.57E-22	1.57E-22	1.48E-24	1.48E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
35	9.75E-22	9.75E-22	6.00E-24	6.00E-24	4.98E-24	4.98E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
36	2.68E-22	2.68E-22	1.77E-22	1.77E-22	3.87E-24	3.87E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
37	1.41E-24	1.41E-24	1.14E-24	1.14E-24	8.73E-23	8.73E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
38	8.84E-23	8.84E-23	1.23E-23	1.23E-23	3.29E-22	3.29E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
39	8.40E-24	8.40E-24	4.14E-22	4.14E-22	1.36E-23	1.36E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
40	5.34E-22	5.34E-22	8.94E-23	8.94E-23	1.05E-22	1.05E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
41	6.75E-23	6.75E-23	7.04E-22	7.04E-22	2.81E-23	2.81E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
42	1.59E-24	1.59E-24	9.91E-24	9.91E-24	1.39E-24	1.39E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
43	2.80E-23	2.80E-23	2.83E-22	2.83E-22	3.08E-24	3.08E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
44	3.65E-24	3.65E-24	1.26E-22	1.26E-22	5.42E-22	5.42E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
45	2.41E-23	2.41E-23	2.61E-24	2.61E-24	2.53E-23	2.53E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
46	3.00E-24	3.00E-24	1.52E-22	1.52E-22	1.38E-23	1.38E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
47	2.80E-24	2.80E-24	3.62E-24	3.62E-24	4.17E-23	4.17E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
48	8.89E-24	8.89E-24	1.69E-23	1.69E-23	4.52E-23	4.52E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
49	1.99E-23	1.99E-23	8.39E-22	8.39E-22	1.13E-23	1.13E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
50	1.42E-23	1.42E-23	2.97E-22	2.97E-22	9.90E-22	9.90E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
51	1.71E-22	1.71E-22	1.32E-24	1.32E-24	9.29E-24	9.29E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
52	5.90E-24	5.90E-24	1.28E-22	1.28E-22	4.11E-24	4.11E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
53	3.04E-23	3.04E-23	3.67E-23	3.67E-23	2.45E-22	2.45E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
54	9.23E-23	9.23E-23	2.31E-24	2.31E-24	1.88E-24	1.88E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
55	6.04E-23	6.04E-23	7.56E-24	7.56E-24	1.27E-22	1.27E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK

Table COMP.B-8. QC Check for Parameter DRZ_OE_1:PERM_Y in CRA19_COMP Analysis, BRAGFLO Salado Flow Model (Continued)

BRAGFLO Salado Flow Model Parameter DRZ_OE_1:PERM_Y							Minimum Checks BLK 1			Maximum Checks BLK 1			Equality Checks		
	Replicate 1		Replicate 2		Replicate 3										
Vector	BLK 45	BLK 1	BLK 45	BLK 1	BLK 45	BLK 1	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3	Rep 1 BK45	Rep 2 BK45	Rep 3 BK45
56	7.36E-24	7.36E-24	3.50E-22	3.50E-22	1.65E-24	1.65E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
57	1.09E-24	1.09E-24	3.59E-22	3.59E-22	2.27E-22	2.27E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
58	2.29E-22	2.29E-22	2.23E-22	2.23E-22	8.00E-24	8.00E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
59	4.99E-23	4.99E-23	7.90E-22	7.90E-22	3.53E-23	3.53E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
60	9.87E-23	9.87E-23	2.52E-22	2.52E-22	2.08E-22	2.08E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
61	2.28E-23	2.28E-23	1.75E-23	1.75E-23	4.50E-22	4.50E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
62	3.19E-24	3.19E-24	1.07E-22	1.07E-22	2.21E-23	2.21E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
63	1.14E-22	1.14E-22	2.49E-23	2.49E-23	2.59E-22	2.59E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
64	6.20E-24	6.20E-24	1.75E-24	1.75E-24	8.97E-24	8.97E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
65	6.65E-22	6.65E-22	9.71E-23	9.71E-23	2.95E-24	2.95E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
66	2.09E-23	2.09E-23	1.55E-24	1.55E-24	9.22E-22	9.22E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
67	7.93E-24	7.93E-24	8.40E-23	8.40E-23	4.75E-22	4.75E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
68	2.43E-22	2.43E-22	2.57E-23	2.57E-23	1.01E-24	1.01E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
69	9.68E-24	9.68E-24	1.35E-23	1.35E-23	1.96E-23	1.96E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
70	3.27E-23	3.27E-23	6.30E-24	6.30E-24	2.64E-24	2.64E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
71	1.69E-24	1.69E-24	1.13E-23	1.13E-23	2.40E-23	2.40E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
72	5.29E-24	5.29E-24	1.42E-22	1.42E-22	5.78E-24	5.78E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
73	1.76E-24	1.76E-24	3.29E-24	3.29E-24	1.81E-22	1.81E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
74	1.34E-23	1.34E-23	3.03E-24	3.03E-24	6.47E-23	6.47E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
75	3.75E-24	3.75E-24	1.11E-22	1.11E-22	1.64E-22	1.64E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
76	5.61E-22	5.61E-22	6.20E-23	6.20E-23	4.06E-23	4.06E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
77	3.22E-22	3.22E-22	4.59E-24	4.59E-24	3.27E-23	3.27E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
78	1.45E-22	1.45E-22	1.30E-24	1.30E-24	6.80E-23	6.80E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
79	1.87E-24	1.87E-24	3.25E-22	3.25E-22	1.10E-24	1.10E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
80	1.41E-24	1.41E-24	8.29E-23	8.29E-23	4.59E-24	4.59E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
81	9.17E-22	9.17E-22	1.51E-23	1.51E-23	7.58E-24	7.58E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
82	3.96E-23	3.96E-23	8.67E-24	8.67E-24	6.67E-24	6.67E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
83	3.43E-23	3.43E-23	4.09E-23	4.09E-23	4.81E-23	4.81E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
84	9.97E-24	9.97E-24	5.48E-22	5.48E-22	2.39E-24	2.39E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
85	2.71E-22	2.71E-22	3.74E-24	3.74E-24	1.86E-24	1.86E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
86	3.82E-23	3.82E-23	1.09E-23	1.09E-23	6.18E-22	6.18E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
87	4.65E-23	4.65E-23	2.07E-22	2.07E-22	2.92E-22	2.92E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
88	3.05E-22	3.05E-22	1.47E-23	1.47E-23	8.17E-22	8.17E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
89	6.71E-24	6.71E-24	5.89E-22	5.89E-22	5.32E-22	5.32E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
90	6.44E-22	6.44E-22	4.79E-22	4.79E-22	4.50E-24	4.50E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
91	2.10E-22	2.10E-22	6.90E-24	6.90E-24	1.18E-22	1.18E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
92	5.22E-23	5.22E-23	2.36E-23	2.36E-23	1.62E-24	1.62E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
93	1.29E-23	1.29E-23	2.16E-23	2.16E-23	3.56E-22	3.56E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
94	1.36E-22	1.36E-22	5.48E-23	5.48E-23	7.73E-23	7.73E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
95	1.60E-23	1.60E-23	7.00E-24	7.00E-24	2.71E-23	2.71E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
96	1.20E-22	1.20E-22	1.71E-24	1.71E-24	3.65E-24	3.65E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
97	1.96E-22	1.96E-22	9.68E-22	9.68E-22	1.68E-22	1.68E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
98	8.06E-22	8.06E-22	3.38E-23	3.38E-23	1.51E-23	1.51E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
99	3.90E-22	3.90E-22	9.48E-24	9.48E-24	6.34E-24	6.34E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
100	1.56E-22	1.56E-22	2.93E-23	2.93E-23	1.11E-22	1.11E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK

Table COMP.B-9. QC Check for Parameter DRZ_OE_1:PERM_Z in CRA19_COMP Analysis, BRAGFLO Salado Flow Model

Checks Performed:

Check that material Block 45 has been assigned the same property values as Block 1.

Check that the values of sampled properties lie between the minimum and maximum values of the uncertainty range for intact halite.

Block Identification Key:	**PERM_Z Target Values:**			**Example logic statements used to perform checks:**		**Check Result Indicators:**	
BLK 45 = DRZ_OE_1	Target Min	Target Max		Check Min Value:	IF(VALUE<E9,S8,T8)	PROBLEM	OK
BLK 1 = S_HALITE	1.00E-24	1.00E-21	m^2	Check Max Value:	IF(VALUE>F9,S8,T8)		
				Check Equality:	IF(BLK45 VALUE=BLK1 VALUE,T8,S8)		

BRAGFLO Salado Flow Model Parameter DRZ_OE_1:PERM_Z																
	Replicate 1		**Replicate 2**		**Replicate 3**		**Minimum Checks BLK 1**			**Maximum Checks BLK 1**			**Equality Checks**		
Vector	**BLK 45**	**BLK 1**	**BLK 45**	**BLK 1**	**BLK 45**	**BLK 1**	**Rep 1**	**Rep 2**	**Rep 3**	**Rep 1**	**Rep 2**	**Rep 3**	**Rep 1 BK45**	**Rep 2 BK45**	**Rep 3 BK45**
1	1.80E-23	1.80E-23	7.54E-22	7.54E-22	6.91E-22	6.91E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
2	1.15E-23	1.15E-23	4.78E-23	4.78E-23	4.26E-22	4.26E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
3	7.67E-23	7.67E-23	2.44E-22	2.44E-22	5.52E-24	5.52E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
4	1.28E-22	1.28E-22	1.86E-23	1.86E-23	5.71E-23	5.71E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
5	5.89E-22	5.89E-22	3.96E-22	3.96E-22	1.83E-23	1.83E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
6	4.10E-24	4.10E-24	2.95E-23	2.95E-23	1.37E-22	1.37E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
7	1.55E-23	1.55E-23	5.23E-22	5.23E-22	3.39E-22	3.39E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
8	1.21E-24	1.21E-24	8.73E-22	8.73E-22	3.63E-23	3.63E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
9	4.37E-22	4.37E-22	5.17E-24	5.17E-24	2.86E-22	2.86E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
10	1.88E-22	1.88E-22	6.30E-22	6.30E-22	2.96E-23	2.96E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
11	2.21E-24	2.21E-24	4.49E-22	4.49E-22	1.25E-24	1.25E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
12	1.30E-24	1.30E-24	6.51E-23	6.51E-23	7.27E-22	7.27E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
13	7.20E-23	7.20E-23	2.87E-24	2.87E-24	1.23E-23	1.23E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
14	1.07E-23	1.07E-23	2.75E-24	2.75E-24	1.04E-23	1.04E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
15	2.50E-24	2.50E-24	2.02E-24	2.02E-24	1.48E-22	1.48E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
16	3.53E-22	3.53E-22	7.52E-23	7.52E-23	8.19E-23	8.19E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
17	4.21E-22	4.21E-22	1.19E-24	1.19E-24	9.39E-23	9.39E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
18	7.21E-22	7.21E-22	4.00E-24	4.00E-24	1.17E-24	1.17E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
19	8.12E-23	8.12E-23	4.31E-23	4.31E-23	1.81E-23	1.81E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
20	4.27E-23	4.27E-23	4.47E-24	4.47E-24	5.90E-22	5.90E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
21	1.06E-24	1.06E-24	3.53E-23	3.53E-23	2.11E-24	2.11E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
22	4.96E-24	4.96E-24	8.47E-24	8.47E-24	1.94E-22	1.94E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
23	2.11E-24	2.11E-24	1.50E-24	1.50E-24	3.88E-22	3.88E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
24	1.06E-22	1.06E-22	2.07E-23	2.07E-23	2.54E-24	2.54E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
25	2.71E-23	2.71E-23	1.78E-22	1.78E-22	7.25E-24	7.25E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
26	3.31E-24	3.31E-24	2.22E-24	2.22E-24	6.06E-23	6.06E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
27	4.82E-24	4.82E-24	4.84E-23	4.84E-23	1.60E-23	1.60E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
28	5.50E-23	5.50E-23	5.40E-24	5.40E-24	1.06E-23	1.06E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
29	8.62E-22	8.62E-22	1.91E-22	1.91E-22	9.88E-23	9.88E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
30	4.46E-24	4.46E-24	1.92E-24	1.92E-24	2.14E-24	2.14E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
31	2.31E-24	2.31E-24	5.88E-23	5.88E-23	8.06E-22	8.06E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
32	1.88E-23	1.88E-23	7.14E-23	7.14E-23	3.30E-24	3.30E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
33	4.86E-22	4.86E-22	1.01E-24	1.01E-24	5.38E-23	5.38E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
34	3.79E-22	3.79E-22	1.57E-22	1.57E-22	1.48E-24	1.48E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
35	9.75E-22	9.75E-22	6.00E-24	6.00E-24	4.98E-24	4.98E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
36	2.68E-22	2.68E-22	1.77E-22	1.77E-22	3.87E-24	3.87E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
37	1.41E-24	1.41E-24	1.14E-24	1.14E-24	8.73E-23	8.73E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
38	8.84E-23	8.84E-23	1.23E-23	1.23E-23	3.29E-22	3.29E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
39	8.40E-24	8.40E-24	4.14E-22	4.14E-22	1.36E-23	1.36E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
40	5.34E-22	5.34E-22	8.94E-23	8.94E-23	1.05E-22	1.05E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
41	6.75E-23	6.75E-23	7.04E-22	7.04E-22	2.81E-23	2.81E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
42	1.59E-24	1.59E-24	9.91E-24	9.91E-24	1.39E-24	1.39E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
43	2.80E-23	2.80E-23	2.83E-22	2.83E-22	3.08E-24	3.08E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
44	3.65E-24	3.65E-24	1.26E-22	1.26E-22	5.42E-22	5.42E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
45	2.41E-23	2.41E-23	2.61E-24	2.61E-24	2.53E-23	2.53E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
46	3.00E-24	3.00E-24	1.52E-22	1.52E-22	1.38E-23	1.38E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
47	2.80E-24	2.80E-24	3.62E-24	3.62E-24	4.17E-23	4.17E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
48	8.89E-24	8.89E-24	1.69E-23	1.69E-23	4.52E-23	4.52E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
49	1.99E-23	1.99E-23	8.39E-22	8.39E-22	1.13E-23	1.13E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
50	1.42E-23	1.42E-23	2.97E-22	2.97E-22	9.90E-22	9.90E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
51	1.71E-22	1.71E-22	1.32E-24	1.32E-24	9.29E-24	9.29E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
52	5.90E-24	5.90E-24	1.28E-22	1.28E-22	4.11E-24	4.11E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
53	3.04E-23	3.04E-23	3.67E-23	3.67E-23	2.45E-22	2.45E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
54	9.23E-23	9.23E-23	2.31E-24	2.31E-24	1.88E-24	1.88E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
55	6.04E-23	6.04E-23	7.56E-24	7.56E-24	1.27E-22	1.27E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK

