Entergy

**Entergy Nuclear Operations, Inc.**
**Palisades Nuclear Plant**
27780 Blue Star Memorial Highway
Covert, MI 49043

August 20, 2007 10 CFR 50.90

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Palisades Nuclear Plant
Docket 50-255
License No. DPR-20

Response to Request for Additional Information – License Amendment Request for Replacement of Containment Sump Buffer (TAC No. MD5893)

Dear Sir or Madam:

Entergy Nuclear Operations, Inc., (ENO) submitted a license amendment request (LAR) on June 29, 2007, to change the containment sump buffering agent from trisodium phosphate (TSP) to sodium tetraborate decahydrate (STB) for Palisades Nuclear Plant (PNP). On July 31, 2007, the Nuclear Regulatory Commission (NRC) electronically sent a request for additional information (RAI) on the LAR. On August 7, 2007, a teleconference was held with the NRC to discuss the RAI issues.

Enclosure 1 provides the response to the RAI. Enclosure 2 provides revised Technical Specifications (TS) pages. Enclosure 3 provides the annotated TS pages showing the proposed changes.

By letter dated September 25, 2006, Nuclear Management Company, LLC, the former licensee for the PNP requested NRC review and approval of a LAR (TAC No. MD3087) to modify the PNP licensing basis to adopt the alternative source term methodology. In a telephone call on July 17, 2007, ENO agreed that the implementation of the alternative source term LAR should be contingent on the approval of the LAR for replacement of the containment sump buffer. ENO will work with the NRC project manager, as necessary, to coordinate the changes.

Summary of Commitments

This letter contains no new commitments and no revision to existing commitments.

I declare under penalty of perjury that the foregoing is true and correct. Executed on August 20, 2007.

Christopher J. Schwarz
Site Vice President
Palisades Nuclear Plant

Enclosures (3)

CC Administrator, Region III, USNRC
Project Manager, Palisades, USNRC
Resident Inspector, Palisades, USNRC

**ENCLOSURE 1**
**RAI RESPONSE – REPLACEMENT OF CONTAINMENT SUMP BUFFER LAR**
**PALISADES NUCLEAR PLANT**

Entergy Nuclear Operations, Inc., (ENO) submitted a license amendment request (LAR) on June 29, 2007, to change the containment sump buffering agent from trisodium phosphate (TSP) to sodium tetraborate decahydrate (STB). On July 31, 2007, the Nuclear Regulatory Commission (NRC) electronically sent a request for additional information (RAI) on the LAR. On August 7, 2007, a teleconference was held with the NRC to discuss the issues in the RAI. The RAI issues and the ENO responses follow.

**NRC Request**

1. *Provide copies of the WCAP-16530-NP* ["Evaluation of Post-Accident Chemical Effects in containment Sump Fluids to Support GSI-191"] *spreadsheets for Palisades under both trisodium phosphate (TSP) and sodium tetraborate decahydrate (STB) conditions. Include all assumptions for temperature, pH, and material inventory input to the model.*

**ENO Response**

1. Copies of the WCAP-16530-NP spreadsheets for TSP and STB conditions are included in Attachments 1 and 2 respectively. The spreadsheets include the values for temperature, pH, and material used in the model.

**NRC Request**

2. *Please describe the procedure for [Technical Specifications] Surveillance Requirement 3.5.5.2. [Verify that a sample from the STB baskets provides adequate pH adjustment of borated water every 18 months]*

   A. *How is the sample obtained? How does the sampling account for the potential that STB on the interior of the basket may exhibit different properties (hydration, density, etc) than samples taken from the basket periphery? Discuss the potential impact that variations in material properties within each basket may have on the accuracy of the pH verification surveillance.*

**ENO Response**

2. A. Two surveillance procedures implement Technical Specification (TS) 3.5.5, "Containment Sump Buffering Agent and Weight Requirements." The procedures are being revised to incorporate the change of the sump buffering agent from TSP to STB. Procedure number RM-124, "Sodium Tetraborate Basket Weights," would be revised to verify the weight of the STB in the baskets. Procedure number RC-123, "Sodium Tetraborate

Decahydrate Buffering Tests," would be revised to verify that the STB in the baskets would provide the required pH control of the post loss-of-coolant accident (LOCA) sump water. Both procedures are performed in an 18-month interval.

Procedure RM-124, which corresponds to TS Surveillance Requirement 3.5.5.1, would provide steps for weighing each of the twenty STB baskets by the use of a calibrated portable scale. The initial empty weight of each basket would be subtracted from the actual weight of the basket plus STB. The total of the all twenty baskets would be added together to verify the weight is within the lower and upper limits in the proposed Technical Specification surveillance requirement of ≥ 8,186 pounds and ≤ 10,533 pounds of equivalent weight sodium tetraborate decahydrate. The total as-found weight of STB would be evaluated and trended and a determination would be made if STB needs to be added to the STB baskets. The procedure would require that a boron concentration of the STB be performed, when the total STB weight is below 8,211 pounds (8,186 pound minimum plus 25 pounds), to determine whether the loss of weight is due to dehydration of the decahydrate form of STB. If the total weight is otherwise within the specified range, no boron concentration test is required.

The STB baskets design length, width, and height are two feet by two feet by three feet two inches. The baskets would be raised off the floor by four-inch legs, and they would be filled with STB to a height of approximately two feet. A 100 mesh inner screen would line the baskets within a four mesh outer screen to contain the STB.

Procedure RC-123, which corresponds to TS Surveillance Requirement 3.5.5.2, would provide steps for sampling from one of the STB baskets and performing a pH test. A different basket is sampled each refueling outage. The procedure would require using a clean tool to scrape away several inches from the top layer of STB and obtain 10-15 grams of STB from the bottom of the scrape area. A controlled amount of the STB sample would then be placed into a heated boric acid solution and cooled to 25°C. The pH of the solution would then be measured and compared to the procedure acceptance criterion of between 7.1 and 7.9.

The STB to be installed inside the containment was procured per Borax Inc. specifications for decahydrate grade special quality granular STB. A certificate of analysis was provided by Borax demonstrating the compliance of the deliverables to the product specification. The receipt

inspection included an additional bulk chemical check to ensure the product specification is met by measuring the boron and sodium contents.

ENO expects that the dehydration of the decahydrate form of the STB would occur in service. It is likely that the dehydration process is faster for the outer peripheral material in the STB basket. Nonetheless, the chemical composition of the STB is not changed by the dehydration. As described in the response to issue 3. below, the aforementioned surveillance procedures account for the weight changes to ensure the design function of post-LOCA sump pH control is maintained.

**NRC Request**

2. B. *Tests conducted under WCAP 16596-NP indicate that STB is readily dissolved. Is there a potential for the varying levels of hydration (based on changes in atmospheric conditions) to affect the dissolution rate of the sodium tetraborate over time? Are dissolution tests performed during each surveillance*?

**ENO Response**

2. B. Refer to the response to 2.C. below.

**NRC Request**

2. C. *Discuss the potential for sodium tetraborate pellets to fuse into larger blocks over time as a result of fluctuating humidity levels. If this were to occur, what would the impact on dissolution time be? How does the current surveillance requirement account for this potential phenomena?*

**ENO Response**

2. C. Dehydration of the decahydrate form of STB is expected to occur in the containment environment. It is likely that there would be varying levels of dehydration of the STB in the STB baskets due to the varying degree of exposure to the containment environment. The dehydration does not have adverse effects on the dissolution time.

The STB is expected to form clumps due to local dissolution and re-precipitation under the in-service conditions of containment environment. This phenomenon is referred by the STB manufacturer as "caking" and does not chemically change the sodium tetraborate portion of the material. As a part of WCAP-16596-P environmental effects testing, the

STB test specimen was exposed to simulated storage condition for 30 days at 150°F and 30% humidity. The STB specimen formed a solid clump. The test results showed that relative to that of the granular form, the clumped STB took longer to dissolve. The increase of dissolution time is considered as the result of surface area reduction. Nevertheless, WCAP-16596-P did not identify any concern about the increase of the dissolution time. The WCAP-16596-P concluded that the clumped STB product is readily dissolved.

The licensee has performed a parametric analysis of the surface dissolution rates (SDR) of both TSP and STB. First, the buffer agent samples were prepared by compacting in a one inch diameter by one inch tall cylinder. The molded samples were placed in boric acid solution for testing of the dissolution time. An analytical model was developed to convert the measured dissolution time of the molded sample into SDR. The SDR pertains to the dissolution rate of a solid block of the buffer agent. It is independent of the shape and size of the block. Tabulated below are the results from the parametric study. It showed that the dissolution rate for STB is substantially higher than the rate of TSP which is the present sump buffer agent. Since the density and amount of the STB employed are comparable to those of the TSP, the calculated SDR predicts that the dissolution time for STB is significantly shorter than that of the TSP.

| Temp °F | STB SDR lbm/ft$^2$-min | TSP SDR lbm/ft$^2$-min |
|---|---|---|
| 130 | 28.4 | 0.553 |
| 160 | 33.3 | 3.39 |
| 190 | 41.2 | 6.39 |

Based on the generic dissolution time tests described in the WCAP-6596-P and the aforementioned SDR analysis results, ENO does not consider the dissolution time of STB as a limiting design parameter. Procedures RM-124 and RC-123 provide sufficient assurance for meeting the design requirements of timely control of the post-LOCA sump pH. No surveillance requirement is planned for the dissolution time of the STB in the STB baskets.

**NRC Request**

3. *Loss of waters of hydration from STB reduces its bulk weight, even though the amount of active chemical remains unchanged. If additional STB is added over time to make up for the water weight loss, can an excess of STB*

*accumulate such that the pH could exceed the maximum calculated level? The result of higher pH would be increased aluminum dissolution, and consequently, increased aluminum based precipitates. The submittal states that an assay of the boron content will be used to determine the equivalent weight of sodium tetraborate decahydrate. Please describe the boron assay procedure, frequency, and safeguards in place to ensure that the maximum amount of STB in the baskets is not exceeded.*

**ENO Response**

3. ENO is incorporating administrative controls on the amount of STB in the containment to assure the TS requirements are met. Regarding the STB weight loss due to dehydration, WCAP-16596-NP reported that a STB sample lost 23% of its weight when exposed to a 150°F and 30% humidity environment for 30 days. The 23% weight change corresponds to the loss of five parts of the ten water molecules attached to the decahydrate STB. ENO is deploying the twenty STB baskets in the containment basement where the temperature is constantly well below 150°F with varying humidity levels over time. ENO does not have the operating data of the STB weight loss due to dehydration in the realistic containment environment, but expects the weight loss to be much less than 23%.

   The addition of the STB would be controlled under the surveillance procedure RM-124. STB would be added to the containment only if it is determined that there is such a need. ENO is sensitive of the adverse effects of placing excessive amount of sump buffer agent inside containment. Procedure RM-124 would control the amount of STB inventory to the lowest level practical.

   There are several safeguards to minimize the amount of STB in the containment. Initially, the STB baskets are to be loaded to a nominal 8,800 pounds of STB. This initial amount of the STB is sized to a nominal weight of 7.5% ± 2% above the minimum Technical Specification requirement. This 7.5% weight margin addresses the expected weight loss due to dehydration, the allowed weight variation per decahydrate STB specification, instrument inaccuracy, potential loss during handling, and sampling usage. Since the weight loss of the STB during service is expected, a special note would be included in the procedure RM-124 explicitly stating that STB need not be added as a result of dehydration. If the total weight of the STB is below the minimum required amount, procedure RM-124 requires a boron concentration test be performed to determine whether the loss of weight is due to dehydration. ENO developed a boron concentration test procedure to verify boron concentration in the bulk chemical. The result is used to

determine the needed adjustment of the STB basket weights to an equivalent weight of sodium tetraborate decahydrate. The boron concentration test would not have a specified frequency. To further raise the sensitivity of the adverse effects of placing excessive amount of STB inside the containment, the basis document for procedure RM-124 would address controlling the amount of STB to the lowest level practical.

**NRC Request**

4. In the August 7, 2007, teleconference, the NRC identified that the TS table of contents page identifying the title change in TS section 3.5.5 had not been submitted on June 29, 2007.

**ENO Response**

4. Enclosure 2 provides page change instructions, the table of contents page ii that was not previously submitted, and the revised TS page 3.5.5-1 for section 3.5.5. Page 3.5.5-1 is submitted for completeness. Enclosure 3 provides the annotated TS pages showing the proposed changes. These enclosures replace the TS page changes and the annotated pages submitted in the June 29, 2007, letter.

# ATTACHMENT 1

Results from WCAP-16530-NP, Rev. 0
"Evaluation of Post-Accident Chemical Effects in Containment Sump Fluids to Support GSI-191"

DOCUMENT No. 2007-03464, REVISION 0
Pages 283 to 320 of 492

SPREADSHEET FOR PALISADES NUCLEAR PLANT
TRISODIUM PHOSPHATE (TSP) BUFFER

39 Pages Follow

Attachment 1-G
Results of WCAP-16530-NP, Rev. 0, (OG-06-255 and OG-06-378)
Spreadsheet for Palisades Nuclear Power Plant Unit 1,
Break S2, Case 4,
TSP Buffer and 100% of the Aluminum and Water in the Reactor Cavity, pH 8

Chemical Effects Calculation

Palisades
Unit 1

Use saturation pH for 20 minutes

Start sump mixing after 12 hours
Stop spray after 30 days

5.1 SIRW Tank Water pH
11.54 Initial Sump pH
8.0 Equilibrium pH
Cases A 7 Equilibrium pH
Cases B 8 Equilibrium pH

| Time step | Start Time (sec) | Time (min) | Time (hour) | Time (day) | Sump Temp. (°F) | Sump Temp. Step | Cont. Temp. (°F) | Cont Temp. Step | Sump pH | Spray pH | Sump Mixed 1=yes | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 10 | 0.2 | 0.00 | 0.00 | 228.0 | | 280.0 | | 11.5 | 5.1 | 0 | |
| 2 | 20 | 0.3 | 0.01 | 0.00 | 250.0 | 22.00 | 281.0 | 1.00 | 11.5 | 5.1 | 0 | |
| 3 | 30 | 0.5 | 0.01 | 0.00 | 260.0 | 10.00 | 279.0 | -2.00 | 11.5 | 5.1 | 0 | |
| 4 | 60 | 1.0 | 0.02 | 0.00 | 268.0 | 8.00 | 276.0 | -3.00 | 11.5 | 5.1 | 0 | |
| 5 | 90 | 1.5 | 0.03 | 0.00 | 272.0 | 4.00 | 272.0 | -4.00 | 11.5 | 5.1 | 0 | |
| 6 | 300 | 5.0 | 0.08 | 0.00 | 277.0 | 5.00 | 265.0 | -7.00 | 11.5 | 5.1 | 0 | |
| 7 | 600 | 10.0 | 0.17 | 0.01 | 275.0 | -2.00 | 255.0 | -10.00 | 11.5 | 5.1 | 0 | |
| 8 | 900 | 15.0 | 0.25 | 0.01 | 271.0 | -4.00 | 245.0 | -10.00 | 11.5 | 5.1 | 0 | |
| 9 | 1200 | 20.0 | 0.33 | 0.01 | 268.0 | -3.00 | 240.0 | -5.00 | 8.0 | 8.0 | 0 | Switchover to recirc at 20 minutes |
| 10 | 1500 | 25.0 | 0.42 | 0.02 | 261.0 | -7.00 | 220.0 | -20.00 | 8.0 | 8.0 | 0 | |
| 11 | 1800 | 30.0 | 0.50 | 0.02 | 255.0 | -6.00 | 215.0 | -5.00 | 8.0 | 8.0 | 0 | |
| 12 | 2700 | 45.0 | 0.75 | 0.03 | 243.0 | -12.00 | 198.0 | -17.00 | 8.0 | 8.0 | 0 | |
| 13 | 3600 | 60.0 | 1.00 | 0.04 | 239.0 | -4.00 | 216.0 | 18.00 | 8.0 | 8.0 | 0 | |
| 14 | 5400 | 90.0 | 1.50 | 0.06 | 238.0 | -1.00 | 221.0 | 5.00 | 8.0 | 8.0 | 0 | |
| 15 | 7200 | 120.0 | 2.00 | 0.08 | 236.0 | -2.00 | 222.0 | 1.00 | 8.0 | 8.0 | 0 | |
| 16 | 14400 | 240.0 | 4.00 | 0.17 | 231.0 | -5.00 | 220.0 | -2.00 | 8.0 | 8.0 | 0 | |
| 17 | 21600 | 360.0 | 6.00 | 0.25 | 225.0 | -6.00 | 220.0 | 0.00 | 8.0 | 8.0 | 0 | |
| 18 | 28800 | 480.0 | 8.00 | 0.33 | 216.0 | -9.00 | 218.0 | -2.00 | 8.0 | 8.0 | 0 | |
| 19 | 36000 | 600.0 | 10.00 | 0.42 | 210.0 | -6.00 | 212.0 | -6.00 | 8.0 | 8.0 | 0 | |
| 20 | 43200 | 720.0 | 12.00 | 0.50 | 206.0 | -4.00 | 205.0 | -7.00 | 8.0 | 8.0 | 1 | Start Mixing at 12 hours |
| 21 | 50400 | 840.0 | 14.00 | 0.58 | 200.0 | -6.00 | 201.0 | -4.00 | 8.0 | 8.0 | 1 | |
| 22 | 57600 | 960.0 | 16.00 | 0.67 | 196.0 | -4.00 | 195.0 | -6.00 | 8.0 | 8.0 | 1 | |
| 23 | 72000 | 1200.0 | 20.00 | 0.83 | 190.0 | -6.00 | 190.0 | -5.00 | 8.0 | 8.0 | 1 | |
| 24 | 86400 | 1440.0 | 24.00 | 1.00 | 185.0 | -5.00 | 185.0 | -5.00 | 8.0 | 8.0 | 1 | |
| 25 | 129600 | 2160.0 | 36.00 | 1.50 | 175.0 | -10.00 | 175.0 | -10.00 | 8.0 | 8.0 | 1 | |
| 26 | 172800 | 2880.0 | 48.00 | 2.00 | 166.0 | -9.00 | 165.0 | -10.00 | 8.0 | 8.0 | 1 | |
| 27 | 259200 | 4320.0 | 72.00 | 3.00 | 158.0 | -8.00 | 155.0 | -10.00 | 8.0 | 8.0 | 1 | |
| 28 | 432000 | 7200.0 | 120.00 | 5.00 | 158.0 | 0.00 | 150.0 | -5.00 | 8.0 | 8.0 | 1 | |
| 29 | 626400 | 10440.0 | 174.00 | 7.25 | 148.0 | -10.00 | 137.0 | -13.00 | 8.0 | 8.0 | 1 | |
| 30 | 864000 | 14400.0 | 240.00 | 10.00 | 139.7 | -8.30 | 126.0 | -11.00 | 8.0 | 8.0 | 1 | |
| 31 | 1296000 | 21600.0 | 360.00 | 15.00 | 134.0 | -5.70 | 116.7 | -9.30 | 8.0 | 8.0 | 1 | |
| 32 | 1728000 | 28800.0 | 480.00 | 20.00 | 130.3 | -3.70 | 111.8 | -4.95 | 8.0 | 8.0 | 1 | |
| 33 | 2160000 | 36000.0 | 600.00 | 25.00 | 122.2 | -8.10 | 102.2 | -9.55 | 8.0 | 8.0 | 1 | |
| 34 | 2592000 | 43200.0 | 720.00 | 30.00 | 120.0 | -2.20 | 101.0 | -1.20 | 8.0 | 8.0 | 1 | |

| Failure of DG 1-1 to Start | | Failure of DG 1-2 to Start | |
|---|---|---|---|
| Fig. 3 | Fig. 2 | Fig. 13 | Fig. 12 |
| Sump Temp. (°F) | Cont. Temp. (°F) | Sump Temp. (°F) | Cont. Temp. (°F) |
| 228.00 | 277.00 | 228.00 | 280.00 |
| 250.00 | 278.00 | 249.00 | 281.00 |
| 259.00 | 278.00 | 260.00 | 279.00 |
| 264.00 | 276.00 | 268.00 | 276.00 |
| 269.00 | 272.00 | 272.00 | 272.00 |
| 271.00 | 262.00 | 277.00 | 265.00 |
| 270.00 | 252.00 | 275.00 | 255.00 |
| 268.00 | 234.00 | 271.00 | 245.00 |
| 260.00 | 221.00 | 268.00 | 240.00 |
| 254.00 | 213.00 | 261.00 | 220.00 |
| 249.00 | 200.00 | 255.00 | 215.00 |
| 231.50 | 174.00 | 243.00 | 198.00 |
| 229.00 | 185.00 | 239.00 | 216.00 |
| 227.00 | 190.00 | 238.00 | 221.00 |
| 220.00 | 189.00 | 236.00 | 222.00 |
| 215.00 | 180.00 | 231.00 | 220.00 |
| 198.00 | 178.00 | 225.00 | 220.00 |
| 192.00 | 178.00 | 216.00 | 218.00 |
| 182.00 | 172.00 | 210.00 | 212.00 |
| 174.00 | 166.00 | 206.00 | 205.00 |
| 170.00 | 162.00 | 200.00 | 201.00 |
| 166.00 | 158.00 | 196.00 | 195.00 |
| 162.00 | 155.00 | 190.00 | 190.00 |
| 157.00 | 152.00 | 185.00 | 185.00 |
| 151.00 | 147.00 | 175.00 | 175.00 |
| 148.00 | 140.00 | 166.00 | 165.00 |
| 144.00 | 150.00 | 158.00 | 155.00 |
| 158.00 | 150.00 | 143.00 | 140.00 |
| 148.00 | 137.00 | 138.30 | 129.00 |
| 139.70 | 126.00 | 134.00 | 120.60 |
| 134.00 | 116.70 | 123.00 | 113.00 |
| 130.30 | 111.75 | 118.20 | 106.19 |
| 122.20 | 102.20 | 114.40 | 101.74 |
| 120.00 | 100.00 | 112.00 | 101.00 |

Chemical Effects Calculation
Palisades
Unit 1

| | | |
|---|---|---|
| Case | | 4 |
| Buffer | TSP | |
| pH | | 8.00 |
| RC Al | | 100.0% |

Start sump mixing after 12 hours
Stop spray after 30 days

Materials Input

| | | |
|---|---|---|
| Coolant | Sump Pool Volume (gal) | 394,307 gal |
| | Sump Pool Volume (ft3) | 52,715 $ft^3$ |
| | Sump Pool Mass (lb) | 3,289,406 lb |
| | Density | 62.4 $lb/ft^3$ |
| | | 8.34 lb/gal |

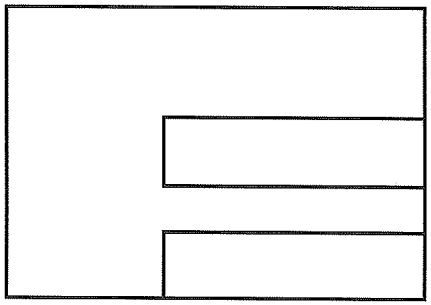
| TSP concentration | | |
|---|---|---|
| 11000 lb | | Trisodium Phosphate |
| 3,289,406 lb | | Sump Pool Mass (lb) |
| 0.33% | | TSP concentration |

| Water in the Reactor Cavity |
|---|
| 4822 $ft^3$ |

| | | |
|---|---|---|
| Aluminum | | |
| % Aluminum in Reactor Cavity Available | | 100% |
| Aluminum Submerged | | 31,951.7 $ft^2$ |
| | | 1,633.9 lb |
| Aluminum Not Submerged | | 108,745.0 $ft^2$ |
| | | 5,756.0 lb |
| Concrete conversion factor | | 1.01E-05 $kg/ft^2$ |
| Latent Debris | | 200 lb |
| Latent Debris fiber | 15.0% | 30.0 lb |
| Latent Debris particulate (cement) | 85.0% | 170.0 lb |
| Concrete | Particulate Concrete | |
| | Concrete in Latent Debris | 170.0 lb |
| | | 77.1114941 kg |
| | Equivalent area of particulate concrete | 7.67E+06 $ft^2$ |
| | Exposed Concrete | |
| | Submerged Solid Concrete (ft2) | 679 $ft^2$ |
| | Nonsubmerged Solid Concrete (ft2) | 59,584 $ft^2$ |
| | Total concrete area | 7.73E+06 $ft^2$ |
| Trisodium Phosphate | | 11,000 |
| | Trisodium Phosphate Hydrate (lbm) | 11,000 lb |

| Palisades Cases | This Case | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 4.00 | 1A | 1B | 2A | 2B | 3A | 3B | 4A | 4 |
| Aluminum in RC | 100.0% | 100.0% | 100.0% | 50.0% | 50.0% | 0.0% | 0.0% | 100.0% | 100.0% |
| Sequestered Water in RC | 0 | 0 | 0 | 2,411 | 2,411 | 4,822 | 4,822 | 0 | 0 |
| Buffer | TSP | STB | STB | STB | STB | STB | STB | TSP | TSP |
| TSP | 11,000 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 11,000 | 11,000 |
| Equilibrium pH | 8.00 | 7.00 | 8.00 | 7.00 | 8.00 | 7.00 | 8.00 | 7.00 | 8.00 |
| Initial sump pH | 11.54 | 9.32 | 9.32 | 9.32 | 9.32 | 9.32 | 9.32 | 11.54 | 11.54 |

| Insulation | Break S2 | Break S1 | Break S2 | Break S3 | Break S4 |
|---|---|---|---|---|---|
| Calcium Silicate | | | | | |
| CalSil (ft3) | 153.3 $ft^3$ | 127.60 | 153.26 | 114.03 | 92.73 |
| Density | 14.5 $lb/ft^3$ | | | | |
| Asbestos (ft3) | 0.0 $ft^3$ | 0.00 | 0.00 | 0.00 | 0.00 |
| Density | 10.0 $lb/ft^3$ | | | | |
| Kaylo (ft3) | 0.0 $ft^3$ | 0.00 | 0.00 | 0.00 | 0.00 |
| Density | 14.5 $lb/ft^3$ | | | | |
| Unibestos (ft3) | 0.0 $ft^3$ | 0.00 | 0.00 | 0.00 | 0.00 |
| Density | 14.5 $lb/ft^3$ | | | | |
| E-glass | | | | | |
| Fiberglass (ft3) | 50.1 $ft^3$ | 160.61 | 50.06 | 159.89 | 0.64 |
| Density | 4.0 $lb/ft^3$ | | | | |
| NUKON (ft3) | 1139.0 $ft^3$ | 1234.02 | 1139.05 | 875.03 | 302.13 |
| Density | 2.4 $lb/ft^3$ | | | | |
| Temp-Mat (ft3) | 0.0 $ft^3$ | 0.00 | 0.00 | 0.00 | 0.00 |
| Density | 11.8 $lb/ft^3$ | | | | |
| Thermal Wrap (ft3) | 0.0 $ft^3$ | 0.00 | 0.00 | 0.00 | 0.00 |
| Density | 2.4 $lb/ft^3$ | | | | |
| Silica Powder | | | | | |
| Microtherm (ft3) | 0.0 $ft^3$ | 0.00 | 0.00 | 0.00 | 0.00 |
| Density | 15.0 $lb/ft^3$ | | | | |
| Min-K (ft3) | 0.0 $ft^3$ | 0.00 | 0.00 | 0.00 | 0.00 |
| Density | 16.0 $lb/ft^3$ | | | | |
| Mineral Wool | | | | | |
| Min-Wool (ft3) | 0.0 $ft^3$ | 0 | 0 | 0 | 0 |
| Density | 10.0 $lb/ft^3$ | | | | |
| Rock Wool (ft3) | 0.0 $ft^3$ | 0 | 0 | 0 | 0 |
| Density | 10.0 $lb/ft^3$ | | | | |
| Aluminum Silicate | | | | | |
| Cerablanket (ft3) | 0.0 $ft^3$ | 0 | 0 | 0 | 0 |
| Density | 12.0 $lb/ft^3$ | | | | |
| FiberFrax Durablanket (ft3) | 0.0 $ft^3$ | 0 | 0 | 0 | 0 |
| Density | 12.0 $lb/ft^3$ | | | | |
| Kaowool (ft3) | 0.0 $ft^3$ | 0 | 0 | 0 | 0 |
| Density | 12.0 $lb/ft^3$ | | | | |
| Mat-Ceramic (ft3) | 0.0 $ft^3$ | 0 | 0 | 0 | 0 |
| Density | 12.0 $lb/ft^3$ | | | | |
| Mineral Fiber (ft3) | 0.0 $ft^3$ | 0 | 0 | 0 | 0 |
| Density | 21.0 $lb/ft^3$ | | | | |
| PAROC Mineral Wool (ft3) | 0.0 $ft^3$ | 0 | 0 | 0 | 0 |
| Density | 21.0 $lb/ft^3$ | | | | |
| Interam | | | | | |
| Interam (ft3) | 0.0 $ft^3$ | 0 | 0 | 0 | 0 |
| Density | 54.0 $lb/ft^3$ | | | | |



Assume particulate debris is insulation in mass proportion to the insulation

| | | Density ($lb/ft^3$) | Break S1 | Break S2 | Break S3 | Break S4 | |
|---|---|---|---|---|---|---|---|
| CalSil | ZOI | | 35.51 | 60.98 | 21.86 | 0.00 | ft3 |
| | Unjacketed | | 50.78 | 50.78 | 50.78 | 50.78 | ft3 |
| | Total | | 86.29 | 111.76 | 72.64 | 50.78 | ft3 |
| | Weight | 14.5 | 1,251.21 | 1,620.52 | 1,053.28 | 736.31 | lb |
| | Marinite | | 12.80 | 12.80 | 12.80 | 12.80 | ft3 |
| | Weight | 46 | 588.80 | 588.80 | 588.80 | 588.80 | lb |
| | Total Weight | | 1,840.01 | 2,209.32 | 1,642.08 | 1,325.11 | lb |
| | | | 33.9% | 43.1% | 37.6% | 64.9% | Weight % |
| Asbestos | ZOI | | 0.00 | 0.00 | 0.00 | 0.00 | ft3 |
| | | | 0.00 | 0.00 | 0.00 | 0.00 | ft3 |
| | Total | | 0.00 | 0.00 | 0.00 | 0.00 | ft3 |
| | | 10.0 | 0.00 | 0.00 | 0.00 | 0.00 | lb |
| | | | 0.0% | 0.0% | 0.0% | 0.0% | Weight % |
| Total calcium silicate | | | 1,840.01 | 2,209.32 | 1,642.08 | 1,325.11 | lb |
| Fiberglass | ZIO | | 159.14 | 49.18 | 158.21 | 0.04 | ft3 |
| | Unjacketed | | 0.59 | 0.59 | 0.59 | 0.59 | ft3 |
| | Total | | 159.73 | 49.77 | 158.80 | 0.63 | ft3 |
| | | 4.0 | 638.92 | 199.08 | 635.20 | 2.52 | lb |
| | | | 11.8% | 3.9% | 14.6% | 0.1% | Weight % |
| Temp-Mat | ZOI | | | | | | ft3 |
| | | | | | | | ft3 |
| | Total | | 0.00 | 0.00 | 0.00 | 0.00 | ft3 |
| | | 11.8 | 0.00 | 0.00 | 0.00 | 0.00 | lb |
| | | | 0.0% | 0.0% | 0.0% | 0.0% | Weight % |
| Nukon | ZOI | | 1,224.64 | 1,129.83 | 866.46 | 295.17 | ft3 |
| Thermal Wrap | Unjacketed | | 2.59 | 2.59 | 2.59 | 2.59 | ft3 |
| | Total | | 1,227.23 | 1,132.42 | 869.05 | 297.76 | ft3 |
| | | 2.4 | 2,945.35 | 2,717.81 | 2,085.72 | 714.62 | lb |
| | | | 54.3% | 53.0% | 47.8% | 35.0% | Weight % |
| Total E-Glass | | | 3,584.27 | 2,916.89 | 2,720.92 | 717.14 | lb |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Microtherm | ZOI | | | | | | ft3 |
| | Margin | | | | | | ft3 |
| | Spray & Submerge | | | | | | ft3 |
| | Margin | | | | | | ft3 |
| | Total | | 0.00 | 0.00 | 0.00 | 0.00 | ft3 |
| | | 15.0 | 0.00 | 0.00 | 0.00 | 0.00 | lb |
| | | | 0.0% | 0.0% | 0.0% | 0.0% | Weight % |
| | Total silica Powder | | 0.00 | 0.00 | 0.00 | 0.00 | lb |
| Mineral Wool | ZOI | | | | | | ft3 |
| | | | | | | | ft3 |
| | | | | | | | ft3 |
| | | | | | | | ft3 |
| | Total | | 0.00 | 0.00 | 0.00 | 0.00 | ft3 |
| | | 10.0 | 0.00 | 0.00 | 0.00 | 0.00 | lb |
| | | | 0.0% | 0.0% | 0.0% | 0.0% | Weight % |
| Cerafiber | ZOI | | | | | | ft3 |
| | | | | | | | ft3 |
| | | | | | | | ft3 |
| | | | | | | | ft3 |
| | Total | | 0.00 | 0.00 | 0.00 | 0.00 | ft3 |
| | | 12.0 | 0.00 | 0.00 | 0.00 | 0.00 | lb |
| | | | 0.0% | 0.0% | 0.0% | 0.0% | Weight % |
| | | | | | | | |
| | Total debris insulation weight | | 5,424.28 | 5,126.21 | 4,363.00 | 2,042.25 | lb |
| | Check sum | | 100.0% | 100.0% | 100.0% | 100.0% | Weight % |

| Latent Debris - Fiber | | 30 lb | Break S1 | Break S2 | Break S3 | Break S4 |
|---|---|---|---|---|---|---|
| | | Density (lb/ft3) | | | | |
| CalSil | Weight % | | 33.9% | 43.1% | 37.6% | 64.9% |
| | Weight fiber | 14.5 | 10.18 | 12.93 | 11.29 | 19.47 lb |
| | Equivalent fiber volume | | 0.70 | 0.89 | 0.78 | 1.34 ft3 |
| Asbestos | Weight % | | 0.0% | 0.0% | 0.0% | 0.0% |
| | Weight fiber | 10.0 | 0.00 | 0.00 | 0.00 | 0.00 lb |
| | Equivalent fiber volume | | 0.00 | 0.00 | 0.00 | 0.00 ft3 |
| Fiberglass | Weight % | | 11.8% | 3.9% | 14.6% | 0.1% |
| | Weight fiber | 4.0 | 3.53 | 1.17 | 4.37 | 0.04 lb |
| | Equivalent fiber volume | | 0.88 | 0.29 | 1.09 | 0.01 ft3 |
| Temp-Mat | Weight % | | 0.0% | 0.0% | 0.0% | 0.0% |
| | Weight fiber | 11.8 | 0.00 | 0.00 | 0.00 | 0.00 lb |
| | Equivalent fiber volume | | 0.00 | 0.00 | 0.00 | 0.00 ft3 |
| Nukon | Weight % | | 54.3% | 53.0% | 47.8% | 35.0% |
| | Weight fiber | 2.4 | 16.29 | 15.91 | 14.34 | 10.50 lb |
| | Equivalent fiber volume | | 6.79 | 6.63 | 5.98 | 4.37 ft3 |
| Microtherm | Weight % | | 0.0% | 0.0% | 0.0% | 0.0% |
| | Weight fiber | 15.0 | 0.00 | 0.00 | 0.00 | 0.00 lb |
| | Equivalent fiber volume | | 0.00 | 0.00 | 0.00 | 0.00 ft3 |
| Mineral Wool | Weight % | | 0.0% | 0.0% | 0.0% | 0.0% |
| | Weight fiber | 10.0 | 0.00 | 0.00 | 0.00 | 0.00 lb |
| | Equivalent fiber volume | | 0.00 | 0.00 | 0.00 | 0.00 ft3 |
| Cerafiber | Weight % | | 0.0% | 0.0% | 0.0% | 0.0% |
| | Weight fiber | 12.0 | 0.00 | 0.00 | 0.00 | 0.00 lb |
| | Equivalent fiber volume | | 0.00 | 0.00 | 0.00 | 0.00 ft3 |
| | Check % TOTAL | | 100.00% | 100.00% | 100.00% | 100.00% |
| | Check Fiber total | | 30.00 | 30.00 | 30.00 | 30.00 |

| Total Insulation volume | | Break S1 ft3 | Break S2 ft3 | Break S3 ft3 | Break S4 ft3 |
|---|---|---|---|---|---|
| CalSil | Insulation | 126.90 | 152.37 | 113.25 | 91.39 |
| Includes Matinite board | Latent Debris | 0.70 | 0.89 | 0.78 | 1.34 |
| | TOTAL | 127.60 | 153.26 | 114.03 | 92.73 |
| Asbestos | Insulation | 0.00 | 0.00 | 0.00 | 0.00 |
| | Latent Debris | 0.00 | 0.00 | 0.00 | 0.00 |
| | TOTAL | 0.00 | 0.00 | 0.00 | 0.00 |
| Fiberglass | Insulation | 159.73 | 49.77 | 158.80 | 0.63 |
| | Latent Debris | 0.88 | 0.29 | 1.09 | 0.01 |
| | TOTAL | 160.61 | 50.06 | 159.89 | 0.64 |
| Temp-Mat | Insulation | 0.00 | 0.00 | 0.00 | 0.00 |
| | Latent Debris | 0.00 | 0.00 | 0.00 | 0.00 |
| | TOTAL | 0.00 | 0.00 | 0.00 | 0.00 |
| Nukon | Insulation | 1227.23 | 1132.42 | 869.05 | 297.76 |
| | Latent Debris | 6.79 | 6.63 | 5.98 | 4.37 |
| | TOTAL | 1234.02 | 1139.05 | 875.03 | 302.13 |
| Microtherm | Insulation | 0.00 | 0.00 | 0.00 | 0.00 |
| | Latent Debris | 0.00 | 0.00 | 0.00 | 0.00 |
| | TOTAL | 0.00 | 0.00 | 0.00 | 0.00 |
| Mineral Wool | Insulation | 0.00 | 0.00 | 0.00 | 0.00 |
| | Latent Debris | 0.00 | 0.00 | 0.00 | 0.00 |
| | TOTAL | 0.00 | 0.00 | 0.00 | 0.00 |
| Cerafiber | Insulation | 0.00 | 0.00 | 0.00 | 0.00 |
| | Latent Debris | 0.00 | 0.00 | 0.00 | 0.00 |
| | TOTAL | 0.00 | 0.00 | 0.00 | 0.00 |

GSI-191 Aluminum & Chemical Effects Evaluation

| Submerged Outside the Reactor Cavity | Area (ft2) | Wetted Area (ft2) | Weight (lb) |
|---|---|---|---|
| Service Water Piping | 2433.0 | 4866.0 | 547.0 |
| Aluminum Paint | 1365.0 | 2730.0 | 153.0 |
| Aluminum Paint | 107.0 | 214.0 | 3.0 |

| Submerged Inside the Reactor Cavity | Area (ft2) | Wetted Area (ft2) | Weight (lb) |
|---|---|---|---|
| Reactor Vessel | 10688.0 | 21376.0 | 98.0 |
| RV Cavity Walls | 907.0 | 1814.0 | 32.0 |
| Reactor Cavity Cir. Panels | 223.0 | 447.0 | 7.9 |
| RV Insulation Supports | 481.0 | 481.0 | 379.0 |
| Reactor Cavity Wall Supports | 19.8 | 19.8 | 338.0 |
| Reactor Cavity Cir. Panel Supports | 3.9 | 3.9 | 76.0 |
| TOTAL (excluding paint) | | 29,007.70 | 1,477.90 |

| Non-Submerged Outside the Reactor Cavity (Exposed to Containment Spray) | Area (ft2) | Wetted Area (ft2) | Weight (lb) |
|---|---|---|---|
| Primary Coolant System | 11,390.0 | 22,781.0 | 160.0 |
| Primary Coolant Pumps | 19,467.0 | 38,934.0 | 273.0 |
| Pressurizer Surge Line | 3,128.0 | 6,256.0 | 44.0 |
| Pressurizer | 799.0 | 1,597.0 | 28.0 |
| Pressurizer | 3,019.0 | 6,048.0 | 48.0 |
| Service Water Piping | 962.0 | 1,923.0 | 216.0 |
| SIS Piping | 3,271.0 | 6,542.0 | 735.0 |
| MSL Pipe | 1,139.0 | 2,279.0 | 256.0 |
| FW Pipe | 1,613.0 | 3,226.0 | 362.0 |
| Miscellaneous Pipe | 7,805.0 | 15,609.0 | 1792.0 |
| Pressurizer Jacket | 487.0 | 974.0 | 269.0 |
| Pressurizer Jacket | 596.0 | 1,193.0 | 337.0 |
| Pressurizer Supports | 144.0 | 144.0 | 133.0 |
| Component Cooling Fan Blades | 252.0 | 504.0 | 473.0 |
| Light Fixtures | 368.0 | 735.0 | 630.0 |
| Aluminum Paint | 0.0 | 0.0 | 0.0 |
| | | 108,745.0 | 5,756.0 |

| Aluminum Summary | 108,745.0 | |
|---|---|---|
| % Aluminum in Reactor Cavity Available | 100% | |
| | ft2 | lb |
| Thick Aluminum Metal Submerged (sq ft) | 5,370.7 | 1,340.0 |
| Thin Aluminum Metal Submerged (sq ft) | 23,637.0 | 137.9 |
| Total Aluminum in Paint Submerged (sq ft) | 2,944.0 | 156.0 |
| Aluminum Paint Submerged (sq ft) | 2,944.0 | 156.0 |
| Total Aluminum in Paint Submerged (sq ft) | 2,944.0 | 156.0 |
| Thick Aluminum Metal Not-Submerged (sq ft) | 34,726.0 | 5,231.0 |
| Thin Aluminum Metal Not-Submerged (sq ft) | 74,019.0 | 525.0 |
| Aluminum Paint Not-Submerged (sq ft) | 0.0 | 0.0 |
| Aluminum Submerged | 31,951.7 | 1,633.9 |
| Aluminum Not Submerged | 108,745.0 | 5,756.0 |

Chemical_Effects Version 1.1, 8/31/2006

1. Enter the pH and temperature vs. time profiles on the sheet "Time Temp pH input"
   a. Replace the values in red
   b. Addition instructions are provided in the comments associated with the cells in row 1. Place cursor over the red triangles to view.
2. Enter containment materials in the sheet labeled "Materials Input"
   a. For the insulation materials, input the quantities that are wetted by the spray, transported to the sump pool, or are submerged.
   b. Aluminum is separated into two categories: that submerged in the sump pool and that impacted by the spray.
   c. Both the mass and surface area of aluminum should be entered. If the mass is not known, enter a very large number (1,000,000 lbm) for conservatism
3. Change default density values in the sheet labeled "Materials Conversions" if the default estimates are not correct for your plant. Otherwise, no entries are needed.
4. View the results of model in the sheet labeled "Results Table"
   a. Results are given as a function of time
   b. The elemental releases of Ca, Al and Si are given, as well as the masses of precipitates likely to form from them.
5. View a summary of the contribution of each material to the total elemental release in sheet "Releases by Material"
6. View a summary of the contribution of each material to each of the precipitates in the sheet "Precipitate by Material"
7. Detailed information on the release of each material component with time is located in subsequent sheets that need not be examined.

| Time (sec) | min | hr | days | Sump pH | Sump Temp. (°F) | Sump Mixed 1=Yes | Steam or Spray pH | Containment Temp. (°F) | Notes |
|---|---|---|---|---|---|---|---|---|---|
| 10 | 0 | 0 | 0 | 11.54 | 228 | 0 | 5.1 | 280 | RCS blowdown |
| 20 | 0.3 | 0 | 0 | 11.54 | 250 | 0 | 5.1 | 281 | |
| 30 | 0.5 | 0 | 0 | 11.54 | 260 | 0 | 5.1 | 279 | pH values are adjusted to room temperature |
| 60 | 1 | 0 | 0 | 11.54 | 268 | 0 | 5.1 | 276 | |
| 90 | 2 | 0 | 0 | 11.54 | 272 | 0 | 5.1 | 272 | |
| 300 | 5 | 0 | 0 | 11.54 | 277 | 0 | 5.1 | 265 | |
| 600 | 10 | 0 | 0 | 11.54 | 275 | 0 | 5.1 | 255 | |
| 900 | 15 | 0 | 0 | 11.54 | 271 | 0 | 5.1 | 245 | |
| 1200 | 20 | 0 | 0 | 8 | 268 | 0 | 8 | 240 | Switchover to recirc at 20 minutes |
| 1500 | 25 | 0 | 0 | 8 | 261 | 0 | 8 | 220 | |
| 1800 | 30 | 1 | 0 | 8 | 255 | 0 | 8 | 215 | |
| 2700 | 45 | 1 | 0 | 8 | 243 | 0 | 8 | 198 | |
| 3600 | 60 | 1 | 0 | 8 | 239 | 0 | 8 | 216 | |
| 5400 | 90 | 2 | 0 | 8 | 238 | 0 | 8 | 221 | |
| 7200 | 120 | 2 | 0 | 8 | 236 | 0 | 8 | 222 | |
| 14400 | 240 | 4 | 0 | 8 | 231 | 0 | 8 | 220 | |
| 21600 | 360 | 6 | 0 | 8 | 225 | 0 | 8 | 220 | |
| 28800 | 480 | 8 | 0 | 8 | 216 | 0 | 8 | 218 | |
| 36000 | 600 | 10 | 0 | 8 | 210 | 0 | 8 | 212 | |
| 43200 | 720 | 12 | 1 | 8 | 206 | 1 | 8 | 205 | Start Mixing at 12 hours |
| 50400 | 840 | 14 | 1 | 8 | 200 | 1 | 8 | 201 | |
| 57600 | 960 | 16 | 1 | 8 | 196 | 1 | 8 | 195 | |
| 72000 | 1200 | 20 | 1 | 8 | 190 | 1 | 8 | 190 | |
| 86400 | 1440 | 24 | 1 | 8 | 185 | 1 | 8 | 185 | |
| 129600 | 2160 | 36 | 2 | 8 | 175 | 1 | 8 | 175 | |
| 172800 | 2880 | 48 | 2 | 8 | 166 | 1 | 8 | 165 | |
| 259200 | 4320 | 72 | 3 | 8 | 158 | 1 | 8 | 155 | |
| 432000 | 7200 | 120 | 5 | 8 | 158 | 1 | 8 | 150 | |
| 626400 | 10440 | 174 | 7 | 8 | 148 | 1 | 8 | 137 | |
| 864000 | 14400 | 240 | 10 | 8 | 139.7 | 1 | 8 | 126 | |
| 1296000 | 21600 | 360 | 15 | 8 | 134 | 1 | 8 | 116.7 | |
| 1728000 | 28800 | 480 | 20 | 8 | 130.3 | 1 | 8 | 111.75 | |
| 2160000 | 36000 | 600 | 25 | 8 | 122.2 | 1 | 8 | 102.2 | |
| 2592000 | 43200 | 720 | 30 | 8 | 120 | 1 | 8 | 101 | |

Do not enter data below row 35.

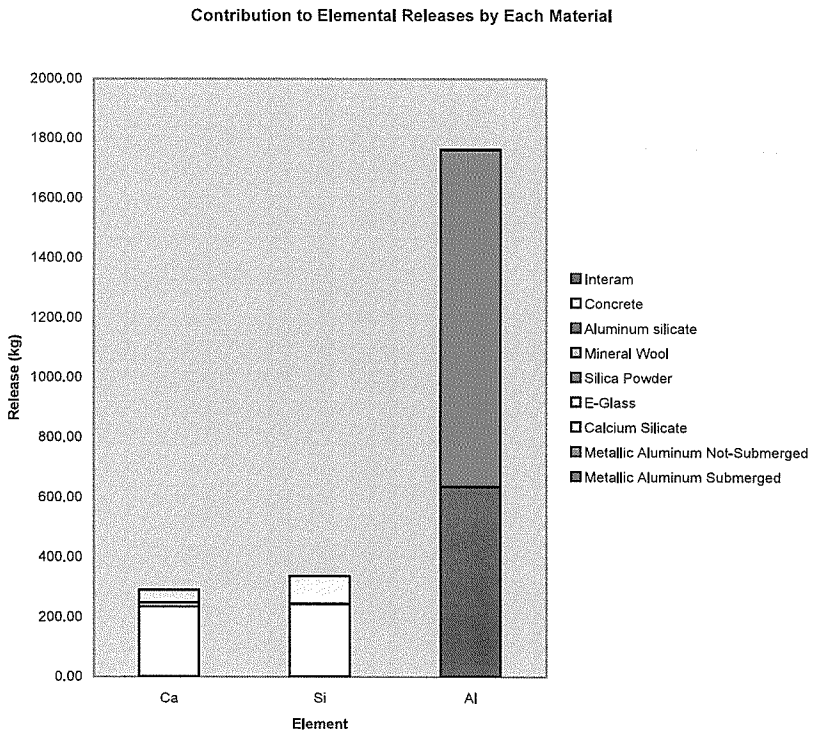
| Class | Material | Amount | Notes |
|---|---|---|---|
| Coolant | Sump Pool Volume (ft3) | 52714.8 | |
| Metallic Aluminum | Aluminum Submerged (sq ft) | 31951.7 | |
| | Aluminum Submerged (lbm) | 1633.9 | |
| | Aluminum Not-Submerged (sq ft) | 108745.0 | |
| | Aluminum Not-Submerged (lbm) | 5756.0 | |
| Calcium Silicate | CalSil Insulation(ft3) | 153.3 | |
| | Asbestos Insulation (ft3) | 0.0 | |
| | Kaylo Insulation (ft3) | 0.0 | |
| | Unibestos Insulation (ft3) | 0.0 | |
| E-glass | Fiberglass Insulation (ft3) | 50.1 | |
| | NUKON (ft3) | 1139.0 | |
| | Temp-Mat (ft3) | 0 | |
| | Thermal Wrap (ft3) | 0 | |
| Silica Powder | Microtherm (ft3) | 0 | |
| | Min-K (ft3) | 0 | |
| Mineral Wool | Min-Wool (ft3) | 0 | |
| | Rock Wool (ft3) | 0 | |
| Aluminum Silicate | Cerablanket (ft3) | 0 | |
| | FiberFrax Durablanket (ft3) | 0 | |
| | Kaowool (ft3) | 0 | |
| | Mat-Ceramic (ft3) | 0 | |
| | Mineral Fiber (ft3) | 0 | |
| | PAROC Mineral Wool (ft3) | 0 | |
| Concrete | Concrete (ft2) | 7.73E+06 | |
| Trisodium Phosphate (TSP) | Trisodium Phosphate Hydrate (lbm) | 11,000 | Flag=0 if no TSP, ≠0 if use TSP as buffering agent |
| Interam | Interam (ft3) | 0 | |

| Class | Material | Amount | Density (lb/ft3) | Mass(kg) | Class total (kg) | Class total (lbm) |
|---|---|---|---|---|---|---|
| Coolant | Sump Pool Volume (ft3) | 52,714.84 | 62.4 | 1,492,064.8 | 1,492,064.8 | 3289406 |
| Metallic Aluminum | Aluminum Submerged (sq ft) | 31,951.70 | | 0.0 | 3,352.0 | |
| | Aluminum Submerged (lbm) | 1,633.90 | | 741.1 | | |
| | Aluminum Not-Submerged (sq ft) | 108,745.00 | | 0.0 | | |
| | Aluminum Not-Submerged (lbm) | 5,756.00 | | 2,610.9 | | |
| Calcium Silicate | CalSil Insulation(ft3) | 153.26 | 14.5 | 1,008.0 | 1,008.0 | |
| | Asbestos Insulation (ft3) | 0.00 | 14.5 | 0.0 | | |
| | Kaylo Insulation (ft3) | 0.00 | 14.5 | 0.0 | | |
| | Unibestos Insulation (ft3) | 0.00 | 14.5 | 0.0 | | |
| E-glass | Fiberglass Insulation (ft3) | 50.06 | 4 | 90.8 | 1,330.8 | |
| | NUKON (ft3) | 1,139.05 | 2.4 | 1,240.0 | | |
| | Temp-Mat (ft3) | 0.00 | 4 | 0.0 | | |
| | Thermal Wrap (ft3) | 0.00 | 16 | 0.0 | | |
| Silica Powder | Microtherm (ft3) | 0.00 | 4 | 0.0 | 0.0 | |
| | Min-K (ft3) | 0.00 | 4 | 0.0 | | |
| Mineral Wool | Min-Wool (ft3) | 0.00 | 10 | 0.0 | 0.0 | |
| | Rock Wool (ft3) | 0.00 | 10 | 0.0 | | |
| Aluminum Silicate | Cerablanket ($ft^3$) | 0.00 | 12 | 0.0 | 0.0 | |
| | FiberFrax Durablanket (ft3) | 0.00 | 12 | 0.0 | | |
| | Kaowool (ft3) | 0.00 | 12 | 0.0 | | |
| | Mat-Ceramic (ft3) | 0.00 | 12 | 0.0 | | |
| | Mineral Fiber (ft3) | 0.00 | 21 | 0.0 | | |
| | PAROC Mineral Wool (ft3) | 0.00 | 21 | 0.0 | | |
| Concrete | Concrete (ft2) | 7,726,945.66 | | 77.7 | 77.7 | |
| Interam | Interam (ft3) | 0.00 | 54 | 0.0 | 0.0 | |

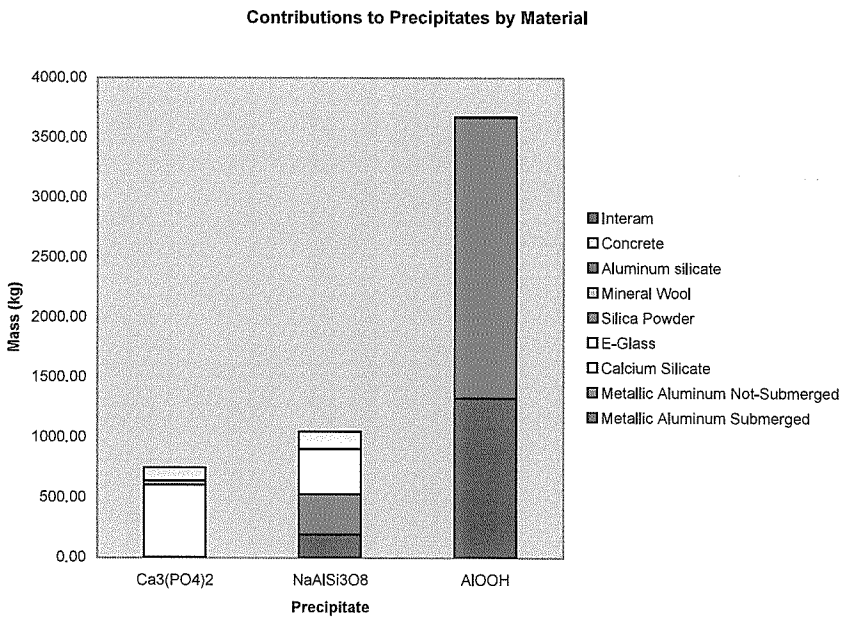
| Interval Duration (min) | Start of Interval (hrs) | End of Interval (hrs) | Average Interval pH | Average Temp (F) | Ca Release (kg) | Si Release (kg) | Al Release (kg) | $NaAlSi_3O_8$ Precipitate (kg) | AlOOH Precipitate (kg) | $Ca_3(PO_4)_2$ Precipitate (kg) |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.2 | 0.00 | 0.0 | 11.54 | 239 | 0.0082 | 0.1375 | 1.1213 | 0.428 | 2.392 | 0.021 |
| 0.2 | 0.01 | 0.0 | 11.54 | 255 | 0.02 | 0.33 | 2.61 | 1.0 | 5.6 | 0.04 |
| 0.5 | 0.01 | 0.0 | 11.54 | 264 | 0.05 | 1.02 | 7.82 | 3.2 | 16.6 | 0.12 |
| 0.5 | 0.02 | 0.0 | 11.54 | 270 | 0.08 | 1.79 | 13.55 | 5.6 | 28.8 | 0.20 |
| 3.5 | 0.03 | 0.1 | 11.54 | 274.5 | 0.29 | 7.71 | 56.35 | 24.0 | 119.6 | 0.76 |
| 5.0 | 0.08 | 0.2 | 11.54 | 276 | 0.61 | 16.35 | 118.20 | 50.9 | 250.8 | 1.56 |
| 5.0 | 0.17 | 0.3 | 11.54 | 273 | 0.91 | 24.43 | 176.12 | 76.0 | 373.6 | 2.35 |
| 5.0 | 0.25 | 0.3 | 9.77 | 269.5 | 1.19 | 28.63 | 186.35 | 89.0 | 393.3 | 3.08 |
| 5.0 | 0.33 | 0.4 | 8 | 264.5 | 1.48 | 30.98 | 191.19 | 96.4 | 402.4 | 3.81 |
| 5.0 | 0.42 | 0.5 | 8 | 258 | 1.75 | 33.04 | 194.87 | 102.8 | 409.1 | 4.51 |
| 15.0 | 0.50 | 0.8 | 8 | 249 | 2.53 | 38.17 | 203.18 | 118.7 | 423.9 | 6.54 |
| 15.0 | 0.75 | 1.0 | 8 | 241 | 3.29 | 42.45 | 210.72 | 132.0 | 437.6 | 8.49 |
| 30.0 | 1.00 | 1.5 | 8 | 238.5 | 4.77 | 50.49 | 228.83 | 157.0 | 472.1 | 12.30 |
| 30.0 | 1.50 | 2.0 | 8 | 237 | 6.19 | 58.10 | 247.76 | 180.7 | 508.7 | 15.98 |
| 120.0 | 2.00 | 4.0 | 8 | 233.5 | 11.68 | 85.67 | 320.42 | 266.4 | 650.5 | 30.14 |
| 120.0 | 4.00 | 6.0 | 8 | 228 | 16.48 | 107.96 | 388.36 | 335.8 | 785.5 | 42.51 |
| 120.0 | 6.00 | 8.0 | 8 | 220.5 | 20.76 | 125.09 | 451.16 | 389.0 | 912.7 | 53.57 |
| 120.0 | 8.00 | 10.0 | 8 | 213 | 24.72 | 138.18 | 505.62 | 429.7 | 1024.3 | 63.77 |
| 120.0 | 10.00 | 12.0 | 8 | 208 | 28.43 | 148.88 | 550.75 | 463.0 | 1116.9 | 73.34 |
| 120.0 | 12.00 | 14.0 | 8 | 203 | 30.12 | 152.39 | 588.86 | 473.9 | 1199.0 | 77.71 |
| 120.0 | 14.00 | 16.0 | 8 | 198 | 31.97 | 155.61 | 621.36 | 483.9 | 1268.9 | 82.49 |
| 240.0 | 16.00 | 20.0 | 8 | 193 | 36.04 | 161.51 | 675.90 | 502.3 | 1385.8 | 92.98 |
| 240.0 | 20.00 | 24.0 | 8 | 187.5 | 40.35 | 166.80 | 721.89 | 518.8 | 1484.1 | 104.09 |
| 720.0 | 24.00 | 36.0 | 8 | 180 | 55.17 | 180.70 | 828.63 | 562.0 | 1711.2 | 142.35 |
| 720.0 | 36.00 | 48.0 | 8 | 170.5 | 70.15 | 192.01 | 903.79 | 597.2 | 1870.0 | 180.98 |
| 1440.0 | 48.00 | 72.0 | 8 | 162 | 101.59 | 210.93 | 1008.96 | 656.0 | 2090.1 | 262.09 |
| 2880.0 | 72.00 | 120.0 | 8 | 158 | 134.97 | 243.78 | 1172.18 | 758.2 | 2429.1 | 348.22 |
| 3240.0 | 120.00 | 174.0 | 8 | 153 | 142.85 | 273.50 | 1306.62 | 850.6 | 2706.4 | 368.56 |
| 3960.0 | 174.00 | 240.0 | 8 | 143.85 | 192.59 | 301.60 | 1410.62 | 938.0 | 2917.3 | 496.88 |
| 7200.0 | 240.00 | 360.0 | 8 | 136.85 | 213.73 | 336.92 | 1538.63 | 1047.8 | 3176.4 | 551.41 |
| 7200.0 | 360.00 | 480.0 | 8 | 132.15 | 238.74 | 336.92 | 1635.74 | 1047.8 | 3392.0 | 615.95 |
| 7200.0 | 480.00 | 600.0 | 8 | 126.25 | 287.00 | 336.92 | 1707.27 | 1047.8 | 3550.8 | 740.45 |
| 7200.0 | 600.00 | 720.0 | 8 | 121.1 | 290.19 | 336.92 | 1763.19 | 1047.8 | 3674.9 | 748.69 |

Releases in kg

| Material Class | Ca | Si | Al |
|---|---|---|---|
| Metallic Aluminum Submerged | 0.00 | 0.00 | 633.95 |
| Metallic Aluminum Not-Submerged | 0.00 | 0.00 | 1125.25 |
| Calcium Silicate | 233.60 | 242.93 | 0.00 |
| E-Glass | 13.87 | 92.57 | 3.52 |
| Silica Powder | 0.00 | 0.00 | 0.00 |
| Mineral Wool | 0.00 | 0.00 | 0.00 |
| Aluminum silicate | 0.00 | 0.00 | 0.00 |
| Concrete | 42.72 | 1.42 | 0.47 |
| Interam | 0.00 | 0.00 | 0.00 |



| | Precipitate (kg) | | |
|---|---|---|---|
| Material Class | $Ca_3(PO_4)_2$ | $NaAlSi_3O_8$ | AlOOH |
| Metallic Aluminum Submerged | 0.00 | 188.37 | 1321.31 |
| Metallic Aluminum Not-Submerged | 0.00 | 334.35 | 2345.30 |
| Calcium Silicate | 602.69 | 377.76 | 0.00 |
| E-Glass | 35.77 | 144.99 | 7.33 |
| Silica Powder | 0.00 | 0.00 | 0.00 |
| Mineral Wool | 0.00 | 0.00 | 0.00 |
| Aluminum silicate | 0.00 | 0.00 | 0.00 |
| Concrete | 110.23 | 2.35 | 0.98 |
| Interam | 0.00 | 0.00 | 0.00 |



| Constants | Value |
|---|---|
| Mass Material (kg) | 1008.0058 |
| Mass Element (kg) | 347.762 |
| a | -2.4063 |
| b | -0.17595 |
| c | 1.967023 |
| d | -2.35331 |
| e | -0.15044 |
| f | 1.820687 |

| Interval Duration (min) | Start of Interval (hrs) | End of Interval (hrs) | Ave Interval pH | Ave Temp (F) | 1000/T ($K^{-1}$) | Ca All Mat | Ca this Mat Only | Ca (ppm) | K | k | R | Positive release rate (mg/kg- | interval pred release (kg) | Amount above start Mass | interval kg Ca released | Integral kg Ca released |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.2 | 0.00 | 0.01 | 11.54 | 239 | 2.576323586 | 0 | 0 | 0.00 | 4.27 | 3.99 | 3.99 | 3.99 | 0.001 | -347.8 | 0.001 | 0.0007 |
| 0.2 | 0.01 | 0.0 | 11.54 | 255 | 2.518644969 | 0.01 | 0.00 | 0.00 | 3.29 | 3.14 | 3.13 | 3.13 | 0.001 | -347.8 | 0.001 | 0.00 |
| 0.5 | 0.01 | 0.0 | 11.54 | 264 | 2.487321569 | 0.01 | 0.00 | 0.00 | 2.86 | 2.75 | 2.75 | 2.75 | 0.001 | -347.8 | 0.001 | 0.00 |
| 0.5 | 0.02 | 0.0 | 11.54 | 270 | 2.466868584 | 0.03 | 0.00 | 0.00 | 2.60 | 2.52 | 2.52 | 2.52 | 0.001 | -347.8 | 0.001 | 0.00 |
| 3.5 | 0.03 | 0.1 | 11.54 | 274.5 | 2.451748233 | 0.05 | 0.00 | 0.00 | 2.43 | 2.37 | 2.37 | 2.37 | 0.008 | -347.7 | 0.008 | 0.01 |
| 5.0 | 0.08 | 0.2 | 11.54 | 276 | 2.446749222 | 0.20 | 0.01 | 0.01 | 2.38 | 2.32 | 2.31 | 2.31 | 0.012 | -347.7 | 0.012 | 0.02 |
| 5.0 | 0.17 | 0.3 | 11.54 | 273 | 2.456767713 | 0.41 | 0.02 | 0.02 | 2.49 | 2.42 | 2.40 | 2.40 | 0.012 | -347.7 | 0.012 | 0.04 |
| 5.0 | 0.25 | 0.3 | 9.77 | 269.5 | 2.468560144 | 0.61 | 0.02 | 0.02 | 5.38 | 4.69 | 4.67 | 4.67 | 0.024 | -347.7 | 0.024 | 0.06 |
| 5.0 | 0.33 | 0.4 | 8 | 264.5 | 2.485604209 | 0.80 | 0.04 | 0.04 | 11.89 | 9.30 | 9.27 | 9.27 | 0.047 | -347.7 | 0.047 | 0.11 |
| 5.0 | 0.42 | 0.5 | 8 | 258 | 2.508116544 | 0.99 | 0.07 | 0.07 | 13.17 | 10.23 | 10.17 | 10.17 | 0.051 | -347.6 | 0.051 | 0.16 |
| 15.0 | 0.50 | 0.8 | 8 | 249 | 2.539969238 | 1.17 | 0.11 | 0.11 | 15.22 | 11.69 | 11.60 | 11.60 | 0.175 | -347.4 | 0.175 | 0.33 |
| 15.0 | 0.75 | 1.0 | 8 | 241 | 2.5689697 | 1.70 | 0.22 | 0.22 | 17.35 | 13.20 | 13.03 | 13.03 | 0.197 | -347.2 | 0.197 | 0.53 |
| 30.0 | 1.00 | 1.5 | 8 | 238.5 | 2.578168641 | 2.21 | 0.36 | 0.36 | 18.09 | 13.72 | 13.45 | 13.45 | 0.407 | -346.8 | 0.407 | 0.94 |
| 30.0 | 1.50 | 2.0 | 8 | 237 | 2.583719695 | 3.20 | 0.63 | 0.63 | 18.55 | 14.04 | 13.56 | 13.56 | 0.410 | -346.4 | 0.410 | 1.35 |
| 120.0 | 2.00 | 4.0 | 8 | 233.5 | 2.596765584 | 4.15 | 0.90 | 0.90 | 19.68 | 14.83 | 14.15 | 14.15 | 1.711 | -344.7 | 1.711 | 3.06 |
| 120.0 | 4.00 | 6.0 | 8 | 228 | 2.617534573 | 7.83 | 2.05 | 2.05 | 21.62 | 16.18 | 14.64 | 14.64 | 1.771 | -342.9 | 1.771 | 4.83 |
| 120.0 | 6.00 | 8.0 | 8 | 220.5 | 2.646397224 | 11.04 | 3.24 | 3.24 | 24.64 | 18.26 | 15.86 | 15.86 | 1.918 | -341.0 | 1.918 | 6.75 |
| 120.0 | 8.00 | 10.0 | 8 | 213 | 2.675903489 | 13.92 | 4.52 | 4.52 | 28.16 | 20.66 | 17.34 | 17.34 | 2.098 | -338.9 | 2.098 | 8.85 |
| 120.0 | 10.00 | 12.0 | 8 | 208 | 2.695942606 | 16.57 | 5.93 | 5.93 | 30.84 | 22.47 | 18.15 | 18.15 | 2.196 | -336.7 | 2.196 | 11.04 |
| 120.0 | 12.00 | 14.0 | 8 | 203 | 2.716284123 | 19.05 | 7.40 | 19.05 | 33.81 | 24.47 | 10.68 | 10.68 | 1.292 | -335.4 | 1.292 | 12.33 |
| 120.0 | 14.00 | 16.0 | 8 | 198 | 2.736934937 | 20.19 | 8.27 | 20.19 | 37.13 | 26.69 | 12.18 | 12.18 | 1.473 | -334.0 | 1.473 | 13.81 |
| 240.0 | 16.00 | 20.0 | 8 | 193 | 2.757902156 | 21.43 | 9.25 | 21.43 | 40.83 | 29.14 | 13.84 | 13.84 | 3.349 | -330.6 | 3.349 | 17.16 |
| 240.0 | 20.00 | 24.0 | 8 | 187.5 | 2.781340297 | 24.15 | 11.50 | 24.15 | 45.40 | 32.15 | 15.04 | 15.04 | 3.639 | -327.0 | 3.639 | 20.79 |
| 720.0 | 24.00 | 36.0 | 8 | 180 | 2.813950943 | 27.04 | 13.94 | 27.04 | 52.63 | 36.85 | 17.92 | 17.92 | 13.004 | -314.0 | 13.004 | 33.80 |
| 720.0 | 36.00 | 48.0 | 8 | 170.5 | 2.85637209 | 36.98 | 22.65 | 36.98 | 63.77 | 44.03 | 18.50 | 18.50 | 13.426 | -300.5 | 13.426 | 47.23 |
| 1440.0 | 48.00 | 72.0 | 8 | 162 | 2.895426834 | 47.01 | 31.65 | 47.01 | 76.12 | 51.86 | 19.83 | 19.83 | 28.782 | -271.8 | 28.782 | 76.01 |
| 2880.0 | 72.00 | 120.0 | 8 | 158 | 2.914177473 | 68.08 | 50.94 | 68.08 | 82.86 | 56.10 | 10.01 | 10.01 | 29.046 | -242.7 | 29.046 | 105.05 |
| 3240.0 | 120.00 | 174.0 | 8 | 153 | 2.937960076 | 90.46 | 70.41 | 90.46 | 92.29 | 61.98 | 1.23 | 1.23 | 4.009 | -238.7 | 4.009 | 109.06 |
| 3960.0 | 174.00 | 240.0 | 8 | 143.85 | 2.982502651 | 95.74 | 73.09 | 95.74 | 112.91 | 74.71 | 11.36 | 11.36 | 45.355 | -193.3 | 45.355 | 154.42 |
| 7200.0 | 240.00 | 360.0 | 8 | 136.85 | 3.017501509 | 129.07 | 103.49 | 129.07 | 132.31 | 86.52 | 2.12 | 2.12 | 15.356 | -178.0 | 15.356 | 169.77 |
| 7200.0 | 360.00 | 480.0 | 8 | 132.15 | 3.04146531 | 143.24 | 113.78 | 143.24 | 147.48 | 95.66 | 2.75 | 2.75 | 19.948 | -158.0 | 19.948 | 189.72 |
| 7200.0 | 480.00 | 600.0 | 8 | 126.25 | 3.072091753 | 160.01 | 127.15 | 160.01 | 169.42 | 108.76 | 6.05 | 6.05 | 43.879 | -114.2 | 43.879 | 233.60 |
| 7200.0 | 600.00 | 720.0 | 8 | 121.1 | 3.099333643 | 192.35 | 156.56 | 192.35 | 191.67 | 121.92 | -0.43 | 0.00 | 0.000 | -114.2 | 0.000 | 233.60 |

| Constants | Value | Interval Duration (min) | Start of Interval (hrs) | End of Interval (hrs) | Ave Interval pH | Ave Temp (F) | 1000/T ($K^{-1}$) | Si All Mat | Si this Mat Only | Si (ppm) | K | k | R | Positive release rate (mg/kg- | interval pred release (kg) | Amount above start Mass | interval kg Si released | Integral kg Si released |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mass Material (kg) | 1008.0058 | 0.2 | 0.00 | 0.01 | 11.54 | 239 | 2.576323586 | 0 | 0 | 0.00 | 220.00 | 74.84 | 74.84 | 74.84 | 0.013 | -242.9 | 0.013 | 0.0126 |
| Mass Element (kg) | 242.92939 | 0.2 | 0.01 | 0.0 | 11.54 | 255 | 2.518644969 | 0.09 | 0.01 | 0.01 | 200.03 | 97.89 | 97.89 | 97.89 | 0.016 | -242.9 | 0.016 | 0.0 |
| a | 0.12735 | 0.5 | 0.01 | 0.0 | 11.54 | 264 | 2.487321569 | 0.22 | 0.02 | 0.02 | 189.95 | 113.26 | 113.25 | 113.25 | 0.057 | -242.8 | 0.057 | 0.1 |
| b | 0.03197 | 0.5 | 0.02 | 0.0 | 11.54 | 270 | 2.466868584 | 0.68 | 0.06 | 0.06 | 183.65 | 124.58 | 124.54 | 124.54 | 0.063 | -242.8 | 0.063 | 0.1 |
| c | 0.71658 | 3.5 | 0.03 | 0.1 | 11.54 | 274.5 | 2.451748233 | 1.20 | 0.10 | 0.10 | 179.13 | 133.67 | 133.59 | 133.59 | 0.471 | -242.3 | 0.471 | 0.6 |
| d | 7.5547 | 5.0 | 0.08 | 0.2 | 11.54 | 276 | 2.446749222 | 5.17 | 0.42 | 0.42 | 177.65 | 136.81 | 136.49 | 136.49 | 0.688 | -241.6 | 0.688 | 1.3 |
| e | -0.04084 | 5.0 | 0.17 | 0.3 | 11.54 | 273 | 2.456767713 | 10.96 | 0.88 | 0.88 | 180.62 | 130.58 | 129.94 | 129.94 | 0.655 | -241.0 | 0.655 | 2.0 |
| f | -2.02198 | 5.0 | 0.25 | 0.3 | 9.77 | 269.5 | 2.468560144 | 16.37 | 1.32 | 1.32 | 161.67 | 145.99 | 144.80 | 144.80 | 0.730 | -240.2 | 0.730 | 2.7 |
| | | 5.0 | 0.33 | 0.4 | 8 | 264.5 | 2.485604209 | 19.19 | 1.80 | 1.80 | 145.96 | 159.27 | 157.30 | 157.30 | 0.793 | -239.4 | 0.793 | 3.5 |
| | | 5.0 | 0.42 | 0.5 | 8 | 258 | 2.508116544 | 20.77 | 2.34 | 2.34 | 151.49 | 143.42 | 141.21 | 141.21 | 0.712 | -238.7 | 0.712 | 4.2 |
| | | 15.0 | 0.50 | 0.8 | 8 | 249 | 2.539969238 | 22.15 | 2.81 | 2.81 | 159.66 | 123.66 | 121.48 | 121.48 | 1.837 | -236.9 | 1.837 | 6.0 |
| | | 15.0 | 0.75 | 1.0 | 8 | 241 | 2.5689697 | 25.58 | 4.04 | 4.04 | 167.49 | 108.04 | 105.43 | 105.43 | 1.594 | -235.3 | 1.594 | 7.6 |
| | | 30.0 | 1.00 | 1.5 | 8 | 238.5 | 2.578168641 | 28.45 | 5.11 | 5.11 | 170.05 | 103.51 | 100.40 | 100.40 | 3.036 | -232.3 | 3.036 | 10.7 |
| | | 30.0 | 1.50 | 2.0 | 8 | 237 | 2.583719695 | 33.84 | 7.15 | 7.15 | 171.61 | 100.87 | 96.67 | 96.67 | 2.923 | -229.3 | 2.923 | 13.6 |
| | | 120.0 | 2.00 | 4.0 | 8 | 233.5 | 2.596765584 | 38.94 | 9.11 | 9.11 | 175.35 | 94.92 | 89.99 | 89.99 | 10.886 | -218.5 | 10.886 | 24.5 |
| | | 120.0 | 4.00 | 6.0 | 8 | 228 | 2.617534573 | 57.42 | 16.40 | 16.40 | 181.46 | 86.17 | 78.39 | 78.39 | 9.482 | -209.0 | 9.482 | 34.0 |
| | | 120.0 | 6.00 | 8.0 | 8 | 220.5 | 2.646397224 | 72.36 | 22.76 | 22.76 | 190.31 | 75.34 | 66.33 | 66.33 | 8.023 | -201.0 | 8.023 | 42.0 |
| | | 120.0 | 8.00 | 10.0 | 8 | 213 | 2.675903489 | 83.83 | 28.13 | 28.13 | 199.81 | 65.67 | 56.42 | 56.42 | 6.825 | -194.1 | 6.825 | 48.8 |
| | | 120.0 | 10.00 | 12.0 | 8 | 208 | 2.695942606 | 92.61 | 32.71 | 32.71 | 206.52 | 59.82 | 50.35 | 50.35 | 6.090 | -188.0 | 6.090 | 54.9 |
| | | 120.0 | 12.00 | 14.0 | 8 | 203 | 2.716284123 | 99.78 | 36.79 | 99.78 | 213.57 | 54.41 | 28.99 | 28.99 | 3.507 | -184.5 | 3.507 | 58.4 |
| | | 120.0 | 14.00 | 16.0 | 8 | 198 | 2.736934937 | 102.13 | 39.14 | 102.13 | 220.97 | 49.43 | 26.58 | 26.58 | 3.215 | -181.3 | 3.215 | 61.6 |
| | | 240.0 | 16.00 | 20.0 | 8 | 193 | 2.757902156 | 104.29 | 41.29 | 104.29 | 228.75 | 44.83 | 24.39 | 24.39 | 5.901 | -175.4 | 5.901 | 67.5 |
| | | 240.0 | 20.00 | 24.0 | 8 | 187.5 | 2.781340297 | 108.24 | 45.25 | 108.24 | 237.77 | 40.19 | 21.90 | 21.90 | 5.297 | -170.1 | 5.297 | 72.8 |
| | | 720.0 | 24.00 | 36.0 | 8 | 180 | 2.813950943 | 111.79 | 48.80 | 111.79 | 250.92 | 34.53 | 19.15 | 19.15 | 13.896 | -156.2 | 13.896 | 86.7 |
| | | 720.0 | 36.00 | 48.0 | 8 | 170.5 | 2.85637209 | 121.11 | 58.11 | 121.11 | 269.11 | 28.34 | 15.59 | 15.59 | 11.313 | -144.9 | 11.313 | 98.0 |
| | | 1440.0 | 48.00 | 72.0 | 8 | 162 | 2.895426834 | 128.69 | 65.70 | 128.69 | 287.02 | 23.63 | 13.04 | 13.04 | 18.922 | -126.0 | 18.922 | 116.9 |
| | | 2880.0 | 72.00 | 120.0 | 8 | 158 | 2.914177473 | 141.37 | 78.38 | 141.37 | 296.04 | 21.66 | 11.31 | 11.31 | 32.846 | -93.1 | 32.846 | 149.8 |
| | | 3240.0 | 120.00 | 174.0 | 8 | 153 | 2.937960076 | 163.38 | 100.39 | 163.38 | 307.89 | 19.39 | 9.10 | 9.10 | 29.715 | -63.4 | 29.715 | 179.5 |
| | | 3960.0 | 174.00 | 240.0 | 8 | 143.85 | 2.982502651 | 183.30 | 120.31 | 183.30 | 331.37 | 15.76 | 7.04 | 7.04 | 28.101 | -35.3 | 28.101 | 207.6 |
| | | 7200.0 | 240.00 | 360.0 | 8 | 136.85 | 3.017501509 | 202.13 | 139.14 | 202.13 | 351.07 | 13.39 | 5.68 | 5.68 | 41.215 | 5.9 | 35.323 | 242.9 |
| | | 7200.0 | 360.00 | 480.0 | 8 | 132.15 | 3.04146531 | 225.81 | 162.81 | 225.81 | 365.23 | 11.97 | 4.57 | 4.57 | 33.171 | 33.2 | 0.000 | 242.9 |
| | | 7200.0 | 480.00 | 600.0 | 8 | 126.25 | 3.072091753 | 225.81 | 162.81 | 225.81 | 384.16 | 10.38 | 4.28 | 4.28 | 31.058 | 31.1 | 0.000 | 242.9 |
| | | 7200.0 | 600.00 | 720.0 | 8 | 121.1 | 3.099333643 | 225.81 | 162.81 | 225.81 | 401.82 | 9.15 | 4.01 | 4.01 | 29.073 | 29.1 | 0.000 | 242.9 |

| Constants | Value | Interval Duration (min) | Start of Interval (hrs) | End of Interval (hrs) | Ave Interval pH | Ave Temp (F) | 1000/T ($K^{-1}$) | Ca All Mat | Ca this Mat Only | Ca (ppm) | K | k | R | Positive release rate (mg/kg- | interval pred release (kg) | Amount above start Mass | interval kg Ca released | Integral kg Ca released |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mass Material (kg) | 77.717619 | 0.2 | 0.00 | 0.01 | 11.54 | 239 | 2.576323586 | 0 | 0 | 0.000 | 59.70 | 39.96 | 39.96 | 39.96 | 0.001 | -1000000 | 0.001 | 0.001 |
| Mass Element (kg) | 1000000 | 0.2 | 0.01 | 0.0 | 11.54 | 255 | 2.518644969 | 0.01 | 0.00 | 0.000 | 52.59 | 46.30 | 46.30 | 46.30 | 0.001 | -1000000 | 0.001 | 0.001 |
| a | -0.15969 | 0.5 | 0.01 | 0.0 | 11.54 | 264 | 2.487321569 | 0.01 | 0.00 | 0.001 | 49.09 | 50.15 | 50.15 | 50.15 | 0.002 | -1000000 | 0.002 | 0.003 |
| b | -0.04542 | 0.5 | 0.02 | 0.0 | 11.54 | 270 | 2.466868584 | 0.03 | 0.00 | 0.002 | 46.93 | 52.83 | 52.83 | 52.83 | 0.002 | -1000000 | 0.002 | 0.005 |
| c | 0.95477 | 3.5 | 0.03 | 0.1 | 11.54 | 274.5 | 2.451748233 | 0.05 | 0.00 | 0.003 | 45.40 | 54.91 | 54.91 | 54.91 | 0.015 | -1000000 | 0.015 | 0.020 |
| d | 5.31705 | 5.0 | 0.08 | 0.2 | 11.54 | 276 | 2.446749222 | 0.20 | 0.01 | 0.013 | 44.90 | 55.62 | 55.60 | 55.60 | 0.022 | -1000000 | 0.022 | 0.042 |
| e | -0.07459 | 5.0 | 0.17 | 0.3 | 11.54 | 273 | 2.456767713 | 0.41 | 0.03 | 0.028 | 45.90 | 54.21 | 54.18 | 54.18 | 0.021 | -1000000 | 0.021 | 0.063 |
| f | -1.10803 | 5.0 | 0.25 | 0.3 | 9.77 | 269.5 | 2.468560144 | 0.61 | 0.04 | 0.042 | 56.68 | 71.30 | 71.24 | 71.24 | 0.028 | -1000000 | 0.028 | 0.090 |
| | | 5.0 | 0.33 | 0.4 | 8 | 264.5 | 2.485604209 | 0.80 | 0.06 | 0.061 | 70.82 | 92.51 | 92.43 | 92.43 | 0.036 | -1000000 | 0.036 | 0.126 |
| | | 5.0 | 0.42 | 0.5 | 8 | 258 | 2.508116544 | 0.99 | 0.08 | 0.085 | 74.41 | 87.35 | 87.25 | 87.25 | 0.034 | -1000000 | 0.034 | 0.160 |
| | | 15.0 | 0.50 | 0.8 | 8 | 249 | 2.539969238 | 1.17 | 0.11 | 0.107 | 79.81 | 80.53 | 80.42 | 80.42 | 0.094 | -1000000 | 0.094 | 0.254 |
| | | 15.0 | 0.75 | 1.0 | 8 | 241 | 2.5689697 | 1.70 | 0.17 | 0.170 | 85.06 | 74.79 | 74.64 | 74.64 | 0.087 | -1000000 | 0.087 | 0.341 |
| Note= Large mass of element us | | 30.0 | 1.00 | 1.5 | 8 | 238.5 | 2.578168641 | 2.21 | 0.23 | 0.229 | 86.80 | 73.05 | 72.86 | 72.86 | 0.170 | -999999 | 0.170 | 0.511 |
| because no limit to concrete assu | | 30.0 | 1.50 | 2.0 | 8 | 237 | 2.583719695 | 3.20 | 0.34 | 0.342 | 87.86 | 72.03 | 71.75 | 71.75 | 0.167 | -999999 | 0.167 | 0.678 |
| mass is an exposed surface. | | 120.0 | 2.00 | 4.0 | 8 | 233.5 | 2.596765584 | 4.15 | 0.45 | 0.454 | 90.42 | 69.67 | 69.32 | 69.32 | 0.646 | -999999 | 0.646 | 1.325 |
| If concrete in latent debris is bein | | 120.0 | 4.00 | 6.0 | 8 | 228 | 2.617534573 | 7.83 | 0.89 | 0.888 | 94.64 | 66.07 | 65.45 | 65.45 | 0.610 | -999998 | 0.610 | 1.935 |
| included, a fraction of B2 should | | 120.0 | 6.00 | 8.0 | 8 | 220.5 | 2.646397224 | 11.04 | 1.30 | 1.297 | 100.84 | 61.38 | 60.59 | 60.59 | 0.565 | -999997 | 0.565 | 2.500 |
| used. | | 120.0 | 8.00 | 10.0 | 8 | 213 | 2.675903489 | 13.92 | 1.68 | 1.676 | 107.60 | 56.93 | 56.04 | 56.04 | 0.523 | -999997 | 0.523 | 3.023 |
| | | 120.0 | 10.00 | 12.0 | 8 | 208 | 2.695942606 | 16.57 | 2.03 | 2.026 | 112.45 | 54.09 | 53.12 | 53.12 | 0.495 | -999996 | 0.495 | 3.518 |
| | | 120.0 | 12.00 | 14.0 | 8 | 203 | 2.716284123 | 19.05 | 2.36 | 19.051 | 117.59 | 51.36 | 43.04 | 43.04 | 0.401 | -999996 | 0.401 | 3.920 |
| | | 120.0 | 14.00 | 16.0 | 8 | 198 | 2.736934937 | 20.19 | 2.63 | 20.186 | 123.05 | 48.72 | 40.73 | 40.73 | 0.380 | -999996 | 0.380 | 4.299 |
| | | 240.0 | 16.00 | 20.0 | 8 | 193 | 2.757902156 | 21.43 | 2.88 | 21.428 | 128.86 | 46.18 | 38.50 | 38.50 | 0.718 | -999995 | 0.718 | 5.018 |
| | | 240.0 | 20.00 | 24.0 | 8 | 187.5 | 2.781340297 | 24.15 | 3.36 | 24.154 | 135.67 | 43.50 | 35.76 | 35.76 | 0.667 | -999994 | 0.667 | 5.685 |
| | | 720.0 | 24.00 | 36.0 | 8 | 180 | 2.813950943 | 27.04 | 3.81 | 27.040 | 145.76 | 40.03 | 32.60 | 32.60 | 1.824 | -999992 | 1.824 | 7.509 |
| | | 720.0 | 36.00 | 48.0 | 8 | 170.5 | 2.85637209 | 36.98 | 5.03 | 36.979 | 160.00 | 35.92 | 27.62 | 27.62 | 1.546 | -999991 | 1.546 | 9.055 |
| | | 1440.0 | 48.00 | 72.0 | 8 | 162 | 2.895426834 | 47.01 | 6.07 | 47.013 | 174.35 | 32.52 | 23.75 | 23.75 | 2.658 | -999988 | 2.658 | 11.712 |
| | | 2880.0 | 72.00 | 120.0 | 8 | 158 | 2.914177473 | 68.08 | 7.85 | 68.084 | 181.69 | 31.00 | 19.38 | 19.38 | 4.338 | -999984 | 4.338 | 16.051 |
| | | 3240.0 | 120.00 | 174.0 | 8 | 153 | 2.937960076 | 90.46 | 10.76 | 90.458 | 191.44 | 29.17 | 15.39 | 15.39 | 3.875 | -999980 | 3.875 | 19.925 |
| | | 3960.0 | 174.00 | 240.0 | 8 | 143.85 | 2.982502651 | 95.74 | 13.35 | 95.742 | 211.13 | 26.04 | 14.23 | 14.23 | 4.380 | -999976 | 4.380 | 24.305 |
| | | 7200.0 | 240.00 | 360.0 | 8 | 136.85 | 3.017501509 | 129.07 | 16.29 | 129.075 | 228.02 | 23.81 | 10.33 | 10.33 | 5.783 | -999970 | 5.783 | 30.088 |
| | | 7200.0 | 360.00 | 480.0 | 8 | 132.15 | 3.04146531 | 143.24 | 20.17 | 143.242 | 240.35 | 22.40 | 9.05 | 9.05 | 5.065 | -999965 | 5.065 | 35.153 |
| | | 7200.0 | 480.00 | 600.0 | 8 | 126.25 | 3.072091753 | 160.01 | 23.56 | 160.006 | 257.09 | 20.72 | 7.82 | 7.82 | 4.378 | -999960 | 4.378 | 39.531 |
| | | 7200.0 | 600.00 | 720.0 | 8 | 121.1 | 3.099333643 | 192.35 | 26.49 | 192.349 | 272.96 | 19.33 | 5.71 | 5.71 | 3.194 | -999957 | 3.194 | 42.725 |

| Constants | Value | Interval Duration (min) | Start of Interval (hrs) | End of Interval (hrs) | Ave Interval pH | Ave Temp (F) | 1000/T (K$^{-1}$) | Si All Mat | Si this Mat Only | Si (ppm) | K | k | R | Positive release rate (mg/kg- | interval pred release (kg) | Amount above start Mass | interval kg Si released | Integral kg Si released |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mass Material (kg) | 77.717619 | 0.2 | 0.00 | 0.01 | 11.54 | 239 | 2.576323586 | 0 | 0 | 0.00 | 34.10 | 24.53 | 24.53 | 24.53 | 0.000 | -1000000 | 0.000 | 0.0003 |
| Mass Element (kg) | 1000000 | 0.2 | 0.01 | 0.0 | 11.54 | 255 | 2.518644969 | 0.09 | 0.00 | 0.00 | 33.56 | 27.07 | 27.07 | 27.07 | 0.000 | -1000000 | 0.000 | 0.00 |
| a | 1.05597 | 0.5 | 0.01 | 0.0 | 11.54 | 264 | 2.487321569 | 0.22 | 0.00 | 0.00 | 33.28 | 28.56 | 28.56 | 28.56 | 0.001 | -1000000 | 0.001 | 0.00 |
| b | 0.01483 | 0.5 | 0.02 | 0.0 | 11.54 | 270 | 2.466868584 | 0.68 | 0.00 | 0.00 | 33.09 | 29.58 | 29.58 | 29.58 | 0.001 | -1000000 | 0.001 | 0.00 |
| c | 0.11862 | 3.5 | 0.03 | 0.1 | 11.54 | 274.5 | 2.451748233 | 1.20 | 0.00 | 0.00 | 32.96 | 30.36 | 30.35 | 30.35 | 0.008 | -1000000 | 0.008 | 0.01 |
| d | 3.50061 | 5.0 | 0.08 | 0.2 | 11.54 | 276 | 2.446749222 | 5.17 | 0.01 | 0.01 | 32.91 | 30.62 | 30.61 | 30.61 | 0.012 | -1000000 | 0.012 | 0.02 |
| e | -0.01713 | 5.0 | 0.17 | 0.3 | 11.54 | 273 | 2.456767713 | 10.96 | 0.02 | 0.02 | 33.00 | 30.10 | 30.08 | 30.08 | 0.012 | -1000000 | 0.012 | 0.03 |
| f | -0.74261 | 5.0 | 0.25 | 0.3 | 9.77 | 269.5 | 2.468560144 | 16.37 | 0.02 | 0.02 | 31.17 | 31.63 | 31.60 | 31.60 | 0.012 | -1000000 | 0.012 | 0.05 |
| | | 5.0 | 0.33 | 0.4 | 8 | 264.5 | 2.485604209 | 19.19 | 0.03 | 0.03 | 29.47 | 32.94 | 32.91 | 32.91 | 0.013 | -1000000 | 0.013 | 0.06 |
| | | 5.0 | 0.42 | 0.5 | 8 | 258 | 2.508116544 | 20.77 | 0.04 | 0.04 | 29.66 | 31.70 | 31.65 | 31.65 | 0.012 | -1000000 | 0.012 | 0.07 |
| | | 15.0 | 0.50 | 0.8 | 8 | 249 | 2.539969238 | 22.15 | 0.05 | 0.05 | 29.92 | 30.02 | 29.97 | 29.97 | 0.035 | -1000000 | 0.035 | 0.11 |
| | | 15.0 | 0.75 | 1.0 | 8 | 241 | 2.5689697 | 25.58 | 0.07 | 0.07 | 30.15 | 28.56 | 28.50 | 28.50 | 0.033 | -1000000 | 0.033 | 0.14 |
| Note= Large mass of element us | | 30.0 | 1.00 | 1.5 | 8 | 238.5 | 2.578168641 | 28.45 | 0.09 | 0.09 | 30.23 | 28.12 | 28.03 | 28.03 | 0.065 | -1000000 | 0.065 | 0.21 |
| because no limit to concrete assu | | 30.0 | 1.50 | 2.0 | 8 | 237 | 2.583719695 | 33.84 | 0.14 | 0.14 | 30.28 | 27.85 | 27.73 | 27.73 | 0.065 | -1000000 | 0.065 | 0.27 |
| mass is an exposed surface. | | 120.0 | 2.00 | 4.0 | 8 | 233.5 | 2.596765584 | 38.94 | 0.18 | 0.18 | 30.38 | 27.24 | 27.08 | 27.08 | 0.253 | -999999 | 0.253 | 0.52 |
| If concrete in latent debris is bein | | 120.0 | 4.00 | 6.0 | 8 | 228 | 2.617534573 | 57.42 | 0.35 | 0.35 | 30.56 | 26.29 | 25.99 | 25.99 | 0.242 | -999999 | 0.242 | 0.77 |
| included, a fraction of B2 should | | 120.0 | 6.00 | 8.0 | 8 | 220.5 | 2.646397224 | 72.36 | 0.51 | 0.51 | 30.80 | 25.02 | 24.61 | 24.61 | 0.229 | -999999 | 0.229 | 0.99 |
| used. | | 120.0 | 8.00 | 10.0 | 8 | 213 | 2.675903489 | 83.83 | 0.67 | 0.67 | 31.05 | 23.79 | 23.28 | 23.28 | 0.217 | -999999 | 0.217 | 1.21 |
| | | 120.0 | 10.00 | 12.0 | 8 | 208 | 2.695942606 | 92.61 | 0.81 | 0.81 | 31.22 | 22.99 | 22.39 | 22.39 | 0.209 | -999999 | 0.209 | 1.42 |
| | | 120.0 | 12.00 | 14.0 | 8 | 203 | 2.716284123 | 99.78 | 0.95 | 99.78 | 31.39 | 22.20 | -48.37 | 0.00 | 0.000 | -999999 | 0.000 | 1.42 |
| | | 120.0 | 14.00 | 16.0 | 8 | 198 | 2.736934937 | 102.13 | 0.95 | 102.13 | 31.57 | 21.43 | -47.91 | 0.00 | 0.000 | -999999 | 0.000 | 1.42 |
| | | 240.0 | 16.00 | 20.0 | 8 | 193 | 2.757902156 | 104.29 | 0.95 | 104.29 | 31.75 | 20.68 | -47.24 | 0.00 | 0.000 | -999999 | 0.000 | 1.42 |
| | | 240.0 | 20.00 | 24.0 | 8 | 187.5 | 2.781340297 | 108.24 | 0.95 | 108.24 | 31.95 | 19.87 | -47.43 | 0.00 | 0.000 | -999999 | 0.000 | 1.42 |
| | | 720.0 | 24.00 | 36.0 | 8 | 180 | 2.813950943 | 111.79 | 0.95 | 111.79 | 32.24 | 18.79 | -46.36 | 0.00 | 0.000 | -999999 | 0.000 | 1.42 |
| | | 720.0 | 36.00 | 48.0 | 8 | 170.5 | 2.85637209 | 121.11 | 0.95 | 121.11 | 32.62 | 17.47 | -47.41 | 0.00 | 0.000 | -999999 | 0.000 | 1.42 |
| | | 1440.0 | 48.00 | 72.0 | 8 | 162 | 2.895426834 | 128.69 | 0.95 | 128.69 | 32.97 | 16.35 | -47.46 | 0.00 | 0.000 | -999999 | 0.000 | 1.42 |
| | | 2880.0 | 72.00 | 120.0 | 8 | 158 | 2.914177473 | 141.37 | 0.95 | 141.37 | 33.14 | 15.83 | -51.71 | 0.00 | 0.000 | -999999 | 0.000 | 1.42 |
| | | 3240.0 | 120.00 | 174.0 | 8 | 153 | 2.937960076 | 163.38 | 0.95 | 163.38 | 33.35 | 15.20 | -59.26 | 0.00 | 0.000 | -999999 | 0.000 | 1.42 |
| | | 3960.0 | 174.00 | 240.0 | 8 | 143.85 | 2.982502651 | 183.30 | 0.95 | 183.30 | 33.76 | 14.08 | -62.39 | 0.00 | 0.000 | -999999 | 0.000 | 1.42 |
| | | 7200.0 | 240.00 | 360.0 | 8 | 136.85 | 3.017501509 | 202.13 | 0.95 | 202.13 | 34.08 | 13.27 | -65.41 | 0.00 | 0.000 | -999999 | 0.000 | 1.42 |
| | | 7200.0 | 360.00 | 480.0 | 8 | 132.15 | 3.04146531 | 225.81 | 0.95 | 225.81 | 34.31 | 12.73 | -71.08 | 0.00 | 0.000 | -999999 | 0.000 | 1.42 |
| | | 7200.0 | 480.00 | 600.0 | 8 | 126.25 | 3.072091753 | 225.81 | 0.95 | 225.81 | 34.60 | 12.08 | -66.79 | 0.00 | 0.000 | -999999 | 0.000 | 1.42 |
| | | 7200.0 | 600.00 | 720.0 | 8 | 121.1 | 3.099333643 | 225.81 | 0.95 | 225.81 | 34.85 | 11.53 | -63.19 | 0.00 | 0.000 | -999999 | 0.000 | 1.42 |