Table COMP.B-9. QC Check for Parameter DRZ_OE_1:PERM_Z in CRA19_COMP Analysis, BRAGFLO Salado Flow Model (Continued)

BRAGFLO Salado Flow Model Parameter DRZ_OE_1:PERM_Z							Minimum Checks BLK 1			Maximum Checks BLK 1			Equality Checks		
	Replicate 1		Replicate 2		Replicate 3										
Vector	BLK 45	BLK 1	BLK 45	BLK 1	BLK 45	BLK 1	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3	Rep 1 BK45	Rep 2 BK45	Rep 3 BK45
56	7.36E-24	7.36E-24	3.50E-22	3.50E-22	1.65E-24	1.65E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
57	1.09E-24	1.09E-24	3.59E-22	3.59E-22	2.27E-22	2.27E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
58	2.29E-22	2.29E-22	2.23E-22	2.23E-22	8.00E-24	8.00E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
59	4.99E-23	4.99E-23	7.90E-22	7.90E-22	3.53E-23	3.53E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
60	9.87E-23	9.87E-23	2.52E-22	2.52E-22	2.08E-22	2.08E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
61	2.28E-23	2.28E-23	1.75E-23	1.75E-23	4.50E-22	4.50E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
62	3.19E-24	3.19E-24	1.07E-22	1.07E-22	2.21E-23	2.21E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
63	1.14E-22	1.14E-22	2.49E-23	2.49E-23	2.59E-22	2.59E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
64	6.20E-24	6.20E-24	1.75E-24	1.75E-24	8.97E-24	8.97E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
65	6.65E-22	6.65E-22	9.71E-23	9.71E-23	2.95E-24	2.95E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
66	2.09E-23	2.09E-23	1.55E-24	1.55E-24	9.22E-22	9.22E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
67	7.93E-24	7.93E-24	8.40E-23	8.40E-23	4.75E-22	4.75E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
68	2.43E-22	2.43E-22	2.57E-23	2.57E-23	1.01E-24	1.01E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
69	9.68E-24	9.68E-24	1.35E-23	1.35E-23	1.96E-23	1.96E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
70	3.27E-23	3.27E-23	6.30E-24	6.30E-24	2.64E-24	2.64E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
71	1.69E-24	1.69E-24	1.13E-23	1.13E-23	2.40E-23	2.40E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
72	5.29E-24	5.29E-24	1.42E-22	1.42E-22	5.78E-24	5.78E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
73	1.76E-24	1.76E-24	3.29E-24	3.29E-24	1.81E-22	1.81E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
74	1.34E-23	1.34E-23	3.03E-24	3.03E-24	6.47E-23	6.47E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
75	3.75E-24	3.75E-24	1.11E-22	1.11E-22	1.64E-22	1.64E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
76	5.61E-22	5.61E-22	6.20E-23	6.20E-23	4.06E-23	4.06E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
77	3.22E-22	3.22E-22	4.59E-24	4.59E-24	3.27E-23	3.27E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
78	1.45E-22	1.45E-22	1.30E-24	1.30E-24	6.80E-23	6.80E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
79	1.87E-24	1.87E-24	3.25E-22	3.25E-22	1.10E-24	1.10E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
80	1.41E-24	1.41E-24	8.29E-23	8.29E-23	4.59E-24	4.59E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
81	9.17E-22	9.17E-22	1.51E-23	1.51E-23	7.58E-24	7.58E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
82	3.96E-23	3.96E-23	8.67E-24	8.67E-24	6.67E-24	6.67E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
83	3.43E-23	3.43E-23	4.09E-23	4.09E-23	4.81E-23	4.81E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
84	9.97E-24	9.97E-24	5.48E-22	5.48E-22	2.39E-24	2.39E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
85	2.71E-22	2.71E-22	3.74E-24	3.74E-24	1.86E-24	1.86E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
86	3.82E-23	3.82E-23	1.09E-23	1.09E-23	6.18E-22	6.18E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
87	4.65E-23	4.65E-23	2.07E-22	2.07E-22	2.92E-22	2.92E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
88	3.05E-22	3.05E-22	1.47E-23	1.47E-23	8.17E-22	8.17E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
89	6.71E-24	6.71E-24	5.89E-22	5.89E-22	5.32E-22	5.32E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
90	6.44E-22	6.44E-22	4.79E-22	4.79E-22	4.50E-24	4.50E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
91	2.10E-22	2.10E-22	6.90E-24	6.90E-24	1.18E-22	1.18E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
92	5.22E-23	5.22E-23	2.36E-23	2.36E-23	1.62E-24	1.62E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
93	1.29E-23	1.29E-23	2.16E-23	2.16E-23	3.56E-22	3.56E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
94	1.36E-22	1.36E-22	5.48E-23	5.48E-23	7.73E-23	7.73E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
95	1.60E-23	1.60E-23	7.00E-24	7.00E-24	2.71E-23	2.71E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
96	1.20E-22	1.20E-22	1.71E-24	1.71E-24	3.65E-24	3.65E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
97	1.96E-22	1.96E-22	9.68E-22	9.68E-22	1.68E-22	1.68E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK
98	8.06E-22	8.06E-22	3.38E-23	3.38E-23	1.51E-23	1.51E-23	OK	OK	OK	OK	OK	OK	OK	OK	OK
99	3.90E-22	3.90E-22	9.48E-24	9.48E-24	6.34E-24	6.34E-24	OK	OK	OK	OK	OK	OK	OK	OK	OK
100	1.56E-22	1.56E-22	2.93E-23	2.93E-23	1.11E-22	1.11E-22	OK	OK	OK	OK	OK	OK	OK	OK	OK

Table COMP.B-10. QC Check for Parameter DRZ_OE_1:PO_MIN in CRA19_COMP Analysis, BRAGFLO Salado Flow Model

Checks Performed:

Check that material Block 45 has been assigned the same property values as Block 1.

Check that the values of sampled properties lie between the minimum and maximum values of the uncertainty range for intact halite.

Block Identification Key:	**PO_MIN Target Values:**			**Example logic statements used to perform checks:**		**Check Result Indicators:**	
BLK 45 = DRZ_OE_1	Target Min	Target Max		Check Min Value:	IF(VALUE<E9,S8,T8)	PROBLEM	OK
BLK 1 = S_HALITE	1.01E+05	1.01E+05	Pa	Check Max Value:	IF(VALUE>F9,S8,T8)		
				Check Equality:	IF(BLK45 VALUE=BLK1 VALUE,T8,S8)		

BRAGFLO Salado Flow Model Parameter DRZ_OE_1:PO_MIN																	
	Replicate 1		**Replicate 2**		**Replicate 3**		**Minimum Checks BLK 1**			**Maximum Checks BLK 1**			**Equality Checks**		
Vector	**BLK 45**	**BLK 1**	**BLK 45**	**BLK 1**	**BLK 45**	**BLK 1**	**Rep 1**	**Rep 2**	**Rep 3**	**Rep 1**	**Rep 2**	**Rep 3**	**Rep 1 BK45**	**Rep 2 BK45**	**Rep 3 BK45**
1	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
2	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
3	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
4	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
5	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
6	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
7	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
8	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
9	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
10	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
11	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
12	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
13	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
14	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
15	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
16	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
17	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
18	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
19	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
20	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
21	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
22	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
23	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
24	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
25	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
26	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
27	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
28	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
29	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
30	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
31	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
32	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
33	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
34	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
35	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
36	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
37	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
38	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
39	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
40	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
41	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
42	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
43	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
44	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
45	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
46	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
47	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
48	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
49	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
50	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
51	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
52	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
53	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
54	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
55	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK

Table COMP.B-10. QC Check for Parameter DRZ_OE_1:PO_MIN in CRA19_COMP Analysis, BRAGFLO Salado Flow Model (Continued)

BRAGFLO Salado Flow Model Parameter DRZ_OE_1:PO_MIN																	
	Replicate 1		Replicate 2		Replicate 3		Minimum Checks BLK 1			Maximum Checks BLK 1			Equality Checks		
Vector	BLK 45	BLK 1	BLK 45	BLK 1	BLK 45	BLK 1	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3	Rep 1 BK45	Rep 2 BK45	Rep 3 BK45
56	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
57	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
58	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
59	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
60	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
61	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
62	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
63	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
64	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
65	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
66	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
67	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
68	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
69	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
70	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
71	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
72	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
73	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
74	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
75	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
76	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
77	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
78	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
79	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
80	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
81	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
82	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
83	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
84	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
85	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
86	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
87	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
88	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
89	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
90	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
91	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
92	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
93	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
94	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
95	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
96	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
97	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
98	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
99	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK
100	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	1.01E+05	OK	OK	OK	OK	OK	OK	OK	OK	OK

Table COMP.B-11. QC Check for Parameter DRZ_OE_1:PORE_DIS in CRA19_COMP Analysis, BRAGFLO Salado Flow Model

Checks Performed:

Check that material Block 45 has been assigned the same property values as Block 1.

Check that the values of sampled properties lie between the minimum and maximum values of the uncertainty range for intact halite.