| Constants | Value | Interval Duration (min) | Start of Interval (hrs) | End of Interval (hrs) | Ave Interval pH | Ave Temp (F) | 1000/T ($K^{-1}$) | Al All Mat | Al this Mat Only | Al (ppm) | K | k | R | Positive release rate (mg/kg- | interval pred release (kg) | Amount above start Mass | interval kg Al released | Integral kg Al released |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mass Material (kg) | 77.717619 | 0.2 | 0.00 | 0.01 | 11.54 | 239 | 2.576323586 | 0 | 0 | 0.00 | 20.58 | 17.44 | 17.44 | 17.44 | 0.000 | -1000000 | 0.000 | 0.0002 |
| Mass Element (kg) | 1000000 | 0.2 | 0.01 | 0.0 | 11.54 | 255 | 2.518644969 | 0.75 | 0.00 | 0.00 | 22.61 | 27.20 | 27.20 | 27.20 | 0.000 | -1000000 | 0.000 | 0.00 |
| a | 2.35338 | 0.5 | 0.01 | 0.0 | 11.54 | 264 | 2.487321569 | 1.75 | 0.00 | 0.00 | 23.80 | 34.63 | 34.62 | 34.62 | 0.001 | -1000000 | 0.001 | 0.00 |
| b | 0.06829 | 0.5 | 0.02 | 0.0 | 11.54 | 270 | 2.466868584 | 5.24 | 0.00 | 0.00 | 24.61 | 40.53 | 40.53 | 40.53 | 0.002 | -1000000 | 0.002 | 0.00 |
| c | -0.70953 | 3.5 | 0.03 | 0.1 | 11.54 | 274.5 | 2.451748233 | 9.08 | 0.00 | 0.00 | 25.23 | 45.54 | 45.54 | 45.54 | 0.012 | -1000000 | 0.012 | 0.02 |
| d | 9.23778 | 5.0 | 0.08 | 0.2 | 11.54 | 276 | 2.446749222 | 37.77 | 0.01 | 0.01 | 25.43 | 47.33 | 47.31 | 47.31 | 0.018 | -1000000 | 0.018 | 0.03 |
| e | 0.05404 | 5.0 | 0.17 | 0.3 | 11.54 | 273 | 2.456767713 | 79.22 | 0.02 | 0.02 | 25.02 | 43.81 | 43.77 | 43.77 | 0.017 | -1000000 | 0.017 | 0.05 |
| f | -3.34577 | 5.0 | 0.25 | 0.3 | 9.77 | 269.5 | 2.468560144 | 118.04 | 0.03 | 0.03 | 18.58 | 32.10 | 32.04 | 32.04 | 0.012 | -1000000 | 0.012 | 0.06 |
| | | 5.0 | 0.33 | 0.4 | 8 | 264.5 | 2.485604209 | 124.89 | 0.04 | 0.04 | 13.68 | 22.59 | 22.52 | 22.52 | 0.009 | -1000000 | 0.009 | 0.07 |
| | | 5.0 | 0.42 | 0.5 | 8 | 258 | 2.508116544 | 128.14 | 0.05 | 0.05 | 13.19 | 18.99 | 18.92 | 18.92 | 0.007 | -1000000 | 0.007 | 0.08 |
| | | 15.0 | 0.50 | 0.8 | 8 | 249 | 2.539969238 | 130.61 | 0.05 | 0.05 | 12.52 | 14.86 | 14.79 | 14.79 | 0.017 | -1000000 | 0.017 | 0.10 |
| | | 15.0 | 0.75 | 1.0 | 8 | 241 | 2.5689697 | 136.17 | 0.07 | 0.07 | 11.94 | 11.88 | 11.82 | 11.82 | 0.014 | -1000000 | 0.014 | 0.11 |
| Note= Large mass of element us | | 30.0 | 1.00 | 1.5 | 8 | 238.5 | 2.578168641 | 141.23 | 0.07 | 0.07 | 11.76 | 11.07 | 11.00 | 11.00 | 0.026 | -1000000 | 0.026 | 0.14 |
| because no limit to concrete assu | | 30.0 | 1.50 | 2.0 | 8 | 237 | 2.583719695 | 153.36 | 0.09 | 0.09 | 11.65 | 10.61 | 10.52 | 10.52 | 0.025 | -1000000 | 0.025 | 0.16 |
| mass is an exposed surface. | | 120.0 | 2.00 | 4.0 | 8 | 233.5 | 2.596765584 | 166.05 | 0.11 | 0.11 | 11.41 | 9.59 | 9.50 | 9.50 | 0.089 | -1000000 | 0.089 | 0.25 |
| If concrete in latent debris is bein | | 120.0 | 4.00 | 6.0 | 8 | 228 | 2.617534573 | 214.75 | 0.17 | 0.17 | 11.03 | 8.17 | 8.05 | 8.05 | 0.075 | -1000000 | 0.075 | 0.32 |
| included, a fraction of B2 should | | 120.0 | 6.00 | 8.0 | 8 | 220.5 | 2.646397224 | 260.28 | 0.22 | 0.22 | 10.52 | 6.54 | 6.41 | 6.41 | 0.060 | -1000000 | 0.060 | 0.38 |
| used. | | 120.0 | 8.00 | 10.0 | 8 | 213 | 2.675903489 | 302.37 | 0.26 | 0.26 | 10.02 | 5.21 | 5.08 | 5.08 | 0.047 | -1000000 | 0.047 | 0.43 |
| | | 120.0 | 10.00 | 12.0 | 8 | 208 | 2.695942606 | 338.87 | 0.29 | 0.29 | 9.70 | 4.47 | 4.33 | 4.33 | 0.040 | -1000000 | 0.040 | 0.47 |
| | | 120.0 | 12.00 | 14.0 | 8 | 203 | 2.716284123 | 369.12 | 0.32 | 369.12 | 9.38 | 3.82 | -146.42 | 0.00 | 0.000 | -1000000 | 0.000 | 0.47 |
| | | 120.0 | 14.00 | 16.0 | 8 | 198 | 2.736934937 | 394.66 | 0.32 | 394.66 | 9.07 | 3.26 | -138.45 | 0.00 | 0.000 | -1000000 | 0.000 | 0.47 |
| | | 240.0 | 16.00 | 20.0 | 8 | 193 | 2.757902156 | 416.44 | 0.32 | 416.44 | 8.77 | 2.77 | -128.89 | 0.00 | 0.000 | -1000000 | 0.000 | 0.47 |
| | | 240.0 | 20.00 | 24.0 | 8 | 187.5 | 2.781340297 | 452.99 | 0.32 | 452.99 | 8.44 | 2.31 | -121.91 | 0.00 | 0.000 | -1000000 | 0.000 | 0.47 |
| | | 720.0 | 24.00 | 36.0 | 8 | 180 | 2.813950943 | 483.82 | 0.32 | 483.82 | 8.00 | 1.80 | -107.05 | 0.00 | 0.000 | -1000000 | 0.000 | 0.47 |
| | | 720.0 | 36.00 | 48.0 | 8 | 170.5 | 2.85637209 | 555.36 | 0.32 | 555.36 | 7.46 | 1.30 | -95.28 | 0.00 | 0.000 | -1000000 | 0.000 | 0.47 |
| | | 1440.0 | 48.00 | 72.0 | 8 | 162 | 2.895426834 | 605.73 | 0.32 | 605.73 | 7.00 | 0.96 | -82.15 | 0.00 | 0.000 | -1000000 | 0.000 | 0.47 |
| | | 2880.0 | 72.00 | 120.0 | 8 | 158 | 2.914177473 | 676.22 | 0.32 | 676.22 | 6.79 | 0.83 | -81.97 | 0.00 | 0.000 | -1000000 | 0.000 | 0.47 |
| | | 3240.0 | 120.00 | 174.0 | 8 | 153 | 2.937960076 | 785.61 | 0.32 | 785.61 | 6.53 | 0.69 | -82.57 | 0.00 | 0.000 | -1000000 | 0.000 | 0.47 |
| | | 3960.0 | 174.00 | 240.0 | 8 | 143.85 | 2.982502651 | 875.72 | 0.32 | 875.72 | 6.07 | 0.49 | -70.33 | 0.00 | 0.000 | -1000000 | 0.000 | 0.47 |
| | | 7200.0 | 240.00 | 360.0 | 8 | 136.85 | 3.017501509 | 945.41 | 0.32 | 945.41 | 5.74 | 0.38 | -61.45 | 0.00 | 0.000 | -1000000 | 0.000 | 0.47 |
| | | 7200.0 | 360.00 | 480.0 | 8 | 132.15 | 3.04146531 | 1031.21 | 0.32 | 1031.21 | 5.52 | 0.31 | -57.99 | 0.00 | 0.000 | -1000000 | 0.000 | 0.47 |
| | | 7200.0 | 480.00 | 600.0 | 8 | 126.25 | 3.072091753 | 1096.29 | 0.32 | 1096.29 | 5.25 | 0.25 | -51.22 | 0.00 | 0.000 | -1000000 | 0.000 | 0.47 |
| | | 7200.0 | 600.00 | 720.0 | 8 | 121.1 | 3.099333643 | 1144.23 | 0.32 | 1144.23 | 5.02 | 0.20 | -45.33 | 0.00 | 0.000 | -1000000 | 0.000 | 0.47 |

| Constants | Value | Interval Duration (min) | Start of Interval (hrs) | End of Interval (hrs) | Ave Interval pH | Ave Temp (F) | 1000/T ($K^{-1}$) | Ca All Mat | Ca this Mat Only | Ca (ppm) | K | k | R | Positive release rate (mg/kg- | interval pred release (kg) | Amount above start Mass | interval kg Ca released | Integral kg Ca released |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mass Material (kg) | 1330.8348 | 0.2 | 0.00 | 0.01 | 11.54 | 239 | 2.576323586 | 0 | 0 | 0.00 | 25.32 | 31.61 | 31.61 | 31.61 | 0.007 | -29 | 0.0070 | 0.01 |
| Mass Element (kg) | 28.746032 | 0.2 | 0.01 | 0.0 | 11.54 | 255 | 2.518644969 | 0.01 | 0.00 | 0.00 | 26.96 | 35.92 | 35.91 | 35.91 | 0.008 | -29 | 0.0080 | 0.01 |
| a | 1.82949 | 0.5 | 0.01 | 0.0 | 11.54 | 264 | 2.487321569 | 0.01 | 0.01 | 0.01 | 27.89 | 38.50 | 38.48 | 38.48 | 0.026 | -29 | 0.0256 | 0.04 |
| b | 0.06821 | 0.5 | 0.02 | 0.0 | 11.54 | 270 | 2.466868584 | 0.03 | 0.03 | 0.03 | 28.51 | 40.28 | 40.24 | 40.24 | 0.027 | -29 | 0.0268 | 0.07 |
| c | -0.47088 | 3.5 | 0.03 | 0.1 | 11.54 | 274.5 | 2.451748233 | 0.05 | 0.05 | 0.05 | 28.98 | 41.65 | 41.59 | 41.59 | 0.194 | -28 | 0.1937 | 0.26 |
| d | 3.67611 | 5.0 | 0.08 | 0.2 | 11.54 | 276 | 2.446749222 | 0.20 | 0.17 | 0.17 | 29.14 | 42.12 | 41.86 | 41.86 | 0.279 | -28 | 0.2786 | 0.54 |
| e | 0.02616 | 5.0 | 0.17 | 0.3 | 11.54 | 273 | 2.456767713 | 0.41 | 0.36 | 0.36 | 28.83 | 41.19 | 40.67 | 40.67 | 0.271 | -28 | 0.2707 | 0.81 |
| f | -0.96191 | 5.0 | 0.25 | 0.3 | 9.77 | 269.5 | 2.468560144 | 0.61 | 0.54 | 0.54 | 21.55 | 36.07 | 35.16 | 35.16 | 0.234 | -28 | 0.2340 | 1.04 |
| | | 5.0 | 0.33 | 0.4 | 8 | 264.5 | 2.485604209 | 0.80 | 0.70 | 0.70 | 16.02 | 31.22 | 29.86 | 29.86 | 0.199 | -28 | 0.1987 | 1.24 |
| | | 5.0 | 0.42 | 0.5 | 8 | 258 | 2.508116544 | 0.99 | 0.83 | 0.83 | 15.64 | 29.70 | 28.12 | 28.12 | 0.187 | -27 | 0.1871 | 1.43 |
| | | 15.0 | 0.50 | 0.8 | 8 | 249 | 2.539969238 | 1.17 | 0.96 | 0.96 | 15.11 | 27.68 | 25.92 | 25.92 | 0.518 | -27 | 0.5175 | 1.95 |
| | | 15.0 | 0.75 | 1.0 | 8 | 241 | 2.5689697 | 1.70 | 1.31 | 1.31 | 14.64 | 25.96 | 23.64 | 23.64 | 0.472 | -26 | 0.4720 | 2.42 |
| | | 30.0 | 1.00 | 1.5 | 8 | 238.5 | 2.578168641 | 2.21 | 1.62 | 1.62 | 14.49 | 25.43 | 22.59 | 22.59 | 0.902 | -25 | 0.9019 | 3.32 |
| | | 30.0 | 1.50 | 2.0 | 8 | 237 | 2.583719695 | 3.20 | 2.23 | 2.23 | 14.41 | 25.12 | 21.24 | 21.24 | 0.848 | -25 | 0.8481 | 4.17 |
| | | 120.0 | 2.00 | 4.0 | 8 | 233.5 | 2.596765584 | 4.15 | 2.79 | 2.79 | 14.20 | 24.41 | 19.61 | 19.61 | 3.131 | -21 | 3.1311 | 7.30 |
| | | 120.0 | 4.00 | 6.0 | 8 | 228 | 2.617534573 | 7.83 | 4.89 | 4.89 | 13.89 | 23.31 | 15.10 | 15.10 | 2.411 | -19 | 2.4111 | 9.71 |
| | | 120.0 | 6.00 | 8.0 | 8 | 220.5 | 2.646397224 | 11.04 | 6.51 | 6.51 | 13.46 | 21.87 | 11.29 | 11.29 | 1.803 | -17 | 1.8034 | 11.52 |
| | | 120.0 | 8.00 | 10.0 | 8 | 213 | 2.675903489 | 13.92 | 7.72 | 7.72 | 13.04 | 20.48 | 8.36 | 8.36 | 1.335 | -16 | 1.3346 | 12.85 |
| | | 120.0 | 10.00 | 12.0 | 8 | 208 | 2.695942606 | 16.57 | 8.61 | 8.61 | 12.76 | 19.59 | 6.37 | 6.37 | 1.017 | -15 | 1.0165 | 13.87 |
| | | 120.0 | 12.00 | 14.0 | 8 | 203 | 2.716284123 | 19.05 | 9.29 | 19.05 | 12.48 | 18.73 | -9.87 | 0.00 | 0.000 | -15 | 0.0000 | 13.87 |
| | | 120.0 | 14.00 | 16.0 | 8 | 198 | 2.736934937 | 20.19 | 9.29 | 20.19 | 12.20 | 17.89 | -11.71 | 0.00 | 0.000 | -15 | 0.0000 | 13.87 |
| | | 240.0 | 16.00 | 20.0 | 8 | 193 | 2.757902156 | 21.43 | 9.29 | 21.43 | 11.93 | 17.08 | -13.61 | 0.00 | 0.000 | -15 | 0.0000 | 13.87 |
| | | 240.0 | 20.00 | 24.0 | 8 | 187.5 | 2.781340297 | 24.15 | 9.29 | 24.15 | 11.63 | 16.22 | -17.47 | 0.00 | 0.000 | -15 | 0.0000 | 13.87 |
| | | 720.0 | 24.00 | 36.0 | 8 | 180 | 2.813950943 | 27.04 | 9.29 | 27.04 | 11.22 | 15.09 | -21.26 | 0.00 | 0.000 | -15 | 0.0000 | 13.87 |
| | | 720.0 | 36.00 | 48.0 | 8 | 170.5 | 2.85637209 | 36.98 | 9.29 | 36.98 | 10.72 | 13.73 | -33.65 | 0.00 | 0.000 | -15 | 0.0000 | 13.87 |
| | | 1440.0 | 48.00 | 72.0 | 8 | 162 | 2.895426834 | 47.01 | 9.29 | 47.01 | 10.27 | 12.60 | -45.04 | 0.00 | 0.000 | -15 | 0.000 | 13.87 |
| | | 2880.0 | 72.00 | 120.0 | 8 | 158 | 2.914177473 | 68.08 | 9.29 | 68.08 | 10.07 | 12.08 | -69.63 | 0.00 | 0.000 | -15 | 0.000 | 13.87 |
| | | 3240.0 | 120.00 | 174.0 | 8 | 153 | 2.937960076 | 90.46 | 9.29 | 90.46 | 9.81 | 11.46 | -94.23 | 0.00 | 0.000 | -15 | 0.000 | 13.87 |
| | | 3960.0 | 174.00 | 240.0 | 8 | 143.85 | 2.982502651 | 95.74 | 9.29 | 95.74 | 9.35 | 10.39 | -95.98 | 0.00 | 0.000 | -15 | 0.000 | 13.87 |
| | | 7200.0 | 240.00 | 360.0 | 8 | 136.85 | 3.017501509 | 129.07 | 9.29 | 129.07 | 9.00 | 9.61 | -128.23 | 0.00 | 0.000 | -15 | 0.000 | 13.87 |
| | | 7200.0 | 360.00 | 480.0 | 8 | 132.15 | 3.04146531 | 143.24 | 9.29 | 143.24 | 8.77 | 9.12 | -139.77 | 0.00 | 0.000 | -15 | 0.000 | 13.87 |
| | | 7200.0 | 480.00 | 600.0 | 8 | 126.25 | 3.072091753 | 160.01 | 9.29 | 160.01 | 8.48 | 8.52 | -152.13 | 0.00 | 0.000 | -15 | 0.000 | 13.87 |
| | | 7200.0 | 600.00 | 720.0 | 8 | 121.1 | 3.099333643 | 192.35 | 9.29 | 192.35 | 8.24 | 8.02 | -179.24 | 0.00 | 0.000 | -15 | 0.000 | 13.87 |

| Constants | Value | Interval Duration (min) | Start of Interval (hrs) | End of Interval (hrs) | Ave Interval pH | Ave Temp (F) | 1000/T ($K^{-1}$) | Si All Mat | Si this Mat Only | Si (ppm) | K | k | R | Positive release rate (mg/kg- | interval pred release (kg) | Amount above start Mass | interval kg Si released | Integral kg Si released |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mass Material (kg) | 1330.835 | 0.2 | 0.00 | 0.01 | 11.54 | 239 | 2.576323586 | 0 | 0 | 0.00 | 333.51 | 561.62 | 561.62 | 561.62 | 0.125 | -261 | 0.125 | 0.1246 |
| Mass Element (kg) | 260.9767 | 0.2 | 0.01 | 0.0 | 11.54 | 255 | 2.518644969 | 0.09 | 0.08 | 0.08 | 407.33 | 788.85 | 788.68 | 788.68 | 0.175 | -261 | 0.175 | 0.30 |
| a | 5.20122 | 0.5 | 0.01 | 0.0 | 11.54 | 264 | 2.487321569 | 0.22 | 0.20 | 0.20 | 454.05 | 948.68 | 948.27 | 948.27 | 0.631 | -260 | 0.631 | 0.93 |
| b | 0.10404 | 0.5 | 0.02 | 0.0 | 11.54 | 270 | 2.466868584 | 0.68 | 0.62 | 0.62 | 487.41 | 1070.15 | 1068.78 | 1068.78 | 0.711 | -259 | 0.711 | 1.64 |
| c | -1.50553 | 3.5 | 0.03 | 0.1 | 11.54 | 274.5 | 2.451748233 | 1.20 | 1.10 | 1.10 | 513.64 | 1169.83 | 1167.33 | 1167.33 | 5.437 | -254 | 5.437 | 7.08 |
| d | 7.46511 | 5.0 | 0.08 | 0.2 | 11.54 | 276 | 2.446749222 | 5.17 | 4.74 | 4.74 | 522.62 | 1204.79 | 1193.85 | 1193.85 | 7.944 | -246 | 7.944 | 15.02 |
| e | 0.16247 | 5.0 | 0.17 | 0.3 | 11.54 | 273 | 2.456767713 | 10.96 | 10.07 | 10.07 | 504.78 | 1135.75 | 1113.10 | 1113.10 | 7.407 | -239 | 7.407 | 22.43 |
| f | -2.55813 | 5.0 | 0.25 | 0.3 | 9.77 | 269.5 | 2.468560144 | 16.37 | 15.03 | 15.03 | 317.10 | 546.44 | 520.54 | 520.54 | 3.464 | -235 | 3.464 | 25.89 |
| | | 5.0 | 0.33 | 0.4 | 8 | 264.5 | 2.485604209 | 19.19 | 17.35 | 17.35 | 195.61 | 254.90 | 232.29 | 232.29 | 1.546 | -234 | 1.546 | 27.44 |
| | | 5.0 | 0.42 | 0.5 | 8 | 258 | 2.508116544 | 20.77 | 18.39 | 18.39 | 180.92 | 223.25 | 200.55 | 200.55 | 1.335 | -232 | 1.335 | 28.77 |
| | | 15.0 | 0.50 | 0.8 | 8 | 249 | 2.539969238 | 22.15 | 19.28 | 19.28 | 162.01 | 185.05 | 163.03 | 163.03 | 3.254 | -229 | 3.254 | 32.03 |
| | | 15.0 | 0.75 | 1.0 | 8 | 241 | 2.5689697 | 25.58 | 21.47 | 21.47 | 146.51 | 156.00 | 133.14 | 133.14 | 2.658 | -226 | 2.658 | 34.69 |
| | | 30.0 | 1.00 | 1.5 | 8 | 238.5 | 2.578168641 | 28.45 | 23.25 | 23.25 | 141.92 | 147.77 | 123.56 | 123.56 | 4.933 | -221 | 4.933 | 39.62 |
| | | 30.0 | 1.50 | 2.0 | 8 | 237 | 2.583719695 | 33.84 | 26.55 | 26.55 | 139.21 | 143.01 | 115.74 | 115.74 | 4.621 | -217 | 4.621 | 44.24 |
| | | 120.0 | 2.00 | 4.0 | 8 | 233.5 | 2.596765584 | 38.94 | 29.65 | 29.65 | 133.06 | 132.44 | 102.92 | 102.92 | 16.437 | -200 | 16.437 | 60.68 |
| | | 120.0 | 4.00 | 6.0 | 8 | 228 | 2.617534573 | 57.42 | 40.67 | 40.67 | 123.81 | 117.19 | 78.70 | 78.70 | 12.568 | -188 | 12.568 | 73.24 |
| | | 120.0 | 6.00 | 8.0 | 8 | 220.5 | 2.646397224 | 72.36 | 49.09 | 49.09 | 112.02 | 98.86 | 55.54 | 55.54 | 8.870 | -179 | 8.870 | 82.11 |
| | | 120.0 | 8.00 | 10.0 | 8 | 213 | 2.675903489 | 83.83 | 55.03 | 55.03 | 101.13 | 83.09 | 37.87 | 37.87 | 6.049 | -173 | 6.049 | 88.16 |
| | | 120.0 | 10.00 | 12.0 | 8 | 208 | 2.695942606 | 92.61 | 59.09 | 59.09 | 94.34 | 73.84 | 27.59 | 27.59 | 4.407 | -168 | 4.407 | 92.57 |
| | | 120.0 | 12.00 | 14.0 | 8 | 203 | 2.716284123 | 99.78 | 62.04 | 99.78 | 87.92 | 65.50 | -8.84 | 0.00 | 0.000 | -168 | 0.000 | 92.57 |
| | | 120.0 | 14.00 | 16.0 | 8 | 198 | 2.736934937 | 102.13 | 62.04 | 102.13 | 81.85 | 58.00 | -14.38 | 0.00 | 0.000 | -168 | 0.000 | 92.57 |
| | | 240.0 | 16.00 | 20.0 | 8 | 193 | 2.757902156 | 104.29 | 62.04 | 104.29 | 76.11 | 51.26 | -18.98 | 0.00 | 0.000 | -168 | 0.000 | 92.57 |
| | | 240.0 | 20.00 | 24.0 | 8 | 187.5 | 2.781340297 | 108.24 | 62.04 | 108.24 | 70.17 | 44.65 | -24.23 | 0.00 | 0.000 | -168 | 0.000 | 92.57 |
| | | 720.0 | 24.00 | 36.0 | 8 | 180 | 2.813950943 | 111.79 | 62.04 | 111.79 | 62.67 | 36.85 | -28.88 | 0.00 | 0.000 | -168 | 0.000 | 92.57 |
| | | 720.0 | 36.00 | 48.0 | 8 | 170.5 | 2.85637209 | 121.11 | 62.04 | 121.11 | 54.10 | 28.70 | -35.55 | 0.00 | 0.000 | -168 | 0.000 | 92.57 |
| | | 1440.0 | 48.00 | 72.0 | 8 | 162 | 2.895426834 | 128.69 | 62.04 | 128.69 | 47.25 | 22.80 | -39.30 | 0.00 | 0.000 | -168 | 0.000 | 92.57 |
| | | 2880.0 | 72.00 | 120.0 | 8 | 158 | 2.914177473 | 141.37 | 62.04 | 141.37 | 44.27 | 20.42 | -44.78 | 0.00 | 0.000 | -168 | 0.000 | 92.57 |
| | | 3240.0 | 120.00 | 174.0 | 8 | 153 | 2.937960076 | 163.38 | 62.04 | 163.38 | 40.77 | 17.75 | -53.38 | 0.00 | 0.000 | -168 | 0.000 | 92.57 |
| | | 3960.0 | 174.00 | 240.0 | 8 | 143.85 | 2.982502651 | 183.30 | 62.04 | 183.30 | 34.94 | 13.65 | -57.98 | 0.00 | 0.000 | -168 | 0.000 | 92.57 |
| | | 7200.0 | 240.00 | 360.0 | 8 | 136.85 | 3.017501509 | 202.13 | 62.04 | 202.13 | 30.95 | 11.11 | -61.46 | 0.00 | 0.000 | -168 | 0.000 | 92.57 |
| | | 7200.0 | 360.00 | 480.0 | 8 | 132.15 | 3.04146531 | 225.81 | 62.04 | 225.81 | 28.48 | 9.65 | -66.85 | 0.00 | 0.000 | -168 | 0.000 | 92.57 |
| | | 7200.0 | 480.00 | 600.0 | 8 | 126.25 | 3.072091753 | 225.81 | 62.04 | 225.81 | 25.61 | 8.05 | -62.97 | 0.00 | 0.000 | -168 | 0.000 | 92.57 |
| | | 7200.0 | 600.00 | 720.0 | 8 | 121.1 | 3.099333643 | 225.81 | 62.04 | 225.81 | 23.30 | 6.86 | -59.62 | 0.00 | 0.000 | -168 | 0.000 | 92.57 |

| Constants | Value | Interval Duration (min) | Start of Interval (hrs) | End of Interval (hrs) | Ave Interval pH | Ave Temp (F) | 1000/T ($K^{-1}$) | Al All Mat | Al this Mat Only | Al (ppm) | K | k | R | Positive release rate (mg/kg-min) | interval pred release (kg) | Amount above start Mass | interval kg Al released | Integral kg Al released |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mass Material (kg) | 1330.835 | 0.2 | 0.00 | 0.01 | 11.54 | 239 | 2.576323586 | 0 | 0 | 0.00 | 9.54 | 36.22 | 36.22 | 36.22 | 0.008 | -26 | 0.008 | 0.00803 |
| Mass Element (kg) | 25.95128 | 0.2 | 0.01 | 0.0 | 11.54 | 255 | 2.518644969 | 0.75 | 0.01 | 0.01 | 11.95 | 63.08 | 63.05 | 63.05 | 0.014 | -26 | 0.014 | 0.022 |
| a | 3.72351 | 0.5 | 0.01 | 0.0 | 11.54 | 264 | 2.487321569 | 1.75 | 0.01 | 0.01 | 13.50 | 85.26 | 85.17 | 85.17 | 0.057 | -26 | 0.057 | 0.079 |
| b | 0.14041 | 0.5 | 0.02 | 0.0 | 11.54 | 270 | 2.466868584 | 5.24 | 0.05 | 0.05 | 14.62 | 103.81 | 103.43 | 103.43 | 0.069 | -26 | 0.069 | 0.148 |
| c | -1.69396 | 3.5 | 0.03 | 0.1 | 11.54 | 274.5 | 2.451748233 | 9.08 | 0.10 | 0.10 | 15.51 | 120.06 | 119.29 | 119.29 | 0.556 | -25 | 0.556 | 0.703 |
| d | 10.35371 | 5.0 | 0.08 | 0.2 | 11.54 | 276 | 2.446749222 | 37.77 | 0.47 | 0.47 | 15.82 | 125.97 | 122.22 | 122.22 | 0.813 | -24 | 0.813 | 1.516 |
| e | 0.17064 | 5.0 | 0.17 | 0.3 | 11.54 | 273 | 2.456767713 | 79.22 | 1.02 | 1.02 | 15.21 | 114.40 | 106.76 | 106.76 | 0.710 | -24 | 0.710 | 2.227 |
| f | -4.17804 | 5.0 | 0.25 | 0.3 | 9.77 | 269.5 | 2.468560144 | 118.04 | 1.49 | 1.49 | 8.20 | 50.95 | 41.67 | 41.67 | 0.277 | -23 | 0.277 | 2.504 |
| | | 5.0 | 0.33 | 0.4 | 8 | 264.5 | 2.485604209 | 124.89 | 1.68 | 1.68 | 4.33 | 21.57 | 13.21 | 13.21 | 0.088 | -23 | 0.088 | 2.592 |
| | | 5.0 | 0.42 | 0.5 | 8 | 258 | 2.508116544 | 128.14 | 1.74 | 1.74 | 3.96 | 17.37 | 9.76 | 9.76 | 0.065 | -23 | 0.065 | 2.657 |
| | | 15.0 | 0.50 | 0.8 | 8 | 249 | 2.539969238 | 130.61 | 1.78 | 1.78 | 3.50 | 12.79 | 6.28 | 6.28 | 0.125 | -23 | 0.125 | 2.782 |
| | | 15.0 | 0.75 | 1.0 | 8 | 241 | 2.5689697 | 136.17 | 1.86 | 1.86 | 3.13 | 9.67 | 3.90 | 3.90 | 0.078 | -23 | 0.078 | 2.860 |
| | | 30.0 | 1.00 | 1.5 | 8 | 238.5 | 2.578168641 | 141.23 | 1.92 | 1.92 | 3.02 | 8.85 | 3.23 | 3.23 | 0.129 | -23 | 0.129 | 2.989 |
| | | 30.0 | 1.50 | 2.0 | 8 | 237 | 2.583719695 | 153.36 | 2.00 | 2.00 | 2.95 | 8.39 | 2.70 | 2.70 | 0.108 | -23 | 0.108 | 3.097 |
| | | 120.0 | 2.00 | 4.0 | 8 | 233.5 | 2.596765584 | 166.05 | 2.08 | 2.08 | 2.81 | 7.40 | 1.93 | 1.93 | 0.308 | -23 | 0.308 | 3.404 |
| | | 120.0 | 4.00 | 6.0 | 8 | 228 | 2.617534573 | 214.75 | 2.28 | 2.28 | 2.59 | 6.06 | 0.72 | 0.72 | 0.114 | -22 | 0.114 | 3.519 |
| | | 120.0 | 6.00 | 8.0 | 8 | 220.5 | 2.646397224 | 260.28 | 2.36 | 2.36 | 2.31 | 4.59 | -0.09 | 0.00 | 0.000 | -22 | 0.000 | 3.519 |
| | | 120.0 | 8.00 | 10.0 | 8 | 213 | 2.675903489 | 302.37 | 2.36 | 2.36 | 2.06 | 3.46 | -0.50 | 0.00 | 0.000 | -22 | 0.000 | 3.519 |
| | | 120.0 | 10.00 | 12.0 | 8 | 208 | 2.695942606 | 338.87 | 2.36 | 2.36 | 1.91 | 2.85 | -0.68 | 0.00 | 0.000 | -22 | 0.000 | 3.519 |
| | | 120.0 | 12.00 | 14.0 | 8 | 203 | 2.716284123 | 369.12 | 2.36 | 369.12 | 1.76 | 2.34 | -489.40 | 0.00 | 0.000 | -22 | 0.000 | 3.519 |
| | | 120.0 | 14.00 | 16.0 | 8 | 198 | 2.736934937 | 394.66 | 2.36 | 394.66 | 1.62 | 1.92 | -465.28 | 0.00 | 0.000 | -22 | 0.000 | 3.519 |
| | | 240.0 | 16.00 | 20.0 | 8 | 193 | 2.757902156 | 416.44 | 2.36 | 416.44 | 1.50 | 1.57 | -435.70 | 0.00 | 0.000 | -22 | 0.000 | 3.519 |
| | | 240.0 | 20.00 | 24.0 | 8 | 187.5 | 2.781340297 | 452.99 | 2.36 | 452.99 | 1.37 | 1.25 | -414.71 | 0.00 | 0.000 | -22 | 0.000 | 3.519 |
| | | 720.0 | 24.00 | 36.0 | 8 | 180 | 2.813950943 | 483.82 | 2.36 | 483.82 | 1.20 | 0.92 | -367.76 | 0.00 | 0.000 | -22 | 0.000 | 3.519 |
| | | 720.0 | 36.00 | 48.0 | 8 | 170.5 | 2.85637209 | 555.36 | 2.36 | 555.36 | 1.02 | 0.61 | -331.41 | 0.00 | 0.000 | -22 | 0.000 | 3.519 |
| | | 1440.0 | 48.00 | 72.0 | 8 | 162 | 2.895426834 | 605.73 | 2.36 | 605.73 | 0.88 | 0.42 | -289.21 | 0.00 | 0.000 | -22 | 0.000 | 3.519 |
| | | 2880.0 | 72.00 | 120.0 | 8 | 158 | 2.914177473 | 676.22 | 2.36 | 676.22 | 0.81 | 0.35 | -290.11 | 0.00 | 0.000 | -22 | 0.000 | 3.519 |
| | | 3240.0 | 120.00 | 174.0 | 8 | 153 | 2.937960076 | 785.61 | 2.36 | 785.61 | 0.74 | 0.28 | -294.25 | 0.00 | 0.000 | -22 | 0.000 | 3.519 |
| | | 3960.0 | 174.00 | 240.0 | 8 | 143.85 | 2.982502651 | 875.72 | 2.36 | 875.72 | 0.62 | 0.18 | -254.28 | 0.00 | 0.000 | -22 | 0.000 | 3.519 |
| | | 7200.0 | 240.00 | 360.0 | 8 | 136.85 | 3.017501509 | 945.41 | 2.36 | 945.41 | 0.54 | 0.13 | -224.75 | 0.00 | 0.000 | -22 | 0.000 | 3.519 |
| | | 7200.0 | 360.00 | 480.0 | 8 | 132.15 | 3.04146531 | 1031.21 | 2.36 | 1031.21 | 0.50 | 0.10 | -213.76 | 0.00 | 0.000 | -22 | 0.000 | 3.519 |
| | | 7200.0 | 480.00 | 600.0 | 8 | 126.25 | 3.072091753 | 1096.29 | 2.36 | 1096.29 | 0.44 | 0.08 | -190.75 | 0.00 | 0.000 | -22 | 0.000 | 3.519 |
| | | 7200.0 | 600.00 | 720.0 | 8 | 121.1 | 3.099333643 | 1144.23 | 2.36 | 1144.23 | 0.40 | 0.06 | -170.38 | 0.00 | 0.000 | -22 | 0.000 | 3.519 |

| Constants | Value | Interval Duration (min) | Start of Interval (hrs) | End of Interval (hrs) | Ave Interval pH | Ave Temp (F) | 1000/T ($K^{-1}$) | Si All Mat | Si this Mat Only | Si (ppm) | K | k | R | Positive release rate (mg/kg-min) | interval pred release (kg) | Amount above start Mass | interval kg Si released | Integral kg Si released |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mass Material (kg) | 0 | 0.2 | 0.00 | 0.01 | 11.54 | 239 | 2.576323586 | 0 | 0 | 0.00 | 156.65 | 31264.70 | 31264.70 | 31264.70 | 0.000 | 0 | 0.000 | 0.00000 |
| Mass Element (kg) | 0 | 0.2 | 0.01 | 0.0 | 11.54 | 255 | 2.518644969 | 0.09 | 0.00 | 0.00 | 158.18 | 40417.13 | 40417.13 | 40417.13 | 0.000 | 0 | 0.000 | 0.000 |
| a | 1.17043 | 0.5 | 0.01 | 0.0 | 11.54 | 264 | 2.487321569 | 0.22 | 0.00 | 0.00 | 159.02 | 46464.76 | 46464.76 | 46464.76 | 0.000 | 0 | 0.000 | 0.000 |
| b | 0.10511 | 0.5 | 0.02 | 0.0 | 11.54 | 270 | 2.466868584 | 0.68 | 0.00 | 0.00 | 159.57 | 50893.91 | 50893.91 | 50893.91 | 0.000 | 0 | 0.000 | 0.000 |
| c | -0.07315 | 3.5 | 0.03 | 0.1 | 11.54 | 274.5 | 2.451748233 | 1.20 | 0.00 | 0.00 | 159.98 | 54437.52 | 54437.52 | 54437.52 | 0.000 | 0 | 0.000 | 0.000 |
| d | 7.41106 | 5.0 | 0.08 | 0.2 | 11.54 | 276 | 2.446749222 | 5.17 | 0.00 | 0.00 | 160.11 | 55662.54 | 55662.54 | 55662.54 | 0.000 | 0 | 0.000 | 0.000 |
| e | 0.17893 | 5.0 | 0.17 | 0.3 | 11.54 | 273 | 2.456767713 | 10.96 | 0.00 | 0.00 | 159.84 | 53234.61 | 53234.61 | 53234.61 | 0.000 | 0 | 0.000 | 0.000 |
| f | -1.93332 | 5.0 | 0.25 | 0.3 | 9.77 | 269.5 | 2.468560144 | 16.37 | 0.00 | 0.00 | 103.94 | 24360.68 | 24360.68 | 24360.68 | 0.000 | 0 | 0.000 | 0.000 |
| | | 5.0 | 0.33 | 0.4 | 8 | 264.5 | 2.485604209 | 19.19 | 0.00 | 0.00 | 67.53 | 10890.10 | 10890.10 | 10890.10 | 0.000 | 0 | 0.000 | 0.000 |
| | | 5.0 | 0.42 | 0.5 | 8 | 258 | 2.508116544 | 20.77 | 0.00 | 0.00 | 67.27 | 9851.63 | 9851.63 | 9851.63 | 0.000 | 0 | 0.000 | 0.000 |
| | | 15.0 | 0.50 | 0.8 | 8 | 249 | 2.539969238 | 22.15 | 0.00 | 0.00 | 66.91 | 8549.22 | 8549.22 | 8549.22 | 0.000 | 0 | 0.000 | 0.000 |
| | | 15.0 | 0.75 | 1.0 | 8 | 241 | 2.5689697 | 25.58 | 0.00 | 0.00 | 66.59 | 7513.80 | 7513.80 | 7513.80 | 0.000 | 0 | 0.000 | 0.000 |
| | | 30.0 | 1.00 | 1.5 | 8 | 238.5 | 2.578168641 | 28.45 | 0.00 | 0.00 | 66.48 | 7212.32 | 7212.32 | 7212.32 | 0.000 | 0 | 0.000 | 0.000 |
| | | 30.0 | 1.50 | 2.0 | 8 | 237 | 2.583719695 | 33.84 | 0.00 | 0.00 | 66.42 | 7036.28 | 7036.28 | 7036.28 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 2.00 | 4.0 | 8 | 233.5 | 2.596765584 | 38.94 | 0.00 | 0.00 | 66.28 | 6639.28 | 6639.28 | 6639.28 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 4.00 | 6.0 | 8 | 228 | 2.617534573 | 57.42 | 0.00 | 0.00 | 66.04 | 6052.96 | 6052.96 | 6052.96 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 6.00 | 8.0 | 8 | 220.5 | 2.646397224 | 72.36 | 0.00 | 0.00 | 65.72 | 5323.13 | 5323.13 | 5323.13 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 8.00 | 10.0 | 8 | 213 | 2.675903489 | 83.83 | 0.00 | 0.00 | 65.40 | 4667.91 | 4667.91 | 4667.91 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 10.00 | 12.0 | 8 | 208 | 2.695942606 | 92.61 | 0.00 | 0.00 | 65.18 | 4269.53 | 4269.53 | 4269.53 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 12.00 | 14.0 | 8 | 203 | 2.716284123 | 99.78 | 0.00 | 99.78 | 64.96 | 3899.90 | -2091.08 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 14.00 | 16.0 | 8 | 198 | 2.736934937 | 102.13 | 0.00 | 102.13 | 64.73 | 3557.37 | -2055.62 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 240.0 | 16.00 | 20.0 | 8 | 193 | 2.757902156 | 104.29 | 0.00 | 104.29 | 64.50 | 3240.36 | -1998.78 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 240.0 | 20.00 | 24.0 | 8 | 187.5 | 2.781340297 | 108.24 | 0.00 | 108.24 | 64.25 | 2919.30 | -1999.11 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 720.0 | 24.00 | 36.0 | 8 | 180 | 2.813950943 | 111.79 | 0.00 | 111.79 | 63.90 | 2524.83 | -1892.70 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 720.0 | 36.00 | 48.0 | 8 | 170.5 | 2.85637209 | 121.11 | 0.00 | 121.11 | 63.44 | 2090.35 | -1900.10 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 1440.0 | 48.00 | 72.0 | 8 | 162 | 2.895426834 | 128.69 | 0.00 | 128.69 | 63.02 | 1756.76 | -1830.36 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 2880.0 | 72.00 | 120.0 | 8 | 158 | 2.914177473 | 141.37 | 0.00 | 141.37 | 62.83 | 1616.08 | -2020.43 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 3240.0 | 120.00 | 174.0 | 8 | 153 | 2.937960076 | 163.38 | 0.00 | 163.38 | 62.57 | 1453.73 | -2342.01 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 3960.0 | 174.00 | 240.0 | 8 | 143.85 | 2.982502651 | 183.30 | 0.00 | 183.30 | 62.11 | 1192.25 | -2326.52 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 7200.0 | 240.00 | 360.0 | 8 | 136.85 | 3.017501509 | 202.13 | 0.00 | 202.13 | 61.74 | 1020.24 | -2319.89 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 7200.0 | 360.00 | 480.0 | 8 | 132.15 | 3.04146531 | 225.81 | 0.00 | 225.81 | 61.49 | 917.01 | -2450.33 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 7200.0 | 480.00 | 600.0 | 8 | 126.25 | 3.072091753 | 225.81 | 0.00 | 225.81 | 61.18 | 800.14 | -2153.22 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 7200.0 | 600.00 | 720.0 | 8 | 121.1 | 3.099333643 | 225.81 | 0.00 | 225.81 | 60.90 | 708.76 | -1919.34 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |

| Constants | Value | Interval Duration (min) | Start of Interval (hrs) | End of Interval (hrs) | Ave Interval pH | Ave Temp (F) | 1000/T ($K^{-1}$) | Al All Mat | Al this Mat Only | Al (ppm) | K | k | R | Positive release rate (mg/kg- | interval pred release (kg) | Amount above start Mass | interval kg Al released | Integral kg Al released |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mass Material (kg) | 0 | 0.2 | 0.00 | 0.01 | 11.54 | 239 | 2.576323586 | 0 | 0 | 0.00 | 66.80 | 209.25 | 209.25 | 209.25 | 0.000 | 0 | 0.000 | 0.00000 |
| Mass Element (kg) | 0 | 0.2 | 0.01 | 0.0 | 11.54 | 255 | 2.518644969 | 0.75 | 0.00 | 0.00 | 93.27 | 325.22 | 325.22 | 325.22 | 0.000 | 0 | 0.000 | 0.000 |
| a | 5.529 | 0.5 | 0.01 | 0.0 | 11.54 | 264 | 2.487321569 | 1.75 | 0.00 | 0.00 | 111.81 | 413.22 | 413.22 | 413.22 | 0.000 | 0 | 0.000 | 0.000 |
| b | 0.2401 | 0.5 | 0.02 | 0.0 | 11.54 | 270 | 2.466868584 | 5.24 | 0.00 | 0.00 | 125.86 | 483.16 | 483.16 | 483.16 | 0.000 | 0 | 0.000 | 0.000 |
| c | -2.51326 | 3.5 | 0.03 | 0.1 | 11.54 | 274.5 | 2.451748233 | 9.08 | 0.00 | 0.00 | 137.36 | 542.37 | 542.37 | 542.37 | 0.000 | 0 | 0.000 | 0.000 |
| d | 8.48062 | 5.0 | 0.08 | 0.2 | 11.54 | 276 | 2.446749222 | 37.77 | 0.00 | 0.00 | 141.40 | 563.50 | 563.50 | 563.50 | 0.000 | 0 | 0.000 | 0.000 |
| e | 0.20749 | 5.0 | 0.17 | 0.3 | 11.54 | 273 | 2.456767713 | 79.22 | 0.00 | 0.00 | 133.43 | 521.95 | 521.95 | 521.95 | 0.000 | 0 | 0.000 | 0.000 |
| f | -3.32039 | 5.0 | 0.25 | 0.3 | 9.77 | 269.5 | 2.468560144 | 118.04 | 0.00 | 0.00 | 46.84 | 204.75 | 204.75 | 204.75 | 0.000 | 0 | 0.000 | 0.000 |
| | | 5.0 | 0.33 | 0.4 | 8 | 264.5 | 2.485604209 | 124.89 | 0.00 | 0.00 | 15.95 | 77.16 | 77.16 | 77.16 | 0.000 | 0 | 0.000 | 0.000 |
| | | 5.0 | 0.42 | 0.5 | 8 | 258 | 2.508116544 | 128.14 | 0.00 | 0.00 | 14.00 | 64.96 | 64.96 | 64.96 | 0.000 | 0 | 0.000 | 0.000 |
| | | 15.0 | 0.50 | 0.8 | 8 | 249 | 2.539969238 | 130.61 | 0.00 | 0.00 | 11.65 | 50.92 | 50.92 | 50.92 | 0.000 | 0 | 0.000 | 0.000 |
| | | 15.0 | 0.75 | 1.0 | 8 | 241 | 2.5689697 | 136.17 | 0.00 | 0.00 | 9.85 | 40.79 | 40.79 | 40.79 | 0.000 | 0 | 0.000 | 0.000 |
| | | 30.0 | 1.00 | 1.5 | 8 | 238.5 | 2.578168641 | 141.23 | 0.00 | 0.00 | 9.34 | 38.02 | 38.02 | 38.02 | 0.000 | 0 | 0.000 | 0.000 |
| | | 30.0 | 1.50 | 2.0 | 8 | 237 | 2.583719695 | 153.36 | 0.00 | 0.00 | 9.04 | 36.44 | 36.44 | 36.44 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 2.00 | 4.0 | 8 | 233.5 | 2.596765584 | 166.05 | 0.00 | 0.00 | 8.38 | 32.98 | 32.98 | 32.98 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 4.00 | 6.0 | 8 | 228 | 2.617534573 | 214.75 | 0.00 | 0.00 | 7.43 | 28.14 | 28.14 | 28.14 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 6.00 | 8.0 | 8 | 220.5 | 2.646397224 | 260.28 | 0.00 | 0.00 | 6.29 | 22.57 | 22.57 | 22.57 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 8.00 | 10.0 | 8 | 213 | 2.675903489 | 302.37 | 0.00 | 0.00 | 5.30 | 18.01 | 18.01 | 18.01 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 10.00 | 12.0 | 8 | 208 | 2.695942606 | 338.87 | 0.00 | 0.00 | 4.72 | 15.45 | 15.45 | 15.45 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 12.00 | 14.0 | 8 | 203 | 2.716284123 | 369.12 | 0.00 | 369.12 | 4.20 | 13.23 | -1149.59 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 14.00 | 16.0 | 8 | 198 | 2.736934937 | 394.66 | 0.00 | 394.66 | 3.73 | 11.29 | -1185.18 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 240.0 | 16.00 | 20.0 | 8 | 193 | 2.757902156 | 416.44 | 0.00 | 416.44 | 3.30 | 9.62 | -1204.64 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 240.0 | 20.00 | 24.0 | 8 | 187.5 | 2.781340297 | 452.99 | 0.00 | 452.99 | 2.88 | 8.04 | -1256.49 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 720.0 | 24.00 | 36.0 | 8 | 180 | 2.813950943 | 483.82 | 0.00 | 483.82 | 2.39 | 6.27 | -1264.89 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 720.0 | 36.00 | 48.0 | 8 | 170.5 | 2.85637209 | 555.36 | 0.00 | 555.36 | 1.87 | 4.53 | -1343.97 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 1440.0 | 48.00 | 72.0 | 8 | 162 | 2.895426834 | 605.73 | 0.00 | 605.73 | 1.49 | 3.36 | -1364.47 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 2880.0 | 72.00 | 120.0 | 8 | 158 | 2.914177473 | 676.22 | 0.00 | 676.22 | 1.34 | 2.91 | -1471.80 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 3240.0 | 120.00 | 174.0 | 8 | 153 | 2.937960076 | 785.61 | 0.00 | 785.61 | 1.16 | 2.43 | -1636.77 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 3960.0 | 174.00 | 240.0 | 8 | 143.85 | 2.982502651 | 875.72 | 0.00 | 875.72 | 0.90 | 1.73 | -1680.31 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 7200.0 | 240.00 | 360.0 | 8 | 136.85 | 3.017501509 | 945.41 | 0.00 | 945.41 | 0.73 | 1.32 | -1700.23 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 7200.0 | 360.00 | 480.0 | 8 | 132.15 | 3.04146531 | 1031.21 | 0.00 | 1031.21 | 0.64 | 1.10 | -1774.02 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 7200.0 | 480.00 | 600.0 | 8 | 126.25 | 3.072091753 | 1096.29 | 0.00 | 1096.29 | 0.54 | 0.87 | -1781.87 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 7200.0 | 600.00 | 720.0 | 8 | 121.1 | 3.099333643 | 1144.23 | 0.00 | 1144.23 | 0.46 | 0.71 | -1768.14 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |

| Constants | Value | Interval Duration (min) | Start of Interval (hrs) | End of Interval (hrs) | Ave Interval pH | Ave Temp (F) | 1000/T ($K^{-1}$) | Si All Mat | Si this Mat Only | Si (ppm) | K | k | R | Positive release rate (mg/kg- | interval pred release (kg) | Amount above start Mass | interval kg Si released | Integral kg Si released |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mass Material (kg) | 0 | 0.2 | 0.00 | 0.01 | 11.54 | 239 | 2.576323586 | 0 | 0 | 0.00 | 162.84 | 179.80 | 179.80 | 179.80 | 0.000 | 0 | 0.000 | 0.000 |
| Mass Element (kg) | 0 | 0.2 | 0.01 | 0.0 | 11.54 | 255 | 2.518644969 | 0.09 | 0.00 | 0.00 | 239.08 | 248.14 | 248.14 | 248.14 | 0.000 | 0 | 0.000 | 0.000 |
| a | 7.51336 | 0.5 | 0.01 | 0.0 | 11.54 | 264 | 2.487321569 | 0.22 | 0.00 | 0.00 | 294.53 | 295.57 | 295.57 | 295.57 | 0.000 | 0 | 0.000 | 0.000 |
| b | 0.18619 | 0.5 | 0.02 | 0.0 | 11.54 | 270 | 2.466868584 | 0.68 | 0.00 | 0.00 | 337.50 | 331.33 | 331.33 | 331.33 | 0.000 | 0 | 0.000 | 0.000 |
| c | -2.89181 | 3.5 | 0.03 | 0.1 | 11.54 | 274.5 | 2.451748233 | 1.20 | 0.00 | 0.00 | 373.25 | 360.53 | 360.53 | 360.53 | 0.000 | 0 | 0.000 | 0.000 |
| d | 7.17588 | 5.0 | 0.08 | 0.2 | 11.54 | 276 | 2.446749222 | 5.17 | 0.00 | 0.00 | 385.89 | 370.73 | 370.73 | 370.73 | 0.000 | 0 | 0.000 | 0.000 |
| e | 0.11502 | 5.0 | 0.17 | 0.3 | 11.54 | 273 | 2.456767713 | 10.96 | 0.00 | 0.00 | 360.98 | 350.56 | 350.56 | 350.56 | 0.000 | 0 | 0.000 | 0.000 |
| f | -2.42532 | 5.0 | 0.25 | 0.3 | 9.77 | 269.5 | 2.468560144 | 16.37 | 0.00 | 0.00 | 156.25 | 205.39 | 205.39 | 205.39 | 0.000 | 0 | 0.000 | 0.000 |
| | | 5.0 | 0.33 | 0.4 | 8 | 264.5 | 2.485604209 | 19.19 | 0.00 | 0.00 | 65.31 | 116.86 | 116.86 | 116.86 | 0.000 | 0 | 0.000 | 0.000 |
| | | 5.0 | 0.42 | 0.5 | 8 | 258 | 2.508116544 | 20.77 | 0.00 | 0.00 | 56.22 | 103.05 | 103.05 | 103.05 | 0.000 | 0 | 0.000 | 0.000 |
| | | 15.0 | 0.50 | 0.8 | 8 | 249 | 2.539969238 | 22.15 | 0.00 | 0.00 | 45.47 | 86.26 | 86.26 | 86.26 | 0.000 | 0 | 0.000 | 0.000 |
| | | 15.0 | 0.75 | 1.0 | 8 | 241 | 2.5689697 | 25.58 | 0.00 | 0.00 | 37.49 | 73.36 | 73.36 | 73.36 | 0.000 | 0 | 0.000 | 0.000 |
| | | 30.0 | 1.00 | 1.5 | 8 | 238.5 | 2.578168641 | 28.45 | 0.00 | 0.00 | 35.26 | 69.69 | 69.69 | 69.69 | 0.000 | 0 | 0.000 | 0.000 |
| | | 30.0 | 1.50 | 2.0 | 8 | 237 | 2.583719695 | 33.84 | 0.00 | 0.00 | 33.98 | 67.56 | 67.56 | 67.56 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 2.00 | 4.0 | 8 | 233.5 | 2.596765584 | 38.94 | 0.00 | 0.00 | 31.15 | 62.81 | 62.81 | 62.81 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 4.00 | 6.0 | 8 | 228 | 2.617534573 | 57.42 | 0.00 | 0.00 | 27.13 | 55.93 | 55.93 | 55.93 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 6.00 | 8.0 | 8 | 220.5 | 2.646397224 | 72.36 | 0.00 | 0.00 | 22.39 | 47.61 | 47.61 | 47.61 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 8.00 | 10.0 | 8 | 213 | 2.675903489 | 83.83 | 0.00 | 0.00 | 18.39 | 40.38 | 40.38 | 40.38 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 10.00 | 12.0 | 8 | 208 | 2.695942606 | 92.61 | 0.00 | 0.00 | 16.10 | 36.10 | 36.10 | 36.10 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 12.00 | 14.0 | 8 | 203 | 2.716284123 | 99.78 | 0.00 | 99.78 | 14.06 | 32.22 | -196.51 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 14.00 | 16.0 | 8 | 198 | 2.736934937 | 102.13 | 0.00 | 102.13 | 12.25 | 28.71 | -210.66 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 240.0 | 16.00 | 20.0 | 8 | 193 | 2.757902156 | 104.29 | 0.00 | 104.29 | 10.65 | 25.54 | -224.45 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 240.0 | 20.00 | 24.0 | 8 | 187.5 | 2.781340297 | 108.24 | 0.00 | 108.24 | 9.12 | 22.41 | -243.68 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 720.0 | 24.00 | 36.0 | 8 | 180 | 2.813950943 | 111.79 | 0.00 | 111.79 | 7.34 | 18.68 | -265.94 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 720.0 | 36.00 | 48.0 | 8 | 170.5 | 2.85637209 | 121.11 | 0.00 | 121.11 | 5.53 | 14.74 | -307.96 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 1440.0 | 48.00 | 72.0 | 8 | 162 | 2.895426834 | 128.69 | 0.00 | 128.69 | 4.26 | 11.85 | -345.74 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 2880.0 | 72.00 | 120.0 | 8 | 158 | 2.914177473 | 141.37 | 0.00 | 141.37 | 3.76 | 10.67 | -390.15 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 3240.0 | 120.00 | 174.0 | 8 | 153 | 2.937960076 | 163.38 | 0.00 | 163.38 | 3.21 | 9.34 | -465.88 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 3960.0 | 174.00 | 240.0 | 8 | 143.85 | 2.982502651 | 183.30 | 0.00 | 183.30 | 2.39 | 7.29 | -551.99 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 7200.0 | 240.00 | 360.0 | 8 | 136.85 | 3.017501509 | 202.13 | 0.00 | 202.13 | 1.89 | 5.99 | -634.38 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 7200.0 | 360.00 | 480.0 | 8 | 132.15 | 3.04146531 | 225.81 | 0.00 | 225.81 | 1.61 | 5.24 | -728.79 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 7200.0 | 480.00 | 600.0 | 8 | 126.25 | 3.072091753 | 225.81 | 0.00 | 225.81 | 1.32 | 4.42 | -754.16 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 7200.0 | 600.00 | 720.0 | 8 | 121.1 | 3.099333643 | 225.81 | 0.00 | 225.81 | 1.10 | 3.79 | -777.31 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |

| Constants | Value | Interval Duration (min) | Start of Interval (hrs) | End of Interval (hrs) | Ave Interval pH | Ave Temp (F) | 1000/T ($K^{-1}$) | Ca All Mat | Ca this Mat Only | Ca (ppm) | K | k | R | Positive release rate (mg/kg- | interval pred release (kg) | Amount above start Mass | interval kg Ca released | Integral kg Ca released |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mass Material (kg) | 0 | 0.2 | 0.00 | 0.01 | 11.54 | 239 | 2.576323586 | 0 | 0 | 0.00 | 36.49 | 47.21 | 47.21 | 47.21 | 0.000 | 0 | 0.000 | 0.0000 |
| Mass Element (kg) | 0 | 0.2 | 0.01 | 0.0 | 11.54 | 255 | 2.518644969 | 0.01 | 0.00 | 0.00 | 40.72 | 50.61 | 50.61 | 50.61 | 0.000 | 0 | 0.000 | 0.000 |
| a | 2.30159 | 0.5 | 0.01 | 0.0 | 11.54 | 264 | 2.487321569 | 0.01 | 0.00 | 0.00 | 43.22 | 52.57 | 52.57 | 52.57 | 0.000 | 0 | 0.000 | 0.000 |
| b | 0.12022 | 0.5 | 0.02 | 0.0 | 11.54 | 270 | 2.466868584 | 0.03 | 0.00 | 0.00 | 44.93 | 53.88 | 53.88 | 53.88 | 0.000 | 0 | 0.000 | 0.000 |
| c | -0.82549 | 3.5 | 0.03 | 0.1 | 11.54 | 274.5 | 2.451748233 | 0.05 | 0.00 | 0.00 | 46.24 | 54.87 | 54.87 | 54.87 | 0.000 | 0 | 0.000 | 0.000 |
| d | 1.98549 | 5.0 | 0.08 | 0.2 | 11.54 | 276 | 2.446749222 | 0.20 | 0.00 | 0.00 | 46.68 | 55.21 | 55.21 | 55.21 | 0.000 | 0 | 0.000 | 0.000 |
| e | 0.09009 | 5.0 | 0.17 | 0.3 | 11.54 | 273 | 2.456767713 | 0.41 | 0.00 | 0.00 | 45.80 | 54.54 | 54.54 | 54.54 | 0.000 | 0 | 0.000 | 0.000 |
| f | -0.52443 | 5.0 | 0.25 | 0.3 | 9.77 | 269.5 | 2.468560144 | 0.61 | 0.00 | 0.00 | 27.44 | 37.25 | 37.25 | 37.25 | 0.000 | 0 | 0.000 | 0.000 |
| | | 5.0 | 0.33 | 0.4 | 8 | 264.5 | 2.485604209 | 0.80 | 0.00 | 0.00 | 16.27 | 25.27 | 25.27 | 25.27 | 0.000 | 0 | 0.000 | 0.000 |
| | | 5.0 | 0.42 | 0.5 | 8 | 258 | 2.508116544 | 0.99 | 0.00 | 0.00 | 15.59 | 24.60 | 24.60 | 24.60 | 0.000 | 0 | 0.000 | 0.000 |
| | | 15.0 | 0.50 | 0.8 | 8 | 249 | 2.539969238 | 1.17 | 0.00 | 0.00 | 14.68 | 23.67 | 23.67 | 23.67 | 0.000 | 0 | 0.000 | 0.000 |
| | | 15.0 | 0.75 | 1.0 | 8 | 241 | 2.5689697 | 1.70 | 0.00 | 0.00 | 13.89 | 22.85 | 22.85 | 22.85 | 0.000 | 0 | 0.000 | 0.000 |
| | | 30.0 | 1.00 | 1.5 | 8 | 238.5 | 2.578168641 | 2.21 | 0.00 | 0.00 | 13.65 | 22.60 | 22.60 | 22.60 | 0.000 | 0 | 0.000 | 0.000 |
| | | 30.0 | 1.50 | 2.0 | 8 | 237 | 2.583719695 | 3.20 | 0.00 | 0.00 | 13.51 | 22.45 | 22.45 | 22.45 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 2.00 | 4.0 | 8 | 233.5 | 2.596765584 | 4.15 | 0.00 | 0.00 | 13.17 | 22.10 | 22.10 | 22.10 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 4.00 | 6.0 | 8 | 228 | 2.617534573 | 7.83 | 0.00 | 0.00 | 12.66 | 21.55 | 21.55 | 21.55 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 6.00 | 8.0 | 8 | 220.5 | 2.646397224 | 11.04 | 0.00 | 0.00 | 11.99 | 20.81 | 20.81 | 20.81 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 8.00 | 10.0 | 8 | 213 | 2.675903489 | 13.92 | 0.00 | 0.00 | 11.33 | 20.09 | 20.09 | 20.09 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 10.00 | 12.0 | 8 | 208 | 2.695942606 | 16.57 | 0.00 | 0.00 | 10.91 | 19.61 | 19.61 | 19.61 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 12.00 | 14.0 | 8 | 203 | 2.716284123 | 19.05 | 0.00 | 19.05 | 10.50 | 19.13 | -15.59 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 14.00 | 16.0 | 8 | 198 | 2.736934937 | 20.19 | 0.00 | 20.19 | 10.09 | 18.66 | -18.66 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 240.0 | 16.00 | 20.0 | 8 | 193 | 2.757902156 | 21.43 | 0.00 | 21.43 | 9.70 | 18.19 | -22.00 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 240.0 | 20.00 | 24.0 | 8 | 187.5 | 2.781340297 | 24.15 | 0.00 | 24.15 | 9.28 | 17.68 | -28.36 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 720.0 | 24.00 | 36.0 | 8 | 180 | 2.813950943 | 27.04 | 0.00 | 27.04 | 8.72 | 17.00 | -35.73 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 720.0 | 36.00 | 48.0 | 8 | 170.5 | 2.85637209 | 36.98 | 0.00 | 36.98 | 8.04 | 16.15 | -58.11 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 1440.0 | 48.00 | 72.0 | 8 | 162 | 2.895426834 | 47.01 | 0.00 | 47.01 | 7.47 | 15.41 | -81.59 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 2880.0 | 72.00 | 120.0 | 8 | 158 | 2.914177473 | 68.08 | 0.00 | 68.08 | 7.21 | 15.06 | -127.25 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 3240.0 | 120.00 | 174.0 | 8 | 153 | 2.937960076 | 90.46 | 0.00 | 90.46 | 6.89 | 14.64 | -177.59 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 3960.0 | 174.00 | 240.0 | 8 | 143.85 | 2.982502651 | 95.74 | 0.00 | 95.74 | 6.33 | 13.87 | -195.96 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 7200.0 | 240.00 | 360.0 | 8 | 136.85 | 3.017501509 | 129.07 | 0.00 | 129.07 | 5.92 | 13.30 | -276.54 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 7200.0 | 360.00 | 480.0 | 8 | 132.15 | 3.04146531 | 143.24 | 0.00 | 143.24 | 5.66 | 12.92 | -314.12 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 7200.0 | 480.00 | 600.0 | 8 | 126.25 | 3.072091753 | 160.01 | 0.00 | 160.01 | 5.34 | 12.45 | -360.70 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 7200.0 | 600.00 | 720.0 | 8 | 121.1 | 3.099333643 | 192.35 | 0.00 | 192.35 | 5.07 | 12.05 | -445.08 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |

| Constants | Value | Interval Duration (min) | Start of Interval (hrs) | End of Interval (hrs) | Ave Interval pH | Ave Temp (F) | 1000/T ($K^{-1}$) | Al All Mat | Al this Mat Only | Al (ppm) | K | k | R | Positive release rate (mg/kg-min) | interval pred release (kg) | Amount above start Mass | interval kg Al released | Integral kg Al released |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mass Material (kg) | 0 | 0.2 | 0.00 | 0.01 | 11.54 | 239 | 2.576323586 | 0 | 0 | 0.00 | 19.69 | 33.66 | 33.66 | 33.66 | 0.000 | 0 | 0.000 | 0.000 |
| Mass Element (kg) | 0 | 0.2 | 0.01 | 0.0 | 11.54 | 255 | 2.518644969 | 0.75 | 0.00 | 0.00 | 19.15 | 47.36 | 47.36 | 47.36 | 0.000 | 0 | 0.000 | 0.000 |
| a | -1.062762025 | 0.5 | 0.01 | 0.0 | 11.54 | 264 | 2.487321569 | 1.75 | 0.00 | 0.00 | 18.87 | 57.02 | 57.02 | 57.02 | 0.000 | 0 | 0.000 | 0.000 |
| b | 0.157710607 | 0.5 | 0.02 | 0.0 | 11.54 | 270 | 2.466868584 | 5.24 | 0.00 | 0.00 | 18.68 | 64.37 | 64.37 | 64.37 | 0.000 | 0 | 0.000 | 0.000 |
| c | 0.208439712 | 3.5 | 0.03 | 0.1 | 11.54 | 274.5 | 2.451748233 | 9.08 | 0.00 | 0.00 | 18.55 | 70.40 | 70.40 | 70.40 | 0.000 | 0 | 0.000 | 0.000 |
| d | 6.629 | 5.0 | 0.08 | 0.2 | 11.54 | 276 | 2.446749222 | 37.77 | 0.00 | 0.00 | 18.50 | 72.51 | 72.51 | 72.51 | 0.000 | 0 | 0.000 | 0.000 |
| e | 0.13222 | 5.0 | 0.17 | 0.3 | 11.54 | 273 | 2.456767713 | 79.22 | 0.00 | 0.00 | 18.59 | 68.33 | 68.33 | 68.33 | 0.000 | 0 | 0.000 | 0.000 |
| f | -2.57256 | 5.0 | 0.25 | 0.3 | 9.77 | 269.5 | 2.468560144 | 118.04 | 0.00 | 0.00 | 9.83 | 37.18 | 37.18 | 37.18 | 0.000 | 0 | 0.000 | 0.000 |
| | | 5.0 | 0.33 | 0.4 | 8 | 264.5 | 2.485604209 | 124.89 | 0.00 | 0.00 | 5.21 | 19.61 | 19.61 | 19.61 | 0.000 | 0 | 0.000 | 0.000 |
| | | 5.0 | 0.42 | 0.5 | 8 | 258 | 2.508116544 | 128.14 | 0.00 | 0.00 | 5.27 | 17.16 | 17.16 | 17.16 | 0.000 | 0 | 0.000 | 0.000 |
| | | 15.0 | 0.50 | 0.8 | 8 | 249 | 2.539969238 | 130.61 | 0.00 | 0.00 | 5.35 | 14.21 | 14.21 | 14.21 | 0.000 | 0 | 0.000 | 0.000 |
| | | 15.0 | 0.75 | 1.0 | 8 | 241 | 2.5689697 | 136.17 | 0.00 | 0.00 | 5.42 | 11.97 | 11.97 | 11.97 | 0.000 | 0 | 0.000 | 0.000 |
| | | 30.0 | 1.00 | 1.5 | 8 | 238.5 | 2.578168641 | 141.23 | 0.00 | 0.00 | 5.45 | 11.33 | 11.33 | 11.33 | 0.000 | 0 | 0.000 | 0.000 |
| | | 30.0 | 1.50 | 2.0 | 8 | 237 | 2.583719695 | 153.36 | 0.00 | 0.00 | 5.46 | 10.96 | 10.96 | 10.96 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 2.00 | 4.0 | 8 | 233.5 | 2.596765584 | 166.05 | 0.00 | 0.00 | 5.50 | 10.15 | 10.15 | 10.15 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 4.00 | 6.0 | 8 | 228 | 2.617534573 | 214.75 | 0.00 | 0.00 | 5.55 | 8.97 | 8.97 | 8.97 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 6.00 | 8.0 | 8 | 220.5 | 2.646397224 | 260.28 | 0.00 | 0.00 | 5.63 | 7.56 | 7.56 | 7.56 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 8.00 | 10.0 | 8 | 213 | 2.675903489 | 302.37 | 0.00 | 0.00 | 5.71 | 6.35 | 6.35 | 6.35 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 10.00 | 12.0 | 8 | 208 | 2.695942606 | 338.87 | 0.00 | 0.00 | 5.77 | 5.64 | 5.64 | 5.64 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 12.00 | 14.0 | 8 | 203 | 2.716284123 | 369.12 | 0.00 | 369.12 | 5.82 | 5.00 | -311.97 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 14.00 | 16.0 | 8 | 198 | 2.736934937 | 394.66 | 0.00 | 394.66 | 5.88 | 4.42 | -292.50 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 240.0 | 16.00 | 20.0 | 8 | 193 | 2.757902156 | 416.44 | 0.00 | 416.44 | 5.94 | 3.91 | -270.04 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 240.0 | 20.00 | 24.0 | 8 | 187.5 | 2.781340297 | 452.99 | 0.00 | 452.99 | 6.01 | 3.40 | -253.06 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 720.0 | 24.00 | 36.0 | 8 | 180 | 2.813950943 | 483.82 | 0.00 | 483.82 | 6.10 | 2.80 | -219.49 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 720.0 | 36.00 | 48.0 | 8 | 170.5 | 2.85637209 | 555.36 | 0.00 | 555.36 | 6.23 | 2.18 | -192.28 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 1440.0 | 48.00 | 72.0 | 8 | 162 | 2.895426834 | 605.73 | 0.00 | 605.73 | 6.35 | 1.73 | -163.44 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 2880.0 | 72.00 | 120.0 | 8 | 158 | 2.914177473 | 676.22 | 0.00 | 676.22 | 6.40 | 1.55 | -161.98 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 3240.0 | 120.00 | 174.0 | 8 | 153 | 2.937960076 | 785.61 | 0.00 | 785.61 | 6.48 | 1.34 | -161.80 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 3960.0 | 174.00 | 240.0 | 8 | 143.85 | 2.982502651 | 875.72 | 0.00 | 875.72 | 6.62 | 1.03 | -135.70 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 7200.0 | 240.00 | 360.0 | 8 | 136.85 | 3.017501509 | 945.41 | 0.00 | 945.41 | 6.73 | 0.84 | -117.13 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 7200.0 | 360.00 | 480.0 | 8 | 132.15 | 3.04146531 | 1031.21 | 0.00 | 1031.21 | 6.81 | 0.73 | -109.65 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 7200.0 | 480.00 | 600.0 | 8 | 126.25 | 3.072091753 | 1096.29 | 0.00 | 1096.29 | 6.91 | 0.61 | -95.84 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 7200.0 | 600.00 | 720.0 | 8 | 121.1 | 3.099333643 | 1144.23 | 0.00 | 1144.23 | 7.00 | 0.52 | -84.03 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |

| Constants | Value | Interval Duration (min) | Start of Interval (hrs) | End of Interval (hrs) | Ave Interval pH | Ave Temp (F) | 1000/T ($K^{-1}$) | Si All Mat | Si this Mat Only | Si (ppm) | K | k | R | Positive release rate (mg/kg- | interval pred release (kg) | Amount above start Mass | interval kg Si released | Integral kg Si released |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mass Material (kg) | 0 | 0.2 | 0.00 | 0.01 | 11.54 | 239 | 2.576323586 | 0 | 0 | 0.00 | 72.01 | 244.03 | 244.03 | 244.03 | 0.000 | 0 | 0.000 | 0.0000 |
| Mass Element (kg) | 0 | 0.2 | 0.01 | 0.0 | 11.54 | 255 | 2.518644969 | 0.09 | 0.00 | 0.00 | 84.90 | 325.72 | 325.72 | 325.72 | 0.000 | 0 | 0.000 | 0.000 |
| a | 3.262764542 | 0.5 | 0.01 | 0.0 | 11.54 | 264 | 2.487321569 | 0.22 | 0.00 | 0.00 | 92.84 | 381.02 | 381.02 | 381.02 | 0.000 | 0 | 0.000 | 0.000 |
| b | 0.155049444 | 0.5 | 0.02 | 0.0 | 11.54 | 270 | 2.466868584 | 0.68 | 0.00 | 0.00 | 98.43 | 422.10 | 422.10 | 422.10 | 0.000 | 0 | 0.000 | 0.000 |
| c | -1.240000065 | 3.5 | 0.03 | 0.1 | 11.54 | 274.5 | 2.451748233 | 1.20 | 0.00 | 0.00 | 102.77 | 455.30 | 455.30 | 455.30 | 0.000 | 0 | 0.000 | 0.000 |
| d | 6.07665 | 5.0 | 0.08 | 0.2 | 11.54 | 276 | 2.446749222 | 5.17 | 0.00 | 0.00 | 104.25 | 466.83 | 466.83 | 466.83 | 0.000 | 0 | 0.000 | 0.000 |
| e | 0.16569 | 5.0 | 0.17 | 0.3 | 11.54 | 273 | 2.456767713 | 10.96 | 0.00 | 0.00 | 101.31 | 444.00 | 444.00 | 444.00 | 0.000 | 0 | 0.000 | 0.000 |
| f | -2.17413 | 5.0 | 0.25 | 0.3 | 9.77 | 269.5 | 2.468560144 | 16.37 | 0.00 | 0.00 | 52.07 | 213.04 | 213.04 | 213.04 | 0.000 | 0 | 0.000 | 0.000 |
| | | 5.0 | 0.33 | 0.4 | 8 | 264.5 | 2.485604209 | 19.19 | 0.00 | 0.00 | 26.36 | 99.57 | 99.57 | 99.57 | 0.000 | 0 | 0.000 | 0.000 |
| | | 5.0 | 0.42 | 0.5 | 8 | 258 | 2.508116544 | 20.77 | 0.00 | 0.00 | 24.72 | 88.96 | 88.96 | 88.96 | 0.000 | 0 | 0.000 | 0.000 |
| | | 15.0 | 0.50 | 0.8 | 8 | 249 | 2.539969238 | 22.15 | 0.00 | 0.00 | 22.57 | 75.85 | 75.85 | 75.85 | 0.000 | 0 | 0.000 | 0.000 |
| | | 15.0 | 0.75 | 1.0 | 8 | 241 | 2.5689697 | 25.58 | 0.00 | 0.00 | 20.78 | 65.60 | 65.60 | 65.60 | 0.000 | 0 | 0.000 | 0.000 |
| | | 30.0 | 1.00 | 1.5 | 8 | 238.5 | 2.578168641 | 28.45 | 0.00 | 0.00 | 20.24 | 62.65 | 62.65 | 62.65 | 0.000 | 0 | 0.000 | 0.000 |
| | | 30.0 | 1.50 | 2.0 | 8 | 237 | 2.583719695 | 33.84 | 0.00 | 0.00 | 19.92 | 60.93 | 60.93 | 60.93 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 2.00 | 4.0 | 8 | 233.5 | 2.596765584 | 38.94 | 0.00 | 0.00 | 19.19 | 57.08 | 57.08 | 57.08 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 4.00 | 6.0 | 8 | 228 | 2.617534573 | 57.42 | 0.00 | 0.00 | 18.09 | 51.44 | 51.44 | 51.44 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 6.00 | 8.0 | 8 | 220.5 | 2.646397224 | 72.36 | 0.00 | 0.00 | 16.66 | 44.52 | 44.52 | 44.52 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 8.00 | 10.0 | 8 | 213 | 2.675903489 | 83.83 | 0.00 | 0.00 | 15.31 | 38.41 | 38.41 | 38.41 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 10.00 | 12.0 | 8 | 208 | 2.695942606 | 92.61 | 0.00 | 0.00 | 14.46 | 34.74 | 34.74 | 34.74 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 12.00 | 14.0 | 8 | 203 | 2.716284123 | 99.78 | 0.00 | 99.78 | 13.64 | 31.38 | -198.08 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 14.00 | 16.0 | 8 | 198 | 2.736934937 | 102.13 | 0.00 | 102.13 | 12.86 | 28.30 | -196.36 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 240.0 | 16.00 | 20.0 | 8 | 193 | 2.757902156 | 104.29 | 0.00 | 104.29 | 12.12 | 25.48 | -193.81 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 240.0 | 20.00 | 24.0 | 8 | 187.5 | 2.781340297 | 108.24 | 0.00 | 108.24 | 11.33 | 22.66 | -193.75 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 720.0 | 24.00 | 36.0 | 8 | 180 | 2.813950943 | 111.79 | 0.00 | 111.79 | 10.32 | 19.24 | -189.12 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 720.0 | 36.00 | 48.0 | 8 | 170.5 | 2.85637209 | 121.11 | 0.00 | 121.11 | 9.15 | 15.56 | -190.48 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 1440.0 | 48.00 | 72.0 | 8 | 162 | 2.895426834 | 128.69 | 0.00 | 128.69 | 8.18 | 12.80 | -188.50 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 2880.0 | 72.00 | 120.0 | 8 | 158 | 2.914177473 | 141.37 | 0.00 | 141.37 | 7.75 | 11.65 | -200.75 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 3240.0 | 120.00 | 174.0 | 8 | 153 | 2.937960076 | 163.38 | 0.00 | 163.38 | 7.25 | 10.34 | -222.89 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 3960.0 | 174.00 | 240.0 | 8 | 143.85 | 2.982502651 | 183.30 | 0.00 | 183.30 | 6.38 | 8.28 | -229.48 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 7200.0 | 240.00 | 360.0 | 8 | 136.85 | 3.017501509 | 202.13 | 0.00 | 202.13 | 5.77 | 6.95 | -236.22 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 7200.0 | 360.00 | 480.0 | 8 | 132.15 | 3.04146531 | 225.81 | 0.00 | 225.81 | 5.39 | 6.16 | -251.84 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 7200.0 | 480.00 | 600.0 | 8 | 126.25 | 3.072091753 | 225.81 | 0.00 | 225.81 | 4.94 | 5.28 | -236.27 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 7200.0 | 600.00 | 720.0 | 8 | 121.1 | 3.099333643 | 225.81 | 0.00 | 225.81 | 4.57 | 4.61 | -223.20 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |

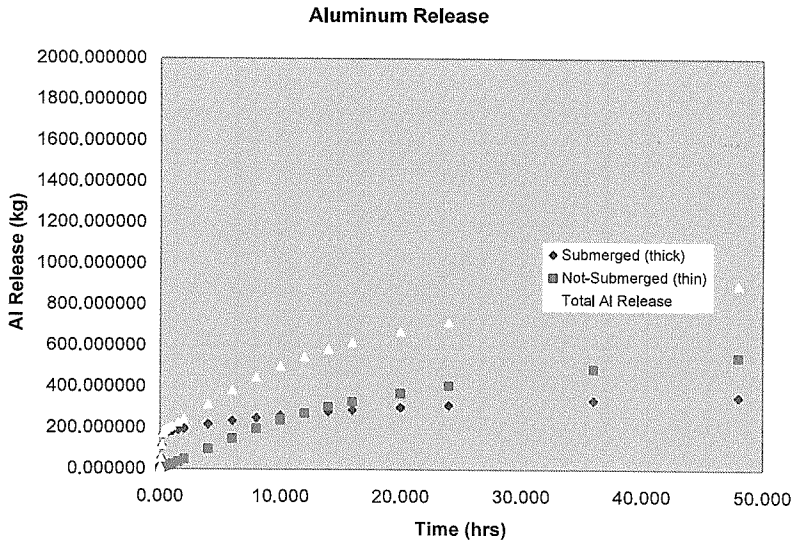
| Constants | Value | Interval Duration (min) | Start of Interval (hrs) | End of Interval (hrs) | Ave Interval pH | Ave Temp (F) | 1000/T ($K^{-1}$) | Si All Mat | Si this Mat Only | Si (ppm) | K | k | R | Positive release rate (mg/kg-min) | interval pred release (kg) | Amount above start Mass | interval kg Si released | Integral kg Si released |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mass Material (kg) | 0 | 0.2 | 0.00 | 0.01 | 11.54 | 239 | 2.576323586 | 0 | 0 | 0.00 | 17.34 | 12770.98 | 12770.98 | 12770.98 | 0.000 | 0 | 0.000 | 0.000 |
| Mass Element (kg) | 0 | 0.2 | 0.01 | 0.0 | 11.54 | 255 | 2.518644969 | 0.09 | 0.00 | 0.00 | 18.27 | 28557.66 | 28557.66 | 28557.66 | 0.000 | 0 | 0.000 | 0.000 |
| a | 0.974998166 | 0.5 | 0.01 | 0.0 | 11.54 | 264 | 2.487321569 | 0.22 | 0.00 | 0.00 | 18.80 | 44210.36 | 44210.36 | 44210.36 | 0.000 | 0 | 0.000 | 0.000 |
| b | 0.111219937 | 0.5 | 0.02 | 0.0 | 11.54 | 270 | 2.466868584 | 0.68 | 0.00 | 0.00 | 19.16 | 58810.79 | 58810.79 | 58810.79 | 0.000 | 0 | 0.000 | 0.000 |
| c | -0.395709671 | 3.5 | 0.03 | 0.1 | 11.54 | 274.5 | 2.451748233 | 1.20 | 0.00 | 0.00 | 19.42 | 72623.54 | 72623.54 | 72623.54 | 0.000 | 0 | 0.000 | 0.000 |
| d | 15.69692 | 5.0 | 0.08 | 0.2 | 11.54 | 276 | 2.446749222 | 5.17 | 0.00 | 0.00 | 19.51 | 77869.70 | 77869.70 | 77869.70 | 0.000 | 0 | 0.000 | 0.000 |
| e | 0.34838 | 5.0 | 0.17 | 0.3 | 11.54 | 273 | 2.456767713 | 10.96 | 0.00 | 0.00 | 19.33 | 67711.49 | 67711.49 | 67711.49 | 0.000 | 0 | 0.000 | 0.000 |
| f | -6.05941 | 5.0 | 0.25 | 0.3 | 9.77 | 269.5 | 2.468560144 | 16.37 | 0.00 | 0.00 | 12.16 | 13885.92 | 13885.92 | 13885.92 | 0.000 | 0 | 0.000 | 0.000 |
| | | 5.0 | 0.33 | 0.4 | 8 | 264.5 | 2.485504209 | 19.19 | 0.00 | 0.00 | 7.61 | 2646.46 | 2646.46 | 2646.46 | 0.000 | 0 | 0.000 | 0.000 |
| | | 5.0 | 0.42 | 0.5 | 8 | 258 | 2.508116544 | 20.77 | 0.00 | 0.00 | 7.45 | 1933.10 | 1933.10 | 1933.10 | 0.000 | 0 | 0.000 | 0.000 |
| | | 15.0 | 0.50 | 0.8 | 8 | 249 | 2.539969238 | 22.15 | 0.00 | 0.00 | 7.24 | 1239.50 | 1239.50 | 1239.50 | 0.000 | 0 | 0.000 | 0.000 |
| | | 15.0 | 0.75 | 1.0 | 8 | 241 | 2.5689697 | 25.58 | 0.00 | 0.00 | 7.05 | 827.03 | 827.03 | 827.03 | 0.000 | 0 | 0.000 | 0.000 |
| | | 30.0 | 1.00 | 1.5 | 8 | 238.5 | 2.578168641 | 28.45 | 0.00 | 0.00 | 6.99 | 727.41 | 727.41 | 727.41 | 0.000 | 0 | 0.000 | 0.000 |
| | | 30.0 | 1.50 | 2.0 | 8 | 237 | 2.583719695 | 33.84 | 0.00 | 0.00 | 6.96 | 673.20 | 673.20 | 673.20 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 2.00 | 4.0 | 8 | 233.5 | 2.596765584 | 38.94 | 0.00 | 0.00 | 6.87 | 561.17 | 561.17 | 561.17 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 4.00 | 6.0 | 8 | 228 | 2.617534573 | 57.42 | 0.00 | 0.00 | 6.74 | 420.00 | 420.00 | 420.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 6.00 | 8.0 | 8 | 220.5 | 2.646397224 | 72.36 | 0.00 | 0.00 | 6.57 | 280.77 | 280.77 | 280.77 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 8.00 | 10.0 | 8 | 213 | 2.675903489 | 83.83 | 0.00 | 0.00 | 6.40 | 186.02 | 186.02 | 186.02 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 10.00 | 12.0 | 8 | 208 | 2.695942606 | 92.61 | 0.00 | 0.00 | 6.28 | 140.65 | 140.65 | 140.65 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 12.00 | 14.0 | 8 | 203 | 2.716284123 | 99.78 | 0.00 | 99.78 | 6.16 | 105.90 | -1608.22 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 14.00 | 16.0 | 8 | 198 | 2.736934937 | 102.13 | 0.00 | 102.13 | 6.05 | 79.39 | -1260.88 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 240.0 | 16.00 | 20.0 | 8 | 193 | 2.757902156 | 104.29 | 0.00 | 104.29 | 5.94 | 59.25 | -981.88 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 240.0 | 20.00 | 24.0 | 8 | 187.5 | 2.781340297 | 108.24 | 0.00 | 108.24 | 5.81 | 42.72 | -753.30 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 720.0 | 24.00 | 36.0 | 8 | 180 | 2.813950943 | 111.79 | 0.00 | 111.79 | 5.64 | 27.11 | -510.23 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 720.0 | 36.00 | 48.0 | 8 | 170.5 | 2.85637209 | 121.11 | 0.00 | 121.11 | 5.43 | 15.00 | -319.76 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 1440.0 | 48.00 | 72.0 | 8 | 162 | 2.895426834 | 128.69 | 0.00 | 128.69 | 5.24 | 8.70 | -205.06 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 2880.0 | 72.00 | 120.0 | 8 | 158 | 2.914177473 | 141.37 | 0.00 | 141.37 | 5.15 | 6.70 | -177.18 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 3240.0 | 120.00 | 174.0 | 8 | 153 | 2.937960076 | 163.38 | 0.00 | 163.38 | 5.04 | 4.80 | -151.04 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 3960.0 | 174.00 | 240.0 | 8 | 143.85 | 2.982502651 | 183.30 | 0.00 | 183.30 | 4.84 | 2.58 | -95.22 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 7200.0 | 240.00 | 360.0 | 8 | 136.85 | 3.017501509 | 202.13 | 0.00 | 202.13 | 4.68 | 1.58 | -66.75 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 7200.0 | 360.00 | 480.0 | 8 | 132.15 | 3.04146531 | 225.81 | 0.00 | 225.81 | 4.58 | 1.13 | -54.71 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 7200.0 | 480.00 | 600.0 | 8 | 126.25 | 3.072091753 | 225.81 | 0.00 | 225.81 | 4.46 | 0.74 | -36.72 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 7200.0 | 600.00 | 720.0 | 8 | 121.1 | 3.099333643 | 225.81 | 0.00 | 225.81 | 4.35 | 0.51 | -25.75 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |

| Interval Duration (min) | Start of Interval (hrs) | End of Interval (hrs) | Average Interval pH | Ave. T (F) | 1000 /T Kelvin$^{-1}$ | pHa squared | pHa / (1000/T) | log prediction | corrosion rate (mg/m2-min) | interval mg Al released | interval kg Al released | Integral kg Al released | mass available Integral kg Al | Model term | coeff |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.2 | 0.00 | 0.0056 | 11.54 | 239 | 2.576323586 | 133.17 | 4.48 | 3.27476089 | 1882.6123 | 931395 | 0.931 | 1 | 0.9314 | Intercept | 14.69039 |
| 0.2 | 0.01 | 0.01 | 11.54 | 255 | 2.518644969 | 133.17 | 4.58 | 3.41947152 | 2627.0692 | 1299704 | 1.2997 | 2 | 2.231 | pHa | 0 |
| 0.5 | 0.01 | 0.02 | 11.54 | 264 | 2.487321569 | 133.17 | 4.64 | 3.49566461 | 3130.867 | 4646853 | 4.647 | 7 | 6.878 | 1000/T (K-1) | -4.64537 |
| 0.5 | 0.02 | 0.03 | 11.54 | 270 | 2.466868584 | 133.17 | 4.68 | 3.54446584 | 3503.2073 | 5199483 | 5.199 | 12 | 12.077 | pHa squared | 0.044554 |
| 3.5 | 0.03 | 0.08 | 11.54 | 274.5 | 2.451748233 | 133.17 | 4.71 | 3.58004763 | 3802.3109 | 39503901 | 39.504 | 52 | 51.581 | pHa/(1000/T) | -1.20131 |
| 5.0 | 0.08 | 0.17 | 11.54 | 276 | 2.446749222 | 133.17 | 4.72 | 3.59171727 | 3905.8654 | 57971106 | 57.971 | 110 | 109.552 | | |
| 5.0 | 0.17 | 0.25 | 11.54 | 273 | 2.456767713 | 133.17 | 4.70 | 3.5682829 | 3700.6916 | 54925905 | 54.926 | 164 | 164.478 | | |
| 5.0 | 0.25 | 0.33 | 9.77 | 269.5 | 2.468560144 | 95.45 | 3.96 | 2.72130634 | 526.38843 | 7812691 | 7.813 | 172 | 172.291 | | |
| 5.0 | 0.33 | 0.42 | 8 | 264.5 | 2.485604209 | 64.00 | 3.22 | 2.12883904 | 134.53617 | 1996794 | 1.997 | 174 | 174.288 | | |
| 5.0 | 0.42 | 0.50 | 8 | 258 | 2.508116544 | 64.00 | 3.19 | 2.05896551 | 114.5422 | 1700043 | 1.700 | 176 | 175.988 | | |
| 15.0 | 0.50 | 0.75 | 8 | 249 | 2.539969238 | 64.00 | 3.15 | 1.95905046 | 91.0019 | 4051968 | 4.052 | 180 | 180.040 | | |
| 15.0 | 0.75 | 1.00 | 8 | 241 | 2.5689697 | 64.00 | 3.11 | 1.86704593 | 73.628496 | 3278397 | 3.278 | 183 | 183.318 | | |
| 30.0 | 1.00 | 1.50 | 8 | 238.5 | 2.578168641 | 64.00 | 3.10 | 1.83766136 | 68.811554 | 6127833 | 6.128 | 189 | 189.446 | | |
| 30.0 | 1.50 | 2.00 | 8 | 237 | 2.583719695 | 64.00 | 3.10 | 1.81988342 | 66.051611 | 5882054 | 5.882 | 195 | 195.328 | | |
| 120.0 | 2.00 | 4.00 | 8 | 233.5 | 2.596765584 | 64.00 | 3.08 | 1.77796752 | 59.974622 | 21363533 | 21.364 | 217 | 216.692 | | |
| 120.0 | 4.00 | 6.00 | 8 | 228 | 2.617534573 | 64.00 | 3.06 | 1.71085331 | 51.387005 | 18304542 | 18.305 | 235 | 234.996 | | |
| 120.0 | 6.00 | 8.00 | 8 | 220.5 | 2.646397224 | 64.00 | 3.02 | 1.61681938 | 41.382753 | 14740932 | 14.741 | 250 | 249.737 | | |
| 120.0 | 8.00 | 10.00 | 8 | 213 | 2.675903489 | 64.00 | 2.99 | 1.51979563 | 33.097533 | 11789658 | 11.790 | 262 | 261.527 | | |
| 120.0 | 10.00 | 12.00 | 8 | 208 | 2.695942606 | 64.00 | 2.97 | 1.45340236 | 28.405495 | 10118309 | 10.118 | 272 | 271.645 | | |
| 120.0 | 12.00 | 14.00 | 8 | 203 | 2.716284123 | 64.00 | 2.95 | 1.38560433 | 24.299892 | 8655853 | 8.656 | 280 | 280.301 | | |
| 120.0 | 14.00 | 16.00 | 8 | 198 | 2.736934937 | 64.00 | 2.92 | 1.31636951 | 20.719034 | 7380318 | 7.380 | 288 | 287.681 | | |
| 240.0 | 16.00 | 20.00 | 8 | 193 | 2.757902156 | 64.00 | 2.90 | 1.24566487 | 17.606169 | 12542971 | 12.543 | 300 | 300.224 | | |
| 240.0 | 20.00 | 24.00 | 8 | 187.5 | 2.781340297 | 64.00 | 2.88 | 1.16615147 | 14.660591 | 10444485 | 10.444 | 311 | 310.669 | | |
| 720.0 | 24.00 | 36.00 | 8 | 180 | 2.813950943 | 64.00 | 2.84 | 1.05470673 | 11.342446 | 24241726 | 24.242 | 335 | 334.910 | | |
| 720.0 | 36.00 | 48.00 | 8 | 170.5 | 2.85637209 | 64.00 | 2.80 | 0.90836693 | 8.0977978 | 17307078 | 17.307 | 352 | 352.218 | | |
| 1440.0 | 48.00 | 72.00 | 8 | 162 | 2.895426834 | 64.00 | 2.76 | 0.77232615 | 5.9200606 | 25305386 | 25.305 | 378 | 377.523 | | |
| 2880.0 | 72.00 | 120.00 | 8 | 158 | 2.914177473 | 64.00 | 2.75 | 0.70657918 | 5.0883758 | 43500674 | 43.501 | 421 | 421.024 | | |
| 3240.0 | 120.00 | 174.00 | 8 | 153 | 2.937960076 | 64.00 | 2.72 | 0.62279605 | 4.1956191 | 40352029 | 40.352 | 461 | 461.376 | | |
| 3960.0 | 174.00 | 240.00 | 8 | 143.85 | 2.982502651 | 64.00 | 2.68 | 0.46473274 | 2.9156322 | 34273009 | 34.273 | 496 | 495.649 | | |
| 7200.0 | 240.00 | 360.00 | 8 | 136.85 | 3.017501509 | 64.00 | 2.65 | 0.3395243 | 2.1853666 | 46706908 | 46.707 | 542 | 542.356 | | |
| 7200.0 | 360.00 | 480.00 | 8 | 132.15 | 3.04146531 | 64.00 | 2.63 | 0.25329769 | 1.7918337 | 38296096 | 38.296 | 581 | 580.652 | | |
| 7200.0 | 480.00 | 600.00 | 8 | 126.25 | 3.072091753 | 64.00 | 2.60 | 0.14252766 | 1.3884417 | 29674572 | 29.675 | 610 | 610.326 | | |
| 7200.0 | 600.00 | 720.00 | 8 | 121.1 | 3.099333643 | 64.00 | 2.58 | 0.04347574 | 1.1052887 | 23622864 | 23.62 | 634 | 633.949 | | |

| Elapsed Time (min) | Interval Duration (min) | Start of Interval (hrs) | End of Interval (hrs) | Average Interval pH | Average Temperature (F) | 1000/T ($K^{-1}$) | pHa squared | pHa/(1000/T) | log prediction | corrosion rate (mg/m2-min) | interval mg Al released | interval Kg Al released | Integral kg Al released | mass available Integral kg Al |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.1666667 | 0.167 | 0.00 | 0.01 | 5.1 | 280.5 | 2.431873759 | 26.01 | 2.10 | 2.032967759 | 107.8866627 | 181659 | 0 | 0.182 | 0.1817 |
| 0 | 0.167 | 0.01 | 0.01 | 5.1 | 280 | 2.43351765 | 26.01 | 2.10 | 2.027033138 | 106.422422 | 179193 | 0.179 | 0.361 | 0.361 |
| 1 | 0.500 | 0.01 | 0.02 | 5.1 | 277.5 | 2.441770555 | 26.01 | 2.09 | 1.997204648 | 99.35841343 | 501897 | 0.502 | 0.863 | 0.863 |
| 1 | 0.500 | 0.02 | 0.03 | 5.1 | 274 | 2.453419112 | 26.01 | 2.08 | 1.955005821 | 90.15832222 | 455424 | 0.455 | 1.318 | 1.318 |
| 2 | 3.5 | 0.03 | 0.08 | 5.1 | 268.5 | 2.471950231 | 26.01 | 2.06 | 1.887642394 | 77.20446081 | 2729921 | 2.730 | 4.048 | 4.048 |
| 5 | 5.0 | 0.08 | 0.17 | 5.1 | 260 | 2.501146359 | 26.01 | 2.04 | 1.780947231 | 60.38752508 | 3050401 | 3.050 | 7.098 | 7.098 |
| 10 | 5.0 | 0.17 | 0.25 | 5.1 | 250 | 2.536390153 | 26.01 | 2.01 | 1.651264005 | 44.79855492 | 2262943 | 2.263 | 9.361 | 9.361 |
| 15 | 5.0 | 0.25 | 0.33 | 6.55 | 242.5 | 2.563481778 | 42.90 | 2.56 | 1.624061556 | 42.07862659 | 2125549 | 2.126 | 11.487 | 11.487 |
| 20 | 5.0 | 0.33 | 0.42 | 8 | 230 | 2.609943886 | 64.00 | 3.07 | 1.735436522 | 54.37966427 | 2746921 | 2.747 | 14.234 | 14.234 |
| 25 | 5.0 | 0.42 | 0.50 | 8 | 217.5 | 2.658121299 | 64.00 | 3.01 | 1.578374222 | 37.87688205 | 1913304 | 1.913 | 16.147 | 16.147 |
| 30 | 15.0 | 0.50 | 0.75 | 8 | 206.5 | 2.702013 | 64.00 | 2.96 | 1.433211892 | 27.11514253 | 4109063 | 4.109 | 20.256 | 20.256 |
| 45 | 15.0 | 0.75 | 1.00 | 8 | 207 | 2.6999865 | 64.00 | 2.96 | 1.439956147 | 27.53950611 | 4173372 | 4.173 | 24.430 | 24.430 |
| 60 | 30.0 | 1.00 | 1.50 | 8 | 218.5 | 2.654201749 | 64.00 | 3.01 | 1.591242813 | 39.01600634 | 11825070 | 11.825 | 36.255 | 36.255 |
| 90 | 30.0 | 1.50 | 2.00 | 8 | 221.5 | 2.642512148 | 64.00 | 3.03 | 1.629527827 | 42.61159856 | 12914831 | 12.915 | 49.170 | 49.170 |
| 120 | 120.0 | 2.00 | 4.00 | 8 | 221 | 2.644453259 | 64.00 | 3.03 | 1.623180232 | 41.99332201 | 50909768 | 50.910 | 100.079 | 100.079 |
| 240 | 120.0 | 4.00 | 6.00 | 8 | 220 | 2.648344049 | 64.00 | 3.02 | 1.610445242 | 40.77981409 | 49438596 | 49.439 | 149.518 | 149.518 |
| 360 | 120.0 | 6.00 | 8.00 | 8 | 219 | 2.652246305 | 64.00 | 3.02 | 1.597656988 | 39.59651714 | 48004050 | 48.004 | 197.522 | 197.522 |
| 480 | 120.0 | 8.00 | 10.00 | 8 | 215 | 2.667971008 | 64.00 | 3.00 | 1.545966601 | 35.15334048 | 42617453 | 42.617 | 240.139 | 240.139 |
| 600 | 120.0 | 10.00 | 12.00 | 8 | 208.5 | 2.693925199 | 64.00 | 2.97 | 1.460104381 | 28.84724753 | 34972387 | 34.972 | 275.112 | 275.112 |
| 720 | 120.0 | 12.00 | 14.00 | 8 | 203 | 2.716284123 | 64.00 | 2.95 | 1.385604335 | 24.29989153 | 29459490 | 29.459 | 304.571 | 304.571 |
| 840 | 120.0 | 14.00 | 16.00 | 8 | 198 | 2.736934937 | 64.00 | 2.92 | 1.316369513 | 20.71903446 | 25118309 | 25.118 | 329.690 | 329.690 |
| 960 | 240.0 | 16.00 | 20.00 | 8 | 192.5 | 2.76001656 | 64.00 | 2.90 | 1.238512267 | 17.31857949 | 41991671 | 41.992 | 371.681 | 371.681 |
| 1200 | 240.0 | 20.00 | 24.00 | 8 | 187.5 | 2.781340297 | 64.00 | 2.88 | 1.16615147 | 14.66059074 | 35546951 | 35.547 | 407.228 | 407.228 |
| 1440 | 720.0 | 24.00 | 36.00 | 8 | 180 | 2.813950943 | 64.00 | 2.84 | 1.05470673 | 11.34244624 | 82504734 | 82.505 | 489.733 | 489.733 |
| 2160 | 720.0 | 36.00 | 48.00 | 8 | 170 | 2.85864024 | 64.00 | 2.80 | 0.90050012 | 7.952434858 | 57845857 | 57.846 | 547.579 | 547.579 |
| 2880 | 1440.0 | 48.00 | 72.00 | 8 | 160 | 2.904771895 | 64.00 | 2.75 | 0.73959323 | 5.490264025 | 79872148 | 79.872 | 627.451 | 627.451 |
| 4320 | 2880.0 | 72.00 | 120.00 | 8 | 152.5 | 2.940359704 | 64.00 | 2.72 | 0.614318478 | 4.114513368 | 119715562 | 119.716 | 747.167 | 747.167 |
| 7200 | 3240.0 | 120.00 | 174.00 | 8 | 143.5 | 2.984233301 | 64.00 | 2.68 | 0.458561939 | 2.874497526 | 94090677 | 94.091 | 841.257 | 841.257 |
| 10440 | 3960.0 | 174.00 | 240.00 | 8 | 131.5 | 3.044809446 | 64.00 | 2.63 | 0.241233409 | 1.742743249 | 69721743 | 69.722 | 910.979 | 910.979 |
| 14400 | 7200.0 | 240.00 | 360.00 | 8 | 121.35 | 3.098000069 | 64.00 | 2.58 | 0.048335897 | 1.1177274 | 81303274 | 81.303 | 992.282 | 992.282 |
| 21600 | 7200.0 | 360.00 | 480.00 | 8 | 114.225 | 3.136462245 | 64.00 | 2.55 | -0.09229352 | 0.808549245 | 58813715 | 58.814 | 1051.096 | 1051.096 |
| 28800 | 7200.0 | 480.00 | 600.00 | 8 | 106.975 | 3.176592046 | 64.00 | 2.52 | -0.24000228 | 0.575436914 | 41857170 | 41.857 | 1092.953 | 1092.953 |
| 36000 | 7200.0 | 600.00 | 720.00 | 8 | 101.6 | 3.207012668 | 64.00 | 2.49 | -0.35261926 | 0.443997723 | 32296308 | 32.296 | 1125.249 | 1125.249 |

| Model term | Value |
|---|---|
| Intercept | 14.69039 |
| pHa | 0 |
| 1000/T (K-1) | -4.645366 |
| pHa squared | 0.044554 |
| pHa/(1000/T) | -1.20131 |

| Min | Time (hrs) | Submerged (thick) | Not-Submerged (thin) | Total Al Release |
|---|---|---|---|---|
| 0.33 | 0.006 | 0.931395 | 0.1817 | 1.1131 |
| 0.50 | 0.0 | 2.2 | 0.36 | 2.59 |
| 1.00 | 0.0 | 6.9 | 0.86 | 7.74 |
| 1.50 | 0.0 | 12.1 | 1.32 | 13.40 |
| 5.00 | 0.1 | 51.6 | 4.05 | 55.63 |
| 10.00 | 0.2 | 109.6 | 7.10 | 116.65 |
| 15.00 | 0.3 | 164.5 | 9.36 | 173.84 |
| 20.00 | 0.3 | 172.3 | 11.49 | 183.78 |
| 25.00 | 0.4 | 174.3 | 14.23 | 188.52 |
| 30.00 | 0.5 | 176.0 | 16.15 | 192.14 |
| 45.00 | 0.8 | 180.0 | 20.26 | 200.30 |
| 60.00 | 1.0 | 183.3 | 24.43 | 207.75 |
| 90.00 | 1.5 | 189.4 | 36.25 | 225.70 |
| 120.00 | 2.0 | 195.3 | 49.17 | 244.50 |
| 240.00 | 4.0 | 216.7 | 100.08 | 316.77 |
| 360.00 | 6.0 | 235.0 | 149.52 | 384.51 |
| 480.00 | 8.0 | 249.7 | 197.52 | 447.26 |
| 600.00 | 10.0 | 261.5 | 240.14 | 501.67 |
| 720.00 | 12.0 | 271.6 | 275.11 | 546.76 |
| 840.00 | 14.0 | 280.3 | 304.57 | 584.87 |
| 960.00 | 16.0 | 287.7 | 329.69 | 617.37 |
| 1200.00 | 20.0 | 300.2 | 371.68 | 671.91 |
| 1440.00 | 24.0 | 310.7 | 407.23 | 717.90 |
| 2160.00 | 36.0 | 334.9 | 489.73 | 824.64 |
| 2880.00 | 48.0 | 352.2 | 547.58 | 899.80 |
| 4320.00 | 72.0 | 377.5 | 627.45 | 1004.97 |
| 7200.00 | 120.0 | 421.0 | 747.17 | 1168.19 |
| 10440.00 | 174.0 | 461.4 | 841.26 | 1302.63 |
| 14400.00 | 240.0 | 495.6 | 910.98 | 1406.63 |
| 21600.00 | 360.0 | 542.4 | 992.28 | 1534.64 |
| 28800.00 | 480.0 | 580.7 | 1051.10 | 1631.75 |
| 36000.00 | 600.0 | 610.3 | 1092.95 | 1703.28 |
| 43200.00 | 720.0 | 633.9 | 1125.25 | 1759.20 |