Block Identification Key:	**PORE_DIS Target Values:**		**Example logic statements used to perform checks:**		**Check Result Indicators:**	
BLK 45 = DRZ_OE_1	Target Min	Target Max	Check Min Value:	IF(VALUE<E9,S8,T8)	PROBLEM	OK
BLK 1 = S_HALITE	7.00E-01	7.00E-01 Pa	Check Max Value:	IF(VALUE>F9,S8,T8)		
			Check Equality:	IF(BLK45 VALUE=BLK1 VALUE,T8,S8)		

BRAGFLO Salado Flow Model Parameter DRZ_OE_1:PORE_DIS																	
	Replicate 1		**Replicate 2**		**Replicate 3**		**Minimum Checks BLK 1**			**Maximum Checks BLK 1**			**Equality Checks**		
Vector	**BLK 45**	**BLK 1**	**BLK 45**	**BLK 1**	**BLK 45**	**BLK 1**	**Rep 1**	**Rep 2**	**Rep 3**	**Rep 1**	**Rep 2**	**Rep 3**	**Rep 1 BK45**	**Rep 2 BK45**	**Rep 3 BK45**
1	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
2	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
3	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
4	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
5	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
6	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
7	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
8	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
9	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
10	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
11	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
12	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
13	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
14	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
15	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
16	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
17	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
18	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
19	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
20	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
21	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
22	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
23	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
24	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
25	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
26	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
27	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
28	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
29	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
30	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
31	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
32	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
33	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
34	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
35	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
36	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
37	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
38	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
39	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
40	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
41	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
42	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
43	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
44	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
45	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
46	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
47	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
48	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
49	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
50	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
51	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
52	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
53	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
54	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
55	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK

Table COMP.B-11. QC Check for Parameter DRZ_OE_1:PORE_DIS in CRA19_COMP Analysis, BRAGFLO Salado Flow Model (Continued)

BRAGFLO Salado Flow Model Parameter DRZ_OE_1:PORE_DIS							Minimum Checks BLK 1			Maximum Checks BLK 1			Equality Checks		
	Replicate 1		Replicate 2		Replicate 3										
Vector	BLK 45	BLK 1	BLK 45	BLK 1	BLK 45	BLK 1	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3	Rep 1 BK45	Rep 2 BK45	Rep 3 BK45
56	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
57	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
58	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
59	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
60	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
61	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
62	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
63	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
64	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
65	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
66	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
67	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
68	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
69	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
70	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
71	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
72	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
73	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
74	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
75	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
76	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
77	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
78	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
79	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
80	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
81	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
82	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
83	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
84	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
85	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
86	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
87	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
88	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
89	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
90	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
91	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
92	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
93	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
94	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
95	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
96	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
97	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
98	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
99	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
100	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK

Table COMP.B-12. QC Check for Parameter DRZ_OE_1:POROSITY in CRA19_COMP Analysis, BRAGFLO Salado Flow Model

Checks Performed:

Check that material Block 45 has been assigned the same property values as Block 1.

Check that the values of sampled properties lie between the minimum and maximum values of the uncertainty range for intact halite.

Block Identification Key:	**POROSITY Target Values:**		**Example logic statements used to perform checks:**		**Check Result Indicators:**	
BLK 45 = DRZ_OE_1	Target Min	Target Max	Check Min Value:	IF(VALUE<E9,S8,T8)	PROBLEM	OK
BLK 1 = S_HALITE	1.00E-03	5.19E-02	Check Max Value:	IF(VALUE>F9,S8,T8)		
			Check Equality:	IF(BLK45 VALUE=BLK1 VALUE,T8,S8)		

BRAGFLO Salado Flow Model Parameter DRZ_OE_1:POROSITY																
	Replicate 1		**Replicate 2**		**Replicate 3**		**Minimum Checks BLK 1**			**Maximum Checks BLK 1**			**Equality Checks**		
Vector	**BLK 45**	**BLK 1**	**BLK 45**	**BLK 1**	**BLK 45**	**BLK 1**	**Rep 1**	**Rep 2**	**Rep 3**	**Rep 1**	**Rep 2**	**Rep 3**	**Rep 1 BK45**	**Rep 2 BK45**	**Rep 3 BK45**
1	4.48E-03	4.48E-03	1.65E-02	1.65E-02	4.12E-03	4.12E-03	OK	OK	OK	OK	OK	OK	OK	OK	OK
2	3.96E-02	3.96E-02	2.23E-03	2.23E-03	2.59E-02	2.59E-02	OK	OK	OK	OK	OK	OK	OK	OK	OK
3	2.95E-02	2.95E-02	3.26E-02	3.26E-02	2.31E-03	2.31E-03	OK	OK	OK	OK	OK	OK	OK	OK	OK
4	1.91E-03	1.91E-03	3.09E-02	3.09E-02	7.13E-03	7.13E-03	OK	OK	OK	OK	OK	OK	OK	OK	OK
5	5.09E-02	5.09E-02	3.02E-03	3.02E-03	5.52E-03	5.52E-03	OK	OK	OK	OK	OK	OK	OK	OK	OK
6	4.71E-02	4.71E-02	3.89E-03	3.89E-03	3.19E-03	3.19E-03	OK	OK	OK	OK	OK	OK	OK	OK	OK
7	5.95E-03	5.95E-03	9.82E-03	9.82E-03	4.38E-02	4.38E-02	OK	OK	OK	OK	OK	OK	OK	OK	OK
8	4.43E-02	4.43E-02	2.77E-03	2.77E-03	1.11E-03	1.11E-03	OK	OK	OK	OK	OK	OK	OK	OK	OK
9	9.76E-03	9.76E-03	3.17E-03	3.17E-03	7.76E-03	7.76E-03	OK	OK	OK	OK	OK	OK	OK	OK	OK
10	9.30E-03	9.30E-03	2.83E-02	2.83E-02	9.40E-03	9.40E-03	OK	OK	OK	OK	OK	OK	OK	OK	OK
11	1.77E-02	1.77E-02	2.26E-02	2.26E-02	6.29E-03	6.29E-03	OK	OK	OK	OK	OK	OK	OK	OK	OK
12	2.20E-02	2.20E-02	7.10E-03	7.10E-03	1.72E-02	1.72E-02	OK	OK	OK	OK	OK	OK	OK	OK	OK
13	2.91E-03	2.91E-03	4.49E-02	4.49E-02	4.92E-02	4.92E-02	OK	OK	OK	OK	OK	OK	OK	OK	OK
14	3.57E-02	3.57E-02	2.02E-02	2.02E-02	3.11E-03	3.11E-03	OK	OK	OK	OK	OK	OK	OK	OK	OK
15	6.10E-03	6.10E-03	1.30E-02	1.30E-02	3.82E-02	3.82E-02	OK	OK	OK	OK	OK	OK	OK	OK	OK
16	2.70E-03	2.70E-03	4.34E-02	4.34E-02	4.85E-02	4.85E-02	OK	OK	OK	OK	OK	OK	OK	OK	OK
17	1.25E-02	1.25E-02	6.55E-03	6.55E-03	4.11E-02	4.11E-02	OK	OK	OK	OK	OK	OK	OK	OK	OK
18	3.36E-02	3.36E-02	4.48E-03	4.48E-03	1.45E-03	1.45E-03	OK	OK	OK	OK	OK	OK	OK	OK	OK
19	6.26E-03	6.26E-03	7.15E-03	7.15E-03	2.16E-03	2.16E-03	OK	OK	OK	OK	OK	OK	OK	OK	OK
20	6.44E-03	6.44E-03	3.58E-03	3.58E-03	6.49E-03	6.49E-03	OK	OK	OK	OK	OK	OK	OK	OK	OK
21	5.84E-03	5.84E-03	1.10E-02	1.10E-02	1.78E-03	1.78E-03	OK	OK	OK	OK	OK	OK	OK	OK	OK
22	1.20E-03	1.20E-03	1.97E-03	1.97E-03	5.02E-02	5.02E-02	OK	OK	OK	OK	OK	OK	OK	OK	OK
23	4.04E-02	4.04E-02	9.35E-03	9.35E-03	3.02E-02	3.02E-02	OK	OK	OK	OK	OK	OK	OK	OK	OK
24	3.27E-02	3.27E-02	1.30E-03	1.30E-03	4.35E-02	4.35E-02	OK	OK	OK	OK	OK	OK	OK	OK	OK
25	1.48E-02	1.48E-02	2.37E-03	2.37E-03	5.74E-03	5.74E-03	OK	OK	OK	OK	OK	OK	OK	OK	OK
26	6.62E-03	6.62E-03	6.10E-03	6.10E-03	8.28E-03	8.28E-03	OK	OK	OK	OK	OK	OK	OK	OK	OK
27	4.16E-02	4.16E-02	4.91E-02	4.91E-02	1.08E-02	1.08E-02	OK	OK	OK	OK	OK	OK	OK	OK	OK
28	4.25E-02	4.25E-02	3.18E-02	3.18E-02	1.64E-02	1.64E-02	OK	OK	OK	OK	OK	OK	OK	OK	OK
29	6.82E-03	6.82E-03	5.12E-02	5.12E-02	9.85E-03	9.85E-03	OK	OK	OK	OK	OK	OK	OK	OK	OK
30	1.61E-03	1.61E-03	7.90E-03	7.90E-03	3.68E-03	3.68E-03	OK	OK	OK	OK	OK	OK	OK	OK	OK
31	5.00E-02	5.00E-02	4.42E-02	4.42E-02	9.62E-03	9.62E-03	OK	OK	OK	OK	OK	OK	OK	OK	OK
32	1.13E-02	1.13E-02	4.75E-03	4.75E-03	4.50E-03	4.50E-03	OK	OK	OK	OK	OK	OK	OK	OK	OK
33	5.29E-03	5.29E-03	2.61E-02	2.61E-02	9.06E-03	9.06E-03	OK	OK	OK	OK	OK	OK	OK	OK	OK
34	8.64E-03	8.64E-03	2.14E-02	2.14E-02	5.06E-02	5.06E-02	OK	OK	OK	OK	OK	OK	OK	OK	OK
35	9.46E-03	9.46E-03	4.65E-02	4.65E-02	1.68E-03	1.68E-03	OK	OK	OK	OK	OK	OK	OK	OK	OK
36	7.64E-03	7.64E-03	3.75E-03	3.75E-03	8.03E-03	8.03E-03	OK	OK	OK	OK	OK	OK	OK	OK	OK
37	3.36E-03	3.36E-03	2.41E-02	2.41E-02	1.97E-03	1.97E-03	OK	OK	OK	OK	OK	OK	OK	OK	OK
38	8.74E-03	8.74E-03	2.94E-02	2.94E-02	6.18E-03	6.18E-03	OK	OK	OK	OK	OK	OK	OK	OK	OK
39	9.90E-03	9.90E-03	7.67E-03	7.67E-03	2.68E-02	2.68E-02	OK	OK	OK	OK	OK	OK	OK	OK	OK
40	3.76E-03	3.76E-03	3.95E-02	3.95E-02	2.07E-02	2.07E-02	OK	OK	OK	OK	OK	OK	OK	OK	OK
41	3.48E-02	3.48E-02	1.38E-02	1.38E-02	5.16E-02	5.16E-02	OK	OK	OK	OK	OK	OK	OK	OK	OK
42	4.26E-03	4.26E-03	2.74E-02	2.74E-02	3.64E-02	3.64E-02	OK	OK	OK	OK	OK	OK	OK	OK	OK
43	4.14E-03	4.14E-03	3.78E-02	3.78E-02	3.96E-03	3.96E-03	OK	OK	OK	OK	OK	OK	OK	OK	OK
44	2.86E-02	2.86E-02	6.87E-03	6.87E-03	3.44E-03	3.44E-03	OK	OK	OK	OK	OK	OK	OK	OK	OK
45	8.53E-03	8.53E-03	4.81E-02	4.81E-02	1.42E-02	1.42E-02	OK	OK	OK	OK	OK	OK	OK	OK	OK
46	2.39E-02	2.39E-02	6.67E-03	6.67E-03	8.01E-03	8.01E-03	OK	OK	OK	OK	OK	OK	OK	OK	OK
47	3.05E-03	3.05E-03	1.80E-02	1.80E-02	3.57E-02	3.57E-02	OK	OK	OK	OK	OK	OK	OK	OK	OK
48	1.94E-02	1.94E-02	6.33E-03	6.33E-03	3.72E-03	3.72E-03	OK	OK	OK	OK	OK	OK	OK	OK	OK
49	3.62E-03	3.62E-03	2.58E-02	2.58E-02	3.01E-02	3.01E-02	OK	OK	OK	OK	OK	OK	OK	OK	OK
50	4.33E-02	4.33E-02	5.12E-03	5.12E-03	6.61E-03	6.61E-03	OK	OK	OK	OK	OK	OK	OK	OK	OK
51	3.11E-02	3.11E-02	2.94E-03	2.94E-03	1.32E-02	1.32E-02	OK	OK	OK	OK	OK	OK	OK	OK	OK
52	1.72E-02	1.72E-02	7.65E-03	7.65E-03	1.80E-02	1.80E-02	OK	OK	OK	OK	OK	OK	OK	OK	OK
53	3.91E-02	3.91E-02	1.79E-03	1.79E-03	4.70E-03	4.70E-03	OK	OK	OK	OK	OK	OK	OK	OK	OK
54	2.19E-03	2.19E-03	5.33E-03	5.33E-03	7.34E-03	7.34E-03	OK	OK	OK	OK	OK	OK	OK	OK	OK
55	7.22E-03	7.22E-03	2.20E-02	2.20E-02	2.56E-03	2.56E-03	OK	OK	OK	OK	OK	OK	OK	OK	OK