Volume of water 1492064.774 kg / liters

Case 4.00
Break Break S2

| Source of Material Release | Quantity of Material Released (kg) | | |
|---|---|---|---|
| | Ca | Si | Al |
| Aluminum Metal Submerged | 0.000 | 0.000 | 633.949 |
| Aluminum Metal Not-Submerged | 0.000 | 0.000 | 1,125.249 |
| Concrete | 42.725 | 1.421 | 0.472 |
| E-glass (Fiberglass, Nukon) | 13.866 | 92.570 | 3.519 |
| Calcium Silicate (Cal-Sil, Marinite) | 233.600 | 242.929 | 0.000 |
| | | | |
| TOTAL Released Material | 290.191 | 336.920 | 1,763.189 |
| | | | |
| Concentration in the sump (mg/kg (mass dissolved divided by the sump pool mass) | 194.489 | 225.808 | 1,181.711 |

Si as $SiO_2$

MW Si 28.086
MW $SiO_2$ 60.085

720.781 kg

483.076 mg/kg

| Precipitate | Mass of Precipitate | | Concentration of Precipitate | |
|---|---|---|---|---|
| $NaAlSi_3O_8$ | 1,047.822 | kg | 702.263 | mg/kg |
| AlOOH | 3,674.932 | kg | 2,462.985 | mg/kg |
| $Ca_3(PO_4)_2$ | 748.692 | kg | 501.783 | mg/kg |
| TOTAL | 5,471.446 | kg | 3,667.030 | mg/kg |

| Source of Material Release | Mass of Precipitate (kg) | | | |
|---|---|---|---|---|
| | $Ca_3(PO_4)_2$ | $NaAlSiO_8$ | AlOOH | Total |
| Aluminum Metal Submerged | 0.000 | 188.370 | 1,321.310 | 1,509.681 |
| Aluminum Metal Not-Submerged | 0.000 | 334.354 | 2,345.304 | 2,679.659 |
| Concrete | 110.229 | 2.349 | 0.984 | 113.563 |
| E-glass (Fiberglass, Nukon) | 35.775 | 144.992 | 7.334 | 188.101 |
| Calcium Silicate (Cal-Sil, Marinite) | 602.688 | 377.755 | 0.000 | 980.443 |
| | | | | |
| TOTAL Precipitate | 748.692 | 1,047.822 | 3,674.932 | 5,471.446 |

| | | |
|---|---|---|
| Density of aluminum | 2.6989 | $g/cm^3$ |
| square feet to square cm | 929.03 | cm2/ft2 |
| cm to mils | 393.70 | mil/cm |

| | | |
|---|---|---|
| Area - submerged | 31,952 | $ft^2$ |
| Area - submerged | 29,684,088 | $cm^2$ |
| Aluminum dissolved | 633,949 | grams |
| Aluminum dissolved | 234,892 | $cm^3$ |
| | | |
| Reduction in thickness | 0.0079 | cm |
| Reduction in thickness | 3.1154 | mils |
| | | |
| Corrosion rate | 37.9036 | mils/year |
| | | |
| Original mass of aluminum | 1,634 | pounds |
| | 741 | kg |
| Fraction of mass dissolved | 85.5% | |

| | | |
|---|---|---|
| Area - not submerged | 108,745 | $ft^2$ |
| Area - not submerged | 101,027,367 | $cm^2$ |
| Aluminum dissolved | 1,125,249 | grams |
| Aluminum dissolved | 416,929 | $cm^3$ |
| | | |
| Reduction in thickness | 0.0041 | cm |
| Reduction in thickness | 1.6248 | mils |
| | | |
| Corrosion rate | 19.7679 | mils/year |
| | | |
| Original mass of aluminum | 5,756 | pounds |
| | 2,611 | kg |
| Fraction of mass dissolved | 43.1% | |

| Dissolved Chemicals (kg) | | | Precipitate (kg) |
|---|---|---|---|
| Ca | Si | Al | |
| 290.191 | 336.920 | 1,763.189 | 5,471.446 |

| Si (g) | Si (ppm) | $SiO_2$ (g) | $SiO_2$ (ppm) |
|---|---|---|---|
| 336,920 | 226 | 720,781 | 483 |

**ATTACHMENT 2**

Results from WCAP-16530-NP, Rev. 0
"Evaluation of Post-Accident Chemical Effects in Containment Sump Fluids to Support GSI-191"

DOCUMENT No. 2007-03464, REVISION 0
Pages 88 to 125 of 492

SPREADSHEET FOR PALISADES NUCLEAR PLANT
SODIUM TETRABORATE DECAHYDRATE (STB) BUFFER

39 Pages Follow

Attachment 1-B
Results of WCAP-16530-NP, Rev. 0, (OG-06-255 and OG-06-378)
Spreadsheet for Palisades Nuclear Power Plant Unit 1,
Break S2, Case 1B,
NaTB Buffer and 100% of the Aluminum and Water in the Reactor Cavity, pH 8

Chemical Effects Calculation

Palisades
Unit 1

Use saturation pH for 20 minutes

Start sump mixing after 12 hours
Stop spray after 30 days

5.1 SIRW Tank Water pH
9.32 Initial Sump pH
8.0 Equilibrium pH
Cases A 7 Equilibrium pH
Cases B 8 Equilibrium pH

| Time step | Start Time (sec) | Time (min) | Time (hour) | Time (day) | Sump Temp. (°F) | Sump Temp. Step | Cont. Temp. (°F) | Cont Temp. Step | Sump pH | Spray pH | Sump Mixed 1=yes | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 10 | 0.2 | 0.00 | 0.00 | 228.0 | | 280.0 | | 9.3 | 5.1 | 0 | |
| 2 | 20 | 0.3 | 0.01 | 0.00 | 250.0 | 22.00 | 281.0 | 1.00 | 9.3 | 5.1 | 0 | |
| 3 | 30 | 0.5 | 0.01 | 0.00 | 260.0 | 10.00 | 279.0 | -2.00 | 9.3 | 5.1 | 0 | |
| 4 | 60 | 1.0 | 0.02 | 0.00 | 268.0 | 8.00 | 276.0 | -3.00 | 9.3 | 5.1 | 0 | |
| 5 | 90 | 1.5 | 0.03 | 0.00 | 272.0 | 4.00 | 272.0 | -4.00 | 9.3 | 5.1 | 0 | |
| 6 | 300 | 5.0 | 0.08 | 0.00 | 277.0 | 5.00 | 265.0 | -7.00 | 9.3 | 5.1 | 0 | |
| 7 | 600 | 10.0 | 0.17 | 0.01 | 275.0 | -2.00 | 255.0 | -10.00 | 9.3 | 5.1 | 0 | |
| 8 | 900 | 15.0 | 0.25 | 0.01 | 271.0 | -4.00 | 245.0 | -10.00 | 9.3 | 5.1 | 0 | |
| 9 | 1200 | 20.0 | 0.33 | 0.01 | 268.0 | -3.00 | 240.0 | -5.00 | 8.0 | 8.0 | 0 | Switchover to recirc at 20 minutes |
| 10 | 1500 | 25.0 | 0.42 | 0.02 | 261.0 | -7.00 | 220.0 | -20.00 | 8.0 | 8.0 | 0 | |
| 11 | 1800 | 30.0 | 0.50 | 0.02 | 255.0 | -6.00 | 215.0 | -5.00 | 8.0 | 8.0 | 0 | |
| 12 | 2700 | 45.0 | 0.75 | 0.03 | 243.0 | -12.00 | 198.0 | -17.00 | 8.0 | 8.0 | 0 | |
| 13 | 3600 | 60.0 | 1.00 | 0.04 | 239.0 | -4.00 | 216.0 | 18.00 | 8.0 | 8.0 | 0 | |
| 14 | 5400 | 90.0 | 1.50 | 0.06 | 238.0 | -1.00 | 221.0 | 5.00 | 8.0 | 8.0 | 0 | |
| 15 | 7200 | 120.0 | 2.00 | 0.08 | 236.0 | -2.00 | 222.0 | 1.00 | 8.0 | 8.0 | 0 | |
| 16 | 14400 | 240.0 | 4.00 | 0.17 | 231.0 | -5.00 | 220.0 | -2.00 | 8.0 | 8.0 | 0 | |
| 17 | 21600 | 360.0 | 6.00 | 0.25 | 225.0 | -6.00 | 220.0 | 0.00 | 8.0 | 8.0 | 0 | |
| 18 | 28800 | 480.0 | 8.00 | 0.33 | 216.0 | -9.00 | 218.0 | -2.00 | 8.0 | 8.0 | 0 | |
| 19 | 36000 | 600.0 | 10.00 | 0.42 | 210.0 | -6.00 | 212.0 | -6.00 | 8.0 | 8.0 | 0 | |
| 20 | 43200 | 720.0 | 12.00 | 0.50 | 206.0 | -4.00 | 205.0 | -7.00 | 8.0 | 8.0 | 1 | Start Mixing at 12 hours |
| 21 | 50400 | 840.0 | 14.00 | 0.58 | 200.0 | -6.00 | 201.0 | -4.00 | 8.0 | 8.0 | 1 | |
| 22 | 57600 | 960.0 | 16.00 | 0.67 | 196.0 | -4.00 | 195.0 | -6.00 | 8.0 | 8.0 | 1 | |
| 23 | 72000 | 1200.0 | 20.00 | 0.83 | 190.0 | -6.00 | 190.0 | -5.00 | 8.0 | 8.0 | 1 | |
| 24 | 86400 | 1440.0 | 24.00 | 1.00 | 185.0 | -5.00 | 185.0 | -5.00 | 8.0 | 8.0 | 1 | |
| 25 | 129600 | 2160.0 | 36.00 | 1.50 | 175.0 | -10.00 | 175.0 | -10.00 | 8.0 | 8.0 | 1 | |
| 26 | 172800 | 2880.0 | 48.00 | 2.00 | 166.0 | -9.00 | 165.0 | -10.00 | 8.0 | 8.0 | 1 | |
| 27 | 259200 | 4320.0 | 72.00 | 3.00 | 158.0 | -8.00 | 155.0 | -10.00 | 8.0 | 8.0 | 1 | |
| 28 | 432000 | 7200.0 | 120.00 | 5.00 | 158.0 | 0.00 | 150.0 | -5.00 | 8.0 | 8.0 | 1 | |
| 29 | 626400 | 10440.0 | 174.00 | 7.25 | 148.0 | -10.00 | 137.0 | -13.00 | 8.0 | 8.0 | 1 | |
| 30 | 864000 | 14400.0 | 240.00 | 10.00 | 139.7 | -8.30 | 126.0 | -11.00 | 8.0 | 8.0 | 1 | |
| 31 | 1296000 | 21600.0 | 360.00 | 15.00 | 134.0 | -5.70 | 116.7 | -9.30 | 8.0 | 8.0 | 1 | |
| 32 | 1728000 | 28800.0 | 480.00 | 20.00 | 130.3 | -3.70 | 111.8 | -4.95 | 8.0 | 8.0 | 1 | |
| 33 | 2160000 | 36000.0 | 600.00 | 25.00 | 122.2 | -8.10 | 102.2 | -9.55 | 8.0 | 8.0 | 1 | |
| 34 | 2592000 | 43200.0 | 720.00 | 30.00 | 120.0 | -2.20 | 101.0 | -1.20 | 8.0 | 8.0 | 1 | |

| Failure of DG 1-1 to Start | | Failure of DG 1-2 to Start | |
|---|---|---|---|
| Fig. 3 | Fig. 2 | Fig. 13 | Fig. 12 |
| Sump Temp. (°F) | Cont. Temp. (°F) | Sump Temp. (°F) | Cont. Temp. (°F) |
| 228.00 | 277.00 | 228.00 | 280.00 |
| 250.00 | 278.00 | 249.00 | 281.00 |
| 259.00 | 278.00 | 260.00 | 279.00 |
| 264.00 | 276.00 | 268.00 | 276.00 |
| 269.00 | 272.00 | 272.00 | 272.00 |
| 271.00 | 262.00 | 277.00 | 265.00 |
| 270.00 | 252.00 | 275.00 | 255.00 |
| 268.00 | 234.00 | 271.00 | 245.00 |
| 260.00 | 221.00 | 268.00 | 240.00 |
| 254.00 | 213.00 | 261.00 | 220.00 |
| 249.00 | 200.00 | 255.00 | 215.00 |
| 231.50 | 174.00 | 243.00 | 198.00 |
| 229.00 | 185.00 | 239.00 | 216.00 |
| 227.00 | 190.00 | 238.00 | 221.00 |
| 220.00 | 189.00 | 236.00 | 222.00 |
| 215.00 | 180.00 | 231.00 | 220.00 |
| 198.00 | 178.00 | 225.00 | 220.00 |
| 192.00 | 178.00 | 216.00 | 218.00 |
| 182.00 | 172.00 | 210.00 | 212.00 |
| 174.00 | 166.00 | 206.00 | 205.00 |
| 170.00 | 162.00 | 200.00 | 201.00 |
| 166.00 | 158.00 | 196.00 | 195.00 |
| 162.00 | 155.00 | 190.00 | 190.00 |
| 157.00 | 152.00 | 185.00 | 185.00 |
| 151.00 | 147.00 | 175.00 | 175.00 |
| 148.00 | 140.00 | 166.00 | 165.00 |
| 144.00 | 150.00 | 158.00 | 155.00 |
| 158.00 | 150.00 | 143.00 | 140.00 |
| 148.00 | 137.00 | 138.30 | 129.00 |
| 139.70 | 126.00 | 134.00 | 120.60 |
| 134.00 | 116.70 | 123.00 | 113.00 |
| 130.30 | 111.75 | 118.20 | 106.19 |
| 122.20 | 102.20 | 114.40 | 101.74 |
| 120.00 | 100.00 | 112.00 | 101.00 |

Chemical Effects Calculation

Palisades
Unit 1

| | |
|---|---|
| Case | 1B |
| Buffer | STB |
| pH | 8.00 |
| RC Al | 100.0% |

Start sump mixing after 12 hours
Stop spray after 30 days

Materials Input

| | | |
|---|---|---|
| Coolant | Sump Pool Volume (gal) | 394,307 gal |
| | Sump Pool Volume (ft3) | 52,715 $ft^3$ |
| | Sump Pool Mass (lb) | 3,289,406 lb |
| | Density | 62.4 $lb/ft^3$ |
| | | 8.34 lb/gal |

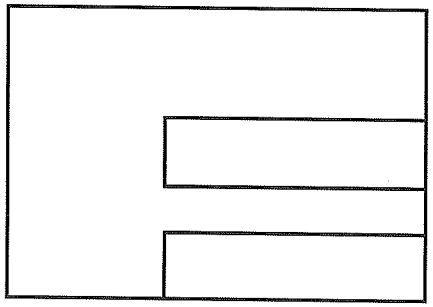
| TSP concentration | |
|---|---|
| 0 lb | Trisodium Phosphate |
| 3,289,406 lb | Sump Pool Mass (lb) |
| 0.00% | TSP concentration |

| Water in the Reactor Cavity |
|---|
| 4822 $ft^3$ |

| | | |
|---|---|---|
| Aluminum | | |
| % Aluminum in Reactor Cavity Available | | 100% |
| Aluminum Submerged | | 31,951.7 $ft^2$ |
| | | 1,633.9 lb |
| Aluminum Not Submerged | | 108,745.0 $ft^2$ |
| | | 5,756.0 lb |
| Concrete conversion factor | | 1.01E-05 $kg/ft^2$ |
| Latent Debris | | 200 lb |
| Latent Debris fiber | 15.0% | 30.0 lb |
| Latent Debris particulate (cement) | 85.0% | 170.0 lb |
| Concrete | Particulate Concrete | |
| | Concrete in Latent Debris | 170.0 lb |
| | | 77.1114941 kg |
| | Equivalent area of particulate concrete | 7.67E+06 $ft^2$ |
| | Exposed Concrete | |
| | Submerged Solid Concrete (ft2) | 679 $ft^2$ |
| | Nonsubmerged Solid Concrete (ft2) | 59,584 $ft^2$ |
| | Total concrete area | 7.73E+06 $ft^2$ |
| Trisodium Phosphate | | 11,000 |
| | Trisodium Phosphate Hydrate (lbm) | 0 lb |

| Palisades Cases | This Case | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1B | 1A | 1B | 2A | 2B | 3A | 3B | 4A | 4B |
| Aluminum in RC | 100.0% | 100.0% | 100.0% | 50.0% | 50.0% | 0.0% | 0.0% | 100.0% | 100.0% |
| Sequestered Water in RC | 0 | 0 | 0 | 2,411 | 2,411 | 4,822 | 4,822 | 0 | 0 |
| Buffer | STB | STB | STB | STB | STB | STB | STB | TSP | TSP |
| TSP | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 11,000 | 11,000 |
| Equilibrium pH | 8.00 | 7.00 | 8.00 | 7.00 | 8.00 | 7.00 | 8.00 | 7.00 | 8.00 |
| Initial sump pH | 9.32 | 9.32 | 9.32 | 9.32 | 9.32 | 9.32 | 9.32 | 11.54 | 11.54 |

| Insulation | Break S2 | Break S1 | Break S2 | Break S3 | Break S4 |
|---|---|---|---|---|---|
| Calcium Silicate | | | | | |
| CalSil (ft3) | 153.3 $ft^3$ | 127.60 | 153.26 | 114.03 | 92.73 |
| Density | 14.5 $lb/ft^3$ | | | | |
| Asbestos (ft3) | 0.0 $ft^3$ | 0.00 | 0.00 | 0.00 | 0.00 |
| Density | 10.0 $lb/ft^3$ | | | | |
| Kaylo (ft3) | 0.0 $ft^3$ | 0.00 | 0.00 | 0.00 | 0.00 |
| Density | 14.5 $lb/ft^3$ | | | | |
| Unibestos (ft3) | 0.0 $ft^3$ | 0.00 | 0.00 | 0.00 | 0.00 |
| Density | 14.5 $lb/ft^3$ | | | | |
| E-glass | | | | | |
| Fiberglass (ft3) | 50.1 $ft^3$ | 160.61 | 50.06 | 159.89 | 0.64 |
| Density | 4.0 $lb/ft^3$ | | | | |
| NUKON (ft3) | 1139.0 $ft^3$ | 1234.02 | 1139.05 | 875.03 | 302.13 |
| Density | 2.4 $lb/ft^3$ | | | | |
| Temp-Mat (ft3) | 0.0 $ft^3$ | 0.00 | 0.00 | 0.00 | 0.00 |
| Density | 11.8 $lb/ft^3$ | | | | |
| Thermal Wrap (ft3) | 0.0 $ft^3$ | 0.00 | 0.00 | 0.00 | 0.00 |
| Density | 2.4 $lb/ft^3$ | | | | |
| Silica Powder | | | | | |
| Microtherm (ft3) | 0.0 $ft^3$ | 0.00 | 0.00 | 0.00 | 0.00 |
| Density | 15.0 $lb/ft^3$ | | | | |
| Min-K (ft3) | 0.0 $ft^3$ | 0.00 | 0.00 | 0.00 | 0.00 |
| Density | 16.0 $lb/ft^3$ | | | | |
| Mineral Wool | | | | | |
| Min-Wool (ft3) | 0.0 $ft^3$ | 0 | 0 | 0 | 0 |
| Density | 10.0 $lb/ft^3$ | | | | |
| Rock Wool (ft3) | 0.0 $ft^3$ | 0 | 0 | 0 | 0 |
| Density | 10.0 $lb/ft^3$ | | | | |
| Aluminum Silicate | | | | | |
| Cerablanket (ft3) | 0.0 $ft^3$ | 0 | 0 | 0 | 0 |
| Density | 12.0 $lb/ft^3$ | | | | |
| FiberFrax Durablanket (ft3) | 0.0 $ft^3$ | 0 | 0 | 0 | 0 |
| Density | 12.0 $lb/ft^3$ | | | | |
| Kaowool (ft3) | 0.0 $ft^3$ | 0 | 0 | 0 | 0 |
| Density | 12.0 $lb/ft^3$ | | | | |
| Mat-Ceramic (ft3) | 0.0 $ft^3$ | 0 | 0 | 0 | 0 |
| Density | 12.0 $lb/ft^3$ | | | | |
| Mineral Fiber (ft3) | 0.0 $ft^3$ | 0 | 0 | 0 | 0 |
| Density | 21.0 $lb/ft^3$ | | | | |
| PAROC Mineral Wool (ft3) | 0.0 $ft^3$ | 0 | 0 | 0 | 0 |
| Density | 21.0 $lb/ft^3$ | | | | |
| Interam | | | | | |
| Interam (ft3) | 0.0 $ft^3$ | 0 | 0 | 0 | 0 |
| Density | 54.0 $lb/ft^3$ | | | | |



Assume particulate debris is insulation in mass proportion to the insulation

| | | Density ($lb/ft^3$) | Break S1 | Break S2 | Break S3 | Break S4 | |
|---|---|---|---|---|---|---|---|
| CalSil | ZOI | | 35.51 | 60.98 | 21.86 | 0.00 | ft3 |
| | Unjacketed | | 50.78 | 50.78 | 50.78 | 50.78 | ft3 |
| | Total | | 86.29 | 111.76 | 72.64 | 50.78 | ft3 |
| | Weight | 14.5 | 1,251.21 | 1,620.52 | 1,053.28 | 736.31 | lb |
| | Marinite | | 12.80 | 12.80 | 12.80 | 12.80 | ft3 |
| | Weight | 46 | 588.80 | 588.80 | 588.80 | 588.80 | lb |
| | Total Weight | | 1,840.01 | 2,209.32 | 1,642.08 | 1,325.11 | lb |
| | | | 33.9% | 43.1% | 37.6% | 64.9% | Weight % |
| Asbestos | ZOI | | 0.00 | 0.00 | 0.00 | 0.00 | ft3 |
| | | | 0.00 | 0.00 | 0.00 | 0.00 | ft3 |
| | Total | | 0.00 | 0.00 | 0.00 | 0.00 | ft3 |
| | | 10.0 | 0.00 | 0.00 | 0.00 | 0.00 | lb |
| | | | 0.0% | 0.0% | 0.0% | 0.0% | Weight % |
| Total calcium silicate | | | 1,840.01 | 2,209.32 | 1,642.08 | 1,325.11 | lb |
| Fiberglass | ZIO | | 159.14 | 49.18 | 158.21 | 0.04 | ft3 |
| | Unjacketed | | 0.59 | 0.59 | 0.59 | 0.59 | ft3 |
| | Total | | 159.73 | 49.77 | 158.80 | 0.63 | ft3 |
| | | 4.0 | 638.92 | 199.08 | 635.20 | 2.52 | lb |
| | | | 11.8% | 3.9% | 14.6% | 0.1% | Weight % |
| Temp-Mat | ZOI | | | | | | ft3 |
| | | | | | | | ft3 |
| | Total | | 0.00 | 0.00 | 0.00 | 0.00 | ft3 |
| | | 11.8 | 0.00 | 0.00 | 0.00 | 0.00 | lb |
| | | | 0.0% | 0.0% | 0.0% | 0.0% | Weight % |
| Nukon | ZOI | | 1,224.64 | 1,129.83 | 866.46 | 295.17 | ft3 |
| Thermal Wrap | Unjacketed | | 2.59 | 2.59 | 2.59 | 2.59 | ft3 |
| | Total | | 1,227.23 | 1,132.42 | 869.05 | 297.76 | ft3 |
| | | 2.4 | 2,945.35 | 2,717.81 | 2,085.72 | 714.62 | lb |
| | | | 54.3% | 53.0% | 47.8% | 35.0% | Weight % |
| Total E-Glass | | | 3,584.27 | 2,916.89 | 2,720.92 | 717.14 | lb |

| | | | | | | |
|---|---|---|---|---|---|---|
| Microtherm | ZOI | | | | | ft3 |
| | Margin | | | | | ft3 |
| | Spray & Submerge | | | | | ft3 |
| | Margin | | | | | ft3 |
| | Total | 0.00 | 0.00 | 0.00 | 0.00 | ft3 |
| | 15.0 | 0.00 | 0.00 | 0.00 | 0.00 | lb |
| | | 0.0% | 0.0% | 0.0% | 0.0% | Weight % |
| Total silica Powder | | 0.00 | 0.00 | 0.00 | 0.00 | lb |
| Mineral Wool | ZOI | | | | | ft3 |
| | | | | | | ft3 |
| | | | | | | ft3 |
| | | | | | | ft3 |
| | Total | 0.00 | 0.00 | 0.00 | 0.00 | ft3 |
| | 10.0 | 0.00 | 0.00 | 0.00 | 0.00 | lb |
| | | 0.0% | 0.0% | 0.0% | 0.0% | Weight % |
| Cerafiber | ZOI | | | | | ft3 |
| | | | | | | ft3 |
| | | | | | | ft3 |
| | | | | | | ft3 |
| | Total | 0.00 | 0.00 | 0.00 | 0.00 | ft3 |
| | 12.0 | 0.00 | 0.00 | 0.00 | 0.00 | lb |
| | | 0.0% | 0.0% | 0.0% | 0.0% | Weight % |
| | | | | | | |
| Total debris insulation weight | | 5,424.28 | 5,126.21 | 4,363.00 | 2,042.25 | lb |
| | Check sum | 100.0% | 100.0% | 100.0% | 100.0% | Weight % |

| Latent Debris - Fiber | 30 | lb | Break S1 | Break S2 | Break S3 | Break S4 |
|---|---|---|---|---|---|---|
| | | Density (lb/ft3) | | | | |
| CalSil | Weight % | | 33.9% | 43.1% | 37.6% | 64.9% |
| | Weight fiber | 14.5 | 10.18 | 12.93 | 11.29 | 19.47 lb |
| | Equivalent fiber volume | | 0.70 | 0.89 | 0.78 | 1.34 ft3 |
| Asbestos | Weight % | | 0.0% | 0.0% | 0.0% | 0.0% |
| | Weight fiber | 10.0 | 0.00 | 0.00 | 0.00 | 0.00 lb |
| | Equivalent fiber volume | | 0.00 | 0.00 | 0.00 | 0.00 ft3 |
| Fiberglass | Weight % | | 11.8% | 3.9% | 14.6% | 0.1% |
| | Weight fiber | 4.0 | 3.53 | 1.17 | 4.37 | 0.04 lb |
| | Equivalent fiber volume | | 0.88 | 0.29 | 1.09 | 0.01 ft3 |
| Temp-Mat | Weight % | | 0.0% | 0.0% | 0.0% | 0.0% |
| | Weight fiber | 11.8 | 0.00 | 0.00 | 0.00 | 0.00 lb |
| | Equivalent fiber volume | | 0.00 | 0.00 | 0.00 | 0.00 ft3 |
| Nukon | Weight % | | 54.3% | 53.0% | 47.8% | 35.0% |
| | Weight fiber | 2.4 | 16.29 | 15.91 | 14.34 | 10.50 lb |
| | Equivalent fiber volume | | 6.79 | 6.63 | 5.98 | 4.37 ft3 |
| Microtherm | Weight % | | 0.0% | 0.0% | 0.0% | 0.0% |
| | Weight fiber | 15.0 | 0.00 | 0.00 | 0.00 | 0.00 lb |
| | Equivalent fiber volume | | 0.00 | 0.00 | 0.00 | 0.00 ft3 |
| Mineral Wool | Weight % | | 0.0% | 0.0% | 0.0% | 0.0% |
| | Weight fiber | 10.0 | 0.00 | 0.00 | 0.00 | 0.00 lb |
| | Equivalent fiber volume | | 0.00 | 0.00 | 0.00 | 0.00 ft3 |
| Cerafiber | Weight % | | 0.0% | 0.0% | 0.0% | 0.0% |
| | Weight fiber | 12.0 | 0.00 | 0.00 | 0.00 | 0.00 lb |
| | Equivalent fiber volume | | 0.00 | 0.00 | 0.00 | 0.00 ft3 |
| | Check % TOTAL | | 100.00% | 100.00% | 100.00% | 100.00% |
| | Check Fiber total | | 30.00 | 30.00 | 30.00 | 30.00 |

| Total Insulation volume | | Break S1 ft3 | Break S2 ft3 | Break S3 ft3 | Break S4 ft3 |
|---|---|---|---|---|---|
| CalSil | Insulation | 126.90 | 152.37 | 113.25 | 91.39 |
| Includes Matinite board | Latent Debris | 0.70 | 0.89 | 0.78 | 1.34 |
| | TOTAL | 127.60 | 153.26 | 114.03 | 92.73 |
| Asbestos | Insulation | 0.00 | 0.00 | 0.00 | 0.00 |
| | Latent Debris | 0.00 | 0.00 | 0.00 | 0.00 |
| | TOTAL | 0.00 | 0.00 | 0.00 | 0.00 |
| Fiberglass | Insulation | 159.73 | 49.77 | 158.80 | 0.63 |
| | Latent Debris | 0.88 | 0.29 | 1.09 | 0.01 |
| | TOTAL | 160.61 | 50.06 | 159.89 | 0.64 |
| Temp-Mat | Insulation | 0.00 | 0.00 | 0.00 | 0.00 |
| | Latent Debris | 0.00 | 0.00 | 0.00 | 0.00 |
| | TOTAL | 0.00 | 0.00 | 0.00 | 0.00 |
| Nukon | Insulation | 1227.23 | 1132.42 | 869.05 | 297.76 |
| | Latent Debris | 6.79 | 6.63 | 5.98 | 4.37 |
| | TOTAL | 1234.02 | 1139.05 | 875.03 | 302.13 |
| Microtherm | Insulation | 0.00 | 0.00 | 0.00 | 0.00 |
| | Latent Debris | 0.00 | 0.00 | 0.00 | 0.00 |
| | TOTAL | 0.00 | 0.00 | 0.00 | 0.00 |
| Mineral Wool | Insulation | 0.00 | 0.00 | 0.00 | 0.00 |
| | Latent Debris | 0.00 | 0.00 | 0.00 | 0.00 |
| | TOTAL | 0.00 | 0.00 | 0.00 | 0.00 |
| Cerafiber | Insulation | 0.00 | 0.00 | 0.00 | 0.00 |
| | Latent Debris | 0.00 | 0.00 | 0.00 | 0.00 |
| | TOTAL | 0.00 | 0.00 | 0.00 | 0.00 |

GSI-191 Aluminum & Chemical Effects Evaluation

| | | | |
|---|---|---|---|
| **Submerged Outside the Reactor Cavity** | | | |
| | Area (ft2) | Wetted Area (ft2) | Weight (lb) |
| Service Water Piping. | 2433.0 | 4866.0 | 547.0 |
| Aluminum Paint | 1365.0 | 2730.0 | 153.0 |
| Aluminum Paint | 107.0 | 214.0 | 3.0 |
| **Submerged Inside the Reactor Cavity** | | | |
| | Area (ft2) | Wetted Area (ft2) | Weight (lb) |
| Reactor Vessel | 10688.0 | 21376.0 | 98.0 |
| RV Cavity Walls | 907.0 | 1814.0 | 32.0 |
| Reactor Cavity Cir. Panels | 223.0 | 447.0 | 7.9 |
| RV Insulation Supports | 481.0 | 481.0 | 379.0 |
| Reactor Cavity Wall Supports | 19.8 | 19.8 | 338.0 |
| Reactor Cavity Cir. Panel Supports | 3.9 | 3.9 | 76.0 |
| TOTAL | | 29,007.70 | 1,477.90 |
| **Non-Submerged Outside the Reactor Cavity (Exposed to Containment Spray)** | | | |
| | Area (ft2) | Wetted Area (ft2) | Weight (lb) |
| Primary Coolant System | 11,390.0 | 22,781.0 | 160.0 |
| Primary Coolant Pumps | 19,467.0 | 38,934.0 | 273.0 |
| Pressurizer Surge Line | 3,128.0 | 6,256.0 | 44.0 |
| Pressurizer | 799.0 | 1,597.0 | 28.0 |
| Pressurizer | 3,019.0 | 6,048.0 | 48.0 |
| Service Water Piping | 962.0 | 1,923.0 | 216.0 |
| SIS Piping | 3,271.0 | 6,542.0 | 735.0 |
| MSL Pipe | 1,139.0 | 2,279.0 | 256.0 |
| FW Pipe | 1,613.0 | 3,226.0 | 362.0 |
| Miscellaneous Pipe | 7,805.0 | 15,609.0 | 1792.0 |
| Pressurizer Jacket | 487.0 | 974.0 | 269.0 |
| Pressurizer Jacket | 596.0 | 1,193.0 | 337.0 |
| Pressurizer Supports | 144.0 | 144.0 | 133.0 |
| Component Cooling Fan Blades | 252.0 | 504.0 | 473.0 |
| Light Fixtures | 368.0 | 735.0 | 630.0 |
| Aluminum Paint | 0.0 | 0.0 | 0.0 |
| | | 108,745.0 | 5,756.0 |

Entergy
Palisades Nuclear Power Plant
Project No. 12122-005

| | | |
|---|---|---|
| Aluminum Summary | 108,745.0 | |
| % Aluminum in Reactor Cavity Available | 100% | |
| | ft2 | lb |
| Thick Aluminum Metal Submerged (sq ft) | 5,370.7 | 1,340.0 |
| Thin Aluminum Metal Submerged (sq ft) | 23,637.0 | 137.9 |
| Total Aluminum in Paint Submerged (sq ft) | 2,944.0 | 156.0 |
| Aluminum Paint Submerged (sq ft) | 2,944.0 | 156.0 |
| Total Aluminum in Paint Submerged (sq ft) | 2,944.0 | 156.0 |
| Thick Aluminum Metal Not-Submerged (sq ft) | 34,726.0 | 5,231.0 |
| Thin Aluminum Metal Not-Submerged (sq ft) | 74,019.0 | 525.0 |
| Aluminum Paint Not-Submerged (sq ft) | 0.0 | 0.0 |
| Aluminum Submerged | 31,951.7 | 1,633.9 |
| Aluminum Not Submerged | 108,745.0 | 5,756.0 |

Chemical_Effects Version 1.1, 8/31/2006

1. Enter the pH and temperature vs. time profiles on the sheet "Time Temp pH input"
   a. Replace the values in red
   b. Addition instructions are provided in the comments associated with the cells in row 1. Place cursor over the red triangles to view.
2. Enter containment materials in the sheet labeled "Materials Input"
   a. For the insulation materials, input the quantities that are wetted by the spray, transported to the sump pool, or are submerged.
   b. Aluminum is separated into two categories: that submerged in the sump pool and that impacted by the spray.
   c. Both the mass and surface area of aluminum should be entered. If the mass is not known, enter a very large number (1,000,000 lbm) for conservatism
3. Change default density values in the sheet labeled "Materials Conversions" if the default estimates are not correct for your plant. Otherwise, no entries are needed.
4. View the results of model in the sheet labeled "Results Table"
   a. Results are given as a function of time
   b. The elemental releases of Ca, Al and Si are given, as well as the masses of precipitates likely to form from them.
5. View a summary of the contribution of each material to the total elemental release in sheet "Releases by Material"
6. View a summary of the contribution of each material to each of the precipitates in the sheet "Precipitate by Material"
7. Detailed information on the release of each material component with time is located in subsequent sheets that need not be examined.

| Time (sec) | min | hr | days | Sump pH | Sump Temp. (°F) | Sump Mixed 1=Yes | Steam or Spray pH | Containment Temp. (°F) | Notes |
|---|---|---|---|---|---|---|---|---|---|
| 10 | 0 | 0 | 0 | 9.32 | 228 | 0 | 5.1 | 280 | RCS blowdown |
| 20 | 0.3 | 0 | 0 | 9.32 | 250 | 0 | 5.1 | 281 | |
| 30 | 0.5 | 0 | 0 | 9.32 | 260 | 0 | 5.1 | 279 | pH values are adjusted to room temperature |
| 60 | 1 | 0 | 0 | 9.32 | 268 | 0 | 5.1 | 276 | |
| 90 | 2 | 0 | 0 | 9.32 | 272 | 0 | 5.1 | 272 | |
| 300 | 5 | 0 | 0 | 9.32 | 277 | 0 | 5.1 | 265 | |
| 600 | 10 | 0 | 0 | 9.32 | 275 | 0 | 5.1 | 255 | |
| 900 | 15 | 0 | 0 | 9.32 | 271 | 0 | 5.1 | 245 | |
| 1200 | 20 | 0 | 0 | 8 | 268 | 0 | 8 | 240 | Switchover to recirc at 20 minutes |
| 1500 | 25 | 0 | 0 | 8 | 261 | 0 | 8 | 220 | |
| 1800 | 30 | 1 | 0 | 8 | 255 | 0 | 8 | 215 | |
| 2700 | 45 | 1 | 0 | 8 | 243 | 0 | 8 | 198 | |
| 3600 | 60 | 1 | 0 | 8 | 239 | 0 | 8 | 216 | |
| 5400 | 90 | 2 | 0 | 8 | 238 | 0 | 8 | 221 | |
| 7200 | 120 | 2 | 0 | 8 | 236 | 0 | 8 | 222 | |
| 14400 | 240 | 4 | 0 | 8 | 231 | 0 | 8 | 220 | |
| 21600 | 360 | 6 | 0 | 8 | 225 | 0 | 8 | 220 | |
| 28800 | 480 | 8 | 0 | 8 | 216 | 0 | 8 | 218 | |
| 36000 | 600 | 10 | 0 | 8 | 210 | 0 | 8 | 212 | |
| 43200 | 720 | 12 | 1 | 8 | 206 | 1 | 8 | 205 | Start Mixing at 12 hours |
| 50400 | 840 | 14 | 1 | 8 | 200 | 1 | 8 | 201 | |
| 57600 | 960 | 16 | 1 | 8 | 196 | 1 | 8 | 195 | |
| 72000 | 1200 | 20 | 1 | 8 | 190 | 1 | 8 | 190 | |
| 86400 | 1440 | 24 | 1 | 8 | 185 | 1 | 8 | 185 | |
| 129600 | 2160 | 36 | 2 | 8 | 175 | 1 | 8 | 175 | |
| 172800 | 2880 | 48 | 2 | 8 | 166 | 1 | 8 | 165 | |
| 259200 | 4320 | 72 | 3 | 8 | 158 | 1 | 8 | 155 | |
| 432000 | 7200 | 120 | 5 | 8 | 158 | 1 | 8 | 150 | |
| 626400 | 10440 | 174 | 7 | 8 | 148 | 1 | 8 | 137 | |
| 864000 | 14400 | 240 | 10 | 8 | 139.7 | 1 | 8 | 126 | |
| 1296000 | 21600 | 360 | 15 | 8 | 134 | 1 | 8 | 116.7 | |
| 1728000 | 28800 | 480 | 20 | 8 | 130.3 | 1 | 8 | 111.75 | |
| 2160000 | 36000 | 600 | 25 | 8 | 122.2 | 1 | 8 | 102.2 | |
| 2592000 | 43200 | 720 | 30 | 8 | 120 | 1 | 8 | 101 | |

Do not enter data below row 35.

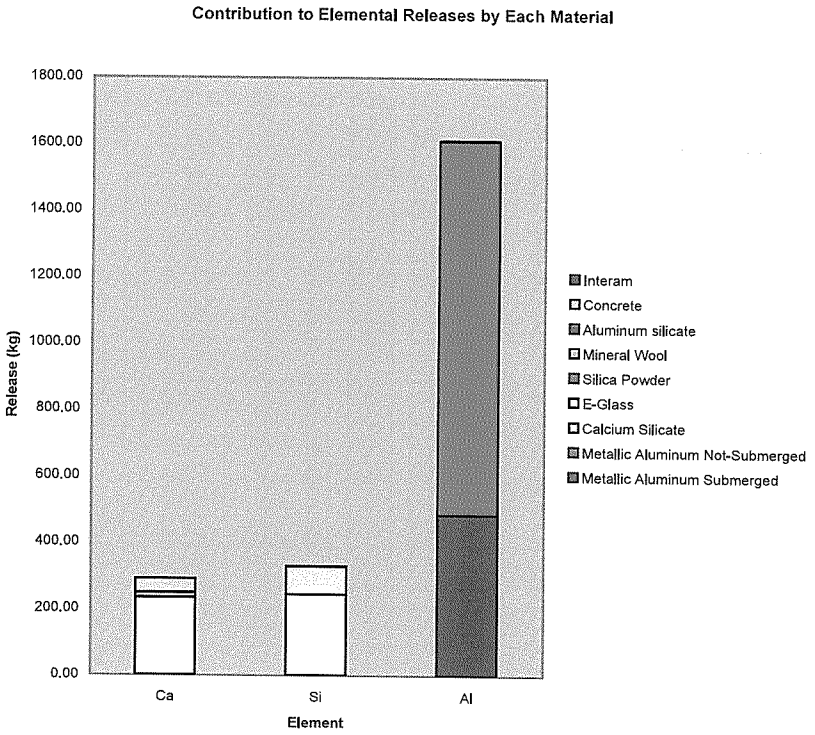
| Class | Material | Amount | Notes |
|---|---|---|---|
| Coolant | Sump Pool Volume (ft3) | 52714.8 | |
| Metallic Aluminum | Aluminum Submerged (sq ft) | 31951.7 | |
| | Aluminum Submerged (lbm) | 1633.9 | |
| | Aluminum Not-Submerged (sq ft) | 108745.0 | |
| | Aluminum Not-Submerged (lbm) | 5756.0 | |
| Calcium Silicate | CalSil Insulation(ft3) | 153.3 | |
| | Asbestos Insulation (ft3) | 0.0 | |
| | Kaylo Insulation (ft3) | 0.0 | |
| | Unibestos Insulation (ft3) | 0.0 | |
| E-glass | Fiberglass Insulation (ft3) | 50.1 | |
| | NUKON (ft3) | 1139.0 | |
| | Temp-Mat (ft3) | 0 | |
| | Thermal Wrap (ft3) | 0 | |
| Silica Powder | Microtherm (ft3) | 0 | |
| | Min-K (ft3) | 0 | |
| Mineral Wool | Min-Wool (ft3) | 0 | |
| | Rock Wool (ft3) | 0 | |
| Aluminum Silicate | Cerablanket (ft3) | 0 | |
| | FiberFrax Durablanket (ft3) | 0 | |
| | Kaowool (ft3) | 0 | |
| | Mat-Ceramic (ft3) | 0 | |
| | Mineral Fiber (ft3) | 0 | |
| | PAROC Mineral Wool (ft3) | 0 | |
| Concrete | Concrete (ft2) | 7.73E+06 | |
| Trisodium Phosphate (TSP) | Trisodium Phosphate Hydrate (lbm) | 0 | Flag=0 if no TSP, ≠0 if use TSP as buffering agent |
| Interam | Interam (ft3) | 0 | |

| Class | Material | Amount | Density (lb/ft3) | Mass(kg) | Class total (kg) | Class total (lbm) |
|---|---|---|---|---|---|---|
| Coolant | Sump Pool Volume (ft3) | 52,714.84 | 62.4 | 1,492,064.8 | 1,492,064.8 | 3289406 |
| Metallic Aluminum | Aluminum Submerged (sq ft) | 31,951.70 | | 0.0 | 3,352.0 | |
| | Aluminum Submerged (lbm) | 1,633.90 | | 741.1 | | |
| | Aluminum Not-Submerged (sq ft) | 108,745.00 | | 0.0 | | |
| | Aluminum Not-Submerged (lbm) | 5,756.00 | | 2,610.9 | | |
| Calcium Silicate | CalSil Insulation(ft3) | 153.26 | 14.5 | 1,008.0 | 1,008.0 | |
| | Asbestos Insulation (ft3) | 0.00 | 14.5 | 0.0 | | |
| | Kaylo Insulation (ft3) | 0.00 | 14.5 | 0.0 | | |
| | Unibestos Insulation (ft3) | 0.00 | 14.5 | 0.0 | | |
| E-glass | Fiberglass Insulation (ft3) | 50.06 | 4 | 90.8 | 1,330.8 | |
| | NUKON (ft3) | 1,139.05 | 2.4 | 1,240.0 | | |
| | Temp-Mat (ft3) | 0.00 | 4 | 0.0 | | |
| | Thermal Wrap (ft3) | 0.00 | 16 | 0.0 | | |
| Silica Powder | Microtherm (ft3) | 0.00 | 4 | 0.0 | 0.0 | |
| | Min-K (ft3) | 0.00 | 4 | 0.0 | | |
| Mineral Wool | Min-Wool (ft3) | 0.00 | 10 | 0.0 | 0.0 | |
| | Rock Wool (ft3) | 0.00 | 10 | 0.0 | | |
| Aluminum Silicate | Cerablanket ($ft^3$) | 0.00 | 12 | 0.0 | 0.0 | |
| | FiberFrax Durablanket (ft3) | 0.00 | 12 | 0.0 | | |
| | Kaowool (ft3) | 0.00 | 12 | 0.0 | | |
| | Mat-Ceramic (ft3) | 0.00 | 12 | 0.0 | | |
| | Mineral Fiber (ft3) | 0.00 | 21 | 0.0 | | |
| | PAROC Mineral Wool (ft3) | 0.00 | 21 | 0.0 | | |
| Concrete | Concrete (ft2) | 7,726,945.66 | | 77.7 | 77.7 | |
| Interam | Interam (ft3) | 0.00 | 54 | 0.0 | 0.0 | |

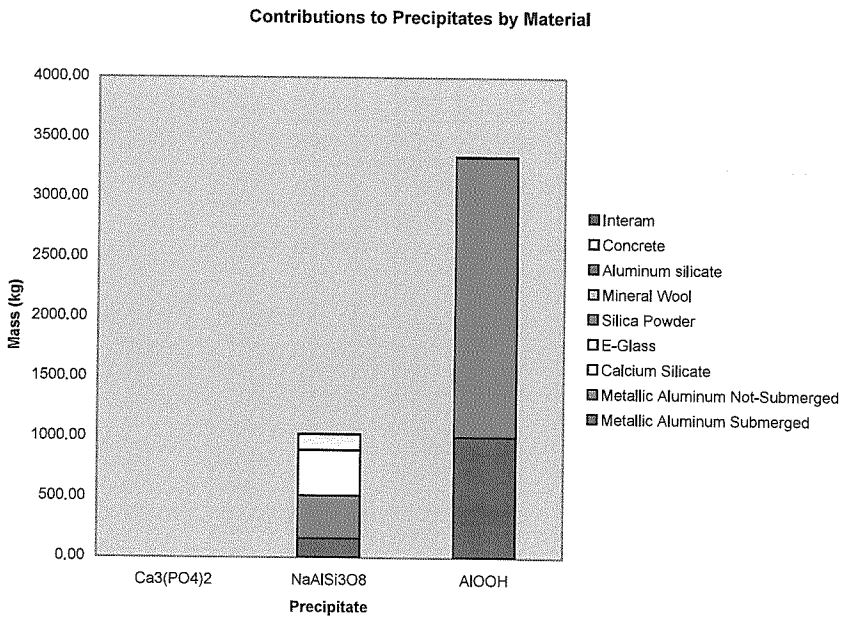
| Interval Duration (min) | Start of Interval (hrs) | End of Interval (hrs) | Average Interval pH | Average Temp (F) | Ca Release (kg) | Si Release (kg) | Al Release (kg) | $NaAlSi_3O_8$ Precipitate (kg) | AlOOH Precipitate (kg) | $Ca_3(PO_4)_2$ Precipitate (kg) |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.2 | 0.00 | 0.0 | 9.32 | 239 | 0.0083 | 0.0701 | 0.2725 | 0.218 | 0.555 | 0.000 |
| 0.2 | 0.01 | 0.0 | 9.32 | 255 | 0.02 | 0.17 | 0.59 | 0.5 | 1.2 | 0.00 |
| 0.5 | 0.01 | 0.0 | 9.32 | 264 | 0.05 | 0.51 | 1.59 | 1.6 | 3.2 | 0.00 |
| 0.5 | 0.02 | 0.0 | 9.32 | 270 | 0.07 | 0.90 | 2.61 | 2.8 | 5.2 | 0.00 |
| 3.5 | 0.03 | 0.1 | 9.32 | 274.5 | 0.28 | 3.86 | 9.77 | 12.0 | 18.9 | 0.00 |
| 5.0 | 0.08 | 0.2 | 9.32 | 276 | 0.58 | 8.19 | 19.34 | 25.5 | 37.1 | 0.00 |
| 5.0 | 0.17 | 0.3 | 9.32 | 273 | 0.88 | 12.26 | 27.69 | 38.1 | 52.8 | 0.00 |
| 5.0 | 0.25 | 0.3 | 8.66 | 269.5 | 1.16 | 15.41 | 33.35 | 47.9 | 63.1 | 0.00 |
| 5.0 | 0.33 | 0.4 | 8 | 264.5 | 1.45 | 17.84 | 38.22 | 55.5 | 72.2 | 0.00 |
| 5.0 | 0.42 | 0.5 | 8 | 258 | 1.72 | 19.97 | 41.93 | 62.1 | 78.9 | 0.00 |
| 15.0 | 0.50 | 0.8 | 8 | 249 | 2.51 | 25.30 | 50.30 | 78.7 | 93.7 | 0.00 |
| 15.0 | 0.75 | 1.0 | 8 | 241 | 3.27 | 29.78 | 57.90 | 92.6 | 107.4 | 0.00 |
| 30.0 | 1.00 | 1.5 | 8 | 238.5 | 4.75 | 38.17 | 76.10 | 118.7 | 141.8 | 0.00 |
| 30.0 | 1.50 | 2.0 | 8 | 237 | 6.18 | 46.13 | 95.11 | 143.5 | 178.4 | 0.00 |
| 120.0 | 2.00 | 4.0 | 8 | 233.5 | 11.68 | 75.01 | 168.07 | 233.3 | 319.8 | 0.00 |
| 120.0 | 4.00 | 6.0 | 8 | 228 | 16.49 | 98.41 | 236.18 | 306.1 | 454.4 | 0.00 |
| 120.0 | 6.00 | 8.0 | 8 | 220.5 | 20.78 | 116.47 | 299.09 | 362.2 | 581.2 | 0.00 |
| 120.0 | 8.00 | 10.0 | 8 | 213 | 24.74 | 130.34 | 353.55 | 405.4 | 692.3 | 0.00 |
| 120.0 | 10.00 | 12.0 | 8 | 208 | 28.46 | 141.73 | 398.68 | 440.8 | 784.4 | 0.00 |
| 120.0 | 12.00 | 14.0 | 8 | 203 | 30.15 | 145.39 | 436.79 | 452.2 | 866.4 | 0.00 |
| 120.0 | 14.00 | 16.0 | 8 | 198 | 32.00 | 148.73 | 469.29 | 462.5 | 936.2 | 0.00 |
| 240.0 | 16.00 | 20.0 | 8 | 193 | 36.06 | 154.85 | 523.83 | 481.6 | 1052.9 | 0.00 |
| 240.0 | 20.00 | 24.0 | 8 | 187.5 | 40.37 | 160.33 | 569.82 | 498.6 | 1151.1 | 0.00 |
| 720.0 | 24.00 | 36.0 | 8 | 180 | 55.19 | 174.66 | 676.56 | 543.2 | 1377.9 | 0.00 |
| 720.0 | 36.00 | 48.0 | 8 | 170.5 | 70.16 | 186.28 | 751.72 | 579.3 | 1536.5 | 0.00 |
| 1440.0 | 48.00 | 72.0 | 8 | 162 | 101.59 | 205.66 | 856.89 | 639.6 | 1756.2 | 0.00 |
| 2880.0 | 72.00 | 120.0 | 8 | 158 | 134.97 | 239.26 | 1020.11 | 744.1 | 2094.7 | 0.00 |
| 3240.0 | 120.00 | 174.0 | 8 | 153 | 142.85 | 269.60 | 1154.55 | 838.4 | 2371.6 | 0.00 |
| 3960.0 | 174.00 | 240.0 | 8 | 143.85 | 192.59 | 298.19 | 1258.55 | 927.4 | 2582.1 | 0.00 |
| 7200.0 | 240.00 | 360.0 | 8 | 136.85 | 213.73 | 329.34 | 1386.56 | 1024.2 | 2844.2 | 0.00 |
| 7200.0 | 360.00 | 480.0 | 8 | 132.15 | 238.74 | 329.34 | 1483.67 | 1024.2 | 3059.8 | 0.00 |
| 7200.0 | 480.00 | 600.0 | 8 | 126.25 | 287.00 | 329.34 | 1555.20 | 1024.2 | 3218.6 | 0.00 |
| 7200.0 | 600.00 | 720.0 | 8 | 121.1 | 290.19 | 329.34 | 1611.12 | 1024.2 | 3342.7 | 0.00 |

Releases in kg

| Material Class | Ca | Si | Al |
|---|---|---|---|
| Metallic Aluminum Submerged | 0.00 | 0.00 | 482.34 |
| Metallic Aluminum Not-Submerged | 0.00 | 0.00 | 1125.25 |
| Calcium Silicate | 233.61 | 242.93 | 0.00 |
| E-Glass | 13.83 | 84.99 | 3.07 |
| Silica Powder | 0.00 | 0.00 | 0.00 |
| Mineral Wool | 0.00 | 0.00 | 0.00 |
| Aluminum silicate | 0.00 | 0.00 | 0.00 |
| Concrete | 42.76 | 1.42 | 0.46 |
| Interam | 0.00 | 0.00 | 0.00 |



| | Precipitate (kg) | | |
|---|---|---|---|
| Material Class | $Ca_3(PO_4)_2$ | $NaAlSi_3O_8$ | AlOOH |
| Metallic Aluminum Submerged | 0.00 | 153.32 | 1000.75 |
| Metallic Aluminum Not-Submerged | 0.00 | 357.68 | 2334.65 |
| Calcium Silicate | 0.00 | 377.76 | 0.00 |
| E-Glass | 0.00 | 133.13 | 6.37 |
| Silica Powder | 0.00 | 0.00 | 0.00 |
| Mineral Wool | 0.00 | 0.00 | 0.00 |
| Aluminum silicate | 0.00 | 0.00 | 0.00 |
| Concrete | 0.00 | 2.36 | 0.95 |
| Interam | 0.00 | 0.00 | 0.00 |



| Constants | Value |
|---|---|
| Mass Material (kg) | 1008.0058 |
| Mass Element (kg) | 347.762 |
| a | -2.4063 |
| b | -0.17595 |
| c | 1.967023 |
| d | -2.35331 |
| e | -0.15044 |
| f | 1.820687 |

| Interval Duration (min) | Start of Interval (hrs) | End of Interval (hrs) | Ave Interval pH | Ave Temp (F) | 1000/T ($K^{-1}$) | Ca All Mat | Ca this Mat Only | Ca (ppm) | K | k | R | Positive release rate (mg/kg- | interval pred release (kg) | Amount above start Mass | interval kg Ca released | Integral kg Ca released |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.2 | 0.00 | 0.01 | 9.32 | 239 | 2.576323586 | 0 | 0 | 0.00 | 10.51 | 8.62 | 8.62 | 8.62 | 0.001 | -347.8 | 0.001 | 0.0014 |
| 0.2 | 0.01 | 0.0 | 9.32 | 255 | 2.518644969 | 0.01 | 0.00 | 0.00 | 8.09 | 6.76 | 6.76 | 6.76 | 0.001 | -347.8 | 0.001 | 0.00 |
| 0.5 | 0.01 | 0.0 | 9.32 | 264 | 2.487321569 | 0.01 | 0.00 | 0.00 | 7.02 | 5.93 | 5.93 | 5.93 | 0.003 | -347.8 | 0.003 | 0.01 |
| 0.5 | 0.02 | 0.0 | 9.32 | 270 | 2.466868584 | 0.03 | 0.00 | 0.00 | 6.40 | 5.44 | 5.44 | 5.44 | 0.003 | -347.8 | 0.003 | 0.01 |
| 3.5 | 0.03 | 0.1 | 9.32 | 274.5 | 2.451748233 | 0.05 | 0.01 | 0.01 | 5.98 | 5.11 | 5.11 | 5.11 | 0.018 | -347.7 | 0.018 | 0.03 |
| 5.0 | 0.08 | 0.2 | 9.32 | 276 | 2.446749222 | 0.19 | 0.02 | 0.02 | 5.84 | 5.00 | 4.99 | 4.99 | 0.025 | -347.7 | 0.025 | 0.05 |
| 5.0 | 0.17 | 0.3 | 9.32 | 273 | 2.456767713 | 0.39 | 0.03 | 0.03 | 6.11 | 5.22 | 5.19 | 5.19 | 0.026 | -347.7 | 0.026 | 0.08 |
| 5.0 | 0.25 | 0.3 | 8.66 | 269.5 | 2.468560144 | 0.59 | 0.05 | 0.05 | 8.43 | 6.89 | 6.85 | 6.85 | 0.035 | -347.6 | 0.035 | 0.11 |
| 5.0 | 0.33 | 0.4 | 8 | 264.5 | 2.485604209 | 0.78 | 0.08 | 0.08 | 11.89 | 9.30 | 9.25 | 9.25 | 0.047 | -347.6 | 0.047 | 0.16 |
| 5.0 | 0.42 | 0.5 | 8 | 258 | 2.508116544 | 0.97 | 0.11 | 0.11 | 13.17 | 10.23 | 10.14 | 10.14 | 0.051 | -347.6 | 0.051 | 0.21 |
| 15.0 | 0.50 | 0.8 | 8 | 249 | 2.539969238 | 1.15 | 0.14 | 0.14 | 15.22 | 11.69 | 11.58 | 11.58 | 0.175 | -347.4 | 0.175 | 0.38 |
| 15.0 | 0.75 | 1.0 | 8 | 241 | 2.5689697 | 1.68 | 0.26 | 0.26 | 17.35 | 13.20 | 13.00 | 13.00 | 0.197 | -347.2 | 0.197 | 0.58 |
| 30.0 | 1.00 | 1.5 | 8 | 238.5 | 2.578168641 | 2.19 | 0.39 | 0.39 | 18.09 | 13.72 | 13.42 | 13.42 | 0.406 | -346.8 | 0.406 | 0.99 |
| 30.0 | 1.50 | 2.0 | 8 | 237 | 2.583719695 | 3.18 | 0.66 | 0.66 | 18.55 | 14.04 | 13.54 | 13.54 | 0.409 | -346.4 | 0.409 | 1.40 |
| 120.0 | 2.00 | 4.0 | 8 | 233.5 | 2.596765584 | 4.14 | 0.94 | 0.94 | 19.68 | 14.83 | 14.12 | 14.12 | 1.708 | -344.7 | 1.708 | 3.10 |
| 120.0 | 4.00 | 6.0 | 8 | 228 | 2.617534573 | 7.83 | 2.08 | 2.08 | 21.62 | 16.18 | 14.62 | 14.62 | 1.768 | -342.9 | 1.768 | 4.87 |
| 120.0 | 6.00 | 8.0 | 8 | 220.5 | 2.646397224 | 11.05 | 3.27 | 3.27 | 24.64 | 18.26 | 15.84 | 15.84 | 1.916 | -341.0 | 1.916 | 6.79 |
| 120.0 | 8.00 | 10.0 | 8 | 213 | 2.675903489 | 13.93 | 4.55 | 4.55 | 28.16 | 20.66 | 17.32 | 17.32 | 2.095 | -338.9 | 2.095 | 8.88 |
| 120.0 | 10.00 | 12.0 | 8 | 208 | 2.695942606 | 16.58 | 5.95 | 5.95 | 30.84 | 22.47 | 18.13 | 18.13 | 2.193 | -336.7 | 2.193 | 11.08 |
| 120.0 | 12.00 | 14.0 | 8 | 203 | 2.716284123 | 19.07 | 7.42 | 19.07 | 33.81 | 24.47 | 10.67 | 10.67 | 1.290 | -335.4 | 1.290 | 12.37 |
| 120.0 | 14.00 | 16.0 | 8 | 198 | 2.736934937 | 20.21 | 8.29 | 20.21 | 37.13 | 26.69 | 12.16 | 12.16 | 1.471 | -333.9 | 1.471 | 13.84 |
| 240.0 | 16.00 | 20.0 | 8 | 193 | 2.757902156 | 21.45 | 9.28 | 21.45 | 40.83 | 29.14 | 13.83 | 13.83 | 3.346 | -330.6 | 3.346 | 17.19 |
| 240.0 | 20.00 | 24.0 | 8 | 187.5 | 2.781340297 | 24.17 | 11.52 | 24.17 | 45.40 | 32.15 | 15.03 | 15.03 | 3.636 | -326.9 | 3.636 | 20.82 |
| 720.0 | 24.00 | 36.0 | 8 | 180 | 2.813950943 | 27.06 | 13.96 | 27.06 | 52.63 | 36.85 | 17.91 | 17.91 | 12.997 | -313.9 | 12.997 | 33.82 |
| 720.0 | 36.00 | 48.0 | 8 | 170.5 | 2.85637209 | 36.99 | 22.67 | 36.99 | 63.77 | 44.03 | 18.49 | 18.49 | 13.421 | -300.5 | 13.421 | 47.24 |
| 1440.0 | 48.00 | 72.0 | 8 | 162 | 2.895426834 | 47.02 | 31.66 | 47.02 | 76.12 | 51.86 | 19.82 | 19.82 | 28.776 | -271.7 | 28.776 | 76.02 |
| 2880.0 | 72.00 | 120.0 | 8 | 158 | 2.914177473 | 68.09 | 50.95 | 68.09 | 82.86 | 56.10 | 10.00 | 10.00 | 29.042 | -242.7 | 29.042 | 105.06 |
| 3240.0 | 120.00 | 174.0 | 8 | 153 | 2.937960076 | 90.46 | 70.41 | 90.46 | 92.29 | 61.98 | 1.23 | 1.23 | 4.010 | -238.7 | 4.010 | 109.07 |
| 3960.0 | 174.00 | 240.0 | 8 | 143.85 | 2.982502651 | 95.74 | 73.10 | 95.74 | 112.91 | 74.71 | 11.36 | 11.36 | 45.354 | -193.3 | 45.354 | 154.42 |
| 7200.0 | 240.00 | 360.0 | 8 | 136.85 | 3.017501509 | 129.07 | 103.50 | 129.07 | 132.31 | 86.52 | 2.12 | 2.12 | 15.357 | -178.0 | 15.357 | 169.78 |
| 7200.0 | 360.00 | 480.0 | 8 | 132.15 | 3.04146531 | 143.24 | 113.79 | 143.24 | 147.48 | 95.66 | 2.75 | 2.75 | 19.946 | -158.0 | 19.946 | 189.72 |
| 7200.0 | 480.00 | 600.0 | 8 | 126.25 | 3.072091753 | 160.00 | 127.16 | 160.00 | 169.42 | 108.76 | 6.05 | 6.05 | 43.885 | -114.2 | 43.885 | 233.61 |
| 7200.0 | 600.00 | 720.0 | 8 | 121.1 | 3.099333643 | 192.35 | 156.57 | 192.35 | 191.67 | 121.92 | -0.43 | 0.00 | 0.000 | -114.2 | 0.000 | 233.61 |

| Constants | Value | Interval Duration (min) | Start of Interval (hrs) | End of Interval (hrs) | Ave Interval pH | Ave Temp (F) | 1000/T ($K^{-1}$) | Si All Mat | Si this Mat Only | Si (ppm) | K | k | R | Positive release rate (mg/kg- | interval pred release (kg) | Amount above start Mass | interval kg Si released | Integral kg Si released |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mass Material (kg) | 1008.0058 | 0.2 | 0.00 | 0.01 | 9.32 | 239 | 2.576323586 | 0 | 0 | 0.00 | 186.83 | 92.21 | 92.21 | 92.21 | 0.015 | -242.9 | 0.015 | 0.0155 |
| Mass Element (kg) | 242.92939 | 0.2 | 0.01 | 0.0 | 9.32 | 255 | 2.518644969 | 0.05 | 0.01 | 0.01 | 169.87 | 120.62 | 120.61 | 120.61 | 0.020 | -242.9 | 0.020 | 0.0 |
| a | 0.12735 | 0.5 | 0.01 | 0.0 | 9.32 | 264 | 2.487321569 | 0.11 | 0.02 | 0.02 | 161.32 | 139.56 | 139.54 | 139.54 | 0.070 | -242.8 | 0.070 | 0.1 |
| b | 0.03197 | 0.5 | 0.02 | 0.0 | 9.32 | 270 | 2.466868584 | 0.34 | 0.07 | 0.07 | 155.96 | 153.50 | 153.43 | 153.43 | 0.077 | -242.7 | 0.077 | 0.2 |
| c | 0.71658 | 3.5 | 0.03 | 0.1 | 9.32 | 274.5 | 2.451748233 | 0.60 | 0.12 | 0.12 | 152.12 | 164.70 | 164.56 | 164.56 | 0.581 | -242.2 | 0.581 | 0.8 |
| d | 7.5547 | 5.0 | 0.08 | 0.2 | 9.32 | 276 | 2.446749222 | 2.59 | 0.51 | 0.51 | 150.87 | 168.58 | 168.00 | 168.00 | 0.847 | -241.3 | 0.847 | 1.6 |
| e | -0.04084 | 5.0 | 0.17 | 0.3 | 9.32 | 273 | 2.456767713 | 5.49 | 1.08 | 1.08 | 153.38 | 160.89 | 159.76 | 159.76 | 0.805 | -240.5 | 0.805 | 2.4 |
| f | -2.02198 | 5.0 | 0.25 | 0.3 | 8.66 | 269.5 | 2.468560144 | 8.21 | 1.62 | 1.62 | 148.98 | 162.05 | 160.29 | 160.29 | 0.808 | -239.7 | 0.808 | 3.2 |
| | | 5.0 | 0.33 | 0.4 | 8 | 264.5 | 2.485604209 | 10.33 | 2.16 | 2.16 | 145.96 | 159.27 | 156.91 | 156.91 | 0.791 | -238.9 | 0.791 | 4.0 |
| | | 5.0 | 0.42 | 0.5 | 8 | 258 | 2.508116544 | 11.96 | 2.69 | 2.69 | 151.49 | 143.42 | 140.88 | 140.88 | 0.710 | -238.2 | 0.710 | 4.7 |
| | | 15.0 | 0.50 | 0.8 | 8 | 249 | 2.539969238 | 13.39 | 3.17 | 3.17 | 159.66 | 123.66 | 121.20 | 121.20 | 1.833 | -236.4 | 1.833 | 6.6 |
| | | 15.0 | 0.75 | 1.0 | 8 | 241 | 2.5689697 | 16.96 | 4.39 | 4.39 | 167.49 | 108.04 | 105.20 | 105.20 | 1.591 | -234.8 | 1.591 | 8.1 |
| | | 30.0 | 1.00 | 1.5 | 8 | 238.5 | 2.578168641 | 19.96 | 5.46 | 5.46 | 170.05 | 103.51 | 100.18 | 100.18 | 3.030 | -231.8 | 3.030 | 11.2 |
| | | 30.0 | 1.50 | 2.0 | 8 | 237 | 2.583719695 | 25.58 | 7.49 | 7.49 | 171.61 | 100.87 | 96.46 | 96.46 | 2.917 | -228.8 | 2.917 | 14.1 |
| | | 120.0 | 2.00 | 4.0 | 8 | 233.5 | 2.596765584 | 30.91 | 9.45 | 9.45 | 175.35 | 94.92 | 89.81 | 89.81 | 10.863 | -218.0 | 10.863 | 25.0 |
| | | 120.0 | 4.00 | 6.0 | 8 | 228 | 2.617534573 | 50.27 | 16.73 | 16.73 | 181.46 | 86.17 | 78.23 | 78.23 | 9.463 | -208.5 | 9.463 | 34.4 |
| | | 120.0 | 6.00 | 8.0 | 8 | 220.5 | 2.646397224 | 65.96 | 23.07 | 23.07 | 190.31 | 75.34 | 66.21 | 66.21 | 8.008 | -200.5 | 8.008 | 42.4 |
| | | 120.0 | 8.00 | 10.0 | 8 | 213 | 2.675903489 | 78.06 | 28.44 | 28.44 | 199.81 | 65.67 | 56.32 | 56.32 | 6.813 | -193.7 | 6.813 | 49.2 |
| | | 120.0 | 10.00 | 12.0 | 8 | 208 | 2.695942606 | 87.36 | 33.00 | 33.00 | 206.52 | 59.82 | 50.26 | 50.26 | 6.079 | -187.6 | 6.079 | 55.3 |
| | | 120.0 | 12.00 | 14.0 | 8 | 203 | 2.716284123 | 94.99 | 37.08 | 94.99 | 213.57 | 54.41 | 30.21 | 30.21 | 3.654 | -184.0 | 3.654 | 59.0 |
| | | 120.0 | 14.00 | 16.0 | 8 | 198 | 2.736934937 | 97.44 | 39.53 | 97.44 | 220.97 | 49.43 | 27.63 | 27.63 | 3.342 | -180.6 | 3.342 | 62.3 |
| | | 240.0 | 16.00 | 20.0 | 8 | 193 | 2.757902156 | 99.68 | 41.77 | 99.68 | 228.75 | 44.83 | 25.29 | 25.29 | 6.119 | -174.5 | 6.119 | 68.4 |
| | | 240.0 | 20.00 | 24.0 | 8 | 187.5 | 2.781340297 | 103.78 | 45.87 | 103.78 | 237.77 | 40.19 | 22.65 | 22.65 | 5.480 | -169.0 | 5.480 | 73.9 |
| | | 720.0 | 24.00 | 36.0 | 8 | 180 | 2.813950943 | 107.45 | 49.54 | 107.45 | 250.92 | 34.53 | 19.74 | 19.74 | 14.330 | -154.7 | 14.330 | 88.2 |
| | | 720.0 | 36.00 | 48.0 | 8 | 170.5 | 2.85637209 | 117.06 | 59.14 | 117.06 | 269.11 | 28.34 | 16.01 | 16.01 | 11.623 | -143.1 | 11.623 | 99.9 |
| | | 1440.0 | 48.00 | 72.0 | 8 | 162 | 2.895426834 | 124.85 | 66.93 | 124.85 | 287.02 | 23.63 | 13.35 | 13.35 | 19.381 | -123.7 | 19.381 | 119.3 |
| | | 2880.0 | 72.00 | 120.0 | 8 | 158 | 2.914177473 | 137.84 | 79.92 | 137.84 | 296.04 | 21.66 | 11.57 | 11.57 | 33.596 | -90.1 | 33.596 | 152.8 |
| | | 3240.0 | 120.00 | 174.0 | 8 | 153 | 2.937960076 | 160.35 | 102.44 | 160.35 | 307.89 | 19.39 | 9.29 | 9.29 | 30.338 | -59.7 | 30.338 | 183.2 |
| | | 3960.0 | 174.00 | 240.0 | 8 | 143.85 | 2.982502651 | 180.69 | 122.77 | 180.69 | 331.37 | 15.76 | 7.16 | 7.16 | 28.597 | -31.1 | 28.597 | 211.8 |
| | | 7200.0 | 240.00 | 360.0 | 8 | 136.85 | 3.017501509 | 199.85 | 141.94 | 199.85 | 351.07 | 13.39 | 5.77 | 5.77 | 41.846 | 10.7 | 31.146 | 242.9 |
| | | 7200.0 | 360.00 | 480.0 | 8 | 132.15 | 3.04146531 | 220.73 | 162.81 | 220.73 | 365.23 | 11.97 | 4.74 | 4.74 | 34.379 | 34.4 | 0.000 | 242.9 |
| | | 7200.0 | 480.00 | 600.0 | 8 | 126.25 | 3.072091753 | 220.73 | 162.81 | 220.73 | 384.16 | 10.38 | 4.42 | 4.42 | 32.055 | 32.1 | 0.000 | 242.9 |
| | | 7200.0 | 600.00 | 720.0 | 8 | 121.1 | 3.099333643 | 220.73 | 162.81 | 220.73 | 401.82 | 9.15 | 4.12 | 4.12 | 29.912 | 29.9 | 0.000 | 242.9 |

| Constants | Value |
|---|---|
| Mass Material (kg) | 77.717619 |
| Mass Element (kg) | 1000000 |
| a | -0.15969 |
| b | -0.04542 |
| c | 0.95477 |
| d | 5.31705 |
| e | -0.07459 |
| f | -1.10803 |

Note= Large mass of element us
because no limit to concrete assu
mass is an exposed surface.
If concrete in latent debris is bein
included, a fraction of B2 should
used.

| Interval Duration (min) | Start of Interval (hrs) | End of Interval (hrs) | Ave Interval pH | Ave Temp (F) | 1000/T ($K^{-1}$) | Ca All Mat | Ca this Mat Only | Ca (ppm) | K | k | R | Positive release rate (mg/kg- | interval pred release (kg) | Amount above start Mass | interval kg Ca released | Integral kg Ca released |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.2 | 0.00 | 0.01 | 9.32 | 239 | 2.576323586 | 0 | 0 | 0.000 | 75.30 | 58.51 | 58.51 | 58.51 | 0.001 | -1000000 | 0.001 | 0.001 |
| 0.2 | 0.01 | 0.0 | 9.32 | 255 | 2.518644969 | 0.01 | 0.00 | 0.001 | 66.33 | 67.79 | 67.79 | 67.79 | 0.001 | -1000000 | 0.001 | 0.002 |
| 0.5 | 0.01 | 0.0 | 9.32 | 264 | 2.487321569 | 0.01 | 0.00 | 0.001 | 61.92 | 73.43 | 73.42 | 73.42 | 0.003 | -1000000 | 0.003 | 0.004 |
| 0.5 | 0.02 | 0.0 | 9.32 | 270 | 2.466868584 | 0.03 | 0.00 | 0.003 | 59.20 | 77.36 | 77.35 | 77.35 | 0.003 | -1000000 | 0.003 | 0.007 |
| 3.5 | 0.03 | 0.1 | 9.32 | 274.5 | 2.451748233 | 0.05 | 0.01 | 0.005 | 57.26 | 80.40 | 80.39 | 80.39 | 0.022 | -1000000 | 0.022 | 0.029 |
| 5.0 | 0.08 | 0.2 | 9.32 | 276 | 2.446749222 | 0.19 | 0.02 | 0.020 | 56.63 | 81.43 | 81.40 | 81.40 | 0.032 | -1000000 | 0.032 | 0.061 |
| 5.0 | 0.17 | 0.3 | 9.32 | 273 | 2.456767713 | 0.39 | 0.04 | 0.041 | 57.90 | 79.38 | 79.32 | 79.32 | 0.031 | -1000000 | 0.031 | 0.092 |
| 5.0 | 0.25 | 0.3 | 8.66 | 269.5 | 2.468560144 | 0.59 | 0.06 | 0.062 | 63.66 | 86.27 | 86.19 | 86.19 | 0.033 | -1000000 | 0.033 | 0.125 |
| 5.0 | 0.33 | 0.4 | 8 | 264.5 | 2.485604209 | 0.78 | 0.08 | 0.084 | 70.82 | 92.51 | 92.40 | 92.40 | 0.036 | -1000000 | 0.036 | 0.161 |
| 5.0 | 0.42 | 0.5 | 8 | 258 | 2.508116544 | 0.97 | 0.11 | 0.108 | 74.41 | 87.35 | 87.22 | 87.22 | 0.034 | -1000000 | 0.034 | 0.195 |
| 15.0 | 0.50 | 0.8 | 8 | 249 | 2.539969238 | 1.15 | 0.13 | 0.131 | 79.81 | 80.53 | 80.40 | 80.40 | 0.094 | -1000000 | 0.094 | 0.289 |
| 15.0 | 0.75 | 1.0 | 8 | 241 | 2.5689697 | 1.68 | 0.19 | 0.194 | 85.06 | 74.79 | 74.62 | 74.62 | 0.087 | -1000000 | 0.087 | 0.376 |
| 30.0 | 1.00 | 1.5 | 8 | 238.5 | 2.578168641 | 2.19 | 0.25 | 0.252 | 86.80 | 73.05 | 72.84 | 72.84 | 0.170 | -999999 | 0.170 | 0.546 |
| 30.0 | 1.50 | 2.0 | 8 | 237 | 2.583719695 | 3.18 | 0.37 | 0.366 | 87.86 | 72.03 | 71.73 | 71.73 | 0.167 | -999999 | 0.167 | 0.713 |
| 120.0 | 2.00 | 4.0 | 8 | 233.5 | 2.596765584 | 4.14 | 0.48 | 0.478 | 90.42 | 69.67 | 69.30 | 69.30 | 0.646 | -999999 | 0.646 | 1.359 |
| 120.0 | 4.00 | 6.0 | 8 | 228 | 2.617534573 | 7.83 | 0.91 | 0.911 | 94.64 | 66.07 | 65.44 | 65.44 | 0.610 | -999998 | 0.610 | 1.969 |
| 120.0 | 6.00 | 8.0 | 8 | 220.5 | 2.646397224 | 11.05 | 1.32 | 1.320 | 100.84 | 61.38 | 60.58 | 60.58 | 0.565 | -999997 | 0.565 | 2.534 |
| 120.0 | 8.00 | 10.0 | 8 | 213 | 2.675903489 | 13.93 | 1.70 | 1.699 | 107.60 | 56.93 | 56.03 | 56.03 | 0.523 | -999997 | 0.523 | 3.057 |
| 120.0 | 10.00 | 12.0 | 8 | 208 | 2.695942606 | 16.58 | 2.05 | 2.049 | 112.45 | 54.09 | 53.11 | 53.11 | 0.495 | -999996 | 0.495 | 3.552 |
| 120.0 | 12.00 | 14.0 | 8 | 203 | 2.716284123 | 19.07 | 2.38 | 19.073 | 117.59 | 51.36 | 43.03 | 43.03 | 0.401 | -999996 | 0.401 | 3.954 |
| 120.0 | 14.00 | 16.0 | 8 | 198 | 2.736934937 | 20.21 | 2.65 | 20.207 | 123.05 | 48.72 | 40.72 | 40.72 | 0.380 | -999996 | 0.380 | 4.333 |
| 240.0 | 16.00 | 20.0 | 8 | 193 | 2.757902156 | 21.45 | 2.90 | 21.447 | 128.86 | 46.18 | 38.50 | 38.50 | 0.718 | -999995 | 0.718 | 5.051 |
| 240.0 | 20.00 | 24.0 | 8 | 187.5 | 2.781340297 | 24.17 | 3.39 | 24.171 | 135.67 | 43.50 | 35.75 | 35.75 | 0.667 | -999994 | 0.667 | 5.718 |
| 720.0 | 24.00 | 36.0 | 8 | 180 | 2.813950943 | 27.06 | 3.83 | 27.055 | 145.76 | 40.03 | 32.60 | 32.60 | 1.824 | -999992 | 1.824 | 7.542 |
| 720.0 | 36.00 | 48.0 | 8 | 170.5 | 2.85637209 | 36.99 | 5.06 | 36.988 | 160.00 | 35.92 | 27.62 | 27.62 | 1.545 | -999991 | 1.545 | 9.088 |
| 1440.0 | 48.00 | 72.0 | 8 | 162 | 2.895426834 | 47.02 | 6.09 | 47.019 | 174.35 | 32.52 | 23.75 | 23.75 | 2.658 | -999988 | 2.658 | 11.746 |
| 2880.0 | 72.00 | 120.0 | 8 | 158 | 2.914177473 | 68.09 | 7.87 | 68.086 | 181.69 | 31.00 | 19.38 | 19.38 | 4.338 | -999984 | 4.338 | 16.084 |
| 3240.0 | 120.00 | 174.0 | 8 | 153 | 2.937960076 | 90.46 | 10.78 | 90.458 | 191.44 | 29.17 | 15.39 | 15.39 | 3.875 | -999980 | 3.875 | 19.959 |
| 3960.0 | 174.00 | 240.0 | 8 | 143.85 | 2.982502651 | 95.74 | 13.38 | 95.742 | 211.13 | 26.04 | 14.23 | 14.23 | 4.380 | -999976 | 4.380 | 24.338 |
| 7200.0 | 240.00 | 360.0 | 8 | 136.85 | 3.017501509 | 129.07 | 16.31 | 129.075 | 228.02 | 23.81 | 10.33 | 10.33 | 5.783 | -999970 | 5.783 | 30.121 |
| 7200.0 | 360.00 | 480.0 | 8 | 132.15 | 3.04146531 | 143.24 | 20.19 | 143.243 | 240.35 | 22.40 | 9.05 | 9.05 | 5.065 | -999965 | 5.065 | 35.186 |
| 7200.0 | 480.00 | 600.0 | 8 | 126.25 | 3.072091753 | 160.00 | 23.58 | 160.005 | 257.09 | 20.72 | 7.82 | 7.82 | 4.378 | -999960 | 4.378 | 39.564 |
| 7200.0 | 600.00 | 720.0 | 8 | 121.1 | 3.099333643 | 192.35 | 26.52 | 192.352 | 272.96 | 19.33 | 5.71 | 5.71 | 3.194 | -999957 | 3.194 | 42.758 |

| Constants | Value |
|---|---|
| Mass Material (kg) | 77.717619 |
| Mass Element (kg) | 1000000 |
| a | 1.05597 |
| b | 0.01483 |
| c | 0.11862 |
| d | 3.50061 |
| e | -0.01713 |
| f | -0.74261 |

Note= Large mass of element us
because no limit to concrete assu
mass is an exposed surface.
If concrete in latent debris is bein
included, a fraction of B2 should
used.

| Interval Duration (min) | Start of Interval (hrs) | End of Interval (hrs) | Ave Interval pH | Ave Temp (F) | 1000/T ($K^{-1}$) | Si All Mat | Si this Mat Only | Si (ppm) | K | k | R | Positive release rate (mg/kg- | interval pred release (kg) | Amount above start Mass | interval kg Si released | Integral kg Si released |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.2 | 0.00 | 0.01 | 9.32 | 239 | 2.576323586 | 0 | 0 | 0.00 | 31.61 | 26.78 | 26.78 | 26.78 | 0.000 | -1000000 | 0.000 | 0.0003 |
| 0.2 | 0.01 | 0.0 | 9.32 | 255 | 2.518644969 | 0.05 | 0.00 | 0.00 | 31.11 | 29.55 | 29.55 | 29.55 | 0.000 | -1000000 | 0.000 | 0.00 |
| 0.5 | 0.01 | 0.0 | 9.32 | 264 | 2.487321569 | 0.11 | 0.00 | 0.00 | 30.85 | 31.18 | 31.18 | 31.18 | 0.001 | -1000000 | 0.001 | 0.00 |
| 0.5 | 0.02 | 0.0 | 9.32 | 270 | 2.466868584 | 0.34 | 0.00 | 0.00 | 30.68 | 32.29 | 32.29 | 32.29 | 0.001 | -1000000 | 0.001 | 0.00 |
| 3.5 | 0.03 | 0.1 | 9.32 | 274.5 | 2.451748233 | 0.60 | 0.00 | 0.00 | 30.55 | 33.13 | 33.13 | 33.13 | 0.009 | -1000000 | 0.009 | 0.01 |
| 5.0 | 0.08 | 0.2 | 9.32 | 276 | 2.446749222 | 2.59 | 0.01 | 0.01 | 30.51 | 33.42 | 33.41 | 33.41 | 0.013 | -1000000 | 0.013 | 0.03 |
| 5.0 | 0.17 | 0.3 | 9.32 | 273 | 2.456767713 | 5.49 | 0.02 | 0.02 | 30.59 | 32.85 | 32.83 | 32.83 | 0.013 | -1000000 | 0.013 | 0.04 |
| 5.0 | 0.25 | 0.3 | 8.66 | 269.5 | 2.468560144 | 8.21 | 0.03 | 0.03 | 30.01 | 33.04 | 33.02 | 33.02 | 0.013 | -1000000 | 0.013 | 0.05 |
| 5.0 | 0.33 | 0.4 | 8 | 264.5 | 2.485604209 | 10.33 | 0.03 | 0.03 | 29.47 | 32.94 | 32.90 | 32.90 | 0.013 | -1000000 | 0.013 | 0.06 |
| 5.0 | 0.42 | 0.5 | 8 | 258 | 2.508116544 | 11.96 | 0.04 | 0.04 | 29.66 | 31.70 | 31.65 | 31.65 | 0.012 | -1000000 | 0.012 | 0.08 |
| 15.0 | 0.50 | 0.8 | 8 | 249 | 2.539969238 | 13.39 | 0.05 | 0.05 | 29.92 | 30.02 | 29.97 | 29.97 | 0.035 | -1000000 | 0.035 | 0.11 |
| 15.0 | 0.75 | 1.0 | 8 | 241 | 2.5689697 | 16.96 | 0.07 | 0.07 | 30.15 | 28.56 | 28.49 | 28.49 | 0.033 | -1000000 | 0.033 | 0.14 |
| 30.0 | 1.00 | 1.5 | 8 | 238.5 | 2.578168641 | 19.96 | 0.10 | 0.10 | 30.23 | 28.12 | 28.03 | 28.03 | 0.065 | -1000000 | 0.065 | 0.21 |
| 30.0 | 1.50 | 2.0 | 8 | 237 | 2.583719695 | 25.58 | 0.14 | 0.14 | 30.28 | 27.85 | 27.72 | 27.72 | 0.065 | -1000000 | 0.065 | 0.27 |
| 120.0 | 2.00 | 4.0 | 8 | 233.5 | 2.596765584 | 30.91 | 0.18 | 0.18 | 30.38 | 27.24 | 27.07 | 27.07 | 0.252 | -999999 | 0.252 | 0.53 |
| 120.0 | 4.00 | 6.0 | 8 | 228 | 2.617534573 | 50.27 | 0.35 | 0.35 | 30.56 | 26.29 | 25.98 | 25.98 | 0.242 | -999999 | 0.242 | 0.77 |
| 120.0 | 6.00 | 8.0 | 8 | 220.5 | 2.646397224 | 65.96 | 0.52 | 0.52 | 30.80 | 25.02 | 24.60 | 24.60 | 0.229 | -999999 | 0.229 | 1.00 |
| 120.0 | 8.00 | 10.0 | 8 | 213 | 2.675903489 | 78.06 | 0.67 | 0.67 | 31.05 | 23.79 | 23.28 | 23.28 | 0.217 | -999999 | 0.217 | 1.22 |
| 120.0 | 10.00 | 12.0 | 8 | 208 | 2.695942606 | 87.36 | 0.81 | 0.81 | 31.22 | 22.99 | 22.39 | 22.39 | 0.209 | -999999 | 0.209 | 1.42 |
| 120.0 | 12.00 | 14.0 | 8 | 203 | 2.716284123 | 94.99 | 0.95 | 94.99 | 31.39 | 22.20 | -44.98 | 0.00 | 0.000 | -999999 | 0.000 | 1.42 |
| 120.0 | 14.00 | 16.0 | 8 | 198 | 2.736934937 | 97.44 | 0.95 | 97.44 | 31.57 | 21.43 | -44.72 | 0.00 | 0.000 | -999999 | 0.000 | 1.42 |
| 240.0 | 16.00 | 20.0 | 8 | 193 | 2.757902156 | 99.68 | 0.95 | 99.68 | 31.75 | 20.68 | -44.24 | 0.00 | 0.000 | -999999 | 0.000 | 1.42 |
| 240.0 | 20.00 | 24.0 | 8 | 187.5 | 2.781340297 | 103.78 | 0.95 | 103.78 | 31.95 | 19.87 | -44.66 | 0.00 | 0.000 | -999999 | 0.000 | 1.42 |
| 720.0 | 24.00 | 36.0 | 8 | 180 | 2.813950943 | 107.45 | 0.95 | 107.45 | 32.24 | 18.79 | -43.83 | 0.00 | 0.000 | -999999 | 0.000 | 1.42 |
| 720.0 | 36.00 | 48.0 | 8 | 170.5 | 2.85637209 | 117.06 | 0.95 | 117.06 | 32.62 | 17.47 | -45.24 | 0.00 | 0.000 | -999999 | 0.000 | 1.42 |
| 1440.0 | 48.00 | 72.0 | 8 | 162 | 2.895426834 | 124.85 | 0.95 | 124.85 | 32.97 | 16.35 | -45.56 | 0.00 | 0.000 | -999999 | 0.000 | 1.42 |
| 2880.0 | 72.00 | 120.0 | 8 | 158 | 2.914177473 | 137.84 | 0.95 | 137.84 | 33.14 | 15.83 | -50.02 | 0.00 | 0.000 | -999999 | 0.000 | 1.42 |
| 3240.0 | 120.00 | 174.0 | 8 | 153 | 2.937960076 | 160.35 | 0.95 | 160.35 | 33.35 | 15.20 | -57.88 | 0.00 | 0.000 | -999999 | 0.000 | 1.42 |
| 3960.0 | 174.00 | 240.0 | 8 | 143.85 | 2.982502651 | 180.69 | 0.95 | 180.69 | 33.76 | 14.08 | -61.30 | 0.00 | 0.000 | -999999 | 0.000 | 1.42 |
| 7200.0 | 240.00 | 360.0 | 8 | 136.85 | 3.017501509 | 199.85 | 0.95 | 199.85 | 34.08 | 13.27 | -64.52 | 0.00 | 0.000 | -999999 | 0.000 | 1.42 |
| 7200.0 | 360.00 | 480.0 | 8 | 132.15 | 3.04146531 | 220.73 | 0.95 | 220.73 | 34.31 | 12.73 | -69.19 | 0.00 | 0.000 | -999999 | 0.000 | 1.42 |
| 7200.0 | 480.00 | 600.0 | 8 | 126.25 | 3.072091753 | 220.73 | 0.95 | 220.73 | 34.60 | 12.08 | -65.01 | 0.00 | 0.000 | -999999 | 0.000 | 1.42 |
| 7200.0 | 600.00 | 720.0 | 8 | 121.1 | 3.099333643 | 220.73 | 0.95 | 220.73 | 34.85 | 11.53 | -61.51 | 0.00 | 0.000 | -999999 | 0.000 | 1.42 |

| Constants | Value |
|---|---|
| Mass Material (kg) | 77.717619 |
| Mass Element (kg) | 1000000 |
| a | 2.35338 |
| b | 0.06829 |
| c | -0.70953 |
| d | 9.23778 |
| e | 0.05404 |
| f | -3.34577 |

Note= Large mass of element us
because no limit to concrete assu
mass is an exposed surface.
If concrete in latent debris is bein
included, a fraction of B2 should
used.

| Interval Duration (min) | Start of Interval (hrs) | End of Interval (hrs) | Ave Interval pH | Ave Temp (F) | 1000/T ($K^{-1}$) | Al All Mat | Al this Mat Only | Al (ppm) | K | k | R | Positive release rate (mg/kg- | interval pred release (kg) | Amount above start Mass | interval kg Al released | Integral kg Al released |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.2 | 0.00 | 0.01 | 9.32 | 239 | 2.576323586 | 0 | 0 | 0.00 | 14.52 | 13.23 | 13.23 | 13.23 | 0.000 | -1000000 | 0.000 | 0.0002 |
| 0.2 | 0.01 | 0.0 | 9.32 | 255 | 2.518644969 | 0.18 | 0.00 | 0.00 | 15.95 | 20.64 | 20.64 | 20.64 | 0.000 | -1000000 | 0.000 | 0.00 |
| 0.5 | 0.01 | 0.0 | 9.32 | 264 | 2.487321569 | 0.39 | 0.00 | 0.00 | 16.79 | 26.27 | 26.27 | 26.27 | 0.001 | -1000000 | 0.001 | 0.00 |
| 0.5 | 0.02 | 0.0 | 9.32 | 270 | 2.466868584 | 1.06 | 0.00 | 0.00 | 17.36 | 30.75 | 30.75 | 30.75 | 0.001 | -1000000 | 0.001 | 0.00 |
| 3.5 | 0.03 | 0.1 | 9.32 | 274.5 | 2.451748233 | 1.75 | 0.00 | 0.00 | 17.79 | 34.55 | 34.55 | 34.55 | 0.009 | -1000000 | 0.009 | 0.01 |
| 5.0 | 0.08 | 0.2 | 9.32 | 276 | 2.446749222 | 6.55 | 0.01 | 0.01 | 17.94 | 35.91 | 35.89 | 35.89 | 0.014 | -1000000 | 0.014 | 0.03 |
| 5.0 | 0.17 | 0.3 | 9.32 | 273 | 2.456767713 | 12.96 | 0.02 | 0.02 | 17.65 | 33.24 | 33.21 | 33.21 | 0.013 | -1000000 | 0.013 | 0.04 |
| 5.0 | 0.25 | 0.3 | 8.66 | 269.5 | 2.468560144 | 18.56 | 0.03 | 0.03 | 15.60 | 27.96 | 27.91 | 27.91 | 0.011 | -1000000 | 0.011 | 0.05 |
| 5.0 | 0.33 | 0.4 | 8 | 264.5 | 2.485604209 | 22.35 | 0.03 | 0.03 | 13.68 | 22.59 | 22.53 | 22.53 | 0.009 | -1000000 | 0.009 | 0.06 |
| 5.0 | 0.42 | 0.5 | 8 | 258 | 2.508116544 | 25.62 | 0.04 | 0.04 | 13.19 | 18.99 | 18.93 | 18.93 | 0.007 | -1000000 | 0.007 | 0.07 |
| 15.0 | 0.50 | 0.8 | 8 | 249 | 2.539969238 | 28.10 | 0.04 | 0.04 | 12.52 | 14.86 | 14.81 | 14.81 | 0.017 | -1000000 | 0.017 | 0.08 |
| 15.0 | 0.75 | 1.0 | 8 | 241 | 2.5689697 | 33.71 | 0.06 | 0.06 | 11.94 | 11.88 | 11.83 | 11.83 | 0.014 | -1000000 | 0.014 | 0.10 |
| 30.0 | 1.00 | 1.5 | 8 | 238.5 | 2.578168641 | 38.80 | 0.06 | 0.06 | 11.76 | 11.07 | 11.01 | 11.01 | 0.026 | -1000000 | 0.026 | 0.12 |
| 30.0 | 1.50 | 2.0 | 8 | 237 | 2.583719695 | 51.00 | 0.08 | 0.08 | 11.65 | 10.61 | 10.53 | 10.53 | 0.025 | -1000000 | 0.025 | 0.15 |
| 120.0 | 2.00 | 4.0 | 8 | 233.5 | 2.596765584 | 63.74 | 0.10 | 0.10 | 11.41 | 9.59 | 9.51 | 9.51 | 0.089 | -1000000 | 0.089 | 0.24 |
| 120.0 | 4.00 | 6.0 | 8 | 228 | 2.617534573 | 112.64 | 0.16 | 0.16 | 11.03 | 8.17 | 8.06 | 8.06 | 0.075 | -1000000 | 0.075 | 0.31 |
| 120.0 | 6.00 | 8.0 | 8 | 220.5 | 2.646397224 | 158.29 | 0.21 | 0.21 | 10.52 | 6.54 | 6.41 | 6.41 | 0.060 | -1000000 | 0.060 | 0.37 |
| 120.0 | 8.00 | 10.0 | 8 | 213 | 2.675903489 | 200.45 | 0.25 | 0.25 | 10.02 | 5.21 | 5.08 | 5.08 | 0.047 | -1000000 | 0.047 | 0.42 |
| 120.0 | 10.00 | 12.0 | 8 | 208 | 2.695942606 | 236.95 | 0.28 | 0.28 | 9.70 | 4.47 | 4.34 | 4.34 | 0.040 | -1000000 | 0.040 | 0.46 |
| 120.0 | 12.00 | 14.0 | 8 | 203 | 2.716284123 | 267.20 | 0.31 | 267.20 | 9.38 | 3.82 | -104.94 | 0.00 | 0.000 | -1000000 | 0.000 | 0.46 |
| 120.0 | 14.00 | 16.0 | 8 | 198 | 2.736934937 | 292.74 | 0.31 | 292.74 | 9.07 | 3.26 | -101.86 | 0.00 | 0.000 | -1000000 | 0.000 | 0.46 |
| 240.0 | 16.00 | 20.0 | 8 | 193 | 2.757902156 | 314.53 | 0.31 | 314.53 | 8.77 | 2.77 | -96.67 | 0.00 | 0.000 | -1000000 | 0.000 | 0.46 |
| 240.0 | 20.00 | 24.0 | 8 | 187.5 | 2.781340297 | 351.07 | 0.31 | 351.07 | 8.44 | 2.31 | -93.96 | 0.00 | 0.000 | -1000000 | 0.000 | 0.46 |
| 720.0 | 24.00 | 36.0 | 8 | 180 | 2.813950943 | 381.90 | 0.31 | 381.90 | 8.00 | 1.80 | -84.12 | 0.00 | 0.000 | -1000000 | 0.000 | 0.46 |
| 720.0 | 36.00 | 48.0 | 8 | 170.5 | 2.85637209 | 453.44 | 0.31 | 453.44 | 7.46 | 1.30 | -77.56 | 0.00 | 0.000 | -1000000 | 0.000 | 0.46 |
| 1440.0 | 48.00 | 72.0 | 8 | 162 | 2.895426834 | 503.81 | 0.31 | 503.81 | 7.00 | 0.96 | -68.16 | 0.00 | 0.000 | -1000000 | 0.000 | 0.46 |
| 2880.0 | 72.00 | 120.0 | 8 | 158 | 2.914177473 | 574.30 | 0.31 | 574.30 | 6.79 | 0.83 | -69.49 | 0.00 | 0.000 | -1000000 | 0.000 | 0.46 |
| 3240.0 | 120.00 | 174.0 | 8 | 153 | 2.937960076 | 683.69 | 0.31 | 683.69 | 6.53 | 0.69 | -71.77 | 0.00 | 0.000 | -1000000 | 0.000 | 0.46 |
| 3960.0 | 174.00 | 240.0 | 8 | 143.85 | 2.982502651 | 773.80 | 0.31 | 773.80 | 6.07 | 0.49 | -62.09 | 0.00 | 0.000 | -1000000 | 0.000 | 0.46 |
| 7200.0 | 240.00 | 360.0 | 8 | 136.85 | 3.017501509 | 843.49 | 0.31 | 843.49 | 5.74 | 0.38 | -54.78 | 0.00 | 0.000 | -1000000 | 0.000 | 0.46 |
| 7200.0 | 360.00 | 480.0 | 8 | 132.15 | 3.04146531 | 929.29 | 0.31 | 929.29 | 5.52 | 0.31 | -52.23 | 0.00 | 0.000 | -1000000 | 0.000 | 0.46 |
| 7200.0 | 480.00 | 600.0 | 8 | 126.25 | 3.072091753 | 994.37 | 0.31 | 994.37 | 5.25 | 0.25 | -46.44 | 0.00 | 0.000 | -1000000 | 0.000 | 0.46 |
| 7200.0 | 600.00 | 720.0 | 8 | 121.1 | 3.099333643 | 1042.31 | 0.31 | 1042.31 | 5.02 | 0.20 | -41.28 | 0.00 | 0.000 | -1000000 | 0.000 | 0.46 |