Table COMP.B-12. QC Check for Parameter DRZ_OE_1:POROSITY in CRA19_COMP Analysis, BRAGFLO Salado Flow Model (Continued)

BRAGFLO Salado Flow Model Parameter DRZ_OE_1:POROSITY							Minimum Checks BLK 1			Maximum Checks BLK 1			Equality Checks		
	Replicate 1		Replicate 2		Replicate 3										
Vector	BLK 45	BLK 1	BLK 45	BLK 1	BLK 45	BLK 1	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3	Rep 1 BK45	Rep 2 BK45	Rep 3 BK45
56	3.30E-03	3.30E-03	1.85E-02	1.85E-02	2.23E-02	2.23E-02	OK	OK	OK	OK	OK	OK	OK	OK	OK
57	2.57E-02	2.57E-02	1.18E-02	1.18E-02	4.69E-02	4.69E-02	OK	OK	OK	OK	OK	OK	OK	OK	OK
58	4.82E-02	4.82E-02	9.66E-03	9.66E-03	8.78E-03	8.78E-03	OK	OK	OK	OK	OK	OK	OK	OK	OK
59	5.32E-03	5.32E-03	1.41E-03	1.41E-03	2.33E-02	2.33E-02	OK	OK	OK	OK	OK	OK	OK	OK	OK
60	4.72E-03	4.72E-03	8.22E-03	8.22E-03	4.86E-03	4.86E-03	OK	OK	OK	OK	OK	OK	OK	OK	OK
61	1.63E-02	1.63E-02	4.28E-03	4.28E-03	2.67E-03	2.67E-03	OK	OK	OK	OK	OK	OK	OK	OK	OK
62	1.86E-02	1.86E-02	3.46E-02	3.46E-02	2.63E-02	2.63E-02	OK	OK	OK	OK	OK	OK	OK	OK	OK
63	1.13E-03	1.13E-03	5.02E-02	5.02E-02	6.95E-03	6.95E-03	OK	OK	OK	OK	OK	OK	OK	OK	OK
64	2.51E-02	2.51E-02	5.76E-03	5.76E-03	5.28E-03	5.28E-03	OK	OK	OK	OK	OK	OK	OK	OK	OK
65	5.11E-02	5.11E-02	3.62E-02	3.62E-02	3.94E-02	3.94E-02	OK	OK	OK	OK	OK	OK	OK	OK	OK
66	1.58E-02	1.58E-02	2.46E-02	2.46E-02	2.91E-02	2.91E-02	OK	OK	OK	OK	OK	OK	OK	OK	OK
67	1.18E-02	1.18E-02	3.39E-02	3.39E-02	4.20E-02	4.20E-02	OK	OK	OK	OK	OK	OK	OK	OK	OK
68	2.01E-02	2.01E-02	4.08E-02	4.08E-02	2.46E-02	2.46E-02	OK	OK	OK	OK	OK	OK	OK	OK	OK
69	4.88E-02	4.88E-02	8.73E-03	8.73E-03	1.38E-02	1.38E-02	OK	OK	OK	OK	OK	OK	OK	OK	OK
70	2.16E-02	2.16E-02	1.48E-02	1.48E-02	4.49E-02	4.49E-02	OK	OK	OK	OK	OK	OK	OK	OK	OK
71	1.45E-03	1.45E-03	9.24E-03	9.24E-03	8.52E-03	8.52E-03	OK	OK	OK	OK	OK	OK	OK	OK	OK
72	8.18E-03	8.18E-03	1.05E-03	1.05E-03	9.70E-03	9.70E-03	OK	OK	OK	OK	OK	OK	OK	OK	OK
73	7.69E-03	7.69E-03	8.16E-03	8.16E-03	2.79E-02	2.79E-02	OK	OK	OK	OK	OK	OK	OK	OK	OK
74	5.60E-03	5.60E-03	7.41E-03	7.41E-03	1.87E-02	1.87E-02	OK	OK	OK	OK	OK	OK	OK	OK	OK
75	2.33E-02	2.33E-02	3.36E-03	3.36E-03	3.32E-02	3.32E-02	OK	OK	OK	OK	OK	OK	OK	OK	OK
76	2.58E-03	2.58E-03	1.98E-02	1.98E-02	8.60E-03	8.60E-03	OK	OK	OK	OK	OK	OK	OK	OK	OK
77	1.90E-03	1.90E-03	4.11E-03	4.11E-03	5.96E-03	5.96E-03	OK	OK	OK	OK	OK	OK	OK	OK	OK
78	3.68E-02	3.68E-02	4.60E-02	4.60E-02	2.98E-03	2.98E-03	OK	OK	OK	OK	OK	OK	OK	OK	OK
79	4.59E-02	4.59E-02	1.54E-02	1.54E-02	3.24E-02	3.24E-02	OK	OK	OK	OK	OK	OK	OK	OK	OK
80	3.05E-02	3.05E-02	4.70E-02	4.70E-02	5.02E-03	5.02E-03	OK	OK	OK	OK	OK	OK	OK	OK	OK
81	4.48E-02	4.48E-02	9.51E-03	9.51E-03	4.53E-02	4.53E-02	OK	OK	OK	OK	OK	OK	OK	OK	OK
82	4.65E-02	4.65E-02	3.55E-02	3.55E-02	3.13E-02	3.13E-02	OK	OK	OK	OK	OK	OK	OK	OK	OK
83	4.91E-03	4.91E-03	1.73E-02	1.73E-02	3.51E-02	3.51E-02	OK	OK	OK	OK	OK	OK	OK	OK	OK
84	5.05E-03	5.05E-03	2.87E-02	2.87E-02	4.06E-02	4.06E-02	OK	OK	OK	OK	OK	OK	OK	OK	OK
85	7.98E-03	7.98E-03	8.88E-03	8.88E-03	1.26E-03	1.26E-03	OK	OK	OK	OK	OK	OK	OK	OK	OK
86	2.84E-02	2.84E-02	1.02E-02	1.02E-02	5.40E-03	5.40E-03	OK	OK	OK	OK	OK	OK	OK	OK	OK
87	2.64E-02	2.64E-02	2.57E-03	2.57E-03	1.19E-02	1.19E-02	OK	OK	OK	OK	OK	OK	OK	OK	OK
88	1.01E-02	1.01E-02	4.19E-02	4.19E-02	7.60E-03	7.60E-03	OK	OK	OK	OK	OK	OK	OK	OK	OK
89	8.24E-03	8.24E-03	4.15E-02	4.15E-02	9.21E-03	9.21E-03	OK	OK	OK	OK	OK	OK	OK	OK	OK
90	7.32E-03	7.32E-03	6.03E-03	6.03E-03	2.14E-02	2.14E-02	OK	OK	OK	OK	OK	OK	OK	OK	OK
91	3.26E-02	3.26E-02	3.89E-02	3.89E-02	1.10E-02	1.10E-02	OK	OK	OK	OK	OK	OK	OK	OK	OK
92	3.82E-02	3.82E-02	3.71E-02	3.71E-02	6.89E-03	6.89E-03	OK	OK	OK	OK	OK	OK	OK	OK	OK
93	1.35E-02	1.35E-02	4.79E-03	4.79E-03	3.92E-02	3.92E-02	OK	OK	OK	OK	OK	OK	OK	OK	OK
94	7.01E-03	7.01E-03	1.70E-03	1.70E-03	4.68E-02	4.68E-02	OK	OK	OK	OK	OK	OK	OK	OK	OK
95	3.91E-03	3.91E-03	5.23E-03	5.23E-03	1.53E-02	1.53E-02	OK	OK	OK	OK	OK	OK	OK	OK	OK
96	9.12E-03	9.12E-03	3.32E-02	3.32E-02	3.38E-02	3.38E-02	OK	OK	OK	OK	OK	OK	OK	OK	OK
97	2.34E-03	2.34E-03	4.99E-02	4.99E-02	2.38E-02	2.38E-02	OK	OK	OK	OK	OK	OK	OK	OK	OK
98	3.75E-02	3.75E-02	8.45E-03	8.45E-03	4.37E-03	4.37E-03	OK	OK	OK	OK	OK	OK	OK	OK	OK
99	2.76E-02	2.76E-02	5.61E-03	5.61E-03	3.73E-02	3.73E-02	OK	OK	OK	OK	OK	OK	OK	OK	OK
100	9.00E-03	9.00E-03	9.06E-03	9.06E-03	1.97E-02	1.97E-02	OK	OK	OK	OK	OK	OK	OK	OK	OK

Table COMP.B-13. QC Check for Parameter DRZ_OE_1:RELP_MOD in CRA19_COMP Analysis, BRAGFLO Salado Flow Model

Checks Performed:

Check that material Block 45 has been assigned the same property values as Block 1.

Check that the values of sampled properties lie between the minimum and maximum values of the uncertainty range for intact halite.

Block Identification Key:	**RELP_MOD target Values:**		**Example logic statements used to perform checks:**		**Check Result Indicators:**	
BLK 45 = DRZ_OE_1	Target Min	Target Max	Check Min Value:	IF(VALUE<E9,S8,T8)	PROBLEM	OK
BLK 1 = S_HALITE	4.00E+00	4.00E+00	Check Max Value:	IF(VALUE>F9,S8,T8)		
			Check Equality:	IF(BLK45 VALUE=BLK1 VALUE,T8,S8)		

BRAGFLO Salado Flow Model Parameter DRZ_OE_1:RELP_MOD																	
	Replicate 1		**Replicate 2**		**Replicate 3**		**Minimum Checks BLK 1**			**Maximum Checks BLK 1**			**Equality Checks**		
Vector	**BLK 45**	**BLK 1**	**BLK 45**	**BLK 1**	**BLK 45**	**BLK 1**	**Rep 1**	**Rep 2**	**Rep 3**	**Rep 1**	**Rep 2**	**Rep 3**	**Rep 1 BK45**	**Rep 2 BK45**	**Rep 3 BK45**
1	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
2	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
3	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
4	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
5	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
6	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
7	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
8	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
9	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
10	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
11	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
12	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
13	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
14	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
15	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
16	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
17	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
18	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
19	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
20	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
21	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
22	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
23	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
24	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
25	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
26	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
27	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
28	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
29	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
30	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
31	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
32	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
33	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
34	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
35	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
36	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
37	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
38	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
39	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
40	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
41	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
42	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
43	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
44	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
45	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
46	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
47	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
48	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
49	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
50	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
51	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
52	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
53	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
54	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
55	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK

Table COMP.B-13. QC Check for Parameter DRZ_OE_1:RELP_MOD in CRA19_COMP Analysis, BRAGFLO Salado Flow Model (Continued)

BRAGFLO Salado Flow Model Parameter DRZ_OE_1:RELP_MOD							Minimum Checks BLK 1			Maximum Checks BLK 1			Equality Checks		
	Replicate 1		Replicate 2		Replicate 3										
Vector	BLK 45	BLK 1	BLK 45	BLK 1	BLK 45	BLK 1	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3	Rep 1 BK45	Rep 2 BK45	Rep 3 BK45
56	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
57	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
58	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
59	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
60	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
61	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
62	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
63	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
64	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
65	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
66	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
67	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
68	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
69	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
70	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
71	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
72	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
73	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
74	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
75	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
76	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
77	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
78	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
79	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
80	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
81	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
82	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
83	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
84	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
85	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
86	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
87	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
88	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
89	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
90	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
91	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
92	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
93	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
94	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
95	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
96	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
97	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
98	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
99	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK
100	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	4.00E+00	OK	OK	OK	OK	OK	OK	OK	OK	OK

Table COMP.B-14. QC Check for Parameter DRZ_OE_1:SAT_RBRN in CRA19_COMP Analysis, BRAGFLO Salado Flow Model

Checks Performed:

Check that material Block 45 has been assigned the same property values as Block 1.

Check that the values of sampled properties lie between the minimum and maximum values of the uncertainty range for intact halite.

Block Identification Key:	**SAT_RBRN target Values:**		**Example logic statements used to perform checks:**		**Check Result Indicators:**	
BLK 45 = DRZ_OE_1	Target Min	Target Max	Check Min Value:	IF(VALUE<E9,S8,T8)	PROBLEM	OK
BLK 1 = S_HALITE	3.00E-01	3.00E-01	Check Max Value:	IF(VALUE>F9,S8,T8)		
			Check Equality:	IF(BLK45 VALUE=BLK1 VALUE,T8,S8)		

	BRAGFLO Salado Flow Model Parameter DRZ_OE_1:SAT_RBRN															
	Replicate 1		**Replicate 2**		**Replicate 3**		**Minimum Checks BLK 1**			**Maximum Checks BLK 1**			**Equality Checks**		
Vector	**BLK 45**	**BLK 1**	**BLK 45**	**BLK 1**	**BLK 45**	**BLK 1**	**Rep 1**	**Rep 2**	**Rep 3**	**Rep 1**	**Rep 2**	**Rep 3**	**Rep 1 BK45**	**Rep 2 BK45**	**Rep 3 BK45**
1	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
2	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
3	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
4	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
5	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
6	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
7	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
8	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
9	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
10	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
11	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
12	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
13	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
14	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
15	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
16	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
17	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
18	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
19	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
20	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
21	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
22	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
23	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
24	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
25	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
26	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
27	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
28	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
29	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
30	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
31	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
32	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
33	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
34	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
35	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
36	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
37	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
38	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
39	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
40	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
41	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
42	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
43	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
44	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
45	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
46	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
47	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
48	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
49	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
50	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
51	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
52	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
53	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
54	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
55	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK

Table COMP.B-14. QC Check for Parameter DRZ_OE_1:SAT_RBRN in CRA19_COMP Analysis, BRAGFLO Salado Flow Model (Continued)

BRAGFLO Salado Flow Model Parameter DRZ_OE_1:SAT_RBRN							Minimum Checks BLK 1			Maximum Checks BLK 1			Equality Checks		
	Replicate 1		Replicate 2		Replicate 3										
Vector	BLK 45	BLK 1	BLK 45	BLK 1	BLK 45	BLK 1	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3	Rep 1 BK45	Rep 2 BK45	Rep 3 BK45
56	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
57	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
58	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
59	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
60	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
61	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
62	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
63	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
64	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
65	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
66	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
67	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
68	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
69	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
70	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
71	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
72	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
73	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
74	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
75	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
76	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
77	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
78	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
79	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
80	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
81	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
82	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
83	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
84	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
85	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
86	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
87	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
88	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
89	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
90	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
91	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
92	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
93	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
94	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
95	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
96	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
97	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
98	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
99	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
100	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK

Table COMP.B-15. QC Check for Parameter DRZ_OE_1:SAT_RGAS in CRA19_COMP Analysis, BRAGFLO Salado Flow Model

Checks Performed:

Check that material Block 45 has been assigned the same property values as Block 1.

Check that the values of sampled properties lie between the minimum and maximum values of the uncertainty range for intact halite.

Block Identification Key:	**SAT_RGAS target Values:**		**Example logic statements used to perform checks:**		**Check Result Indicators:**	
BLK 45 = DRZ_OE_1	Target Min	Target Max	Check Min Value:	IF(VALUE<E9,S8,T8)	PROBLEM	OK
BLK 1 = S_HALITE	2.00E-01	2.00E-01	Check Max Value:	IF(VALUE>F9,S8,T8)		
			Check Equality:	IF(BLK45 VALUE=BLK1 VALUE,T8,S8)		

	BRAGFLO Salado Flow Model Parameter DRZ_OE_1:SAT_RGAS																
	Replicate 1		**Replicate 2**		**Replicate 3**		**Minimum Checks BLK 1**			**Maximum Checks BLK 1**			**Equality Checks**		
Vector	**BLK 45**	**BLK 1**	**BLK 45**	**BLK 1**	**BLK 45**	**BLK 1**	**Rep 1**	**Rep 2**	**Rep 3**	**Rep 1**	**Rep 2**	**Rep 3**	**Rep 1 BK45**	**Rep 2 BK45**	**Rep 3 BK45**
1	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
2	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
3	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
4	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
5	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
6	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
7	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
8	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
9	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
10	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
11	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
12	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
13	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
14	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
15	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
16	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
17	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
18	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
19	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
20	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
21	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
22	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
23	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
24	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
25	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
26	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
27	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
28	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
29	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
30	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
31	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
32	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
33	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
34	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
35	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
36	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
37	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
38	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
39	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
40	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
41	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
42	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
43	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
44	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
45	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
46	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
47	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
48	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
49	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
50	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
51	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
52	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
53	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
54	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
55	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK

Table COMP.B-15. QC Check for Parameter DRZ_OE_1:SAT_RGAS in CRA19_COMP Analysis, BRAGFLO Salado Flow Model (Continued)

BRAGFLO Salado Flow Model Parameter DRZ_OE_1:SAT_RGAS							Minimum Checks BLK 1			Maximum Checks BLK 1			Equality Checks		
	Replicate 1		Replicate 2		Replicate 3										
Vector	BLK 45	BLK 1	BLK 45	BLK 1	BLK 45	BLK 1	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3	Rep 1 BK45	Rep 2 BK45	Rep 3 BK45
56	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
57	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
58	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
59	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
60	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
61	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
62	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
63	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
64	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
65	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
66	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
67	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
68	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
69	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
70	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
71	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
72	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
73	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
74	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
75	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
76	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
77	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
78	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
79	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
80	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
81	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
82	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
83	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
84	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
85	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
86	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
87	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
88	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
89	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
90	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
91	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
92	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
93	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
94	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
95	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
96	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
97	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
98	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
99	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK
100	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	OK	OK	OK	OK	OK	OK	OK	OK	OK

Attachment C to Appendix COMP

Quality Control Checks of Restoring Undisturbed Properties of Anhydrite Interbeds within DRZs Above and Below Open Areas

The following tables are copies of Excel spreadsheets used to confirm the correct restoration of undisturbed anhydrite interbed properties within the DRZs above and below the open areas in the BRAGFLO Salado Flow model. In the CRA19 and CRA19_CL analyses, those interbeds were assigned the same properties as the DRZs around open areas while those same interbeds were assigned the properties of undisturbed anhydrite around intact ROM salt panel closures. These interbeds were extended into the halite above and below the open areas in the CRA19_COMP analysis to be consistent with their treatment around intact panel closures in the CRA19 and CRA19_CL analyses.

The restoration of anhydrite interbeds was accomplished by reassigning affected DRZ cells the material properties of Block 3 for anhydrite Marker Bed 139 (material S_MB139) and Block 4 for anhydrite layers A and B (material S_ANH_AB). Because the restoration could be conducted by substituting all property values in an entire block (rather than substituting values only for selected parameters within a block as was done for S_HALITE; see text discussion), the checking process was simplified by limiting it to one selected property with a constant value (rock compressibility or COMP_RCK was chosen) and one selected property with a sampled value (log permeability or PRMX_LOG was chosen) for each interbed. The assigned parameter values were checked for accuracy by comparing them with the values listed in Kim and Feng (2019). The checks were conducted using Excel spreadsheets in the same manner as described above in Attachment B to Appendix COMP. All parameter values were found to be assigned as intended.

Table COMP.C-1. QC Check for Parameter S_MB139:COMP_RCK in CRA19_COMP Analysis, BRAGFLO Salado Flow Model

Checks Performed:

Check that material Block 3 has been assigned the same property values as listed in Kim and Feng (2019, Table 23; ERMS 571660).

Check that the values of sampled properties lie between the minimum and maximum values of the uncertainty range listed in Kim and Feng (2019, Table 4; ERMS 571660).

Block Identification Key:	**COMP_RCK Target Values:**		**Example logic statements used to perform checks:**		**Check Result Indicators:**	
BLK 3 = S_MB139	Target Min	Target Max	Check Min Value:	IF(VALUE<E9,S8,T8)	PROBLEM	OK
	2.23E-11	2.23E-11 Pa^{-1}	Check Max Value:	IF(VALUE>F9,S8,T8)		
			Check Equality:	IF(BLK3 ACTUAL=BLK3 LISTED,T8,S8)		

BRAGFLO Salado Flow Model Parameter S_MB139:COMP_RCK																	
	Replicate 1		**Replicate 2**		**Replicate 3**		**Minimum Checks**			**Maximum Checks**			**Equality Checks**				
Vector	**BLK 3 Actual**	**BLK 3 Listed**	**BLK 3 Actual**	**BLK 3 Listed**	**BLK 3 Actual**	**BLK 3 Listed**	**Rep 1**	**Rep 2**	**Rep 3**	**Rep 1**	**Rep 2**	**Rep 3**	**Rep 1**	**Rep 2**	**Rep 3**		
1	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
2	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
3	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
4	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
5	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
6	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
7	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
8	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
9	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
10	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
12	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
13	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
14	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
15	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
16	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
17	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
18	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
19	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
20	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
21	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
22	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
23	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
24	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
25	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
26	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
27	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
28	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
29	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
30	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
31	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
32	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
33	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
34	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
35	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
36	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
37	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
38	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
39	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
40	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
41	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
42	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
43	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
44	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
45	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
46	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
47	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
48	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
49	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
50	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
51	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
52	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
53	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
54	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
55	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		

Table COMP.C-1. QC Check for Parameter S_MB139:COMP_RCK in CRA19_COMP Analysis, BRAGFLO Salado Flow Model (Continued)

BRAGFLO Salado Flow Model Parameter S_MB139:COMP_RCK															
	Replicate 1		Replicate 2		Replicate 3		Minimum Checks			Maximum Checks			Equality Checks		
Vector	BLK 3 Actual	BLK 3 Listed	BLK 3 Actual	BLK 3 Listed	BLK 3 Actual	BLK 3 Listed	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3
56	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
57	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
58	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
59	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
60	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
61	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
62	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
63	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
64	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
65	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
66	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
67	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
68	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
69	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
70	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
71	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
72	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
73	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
74	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
75	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
76	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
77	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
78	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
79	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
80	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
81	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
82	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
83	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
84	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
85	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
86	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
87	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
88	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
89	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
90	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
91	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
92	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
93	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
94	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
95	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
96	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
97	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
98	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
99	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK
100	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK

Table COMP.C-2. QC Check for Parameter S_MB139:PRMX_LOG in CRA19_COMP Analysis, BRAGFLO Salado Flow Model

Checks Performed:

Check that material Block 3 has been assigned the same property values as listed in Kim and Feng (2019, Table A.44; ERMS 571660).

Check that the values of sampled properties lie between the minimum and maximum values of the uncertainty range listed in Kim and Feng (2019, Table 4; ERMS 571660).