| Constants | Value | Interval Duration (min) | Start of Interval (hrs) | End of Interval (hrs) | Ave Interval pH | Ave Temp (F) | 1000/T ($K^{-1}$) | Ca All Mat | Ca this Mat Only | Ca (ppm) | K | k | R | Positive release rate (mg/kg- | interval pred release (kg) | Amount above start Mass | interval kg Ca released | Integral kg Ca released |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mass Material (kg) | 1330.8348 | 0.2 | 0.00 | 0.01 | 9.32 | 239 | 2.576323586 | 0 | 0 | 0.00 | 17.87 | 27.65 | 27.65 | 27.65 | 0.006 | -29 | 0.0061 | 0.01 |
| Mass Element (kg) | 28.746032 | 0.2 | 0.01 | 0.0 | 9.32 | 255 | 2.518644969 | 0.01 | 0.00 | 0.00 | 19.02 | 31.42 | 31.41 | 31.41 | 0.007 | -29 | 0.0070 | 0.01 |
| a | -1.82949 | 0.5 | 0.01 | 0.0 | 9.32 | 264 | 2.487321569 | 0.01 | 0.01 | 0.01 | 19.68 | 33.68 | 33.66 | 33.66 | 0.022 | -29 | 0.0224 | 0.04 |
| b | 0.06821 | 0.5 | 0.02 | 0.0 | 9.32 | 270 | 2.466868584 | 0.03 | 0.02 | 0.02 | 20.12 | 35.24 | 35.20 | 35.20 | 0.023 | -29 | 0.0234 | 0.06 |
| c | -0.47088 | 3.5 | 0.03 | 0.1 | 9.32 | 274.5 | 2.451748233 | 0.05 | 0.04 | 0.04 | 20.45 | 36.44 | 36.37 | 36.37 | 0.169 | -29 | 0.1694 | 0.23 |
| d | 3.67611 | 5.0 | 0.08 | 0.2 | 9.32 | 276 | 2.446749222 | 0.19 | 0.15 | 0.15 | 20.56 | 36.84 | 36.57 | 36.57 | 0.243 | -28 | 0.2433 | 0.47 |
| e | 0.02616 | 5.0 | 0.17 | 0.3 | 9.32 | 273 | 2.456767713 | 0.39 | 0.32 | 0.32 | 20.34 | 36.04 | 35.48 | 35.48 | 0.236 | -28 | 0.2361 | 0.71 |
| f | -0.96191 | 5.0 | 0.25 | 0.3 | 8.66 | 269.5 | 2.468560144 | 0.59 | 0.47 | 0.47 | 18.10 | 33.74 | 32.85 | 32.85 | 0.219 | -28 | 0.2186 | 0.93 |
| | | 5.0 | 0.33 | 0.4 | 8 | 264.5 | 2.485604209 | 0.78 | 0.62 | 0.62 | 16.02 | 31.22 | 30.01 | 30.01 | 0.200 | -28 | 0.1997 | 1.13 |
| | | 5.0 | 0.42 | 0.5 | 8 | 258 | 2.508116544 | 0.97 | 0.75 | 0.75 | 15.64 | 29.70 | 28.27 | 28.27 | 0.188 | -27 | 0.1881 | 1.31 |
| | | 15.0 | 0.50 | 0.8 | 8 | 249 | 2.539969238 | 1.15 | 0.88 | 0.88 | 15.11 | 27.68 | 26.07 | 26.07 | 0.520 | -27 | 0.5203 | 1.83 |
| | | 15.0 | 0.75 | 1.0 | 8 | 241 | 2.5689697 | 1.68 | 1.23 | 1.23 | 14.64 | 25.96 | 23.78 | 23.78 | 0.475 | -26 | 0.4747 | 2.31 |
| | | 30.0 | 1.00 | 1.5 | 8 | 238.5 | 2.578168641 | 2.19 | 1.55 | 1.55 | 14.49 | 25.43 | 22.72 | 22.72 | 0.907 | -26 | 0.9070 | 3.22 |
| | | 30.0 | 1.50 | 2.0 | 8 | 237 | 2.583719695 | 3.18 | 2.16 | 2.16 | 14.41 | 25.12 | 21.36 | 21.36 | 0.853 | -25 | 0.8530 | 4.07 |
| | | 120.0 | 2.00 | 4.0 | 8 | 233.5 | 2.596765584 | 4.14 | 2.73 | 2.73 | 14.20 | 24.41 | 19.72 | 19.72 | 3.150 | -22 | 3.1496 | 7.22 |
| | | 120.0 | 4.00 | 6.0 | 8 | 228 | 2.617534573 | 7.83 | 4.84 | 4.84 | 13.89 | 23.31 | 15.19 | 15.19 | 2.426 | -19 | 2.4258 | 9.64 |
| | | 120.0 | 6.00 | 8.0 | 8 | 220.5 | 2.646397224 | 11.05 | 6.46 | 6.46 | 13.46 | 21.87 | 11.37 | 11.37 | 1.815 | -17 | 1.8151 | 11.46 |
| | | 120.0 | 8.00 | 10.0 | 8 | 213 | 2.675903489 | 13.93 | 7.68 | 7.68 | 13.04 | 20.48 | 8.42 | 8.42 | 1.344 | -16 | 1.3439 | 12.80 |
| | | 120.0 | 10.00 | 12.0 | 8 | 208 | 2.695942606 | 16.58 | 8.58 | 8.58 | 12.76 | 19.59 | 6.41 | 6.41 | 1.024 | -15 | 1.0241 | 13.83 |
| | | 120.0 | 12.00 | 14.0 | 8 | 203 | 2.716284123 | 19.07 | 9.27 | 19.07 | 12.48 | 18.73 | -9.90 | 0.00 | 0.000 | -15 | 0.0000 | 13.83 |
| | | 120.0 | 14.00 | 16.0 | 8 | 198 | 2.736934937 | 20.21 | 9.27 | 20.21 | 12.20 | 17.89 | -11.74 | 0.00 | 0.000 | -15 | 0.0000 | 13.83 |
| | | 240.0 | 16.00 | 20.0 | 8 | 193 | 2.757902156 | 21.45 | 9.27 | 21.45 | 11.93 | 17.08 | -13.63 | 0.00 | 0.000 | -15 | 0.0000 | 13.83 |
| | | 240.0 | 20.00 | 24.0 | 8 | 187.5 | 2.781340297 | 24.17 | 9.27 | 24.17 | 11.63 | 16.22 | -17.49 | 0.00 | 0.000 | -15 | 0.0000 | 13.83 |
| | | 720.0 | 24.00 | 36.0 | 8 | 180 | 2.813950943 | 27.06 | 9.27 | 27.06 | 11.22 | 15.09 | -21.28 | 0.00 | 0.000 | -15 | 0.0000 | 13.83 |
| | | 720.0 | 36.00 | 48.0 | 8 | 170.5 | 2.85637209 | 36.99 | 9.27 | 36.99 | 10.72 | 13.73 | -33.66 | 0.00 | 0.000 | -15 | 0.0000 | 13.83 |
| | | 1440.0 | 48.00 | 72.0 | 8 | 162 | 2.895426834 | 47.02 | 9.27 | 47.02 | 10.27 | 12.60 | -45.05 | 0.00 | 0.000 | -15 | 0.000 | 13.83 |
| | | 2880.0 | 72.00 | 120.0 | 8 | 158 | 2.914177473 | 68.09 | 9.27 | 68.09 | 10.07 | 12.08 | -69.64 | 0.00 | 0.000 | -15 | 0.000 | 13.83 |
| | | 3240.0 | 120.00 | 174.0 | 8 | 153 | 2.937960076 | 90.46 | 9.27 | 90.46 | 9.81 | 11.46 | -94.23 | 0.00 | 0.000 | -15 | 0.000 | 13.83 |
| | | 3960.0 | 174.00 | 240.0 | 8 | 143.85 | 2.982502651 | 95.74 | 9.27 | 95.74 | 9.35 | 10.39 | -95.98 | 0.00 | 0.000 | -15 | 0.000 | 13.83 |
| | | 7200.0 | 240.00 | 360.0 | 8 | 136.85 | 3.017501509 | 129.07 | 9.27 | 129.07 | 9.00 | 9.61 | -128.23 | 0.00 | 0.000 | -15 | 0.000 | 13.83 |
| | | 7200.0 | 360.00 | 480.0 | 8 | 132.15 | 3.04146531 | 143.24 | 9.27 | 143.24 | 8.77 | 9.12 | -139.77 | 0.00 | 0.000 | -15 | 0.000 | 13.83 |
| | | 7200.0 | 480.00 | 600.0 | 8 | 126.25 | 3.072091753 | 160.00 | 9.27 | 160.00 | 8.48 | 8.52 | -152.13 | 0.00 | 0.000 | -15 | 0.000 | 13.83 |
| | | 7200.0 | 600.00 | 720.0 | 8 | 121.1 | 3.099333643 | 192.35 | 9.27 | 192.35 | 8.24 | 8.02 | -179.24 | 0.00 | 0.000 | -15 | 0.000 | 13.83 |

| Constants | Value | Interval Duration (min) | Start of Interval (hrs) | End of Interval (hrs) | Ave Interval pH | Ave Temp (F) | 1000/T ($K^{-1}$) | Si All Mat | Si this Mat Only | Si (ppm) | K | k | R | Positive release rate (mg/kg- | interval pred release (kg) | Amount above start Mass | interval kg Si released | Integral kg Si released |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mass Material (kg) | 1330.835 | 0.2 | 0.00 | 0.01 | 9.32 | 239 | 2.576323586 | 0 | 0 | 0.00 | 195.95 | 244.77 | 244.77 | 244.77 | 0.054 | -261 | 0.054 | 0.0543 |
| Mass Element (kg) | 260.9767 | 0.2 | 0.01 | 0.0 | 9.32 | 255 | 2.518644969 | 0.05 | 0.04 | 0.04 | 239.32 | 343.80 | 343.75 | 343.75 | 0.076 | -261 | 0.076 | 0.13 |
| a | 5.20122 | 0.5 | 0.01 | 0.0 | 9.32 | 264 | 2.487321569 | 0.11 | 0.09 | 0.09 | 266.77 | 413.46 | 413.33 | 413.33 | 0.275 | -261 | 0.275 | 0.41 |
| b | 0.10404 | 0.5 | 0.02 | 0.0 | 9.32 | 270 | 2.466868584 | 0.34 | 0.27 | 0.27 | 286.37 | 466.40 | 465.96 | 465.96 | 0.310 | -260 | 0.310 | 0.72 |
| c | -1.50553 | 3.5 | 0.03 | 0.1 | 9.32 | 274.5 | 2.451748233 | 0.60 | 0.48 | 0.48 | 301.78 | 509.85 | 509.04 | 509.04 | 2.371 | -258 | 2.371 | 3.09 |
| d | 7.46511 | 5.0 | 0.08 | 0.2 | 9.32 | 276 | 2.446749222 | 2.59 | 2.07 | 2.07 | 307.06 | 525.08 | 521.55 | 521.55 | 3.470 | -254 | 3.470 | 6.56 |
| e | 0.16247 | 5.0 | 0.17 | 0.3 | 9.32 | 273 | 2.456767713 | 5.49 | 4.39 | 4.39 | 296.58 | 494.99 | 487.66 | 487.66 | 3.245 | -251 | 3.245 | 9.80 |
| f | -2.55813 | 5.0 | 0.25 | 0.3 | 8.66 | 269.5 | 2.468560144 | 8.21 | 6.57 | 6.57 | 243.06 | 360.75 | 351.00 | 351.00 | 2.336 | -249 | 2.336 | 12.14 |
| | | 5.0 | 0.33 | 0.4 | 8 | 264.5 | 2.485604209 | 10.33 | 8.13 | 8.13 | 195.61 | 254.90 | 244.30 | 244.30 | 1.626 | -247 | 1.626 | 13.76 |
| | | 5.0 | 0.42 | 0.5 | 8 | 258 | 2.508116544 | 11.96 | 9.22 | 9.22 | 180.92 | 223.25 | 211.86 | 211.86 | 1.410 | -246 | 1.410 | 15.17 |
| | | 15.0 | 0.50 | 0.8 | 8 | 249 | 2.539969238 | 13.39 | 10.17 | 10.17 | 162.01 | 185.05 | 173.44 | 173.44 | 3.462 | -242 | 3.462 | 18.64 |
| | | 15.0 | 0.75 | 1.0 | 8 | 241 | 2.5689697 | 16.96 | 12.49 | 12.49 | 146.51 | 156.00 | 142.70 | 142.70 | 2.849 | -239 | 2.849 | 21.48 |
| | | 30.0 | 1.00 | 1.5 | 8 | 238.5 | 2.578168641 | 19.96 | 14.40 | 14.40 | 141.92 | 147.77 | 132.78 | 132.78 | 5.301 | -234 | 5.301 | 26.78 |
| | | 30.0 | 1.50 | 2.0 | 8 | 237 | 2.583719695 | 25.58 | 17.95 | 17.95 | 139.21 | 143.01 | 124.57 | 124.57 | 4.974 | -229 | 4.974 | 31.76 |
| | | 120.0 | 2.00 | 4.0 | 8 | 233.5 | 2.596765584 | 30.91 | 21.28 | 21.28 | 133.06 | 132.44 | 111.25 | 111.25 | 17.767 | -211 | 17.767 | 49.53 |
| | | 120.0 | 4.00 | 6.0 | 8 | 228 | 2.617534573 | 50.27 | 33.19 | 33.19 | 123.81 | 117.19 | 85.77 | 85.77 | 13.697 | -198 | 13.697 | 63.22 |
| | | 120.0 | 6.00 | 8.0 | 8 | 220.5 | 2.646397224 | 65.96 | 42.37 | 42.37 | 112.02 | 98.86 | 61.47 | 61.47 | 9.817 | -188 | 9.817 | 73.04 |
| | | 120.0 | 8.00 | 10.0 | 8 | 213 | 2.675903489 | 78.06 | 48.95 | 48.95 | 101.13 | 83.09 | 42.87 | 42.87 | 6.847 | -181 | 6.847 | 79.89 |
| | | 120.0 | 10.00 | 12.0 | 8 | 208 | 2.695942606 | 87.36 | 53.54 | 53.54 | 94.34 | 73.84 | 31.94 | 31.94 | 5.100 | -176 | 5.100 | 84.99 |
| | | 120.0 | 12.00 | 14.0 | 8 | 203 | 2.716284123 | 94.99 | 56.96 | 94.99 | 87.92 | 65.50 | -5.27 | 0.00 | 0.000 | -176 | 0.000 | 84.99 |
| | | 120.0 | 14.00 | 16.0 | 8 | 198 | 2.736934937 | 97.44 | 56.96 | 97.44 | 81.85 | 58.00 | -11.05 | 0.00 | 0.000 | -176 | 0.000 | 84.99 |
| | | 240.0 | 16.00 | 20.0 | 8 | 193 | 2.757902156 | 99.68 | 56.96 | 99.68 | 76.11 | 51.26 | -15.88 | 0.00 | 0.000 | -176 | 0.000 | 84.99 |
| | | 240.0 | 20.00 | 24.0 | 8 | 187.5 | 2.781340297 | 103.78 | 56.96 | 103.78 | 70.17 | 44.65 | -21.39 | 0.00 | 0.000 | -176 | 0.000 | 84.99 |
| | | 720.0 | 24.00 | 36.0 | 8 | 180 | 2.813950943 | 107.45 | 56.96 | 107.45 | 62.67 | 36.85 | -26.33 | 0.00 | 0.000 | -176 | 0.000 | 84.99 |
| | | 720.0 | 36.00 | 48.0 | 8 | 170.5 | 2.85637209 | 117.06 | 56.96 | 117.06 | 54.10 | 28.70 | -33.40 | 0.00 | 0.000 | -176 | 0.000 | 84.99 |
| | | 1440.0 | 48.00 | 72.0 | 8 | 162 | 2.895426834 | 124.85 | 56.96 | 124.85 | 47.25 | 22.80 | -37.45 | 0.00 | 0.000 | -176 | 0.000 | 84.99 |
| | | 2880.0 | 72.00 | 120.0 | 8 | 158 | 2.914177473 | 137.84 | 56.96 | 137.84 | 44.27 | 20.42 | -43.15 | 0.00 | 0.000 | -176 | 0.000 | 84.99 |
| | | 3240.0 | 120.00 | 174.0 | 8 | 153 | 2.937960076 | 160.35 | 56.96 | 160.35 | 40.77 | 17.75 | -52.06 | 0.00 | 0.000 | -176 | 0.000 | 84.99 |
| | | 3960.0 | 174.00 | 240.0 | 8 | 143.85 | 2.982502651 | 180.69 | 56.96 | 180.69 | 34.94 | 13.65 | -56.96 | 0.00 | 0.000 | -176 | 0.000 | 84.99 |
| | | 7200.0 | 240.00 | 360.0 | 8 | 136.85 | 3.017501509 | 199.85 | 56.96 | 199.85 | 30.95 | 11.11 | -60.64 | 0.00 | 0.000 | -176 | 0.000 | 84.99 |
| | | 7200.0 | 360.00 | 480.0 | 8 | 132.15 | 3.04146531 | 220.73 | 56.96 | 220.73 | 28.48 | 9.65 | -65.12 | 0.00 | 0.000 | -176 | 0.000 | 84.99 |
| | | 7200.0 | 480.00 | 600.0 | 8 | 126.25 | 3.072091753 | 220.73 | 56.96 | 220.73 | 25.61 | 8.05 | -61.37 | 0.00 | 0.000 | -176 | 0.000 | 84.99 |
| | | 7200.0 | 600.00 | 720.0 | 8 | 121.1 | 3.099333643 | 220.73 | 56.96 | 220.73 | 23.30 | 6.86 | -58.13 | 0.00 | 0.000 | -176 | 0.000 | 84.99 |

| Constants | Value |
|---|---|
| Mass Material (kg) | 1330.835 |
| Mass Element (kg) | 25.95128 |
| a | 9.72351 |
| b | 0.14041 |
| c | -1.69396 |
| d | 10.35371 |
| e | 0.17064 |
| f | -4.17804 |

| Interval Duration (min) | Start of Interval (hrs) | End of Interval (hrs) | Ave Interval pH | Ave Temp (F) | 1000/T ($K^{-1}$) | Al All Mat | Al this Mat Only | Al (ppm) | K | k | R | Positive release rate (mg/kg- | interval pred release (kg) | Amount above start Mass | interval kg Al released | Integral kg Al released |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.2 | 0.00 | 0.01 | 9.32 | 239 | 2.576323586 | 0 | 0 | 0.00 | 4.66 | 15.14 | 15.14 | 15.14 | 0.003 | -26 | 0.003 | 0.00336 |
| 0.2 | 0.01 | 0.0 | 9.32 | 255 | 2.518644969 | 0.18 | 0.00 | 0.00 | 5.83 | 26.37 | 26.36 | 26.36 | 0.006 | -26 | 0.006 | 0.009 |
| 0.5 | 0.01 | 0.0 | 9.32 | 264 | 2.487321569 | 0.39 | 0.01 | 0.01 | 6.59 | 35.64 | 35.61 | 35.61 | 0.024 | -26 | 0.024 | 0.033 |
| 0.5 | 0.02 | 0.0 | 9.32 | 270 | 2.466868584 | 1.06 | 0.02 | 0.02 | 7.13 | 43.39 | 43.26 | 43.26 | 0.029 | -26 | 0.029 | 0.062 |
| 3.5 | 0.03 | 0.1 | 9.32 | 274.5 | 2.451748233 | 1.75 | 0.04 | 0.04 | 7.57 | 50.18 | 49.91 | 49.91 | 0.232 | -26 | 0.232 | 0.294 |
| 5.0 | 0.08 | 0.2 | 9.32 | 276 | 2.446749222 | 6.55 | 0.20 | 0.20 | 7.72 | 52.66 | 51.31 | 51.31 | 0.341 | -25 | 0.341 | 0.636 |
| 5.0 | 0.17 | 0.3 | 9.32 | 273 | 2.456767713 | 12.96 | 0.43 | 0.43 | 7.42 | 47.82 | 45.07 | 45.07 | 0.300 | -25 | 0.300 | 0.936 |
| 5.0 | 0.25 | 0.3 | 8.66 | 269.5 | 2.468560144 | 18.56 | 0.63 | 0.63 | 5.73 | 32.94 | 29.33 | 29.33 | 0.195 | -25 | 0.195 | 1.131 |
| 5.0 | 0.33 | 0.4 | 8 | 264.5 | 2.485604209 | 22.35 | 0.76 | 0.76 | 4.33 | 21.57 | 17.79 | 17.79 | 0.118 | -25 | 0.118 | 1.249 |
| 5.0 | 0.42 | 0.5 | 8 | 258 | 2.508116544 | 25.62 | 0.84 | 0.84 | 3.96 | 17.37 | 13.70 | 13.70 | 0.091 | -25 | 0.091 | 1.340 |
| 15.0 | 0.50 | 0.8 | 8 | 249 | 2.539969238 | 28.10 | 0.90 | 0.90 | 3.50 | 12.79 | 9.51 | 9.51 | 0.190 | -24 | 0.190 | 1.530 |
| 15.0 | 0.75 | 1.0 | 8 | 241 | 2.5689697 | 33.71 | 1.03 | 1.03 | 3.13 | 9.67 | 6.50 | 6.50 | 0.130 | -24 | 0.130 | 1.660 |
| 30.0 | 1.00 | 1.5 | 8 | 238.5 | 2.578168641 | 38.80 | 1.11 | 1.11 | 3.02 | 8.85 | 5.59 | 5.59 | 0.223 | -24 | 0.223 | 1.883 |
| 30.0 | 1.50 | 2.0 | 8 | 237 | 2.583719695 | 51.00 | 1.26 | 1.26 | 2.95 | 8.39 | 4.80 | 4.80 | 0.192 | -24 | 0.192 | 2.075 |
| 120.0 | 2.00 | 4.0 | 8 | 233.5 | 2.596765584 | 63.74 | 1.39 | 1.39 | 2.81 | 7.40 | 3.73 | 3.73 | 0.596 | -23 | 0.596 | 2.671 |
| 120.0 | 4.00 | 6.0 | 8 | 228 | 2.617534573 | 112.64 | 1.79 | 1.79 | 2.59 | 6.06 | 1.87 | 1.87 | 0.298 | -23 | 0.298 | 2.969 |
| 120.0 | 6.00 | 8.0 | 8 | 220.5 | 2.646397224 | 158.29 | 1.99 | 1.99 | 2.31 | 4.59 | 0.64 | 0.64 | 0.102 | -23 | 0.102 | 3.071 |
| 120.0 | 8.00 | 10.0 | 8 | 213 | 2.675903489 | 200.45 | 2.06 | 2.06 | 2.06 | 3.46 | 0.00 | 0.00 | 0.000 | -23 | 0.000 | 3.072 |
| 120.0 | 10.00 | 12.0 | 8 | 208 | 2.695942606 | 236.95 | 2.06 | 2.06 | 1.91 | 2.85 | -0.23 | 0.00 | 0.000 | -23 | 0.000 | 3.072 |
| 120.0 | 12.00 | 14.0 | 8 | 203 | 2.716284123 | 267.20 | 2.06 | 267.20 | 1.76 | 2.34 | -353.62 | 0.00 | 0.000 | -23 | 0.000 | 3.072 |
| 120.0 | 14.00 | 16.0 | 8 | 198 | 2.736934937 | 292.74 | 2.06 | 292.74 | 1.62 | 1.92 | -344.63 | 0.00 | 0.000 | -23 | 0.000 | 3.072 |
| 240.0 | 16.00 | 20.0 | 8 | 193 | 2.757902156 | 314.53 | 2.06 | 314.53 | 1.50 | 1.57 | -328.68 | 0.00 | 0.000 | -23 | 0.000 | 3.072 |
| 240.0 | 20.00 | 24.0 | 8 | 187.5 | 2.781340297 | 351.07 | 2.06 | 351.07 | 1.37 | 1.25 | -321.13 | 0.00 | 0.000 | -23 | 0.000 | 3.072 |
| 720.0 | 24.00 | 36.0 | 8 | 180 | 2.813950943 | 381.90 | 2.06 | 381.90 | 1.20 | 0.92 | -290.09 | 0.00 | 0.000 | -23 | 0.000 | 3.072 |
| 720.0 | 36.00 | 48.0 | 8 | 170.5 | 2.85637209 | 453.44 | 2.06 | 453.44 | 1.02 | 0.61 | -270.48 | 0.00 | 0.000 | -23 | 0.000 | 3.072 |
| 1440.0 | 48.00 | 72.0 | 8 | 162 | 2.895426834 | 503.81 | 2.06 | 503.81 | 0.88 | 0.42 | -240.48 | 0.00 | 0.000 | -23 | 0.000 | 3.072 |
| 2880.0 | 72.00 | 120.0 | 8 | 158 | 2.914177473 | 574.30 | 2.06 | 574.30 | 0.81 | 0.35 | -246.33 | 0.00 | 0.000 | -23 | 0.000 | 3.072 |
| 3240.0 | 120.00 | 174.0 | 8 | 153 | 2.937960076 | 683.69 | 2.06 | 683.69 | 0.74 | 0.28 | -256.04 | 0.00 | 0.000 | -23 | 0.000 | 3.072 |
| 3960.0 | 174.00 | 240.0 | 8 | 143.85 | 2.982502651 | 773.80 | 2.06 | 773.80 | 0.62 | 0.18 | -224.67 | 0.00 | 0.000 | -23 | 0.000 | 3.072 |
| 7200.0 | 240.00 | 360.0 | 8 | 136.85 | 3.017501509 | 843.49 | 2.06 | 843.49 | 0.54 | 0.13 | -200.51 | 0.00 | 0.000 | -23 | 0.000 | 3.072 |
| 7200.0 | 360.00 | 480.0 | 8 | 132.15 | 3.04146531 | 929.29 | 2.06 | 929.29 | 0.50 | 0.10 | -192.63 | 0.00 | 0.000 | -23 | 0.000 | 3.072 |
| 7200.0 | 480.00 | 600.0 | 8 | 126.25 | 3.072091753 | 994.37 | 2.06 | 994.37 | 0.44 | 0.08 | -173.01 | 0.00 | 0.000 | -23 | 0.000 | 3.072 |
| 7200.0 | 600.00 | 720.0 | 8 | 121.1 | 3.099333643 | 1042.31 | 2.06 | 1042.31 | 0.40 | 0.06 | -155.20 | 0.00 | 0.000 | -23 | 0.000 | 3.072 |

| Constants | Value | Interval Duration (min) | Start of Interval (hrs) | End of Interval (hrs) | Ave Interval pH | Ave Temp (F) | 1000/T ($K^{-1}$) | Si All Mat | Si this Mat Only | Si (ppm) | K | k | R | Positive release rate (mg/kg-min) | interval pred release (kg) | Amount above start Mass | interval kg Si released | Integral kg Si released |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mass Material (kg) | 0 | 0.2 | 0.00 | 0.01 | 9.32 | 239 | 2.576323586 | 0 | 0 | 0.00 | 91.54 | 12526.50 | 12526.50 | 12526.50 | 0.000 | 0 | 0.000 | 0.00000 |
| Mass Element (kg) | 0 | 0.2 | 0.01 | 0.0 | 9.32 | 255 | 2.518644969 | 0.05 | 0.00 | 0.00 | 92.43 | 16193.51 | 16193.51 | 16193.51 | 0.000 | 0 | 0.000 | 0.000 |
| a | 1.17043 | 0.5 | 0.01 | 0.0 | 9.32 | 264 | 2.487321569 | 0.11 | 0.00 | 0.00 | 92.92 | 18616.54 | 18616.54 | 18616.54 | 0.000 | 0 | 0.000 | 0.000 |
| b | 0.10511 | 0.5 | 0.02 | 0.0 | 9.32 | 270 | 2.466868584 | 0.34 | 0.00 | 0.00 | 93.24 | 20391.13 | 20391.13 | 20391.13 | 0.000 | 0 | 0.000 | 0.000 |
| c | -0.07315 | 3.5 | 0.03 | 0.1 | 9.32 | 274.5 | 2.451748233 | 0.60 | 0.00 | 0.00 | 93.48 | 21810.91 | 21810.91 | 21810.91 | 0.000 | 0 | 0.000 | 0.000 |
| d | 7.41106 | 5.0 | 0.08 | 0.2 | 9.32 | 276 | 2.446749222 | 2.59 | 0.00 | 0.00 | 93.56 | 22301.72 | 22301.72 | 22301.72 | 0.000 | 0 | 0.000 | 0.000 |
| e | 0.17893 | 5.0 | 0.17 | 0.3 | 9.32 | 273 | 2.456767713 | 5.49 | 0.00 | 0.00 | 93.40 | 21328.95 | 21328.95 | 21328.95 | 0.000 | 0 | 0.000 | 0.000 |
| f | -1.93332 | 5.0 | 0.25 | 0.3 | 8.66 | 269.5 | 2.468560144 | 8.21 | 0.00 | 0.00 | 79.45 | 15419.74 | 15419.74 | 15419.74 | 0.000 | 0 | 0.000 | 0.000 |
| | | 5.0 | 0.33 | 0.4 | 8 | 264.5 | 2.485604209 | 10.33 | 0.00 | 0.00 | 67.53 | 10890.10 | 10890.10 | 10890.10 | 0.000 | 0 | 0.000 | 0.000 |
| | | 5.0 | 0.42 | 0.5 | 8 | 258 | 2.508116544 | 11.96 | 0.00 | 0.00 | 67.27 | 9851.63 | 9851.63 | 9851.63 | 0.000 | 0 | 0.000 | 0.000 |
| | | 15.0 | 0.50 | 0.8 | 8 | 249 | 2.539969238 | 13.39 | 0.00 | 0.00 | 66.91 | 8549.22 | 8549.22 | 8549.22 | 0.000 | 0 | 0.000 | 0.000 |
| | | 15.0 | 0.75 | 1.0 | 8 | 241 | 2.5689697 | 16.96 | 0.00 | 0.00 | 66.59 | 7513.80 | 7513.80 | 7513.80 | 0.000 | 0 | 0.000 | 0.000 |
| | | 30.0 | 1.00 | 1.5 | 8 | 238.5 | 2.578168641 | 19.96 | 0.00 | 0.00 | 66.48 | 7212.32 | 7212.32 | 7212.32 | 0.000 | 0 | 0.000 | 0.000 |
| | | 30.0 | 1.50 | 2.0 | 8 | 237 | 2.583719695 | 25.58 | 0.00 | 0.00 | 66.42 | 7036.28 | 7036.28 | 7036.28 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 2.00 | 4.0 | 8 | 233.5 | 2.596765584 | 30.91 | 0.00 | 0.00 | 66.28 | 6639.28 | 6639.28 | 6639.28 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 4.00 | 6.0 | 8 | 228 | 2.617534573 | 50.27 | 0.00 | 0.00 | 66.04 | 6052.96 | 6052.96 | 6052.96 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 6.00 | 8.0 | 8 | 220.5 | 2.646397224 | 65.96 | 0.00 | 0.00 | 65.72 | 5323.13 | 5323.13 | 5323.13 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 8.00 | 10.0 | 8 | 213 | 2.675903489 | 78.06 | 0.00 | 0.00 | 65.40 | 4667.91 | 4667.91 | 4667.91 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 10.00 | 12.0 | 8 | 208 | 2.695942606 | 87.36 | 0.00 | 0.00 | 65.18 | 4269.53 | 4269.53 | 4269.53 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 12.00 | 14.0 | 8 | 203 | 2.716284123 | 94.99 | 0.00 | 94.99 | 64.96 | 3899.90 | -1803.32 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 14.00 | 16.0 | 8 | 198 | 2.736934937 | 97.44 | 0.00 | 97.44 | 64.73 | 3557.37 | -1797.66 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 240.0 | 16.00 | 20.0 | 8 | 193 | 2.757902156 | 99.68 | 0.00 | 99.68 | 64.50 | 3240.36 | -1767.25 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 240.0 | 20.00 | 24.0 | 8 | 187.5 | 2.781340297 | 103.78 | 0.00 | 103.78 | 64.25 | 2919.30 | -1796.35 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 720.0 | 24.00 | 36.0 | 8 | 180 | 2.813950943 | 107.45 | 0.00 | 107.45 | 63.90 | 2524.83 | -1721.21 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 720.0 | 36.00 | 48.0 | 8 | 170.5 | 2.85637209 | 117.06 | 0.00 | 117.06 | 63.44 | 2090.35 | -1766.67 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 1440.0 | 48.00 | 72.0 | 8 | 162 | 2.895426834 | 124.85 | 0.00 | 124.85 | 63.02 | 1756.76 | -1723.26 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 2880.0 | 72.00 | 120.0 | 8 | 158 | 2.914177473 | 137.84 | 0.00 | 137.84 | 62.83 | 1616.08 | -1929.52 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 3240.0 | 120.00 | 174.0 | 8 | 153 | 2.937960076 | 160.35 | 0.00 | 160.35 | 62.57 | 1453.73 | -2271.59 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 3960.0 | 174.00 | 240.0 | 8 | 143.85 | 2.982502651 | 180.69 | 0.00 | 180.69 | 62.11 | 1192.25 | -2276.35 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 7200.0 | 240.00 | 360.0 | 8 | 136.85 | 3.017501509 | 199.85 | 0.00 | 199.85 | 61.74 | 1020.24 | -2282.20 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 7200.0 | 360.00 | 480.0 | 8 | 132.15 | 3.04146531 | 220.73 | 0.00 | 220.73 | 61.49 | 917.01 | -2374.57 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 7200.0 | 480.00 | 600.0 | 8 | 126.25 | 3.072091753 | 220.73 | 0.00 | 220.73 | 61.18 | 800.14 | -2086.78 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 7200.0 | 600.00 | 720.0 | 8 | 121.1 | 3.099333643 | 220.73 | 0.00 | 220.73 | 60.90 | 708.76 | -1860.22 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |

| Constants | Value | Interval Duration (min) | Start of Interval (hrs) | End of Interval (hrs) | Ave Interval pH | Ave Temp (F) | 1000/T ($K^{-1}$) | Al All Mat | Al this Mat Only | Al (ppm) | K | k | R | Positive release rate (mg/kg- | interval pred release (kg) | Amount above start Mass | interval kg Al released | Integral kg Al released |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mass Material (kg) | 0 | 0.2 | 0.00 | 0.01 | 9.32 | 239 | 2.576323586 | 0 | 0 | 0.00 | 19.58 | 72.45 | 72.45 | 72.45 | 0.000 | 0 | 0.000 | 0.00000 |
| Mass Element (kg) | 0 | 0.2 | 0.01 | 0.0 | 9.32 | 255 | 2.518644969 | 0.18 | 0.00 | 0.00 | 27.34 | 112.60 | 112.60 | 112.60 | 0.000 | 0 | 0.000 | 0.000 |
| a | 5.529 | 0.5 | 0.01 | 0.0 | 9.32 | 264 | 2.487321569 | 0.39 | 0.00 | 0.00 | 32.77 | 143.07 | 143.07 | 143.07 | 0.000 | 0 | 0.000 | 0.000 |
| b | 0.2401 | 0.5 | 0.02 | 0.0 | 9.32 | 270 | 2.466868584 | 1.06 | 0.00 | 0.00 | 36.89 | 167.29 | 167.29 | 167.29 | 0.000 | 0 | 0.000 | 0.000 |
| c | -2.51326 | 3.5 | 0.03 | 0.1 | 9.32 | 274.5 | 2.451748233 | 1.75 | 0.00 | 0.00 | 40.26 | 187.79 | 187.79 | 187.79 | 0.000 | 0 | 0.000 | 0.000 |
| d | 8.48062 | 5.0 | 0.08 | 0.2 | 9.32 | 276 | 2.446749222 | 6.55 | 0.00 | 0.00 | 41.44 | 195.10 | 195.10 | 195.10 | 0.000 | 0 | 0.000 | 0.000 |
| e | 0.20749 | 5.0 | 0.17 | 0.3 | 9.32 | 273 | 2.456767713 | 12.96 | 0.00 | 0.00 | 39.11 | 180.72 | 180.72 | 180.72 | 0.000 | 0 | 0.000 | 0.000 |
| f | -3.32039 | 5.0 | 0.25 | 0.3 | 8.66 | 269.5 | 2.468560144 | 18.56 | 0.00 | 0.00 | 25.36 | 120.48 | 120.48 | 120.48 | 0.000 | 0 | 0.000 | 0.000 |
| | | 5.0 | 0.33 | 0.4 | 8 | 264.5 | 2.485604209 | 22.35 | 0.00 | 0.00 | 15.95 | 77.16 | 77.16 | 77.16 | 0.000 | 0 | 0.000 | 0.000 |
| | | 5.0 | 0.42 | 0.5 | 8 | 258 | 2.508116544 | 25.62 | 0.00 | 0.00 | 14.00 | 64.96 | 64.96 | 64.96 | 0.000 | 0 | 0.000 | 0.000 |
| | | 15.0 | 0.50 | 0.8 | 8 | 249 | 2.539969238 | 28.10 | 0.00 | 0.00 | 11.65 | 50.92 | 50.92 | 50.92 | 0.000 | 0 | 0.000 | 0.000 |
| | | 15.0 | 0.75 | 1.0 | 8 | 241 | 2.5689697 | 33.71 | 0.00 | 0.00 | 9.85 | 40.79 | 40.79 | 40.79 | 0.000 | 0 | 0.000 | 0.000 |
| | | 30.0 | 1.00 | 1.5 | 8 | 238.5 | 2.578168641 | 38.80 | 0.00 | 0.00 | 9.34 | 38.02 | 38.02 | 38.02 | 0.000 | 0 | 0.000 | 0.000 |
| | | 30.0 | 1.50 | 2.0 | 8 | 237 | 2.583719695 | 51.00 | 0.00 | 0.00 | 9.04 | 36.44 | 36.44 | 36.44 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 2.00 | 4.0 | 8 | 233.5 | 2.596765584 | 63.74 | 0.00 | 0.00 | 8.38 | 32.98 | 32.98 | 32.98 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 4.00 | 6.0 | 8 | 228 | 2.617534573 | 112.64 | 0.00 | 0.00 | 7.43 | 28.14 | 28.14 | 28.14 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 6.00 | 8.0 | 8 | 220.5 | 2.646397224 | 158.29 | 0.00 | 0.00 | 6.29 | 22.57 | 22.57 | 22.57 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 8.00 | 10.0 | 8 | 213 | 2.675903489 | 200.45 | 0.00 | 0.00 | 5.30 | 18.01 | 18.01 | 18.01 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 10.00 | 12.0 | 8 | 208 | 2.695942606 | 236.95 | 0.00 | 0.00 | 4.72 | 15.45 | 15.45 | 15.45 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 12.00 | 14.0 | 8 | 203 | 2.716284123 | 267.20 | 0.00 | 267.20 | 4.20 | 13.23 | -828.52 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 14.00 | 16.0 | 8 | 198 | 2.736934937 | 292.74 | 0.00 | 292.74 | 3.73 | 11.29 | -876.20 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 240.0 | 16.00 | 20.0 | 8 | 193 | 2.757902156 | 314.53 | 0.00 | 314.53 | 3.30 | 9.62 | -907.46 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 240.0 | 20.00 | 24.0 | 8 | 187.5 | 2.781340297 | 351.07 | 0.00 | 351.07 | 2.88 | 8.04 | -971.98 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 720.0 | 24.00 | 36.0 | 8 | 180 | 2.813950943 | 381.90 | 0.00 | 381.90 | 2.39 | 6.27 | -997.11 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 720.0 | 36.00 | 48.0 | 8 | 170.5 | 2.85637209 | 453.44 | 0.00 | 453.44 | 1.87 | 4.53 | -1096.49 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 1440.0 | 48.00 | 72.0 | 8 | 162 | 2.895426834 | 503.81 | 0.00 | 503.81 | 1.49 | 3.36 | -1134.32 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 2880.0 | 72.00 | 120.0 | 8 | 158 | 2.914177473 | 574.30 | 0.00 | 574.30 | 1.34 | 2.91 | -1249.54 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 3240.0 | 120.00 | 174.0 | 8 | 153 | 2.937960076 | 683.69 | 0.00 | 683.69 | 1.16 | 2.43 | -1424.11 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 3960.0 | 174.00 | 240.0 | 8 | 143.85 | 2.982502651 | 773.80 | 0.00 | 773.80 | 0.90 | 1.73 | -1484.55 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 7200.0 | 240.00 | 360.0 | 8 | 136.85 | 3.017501509 | 843.49 | 0.00 | 843.49 | 0.73 | 1.32 | -1516.80 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 7200.0 | 360.00 | 480.0 | 8 | 132.15 | 3.04146531 | 929.29 | 0.00 | 929.29 | 0.64 | 1.10 | -1598.58 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 7200.0 | 480.00 | 600.0 | 8 | 126.25 | 3.072091753 | 994.37 | 0.00 | 994.37 | 0.54 | 0.87 | -1616.14 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 7200.0 | 600.00 | 720.0 | 8 | 121.1 | 3.099333643 | 1042.31 | 0.00 | 1042.31 | 0.46 | 0.71 | -1610.58 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |

| Constants | Value | Interval Duration (min) | Start of Interval (hrs) | End of Interval (hrs) | Ave Interval pH | Ave Temp (F) | 1000/T ($K^{-1}$) | Si All Mat | Si this Mat Only | Si (ppm) | K | k | R | Positive release rate (mg/kg- | interval pred release (kg) | Amount above start Mass | interval kg Si released | Integral kg Si released |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mass Material (kg) | 0 | 0.2 | 0.00 | 0.01 | 9.32 | 239 | 2.576323586 | 0 | 0 | 0.00 | 62.87 | 99.88 | 99.88 | 99.88 | 0.000 | 0 | 0.000 | 0.000 |
| Mass Element (kg) | 0 | 0.2 | 0.01 | 0.0 | 9.32 | 255 | 2.518644969 | 0.05 | 0.00 | 0.00 | 92.30 | 137.83 | 137.83 | 137.83 | 0.000 | 0 | 0.000 | 0.000 |
| a | 7.51336 | 0.5 | 0.01 | 0.0 | 9.32 | 264 | 2.487321569 | 0.11 | 0.00 | 0.00 | 113.71 | 164.18 | 164.18 | 164.18 | 0.000 | 0 | 0.000 | 0.000 |
| b | 0.18619 | 0.5 | 0.02 | 0.0 | 9.32 | 270 | 2.466868584 | 0.34 | 0.00 | 0.00 | 130.30 | 184.04 | 184.04 | 184.04 | 0.000 | 0 | 0.000 | 0.000 |
| c | -2.89181 | 3.5 | 0.03 | 0.1 | 9.32 | 274.5 | 2.451748233 | 0.60 | 0.00 | 0.00 | 144.10 | 200.26 | 200.26 | 200.26 | 0.000 | 0 | 0.000 | 0.000 |
| d | 7.17588 | 5.0 | 0.08 | 0.2 | 9.32 | 276 | 2.446749222 | 2.59 | 0.00 | 0.00 | 148.98 | 205.93 | 205.93 | 205.93 | 0.000 | 0 | 0.000 | 0.000 |
| e | 0.11502 | 5.0 | 0.17 | 0.3 | 9.32 | 273 | 2.456767713 | 5.49 | 0.00 | 0.00 | 139.36 | 194.72 | 194.72 | 194.72 | 0.000 | 0 | 0.000 | 0.000 |
| f | -2.42532 | 5.0 | 0.25 | 0.3 | 8.66 | 269.5 | 2.468560144 | 8.21 | 0.00 | 0.00 | 97.09 | 153.08 | 153.08 | 153.08 | 0.000 | 0 | 0.000 | 0.000 |
| | | 5.0 | 0.33 | 0.4 | 8 | 264.5 | 2.485604209 | 10.33 | 0.00 | 0.00 | 65.31 | 116.86 | 116.86 | 116.86 | 0.000 | 0 | 0.000 | 0.000 |
| | | 5.0 | 0.42 | 0.5 | 8 | 258 | 2.508116544 | 11.96 | 0.00 | 0.00 | 56.22 | 103.05 | 103.05 | 103.05 | 0.000 | 0 | 0.000 | 0.000 |
| | | 15.0 | 0.50 | 0.8 | 8 | 249 | 2.539969238 | 13.39 | 0.00 | 0.00 | 45.47 | 86.26 | 86.26 | 86.26 | 0.000 | 0 | 0.000 | 0.000 |
| | | 15.0 | 0.75 | 1.0 | 8 | 241 | 2.5689697 | 16.96 | 0.00 | 0.00 | 37.49 | 73.36 | 73.36 | 73.36 | 0.000 | 0 | 0.000 | 0.000 |
| | | 30.0 | 1.00 | 1.5 | 8 | 238.5 | 2.578168641 | 19.96 | 0.00 | 0.00 | 35.26 | 69.69 | 69.69 | 69.69 | 0.000 | 0 | 0.000 | 0.000 |
| | | 30.0 | 1.50 | 2.0 | 8 | 237 | 2.583719695 | 25.58 | 0.00 | 0.00 | 33.98 | 67.56 | 67.56 | 67.56 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 2.00 | 4.0 | 8 | 233.5 | 2.596765584 | 30.91 | 0.00 | 0.00 | 31.15 | 62.81 | 62.81 | 62.81 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 4.00 | 6.0 | 8 | 228 | 2.617534573 | 50.27 | 0.00 | 0.00 | 27.13 | 55.93 | 55.93 | 55.93 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 6.00 | 8.0 | 8 | 220.5 | 2.646397224 | 65.96 | 0.00 | 0.00 | 22.39 | 47.61 | 47.61 | 47.61 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 8.00 | 10.0 | 8 | 213 | 2.675903489 | 78.06 | 0.00 | 0.00 | 18.39 | 40.38 | 40.38 | 40.38 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 10.00 | 12.0 | 8 | 208 | 2.695942606 | 87.36 | 0.00 | 0.00 | 16.10 | 36.10 | 36.10 | 36.10 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 12.00 | 14.0 | 8 | 203 | 2.716284123 | 94.99 | 0.00 | 94.99 | 14.06 | 32.22 | -185.53 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 14.00 | 16.0 | 8 | 198 | 2.736934937 | 97.44 | 0.00 | 97.44 | 12.25 | 28.71 | -199.66 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 240.0 | 16.00 | 20.0 | 8 | 193 | 2.757902156 | 99.68 | 0.00 | 99.68 | 10.65 | 25.54 | -213.41 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 240.0 | 20.00 | 24.0 | 8 | 187.5 | 2.781340297 | 103.78 | 0.00 | 103.78 | 9.12 | 22.41 | -232.71 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 720.0 | 24.00 | 36.0 | 8 | 180 | 2.813950943 | 107.45 | 0.00 | 107.45 | 7.34 | 18.68 | -254.89 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 720.0 | 36.00 | 48.0 | 8 | 170.5 | 2.85637209 | 117.06 | 0.00 | 117.06 | 5.53 | 14.74 | -297.17 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 1440.0 | 48.00 | 72.0 | 8 | 162 | 2.895426834 | 124.85 | 0.00 | 124.85 | 4.26 | 11.85 | -335.07 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 2880.0 | 72.00 | 120.0 | 8 | 158 | 2.914177473 | 137.84 | 0.00 | 137.84 | 3.76 | 10.67 | -380.13 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 3240.0 | 120.00 | 174.0 | 8 | 153 | 2.937960076 | 160.35 | 0.00 | 160.35 | 3.21 | 9.34 | -457.06 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 3960.0 | 174.00 | 240.0 | 8 | 143.85 | 2.982502651 | 180.69 | 0.00 | 180.69 | 2.39 | 7.29 | -544.02 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 7200.0 | 240.00 | 360.0 | 8 | 136.85 | 3.017501509 | 199.85 | 0.00 | 199.85 | 1.89 | 5.99 | -627.15 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 7200.0 | 360.00 | 480.0 | 8 | 132.15 | 3.04146531 | 220.73 | 0.00 | 220.73 | 1.61 | 5.24 | -712.27 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 7200.0 | 480.00 | 600.0 | 8 | 126.25 | 3.072091753 | 220.73 | 0.00 | 220.73 | 1.32 | 4.42 | -737.09 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 7200.0 | 600.00 | 720.0 | 8 | 121.1 | 3.099333643 | 220.73 | 0.00 | 220.73 | 1.10 | 3.79 | -759.73 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |

| Constants | Value |
|---|---|
| Mass Material (kg) | 0 |
| Mass Element (kg) | 0 |
| a | 2.30159 |
| b | 0.12022 |
| c | -0.82549 |
| d | 1.98549 |
| e | 0.09009 |
| f | -0.52443 |

| Interval Duration (min) | Start of Interval (hrs) | End of Interval (hrs) | Ave Interval pH | Ave Temp (F) | 1000/T ($K^{-1}$) | Ca All Mat | Ca this Mat Only | Ca (ppm) | K | k | R | Positive release rate (mg/kg- | interval pred release (kg) | Amount above start Mass | interval kg Ca released | Integral kg Ca released |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.2 | 0.00 | 0.01 | 9.32 | 239 | 2.576323586 | 0 | 0 | 0.00 | 19.74 | 29.79 | 29.79 | 29.79 | 0.000 | 0 | 0.000 | 0.0000 |
| 0.2 | 0.01 | 0.0 | 9.32 | 255 | 2.518644969 | 0.01 | 0.00 | 0.00 | 22.03 | 31.94 | 31.94 | 31.94 | 0.000 | 0 | 0.000 | 0.000 |
| 0.5 | 0.01 | 0.0 | 9.32 | 264 | 2.487321569 | 0.01 | 0.00 | 0.00 | 23.38 | 33.17 | 33.17 | 33.17 | 0.000 | 0 | 0.000 | 0.000 |
| 0.5 | 0.02 | 0.0 | 9.32 | 270 | 2.466868584 | 0.03 | 0.00 | 0.00 | 24.30 | 34.00 | 34.00 | 34.00 | 0.000 | 0 | 0.000 | 0.000 |
| 3.5 | 0.03 | 0.1 | 9.32 | 274.5 | 2.451748233 | 0.05 | 0.00 | 0.00 | 25.01 | 34.62 | 34.62 | 34.62 | 0.000 | 0 | 0.000 | 0.000 |
| 5.0 | 0.08 | 0.2 | 9.32 | 276 | 2.446749222 | 0.19 | 0.00 | 0.00 | 25.25 | 34.83 | 34.83 | 34.83 | 0.000 | 0 | 0.000 | 0.000 |
| 5.0 | 0.17 | 0.3 | 9.32 | 273 | 2.456767713 | 0.39 | 0.00 | 0.00 | 24.77 | 34.41 | 34.41 | 34.41 | 0.000 | 0 | 0.000 | 0.000 |
| 5.0 | 0.25 | 0.3 | 8.66 | 269.5 | 2.468560144 | 0.59 | 0.00 | 0.00 | 20.18 | 29.59 | 29.59 | 29.59 | 0.000 | 0 | 0.000 | 0.000 |
| 5.0 | 0.33 | 0.4 | 8 | 264.5 | 2.485604209 | 0.78 | 0.00 | 0.00 | 16.27 | 25.27 | 25.27 | 25.27 | 0.000 | 0 | 0.000 | 0.000 |
| 5.0 | 0.42 | 0.5 | 8 | 258 | 2.508116544 | 0.97 | 0.00 | 0.00 | 15.59 | 24.60 | 24.60 | 24.60 | 0.000 | 0 | 0.000 | 0.000 |
| 15.0 | 0.50 | 0.8 | 8 | 249 | 2.539969238 | 1.15 | 0.00 | 0.00 | 14.68 | 23.67 | 23.67 | 23.67 | 0.000 | 0 | 0.000 | 0.000 |
| 15.0 | 0.75 | 1.0 | 8 | 241 | 2.5689697 | 1.68 | 0.00 | 0.00 | 13.89 | 22.85 | 22.85 | 22.85 | 0.000 | 0 | 0.000 | 0.000 |
| 30.0 | 1.00 | 1.5 | 8 | 238.5 | 2.578168641 | 2.19 | 0.00 | 0.00 | 13.65 | 22.60 | 22.60 | 22.60 | 0.000 | 0 | 0.000 | 0.000 |
| 30.0 | 1.50 | 2.0 | 8 | 237 | 2.583719695 | 3.18 | 0.00 | 0.00 | 13.51 | 22.45 | 22.45 | 22.45 | 0.000 | 0 | 0.000 | 0.000 |
| 120.0 | 2.00 | 4.0 | 8 | 233.5 | 2.596765584 | 4.14 | 0.00 | 0.00 | 13.17 | 22.10 | 22.10 | 22.10 | 0.000 | 0 | 0.000 | 0.000 |
| 120.0 | 4.00 | 6.0 | 8 | 228 | 2.617534573 | 7.83 | 0.00 | 0.00 | 12.66 | 21.55 | 21.55 | 21.55 | 0.000 | 0 | 0.000 | 0.000 |
| 120.0 | 6.00 | 8.0 | 8 | 220.5 | 2.646397224 | 11.05 | 0.00 | 0.00 | 11.99 | 20.81 | 20.81 | 20.81 | 0.000 | 0 | 0.000 | 0.000 |
| 120.0 | 8.00 | 10.0 | 8 | 213 | 2.675903489 | 13.93 | 0.00 | 0.00 | 11.33 | 20.09 | 20.09 | 20.09 | 0.000 | 0 | 0.000 | 0.000 |
| 120.0 | 10.00 | 12.0 | 8 | 208 | 2.695942606 | 16.58 | 0.00 | 0.00 | 10.91 | 19.61 | 19.61 | 19.61 | 0.000 | 0 | 0.000 | 0.000 |
| 120.0 | 12.00 | 14.0 | 8 | 203 | 2.716284123 | 19.07 | 0.00 | 19.07 | 10.50 | 19.13 | -15.63 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| 120.0 | 14.00 | 16.0 | 8 | 198 | 2.736934937 | 20.21 | 0.00 | 20.21 | 10.09 | 18.66 | -18.70 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| 240.0 | 16.00 | 20.0 | 8 | 193 | 2.757902156 | 21.45 | 0.00 | 21.45 | 9.70 | 18.19 | -22.04 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| 240.0 | 20.00 | 24.0 | 8 | 187.5 | 2.781340297 | 24.17 | 0.00 | 24.17 | 9.28 | 17.68 | -28.39 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| 720.0 | 24.00 | 36.0 | 8 | 180 | 2.813950943 | 27.06 | 0.00 | 27.06 | 8.72 | 17.00 | -35.75 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| 720.0 | 36.00 | 48.0 | 8 | 170.5 | 2.85637209 | 36.99 | 0.00 | 36.99 | 8.04 | 16.15 | -58.13 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| 1440.0 | 48.00 | 72.0 | 8 | 162 | 2.895426834 | 47.02 | 0.00 | 47.02 | 7.47 | 15.41 | -81.61 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| 2880.0 | 72.00 | 120.0 | 8 | 158 | 2.914177473 | 68.09 | 0.00 | 68.09 | 7.21 | 15.06 | -127.25 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| 3240.0 | 120.00 | 174.0 | 8 | 153 | 2.937960076 | 90.46 | 0.00 | 90.46 | 6.89 | 14.64 | -177.59 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| 3960.0 | 174.00 | 240.0 | 8 | 143.85 | 2.982502651 | 95.74 | 0.00 | 95.74 | 6.33 | 13.87 | -195.96 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| 7200.0 | 240.00 | 360.0 | 8 | 136.85 | 3.017501509 | 129.07 | 0.00 | 129.07 | 5.92 | 13.30 | -276.54 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| 7200.0 | 360.00 | 480.0 | 8 | 132.15 | 3.04146531 | 143.24 | 0.00 | 143.24 | 5.66 | 12.92 | -314.12 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| 7200.0 | 480.00 | 600.0 | 8 | 126.25 | 3.072091753 | 160.00 | 0.00 | 160.00 | 5.34 | 12.45 | -360.70 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| 7200.0 | 600.00 | 720.0 | 8 | 121.1 | 3.099333643 | 192.35 | 0.00 | 192.35 | 5.07 | 12.05 | -445.09 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |

| Constants | Value | Interval Duration (min) | Start of Interval (hrs) | End of Interval (hrs) | Ave Interval pH | Ave Temp (F) | 1000/T ($K^{-1}$) | Al All Mat | Al this Mat Only | Al (ppm) | K | k | R | Positive release rate (mg/kg- | interval pred release (kg) | Amount above start Mass | interval kg Al released | Integral kg Al released |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mass Material (kg) | 0 | 0.2 | 0.00 | 0.01 | 9.32 | 239 | 2.576323586 | 0 | 0 | 0.00 | 8.79 | 17.12 | 17.12 | 17.12 | 0.000 | 0 | 0.000 | 0.000 |
| Mass Element (kg) | 0 | 0.2 | 0.01 | 0.0 | 9.32 | 255 | 2.518644969 | 0.18 | 0.00 | 0.00 | 8.55 | 24.09 | 24.09 | 24.09 | 0.000 | 0 | 0.000 | 0.000 |
| a | -1.062762025 | 0.5 | 0.01 | 0.0 | 9.32 | 264 | 2.487321569 | 0.39 | 0.00 | 0.00 | 8.42 | 29.01 | 29.01 | 29.01 | 0.000 | 0 | 0.000 | 0.000 |
| b | 0.157710607 | 0.5 | 0.02 | 0.0 | 9.32 | 270 | 2.466868584 | 1.06 | 0.00 | 0.00 | 8.34 | 32.74 | 32.74 | 32.74 | 0.000 | 0 | 0.000 | 0.000 |
| c | 0.208439712 | 3.5 | 0.03 | 0.1 | 9.32 | 274.5 | 2.451748233 | 1.75 | 0.00 | 0.00 | 8.28 | 35.81 | 35.81 | 35.81 | 0.000 | 0 | 0.000 | 0.000 |
| d | 6.629 | 5.0 | 0.08 | 0.2 | 9.32 | 276 | 2.446749222 | 6.55 | 0.00 | 0.00 | 8.26 | 36.89 | 36.89 | 36.89 | 0.000 | 0 | 0.000 | 0.000 |
| e | 0.13222 | 5.0 | 0.17 | 0.3 | 9.32 | 273 | 2.456767713 | 12.96 | 0.00 | 0.00 | 8.30 | 34.76 | 34.76 | 34.76 | 0.000 | 0 | 0.000 | 0.000 |
| f | -2.57256 | 5.0 | 0.25 | 0.3 | 8.66 | 269.5 | 2.468560144 | 18.56 | 0.00 | 0.00 | 6.57 | 26.52 | 26.52 | 26.52 | 0.000 | 0 | 0.000 | 0.000 |
| | | 5.0 | 0.33 | 0.4 | 8 | 264.5 | 2.485604209 | 22.35 | 0.00 | 0.00 | 5.21 | 19.61 | 19.61 | 19.61 | 0.000 | 0 | 0.000 | 0.000 |
| | | 5.0 | 0.42 | 0.5 | 8 | 258 | 2.508116544 | 25.62 | 0.00 | 0.00 | 5.27 | 17.16 | 17.16 | 17.16 | 0.000 | 0 | 0.000 | 0.000 |
| | | 15.0 | 0.50 | 0.8 | 8 | 249 | 2.539969238 | 28.10 | 0.00 | 0.00 | 5.35 | 14.21 | 14.21 | 14.21 | 0.000 | 0 | 0.000 | 0.000 |
| | | 15.0 | 0.75 | 1.0 | 8 | 241 | 2.5689697 | 33.71 | 0.00 | 0.00 | 5.42 | 11.97 | 11.97 | 11.97 | 0.000 | 0 | 0.000 | 0.000 |
| | | 30.0 | 1.00 | 1.5 | 8 | 238.5 | 2.578168641 | 38.80 | 0.00 | 0.00 | 5.45 | 11.33 | 11.33 | 11.33 | 0.000 | 0 | 0.000 | 0.000 |
| | | 30.0 | 1.50 | 2.0 | 8 | 237 | 2.583719695 | 51.00 | 0.00 | 0.00 | 5.46 | 10.96 | 10.96 | 10.96 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 2.00 | 4.0 | 8 | 233.5 | 2.596765584 | 63.74 | 0.00 | 0.00 | 5.50 | 10.15 | 10.15 | 10.15 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 4.00 | 6.0 | 8 | 228 | 2.617534573 | 112.64 | 0.00 | 0.00 | 5.55 | 8.97 | 8.97 | 8.97 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 6.00 | 8.0 | 8 | 220.5 | 2.646397224 | 158.29 | 0.00 | 0.00 | 5.63 | 7.56 | 7.56 | 7.56 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 8.00 | 10.0 | 8 | 213 | 2.675903489 | 200.45 | 0.00 | 0.00 | 5.71 | 6.35 | 6.35 | 6.35 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 10.00 | 12.0 | 8 | 208 | 2.695942606 | 236.95 | 0.00 | 0.00 | 5.77 | 5.64 | 5.64 | 5.64 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 12.00 | 14.0 | 8 | 203 | 2.716284123 | 267.20 | 0.00 | 267.20 | 5.82 | 5.00 | -224.45 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 14.00 | 16.0 | 8 | 198 | 2.736934937 | 292.74 | 0.00 | 292.74 | 5.88 | 4.42 | -215.82 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 240.0 | 16.00 | 20.0 | 8 | 193 | 2.757902156 | 314.53 | 0.00 | 314.53 | 5.94 | 3.91 | -203.00 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 240.0 | 20.00 | 24.0 | 8 | 187.5 | 2.781340297 | 351.07 | 0.00 | 351.07 | 6.01 | 3.40 | -195.36 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 720.0 | 24.00 | 36.0 | 8 | 180 | 2.813950943 | 381.90 | 0.00 | 381.90 | 6.10 | 2.80 | -172.66 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 720.0 | 36.00 | 48.0 | 8 | 170.5 | 2.85637209 | 453.44 | 0.00 | 453.44 | 6.23 | 2.18 | -156.60 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 1440.0 | 48.00 | 72.0 | 8 | 162 | 2.895426834 | 503.81 | 0.00 | 503.81 | 6.35 | 1.73 | -135.65 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 2880.0 | 72.00 | 120.0 | 8 | 158 | 2.914177473 | 574.30 | 0.00 | 574.30 | 6.40 | 1.55 | -137.34 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 3240.0 | 120.00 | 174.0 | 8 | 153 | 2.937960076 | 683.69 | 0.00 | 683.69 | 6.48 | 1.34 | -140.64 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 3960.0 | 174.00 | 240.0 | 8 | 143.85 | 2.982502651 | 773.80 | 0.00 | 773.80 | 6.62 | 1.03 | -119.78 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 7200.0 | 240.00 | 360.0 | 8 | 136.85 | 3.017501509 | 843.49 | 0.00 | 843.49 | 6.73 | 0.84 | -104.42 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 7200.0 | 360.00 | 480.0 | 8 | 132.15 | 3.04146531 | 929.29 | 0.00 | 929.29 | 6.81 | 0.73 | -98.74 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 7200.0 | 480.00 | 600.0 | 8 | 126.25 | 3.072091753 | 994.37 | 0.00 | 994.37 | 6.91 | 0.61 | -86.87 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 7200.0 | 600.00 | 720.0 | 8 | 121.1 | 3.099333643 | 1042.31 | 0.00 | 1042.31 | 7.00 | 0.52 | -76.50 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |

| Constants | Value |
|---|---|
| Mass Material (kg) | 0 |
| Mass Element (kg) | 0 |
| a | -3.262764542 |
| b | 0.155049444 |
| c | -1.240000065 |
| d | 6.07665 |
| e | 0.16569 |
| f | -2.17413 |

| Interval Duration (min) | Start of Interval (hrs) | End of Interval (hrs) | Ave Interval pH | Ave Temp (F) | 1000/T ($K^{-1}$) | Si All Mat | Si this Mat Only | Si (ppm) | K | k | R | Positive release rate (mg/kg- | interval pred release (kg) | Amount above start Mass | interval kg Si released | Integral kg Si released |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.2 | 0.00 | 0.01 | 9.32 | 239 | 2.576323586 | 0 | 0 | 0.00 | 32.60 | 104.62 | 104.62 | 104.62 | 0.000 | 0 | 0.000 | 0.0000 |
| 0.2 | 0.01 | 0.0 | 9.32 | 255 | 2.518644969 | 0.05 | 0.00 | 0.00 | 38.43 | 139.64 | 139.64 | 139.64 | 0.000 | 0 | 0.000 | 0.000 |
| 0.5 | 0.01 | 0.0 | 9.32 | 264 | 2.487321569 | 0.11 | 0.00 | 0.00 | 42.03 | 163.35 | 163.35 | 163.35 | 0.000 | 0 | 0.000 | 0.000 |
| 0.5 | 0.02 | 0.0 | 9.32 | 270 | 2.466868584 | 0.34 | 0.00 | 0.00 | 44.56 | 180.96 | 180.96 | 180.96 | 0.000 | 0 | 0.000 | 0.000 |
| 3.5 | 0.03 | 0.1 | 9.32 | 274.5 | 2.451748233 | 0.60 | 0.00 | 0.00 | 46.52 | 195.19 | 195.19 | 195.19 | 0.000 | 0 | 0.000 | 0.000 |
| 5.0 | 0.08 | 0.2 | 9.32 | 276 | 2.446749222 | 2.59 | 0.00 | 0.00 | 47.19 | 200.14 | 200.14 | 200.14 | 0.000 | 0 | 0.000 | 0.000 |
| 5.0 | 0.17 | 0.3 | 9.32 | 273 | 2.456767713 | 5.49 | 0.00 | 0.00 | 45.86 | 190.35 | 190.35 | 190.35 | 0.000 | 0 | 0.000 | 0.000 |
| 5.0 | 0.25 | 0.3 | 8.66 | 269.5 | 2.468560144 | 8.21 | 0.00 | 0.00 | 35.03 | 139.49 | 139.49 | 139.49 | 0.000 | 0 | 0.000 | 0.000 |
| 5.0 | 0.33 | 0.4 | 8 | 264.5 | 2.485604209 | 10.33 | 0.00 | 0.00 | 26.36 | 99.57 | 99.57 | 99.57 | 0.000 | 0 | 0.000 | 0.000 |
| 5.0 | 0.42 | 0.5 | 8 | 258 | 2.508116544 | 11.96 | 0.00 | 0.00 | 24.72 | 88.96 | 88.96 | 88.96 | 0.000 | 0 | 0.000 | 0.000 |
| 15.0 | 0.50 | 0.8 | 8 | 249 | 2.539969238 | 13.39 | 0.00 | 0.00 | 22.57 | 75.85 | 75.85 | 75.85 | 0.000 | 0 | 0.000 | 0.000 |
| 15.0 | 0.75 | 1.0 | 8 | 241 | 2.5689697 | 16.96 | 0.00 | 0.00 | 20.78 | 65.60 | 65.60 | 65.60 | 0.000 | 0 | 0.000 | 0.000 |
| 30.0 | 1.00 | 1.5 | 8 | 238.5 | 2.578168641 | 19.96 | 0.00 | 0.00 | 20.24 | 62.65 | 62.65 | 62.65 | 0.000 | 0 | 0.000 | 0.000 |
| 30.0 | 1.50 | 2.0 | 8 | 237 | 2.583719695 | 25.58 | 0.00 | 0.00 | 19.92 | 60.93 | 60.93 | 60.93 | 0.000 | 0 | 0.000 | 0.000 |
| 120.0 | 2.00 | 4.0 | 8 | 233.5 | 2.596765584 | 30.91 | 0.00 | 0.00 | 19.19 | 57.08 | 57.08 | 57.08 | 0.000 | 0 | 0.000 | 0.000 |
| 120.0 | 4.00 | 6.0 | 8 | 228 | 2.617534573 | 50.27 | 0.00 | 0.00 | 18.09 | 51.44 | 51.44 | 51.44 | 0.000 | 0 | 0.000 | 0.000 |
| 120.0 | 6.00 | 8.0 | 8 | 220.5 | 2.646397224 | 65.96 | 0.00 | 0.00 | 16.66 | 44.52 | 44.52 | 44.52 | 0.000 | 0 | 0.000 | 0.000 |
| 120.0 | 8.00 | 10.0 | 8 | 213 | 2.675903489 | 78.06 | 0.00 | 0.00 | 15.31 | 38.41 | 38.41 | 38.41 | 0.000 | 0 | 0.000 | 0.000 |
| 120.0 | 10.00 | 12.0 | 8 | 208 | 2.695942606 | 87.36 | 0.00 | 0.00 | 14.46 | 34.74 | 34.74 | 34.74 | 0.000 | 0 | 0.000 | 0.000 |
| 120.0 | 12.00 | 14.0 | 8 | 203 | 2.716284123 | 94.99 | 0.00 | 94.99 | 13.64 | 31.38 | -187.06 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| 120.0 | 14.00 | 16.0 | 8 | 198 | 2.736934937 | 97.44 | 0.00 | 97.44 | 12.86 | 28.30 | -186.04 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| 240.0 | 16.00 | 20.0 | 8 | 193 | 2.757902156 | 99.68 | 0.00 | 99.68 | 12.12 | 25.48 | -184.12 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| 240.0 | 20.00 | 24.0 | 8 | 187.5 | 2.781340297 | 103.78 | 0.00 | 103.78 | 11.33 | 22.66 | -184.83 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| 720.0 | 24.00 | 36.0 | 8 | 180 | 2.813950943 | 107.45 | 0.00 | 107.45 | 10.32 | 19.24 | -181.04 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| 720.0 | 36.00 | 48.0 | 8 | 170.5 | 2.85637209 | 117.06 | 0.00 | 117.06 | 9.15 | 15.56 | -183.59 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| 1440.0 | 48.00 | 72.0 | 8 | 162 | 2.895426834 | 124.85 | 0.00 | 124.85 | 8.18 | 12.80 | -182.49 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| 2880.0 | 72.00 | 120.0 | 8 | 158 | 2.914177473 | 137.84 | 0.00 | 137.84 | 7.75 | 11.65 | -195.44 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| 3240.0 | 120.00 | 174.0 | 8 | 153 | 2.937960076 | 160.35 | 0.00 | 160.35 | 7.25 | 10.34 | -218.56 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| 3960.0 | 174.00 | 240.0 | 8 | 143.85 | 2.982502651 | 180.69 | 0.00 | 180.69 | 6.38 | 8.28 | -226.09 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| 7200.0 | 240.00 | 360.0 | 8 | 136.85 | 3.017501509 | 199.85 | 0.00 | 199.85 | 5.77 | 6.95 | -233.48 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| 7200.0 | 360.00 | 480.0 | 8 | 132.15 | 3.04146531 | 220.73 | 0.00 | 220.73 | 5.39 | 6.16 | -246.04 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| 7200.0 | 480.00 | 600.0 | 8 | 126.25 | 3.072091753 | 220.73 | 0.00 | 220.73 | 4.94 | 5.28 | -230.84 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| 7200.0 | 600.00 | 720.0 | 8 | 121.1 | 3.099333643 | 220.73 | 0.00 | 220.73 | 4.57 | 4.61 | -218.07 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |

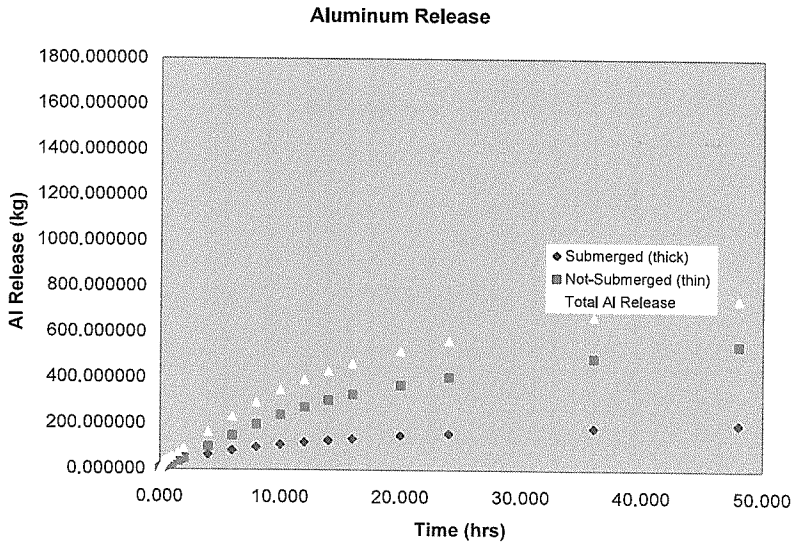
| Constants | Value | Interval Duration (min) | Start of Interval (hrs) | End of Interval (hrs) | Ave Interval pH | Ave Temp (F) | 1000/T ($K^{-1}$) | Si All Mat | Si this Mat Only | Si (ppm) | K | k | R | Positive release rate (mg/kg-min) | interval pred release (kg) | Amount above start Mass | interval kg Si released | Integral kg Si released |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mass Material (kg) | 0 | 0.2 | 0.00 | 0.01 | 9.32 | 239 | 2.576323586 | 0 | 0 | 0.00 | 9.82 | 2151.89 | 2151.89 | 2151.89 | 0.000 | 0 | 0.000 | 0.000 |
| Mass Element (kg) | 0 | 0.2 | 0.01 | 0.0 | 9.32 | 255 | 2.518644969 | 0.05 | 0.00 | 0.00 | 10.35 | 4811.93 | 4811.93 | 4811.93 | 0.000 | 0 | 0.000 | 0.000 |
| a | 0.974998166 | 0.5 | 0.01 | 0.0 | 9.32 | 264 | 2.487321569 | 0.11 | 0.00 | 0.00 | 10.65 | 7449.38 | 7449.38 | 7449.38 | 0.000 | 0 | 0.000 | 0.000 |
| b | 0.111219937 | 0.5 | 0.02 | 0.0 | 9.32 | 270 | 2.466868584 | 0.34 | 0.00 | 0.00 | 10.85 | 9909.54 | 9909.54 | 9909.54 | 0.000 | 0 | 0.000 | 0.000 |
| c | -0.395709671 | 3.5 | 0.03 | 0.1 | 9.32 | 274.5 | 2.451748233 | 0.60 | 0.00 | 0.00 | 11.00 | 12236.97 | 12236.97 | 12236.97 | 0.000 | 0 | 0.000 | 0.000 |
| d | 15.69692 | 5.0 | 0.08 | 0.2 | 9.32 | 276 | 2.446749222 | 2.59 | 0.00 | 0.00 | 11.05 | 13120.94 | 13120.94 | 13120.94 | 0.000 | 0 | 0.000 | 0.000 |
| e | 0.34838 | 5.0 | 0.17 | 0.3 | 9.32 | 273 | 2.456767713 | 5.49 | 0.00 | 0.00 | 10.95 | 11409.29 | 11409.29 | 11409.29 | 0.000 | 0 | 0.000 | 0.000 |
| f | -6.05941 | 5.0 | 0.25 | 0.3 | 8.66 | 269.5 | 2.468560144 | 8.21 | 0.00 | 0.00 | 9.15 | 5699.97 | 5699.97 | 5699.97 | 0.000 | 0 | 0.000 | 0.000 |
| | | 5.0 | 0.33 | 0.4 | 8 | 264.5 | 2.485604209 | 10.33 | 0.00 | 0.00 | 7.61 | 2646.46 | 2646.46 | 2646.46 | 0.000 | 0 | 0.000 | 0.000 |
| | | 5.0 | 0.42 | 0.5 | 8 | 258 | 2.508116544 | 11.96 | 0.00 | 0.00 | 7.45 | 1933.10 | 1933.10 | 1933.10 | 0.000 | 0 | 0.000 | 0.000 |
| | | 15.0 | 0.50 | 0.8 | 8 | 249 | 2.539969238 | 13.39 | 0.00 | 0.00 | 7.24 | 1239.50 | 1239.50 | 1239.50 | 0.000 | 0 | 0.000 | 0.000 |
| | | 15.0 | 0.75 | 1.0 | 8 | 241 | 2.5689697 | 16.96 | 0.00 | 0.00 | 7.05 | 827.03 | 827.03 | 827.03 | 0.000 | 0 | 0.000 | 0.000 |
| | | 30.0 | 1.00 | 1.5 | 8 | 238.5 | 2.578168641 | 19.96 | 0.00 | 0.00 | 6.99 | 727.41 | 727.41 | 727.41 | 0.000 | 0 | 0.000 | 0.000 |
| | | 30.0 | 1.50 | 2.0 | 8 | 237 | 2.583719695 | 25.58 | 0.00 | 0.00 | 6.96 | 673.20 | 673.20 | 673.20 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 2.00 | 4.0 | 8 | 233.5 | 2.596765584 | 30.91 | 0.00 | 0.00 | 6.87 | 561.17 | 561.17 | 561.17 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 4.00 | 6.0 | 8 | 228 | 2.617534573 | 50.27 | 0.00 | 0.00 | 6.74 | 420.00 | 420.00 | 420.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 6.00 | 8.0 | 8 | 220.5 | 2.646397224 | 65.96 | 0.00 | 0.00 | 6.57 | 280.77 | 280.77 | 280.77 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 8.00 | 10.0 | 8 | 213 | 2.675903489 | 78.06 | 0.00 | 0.00 | 6.40 | 186.02 | 186.02 | 186.02 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 10.00 | 12.0 | 8 | 208 | 2.695942606 | 87.36 | 0.00 | 0.00 | 6.28 | 140.65 | 140.65 | 140.65 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 12.00 | 14.0 | 8 | 203 | 2.716284123 | 94.99 | 0.00 | 94.99 | 6.16 | 105.90 | -1525.89 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 120.0 | 14.00 | 16.0 | 8 | 198 | 2.736934937 | 97.44 | 0.00 | 97.44 | 6.05 | 79.39 | -1199.29 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 240.0 | 16.00 | 20.0 | 8 | 193 | 2.757902156 | 99.68 | 0.00 | 99.68 | 5.94 | 59.25 | -935.87 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 240.0 | 20.00 | 24.0 | 8 | 187.5 | 2.781340297 | 103.78 | 0.00 | 103.78 | 5.81 | 42.72 | -720.48 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 720.0 | 24.00 | 36.0 | 8 | 180 | 2.813950943 | 107.45 | 0.00 | 107.45 | 5.64 | 27.11 | -489.37 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 720.0 | 36.00 | 48.0 | 8 | 170.5 | 2.85637209 | 117.06 | 0.00 | 117.06 | 5.43 | 15.00 | -308.57 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 1440.0 | 48.00 | 72.0 | 8 | 162 | 2.895426834 | 124.85 | 0.00 | 124.85 | 5.24 | 8.70 | -198.68 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 2880.0 | 72.00 | 120.0 | 8 | 158 | 2.914177473 | 137.84 | 0.00 | 137.84 | 5.15 | 6.70 | -172.59 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 3240.0 | 120.00 | 174.0 | 8 | 153 | 2.937960076 | 160.35 | 0.00 | 160.35 | 5.04 | 4.80 | -148.15 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 3960.0 | 174.00 | 240.0 | 8 | 143.85 | 2.982502651 | 180.69 | 0.00 | 180.69 | 4.84 | 2.58 | -93.83 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 7200.0 | 240.00 | 360.0 | 8 | 136.85 | 3.017501509 | 199.85 | 0.00 | 199.85 | 4.68 | 1.58 | -65.98 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 7200.0 | 360.00 | 480.0 | 8 | 132.15 | 3.04146531 | 220.73 | 0.00 | 220.73 | 4.58 | 1.13 | -53.46 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 7200.0 | 480.00 | 600.0 | 8 | 126.25 | 3.072091753 | 220.73 | 0.00 | 220.73 | 4.46 | 0.74 | -35.87 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |
| | | 7200.0 | 600.00 | 720.0 | 8 | 121.1 | 3.099333643 | 220.73 | 0.00 | 220.73 | 4.35 | 0.51 | -25.16 | 0.00 | 0.000 | 0 | 0.000 | 0.000 |

| Interval Duration (min) | Start of Interval (hrs) | End of Interval (hrs) | Average Interval pH | Ave. T (F) | 1000 /T Kelvin$^{-1}$ | pHa squared | pHa / (1000/T) | log prediction | corrosion rate (mg/m2-min) | interval mg Al released | interval kg Al released | Integral kg Al released | mass available Integral kg Al | Model term | coeff |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.2 | 0.00 | 0.0056 | 9.32 | 239 | 2.576323586 | 86.86 | 3.62 | 2.24666934 | 176.46937 | 87306 | 0.087 | 0 | 0.0873 | Intercept | 14.69039 |
| 0.2 | 0.01 | 0.01 | 9.32 | 255 | 2.518644969 | 86.86 | 3.70 | 2.41508581 | 260.06733 | 128665 | 0.1287 | 0 | 0.216 | pHa | 0 |
| 0.5 | 0.01 | 0.02 | 9.32 | 264 | 2.487321569 | 86.86 | 3.75 | 2.50461344 | 319.60491 | 474360 | 0.474 | 1 | 0.690 | 1000/T (K-1) | -4.64537 |
| 0.5 | 0.02 | 0.03 | 9.32 | 270 | 2.466868584 | 86.86 | 3.78 | 2.56230436 | 365.00966 | 541750 | 0.542 | 1 | 1.232 | pHa squared | 0.044554 |
| 3.5 | 0.03 | 0.08 | 9.32 | 274.5 | 2.451748233 | 86.86 | 3.80 | 2.60455341 | 402.30313 | 4179706 | 4.180 | 5 | 5.412 | pHa/(1000/T) | -1.20131 |
| 5.0 | 0.08 | 0.17 | 9.32 | 276 | 2.446749222 | 86.86 | 3.81 | 2.61844548 | 415.3799 | 6165095 | 6.165 | 12 | 11.577 | | |
| 5.0 | 0.17 | 0.25 | 9.32 | 273 | 2.456767713 | 86.86 | 3.79 | 2.59056626 | 389.55274 | 5781767 | 5.782 | 17 | 17.359 | | |
| 5.0 | 0.25 | 0.33 | 8.66 | 269.5 | 2.468560144 | 75.00 | 3.51 | 2.35003021 | 223.88769 | 3322956 | 3.323 | 21 | 20.682 | | |
| 5.0 | 0.33 | 0.42 | 8 | 264.5 | 2.485604209 | 64.00 | 3.22 | 2.12883904 | 134.53617 | 1996794 | 1.997 | 23 | 22.678 | | |
| 5.0 | 0.42 | 0.50 | 8 | 258 | 2.508116544 | 64.00 | 3.19 | 2.05896551 | 114.5422 | 1700043 | 1.700 | 24 | 24.378 | | |
| 15.0 | 0.50 | 0.75 | 8 | 249 | 2.539969238 | 64.00 | 3.15 | 1.95905046 | 91.0019 | 4051968 | 4.052 | 28 | 28.430 | | |
| 15.0 | 0.75 | 1.00 | 8 | 241 | 2.5689697 | 64.00 | 3.11 | 1.86704593 | 73.628496 | 3278397 | 3.278 | 32 | 31.709 | | |
| 30.0 | 1.00 | 1.50 | 8 | 238.5 | 2.578168641 | 64.00 | 3.10 | 1.83766136 | 68.811554 | 6127833 | 6.128 | 38 | 37.837 | | |
| 30.0 | 1.50 | 2.00 | 8 | 237 | 2.583719695 | 64.00 | 3.10 | 1.81988342 | 66.051611 | 5882054 | 5.882 | 44 | 43.719 | | |
| 120.0 | 2.00 | 4.00 | 8 | 233.5 | 2.596765584 | 64.00 | 3.08 | 1.77796752 | 59.974622 | 21363533 | 21.364 | 65 | 65.082 | | |
| 120.0 | 4.00 | 6.00 | 8 | 228 | 2.617534573 | 64.00 | 3.06 | 1.71085331 | 51.387005 | 18304542 | 18.305 | 83 | 83.387 | | |
| 120.0 | 6.00 | 8.00 | 8 | 220.5 | 2.646397224 | 64.00 | 3.02 | 1.61681938 | 41.382753 | 14740932 | 14.741 | 98 | 98.128 | | |
| 120.0 | 8.00 | 10.00 | 8 | 213 | 2.675903489 | 64.00 | 2.99 | 1.51979563 | 33.097533 | 11789658 | 11.790 | 110 | 109.917 | | |
| 120.0 | 10.00 | 12.00 | 8 | 208 | 2.695942606 | 64.00 | 2.97 | 1.45340236 | 28.405495 | 10118309 | 10.118 | 120 | 120.036 | | |
| 120.0 | 12.00 | 14.00 | 8 | 203 | 2.716284123 | 64.00 | 2.95 | 1.38560433 | 24.299892 | 8655853 | 8.656 | 129 | 128.692 | | |
| 120.0 | 14.00 | 16.00 | 8 | 198 | 2.736934937 | 64.00 | 2.92 | 1.31636951 | 20.719034 | 7380318 | 7.380 | 136 | 136.072 | | |
| 240.0 | 16.00 | 20.00 | 8 | 193 | 2.757902156 | 64.00 | 2.90 | 1.24566487 | 17.606169 | 12542971 | 12.543 | 149 | 148.615 | | |
| 240.0 | 20.00 | 24.00 | 8 | 187.5 | 2.781340297 | 64.00 | 2.88 | 1.16615147 | 14.660591 | 10444485 | 10.444 | 159 | 159.059 | | |
| 720.0 | 24.00 | 36.00 | 8 | 180 | 2.813950943 | 64.00 | 2.84 | 1.05470673 | 11.342446 | 24241726 | 24.242 | 183 | 183.301 | | |
| 720.0 | 36.00 | 48.00 | 8 | 170.5 | 2.85637209 | 64.00 | 2.80 | 0.90836693 | 8.0977978 | 17307078 | 17.307 | 201 | 200.608 | | |
| 1440.0 | 48.00 | 72.00 | 8 | 162 | 2.895426834 | 64.00 | 2.76 | 0.77232615 | 5.9200606 | 25305386 | 25.305 | 226 | 225.913 | | |
| 2880.0 | 72.00 | 120.00 | 8 | 158 | 2.914177473 | 64.00 | 2.75 | 0.70657918 | 5.0883758 | 43500674 | 43.501 | 269 | 269.414 | | |
| 3240.0 | 120.00 | 174.00 | 8 | 153 | 2.937960076 | 64.00 | 2.72 | 0.62279605 | 4.1956191 | 40352029 | 40.352 | 310 | 309.766 | | |
| 3960.0 | 174.00 | 240.00 | 8 | 143.85 | 2.982502651 | 64.00 | 2.68 | 0.46473274 | 2.9156322 | 34273009 | 34.273 | 344 | 344.039 | | |
| 7200.0 | 240.00 | 360.00 | 8 | 136.85 | 3.017501509 | 64.00 | 2.65 | 0.3395243 | 2.1853666 | 46706908 | 46.707 | 391 | 390.746 | | |
| 7200.0 | 360.00 | 480.00 | 8 | 132.15 | 3.04146531 | 64.00 | 2.63 | 0.25329769 | 1.7918337 | 38296096 | 38.296 | 429 | 429.042 | | |
| 7200.0 | 480.00 | 600.00 | 8 | 126.25 | 3.072091753 | 64.00 | 2.60 | 0.14252766 | 1.3884417 | 29674572 | 29.675 | 459 | 458.717 | | |
| 7200.0 | 600.00 | 720.00 | 8 | 121.1 | 3.099333643 | 64.00 | 2.58 | 0.04347574 | 1.1052887 | 23622864 | 23.62 | 482 | 482.340 | | |

| Elapsed Time (min) | Interval Duration (min) | Start of Interval (hrs) | End of Interval (hrs) | Average Interval pH | Average Temperature (F) | 1000/T ($K^{-1}$) | pHa square d | pHa/(1000/T) | log prediction | corrosion rate (mg/m2-min) | interval mg Al released | interval Kg Al released | Integral kg Al released | mass available Integral kg Al |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.1666667 | 0.167 | 0.00 | 0.01 | 5.1 | 280.5 | 2.431873759 | 26.01 | 2.10 | 2.032967759 | 107.8866627 | 181659 | 0 | 0.182 | 0.1817 |
| 0 | 0.167 | 0.01 | 0.01 | 5.1 | 280 | 2.43351765 | 26.01 | 2.10 | 2.027033138 | 106.422422 | 179193 | 0.179 | 0.361 | 0.361 |
| 1 | 0.500 | 0.01 | 0.02 | 5.1 | 277.5 | 2.441770555 | 26.01 | 2.09 | 1.997204648 | 99.35841343 | 501897 | 0.502 | 0.863 | 0.863 |
| 1 | 0.500 | 0.02 | 0.03 | 5.1 | 274 | 2.453419112 | 26.01 | 2.08 | 1.955005821 | 90.15832222 | 455424 | 0.455 | 1.318 | 1.318 |
| 2 | 3.5 | 0.03 | 0.08 | 5.1 | 268.5 | 2.471950231 | 26.01 | 2.06 | 1.887642394 | 77.20446081 | 2729921 | 2.730 | 4.048 | 4.048 |
| 5 | 5.0 | 0.08 | 0.17 | 5.1 | 260 | 2.501146359 | 26.01 | 2.04 | 1.780947231 | 60.38752508 | 3050401 | 3.050 | 7.098 | 7.098 |
| 10 | 5.0 | 0.17 | 0.25 | 5.1 | 250 | 2.536390153 | 26.01 | 2.01 | 1.651264005 | 44.79855492 | 2262943 | 2.263 | 9.361 | 9.361 |
| 15 | 5.0 | 0.25 | 0.33 | 6.55 | 242.5 | 2.563481778 | 42.90 | 2.56 | 1.624061556 | 42.07862659 | 2125549 | 2.126 | 11.487 | 11.487 |
| 20 | 5.0 | 0.33 | 0.42 | 8 | 230 | 2.609943886 | 64.00 | 3.07 | 1.735436522 | 54.37966427 | 2746921 | 2.747 | 14.234 | 14.234 |
| 25 | 5.0 | 0.42 | 0.50 | 8 | 217.5 | 2.658121299 | 64.00 | 3.01 | 1.578374222 | 37.87688205 | 1913304 | 1.913 | 16.147 | 16.147 |
| 30 | 15.0 | 0.50 | 0.75 | 8 | 206.5 | 2.702013 | 64.00 | 2.96 | 1.433211892 | 27.11514253 | 4109063 | 4.109 | 20.256 | 20.256 |
| 45 | 15.0 | 0.75 | 1.00 | 8 | 207 | 2.6999865 | 64.00 | 2.96 | 1.439956147 | 27.53950611 | 4173372 | 4.173 | 24.430 | 24.430 |
| 60 | 30.0 | 1.00 | 1.50 | 8 | 218.5 | 2.654201749 | 64.00 | 3.01 | 1.591242813 | 39.01600634 | 11825070 | 11.825 | 36.255 | 36.255 |
| 90 | 30.0 | 1.50 | 2.00 | 8 | 221.5 | 2.642512148 | 64.00 | 3.03 | 1.629527827 | 42.61159856 | 12914831 | 12.915 | 49.170 | 49.170 |
| 120 | 120.0 | 2.00 | 4.00 | 8 | 221 | 2.644453259 | 64.00 | 3.03 | 1.623180232 | 41.99332201 | 50909768 | 50.910 | 100.079 | 100.079 |
| 240 | 120.0 | 4.00 | 6.00 | 8 | 220 | 2.648344049 | 64.00 | 3.02 | 1.610445242 | 40.77981409 | 49438596 | 49.439 | 149.518 | 149.518 |
| 360 | 120.0 | 6.00 | 8.00 | 8 | 219 | 2.652246305 | 64.00 | 3.02 | 1.597656988 | 39.59651714 | 48004050 | 48.004 | 197.522 | 197.522 |
| 480 | 120.0 | 8.00 | 10.00 | 8 | 215 | 2.667971008 | 64.00 | 3.00 | 1.545966601 | 35.15334048 | 42617453 | 42.617 | 240.139 | 240.139 |
| 600 | 120.0 | 10.00 | 12.00 | 8 | 208.5 | 2.693925199 | 64.00 | 2.97 | 1.460104381 | 28.84724753 | 34972387 | 34.972 | 275.112 | 275.112 |
| 720 | 120.0 | 12.00 | 14.00 | 8 | 203 | 2.716284123 | 64.00 | 2.95 | 1.385604335 | 24.29989153 | 29459490 | 29.459 | 304.571 | 304.571 |
| 840 | 120.0 | 14.00 | 16.00 | 8 | 198 | 2.736934937 | 64.00 | 2.92 | 1.316369513 | 20.71903446 | 25118309 | 25.118 | 329.690 | 329.690 |
| 960 | 240.0 | 16.00 | 20.00 | 8 | 192.5 | 2.76001656 | 64.00 | 2.90 | 1.238512267 | 17.31857949 | 41991671 | 41.992 | 371.681 | 371.681 |
| 1200 | 240.0 | 20.00 | 24.00 | 8 | 187.5 | 2.781340297 | 64.00 | 2.88 | 1.16615147 | 14.66059074 | 35546951 | 35.547 | 407.228 | 407.228 |
| 1440 | 720.0 | 24.00 | 36.00 | 8 | 180 | 2.813950943 | 64.00 | 2.84 | 1.05470673 | 11.34244624 | 82504734 | 82.505 | 489.733 | 489.733 |
| 2160 | 720.0 | 36.00 | 48.00 | 8 | 170 | 2.85864024 | 64.00 | 2.80 | 0.90050012 | 7.952434858 | 57845857 | 57.846 | 547.579 | 547.579 |
| 2880 | 1440.0 | 48.00 | 72.00 | 8 | 160 | 2.904771895 | 64.00 | 2.75 | 0.73959323 | 5.490264025 | 79872148 | 79.872 | 627.451 | 627.451 |
| 4320 | 2880.0 | 72.00 | 120.00 | 8 | 152.5 | 2.940359704 | 64.00 | 2.72 | 0.614318478 | 4.114513368 | 119715562 | 119.716 | 747.167 | 747.167 |
| 7200 | 3240.0 | 120.00 | 174.00 | 8 | 143.5 | 2.984233301 | 64.00 | 2.68 | 0.458561939 | 2.874497526 | 94090677 | 94.091 | 841.257 | 841.257 |
| 10440 | 3960.0 | 174.00 | 240.00 | 8 | 131.5 | 3.044809446 | 64.00 | 2.63 | 0.241233409 | 1.742743249 | 69721743 | 69.722 | 910.979 | 910.979 |
| 14400 | 7200.0 | 240.00 | 360.00 | 8 | 121.35 | 3.098000069 | 64.00 | 2.58 | 0.048335897 | 1.1177274 | 81303274 | 81.303 | 992.282 | 992.282 |
| 21600 | 7200.0 | 360.00 | 480.00 | 8 | 114.225 | 3.136462245 | 64.00 | 2.55 | -0.09229352 | 0.808549245 | 58813715 | 58.814 | 1051.096 | 1051.096 |
| 28800 | 7200.0 | 480.00 | 600.00 | 8 | 106.975 | 3.176592046 | 64.00 | 2.52 | -0.24000228 | 0.575436914 | 41857170 | 41.857 | 1092.953 | 1092.953 |
| 36000 | 7200.0 | 600.00 | 720.00 | 8 | 101.6 | 3.207012668 | 64.00 | 2.49 | -0.35261926 | 0.443997723 | 32296308 | 32.296 | 1125.249 | 1125.249 |

| Model term | Value |
|---|---|
| Intercept | 14.69039 |
| pHa | 0 |
| 1000/T (K-1) | -4.645366 |
| pHa squared | 0.044554 |
| pHa/(1000/T) | -1.20131 |

| Min | Time (hrs) | Submerged (thick) | Not-Submerged (thin) | Total Al Release |
|---|---|---|---|---|
| 0.33 | 0.006 | 0.087306 | 0.1817 | 0.2690 |
| 0.50 | 0.0 | 0.2 | 0.36 | 0.58 |
| 1.00 | 0.0 | 0.7 | 0.86 | 1.55 |
| 1.50 | 0.0 | 1.2 | 1.32 | 2.55 |
| 5.00 | 0.1 | 5.4 | 4.05 | 9.46 |
| 10.00 | 0.2 | 11.6 | 7.10 | 18.68 |
| 15.00 | 0.3 | 17.4 | 9.36 | 26.72 |
| 20.00 | 0.3 | 20.7 | 11.49 | 32.17 |
| 25.00 | 0.4 | 22.7 | 14.23 | 36.91 |
| 30.00 | 0.5 | 24.4 | 16.15 | 40.53 |
| 45.00 | 0.8 | 28.4 | 20.26 | 48.69 |
| 60.00 | 1.0 | 31.7 | 24.43 | 56.14 |
| 90.00 | 1.5 | 37.8 | 36.25 | 74.09 |
| 120.00 | 2.0 | 43.7 | 49.17 | 92.89 |
| 240.00 | 4.0 | 65.1 | 100.08 | 165.16 |
| 360.00 | 6.0 | 83.4 | 149.52 | 232.90 |
| 480.00 | 8.0 | 98.1 | 197.52 | 295.65 |
| 600.00 | 10.0 | 109.9 | 240.14 | 350.06 |
| 720.00 | 12.0 | 120.0 | 275.11 | 395.15 |
| 840.00 | 14.0 | 128.7 | 304.57 | 433.26 |
| 960.00 | 16.0 | 136.1 | 329.69 | 465.76 |
| 1200.00 | 20.0 | 148.6 | 371.68 | 520.30 |
| 1440.00 | 24.0 | 159.1 | 407.23 | 566.29 |
| 2160.00 | 36.0 | 183.3 | 489.73 | 673.03 |
| 2880.00 | 48.0 | 200.6 | 547.58 | 748.19 |
| 4320.00 | 72.0 | 225.9 | 627.45 | 853.36 |
| 7200.00 | 120.0 | 269.4 | 747.17 | 1016.58 |
| 10440.00 | 174.0 | 309.8 | 841.26 | 1151.02 |
| 14400.00 | 240.0 | 344.0 | 910.98 | 1255.02 |
| 21600.00 | 360.0 | 390.7 | 992.28 | 1383.03 |
| 28800.00 | 480.0 | 429.0 | 1051.10 | 1480.14 |
| 36000.00 | 600.0 | 458.7 | 1092.95 | 1551.67 |
| 43200.00 | 720.0 | 482.3 | 1125.25 | 1607.59 |



Volume of water 1492064.774 kg / liters

Case 1B
Break Break S2

| Source of Material Release | Quantity of Material Released (kg) | | |
|---|---|---|---|
| | Ca | Si | Al |
| Aluminum Metal Submerged | 0.000 | 0.000 | 482.340 |
| Aluminum Metal Not-Submerged | 0.000 | 0.000 | 1,125.249 |
| Concrete | 42.758 | 1.424 | 0.459 |
| E-glass (Fiberglass, Nukon) | 13.828 | 84.986 | 3.072 |
| Calcium Silicate (Cal-Sil, Marinite) | 233.610 | 242.929 | 0.000 |
| | | | |
| TOTAL Released Material | 290.195 | 329.340 | 1,611.119 |
| | | | |
| Concentration in the sump (mg/kg (mass dissolved divided by the sump pool mass) | 194.492 | 220.728 | 1,079.792 |

Si as $SiO_2$

MW Si 28.086
MW $SiO_2$ 60.085

704.564 kg

472.207 mg/kg

| Precipitate | Mass of Precipitate | | Concentration of Precipitate | |
|---|---|---|---|---|
| $NaAlSi_3O_8$ | 1,024.247 | kg | 686.463 | mg/kg |
| AlOOH | 3,342.722 | kg | 2,240.333 | mg/kg |
| $Ca_3(PO_4)_2$ | 0.000 | kg | 0.000 | mg/kg |
| TOTAL | 4,366.969 | kg | 2,926.796 | mg/kg |

| Source of Material Release | Mass of Precipitate (kg) | | | |
|---|---|---|---|---|
| | $Ca_3(PO_4)_2$ | $NaAlSiO_8$ | AlOOH | Total |
| Aluminum Metal Submerged | 0.000 | 153.320 | 1,000.750 | 1,154.070 |
| Aluminum Metal Not-Submerged | 0.000 | 357.681 | 2,334.648 | 2,692.329 |
| Concrete | 0.000 | 2.360 | 0.952 | 3.312 |
| E-glass (Fiberglass, Nukon) | 0.000 | 133.130 | 6.373 | 139.503 |
| Calcium Silicate (Cal-Sil, Marinite) | 0.000 | 377.755 | 0.000 | 377.755 |
| | | | | |
| TOTAL Precipitate | 0.000 | 1,024.247 | 3,342.722 | 4,366.969 |

| | | |
|---|---|---|
| Density of aluminum | 2.6989 | $g/cm^3$ |
| square feet to square cm | 929.03 | cm2/ft2 |
| cm to mils | 393.70 | mil/cm |

| | | |
|---|---|---|
| Area - submerged | 31,952 | $ft^2$ |
| Area - submerged | 29,684,088 | $cm^2$ |
| Aluminum dissolved | 482,340 | grams |
| Aluminum dissolved | 178,717 | $cm^3$ |
| | | |
| Reduction in thickness | 0.0060 | cm |
| Reduction in thickness | 2.3703 | mils |
| | | |
| Corrosion rate | 28.8390 | mils/year |
| | | |
| Original mass of aluminum | 1,634 | pounds |
| | 741 | kg |
| Fraction of mass dissolved | 65.1% | |

| | | |
|---|---|---|
| Area - not submerged | 108,745 | $ft^2$ |
| Area - not submerged | 101,027,367 | $cm^2$ |
| Aluminum dissolved | 1,125,249 | grams |
| Aluminum dissolved | 416,929 | $cm^3$ |
| | | |
| Reduction in thickness | 0.0041 | cm |
| Reduction in thickness | 1.6248 | mils |
| | | |
| Corrosion rate | 19.7679 | mils/year |
| | | |
| Original mass of aluminum | 5,756 | pounds |
| | 2,611 | kg |
| Fraction of mass dissolved | 43.1% | |

| Dissolved Chemicals (kg) | | | Precipitate (kg) |
|---|---|---|---|
| Ca | Si | Al | |
| 290.195 | 329.340 | 1,611.119 | 4,366.969 |

| Si (g) | Si (ppm) | $SiO_2$ (g) | $SiO_2$ (ppm) |
|---|---|---|---|
| 329,340 | 221 | 704,564 | 472 |

**ENCLOSURE 2**

**LICENSE AMENDMENT REQUEST:**

**CONTAINMENT SUMP BUFFERING AGENT AND WEIGHT REQUIREMENTS**

OPERATING LICENSE PAGE CHANGE INSTRUCTIONS
and
REVISED TECHNICAL SPECIFICATIONS TABLE OF CONTENTS PAGE ii
and
REVISED TECHNICAL SPECIFICATIONS PAGE
3.5.5-1

3 Pages Follow

## ATTACHMENT TO LICENSE AMENDMENT NO.

## FACILITY OPERATING LICENSE NO. DPR-20

## DOCKET NO. 50-255

Remove the following page of Appendix A Technical Specifications and replace with the attached revised page. The revised page is identified by amendment number and contains marginal lines indicating the areas of change.

| REMOVE | INSERT |
|---|---|
| Table of Contents page ii | Table of Contents page ii |
| 3.5.5-1 | 3.5.5-1 |

## 3.4 PRIMARY COOLANT SYSTEM (PCS)



## 3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)



## 3.6 CONTAINMENT SYSTEMS



## 3.7 PLANT SYSTEMS

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.5 Containment Sump Buffering Agent and Weight Requirements

LCO 3.5.5 Buffer baskets shall contain ≥ 8,186 lbs and ≤10,553 lbs of Sodium Tetraborate Decahydrate (STB) $Na_2B_4O_7 \cdot 10H_2O$.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|---|---|---|
| A. STB not within limits. | A.1 Restore STB to within limits. | 72 hours |
| B. Required Action and associated Completion Time not met. | B.1 Be in MODE 3.<br>AND<br>B.2 Be in MODE 4. | 6 hours<br><br>30 hours |

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE | | FREQUENCY |
|---|---|---|
| SR 3.5.5.1 | Verify the STB baskets contain ≥ 8,186 lbs and ≤10,553 lbs of equivalent weight sodium tetraborate decahydrate. | 18 months |
| SR 3.5.5.2 | Verify that a sample from the STB baskets provides adequate pH adjustment of borated water. | 18 months |

**ENCLOSURE 3**

**LICENSE AMENDMENT REQUEST:**

**CONTAINMENT SUMP BUFFERING AGENT AND WEIGHT REQUIREMENTS**

MARK-UP OF TECHNICAL SPECIFICATIONS PAGES

TABLE OF CONTENTS page ii

and

page 3.5.5-1

(showing proposed changes)

(additions are underlined; deletions are strikethrough)

2 Pages Follow

## 3.4 PRIMARY COOLANT SYSTEM (PCS)



## 3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)



## 3.6 CONTAINMENT SYSTEMS



## 3.7 PLANT SYSTEMS

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.5 ~~Trisodium Phosphate (TSP)~~ Containment Sump Buffering Agent and Weight Requirements

LCO 3.5.5 ~~The TSP baskets shall contain ≥ 8,300 lbs and ≤ 11,000 lbs of active TSP.~~ Buffer baskets shall contain ≥ 8,186 lbs and ≤10,553 lbs of Sodium Tetraborate Decahydrate (STB) $Na_2B_4O_7 \cdot 10H_2O$.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|---|---|---|
| A. ~~TSP~~ STB not within limits. | A.1 Restore ~~TSP~~ STB to within limits. | 72 hours |
| B. Required Action and associated Completion Time not met. | B.1 Be in MODE 3.<br>AND<br>B.2 Be in MODE 4. | 6 hours<br><br>30 hours |

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE | | FREQUENCY |
|---|---|---|
| SR 3.5.5.1 | Verify the ~~TSP~~ STB baskets contain ≥ ~~8,300~~ 8,186 lbs and ≤ ~~11,000~~ 10,553 lbs of ~~TSP~~ equivalent weight sodium tetraborate decahydrate. | 18 months |
| SR 3.5.5.2 | Verify that a sample from the ~~TSP~~ STB baskets provides adequate pH adjustment of borated water. | 18 months |