Block Identification Key:	**PRMX_LOG Target Values:**			**Example logic statements used to perform checks:**		**Check Result Indicators:**	
BLK 3 = S_MB139	Target Min	Target Max		Check Min Value:	IF(VALUE<E9,S8,T8)	PROBLEM	OK
	-2.10E+01	-1.71E+01	log(m^2)	Check Max Value:	IF(VALUE>F9,S8,T8)		
				Check Equality:	IF(BLK3 ACTUAL=BLK3 LISTED,T8,S8)		

BRAGFLO Salado Flow Model Parameter S_MB139:PRMX_LOG																
	Replicate 1		**Replicate 2**		**Replicate 3**		**Minimum Checks**			**Maximum Checks**			**Visual Equality Checks**			
Vector	**BLK 3 Actual**	**BLK 3 Listed**	**BLK 3 Actual**	**BLK 3 Listed**	**BLK 3 Actual**	**BLK 3 Listed**	**Rep 1**	**Rep 2**	**Rep 3**	**Rep 1**	**Rep 2**	**Rep 3**	**Rep 1**	**Rep 2**	**Rep 3**
1	-1.90E+01	-1.90E+01	-1.87E+01	-1.87E+01	-1.83E+01	-1.83E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
2	-1.78E+01	-1.78E+01	-1.84E+01	-1.84E+01	-1.86E+01	-1.86E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
3	-1.88E+01	-1.88E+01	-1.91E+01	-1.91E+01	-1.93E+01	-1.93E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
4	-1.98E+01	-1.98E+01	-1.89E+01	-1.89E+01	-1.94E+01	-1.94E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
5	-1.90E+01	-1.90E+01	-1.92E+01	-1.92E+01	-2.00E+01	-2.00E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
6	-1.93E+01	-1.93E+01	-1.89E+01	-1.89E+01	-1.90E+01	-1.90E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
7	-1.87E+01	-1.87E+01	-1.90E+01	-1.90E+01	-1.95E+01	-1.95E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
8	-1.83E+01	-1.83E+01	-1.90E+01	-1.90E+01	-1.86E+01	-1.86E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
9	-1.91E+01	-1.91E+01	-1.89E+01	-1.89E+01	-1.77E+01	-1.77E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
10	-1.97E+01	-1.97E+01	-1.89E+01	-1.89E+01	-1.83E+01	-1.83E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
11	-1.90E+01	-1.90E+01	-1.94E+01	-1.94E+01	-1.89E+01	-1.89E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
12	-1.86E+01	-1.86E+01	-1.93E+01	-1.93E+01	-1.88E+01	-1.88E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
13	-1.82E+01	-1.82E+01	-1.86E+01	-1.86E+01	-1.89E+01	-1.89E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
14	-1.91E+01	-1.91E+01	-1.89E+01	-1.89E+01	-1.91E+01	-1.91E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
15	-1.98E+01	-1.98E+01	-1.86E+01	-1.86E+01	-1.89E+01	-1.89E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
16	-1.76E+01	-1.76E+01	-1.92E+01	-1.92E+01	-1.83E+01	-1.83E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
17	-1.93E+01	-1.93E+01	-1.87E+01	-1.87E+01	-1.85E+01	-1.85E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
18	-1.89E+01	-1.89E+01	-1.87E+01	-1.87E+01	-1.87E+01	-1.87E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
19	-1.82E+01	-1.82E+01	-1.82E+01	-1.82E+01	-1.92E+01	-1.92E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
20	-1.89E+01	-1.89E+01	-1.88E+01	-1.88E+01	-1.84E+01	-1.84E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
21	-1.89E+01	-1.89E+01	-1.87E+01	-1.87E+01	-1.86E+01	-1.86E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
22	-1.94E+01	-1.94E+01	-1.86E+01	-1.86E+01	-1.92E+01	-1.92E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
23	-1.87E+01	-1.87E+01	-1.94E+01	-1.94E+01	-1.84E+01	-1.84E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
24	-1.92E+01	-1.92E+01	-1.89E+01	-1.89E+01	-1.96E+01	-1.96E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
25	-1.89E+01	-1.89E+01	-1.88E+01	-1.88E+01	-1.92E+01	-1.92E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
26	-1.85E+01	-1.85E+01	-1.85E+01	-1.85E+01	-1.86E+01	-1.86E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
27	-1.84E+01	-1.84E+01	-1.88E+01	-1.88E+01	-1.86E+01	-1.86E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
28	-1.91E+01	-1.91E+01	-1.94E+01	-1.94E+01	-1.98E+01	-1.98E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
29	-1.94E+01	-1.94E+01	-1.95E+01	-1.95E+01	-1.88E+01	-1.88E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
30	-1.83E+01	-1.83E+01	-1.85E+01	-1.85E+01	-1.85E+01	-1.85E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
31	-1.93E+01	-1.93E+01	-1.90E+01	-1.90E+01	-1.90E+01	-1.90E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
32	-1.96E+01	-1.96E+01	-1.88E+01	-1.88E+01	-2.00E+01	-2.00E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
33	-1.89E+01	-1.89E+01	-1.81E+01	-1.81E+01	-1.85E+01	-1.85E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
34	-1.87E+01	-1.87E+01	-1.86E+01	-1.86E+01	-1.93E+01	-1.93E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
35	-1.86E+01	-1.86E+01	-1.96E+01	-1.96E+01	-1.73E+01	-1.73E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
36	-1.84E+01	-1.84E+01	-1.91E+01	-1.91E+01	-1.90E+01	-1.90E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
37	-1.85E+01	-1.85E+01	-1.90E+01	-1.90E+01	-2.01E+01	-2.01E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
38	-1.91E+01	-1.91E+01	-1.83E+01	-1.83E+01	-1.88E+01	-1.88E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
39	-1.90E+01	-1.90E+01	-1.87E+01	-1.87E+01	-1.87E+01	-1.87E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
40	-1.89E+01	-1.89E+01	-1.88E+01	-1.88E+01	-1.87E+01	-1.87E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
41	-2.04E+01	-2.04E+01	-1.90E+01	-1.90E+01	-1.83E+01	-1.83E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
42	-1.87E+01	-1.87E+01	-1.84E+01	-1.84E+01	-1.90E+01	-1.90E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
43	-1.92E+01	-1.92E+01	-1.77E+01	-1.77E+01	-1.97E+01	-1.97E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
44	-1.84E+01	-1.84E+01	-1.87E+01	-1.87E+01	-1.82E+01	-1.82E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
45	-1.94E+01	-1.94E+01	-1.86E+01	-1.86E+01	-1.92E+01	-1.92E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
46	-1.94E+01	-1.94E+01	-1.91E+01	-1.91E+01	-1.89E+01	-1.89E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
47	-1.85E+01	-1.85E+01	-1.83E+01	-1.83E+01	-1.82E+01	-1.82E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
48	-1.88E+01	-1.88E+01	-1.85E+01	-1.85E+01	-1.96E+01	-1.96E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
49	-2.02E+01	-2.02E+01	-1.81E+01	-1.81E+01	-1.93E+01	-1.93E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
50	-1.95E+01	-1.95E+01	-1.89E+01	-1.89E+01	-2.03E+01	-2.03E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
51	-1.92E+01	-1.92E+01	-1.85E+01	-1.85E+01	-1.87E+01	-1.87E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
52	-1.86E+01	-1.86E+01	-2.07E+01	-2.07E+01	-1.92E+01	-1.92E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
53	-1.71E+01	-1.71E+01	-1.72E+01	-1.72E+01	-1.91E+01	-1.91E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
54	-1.90E+01	-1.90E+01	-1.85E+01	-1.85E+01	-1.85E+01	-1.85E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
55	-1.99E+01	-1.99E+01	-1.80E+01	-1.80E+01	-1.97E+01	-1.97E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK

Table COMP.C-2. QC Check for Parameter S_MB139:PRMX_LOG in CRA19_COMP Analysis, BRAGFLO Salado Flow Model (Continued)

BRAGFLO Salado Flow Model Parameter S_MB139:PRMX_LOG																	
	Replicate 1		Replicate 2		Replicate 3		Minimum Checks			Maximum Checks			Visual Equality Checks				
Vector	BLK 3 Actual	BLK 3 Listed	BLK 3 Actual	BLK 3 Listed	BLK 3 Actual	BLK 3 Listed	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3		
56	-1.88E+01	-1.88E+01	-1.96E+01	-1.96E+01	-1.94E+01	-1.94E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
57	-1.91E+01	-1.91E+01	-1.84E+01	-1.84E+01	-1.90E+01	-1.90E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
58	-1.85E+01	-1.85E+01	-1.89E+01	-1.89E+01	-1.87E+01	-1.87E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
59	-1.75E+01	-1.75E+01	-1.77E+01	-1.77E+01	-1.87E+01	-1.87E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
60	-1.97E+01	-1.97E+01	-2.00E+01	-2.00E+01	-1.81E+01	-1.81E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
61	-1.88E+01	-1.88E+01	-1.91E+01	-1.91E+01	-1.88E+01	-1.88E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
62	-1.86E+01	-1.86E+01	-1.81E+01	-1.81E+01	-1.90E+01	-1.90E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
63	-1.83E+01	-1.83E+01	-1.93E+01	-1.93E+01	-1.79E+01	-1.79E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
64	-1.92E+01	-1.92E+01	-1.95E+01	-1.95E+01	-1.88E+01	-1.88E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
65	-1.91E+01	-1.91E+01	-1.84E+01	-1.84E+01	-1.81E+01	-1.81E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
66	-1.88E+01	-1.88E+01	-1.88E+01	-1.88E+01	-1.89E+01	-1.89E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
67	-1.92E+01	-1.92E+01	-1.83E+01	-1.83E+01	-1.90E+01	-1.90E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
68	-1.92E+01	-1.92E+01	-1.98E+01	-1.98E+01	-1.84E+01	-1.84E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
69	-1.84E+01	-1.84E+01	-1.99E+01	-1.99E+01	-1.96E+01	-1.96E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
70	-1.90E+01	-1.90E+01	-1.85E+01	-1.85E+01	-1.92E+01	-1.92E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
71	-1.96E+01	-1.96E+01	-1.92E+01	-1.92E+01	-1.88E+01	-1.88E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
72	-1.86E+01	-1.86E+01	-1.94E+01	-1.94E+01	-1.91E+01	-1.91E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
73	-1.87E+01	-1.87E+01	-1.90E+01	-1.90E+01	-1.91E+01	-1.91E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
74	-2.00E+01	-2.00E+01	-1.82E+01	-1.82E+01	-1.81E+01	-1.81E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
75	-1.82E+01	-1.82E+01	-1.95E+01	-1.95E+01	-1.95E+01	-1.95E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
76	-1.81E+01	-1.81E+01	-1.92E+01	-1.92E+01	-1.85E+01	-1.85E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
77	-1.88E+01	-1.88E+01	-1.91E+01	-1.91E+01	-1.76E+01	-1.76E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
78	-1.88E+01	-1.88E+01	-1.97E+01	-1.97E+01	-1.92E+01	-1.92E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
79	-1.80E+01	-1.80E+01	-1.78E+01	-1.78E+01	-1.80E+01	-1.80E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
80	-1.86E+01	-1.86E+01	-1.93E+01	-1.93E+01	-1.93E+01	-1.93E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
81	-1.83E+01	-1.83E+01	-1.99E+01	-1.99E+01	-1.94E+01	-1.94E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
82	-1.94E+01	-1.94E+01	-1.79E+01	-1.79E+01	-1.89E+01	-1.89E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
83	-1.79E+01	-1.79E+01	-1.90E+01	-1.90E+01	-1.88E+01	-1.88E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
84	-1.96E+01	-1.96E+01	-1.80E+01	-1.80E+01	-1.89E+01	-1.89E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
85	-1.85E+01	-1.85E+01	-1.94E+01	-1.94E+01	-1.94E+01	-1.94E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
86	-2.01E+01	-2.01E+01	-2.01E+01	-2.01E+01	-1.86E+01	-1.86E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
87	-1.88E+01	-1.88E+01	-1.86E+01	-1.86E+01	-1.82E+01	-1.82E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
88	-1.93E+01	-1.93E+01	-1.84E+01	-1.84E+01	-1.94E+01	-1.94E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
89	-1.95E+01	-1.95E+01	-1.96E+01	-1.96E+01	-1.95E+01	-1.95E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
90	-1.86E+01	-1.86E+01	-1.91E+01	-1.91E+01	-1.84E+01	-1.84E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
91	-1.81E+01	-1.81E+01	-1.96E+01	-1.96E+01	-1.79E+01	-1.79E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
92	-1.89E+01	-1.89E+01	-1.75E+01	-1.75E+01	-1.80E+01	-1.80E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
93	-1.81E+01	-1.81E+01	-1.82E+01	-1.82E+01	-1.88E+01	-1.88E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
94	-1.80E+01	-1.80E+01	-2.02E+01	-2.02E+01	-1.97E+01	-1.97E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
95	-1.95E+01	-1.95E+01	-1.93E+01	-1.93E+01	-2.03E+01	-2.03E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
96	-1.87E+01	-1.87E+01	-1.91E+01	-1.91E+01	-1.76E+01	-1.76E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
97	-1.92E+01	-1.92E+01	-1.87E+01	-1.87E+01	-1.91E+01	-1.91E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
98	-1.99E+01	-1.99E+01	-1.92E+01	-1.92E+01	-1.91E+01	-1.91E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
99	-1.78E+01	-1.78E+01	-1.97E+01	-1.97E+01	-1.98E+01	-1.98E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
100	-1.90E+01	-1.90E+01	-1.93E+01	-1.93E+01	-1.85E+01	-1.85E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		

Table COMP.C-3. QC Check for Parameter S_ANH_AB:COMP_RCK in CRA19_COMP Analysis, BRAGFLO Salado Flow Model

Checks Performed:

Check that material Block 4 has been assigned the same property values as listed in Kim and Feng (2019, Table 24; ERMS 571660).

Check that the values of sampled properties lie between the minimum and maximum values of the uncertainty range listed in Kim and Feng (2019, Table 4; ERMS 571660).

Block Identification Key:	**COMP_RCK Target Values:**		**Example logic statements used to perform checks:**		**Check Result Indicators:**	
BLK 4 = S_ANH_AB	Target Min	Target Max	Check Min Value:	IF(VALUE<E9,S8,T8)	PROBLEM	OK
	2.23E-11	2.23E-11 Pa^{-1}	Check Max Value:	IF(VALUE>F9,S8,T8)		
			Check Equality:	IF(BLK4 ACTUAL=BLK4 LISTED,T8,S8)		

BRAGFLO Salado Flow Model Parameter S_ANH_AB:COMP_RCK																	
	Replicate 1		**Replicate 2**		**Replicate 3**		**Minimum Checks**			**Maximum Checks**			**Equality Checks**				
Vector	**BLK 4 Actual**	**BLK 4 Listed**	**BLK 4 Actual**	**BLK 4 Listed**	**BLK 4 Actual**	**BLK 4 Listed**	**Rep 1**	**Rep 2**	**Rep 3**	**Rep 1**	**Rep 2**	**Rep 3**	**Rep 1**	**Rep 2**	**Rep 3**		
1	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
2	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
3	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
4	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
5	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
6	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
7	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
8	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
9	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
10	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
12	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
13	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
14	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
15	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
16	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
17	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
18	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
19	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
20	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
21	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
22	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
23	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
24	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
25	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
26	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
27	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
28	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
29	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
30	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
31	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
32	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
33	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
34	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
35	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
36	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
37	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
38	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
39	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
40	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
41	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
42	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
43	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
44	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
45	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
46	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
47	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
48	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
49	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
50	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
51	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
52	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
53	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
54	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		
55	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK		

Table COMP.C-3. QC Check for Parameter S_ANH_AB:COMP_RCK in CRA19_COMP Analysis, BRAGFLO Salado Flow Model (Continued)

BRAGFLO Salado Flow Model Parameter S_ANH_AB:COMP_RCK																
	Replicate 1		Replicate 2		Replicate 3		Minimum Checks			Maximum Checks			Equality Checks			
Vector	BLK 4 Actual	BLK 4 Listed	BLK 4 Actual	BLK 4 Listed	BLK 4 Actual	BLK 4 Listed	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3	
56	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK	
57	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK	
58	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK	
59	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK	
60	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK	
61	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK	
62	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK	
63	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK	
64	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK	
65	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK	
66	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK	
67	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK	
68	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK	
69	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK	
70	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK	
71	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK	
72	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK	
73	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK	
74	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK	
75	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK	
76	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK	
77	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK	
78	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK	
79	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK	
80	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK	
81	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK	
82	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK	
83	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK	
84	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK	
85	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK	
86	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK	
87	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK	
88	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK	
89	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK	
90	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK	
91	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK	
92	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK	
93	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK	
94	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK	
95	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK	
96	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK	
97	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK	
98	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK	
99	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK	
100	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	2.23E-11	OK	OK	OK	OK	OK	OK	OK	OK	OK	

Table COMP.C-4. QC Check for Parameter S_ANH_AB:PRMX_LOG in CRA19_COMP Analysis, BRAGFLO Salado Flow Model

Checks Performed:

Check that material Block 4 has been assigned the same property values for PRMX_LOG as material Block 3. See Table COMP.2-3 in this report. Equality checks were confirmed visually to three significant figures rather than using Excel logic statements because sampled values values listed by Kim and Feng (2019, Table A.44; ERMS 571660) were rounded to only three significant figures.

Check that the values of sampled properties lie between the minimum and maximum values of the uncertainty range listed in Kim and Feng (2019, Table 4; ERMS 571660).

Block Identification Key:	**PRMX_LOG Target Values:**		**Example logic statements used to perform checks:**		**Check Result Indicators:**	
BLK 4 = S_ANH_AB	Target Min	Target Max	Check Min Value:	IF(VALUE<E9,S8,T8)	PROBLEM	OK
	-2.10E+01	-1.71E+01 log(m^2)	Check Max Value:	IF(VALUE>F9,S8,T8)		
			Check Equality:	IF(BLK4 ACTUAL=BLK4 LISTED,T8,S8)		

BRAGFLO Salado Flow Model Parameter S_ANH_AB:PRMX_LOG																	
	Replicate 1		**Replicate 2**		**Replicate 3**		**Minimum Checks**			**Maximum Checks**			**Visual Equality Checks**				
Vector	**BLK 4 Actual**	**BLK 4 Listed**	**BLK 4 Actual**	**BLK 4 Listed**	**BLK 4 Actual**	**BLK 4 Listed**	**Rep 1**	**Rep 2**	**Rep 3**	**Rep 1**	**Rep 2**	**Rep 3**	**Rep 1**	**Rep 2**	**Rep 3**		
1	-1.90E+01	-1.90E+01	-1.87E+01	-1.87E+01	-1.83E+01	-1.83E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
2	-1.78E+01	-1.78E+01	-1.84E+01	-1.84E+01	-1.86E+01	-1.86E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
3	-1.88E+01	-1.88E+01	-1.91E+01	-1.91E+01	-1.93E+01	-1.93E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
4	-1.98E+01	-1.98E+01	-1.89E+01	-1.89E+01	-1.94E+01	-1.94E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
5	-1.90E+01	-1.90E+01	-1.92E+01	-1.92E+01	-2.00E+01	-2.00E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
6	-1.93E+01	-1.93E+01	-1.89E+01	-1.89E+01	-1.90E+01	-1.90E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
7	-1.87E+01	-1.87E+01	-1.90E+01	-1.90E+01	-1.95E+01	-1.95E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
8	-1.83E+01	-1.83E+01	-1.90E+01	-1.90E+01	-1.86E+01	-1.86E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
9	-1.91E+01	-1.91E+01	-1.89E+01	-1.89E+01	-1.77E+01	-1.77E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
10	-1.97E+01	-1.97E+01	-1.89E+01	-1.89E+01	-1.83E+01	-1.83E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
11	-1.90E+01	-1.90E+01	-1.94E+01	-1.94E+01	-1.89E+01	-1.89E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
12	-1.86E+01	-1.86E+01	-1.93E+01	-1.93E+01	-1.88E+01	-1.88E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
13	-1.82E+01	-1.82E+01	-1.86E+01	-1.86E+01	-1.89E+01	-1.89E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
14	-1.91E+01	-1.91E+01	-1.89E+01	-1.89E+01	-1.91E+01	-1.91E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
15	-1.98E+01	-1.98E+01	-1.86E+01	-1.86E+01	-1.89E+01	-1.89E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
16	-1.76E+01	-1.76E+01	-1.92E+01	-1.92E+01	-1.83E+01	-1.83E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
17	-1.93E+01	-1.93E+01	-1.87E+01	-1.87E+01	-1.85E+01	-1.85E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
18	-1.89E+01	-1.89E+01	-1.87E+01	-1.87E+01	-1.87E+01	-1.87E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
19	-1.82E+01	-1.82E+01	-1.82E+01	-1.82E+01	-1.92E+01	-1.92E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
20	-1.89E+01	-1.89E+01	-1.88E+01	-1.88E+01	-1.84E+01	-1.84E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
21	-1.89E+01	-1.89E+01	-1.87E+01	-1.87E+01	-1.86E+01	-1.86E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
22	-1.94E+01	-1.94E+01	-1.86E+01	-1.86E+01	-1.92E+01	-1.92E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
23	-1.87E+01	-1.87E+01	-1.94E+01	-1.94E+01	-1.84E+01	-1.84E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
24	-1.92E+01	-1.92E+01	-1.89E+01	-1.89E+01	-1.96E+01	-1.96E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
25	-1.89E+01	-1.89E+01	-1.88E+01	-1.88E+01	-1.92E+01	-1.92E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
26	-1.85E+01	-1.85E+01	-1.85E+01	-1.85E+01	-1.86E+01	-1.86E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
27	-1.84E+01	-1.84E+01	-1.88E+01	-1.88E+01	-1.86E+01	-1.86E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
28	-1.91E+01	-1.91E+01	-1.94E+01	-1.94E+01	-1.98E+01	-1.98E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
29	-1.94E+01	-1.94E+01	-1.95E+01	-1.95E+01	-1.88E+01	-1.88E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
30	-1.83E+01	-1.83E+01	-1.85E+01	-1.85E+01	-1.85E+01	-1.85E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
31	-1.93E+01	-1.93E+01	-1.90E+01	-1.90E+01	-1.90E+01	-1.90E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
32	-1.96E+01	-1.96E+01	-1.88E+01	-1.88E+01	-2.00E+01	-2.00E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
33	-1.89E+01	-1.89E+01	-1.81E+01	-1.81E+01	-1.85E+01	-1.85E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
34	-1.87E+01	-1.87E+01	-1.86E+01	-1.86E+01	-1.93E+01	-1.93E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
35	-1.86E+01	-1.86E+01	-1.96E+01	-1.96E+01	-1.73E+01	-1.73E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
36	-1.84E+01	-1.84E+01	-1.91E+01	-1.91E+01	-1.90E+01	-1.90E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
37	-1.85E+01	-1.85E+01	-1.90E+01	-1.90E+01	-2.01E+01	-2.01E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
38	-1.91E+01	-1.91E+01	-1.83E+01	-1.83E+01	-1.88E+01	-1.88E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
39	-1.90E+01	-1.90E+01	-1.87E+01	-1.87E+01	-1.87E+01	-1.87E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
40	-1.89E+01	-1.89E+01	-1.88E+01	-1.88E+01	-1.87E+01	-1.87E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
41	-2.04E+01	-2.04E+01	-1.90E+01	-1.90E+01	-1.83E+01	-1.83E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
42	-1.87E+01	-1.87E+01	-1.84E+01	-1.84E+01	-1.90E+01	-1.90E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
43	-1.92E+01	-1.92E+01	-1.77E+01	-1.77E+01	-1.97E+01	-1.97E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
44	-1.84E+01	-1.84E+01	-1.87E+01	-1.87E+01	-1.82E+01	-1.82E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
45	-1.94E+01	-1.94E+01	-1.86E+01	-1.86E+01	-1.92E+01	-1.92E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
46	-1.94E+01	-1.94E+01	-1.91E+01	-1.91E+01	-1.89E+01	-1.89E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
47	-1.85E+01	-1.85E+01	-1.83E+01	-1.83E+01	-1.82E+01	-1.82E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
48	-1.88E+01	-1.88E+01	-1.85E+01	-1.85E+01	-1.96E+01	-1.96E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
49	-2.02E+01	-2.02E+01	-1.81E+01	-1.81E+01	-1.93E+01	-1.93E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
50	-1.95E+01	-1.95E+01	-1.89E+01	-1.89E+01	-2.03E+01	-2.03E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
51	-1.92E+01	-1.92E+01	-1.85E+01	-1.85E+01	-1.87E+01	-1.87E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
52	-1.86E+01	-1.86E+01	-2.07E+01	-2.07E+01	-1.92E+01	-1.92E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
53	-1.71E+01	-1.71E+01	-1.72E+01	-1.72E+01	-1.91E+01	-1.91E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
54	-1.90E+01	-1.90E+01	-1.85E+01	-1.85E+01	-1.85E+01	-1.85E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		
55	-1.99E+01	-1.99E+01	-1.80E+01	-1.80E+01	-1.97E+01	-1.97E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK		

Table COMP.C-4. QC Check for Parameter S_ANH_AB:PRMX_LOG in CRA19_COMP Analysis, BRAGFLO Salado Flow Model (Continued)

BRAGFLO Salado Flow Model Parameter S_ANH_AB:PRMX_LOG															
	Replicate 1		Replicate 2		Replicate 3		Minimum Checks			Maximum Checks			Visual Equality Checks		
Vector	BLK 4 Actual	BLK 4 Listed	BLK 4 Actual	BLK 4 Listed	BLK 4 Actual	BLK 4 Listed	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3
56	-1.88E+01	-1.88E+01	-1.96E+01	-1.96E+01	-1.94E+01	-1.94E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
57	-1.91E+01	-1.91E+01	-1.84E+01	-1.84E+01	-1.90E+01	-1.90E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
58	-1.85E+01	-1.85E+01	-1.89E+01	-1.89E+01	-1.87E+01	-1.87E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
59	-1.75E+01	-1.75E+01	-1.77E+01	-1.77E+01	-1.87E+01	-1.87E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
60	-1.97E+01	-1.97E+01	-2.00E+01	-2.00E+01	-1.81E+01	-1.81E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
61	-1.88E+01	-1.88E+01	-1.91E+01	-1.91E+01	-1.88E+01	-1.88E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
62	-1.86E+01	-1.86E+01	-1.81E+01	-1.81E+01	-1.90E+01	-1.90E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
63	-1.83E+01	-1.83E+01	-1.93E+01	-1.93E+01	-1.79E+01	-1.79E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
64	-1.92E+01	-1.92E+01	-1.95E+01	-1.95E+01	-1.88E+01	-1.88E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
65	-1.91E+01	-1.91E+01	-1.84E+01	-1.84E+01	-1.81E+01	-1.81E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
66	-1.88E+01	-1.88E+01	-1.88E+01	-1.88E+01	-1.89E+01	-1.89E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
67	-1.92E+01	-1.92E+01	-1.83E+01	-1.83E+01	-1.90E+01	-1.90E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
68	-1.92E+01	-1.92E+01	-1.98E+01	-1.98E+01	-1.84E+01	-1.84E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
69	-1.84E+01	-1.84E+01	-1.99E+01	-1.99E+01	-1.96E+01	-1.96E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
70	-1.90E+01	-1.90E+01	-1.85E+01	-1.85E+01	-1.92E+01	-1.92E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
71	-1.96E+01	-1.96E+01	-1.92E+01	-1.92E+01	-1.88E+01	-1.88E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
72	-1.86E+01	-1.86E+01	-1.94E+01	-1.94E+01	-1.91E+01	-1.91E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
73	-1.87E+01	-1.87E+01	-1.90E+01	-1.90E+01	-1.91E+01	-1.91E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
74	-2.00E+01	-2.00E+01	-1.82E+01	-1.82E+01	-1.81E+01	-1.81E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
75	-1.82E+01	-1.82E+01	-1.95E+01	-1.95E+01	-1.95E+01	-1.95E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
76	-1.81E+01	-1.81E+01	-1.92E+01	-1.92E+01	-1.85E+01	-1.85E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
77	-1.88E+01	-1.88E+01	-1.91E+01	-1.91E+01	-1.76E+01	-1.76E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
78	-1.88E+01	-1.88E+01	-1.97E+01	-1.97E+01	-1.92E+01	-1.92E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
79	-1.80E+01	-1.80E+01	-1.78E+01	-1.78E+01	-1.80E+01	-1.80E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
80	-1.86E+01	-1.86E+01	-1.93E+01	-1.93E+01	-1.93E+01	-1.93E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
81	-1.83E+01	-1.83E+01	-1.99E+01	-1.99E+01	-1.94E+01	-1.94E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
82	-1.94E+01	-1.94E+01	-1.79E+01	-1.79E+01	-1.89E+01	-1.89E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
83	-1.79E+01	-1.79E+01	-1.90E+01	-1.90E+01	-1.88E+01	-1.88E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
84	-1.96E+01	-1.96E+01	-1.80E+01	-1.80E+01	-1.89E+01	-1.89E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
85	-1.85E+01	-1.85E+01	-1.94E+01	-1.94E+01	-1.94E+01	-1.94E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
86	-2.01E+01	-2.01E+01	-2.01E+01	-2.01E+01	-1.86E+01	-1.86E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
87	-1.88E+01	-1.88E+01	-1.86E+01	-1.86E+01	-1.82E+01	-1.82E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
88	-1.93E+01	-1.93E+01	-1.84E+01	-1.84E+01	-1.94E+01	-1.94E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
89	-1.95E+01	-1.95E+01	-1.96E+01	-1.96E+01	-1.95E+01	-1.95E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
90	-1.86E+01	-1.86E+01	-1.91E+01	-1.91E+01	-1.84E+01	-1.84E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
91	-1.81E+01	-1.81E+01	-1.96E+01	-1.96E+01	-1.79E+01	-1.79E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
92	-1.89E+01	-1.89E+01	-1.75E+01	-1.75E+01	-1.80E+01	-1.80E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
93	-1.81E+01	-1.81E+01	-1.82E+01	-1.82E+01	-1.88E+01	-1.88E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
94	-1.80E+01	-1.80E+01	-2.02E+01	-2.02E+01	-1.97E+01	-1.97E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
95	-1.95E+01	-1.95E+01	-1.93E+01	-1.93E+01	-2.03E+01	-2.03E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
96	-1.87E+01	-1.87E+01	-1.91E+01	-1.91E+01	-1.76E+01	-1.76E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
97	-1.92E+01	-1.92E+01	-1.87E+01	-1.87E+01	-1.91E+01	-1.91E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
98	-1.99E+01	-1.99E+01	-1.92E+01	-1.92E+01	-1.91E+01	-1.91E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
99	-1.78E+01	-1.78E+01	-1.97E+01	-1.97E+01	-1.98E+01	-1.98E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK
100	-1.90E+01	-1.90E+01	-1.93E+01	-1.93E+01	-1.85E+01	-1.85E+01	OK	OK	OK	OK	OK	OK	OK	OK	OK

Attachment D to Appendix COMP

Quality Control Checks of Cell Assignments for Property Changes in CRA19_COMP Model

Attachments B and C to Appendix COMP present the results of quality checks on parameter value changes made for the CRA19_COMP model. Attachment D presents the results of quality checks made to confirm that the parameter value changes were made for the correct BRAGFLO model cells. Five groups of checks were made:

- DRZ cells above and below Abandoned Panel Closures
- DRZ cells above and below the Operations Area
- DRZ cells above and below the Experimental Area
- Anhydrite Marker Bed 139 below the Abandoned Panel Closures, Operations Area, and Experimental Area
- Anhydrite Layers A and B above the Abandoned Panel Closures, Operations Area, and Experimental Area

The three left-hand columns in the following table identify the coordinates of the intended cells, the fourth column reproduces the related model command, and the right-hand column provides the check results indicating that all cells were appropriately identified.

Cell Coordinates X-Direction	Cell Coordinates Y-Direction	Cell Coordinates Z-Direction	Relevant COMP Model Command	QC Check Result
DRZ Above and Below Abandoned Panel Closures				
30 & 31	8	1	< MODIFY, MAT=DRZ_OE_1, TIME_ID=1, IRANGE=30,31, JRANGE=8,9, KRANGE=1,1	Passed
	9	1	< MODIFY, MAT=DRZ_OE_1, TIME_ID=1, IRANGE=30,31, JRANGE=8,9, KRANGE=1,1	Passed
	13	1	< MODIFY, MAT=DRZ_OE_1, TIME_ID=1, IRANGE=30,31, JRANGE=13,13, KRANGE=1,1	Passed
	15	1	< MODIFY, MAT=DRZ_OE_1, TIME_ID=1, IRANGE=30,31, JRANGE=15,16, KRANGE=1,1	Passed
	16	1	< MODIFY, MAT=DRZ_OE_1, TIME_ID=1, IRANGE=30,31, JRANGE=15,16, KRANGE=1,1	Passed
DRZ Above and Below Operations Area				
40, 41, & 42	8	1	< MODIFY, MAT=DRZ_OE_1, TIME_ID=1, IRANGE=40,42, JRANGE=8,9, KRANGE=1,1	Passed
	9	1	< MODIFY, MAT=DRZ_OE_1, TIME_ID=1, IRANGE=40,42, JRANGE=8,9, KRANGE=1,1	Passed
	13	1	< MODIFY, MAT=DRZ_OE_1, TIME_ID=1, IRANGE=40,42, JRANGE=13,13, KRANGE=1,1	Passed
	15	1	< MODIFY, MAT=DRZ_OE_1, TIME_ID=1, IRANGE=40,42, JRANGE=15,16, KRANGE=1,1	Passed
	16	1	< MODIFY, MAT=DRZ_OE_1, TIME_ID=1, IRANGE=40,42, JRANGE=15,16, KRANGE=1,1	Passed
DRZ Above and Below Experimental Area				
44 & 45	8	1	< MODIFY, MAT=DRZ_OE_1, TIME_ID=1, IRANGE=44,45, JRANGE=8,9, KRANGE=1,1	Passed
	9	1	< MODIFY, MAT=DRZ_OE_1, TIME_ID=1, IRANGE=44,45, JRANGE=8,9, KRANGE=1,1	Passed
	13	1	< MODIFY, MAT=DRZ_OE_1, TIME_ID=1, IRANGE=44,45, JRANGE=13,13, KRANGE=1,1	Passed
	15	1	< MODIFY, MAT=DRZ_OE_1, TIME_ID=1, IRANGE=44,45, JRANGE=15,16, KRANGE=1,1	Passed
	16	1	< MODIFY, MAT=DRZ_OE_1, TIME_ID=1, IRANGE=44,45, JRANGE=15,16, KRANGE=1,1	Passed
Marker Bed 139 Below Abandoned Panel Closures, Operations Area, and Experimental Area				
30 & 31	7	1	< MODIFY, MAT=S_MB139, TIME_ID=1, IRANGE=30,31, JRANGE=7,7, KRANGE=1,1	Passed
40, 41, & 42	7	1	< MODIFY, MAT=S_MB139, TIME_ID=1, IRANGE=40,42, JRANGE=7,7, KRANGE=1,1	Passed
44 & 45	7	1	< MODIFY, MAT=S_MB139, TIME_ID=1, IRANGE=44,45, JRANGE=7,7, KRANGE=1,1	Passed
Anhydrite Layers A & B Above Abandoned Panel Closures, Operations Area, and Experimental Area				
30 & 31	14	1	< MODIFY, MAT=S_ANH_AB, TIME_ID=1, IRANGE=30,31, JRANGE=14,14, KRANGE=1,1	Passed
40, 41, & 42	14	1	< MODIFY, MAT=S_ANH_AB, TIME_ID=1, IRANGE=40,42, JRANGE=14,14, KRANGE=1,1	Passed
44 & 45	14	1	< MODIFY, MAT=S_ANH_AB, TIME_ID=1, IRANGE=44,45, JRANGE=14,14, KRANGE=1,1	Passed